

Child labor and severe functioning difficulties and disability in Mexican children and adolescents 5-17 years of age

Aremis Villalobos, PhD,⁽¹⁾ Filipa de Castro, PhD,⁽¹⁾ Rosalba Rojas, DSc,⁽¹⁾ Betania Allen-Leigh, PhD,⁽¹⁾ Celia Hubert, PhD,⁽²⁾ Diana Avendaño-Badillo, MD, MSc,⁽³⁾ Martín Romero, DSc,⁽⁴⁾ Agustín Vázquez-García, MA,⁽⁵⁾ Tonatiuh Barrientos-Gutiérrez, DSc,⁽⁶⁾ Eduardo Lazcano-Ponce, DSc.⁽⁷⁾

Villalobos A, de Castro F, Rojas R, Allen-Leigh B, Hubert C, Avendaño-Badillo D, Romero M, Vázquez-García A, Barrientos-Gutiérrez T, Lazcano-Ponce E. Child labor and severe functioning difficulties and disability in Mexican children and adolescents 5-17 years of age. *Salud Publica Mex* 2017;59:380-388.

<https://doi.org/10.21149/8483>

Villalobos A, de Castro F, Rojas R, Allen-Leigh B, Hubert C, Avendaño-Badillo D, Romero M, Vázquez-García A, Barrientos-Gutiérrez T, Lazcano-Ponce E. Trabajo infantil y dificultades severas de funcionamiento y discapacidad en niños y adolescentes mexicanos de 5-17 años. *Salud Publica Mex* 2017;59:380-388.

<https://doi.org/10.21149/8483>

Abstract

Objective. To describe the characteristics of Mexican children and adolescents 5-17 years with severe functioning difficulties and disability and explore their participation in child labor. **Materials and methods.** Using data from the National Survey of Boys, Girls and Women in Mexico 2015 we estimated prevalence of functioning difficulties and disability and used logistic regression to explore the association between this condition and child labor. **Results.** While 11.2% of Mexicans 5-17 years-old has severe functioning difficulties or disability, 13.4% work. The functioning difficulty and disability domains with the highest prevalence are experiencing anxiety (5.4%) and depression (1.5%) daily. Children and adolescents with severe functioning difficulties and disability are 70% more likely to do child labor [OR=1.7, 95%CI:1.2,2.4]. Educational lag doubles the likelihood of doing child labor [OR=2.2, 95%CI:1.5,3.3]. **Conclusions.** Guaranteeing educational opportunities and respect for the rights of children with severe functioning difficulties and disability is essential to achieve development of their full potential.

Keywords: child; adolescent; disabled children; International Classification of Functioning, Disability and Health; child labor; Mexico

Resumen

Objetivo. Describir la población mexicana de 5-17 años con problemas severos de funcionamiento y discapacidad y explorar su realización de trabajo infantil. **Material y métodos.** Basado en la Encuesta Nacional de Niños, Niñas y Mujeres 2015, se estimaron prevalencias de problemas de funcionamiento y discapacidad y se exploró la relación con el trabajo infantil en un modelo de regresión logística. **Resultados.** El 11.2% de los mexicanos de 5-17 años tiene dificultades severas de funcionamiento o discapacidad y 13.4% realiza trabajo infantil. Los ámbitos con la mayor prevalencia fueron ansiedad (5.4%) y depresión (1.5%) experimentadas diariamente. Niños y adolescentes con problemas severos de funcionamiento o discapacidad tienen 70% más posibilidades de realizar trabajo infantil [RM=1.7, IC95%:1.2,2.4]. El rezago educativo duplica las posibilidades de realizar trabajo infantil [RM=2.2, IC95%:1.5,3.3]. **Conclusiones.** Es imprescindible garantizar oportunidades educativas y respeto a los derechos de la población infantil con problemas de funcionamiento y discapacidad para lograr su desarrollo integral.

Palabras clave: niño; adolescente; niños con discapacidad; Clasificación Internacional del Funcionamiento de la Discapacidad y de la Salud; trabajo de menores; México

(1) Dirección de Salud Reproductiva, Centro de Investigación en Salud Poblacional, Instituto Nacional de Salud Pública. México.

(2) Conacyt, Dirección de Salud Reproductiva, Instituto Nacional de Salud Pública. México.

(3) Instituto Nacional de Rehabilitación. México.

(4) Centro de Encuestas, Instituto Nacional de Salud Pública. México.

(5) Departamento de Producción Económica, Universidad Autónoma Metropolitana, campus Xochimilco. México.

(6) Dirección de Salud Reproductiva, Centro de Investigación en Salud Poblacional, Instituto Nacional de Salud Pública. México.

(7) Centro de Investigación en Salud Poblacional, Instituto Nacional de Salud Pública. México.

Received on: January 9, 2017 • Accepted on: May 30, 2017

Corresponding author: Dr. Betania Allen-Leigh. Dirección de Salud Reproductiva. Centro de Investigación en Salud Poblacional, Instituto Nacional de Salud Pública. 7a. Cerrada de Fray Pedro de Gante 50, col. Sección XVI Tlalpan. 14080 Ciudad de México, México.

E-mail: ballen@insp.mx

An estimated 785 million people (15.6% of the total population) worldwide 15 years old or over live with some type of disability, of whom 110 millions have severe functioning difficulties. In addition, an estimated 95 million girls and boys have a functioning difficulty or disability, of whom 13 million have a severe disability.¹ In Mexico, the 2012 National Survey on Household Income and Expenses (ENIGH, using the Spanish acronym) estimated that approximately 564 000 children under 14 years old had difficulties carrying out daily activities.² Data from the 2014 National Survey on Demographic Dynamics (ENADID) estimated that 1.9% of minors under 18 years old in Mexico had a disability and 4.8% had a functional difficulty.³

In general the evidence has shown that people with a functioning difficulty or disability tend to live in households that compared to the average have greater poverty, less education, lower employment rates, poorer health and in general worse living conditions. Children with a functioning difficulty or disability in particular can experience a variety of disadvantages and types of exclusion, such as greater participation in child labor and reduced access to education and health services, all of which can have an impact on future opportunities and their potential in general.^{4,5}

However, there is a dearth of published or grey literature about the relationship between functioning difficulties or disabilities in children and child labor, including any possible associations with educational attainment. Such data is important for a variety of reasons; to begin with, child labor has been found to have a negative impact on children's development⁶ as well as on health during childhood, adolescence and adulthood.⁶⁻⁸ Moreover, child labor is recognized as a violation of children's rights and can imply immediate and serious danger to children's safety as well as curtail their education.^{4,9} Although the relationship between child labor and education is complex, child labor is often associated with inadequate educational opportunities and attainment;^{7,8} in Latin America child labor has been found to result in lower test scores in mathematics and language.¹⁰ In the specific case of children with a functioning difficulty or disability, they have fewer possibilities of starting or staying in school as compared to those without such difficulties or disability.¹ The issue of educational enrollment and attainment is of utmost importance given that research has found a causal impact of education on health and mortality.¹¹ Since both lack of school enrollment and poverty are associated with child labor,⁷ there are worrisome indications of a vicious cycle of limited education and poverty for those who do child labor, perhaps especially for children who have a functioning difficulty or disability.⁵

Given the above, research exploring these relationships and associations are needed in order to position the issue of child labor (specifically among children with functioning difficulties or disabilities, and also among children in general) in the national and international political agenda and for developing related evidence-based policies (including laws and social programs). Such policies are important for two reasons. First, laws on compulsory school attendance and those limiting child labor can contribute to increased years of education and decreased educational inequality¹² (and given the cited causal impact of education on health and mortality, could thereby increase health and decrease early mortality). Second, that social policies such as poverty reduction programs have been found to increase educational attainment and decrease child labor.^{13,14} Data about general prevalence of functioning difficulty and disability among children and specifically on associations with child labor could be a first step in developing evidence-based policies aimed at guaranteeing these children's rights and providing services.

The first objective of this article is to describe Mexican children and adolescents 5 to 17 years old who have severe functioning difficulties or disabilities, based on current information measured by an instrument developed by international experts. This description will provide context for our second objective, which is to measure the prevalence of child labor among children in this age group in Mexico and explore any associations with severe functioning difficulties or disabilities. In addition, we explore associations with educational lags. Our hypothesis is that children who do child labor will tend to have severe functioning difficulties or disabilities as well as an educational lag.

Materials and methods

We used data from the National Survey of Boys, Girls and Women in Mexico 2015. The Ethics Committee of the National Institute of Public Health of Mexico approved the survey research protocol, letters of consent and instruments. This was a probabilistic, multi-stage, cluster, household survey that is representative at the national and regional levels and for rural and urban areas. A detailed description of the survey methodology can be found elsewhere.¹⁵ The data used in this analysis were collected with two questionnaires: the first on household characteristics was applied to an adult member of the household; the second on functioning difficulties and disability of the child or adolescent was applied to the child's or adolescent's mother, except for emancipated adolescents (who live without a guardian) in which case they responded to the questionnaire themselves.

The first questionnaire collected information about the household, including education levels for all members and child labor done by a randomly selected household member 5 to 17 years old. The second instrument included 40 questions that evaluate the type and level of functioning difficulties and disability in 14 domains; this questionnaire is based on the International Classification of Functioning, Disability and Health (ICF).¹⁶

The initial data analysis explored prevalence of functioning difficulty and disability in general as well as within specific domains, among a representative sample of 11 607, 5-17 year-old Mexican children and adolescents. A subsample of 4 655 children and adolescents with information on child labor was then analyzed. Percentages and 95% confidence intervals (CI) were calculated, bivariate comparisons and Wald tests for independence¹⁷ were done and a logistic regression model was constructed to test the associations between child labor and severe functioning difficulties and disabilities. Given the possibility that wealth index (socio-economic level) is strongly correlated to the other variables in the model (specifically child labor and educational lag), in the logistic regression model, we first analyzed the data adjusting by wealth index. Next we did the analysis eliminating wealth index from the model; the results obtained were extremely similar and we include the analysis that eliminates wealth index. Statistical analysis took into account the complex sample design, using the functioning difficulty and disability survey sample weight for analysis of this data and a scaled weight for analyzing the number of 5-17 year-olds for whom child labor data was collected. Analysis was done in Stata SE 12.1.

The main variables in this analysis were defined as follows:

Functioning difficulties and disability was defined as severe difficulties in functioning in at least one of the following domains: seeing, hearing, walking, feeding or dressing, being understood inside the home, being understood outside the home, learning, remembering, focusing, accepting change, making friends, controlling behavior, anxiety and depression. To generate the functioning difficulties and disability variable the questions on these domains were combined; greater detail about this variable can be found elsewhere in this issue.¹⁸

Socio-economic status was divided into three categories –low, middle and high; greater detail about the wealth index this was based on can be consulted elsewhere in this issue.¹⁹

Educational lag assesses the progress of a student in the school system calculating schooling-for-age. We estimated years of completed schooling and we calculated the difference between schooling-for-age with the child's

actual age, and the normal age in a given grade (year in school). All differences higher than one are considered over-age students, which mean that their progress in the school system is below the normal performance because of grade repetition, late entry, or dropping out. In sum, educational lag indicates students over the normal age for the grade they are currently in.

Child labor was defined according to the MICS survey criteria, which are defined by UNICEF, are internationally comparable and are based on the International Labor Organization conventions.²⁰ Child labor is defined as carrying out housework above specified thresholds (any done by children under twelve, adolescents 12-14 years old who do 28 or more hours and adolescents 15-17 years old who do 43 or more hours per week), economic activity above the minimum specified number of hours for their age (an hour or more for children under twelve, 14 or more hours for adolescents 12-14 years old and 43 or more hours per week for adolescents 15-17 years old) or when the minor works in dangerous conditions.

Results

Socio-demographic and educational characteristics of children and adolescents with severe functioning difficulties and disability

Prevalence of severe functioning difficulties and disability in at least one domain is 11.2% among Mexican children and adolescents 5 to 17 years old and was higher in boys (12.7%, 95%CI 11.3,14.2) than in girls (9.7%, 95%CI 8.5,11.1) (table I). The domains with the highest prevalence are experiencing anxiety (5.5%, 95%CI 4.8,6.2) daily, having difficulty controlling behavior (5.2%, 95%CI 4.4,6.0) or experiencing depression (1.5%, 95%CI 1.2,1.9) daily. Difficulty controlling behavior was significantly greater among boys (6.9%, 95%CI 5.8,8.1) than girls (3.4%, 95%CI 2.6,4.4) (table I).

The socio-demographic characteristics associated with severe functioning difficulties and disability included a greater proportion of homes with a female head of household (29.1%, 95%CI 24.9,33.7 vs. 21.5%, 19.5,23.7) and heads of household with only a primary school education (38.7%, 95%CI 34.0,43.5 vs. 30.3%, 95%CI 27.8,32.9) (table II).

More children and adolescents with severe functioning difficulties and disability attended special education (19.0%, 95%CI 15.3,23.4) than those without this condition (11.1%, 95%CI 9.2,13.3) (table III). Fewer children and adolescents with severe functioning difficulties and disability had attended school in the previ-

Table I
PREVALENCE OF SEVERE FUNCTIONING DIFFICULTIES OR DISABILITY, BY SEX, IN MEXICAN CHILDREN AND ADOLESCENTS 5 TO 17 YEARS OLD (N=11 607). MEXICO, 2015

Domain of functioning difficulty or disability	Boys n= 5 890		Girls n= 5 717		Total n= 11 607	
	%	95%CI	%	95%CI	%	95%CI
Severe difficulties in:						
Seeing	0.681	[0.435,1.064]	0.995	[0.658,1.503]	0.836	[0.612,1.139]
Hearing	0.238	[0.134,0.422]	0.24	[0.116,0.495]	0.239	[0.147,0.388]
Walking	1.123	[0.795,1.584]	0.583	[0.410,0.829]	0.857	[0.662,1.108]
Feeding or dressing	0.561	[0.384,0.818]	0.329	[0.198,0.545]	0.447	[0.329,0.606]
Being understood inside the household	0.653	[0.475,0.897]	0.631	[0.375,1.058]	0.642	[0.474,0.869]
Being understood outside the household	1.239	[0.892,1.719]	0.73	[0.517,1.031]	0.988	[0.778,1.254]
Learning	2.481	[1.990,3.090]	1.238	[0.912,1.679]	1.869	[1.548,2.256]
Remembering	1.723	[1.326,2.236]	0.894	[0.636,1.256]	1.315	[1.073,1.611]
Controlling behavior (a lot more than other children)	6.881	[5.853,8.076]	3.381	[2.557,4.457]	5.157	[4.451,5.969]
Focusing	1.561	[1.125,2.163]	1.082	[0.713,1.639]	1.325	[1.018,1.724]
Accepting change	2.34	[1.700,3.214]	1.2	[0.883,1.629]	1.778	[1.416,2.232]
Making friends	1.945	[1.439,2.624]	1.606	[1.215,2.122]	1.778	[1.455,2.171]
Experiencing anxiety daily	6.142	[5.108,7.368]	4.758	[3.954,5.716]	5.46	[4.771,6.242]
Experiencing depression daily	1.392	[0.978,1.977]	1.703	[1.270,2.280]	1.545	[1.229,1.940]
Severe functioning difficulties or disability in at least one domain	12.668	[11.289,14.188]	9.75	[8.523,11.132]	11.231	[10.272,12.266]

ous school year (9.4% did not vs. 5.9% among children without a severe functioning difficulties and disability), fewer attended school in the current school year (9.8 vs. 6.4%) and more had an educational lag (8.0 vs. 4.9%).

Child labor among children and adolescents with severe functioning difficulties and disability

Of Mexican children and adolescents 5 to 17 years old in general (i.e., with or without severe functioning difficulties and disability), 13.4% do child labor, principally dangerous work (8.5%) and economic activities outside the home above the threshold specified or their age (7.5%), with only 0.6% doing housework above the specified thresholds (table IV).

Children and adolescents with severe functioning difficulties and disability have a 70% greater likelihood of doing child labor (OR=1.7, 95%CI: 1.2,2.4) as compared to those without these difficulties (table V). Boys and male adolescents have an 80% greater likelihood of doing child labor as compared to girls and female adolescents (OR=1.8, 95%CI: 1.5,2.3). Older adolescents (those 15-19 years old) had twice the likelihood of doing child labor than those who were younger (OR=2.0, 95%CI: 1.4,2.7). Having an educational lag increased

the likelihood of doing child labor; children with an educational lag had twice the likelihood of doing child labor than those without (OR=2.2,95%CI: 1.5,3.3). Living in urban areas reduced the likelihood that children and adolescents do child labor by 60% as compared with their rural peers (OR=0.4, 95%CI: 0.3,0.5).

Discussion

This study shows that 11.2% of Mexican children and adolescents 5 to 17 years old have severe functioning difficulties or disability in at least one of the measured domains and that the prevalence is higher in boys than girls. Comparison of these results with other studies is difficult given that there are few population-based surveys on this topic, the age groups studied are often quite different and above all because the way functioning difficulties and disability are measured by different instruments varies a great deal. In spite of this, in other studies a higher prevalence of functioning difficulties and disability has also been found in boys and young men as compared to girls.^{21,22} Keeping the differences in surveys in mind, a comparison shows that the survey reported on here found a higher prevalence of functioning difficulties and disability in children and adolescents living in homes with female heads of household as well

Table II
SOCIO-DEMOGRAPHIC CHARACTERISTICS OF MEXICAN CHILDREN AND ADOLESCENTS 5-17 YEARS OLD WITH AND WITHOUT SEVERE FUNCTIONING DIFFICULTIES AND DISABILITY (N=11 607). MEXICO, 2015

Children and adolescents with severe functioning difficulties or disability in at least one domain

	N,%[CI]*=	No		Yes		Total	p-value
		10 304 %	88.8[87.7,89.7] 95%CI	1 303 %	11.2[10.3,12.3] 95%CI	11 607 95%CI	
Sex							
Male		49.9	[48.0,51.9]	57.2	[52.9,61.5]	50.7	[48.9,52.6]
Female		50.1	[48.1,52.0]	42.8	[38.5,47.1]	49.3	[47.4,51.1]
Age group							
5-9 years		37.7	[35.8,39.6]	39.1	[34.8,43.5]	37.9	[36.1,39.7]
10-14 years		41.4	[39.4,43.4]	42	[37.7,46.3]	41.5	[39.6,43.3]
15-17 years		20.9	[19.4,22.5]	19	[16.0,22.4]	20.7	[19.3,22.2]
Mother's education							
None		4	[3.2,5.0]	4.3	[2.9,6.2]	4	[3.3,5.0]
Primary		26.8	[24.4,29.2]	31.1	[27.1,35.4]	27.2	[25.0,29.6]
Lower secondary		40.4	[37.5,43.4]	36.3	[31.6,41.3]	40	[37.3,42.7]
Upper secondary		17.2	[15.3,19.3]	18.9	[15.0,23.5]	17.4	[15.6,19.4]
Tertiary		11.2	[8.5,14.5]	9	[6.8,11.8]	10.9	[8.5,13.9]
Undetermined		0.4	[0.3,0.6]	0.4	[0.1,1.3]	0.4	[0.3,0.6]
Sex of head of household							
Male		78.5	[76.3,80.5]	70.9	[66.3,75.1]	77.7	[75.6,79.6]
Female		21.5	[19.5,23.7]	29.1	[24.9,33.7]	22.3	[20.4,24.4]
Ethnicity of head of household							
Indigenous		9.5	[7.1,12.7]	8.2	[5.9,11.4]	9.4	[7.1,12.4]
Non indigenous		90.4	[87.2,92.8]	91.8	[88.6,94.1]	90.6	[87.6,92.9]
Head of household's education							
None		6.5	[5.4,7.8]	6.5	[4.8,8.6]	6.5	[5.5,7.7]
Primary		30.3	[27.8,32.9]	38.7	[34.0,43.5]	31.2	[28.9,33.7]
Lower secondary		32.7	[30.0,35.4]	28.3	[24.4,32.6]	32.2	[29.7,34.7]
Upper secondary		17.8	[15.7,20.2]	18.8	[14.7,23.8]	18	[15.9,20.2]
Tertiary		12.6	[9.5,16.5]	7.7	[5.6,10.6]	12.1	[9.2,15.6]
Socioeconomic status							
Low		45	[41.4,48.7]	47	[42.2,52.0]	45.3	[41.8,48.7]
Middle		20.4	[18.1,22.8]	24.9	[20.3,30.2]	20.9	[18.6,23.4]
High		34.6	[30.9,38.4]	28	[23.9,32.6]	33.8	[30.5,37.4]
Region							
Northwest		20.1	[16.8,23.8]	18.2	[13.8,23.7]	19.9	[16.6,23.6]
Northeast		23	[20.3,26.0]	16.8	[13.5,20.6]	22.3	[19.8,25.1]
Center		15.7	[12.5,19.5]	14.3	[11.8,17.3]	15.6	[12.6,19.0]
Mexico City & Mexico State		19.2	[16.6,22.2]	25	[20.7,29.8]	19.9	[17.2,22.8]
South		22	[19.4,24.8]	25.7	[21.5,30.4]	22.4	[19.9,25.0]
Area							
Urban		73.3	[69.6,76.8]	76	[71.2,80.3]	73.6	[70.0,77.0]
Rural		26.7	[23.2,30.4]	24	[19.7,28.8]	26.4	[23.0,30.0]

* CI= Confidence Interval

Table III
EDUCATIONAL CHARACTERISTICS OF MEXICAN CHILDREN AND ADOLESCENTS 5-17 YEARS OLD WITH AND WITHOUT SEVERE FUNCTIONING DIFFICULTIES AND DISABILITY (N=11 607). MEXICO, 2015

Children and adolescents with severe functioning difficulties or disability in at least one domain

	No 10 303.50		Yes 1 303.5		Total 11 607		p-value
	%	95%CI*	%	95%CI	%	95%CI	
Attended special education [‡]							
Yes	11.1	[9.2,13.3]	19	[15.3,23.4]	12	[10.0,14.2]	
No	88.9	[86.7,90.8]	81	[76.6,84.7]	88	[85.8,90.0]	<.0001
Attended school during the previous school year (2014 -2015)							
Yes	94	[93.2,94.8]	90.6	[88.0,92.7]	93.7	[92.9,94.4]	
No	5.9	[5.2,6.8]	9.4	[7.3,12.0]	6.3	[5.6,7.1]	0.0052
Attended school during the current school year (2015-2016)							
Yes	93.6	[92.4,94.6]	90.2	[87.0,92.7]	93.2	[92.1,94.2]	
No	6.4	[5.4,7.6]	9.8	[7.3,13.0]	6.8	[5.8,7.9]	0.0282
Educational lag [§]							
No educational lag	95.1	[94.2,95.8]	92	[89.6,93.9]	94.7	[93.9,95.5]	
With educational lag	4.9	[4.2,5.8]	8	[6.1,10.4]	5.3	[4.5,6.1]	0.0078

* CI= Confidence Interval

[‡] Mother's report of the child ever attending a special education school or a group within a regular school

[§] Schooling-for-age, educational lag indicates students over the normal age for the grade they are currently in

Table IV
CHILD LABOR (ECONOMIC ACTIVITIES AND HOUSEWORK) BY MEXICAN CHILDREN AND ADOLESCENTS (5-17 YEARS OLD) WITH AND WITHOUT SEVERE FUNCTIONING DIFFICULTIES AND DISABILITY (N=4 955). MEXICO, 2015

Children and adolescents with severe functioning difficulties or disability in at least one domain

	No %[95%CI*]	Yes %[95%CI]	Total % [95%CI]	p-value
Participates in...				
Housework at or above age-specific thresholds	0.4 [0.3,0.7]	2.2 [0.7,7.0]	0.6 [0.4,1.1]	0.1957
Economic activities at or above age-specific thresholds	7 [6.0,8.1]	11.1 [7.9,15.4]	7.5 [6.5,8.6]	0.0314
Involved in dangerous work	7.9 [6.9,8.9]	13 [9.0,18.4]	8.5 [7.4,9.6]	0.0362
Child labor (total)	12.5 [11.3,13.9]	19.4 [14.8,25.0]	13.4 [12.1,14.7]	0.0096

* CI= Confidence Interval

as homes where the head of the household has only a primary school education.

The domains of severe functioning difficulty and disability with the highest prevalence among Mexican children 5 to 17 years old were experiencing daily anxi-

ety and having difficulty controlling behavior, as well as a somewhat lower prevalence of daily depression. Anxiety disorders have been found to be associated with leaving school earlier.²³ Also, childhood-onset of mental disorders (including anxiety disorders, disorders relat-

Table V
LOGISTIC REGRESSION MODEL ON CHILD LABOR AMONG MEXICAN CHILDREN AND ADOLESCENTS (5-17 YRS)
WITH AND WITHOUT SEVERE FUNCTIONING DIFFICULTIES AND DISABILITY (N=4 955). MEXICO, 2015

		Crude OR* [95%CI‡]	p-value	Adjusted OR [95%CI]	p-value
Severe functioning difficulties and disability	No	1		1	
	Yes	1.7 [1.2,2.3]	0.002	1.7 [1.2,2.4]	0.001
Sex	Female	1		1	
	Male	1.8 [1.4,2.2]	<0.001	1.8 [1.5,2.3]	<0.001
Age group (years)	5-9	1		1	
	10-14	1.3 [1.0,1.7]	0.025	1.3 [0.99,1.7]	0.058
	15-19	2.3 [1.7,3.1]	<0.001	2.0 [1.4,2.7]	<0.001
Educational lag§	No	1		1	
	Yes	3.3 [2.4,4.7]	<0.001	2.2 [1.5,3.3]	<0.001
Urban residence	No	1		1	
	Yes	0.4 [0.3,0.5]	<0.001	0.4 [0.3,0.5]	<0.001

* OR= Odds Ratio

‡ CI= Confidence Interval

§ Schooling-for-age, educational lag indicates students over the normal age for the grade they are currently in

ing to controlling behavior and depression) has been found to be associated with not completing high school (with the same tendency for not completing primary school, but without statistical significance).²⁴ Research has yet to clarify the relationships between anxiety or depression and child labor; some authors theorize that child labor creates stress or trauma during childhood, which could lead to mental disorders at that time and later in life.²⁵

Systematic reviews show that improvements in depression and anxiety prevention programs (school-based or not)²⁶ as well as cognitive behavioral therapy and interpersonal psychotherapy²⁷ can be efficacious at reducing these important health problems. Either of these options (prevention programs or treatment) have the potential to reduce the possible contribution of these mental health issues on higher levels of child labor or of educational lag as well as their impact in adulthood.

This data shows important associations between educational issues and functioning difficulties and disability in Mexican children, as well as with child labor. Our data shows a to-be-expected association between functioning difficulties and disability and attending special education, since this type of school (or group within a regular school) was created specifically for children and young people with disabilities in order to promote their integral development and facilitate acquisition of skills and competencies needed to achieve their educational goals.²⁸ School attendance and educational lag were also associated with having a function-

ing difficulty or disability. This reflects the issues faced by children and adolescents a functioning difficulty or disability in terms of attending school and completing age-appropriate educational levels.^{1,29} Children and adolescents with functioning difficulties or disability may have special education needs which are not being met either in special educational facilities or a group or individualized program mainstreamed into a regular school, as well as health needs, all of which can affect both school attendance and educational lag.³⁰

In addition, we found that children and adolescents with an educational lag are more likely to be involved in child labor. This result is consistent with previously published studies that have documented that the population that does child labor also tends to have problems with educational achievement. On average, children and adolescents who work are two years behind their standard school year and only one of every four children who work concludes their basic education.^{31,32} This scenario is worrisome given that participation in education contributes to achieving social equity as well as constituting an opportunity for social integration and, evidently, acquiring skills and knowledge.^{33,34}

Our study also found that Mexican children and adolescents 5-17 years of age who do child labor, do principally dangerous work (8.5%) or work outside the home, with few doing housework or chores above the level indicated for their age. This is of interest because while some child labor can benefit the child,³⁵ this is not the case for dangerous work; some authors define

child labor as beneficial to children only if it does not impact their educational attainment (more years of education or acquisition of specific skills such as math or reading).³⁶

Our results show that among Mexican children and adolescents, there is an association between doing child labor and having a functional difficulty or disability; this has the potential to increase the inequalities that this group of children experiences. This is especially true given the social inequalities that families of children with functioning difficulties and disabilities experience. The evidence shows that when a household includes members with moderate or severe functioning difficulties, poor families are forced to spend a greater proportion of their income on healthcare than non-poor families. In addition, the direct and indirect costs associated with child functioning difficulties and disability are high.^{36,37}

Our findings around these different associations between child labor and educational lag, between disability and educational issues and between child labor and disability constitute an initial exploration of a possible cycle of disadvantage through an accumulation of vulnerabilities. More research and analysis is needed to explore the directionality of these associations.

These results provide an evidence base that shows how essential it is to guarantee children's opportunities and rights, including the most vulnerable groups. This implies developing public policy that takes into account social and economic factors and the diverse life circumstances of Mexican children and adolescents in order to promote their integral development and that each child reach his or her potential.

This survey has limitations including that measurement of functioning difficulties and disabilities is based on the mother's or principal caretaker's report and not a professional diagnosis. In addition, the study's transversal design does not allow us to identify directionality in the association between child labor and functioning difficulties and disability; that is, we do not know if functioning difficulties and disability leads to higher level of child labor, or vice versa. In addition, it was not possible to analyze the relationship between child labor and specific functional difficulty and disability domains, given the sample size (number of children within each specific domain). We also do not have data about the cause of the child or adolescent's functioning difficulty or disability, which might influence child labor or educational attainment.

In spite of these limitations, this study provides current, nationally representative data and an initial exploration of child labor and functioning difficulties and disability. These results can be the jumping off

point for future, more in-depth research on the associations (and their directionality) between child labor and functioning difficulties and disability, preferably using instruments based on the International Classification of Functioning, Disability and Health (ICF) and which are internationally comparable, as was the instrument used in this study.

Acknowledgments

The authors gratefully acknowledge Conacyt, FOSISS 2016 (Project No. 272137) for providing funding for this work.

Declaration of conflict of interests. The authors declare that they have no conflict of interests.

References

1. Organización Mundial de la Salud. Informe mundial sobre la discapacidad. Ginebra: OMS, 2011.
2. INEGI. Estadísticas a propósito del día del niño (30 de abril), 28 de abril de 2015. Aguascalientes, Aguascalientes, Aguascalientes, 2015.
3. INEGI. Estadísticas a propósito del día del niño (30 de abril), 27 de abril de 2016, Aguascalientes, Aguascalientes, 2015.
4. UNICEF. Estado Mundial de la Infancia 2013. Niñas y niños con discapacidad. Ginebra: OMS, 2013.
5. Filmer D. Disability, poverty, and schooling in developing countries: Results from 14 Household Surveys. *The World Bank Economic Review* 2008;22:141-163. <https://doi.org/10.1093/wber/lhm021>
6. Muntaner C, Solar O, Vanroelen C, Martínez JM, Vergara M, Santana V, et al. Unemployment, informal work, precarious employment, child labor, slavery, and health inequalities: pathways and mechanisms. *Int J Health Serv* 2010;40(2):281-295. <https://doi.org/10.2190/HS.40.2.h>
7. Roggero P, Mangiaterra V, Bustreo F, Rosati F. The health impact of child labor in developing countries: evidence from cross-country data. *Am J Public Health* 2007;97(2):271-275. <https://doi.org/10.2105/AJPH.2005.066829>
8. Fassa AG. Health benefits of eliminating child labour. Research paper in conjunction with the ILO-IPEC Study on the Costs and Benefits of the Elimination of Child Labour. Geneva: International Labour Organization, 2003 [accessed on May 4, 2017]. Available at: <http://www.traffickingresourcecenter.org/sites/default/files/Health%20Benefits%20for%20Eliminating%20Child%20Labor%20-%20ILO.pdf>
9. Organización Internacional del Trabajo. Informe mundial de 2015 sobre el trabajo infantil: Allancar el camino hacia el trabajo decente para los jóvenes. Ginebra: OIT, 2015.
10. Gunnarsson V, Orazem PF, Sánchez MA. Child labor and school achievement in Latin America. *World Bank Econ Rev* 2006;20(1):31-54. <https://doi.org/10.1093/wber/lhj003>
11. Lleras-Muney A. The relationship between education and adult mortality in the United States. *Rev Econ Stud* 2005;72(1):189-221. <https://doi.org/10.1111/0034-6527.00329>
12. Lleras-Muney A. Were Compulsory Attendance and Child Labor Laws effective? An Analysis from 1915 to 1939. *J Law and Economics* 2002;45(2):401-435. <https://doi.org/10.1086/340393>
13. Schultz TP. School Subsidies for the Poor: Evaluating the Mexican Progresa Poverty Program. *J Development Economics* 2004;74:199-250. <https://doi.org/10.1016/j.jdeveco.2003.12.009>

14. Ahmed AU, del Ninno C. The food for education program in Bangladesh: An Evaluation of its Impact on Educational Attainment and Food Security. FCND Discussion Paper No. 138. Washington DC: Food Consumption and Nutrition Division, 2002 [accessed on May 4, 2017]. Available at: <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/78554>
15. De Castro F, Rojas R, Villalobos A, Allen B, Hubert C, Romero M, et al. Bases metodológicas y resultados de la implementación de la Encuesta Nacional de Niños, Niñas y Mujeres en México 2015. *Salud Publica Mex* 2016;58(6):676-684. <https://doi.org/10.21149/spm.v58i6.8192>
16. OMS/OPS. Clasificación Internacional del Funcionamiento, de la Discapacidad y de la Salud: CIF Ginebra, Suiza: Organización Mundial de la Salud, 2001.
17. Lohr S. Muestreo: diseño y análisis. Ciudad de México: International Thompson, 2000.
18. Module on Child Functioning and Disability, Washington Group on Disability Statistics/UNICEF. Draft Document. Washington DC: WG, 2014 [accessed on: May 4, 2017]. Available at: <https://www.cdc.gov/nchs/data/washington>
19. De Castro F, Hubert C, Strand E, Prado E, Braverman A. Severe functional difficulties and disabilities in children and adolescents and the Sustainable Development Goals. *Salud Publica Mex* 2017;59:354-360. <https://doi.org/10.21149/8487>
20. Dayioğlu M. Impact of Unpaid Household Services on the Measurement of Child Labour. MICS Methodological Papers, No. 2. New York: Statistics and Monitoring Section, Division of Policy and Strategy, United Nations Children's Fund: 2013.
21. Blackburn CM, Spencer NJ, Read JM. Prevalence of childhood disability and the characteristics and circumstances of disabled children in the UK: secondary analysis of the Family Resources Survey. *BMC Pediatr* 2010;10:21. <https://doi.org/10.1186/1471-2431-10-21>
22. Boyle CA, Boulet S, Schieve LA, Cohen RA, Blumberg SJ, Yeargin-Allsopp M, et al. Trends in the prevalence of developmental disabilities in US children, 1997-2008. *Pediatrics* 2011;127(6):1034-1042. <https://doi.org/10.1542/peds.2010-2989>
23. Van Ameringen M, Mancini C, Fervolden P. The impact of anxiety disorders on educational achievement. *J Anxiety Disord* 2003;17(5):561-571. [https://doi.org/10.1016/S0887-6185\(02\)00228-1](https://doi.org/10.1016/S0887-6185(02)00228-1)
24. Breslau J, Lane M, Sampson N, Kessler RC. Mental disorders and subsequent educational attainment in a US national sample. *J Psychiatr Res* 2008;42(9):708-716. <https://doi.org/10.1016/j.jpsychires.2008.01.016>
25. Edmonds EV. Child labor. IZA Discussion Papers, No. 2606. Bonn, Alemania: Forschungsinstitut zur Zukunft der Arbeit (IZA)/Institute for the Study of Labor, 2007 [accessed on May 4, 2017]. Available at: <http://nbn-resolving.de/urn:nbn:de:101:1-20080422146>
26. Werner-Seidler A, Perry Y, Calear AL, Newby JM, Christensen H. School-based depression and anxiety prevention programs for young people: A systematic review and meta-analysis. *Clin Psychol Rev* 2017;51:30-47. <https://doi.org/10.1016/j.cpr.2016.10.005>
27. Weersing VR, Jeffreys M, Do MT, Schwartz KT, Bolano C. Evidence Base Update of Psychosocial Treatments for Child and Adolescent Depression. *J Clin Child Adolesc Psychol* 2016:1-33.
28. Instituto Nacional para la Evaluación de la Educación. Panorama Educativo de México 2013, Indicadores del Sistema Educativo Nacional. Educación Básica y Media Superior. Ciudad de México: INEE, 2014
29. Ellen-Groce N. Adolescents and youth with disability: issues and challenges. *Asia Pacific Disability Rehabilitation Journal* 2004;15(2):13-32.
30. Johnson S, Hennessy E, Smith R, Trikić R, Wolke D, Marlow N. Academic attainment and special educational needs in extremely preterm children at 11 years of age: the EPICure study. *Arch Dis Child Fetal Neonatal Ed* 2009;94(4):F283-F289. <https://doi.org/10.1136/adc.2008.152793>
31. Secretaría del Trabajo y Previsión Social. El trabajo infantil en México: Avances y desafíos. Ciudad de México: Secretaría del Trabajo y Previsión Social, 2014.
32. Beegle K, Dehejia R, Robertta G. Why should we care about child labor? The education, labor market, and health consequences of child labor. *The Journal of Human Resources* 2009;44:871-889. <https://doi.org/10.3368/jhr.44.4.871>
33. Espíndola E. Invertir más e invertir mejor en la educación en Iberoamérica: una necesidad y una oportunidad. In: Presente y futuro de la educación Iberoamericana. Madrid: Pensamiento Iberoamericano, 2010.
34. Barnes C. Disability, higher education and the inclusive society. *British Journal of Sociology of Education* 2007;28:135-145. <https://doi.org/10.1080/01425690600996832>
35. Bunch NH, Verner D. Revisiting the link between poverty and child labor: the Ghanaian experience. Working Paper 01-03. Aarhus V, Dinamarca: Centre for Labour Market and Social Research, 2001 [accessed on May 4, 2017]. Available at: <http://documents.worldbank.org/curated/en/167581468751536929/pdf/multi-page.pdf>
36. Stabile M, Sara A. The economic cost of childhood disability. *The future of children* 2012;22:65-96. <https://doi.org/10.1353/foc.2012.0008>
37. Urquiza-Salomón JE, Figueroa JL, Hernández-Prado B. El gasto en salud relacionado con la condición de discapacidad. Un análisis en población pobre de México. *Salud Publica Mex* 2008;50(2):136-146. <https://doi.org/10.1590/S0036-36342008000200007>