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Centro Centroamericano de Población

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Nivel de educación y discapacidad entre los ancianos de Buenos Aires

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ABSTRACT

The context in which ageing is occurring in Latin America and the Caribbean countries raises questions about future trajectories in the prevalence of disabilities by age. In this sense, it is of great importance to study the behaviour of the prevalence of disabilities and analyse the risk factors in populations of the region. The aim of this study is to analyze the association between the risk of experiencing disabilities and the level of formal education among people 60 years and over that lived in Buenos Aires in 2000. The data used come from the study "Health, Welfare and Aging"-SABE (Spanish acronym)- for Buenos Aires. Based on this information, we estimate the prevalence of disabilities by level of education and we analyse the effects of different risk factors on the likelihood of experiencing disability among individuals with different levels of education. The results show an inverse and strong correlation between educational level and the risk of experiencing disabilities in ADL (Activities of Daily Living) and IADL (Instrumental Activities of Daily Living) and the relationship would be partially mediated by health profiles of the individuals.

Keywords: Ageing population, Level of Education, Disability

RESUMEN

El contexto en el que se está produciendo el envejecimiento de la población en América Latina y el Caribe genera interrogantes acerca de la trayectoria futura en la prevalencia de discapacidades por edad. En este sentido, resulta de gran importancia estudiar el comportamiento de la prevalencia de discapacidades y analizar los factores de riesgo en poblaciones de la región. El objetivo del presente estudio es analizar la asociación entre el riesgo de experimentar discapacidades y el nivel de educación formal de la población de 60 años y más que residía en Buenos Aires en el año 2000. Los datos usados provienen del estudio "Salud, Bienestar y Envejecimiento" -SABE- para Buenos Aires. En base a dicha información, se estima la prevalencia de discapacidades según nivel educativo y se analizan los efectos de diferentes factores de riesgo sobre la probabilidad de experimentar discapacidades entre individuos con diferentes niveles de educación. Los resultados muestran la existencia de una inversa y fuerte correlación entre el nivel de educación y el riesgo de experimentar discapacidades en AVD (Actividades de la Vida Diaria) y en AIV (Actividades Instrumentales de la Vida Diaria) y dicha relación estaría parcialmente mediada por el perfil de salud de los individuos.

Palabras clave: Envejecimiento de la población, Nivel de Educación, Discapacidad

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1. INTRODUCTION

Population ageing is a phenomenon that is occurring worldwide though with marked differences in level, speed, determinants and the socio-economic and institutional contexts of different countries.

According to the report *World Population Ageing 2009*, from the Population Division of the United Nations, individuals 60 years and older represent 30% of the total population in Japan, 26% in Italy and 26% in Germany. Puerto Rico, Uruguay, Cuba, Barbados and Argentina represent the most aged populations in the Latin American and the Caribbean (LAC) region, with relative participation of the group 60 years and older in the total population of 19%, 18%, 17% and 15% for the last two countries, respectively (UN, 2009).

Whereas the proportion of elderly people in Latin America and the Caribbean has not reached the levels of the most aged countries in the world, the pace of growth in the number of older individuals in the region is occurring at unprecedented rates (Palloni et al., 2002; Kinsella and VelKoff, 2001; Chackiel, 1999). Chackiel (1999) notes that whereas in Europe the ageing process took between 150 and 200 years, in Latin America the same phenomenon took place in about 40 to 60 years and, unlike Europe, Latin America is ageing in an impoverished society with serious income inequalities. It can be affirmed that Europe got rich before it got old whereas Latin America is getting old before getting rich.

The morbidity profile of aged societies and the consequences on retirement and health care systems and on the economic growth are the main worries related to the current ageing process.

There is consensus to say that population ageing will result in absolute increases in the number of people with disabilities and that this will increase the demand for long-term care services (Mayhew, 2000; Comas-Herrera et al., 2003, etc.). However, the existent controversy between the theories of expansion and compression of morbidity reflects the uncertainty that still exists about the future trajectories in the prevalence of illnesses and disabilities associated with the ageing processes. According to the theory of expansion of morbidity, mortality decline will be accompanied by a pandemic, since this reduction in mortality would be the result of the lower lethality of chronic diseases as well as degenerative and disabling conditions. Therefore, delayed death will only cause an increase in the proportion of those who suffer from the diseases as well as the emergence of multiple and more severe cases, previously infrequent (Gruenberg, 1977).

On the contrary, according to the theory of compression of morbidity, apart from increasing life expectancy, the age at which chronic diseases start to appear is being delayed. Therefore they are concentrated at the end of life (Fries, 1980, 2003). On the other hand, Manton (1982) has developed a third theory called "dynamic equilibrium" according to which the decline in mortality is due to, in part, the decrease of the progression rate of chronic diseases. According to the latter, although a decrease in mortality could lead to an increase in the prevalence of disabilities, they would be less severe.

Current empiric evidence does not show a unique pattern related to each of the previous theories (Murray and Lopez, 1997; Casado-Marín y López-Casasnovas, 2001; Fries, 2003; Sagardui-

Villamor et al., 2005; Chou and Leung, 2008) and this fact could be associated with the differences in determinants and the context in which population ageing is occurring, differences that subsist not only among regions and countries but also among different social groups within countries.

Several studies show that the risk of experiencing disabilities exponentially increases with age (Monteverde, 2004), it is inversely related to income and education level (Hayward et al., 2000), it is positively related to less qualified jobs (Krause et al., 1997) and it is higher among women (Guralnik et al., 1997, 2006; Monteverde, 2004).

Additionally, other studies show that people who suffer from cardiovascular diseases, diabetes, respiratory illnesses, rheumatism, osteoporosis and obesity condition have a higher risk of experiencing disabilities at older ages (Monteverde et al., 2008; Sohan et al., 2007; Fried et al., 1999; Verbrugge et al., 1989).

Also, more recent studies show that having experienced poor nutrition, health problems or low socio-economic conditions during gestation and/or childhood increases the risk of suffering from chronic diseases and experiencing disabilities at older ages (Monteverde et al., 2008; Palloni et al., 2005; Couzin, 2002; Barker, 1998; Elo and Preston, 1992), and those effects could persist after controlling for current individual socio-economic conditions (Monteverde et al., 2008; Khu et al., 2006; Guralnik et al., 2006).

A recent study for Argentina, Mexico and Puerto Rico suggests that the prevalence of disabilities among elderly people is significantly higher among the poorer groups (Monteverde et al., 2007).

The Autonomous City of Buenos Aires (Ciudad Autónoma de Buenos Aires – CABA-) and the Buenos Aires province are among the most aged populations in Argentina (together with Santa Fe and Córdoba provinces). According to the last available information from Census (INDEC, 2010), the percentage of people 60 years and over is 22% in CABA and 15% in Buenos Aires province. These percentages in absolute values mean more than 600 thousand individuals and more than 2 million people 60 years and older, respectively.

The aim of this study is to analyze the association between the risk of experiencing disabilities and the level of formal education among people 60 years and over that lived in Buenos Aires in 2000. For this purpose, we first estimated the prevalence of disability for groups with different levels of education. Then, we estimate logistic regression models to measure the association between the likelihood of experiencing disability and level of education, after controlling for other characteristics of individuals who may act as confounding factors, such as age or sex, or which may act as mediators in the relationship, such as suffering from the chronic diseases mentioned above. Finally, logistic models are estimated separately for groups of low and high education in order to assess whether chronic disease, besides acting as potential mediators in the relationship between education and disability, have an interaction effect with education affecting differentially the probability of experiencing disabilities.

To measure disability we use the self-reported difficulty in performing activities considered "core" to lead an independent life among the elderly group, and widely used in the literature on the subject. These activities are classified in Activities of Daily Living (ADL) and Instrumental

Activities of Daily Living (IADL), which are considered separately, as they measure different dimensions of disability and are associated with different degrees of dependence (McDowell, 2006).

2. DATA AND METHODS

The data used to analyse the prevalence of disability and its risk factors was the study “Salud, Bienestar y Envejecimiento” (*Health, Welfare and Ageing*) for Buenos Aires (Peláez et al., 2004). The SABE survey is a cross-sectional study carried out in 2000 in seven big cities of Latin America and the Caribbean (Bridgetown, Buenos Aires, Havana, Mexico F.D., Montevideo, Santiago de Chile and São Paulo), that represent different stages of the ageing process in the region (Albala et al., 2005).

The sample for Buenos Aires includes 1043 individuals 60 years and over residing in “Ciudad Autónoma de Buenos Aires” (*Autonomous City of Buenos Aires*) and in “Gran Buenos Aires⁴” (*Great Buenos Aires*).

The survey provides comprehensive and representative information of the population 60 years and over, including demographic, socioeconomic and housing characteristics, marital status, health, anthropometry, flexibility and mobility, use and expenditure on medical services (including drugs), difficulty and help to perform activities of daily living (ADL) and Instrumental Activities of Daily Living (IADL), cognitive state assessment, information on family support networks and social transfers, employment history and sources of income and feedback of the socio-economic, health and nutrition conditions in childhood.

Section D, relating to the functional status of the respondent, collects information about difficulties in performing a series of activities due to health problems. This section begins with questions concerning general mobility problems (such as walking a certain number of blocks, sitting down for two hours, standing up after sitting for a long time, climbing stairs, etc.) and then it continues with questions about difficulties in performing ADL and IADL expected to last for more than three months. The ADLs considered are: walking through a room, getting dressed, having a bath or a shower, eating, sleeping or getting out of bed, and using the toilet. The IADLs covered are: preparing hot meals, managing your own money, going out (such as the doctor’s, the church, etc.), food shopping, telephoning, doing light house chores (like making the bed, shaking, etc.), doing heavy household chores (like cleaning toilets, floors, etc.) and taking medication.

Based on this information, we estimate the prevalence of disabilities by level of formal education, a variable highly correlated with socio-economic level and that allows us to capture a broader dimension of the asset that people have for access to health services and information and which is positively associated with healthier behaviours and healthy lifestyles (Winkleby et al., 1992; Ross and Wu, 1995; Nutbean, 2000).

⁴ “El Gran Buenos Aires” involves the 24 most populated local communities of the Buenos Aires province closest to the Autonomous City of Buenos Aires (the capital of Argentina).

To analyse the effects of different risk factors on the likelihood of having disabilities and to analyse how these change or are maintained among individuals with different levels of education, we estimate regression models of discrete dependent variables (such as Logit regression models), using the software Stata/SE 11.1 version.

For identification and classification of people according to their disability status, two groups are considered. A group with "Disability in ADL" which includes people who have difficulty performing at least one of the ADLs listed in the SABE study and another group with "Disability in IADL" if the individual has difficulty in at least one of the IADL described. The distinction reflects the general differences associated with disability in ADLs and IADLs that capture different dimensions of the problem. Whereas disability in ADLs is associated with more severe levels of disability, disability in tasks requiring IADL covers levels of finer motor coordination that are necessary for people to continue living in an autonomous community (McDowell, 2006).

3. RESULTS

Table 1 shows the descriptive analysis of the main variables of interest, using data from SABE for Buenos Aires. The percentages, means and prevalence of diseases and disabilities that are listed in the table are values extrapolated to the population (from the application of the corresponding expansion factor).

Descriptive analysis shows that over 60% of the population 60 years and older from Buenos Aires are women with an average age of almost 71 years. Men account for just 40% with an average age of 70.2 years. The average education of this population is 7.2 years (both sexes).

The prevalence of disability in ADLs would be 17.4 and 27.1 for IADLs. Almost 50% of the population have been diagnosed with high blood pressure or hypertension by a doctor or a nurse, just over 12% have been diagnosed with diabetes, about 5% have once been diagnosed with a kind of cancer (excluding small tumours of the skin), nearly 8% appear to suffer from some form of chronic lung disease (such as bronchitis or emphysema), nearly 20% have or have had heart disease (heart attack, heart disease, angina, congestive or other), about 5% have suffered a cerebral-vascular disease (stroke, stroke, ischemic attack or cerebral thrombosis), over 50% suffer from arthritis, rheumatism or arthrosis and almost a third have fallen down over the last year (an indicator of general weakness of the individual).

Table 1- Descriptive analysis for selected variables. Population 60 years and over residing in Buenos Aires in 2000

Variable	Indicator
Women (proportion)	61.7
Age (average)	70.7
Women age (average)	71.0
Men age (average)	70.2
Years of formal education (average)	7.2
Disability in ADL (prevalence)	17.4
Disability in IADL (prevalence)	27.1
Hypertension (prevalence)	49.4
Diabetes (prevalence)	12.3
Cancer (prevalence)	5.2
Chronic lung diseases (prevalence)	7.8
Heart diseases (prevalence)	19.8
Cerebral-vascular diseases (prevalence)	4.8
Arthritis, rheumatism, arthrosis (prevalence)	52.5
Falls in the last year (prevalence)	28.9

Source: SABE (Peláez et al. 2003).

Table 2 allows us to evaluate the extent to which previous prevalence differs between groups with different levels of education. In order to do that, two groups are considered: the first one is composed of individual of relatively low education and it includes people with less than 7 years of schooling (equivalent to complete primary school or less) and a second tier of relatively higher education of people who received 7 or more years of formal education, i.e., who completed primary school or attained higher levels of education.

The proportion of sampled people in the group with low education (incomplete primary or less) reaches 44% and for less than 1% of people there is no information (3 in 1043). Notably, the proportion of people with low education varies significantly for men and women of the cohorts under study. While among men the percentage of people with less than 7 years of schooling is 37%, this figure rises to 48% among women in the same age group (these percentages are not shown in the table).

As shown in Table 2, the average years of formal education among low educated individuals is about 3 years, whereas among people with higher level of education it is almost ten years.

There is a higher prevalence of disabilities among the less educated group. The prevalence of disability in ADLs is 25% among people with low education and it is almost half among people with relatively high education (prevalence of 13%). The differences in prevalence of disability in IADLs for the two groups are also important, with almost 22% for the less educated group and 16% for higher educated individuals.

The prevalence of chronic diseases such as hypertension, diabetes, chronic lung disease, heart disease, arthritis, rheumatism and arthrosis, as well as the prevalence of falls in the last year and

the self-perceived fair or poor health, is higher among lower educated people. The only disease for which there was a higher prevalence among the group of higher education is cancer, and in the case of cerebral-vascular diseases the prevalence would be similar for both groups.

Table 2- Descriptive analysis for selected variables
Two educational groups: low and high education
Population 60 years and over residing in Buenos Aires in 2000

Variable	Low Education	High Education
Sampled People	455	585
Years of formal education (average)	3.2	9.8
Disability in ADL (prevalence)	25.3	13.3
Disability in IADL (prevalence)	21.7	16.1
Hypertension (prevalence)	51.6	47.0
Diabetes (prevalence)	16.5	9.6
Cancer (prevalence)	3.7	5.8
Chronic lung diseases (prevalence)	10.1	7.0
Heart diseases (prevalence)	21.8	19.3
Cerebral-vascular diseases (prevalence)	4.6	4.8
Arthritis, rheumatism, arthrosis (prevalence)	60.4	47.0
Falls in the last year (prevalence)	35.2	25.3
Fair or poor health (prevalence)	47.5	23.1

Source: SABE (Peláez et al. 2003).

Therefore, the analysis suggests that the differences in self-reported disability between educational groups would be, to some extent, due to the existence of significant differences in health profiles between those groups. However, comparison of prevalence is not a robust tool in order to analyse “effects” because the observed differences between groups may simply reflect differences in composition of populations and, therefore, be due to the effects of other variables (e.g. sex or age).

In the light of what was mentioned above, below we show the results of a series of logistic regression models that allow us to analyse the relationship between educational level and risk of experiencing disabilities controlling for other characteristics of individuals that may be mediating the relationship or may be confounding effects of this.

Table 3 and table 4 show the results of the regression analysis for the whole sample, where the level of education is an explicative variable of the probability of experiencing disabilities in ADL or in IADL.

The results presented in table 3 indicate that among lowly educated individuals the probability of experiencing disabilities in ADL or IADL is significantly higher, with an odd ratio between the two educational groups of 88% for disabilities in ADL and 90% for disabilities in IADL (controlling for age and sex).

On the other hand, adding the chronic diseases in the regression model (hypertension, diabetes, cancer, lung disease, heart disease, cerebral-vascular disease and bone/joint disease), there is some reduction in the effect of education on the likelihood of experiencing disabilities (see Table 4).

Cerebral-vascular diseases, cancer (except skin cancer), bone-joint diseases (such as osteoporosis, arthritis and arthrosis), heart disease and diabetes, in that order, are the chronic diseases that would have greatest effects on the likelihood of experiencing disabilities in ADL. Cerebral-vascular disease, heart disease, diabetes and lung diseases would have the greatest effect on the likelihood of developing disability in IADL.

Note that the results of Table 4 also indicate that the effect of low educational level, although reduced, remains significant even after controlling for the previous chronic disabling diseases mentioned.

Table 3- Logistic regression predicting the probability of experiencing disabilities, controlling for age, sex and low education

Variable	ADL Disability		IADL Disability	
	Odds Ratio	P-value	Odds Ratio	P-value
Age	1.09	0.00	1.11	0.00
Sex (man=0; woman=1)	1.56	0.02	1.56	0.03
Low education	1.88	0.00	1.90	0.00

Source: SABE (Peláez et al. 2003).

Table 4- Logistic regression predicting the probability of experiencing disabilities, controlling for age, sex, low education and chronic diseases

Variable	ADL Disability		IADL Disability	
	Odds Ratio	P-value	Odds Ratio	P-value
Age	1.09	0.00	1.11	0.00
Sex (man=0; woman=1)	1.58	0.03	1.83	0.01
Low education	1.70	0.00	1.63	0.01
Hypertension	1.29	0.17	1.11	0.56
Diabetes	1.49	0.10	1.81	0.02
Cancer	2.19	0.02	1.19	0.65
Chronic lung diseases	1.38	0.25	1.57	0.12
Heart diseases	1.50	0.05	1.91	0.00
Cerebral-vascular diseases	4.07	0.00	2.48	0.01
Arthritis, rheumatism, arthrosis	1.61	0.01	1.17	0.40

Source: SABE (Peláez et al. 2003).

Tables 5 and 6 show the results of the logistic model (for ADL and IADL, respectively) estimated separately for each educational group, which allows us to evaluate the existence of interactions between level of education and the other factors.

The results showed in Table 5 indicate that the effects of age and sex (on the odd of experiencing disabilities in ADL) are similar in both groups, i.e. the probability of experiencing disabilities in ADL increase by age and it is higher among women, for both low- and highly educated individuals.

However, the chronic diseases that produce higher effects on the odd of experiencing disabilities would not be the same in both groups. Among lowly educated individuals, those chronic diseases with higher effects would be: cerebral-vascular diseases, cancer (except skin cancer) and diabetes. On the other hand, among highly educated individuals, the diseases with higher effect would be: cerebral-vascular diseases (but with an effect substantially lower than among lowly educated individuals), lung diseases (which are not important among the lowly educated group) and heart diseases (diseases that among the lower educated individuals is important but in a lower extent).

In a similar fashion, results from Table 6 show that the effects of age and sex (on the probability of experiencing disabilities in IADL in this case) are similar in both educational groups. In the same way as for ADLs, it can be observed that cerebral-vascular diseases would be the diseases that mostly increase the odd of experiencing disabilities in both groups, lung diseases are important only in the group of high education, diabetes only affects the lowly educated group and hypertension does not have a significant effect in any of the groups. However, unlike what was observed for disabilities in ADLs, heart diseases affect both groups in a significant fashion and cancer does not significantly affect any of the groups.

Table 5- Logistic regression predicting the probability of experiencing disabilities in ADL for low and high educational groups

ADL Disabilities Variables	Low Education		High Education	
	Odds Ratio	P>z	Odds Ratio	P>z
Age	1.08	0.00	1.10	0.00
Sex (man=0; woman=1)	1.60	0.12	1.67	0.08
Hypertension	1.08	0.77	1.58	0.10
Diabetes	1.79	0.05	1.15	0.75
Cancer	3.56	0.02	1.56	0.34
Chronic lung diseases	1.02	0.96	2.21	0.06
Heart diseases	1.23	0.46	2.15	0.01
Cerebral-vascular diseases	8.02	0.00	2.53	0.06
Arthritis, rheumatism, arthrosis	1.55	0.10	1.61	0.09

Source: SABE (Peláez et al. 2003).

Table 6- Logistic regression predicting the probability of experiencing disabilities in IADL for low and high educational groups

IADL Disabilities Variables	Low Education		High Education	
	Odds Ratio	P>z	Odds Ratio	P>z
Age	1.10	0.00	1.13	0.00
Sex (man=0; woman=1)	1.79	0.07	1.90	0.04
Hypertension	1.07	0.78	1.18	0.54
Diabetes	1.78	0.06	1.88	0.14
Cancer	1.39	0.59	1.01	0.99
Chronic lung diseases	1.14	0.73	2.47	0.05
Heart diseases	1.94	0.02	2.03	0.02
Cerebral-vascular diseases	2.49	0.09	2.79	0.05
Arthritis, rheumatism, arthrosis	1.20	0.49	1.08	0.76

Source: SABE (Peláez et al. 2003).

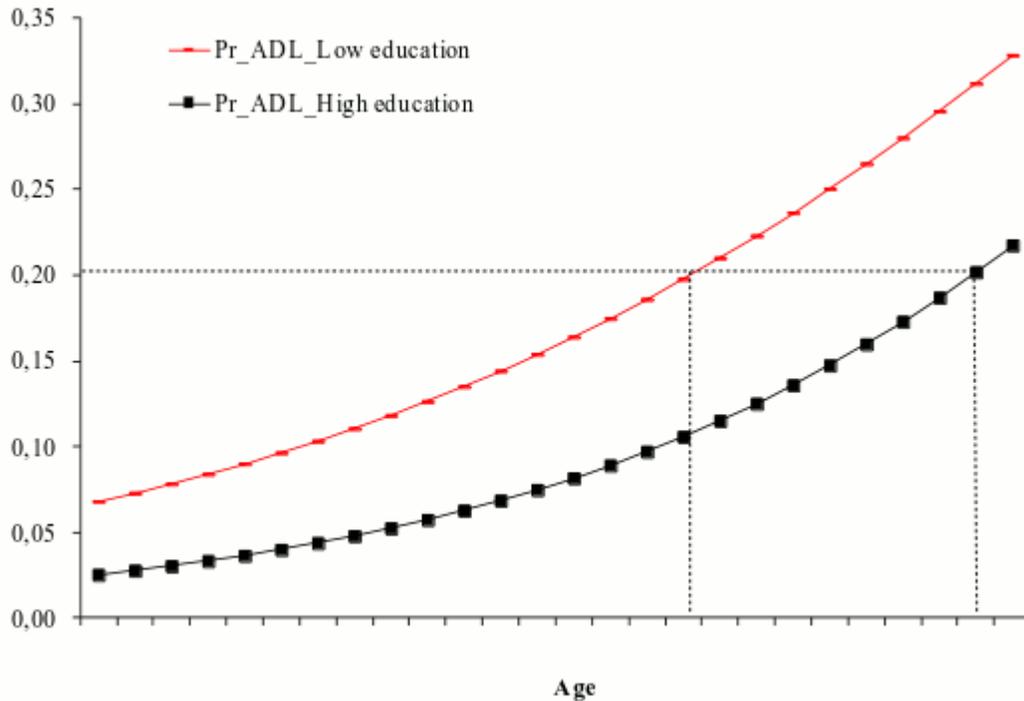
The figures below show the odd of experiencing disabilities in ADL (Figure 1) and IADL (Figure 2) by age, for lowly educated (red curve) and highly educated (black curve) people.

In order to graphically show the differential effect on the probability of experiencing disabilities that are exclusively attributable to education, we estimated the probabilities for both groups (low and high education) assuming the same values for the rest of covariants (one for sex and zero for chronic diseases).

Figure 1 shows that whereas highly educated people reach risks of experiencing disabilities in ADL of 20% at around 84 years old (see dotted line joining the black curve), lowly educated individuals reach the same level of risk five years younger, at around 77 years old (see dotted line joining the red curve).

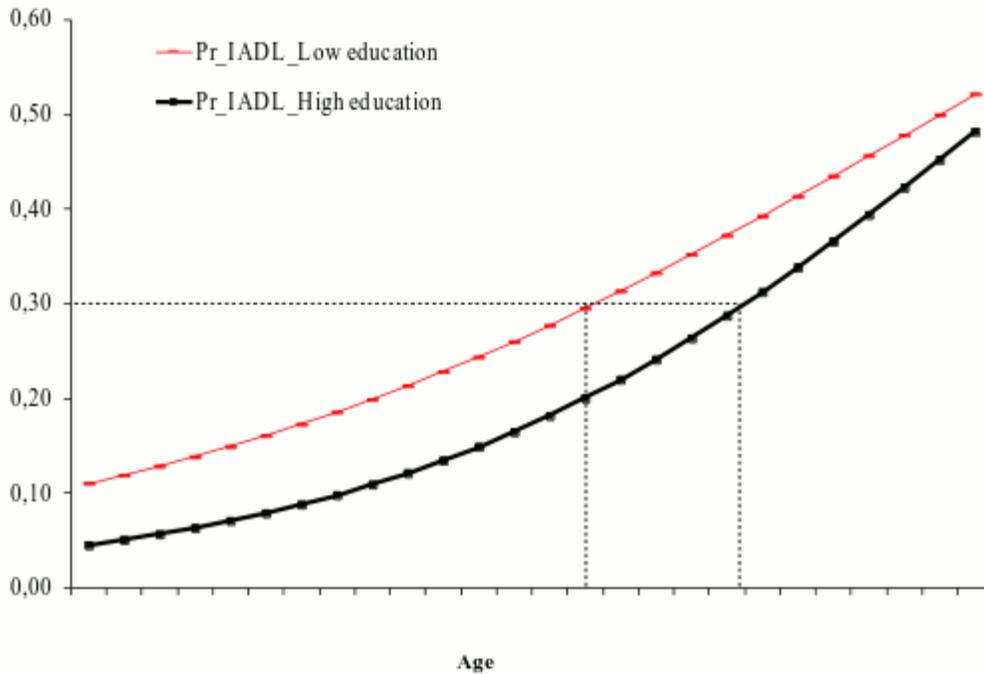
Figure 2 shows that differences in the likelihood of experiencing disabilities in IADL between educational groups decrease with age. However, at younger ages we observe important differences between both groups: the low educational group reaches the probability of experiencing disabilities in IADL of 30% at around 74 years old, whereas the group of highly educated people reaches the same probability at around 79 years old.

Figure 1- Probability of experiencing Disabilities in ADL among Low and High Educational Groups, Controlling for Age, Sex and Chronic Conditions



Source: SABE (Peláez et al. 2003).

Figure 2- Probability of Experiencing Disabilities in IADL among Low and High Educational Groups, Controlling for Age, Sex and Chronic Conditions



Source: SABE (Peláez et al. 2003).

4. DISCUSSION

The results of the current study show an inverse and strong correlation between educational level and the risk of experiencing disabilities in ADL and IADL among population 60 years old and over in Buenos Aires in 2000. They also indicate that the relationship between level of education and disability would be partially mediated by health profiles of individuals and, apart from chronic diseases, other mechanisms (direct and/or indirect) would be operating in the education-disability relationship, since the level of education remains highly significant in explaining self-reported disability after controlling for chronic diseases.

The updated version of the “International Classification of Functioning, Disability and Health -ICF-” (WHO, 2001), conceives functioning and disability as the result of dynamic interaction between health factors and contextual factors (environmental or individual). Since contextual factors (such as facilities of the household or the state of the sidewalks of the neighbourhood where the house is located) significantly vary among socio-economic strata of population, differences in self-report of disability observed among groups of people with different levels of education could be exclusively due to such contextual differences and not to significant differences in the health profiles of the individuals. However, the results of this study show the importance of health profiles (prevalence of chronic diseases) to explain the differential self-report of disability among the target population in the study and also suggest that other factors may be operating, including the contextual and individual factors above mentioned.

Chronic diseases may affect the prevalence of disability of different groups through two pathways: through the prevalence of diseases present in the different groups (*prevalence* effect) and through the interaction between the diseases and the particular characteristics of each group (*interaction* effect).

Even though it can be noted that the prevalence of *cerebral-vascular disease* is similar in the two educational groups considered, the effect on the likelihood of developing disability in ADLs is much higher among people with a low education level (*i.e.* positive interaction effect between the disease and low education condition). This interaction effect between low education and cerebral-vascular diseases could be associated with less treatment, medical monitoring, access to rehabilitation and greater severity of the consequences of the disease in this group. According to information provided by the SABE survey, among individuals belonging to the low education group and who have suffered from a cerebral-vascular episode, more than half (52%) indicated they had not seen a doctor to treat this disease in the last twelve months (whereas this percentage is 18% among the highly educated group) and only 24% indicated that the condition does not affect their daily activities (against 61% among individuals with high education). It is further noted that 79% of people with low education and cerebral-vascular diseases had sequelae (among those with higher education this figure is 61%), 81% among lowly educated group indicate they experience weaknesses in arms and legs (43% in the high educational group), 48% indicated they have problems seeing (among the group with high education it is 21%) and 62% indicated they have problems thinking (43% among high educated individuals).

As regards **cancer** (which includes all types of cancer other than skin cancer), it is noteworthy that the prevalence of disease is higher among highly educated individuals but the effect on the condition of disability is greater among the low educational group (especially for the case of ADL). This could be the result of a greater under-reporting of less severe cases in the low educational group. If true, among highly educated people self-report of the disease includes a broader range of cases (including less severe cases detected by more frequent medical controls) and consequently with less impact on the functional status of individuals. However, the difference in under-reporting by severity is a simple assumption that can not be verified with the available information.

Another interesting result is that of **diabetes**, that is most prevalent and also has a greater effect on the likelihood of experiencing disabilities in the lowly educated group. While the SABE survey for Argentina did not include measurements of obesity (although it was measured for the other countries), there is wide evidence that the condition is the major risk factor for diabetes type 2 (Leong and Wilding, 1999) and it is more prevalent among the lower socio-economic strata of the population (Monteiro et al., 2004). Also, several studies show that obesity and diabetes themselves and in combination significantly increase the risk of mortality and disability condition (Sohan et al., 2007).

On the other hand, it can be noted that **lung diseases**, which are more prevalent among low educational groups, only affect the condition of disability among individuals with high education. Analysing the differences between the two educational groups within the group of people with this disease, we observed that the proportion of people of these cohorts that report they smoke or smoked in the past is significantly higher among highly educated people (48% vs. 35% of those with low education), which could affect the severity of the disease and the consequences on the functional status of people in this group (although there is no detailed information available to test this hypothesis).

The prevalence of **heart disease** is somewhat higher in the less educated strata, but the effect is greater among the high educational group (especially for ADL). This result is somewhat surprising since, in general, people with high education go for check-ups and carry out treatments more frequently (81% of highly educated people with heart disease made at least one medical consultation last year due to the disease, against 78% with low education). A possible explanation for this result is the existence of a selection effect, which implies a greater survival probability of individuals most vulnerable among the group with higher education. Existing evidence supports this hypothesis, since the average age at diagnosis of the disease is 64 years in low educational and 62 years in high educational groups. It could also occur that in the sectors of higher education knowing about their conditions generates greater caution and more care and this will lead to greater awareness of the limitations for daily living or instrumental activities.

Among the main limitations of the study is the fact that both disabilities and chronic diseases are measured from self-reports. In the case of illnesses, people are asked "*Have you been diagnosed by a doctor or health nurse?*" Therefore, in these cases, there may be underreported cases, especially among people with less access to and use of health services. Reduced access to and use of these services is generally higher among people with lower education and socio-economic level and, in this sense, it can be expected that under-report mainly affects the less educated group. Therefore, differences in disease prevalence found in this study (between high and low

education) could be considered conservative since if all individuals, regardless of their level of education, agreed to a proper medical diagnosis, this would probably increase the observed prevalence among the groups with lower relative education.

Finally, it is important to note that the lack of longitudinal studies for Argentina (and for most countries in the region) restricts the analysis to measure the correlation between education level and disability status. The cross-sectional data do not allow identifying the sequence of events and therefore do not allow drawing conclusions about the causal link between disability and education of individuals, as would have been desirable. Also, it is noteworthy that the lack of longitudinal studies or cross-sectional studies repeated over time for Argentina and for most countries in the region, do not enable us to measure the evolution of the prevalence of disability in long-term and therefore, it makes difficult to assess empirically the theories of compression, expansion or dynamic equilibrium of morbidity (disability) in these countries.

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