

SOCIO-ECONOMIC DETERMINANTS OF THE PREVALENCE OF DISABILITY IN MOROCCO: EMPIRICAL EVIDENCE FROM SPATIAL DATA

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Abstract:

The issue of inequality has known a wide debate recently in Morocco. It is considered as one of the most outstanding obstacles to the development of the country. These inequalities constitute an important source of regional imbalance in the whole field, including health, specifically the field of disability. The aim of this paper is to develop a map of disability in Morocco while evaluating its socioeconomic determinants taking into consideration the spatial context. The data are taken from the 2014 GCPH. Our results suggest that the phenomenon of disability is a geographical phenomenon since it is unequally distributed over the Moroccan territory. Our analyzes also showed that the level of education, the participation rate, the type of housing and the size of the household have an impact on the prevalence of disability. We provide geographic targeting policies to reduce regional disparities in term of disability.

Keywords: Inequality, disability, determinants, spatial approach, Morocco.

JEL code : I10, N3, N37, N97, O55

1. Introduction

According to the World Bank (2011) and the International Health Organization, more than 1 billion people live with some form of disability (15% of the world's population, 80% live in developing countries). Compared to 1970, the rate of disability did not exceed 10 per cent.

According to the World Health Survey, 110 million people (almost 2.2% of the world's population) suffer from very great functional difficulties. On the other hand, Morbidity statistics from the World Bank show that 190 million people (3.8% of the world population) are affected by a "severe disability". These rates are essentially high among children. Indeed, disability affects 95 million children, 13 million of whom suffer from a "severe handicap".

Data from the 2012 World Health Survey also show that the prevalence of disability is higher in low-income countries than in high-income countries. The results also show that the most exposed group to disability is the poorest quintile of the world's population (Rice and Traustadóttir, 2012), women (United Nations, 2000), the elderly (Kellet-Moore and Schmacher, 2006), people with low levels of education (UNESCO, 2017) and people with low incomes.

Evidence from some countries shows that children from poor families and those from ethnic minorities are also significantly at risk of disability (World Bank, 2012). In this context, disability disproportionately affects living populations in vulnerable spaces.

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They are a number of factors that contribute to the prevalence of disability among which we can list: its dependence on trends in health problems (Blencowe et al., 2013, Adamas et al, 2012), factors related to the environment (Desrosiers, 2012, Fojugeyrollas et al, 1998, Fojugeyrollas, 1994), and other factors such as traffic accidents (Chen et al, 2013; Palmera-Suárez, 2015), natural disasters (Yamin et al., 2005, Wisner, 2002), and conflict (IFRC, 2007; , 2008). However, few studies in the literature have focused on identifying the role of socio-economic determinants in the prevalence of disability using a spatial approach. If we take into account this spatial dimension, the results obtained would change.

In Morocco, the issue of disability has been of particular interest in recent years. According to data from the High Commissioner for Planning (HCP) in 2014, the rate of disability in 2014 is approximately 5.1% of the total population (1.7 million people). In 2004, this rate of disability was only 2.3% (680 thousand people with disabilities), thus showing a remarkable increase despite major efforts that have been made both by the government sectors concerned and by the associative fabric to promote the rights of people with disabilities.

Unlike the previous studies which adopted a classical approach; Comparisons between countries (WHO, 2011), between generation (Omariba, 2015), between sex (Miszkurka, et al., 2012) and between rural and urban areas (Islam, 2017). The originality of this study lies in the fact that it adopts a spatial dimension.

The aim of this study is therefore to describe the disability situation in Morocco while evaluating its socioeconomic determinants by opting for a spatial approach. Especially, The aim of this paper is to develop a map of disability in Morocco, to describe and visualize spatial distributions in order to identify spatial cluster and typical locations, and to show that the prevalence of disability is attributed to the distribution patterns of socio-economic services. The data of this paper are taken from the 2014 GCPH.

This paper is structured as follows: The second section reviews the literature on the concept of disability by analyzing its key socio-economic determinants. The third section describes the situation of disability in Morocco. The fourth attempts to empirically determine the explanatory factors. The last section provides the main findings of the current study.

2. Socio-economic determinants of disability: a brief review of the literature

2.1. The concept of disability is a complex concept

Before conducting an analysis of the determinants of disability, we should first start with a definition of the concept. In the literature, disability is defined on the basis of two approaches: the social approach and the functional approach.

The social approach shows that the majority of families with disabilities live in a vulnerable environment. Therefore, the social approach to disability is said to be highly dependent on the environment. The ultimate goal of this approach is to integrate and adapt disabled people in their societies, and to consider them as a resource, not a burden. Being handicapped is no longer a difference; instead, a handicapped person can live an everyday normal life. "(Haddad, 2009, 918). Thus, according to the social

model, disability is the result of the interaction between a person's functional status and their environment (Braithwaite and Mont, 2009).

Recently, the International Classification of Disability and Health Functioning provided by the World Health Organization and the Washington Group on Disability Statistics adopt a functional approach to define disability. According these organizations, disability is the presence of difficulties in at least one of the basic activities - sight, hearing, walking, cognition, communication, and self-management (Mont, 2007a, 2007b).

By comparing the results of people with and without these impairments, it is possible to understand how the environment can handicap people. For example, if people in a particular country who have difficulty walking without assistive devices have similar levels of consumption, employment, education and other social indicators, this would prove that the physical disability in this country's environment is not an economic problem.

The Washington Group also recommends examining data on disability using multiple thresholds for the level of difficulty in carrying out core activities in order to have an idea of the impact of mild, moderate and severe limitations in the community operation. Gertler and Gruber (2002) also recommend looking at activities of daily living or functional areas.

Beyond this debate on the concept of disability, the following point addresses the question of the relationship between disability and poverty.

2.2. The Theoretical Framework of the Poverty Cycle and Disability: The Chicken and the Egg

The analytical framework used in this paper is based on the social approach that identifies disability not on a medical basis, but on the socio-economic environment generally designated by poverty. Indeed, poverty could be the cause and consequence of disability leading to a vicious cycle (Yeo & Moore, 2003).

2.3. Poor people are highly exposed to become handicapped.

Populations living in poverty generally suffer from hunger (Sofa and Wocks, 2017, Squicciarini et al., 2013, Dasgupta and Kates, 2007). They also do not have access to potable water (World Health Organization, 2014, Schuster-Wallace et al. 2008, Jumbe et al., 2013), sanitation services (Bhatkal, 2018, Haughton and Khandker, 2009) and health services (Jeon et al, 2017, Choi et al., 2015, Shaw et al. ., 2014, Wu et al., 2013, Ke et al., 2011). They generally live in unsafe environments with inadequate housing in areas more likely to be affected by natural disasters (Yamin et al., 2005, Wisner, 2002), at higher conflict rates (IFRC, 2007; 2008). These populations are also more likely to work in high-risk occupations. All these conditions of poverty greatly increase the chances of being handicapped. Indeed, poverty is usually associated with lack of income that can be a source of malnutrition. The latter is linked to disability. Indeed, countries with high levels of malnutrition and nutrient deficiency often report higher rates of disability and delayed development (World Health Organization, 2012). It should be noted that malnutrition is identified through several sources. Thus, maternal malnutrition can affect fetal development, delay intrauterine growth, and increase the risk of developing impairments in infants (Blencowe et al 2013, Walker et al 2007,

Konje et al 2000, Ezegwui et al. 2012, Lumey et al., 2007, Roseboom et al., 2011, Lutter et al., 2012). Another factor that can lead to disability is infant nutrition. In this sense, many studies show that infants and young children who are underweight compared to age or stunted low in height compared to age are also more likely to be affected by disability (Gottlieb et al., 2012, Maulik et al., 2007, Chisolm-Straker et al., 2013, Steffen et al, 2012, Wang et al., 2007. Studies also show that cultural and social attitudes can lead to severe malnutrition and, in extreme cases, cause disability (Werner et al., 2009, Adamas et al., 2012, Rosenbloom et al., 2010, Hakime Nogay, 2013, Gannotti et al., 2004).

2.4. Handicapped people are more likely to be affected by poverty

People with disabilities are more likely to remain prisoners of poverty when they face multiple constraints that prevent them from living and actively participating in the development of society. Their exclusion limits opportunities for education (David et al., 2008; Aron and Loprest 2012; Corbett et al. 2016), training (Thompson, 2011), employment (Persson, 2016) and income generation (Cameron et al., 2009). Even in a household that can live above the poverty line, stigma can keep family members with disabilities in a state of poverty if they ignore education or participate in decision-making (Palmer , 2011). In addition, people with disabilities have a higher cost of living because of medical care and costs of adaptation within their societies, which reduces their income and increases their chances of falling into poverty.

3. The handicapped in Morocco : An overview

The main data on the prevalence of disability in Morocco come from the HCP (High Commissioner of Planning). Referring to the United Nations standards, the HCP considers a person as a handicapped person when they have either total disability or great difficulty in at least one of the areas of daily activity (sight, hearing, walking or climbing stairs, remembering or concentrating, taking care of oneself, communicating in one's usual language).

The 2014 GCPH shows that the prevalence of disability in 2014 is estimated by 5.1% of the total population, That is exactly 1703424 individuals. This prevalence rate is not the same throughout the Moroccan territory and differs from one region to another. In fact, there are higher disability prevalence rates than the national average in six regions: Orientale (5.9% or 136791 individuals), Fèz-Meknès (5.4% or 229590), Béni Mellale-Khénifra (5.4% or 136143 individuals), Marrakeche-Safi, Sous-Massa and Gulmim-Oued Noun (5.2% each respectively 235496, 136936 and 21474 individuals). On the other hand, it is lower than the national average in the regions of Casablanca-Settat (4.7% or 320244 individuals), Rabat-Salée-Kenitra (4.6% or 209697 individuals), Layoune-Sakia El Hammra (3, 4% or 11464 individuals) and finally the region of Edakhla-Oued Eddahab (2.4% or 2786 individuals).

Breakdown by environment, the 2014 RGPH data suggest that the prevalence of disability is relatively higher in rural areas (5.5% or 727833 individuals) than in urban areas (4.8% or 975591 individuals). In relation to gender, the data do not show any significant differences in this prevalence between women (5.1% or 859965 women) and men (5% or 843459 men).

By province, Driouche recorded the highest prevalence with 8.2% (17215 individuals), followed by Tata with 7.5% (8618 individuals), Tiznite with 7.4% (15130

individuals), Sidi Ifnni with 7.0 % (8097 individuals), Berkan with 6.9% (19906 individuals) and then Ouezane with 6.8% (20194 individuals). On the other hand, the provinces with the lowest prevalence are: TanTan with 3.5% (2997 individuals), followed by Lâyoune with 3.4% (7922 individuals), Boujdoure with 2.7% (1219 individuals), then Aoussered with 2.5% (60 individuals) and finally Oued Ed-Dahab with 2.4% (2726 individuals).

By municipality, we find that it is within the Eastern region that the majority of municipalities (68.5% or 85 municipalities) have a prevalence above the national average (5.1%), followed by the region of Sous-Massa (66.9% or 117 municipalities), then the region of Fèz-Meknès (65.3% or 130 municipalities) and the region of Béni Mellale-Khénifra (61.5% or 83 municipalities). On the other hand, the regions where the majority of municipalities have a prevalence of less than 5.1% are: Edakhla-Oued Edhab region (100% or 9 communes), followed by the Lâyoune-Sakia El Hamra region (80%). ie 16 municipalities), followed by the Casablanca-Settate region (66.1% or 111 municipalities) and the Rabat-Salée-Kénitra region (62.3%, ie 76 municipalities).

It should be noted that the prevalence of disability increases with age. In fact, just under half (46.5% or 791264 individuals) are aged 60 and over, 45.6% (776778 individuals) are 15-59 years old and 7.9% are under 15 years old (135382 individuals). The results also suggest that 1.8% of people under the age of 15 are disabled. This rate rises to 4.8% for people aged 15-59 years. Its value is 33.7% for people over the age of 60. Compared with Tunisia, a country with a comparable level of development, these rates are respectively 2.6%, 4.3% and 25.5%. So the performance of Morocco is much lower than that of Tunisia except for the first age group.

The results of the 2014 RGPH also provide information on marital status. Married individuals with disabilities account for almost 46.5% (791328 individuals), 29% are single (493546 individuals), 21.6% are widows (367824 individuals) and finally 3% are divorced (50726 individuals). For comparison, these values are respectively 41.2%, 54.5%, 2.9% and 1.5% among the non-disabled individuals.

The nature of the family structure and the lack of specific care units mean that the majority of disabled people live in households. The details show that just over half (59.5%, or 1013264 individuals) of individuals with disabilities live in households of 5 or more individuals, 14.2% (242248) in households of 4 individuals. . They are 11.6% and 10% to live, respectively, in households of 3 individuals and two individuals. Finally, disabled people living alone represent 4.7% (80331), of which 68.8% are individuals aged 60 and over and 31.2% are individuals in the 15-59 age group.

Interestingly, the level of education of individuals with disabilities is also affected dramatically. In fact, 66.5% (1133615 individuals) have no level of education compared to 35.3% among non-disabled individuals. This situation is very prevalent among women (79.5%) and men (53.4%). 17.1% of them attended only primary school. 9.8% attended secondary school and only 1.5% succeeded to attend higher education compared to 28.6%, 25.1% and 6.4% among non-disabled individuals respectively.

This low level of education affects the rate of job integration among disabled people. Therefore, more than 8 out of 10 disabled people (86.6%) are inactive and only

10.7% are employed (this rate is 29.8% among non-disabled individuals). Their unemployment rate is relatively low at no more than 2.7% (5.7% among individuals without disabilities).

The results of the 2014 RGPH also provide information on the prevalence of disability by type of disability. The HCP (2014) identified the following disability types:

- ✓ Sight: They are 0.2% of the population (75864 individuals) to have a total disability of sight (completely blind), 1.8% (606336 individuals) have difficult sight problems and 5.5% (1840292 individuals) have slight sight problems .

- ✓ Deaf and people with hard hearing: 0.2% of the population (56745 individuals) have a total disability to hear (the deaf), 1.0% (347386 individuals) difficult hard-hearing problems and 2.3% (778550 individuals) have slight hard-hearing problems.

- ✓ Mobility: they are 0.5% of the population (173251 individuals) to have a total disability to walk or climb the stairs, 2.0% (679073 individuals) have a lot of difficult mobility problems and 2.4% (791779 individuals) have slight problems.

- ✓ Concentration: they are 0.3% of the population (101779 individuals) to have a total disability to remember events or objects or to focus on their tasks, 1.0% (319772 individuals) have great difficulty and 1.2% (408051 individuals) have slight problems.

- ✓ Taking care of themselves: they are 0.6% of the population (209038 individuals) have a total disability to do so, 0.9% (302543 individuals) have a lot of problems and 0.8% (256271 individuals) have slight problems.

- ✓ Communication: 0.3% of the population (99275 individuals) has a total disability to communicate in their everyday-used language, 0.6% (215707 individuals) has great difficulty and 0.6% (191779 individuals) have slight problems.

It is usual that the same person can be identified as disabled on several disabilities. 1.2% of the population (393919 individuals) suffer from a total disability in at least one of the six above mentioned types, 4.4% (1474568 individuals) are experiencing many problems and 8.1% (2733377 individuals) with slight problems.

4. Determinants of disability prevalence: an empirical spatial analysis

4.1 Exploratory analysis of spatial data on the disability rate in Morocco

The objective of this section is to conduct an exploratory analysis on the distribution of the disability rate according to a spatial approach. In recent years, new techniques have been developed to detect spatial inequalities. These studies are based on the construction of spatial indices for each spatial unit. The purpose is to determine to what extent the values taken by a region is similar to that taken by the neighboring region. This type of analysis assumes that detection methods take into account spatial data, namely spatial autocorrelation and spatial heterogeneity, which are unavoidable features. This spatial autocorrelation means that the values taken by a random variable in a spatial unit are not randomly arranged (Anselin and Bera, 1998), but are often close for two neighboring spatial observations (Jayet, 1993). In other words, spatial autocorrelation is characterized by the coincidence of the similarity of values with the similarity of location (Anselin, 2001). Practically, spatial autocorrelation is considered to be positive when high or low values of a random variable tend to cluster in space. Spatial autocorrelation is negative when spatial units tend to be surrounded by neighbors with very different values (Vasiliev, 1996).

Empirically, the analysis of spatial autocorrelation is made possible thanks to the Exploratory Analysis of Spatial Data. According to LeGallo (2002), this is the set of techniques intended to describe and visualize spatial distributions in order to identify atypical locations, extreme observations and spatial groupings, to detect patterns of spatial association and finally to suggest spatial regimes and other forms of spatial heterogeneity. The spatial interactivity between two geographical units is directly taken into account through the matrix of weight (Guillain et al, 2004). In practical terms, spatial autocorrelation is measured by Moran's I statistics and Geary's C statistics.

Table 1 shows the value of the Moran I statistics for the different disability rates in Morocco. Note that the weight matrix used is that of the order 1 contiguity. In other words, two regions are neighbors if they share the same boundary. If the Moran statistics I (table 1) has a high positive value, it indicates the presence of a strong global spatial autocorrelation of the handicap in Morocco. The results of the calculation of the Moran statistics indicate the present positive and significant values at the 1% threshold for all disability measures.

Table 1: Spatial autocorrelation using Moran'I

Variables	Moran's I	E(I)	sd(I)	Z	p-value*
Rate of disability total	0.510	-0.014	0.078	6.709	0.000
Rate of disability men	0.548	-0.014	0.078	7.184	0.000
Rate of Disability women	0.433	-0.014	0.078	5.700	0.000
Rate of Disability urban	0.555	-0.014	0.080	7.133	0.000
Rate of Disability rural	0.482	-0.014	0.079	6.289	0.000

To test the robustness of the presence of spatial dependence for disability indicators in Morocco, we calculated Geary's C statistics (Table 2). The results confirm the presence of a positive spatial autocorrelation. Otherwise, neighboring provinces are more likely to have similar values in terms of disability prevalence.

Table 2 : Spatial autocorrelation using Geary's c

Variables	Geary's c	E(I)	sd(I)	Z	p-value*
rate of disability Total	0.473	1.000	0.084	-6.271	0.000
Rate of disability men	0.441	1.000	0.084	-6.644	0.000
Rate of Disability women	0.547	1.000	0.084	-5.422	0.000
Rate of Disability urban	0.410	1.000	0.084	-7.001	0.000
Rate of Disability rural	0.522	1.000	0.088	-5.416	0.000

To detect the different types of spatial association between "provinces", we use the Moran's map (Anselin, 1995). It identifies four quadrants: EE (a high value province surrounded by provinces with high values); FE (a province with low value surrounded by provinces with low values), EF (a high value provinces surrounded by low value provinces) and FF (a low value province surrounded by high value provinces). The first and last quadrants represent a positive spatial association; the other two represent a negative spatial association.

The results, [in the Annex](#), show important positive associations in terms of spatial inequality of the disability rate. For the total disability rate, it represents nearly 70% of all associations: 40% are EE and 30% are FF. Negative associations are about 22% for EF and about 7% for FE. For the disability rate of men, it presents nearly 72% of all

associations: 44% are EE and 28% are FF. The negative associations are about 24% for EF and about 4% for FE. For the disability rate of women, it presents nearly 72% of all associations: 44% are EE and 28% are FF. The negative associations are about 24% for EF and about 4% for FE. For the urban disability rate, it accounts for nearly 72% of all associations: 44% are EE and 28% are FF. The negative associations are about 24% for EF and about 4% for FE. For the disability rate in rural areas, it accounts for nearly 72% of all associations: 44% are EE and 28% are FF. The negative associations are about 24% for EF and about 4% for FE. These local spatial associations confirm the global spatial association found previously.

This general trend suggests a bipolarization of this phenomenon in Morocco. A first province pole characterized by a low prevalence of disability. These are mainly the provinces located in the Kenitra-Casablanca axis (which is the economic body of the country) and some provinces of the Moroccan Sahara (which benefits from a particular interest in public policy). The second pole is characterized by high rates of disability. It mainly contains poor provinces located in the mountains (Al Haouz, Chichaoua, Essaouira, Khelifra). The modeling of this spatial polarization will be treated in the next point.

4.2 Socioeconomic Determinants of Disability Prevalence: An Empirical Study

4.2.1 Model, methodology and data

The modeling of the determinants of disability in Morocco is obtained in regression the rate of the prevalence of disability at the provincial level on a number of factors identified in the literature. The model is given as follows:

$$DISABILITY_rate = + X \beta + \varepsilon \quad (1)$$

With Disability_rate is the prevalence rate of disability retained between 2004 and 2014, X is a vector of factors that can impact the disability rate. These are the level of education (measured by the illiteracy rate), the level of economic activity (measured by the unemployment rate), demographic characteristics (measured by household size), and the living conditions. life (as measured by the Internet access rate and the type of housing). ε is an independent error term and identically distributed. In the presence of spatial interaction between observations, the estimation of this model by the ordinary least square method causes an estimation bias (Elhorst, 2014). Generally, the origin of spatial dependence comes either from the endogenous variable shifted by the weight matrix or from the error terms (Pinkse and Slade, 2010).

In the first case, we specify an autoregressive spatial model, noted in the literature by SAR (Liu et al., 2012). Equation 1 becomes:

$$(2) \quad DISABILITY_rate = \rho W (DISABILITY_rate) + X \beta + \varepsilon$$

With W (Disability_rate) is the endogenous variable shifted for the weight matrix W, ρ is the autoregressive spatial parameter indicating the intensity of the interaction between Disability_rate observations. It should be noted that W is not endogenous (Qu and Lee, 2015).

In the second case, we note the presence of a correlation between the error terms of the adjacent spatial units. The solution is to introduce spatial dependence into the

equation to be estimated using a spatial error model (SEM), noted in the literature by SEM (Elhorst, 2014). Equation (1) becomes:

$$DISABILITY_rate = X\beta + \varepsilon$$

with $\varepsilon = \lambda W\varepsilon + \mu$ (3)

λ is the autoregressive spatial parameter indicating the intensity of the interaction existing between model perturbations.

In Morocco, recent data from the General Census of Population and Housing in 2014 allowed a quantification of the different variables subject of the study according to a local scale.

4.2.2 Results of the estimation

The objective here is to present an estimate of the impact of socioeconomic determinants on the prevalence of disability for the entire population. To identify a possible gender difference, we re-estimated the same model for men and women.

We estimated the model using the following three techniques; OLS, SAR and SEM. The diagnostic tests show the presence of a spatial autocorrelation of the residuals of the OLS estimation. As expected, spatial models are becoming a better specification of our model. The results of the Lagrange test estimates show that the SAR model has unbiased coefficients. Thus, it is retained for the analysis of our results. In addition, the degree of satisfaction of the model is sufficient since the $R^2 = 0.63$.

The econometric results suggest (table 3) that the disability rate is positively and significantly associated with the illiteracy rate. Our results are also consistent with previous studies in other Asian developing countries, such as Indonesia, China, Bangladesh, and Pakistan, where they revealed the negative effects of education on disability (Semba et al., 2008, Aslam, 2012).

This impact is due to parents' level of education. This may be due to the fact that children develop a specific and enduring relationship with their mother (Al-agon, 2014) and that mothers usually play the role of primary care providers (Amin et al., 2015), based attachment theory (Bowlby, 1980), as well as Grossman's division of labor theory (Grossman, 2006).

Thus, it can be argued that at the provincial level, parents' attitudes to modern medicine may well influence their decisions to opt for health services, thereby reducing the prevalence of disability. Provinces with a low illiteracy rate are assumed to have low rates of disability prevalence.

In relation to household size, the coefficient associated with it is significantly negative. The incidence of household size seems to be counterintuitive. In fact, households with more members seem to be more likely to have a member with a disability. This paradoxical result was also found by Eggers and Moumen (2011). Such a result can be explained by the fact that we do not have information on age or the nature of the disability.

Regarding economic activity, the results suggest that the unemployment rate observed in a province positively impact is significantly the rate of disability prevalence. Indeed, a high unemployment rate is a source of income reduction. This income shortage negatively affects health expenditures, increasing the likelihood of illness and consequently the prevalence of disability. This analysis reaffirms the close link between income poverty and the prevalence of disability. Indeed, income poverty can limit access to health care and prevention services, and increase the chances that a person will live and work in an environment that may be harmful to health. While poverty may increase the risk of being disabled, however, according to WHO (2011), disability may increase the risk of poverty. Thus, we agree with Yeo (2005) that the relationship between disability and poverty is often referred to as a "vicious circle".

Table 3: model estimation. Dependant Variable: **Rate of the prevalence of disability**

Variables	OLS	SAR	SEM
Constant	1.853672	1.583823	5.580001***
Education	.0860847***	.0374897**	.0327729
Rural Housing	.0179271*	.0203646***	.0232169***
Household size	-.3977384 **	-.5420121***	-.7251872***
Unemployment rate	.0519181***	.0433734***	.0517094***
Internet	.0479636*	.0214691	.0183442
R ²	0.33	0.62	0,27
Fisher	8,5***	--	--
p-value	0.000	-	-
LM lag	-	26.786***	-
p-value	-	0.000	-
RLM-lag	-	6.833***	-
p-value	-	0.009	-
Moran-err	-	--	5.250***
p-value	-	--	0.000
LM-err	-	--	19.954***
p-value	-	--	0.000
RLM-err	-	--	0.001
p-value	-	--	0.972
Number of observations	75	75	75

*significant at 10%, ** significant 5%, *** significant at 1%

The variables related to living conditions have mixed effects. Indeed, the predominance of rural-type housing in a province increases the probability of being reached by a disability. In Morocco, rural housing is a synonym for the prevalence of poverty. This result reaffirms the conclusions about the importance of the fight against poverty to reduce the disability rate. As for access to the Internet, the estimates show no significant effect. Indeed, in Morocco, access to the Internet is in its infancy and its use is essentially linked to social networks without being a tool to educate people on practices that can lead to the reduction of the disability rate.

Finally, to verify the robustness of our results, we made estimates using subsamples for both men and women. The objective is to determine the extent to which socioeconomic determinants have the same effect on the prevalence of disability among men and women. This choice is justified by the fact that disabled women are

generally more disadvantaged than men with disabilities. In developing countries, the income, education and employment indicators of people with disabilities show significant gaps between men and women (WHO, 2011).

The diagnostic tests of the presence of the spatial dependence of the observations also show two observations. First, the presence of a spatial autocorrelation of the residuals of the estimation by OLS. Next, the SAR estimate produces the best estimators.

Table 4 presents the results of the estimates from the three models, although the interpretations are based on the SAR estimates.

Table 4: Model estimation for Women and Men. Dependant Variable: Rate of the prevalence of disability

Variables						
	Men	Women	Men	Women	Men	Women
	OLS		SAR		SEM	
Constant	1.4420	2.6774**	1.4547	2.0067*	5.4312***	5.7614***
Education	.0887***	.0786747***	.0371*	.0371**	.0344	.0306
Rural housing	.0196**	.015634*	.0209***	.01917***	.0236***	.0222***
Taux de ménage	-.3367	-.482044**	-.5087***	-.5799***	-.6866***	-.7504***
Unemployment rate	.0598***	.0420961**	.0478***	.0375***	.0563**	.0456***
Internet	.0398	.0499327**	.0108	.02875	.0070	.0263
R ²	0.36	0.28	0.65	0.54	0.32	0.24
Fisher	9,61***	6,79***	-	-	-	-
p-value	0.000	0.000	-	-	-	-
LM lag	-	-	30.879***	20.304***	-	-
p-value	-	-	0.000	0.000	-	-
RLM-lag	-	-	7.395***	4.370**	-	-
p-value	-	-	0.007	0.037	-	-
Moran-err	-	-	-	-	5.660***	4.744***
p-value	-	-	-	-	0.000	0.000
LM-err	-	-	-	-	23.541***	15.943***
p-value	-	-	-	-	0.000	0.000
RLM-err	-	-	-	-	0.058	0.008
p-value	-	-	-	-	0.8	0.9
N° of observations	75		75	75	75	75

*significant at 10%, ** significant 5%, *** significant at 1%

The results suggest that the impact of socioeconomic determinants (with the exception of education) on the prevalence of disability at the provincial level is almost the same for men and women. Indeed, the signs and the magnitudes of the coefficients corresponded to the expected values. For the variable "education", which is measured by the illiteracy rate, its impact on the prevalence rate of disability among women is significantly higher than that observed for men. This important result observed at the provincial level confirms the idea that parents' levels of education affect the level of health of their daughter and son. Already Sandiford et al. (1995), Cochrane et al. (2004) and De Silva (2018) examine a wide range of evidence on the relationship between parent education and child health without either distinguishing between boys and girls or opt for the spatial approach.

Our findings may be explained by the fact that women may experience discrimination within the family, receive less medical care and food, and may be excluded from family activities. They also have less access to health care and rehabilitation services, and fewer opportunities for education and employment, making their lives very vulnerable.

5. Conclusion

Several studies have analyzed the factors that explain the prevalence of disability. These factors include, but not limited to the level of education, access to socio-economic services, the rate of poverty, unemployment rate, family structure. However, the prevalence of disability is a complex and broad phenomenon. Analysing this phenomenon necessitates taking into account its geographical and spatial context. These kinds of studies are rare in this respect.

Recent data from the 2014 *General Census of Population and Housing* (GCPH) show that 2.3 million Moroccans are disabled people which is approximately 5.1% of the population. The rate of disability in rural areas is 5.5% and 4.8% in urban areas. This also indicates the spatial inequalities of health care. The purpose of this work was to show to what extent socio-economic factors can influence the prevalence of disability at the provincial level. To answer this problem, we used spatial data covering 75 provinces. They come from the 2014 RGPH. Our results suggest that the phenomenon of disability is a geographical phenomenon since it is unequally distributed over the Moroccan territory. Our analyzes also showed that the level of education, the participation rate, the type of housing and the size of the household have an impact on the prevalence of disability. In other words, these factors constitute the main axes of multidimensional poverty. Thus, reducing the prevalence of disability amounts to reducing the prevalence of multidimensional poverty. The vicious circle of intergenerational transmission of poverty must be broken. Indeed, the dimension that deserves more attention and on which priority must be given is education. Despite the efforts made by the country, problems related to access and retention still exist. Educational policies must ensure that every child has to complete compulsory education throughout the national territory. This passes one of the geographic targeting policies to meet the specific needs of each province. Although spending on education is close to international standards, there is a need for effective management of these expenditures. The dysfunction of the education system also does not provide individuals with the skills needed to enter the labor market. Public policies must multiply the launch of initiatives aimed at creating productive employment by promoting both traditional sectors (agriculture, fishing ...), which are very prevalent in the poor rural areas, and non-traditional employment-intensive to such manufacturing industry and services. The government must also invest in the social protection of the population through the elimination of unhealthy housing and the encouragement of the construction of housing that respects the minimum of sanitary standards. Although disability is a global phenomenon, it should not be a fatality. They must be included in all levels of life: education, health, jobs, information.

Morocco has taken measures to protect and promote the rights of people with disabilities. In July 2017, the Government adopted a national action plan (2017-2021) for the implementation of integrated public policies aimed at promoting the rights of

people with disabilities, in particular the adoption of sectoral strategies (accessibility to transportation, professional integration, income-generating activities, access to audiovisual communication, support for the education of people with disabilities, especially children (the rate is 49.5%) and support to civil society (providing the devices necessary to ensure technical assistance).

Despite efforts to improve the situation of people with disabilities in Moroccan society, challenges remain: the consolidation of the legal arsenal, capacity building and expertise and the convergence of public policies. It is also difficult to change the negative perception of individuals towards people with disabilities.

The non-inclusion of people with disabilities in any development strategy can contribute to a very low level of economic development which has already been observed by Guisan (2017) African countries. Indeed, In order to diminish poverty and to increase support to disabled people, it is important to avoid stagnation and to increase real production per capita. There are many positive impacts of industry on non industrial sectors, general economic development, and support for disable people.

A major limitation of this work is that there is no single definition of disability and therefore there is no single measure. Indeed, the concept of disability is complex and can be understood in different ways. Moreover, the exact mechanisms by which these socioeconomic factors affect the prevalence of disability are unclear.

Future research, based on surveys of households can help us better understand the circumstances in which that relationship is causal, how variables on literacy, health, living conditions, income and geographical location of households are linked to the phenomenon of disability, and what interventions can effectively reduce spatial disparities related to the prevalence of disability.

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Annex : Table 5 : province liste

Code	Provinces	Region
AZ	Azilal	Béni-Mellal Khenifra
BM	Béni Mellal	Béni-Mellal Khenifra
FBS	Fquih Ben Salah	Béni-Mellal Khenifra
Khe	Khénifra	Béni-Mellal Khenifra
Kho	Khouribga	Béni-Mellal Khenifra
Ben	Benslimane	Casablanca-Settat
BERR	Berrechid	Casablanca-Settat
CA	Casablanca	Casablanca-Settat
EJ	El Jadida	Casablanca-Settat
MED	Médiouna	Casablanca-Settat
MO	Mohammadia	Casablanca-Settat
NO	Nouaceur	Casablanca-Settat
SE	Settat	Casablanca-Settat
SB	Sidi Bennour	Casablanca-Settat
ERR	Errachidia	Daraa-Tafilalet
MID	Midelt	Daraa-Tafilalet
OUA	Ouarzazate	Daraa-Tafilalet
TIN	Tinghir	Daraa-Tafilalet
ZA	Zagora	Daraa-Tafilalet
AO	Aousserd	Eddakhla-Oued Eddahab
OD	Oued Ed-Dahab	Eddakhla-Oued Eddahab
BOU	Boulemane	Fès-Meknès
EH	El Hajeb	Fès-Meknès
FE	Fès	Fès-Meknès
IF	Ifrane	Fès-Meknès
ME	Meknès	Fès-Meknès

MY	Moulay Yacoub	Fès-Meknès
SEF	Sefrou	Fès-Meknès
TAO	Taounate	Fès-Meknès
TAZ	Taza	Fès-Meknès
AZ	Assa-Zag	Guelmim-Oued Noun
GU	Guelmim	Guelmim-Oued Noun
SI	Sidi Ifni	Guelmim-Oued Noun
TT	Tan-Tan	Guelmim-Oued Noun
BO	Boujdour	Laayoun-Sakia El Hamra
ES	Es-Semara	Laayoun-Sakia El Hamra
LA	Laâyoune	Laayoun-Sakia El Hamra
TAR	Tarfaya	Laayoun-Sakia El Hamra
AH	Al Haouz	Marrakech-Safi
CH	Chichaoua	Marrakech-Safi
EK	El Kelâa des Sraghna	Marrakech-Safi
ESS	Essaouira	Marrakech-Safi
MA	Marrakech	Marrakech-Safi
RE	Rehamna	Marrakech-Safi
SA	Safi	Marrakech-Safi
YO	Yousseoufia	Marrakech-Safi
BER	Berkane	Oriental
DR	Driouch	Oriental
FI	Figuig	Oriental
GUE	Guercif	Oriental
JE	Jerada	Oriental
NA	Nador	Oriental
OA	Oujda-Angad	Oriental
TA	Taourirt	Oriental
KE	Kénitra	Rabat-Salé-Kénitra
KH	Khémisset	Rabat-Salé-Kénitra
RA	Rabat	Rabat-Salé-Kénitra
SA	Salé	Rabat-Salé-Kénitra
SK	Sidi Kacem	Rabat-Salé-Kénitra
SS	Sidi Slimane	Rabat-Salé-Kénitra
ST	Skhirate- Témara	Rabat-Salé-Kénitra
AIT	Agadir-Ida -Ou-Tanane	Souss-Massa
CAB	Chtouka- Ait Baha	Souss-Massa
IAM	Inezgane- Ait Melloul	Souss-Massa
TAR	Taroudannt	Souss-Massa
TAT	Tata	Souss-Massa
TIZ	Tiznit	Souss-Massa
ALH	Al Hoceima	Tanger-Tetouan-Al Hoceima
CHE	Chefchaouen	Tanger-Tetouan-Al Hoceima
FA	Fahs-Anjra	Tanger-Tetouan-Al Hoceima
LAR	Larache	Tanger-Tetouan-Al Hoceima
MDF	M'Diq-Fnideq	Tanger-Tetouan-Al Hoceima
OUE	Ouezzane	Tanger-Tetouan-Al Hoceima
TAN	Tanger-Assilah	Tanger-Tetouan-Al Hoceima
TE	Tétouan	Tanger-Tetouan-Al Hoceima

Moran scatterplot (Moran's I = 0.482)
disability_R







