Original Article

Factors associated with disability severity in El Salvador

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Abstract

Introduction. Disability is accompanied by physical, mental, intellectual or sensory difficulties; in the world, it is estimated that 15 % of the population has some type. This condition is a dynamic concept that involves the relationship between the person, physical environment, and social environment. **Objective.** Determine the factors associated with the severity of disability in the National Health Survey, El Salvador. **Methodology.** An analytical cross-sectional study based on the National Health Survey included people registered with disabilities in the axes: vision, hearing, walking, cognition, self-care, and communication, registered through the Washington Group questionnaire. Descriptive statistics, U Mann Whitney, and the association was determined by Odds Ratio with 95 % confidence intervals and p-value. In turn, a logistic regression model was built. **Results.** 17,1 % of the people had disabilities, 58,4 % were female and 62,9 % were from urban areas. The most frequent type of disability by severity indicator was mild with 63,7 %; 37,4 % presented functional difficulty seeing and the total prevalence of the disability condition in the axes evaluated by the National Health Survey was: 17,1 % (IC 95 %: 16,8-17,4). The factor that presented the greatest association was chronic diseases with Odds Ratio 2. 1. (IC 95 %I: 1,15-1,76) $p < 0,05$. **Conclusion.** The factors associated with the severity of disability were age and chronic diseases.

Keywords

Disability Studies, Health Surveys, Surveys and Questionnaires, Secondary Data Analysis, Statistics on Sequelae and Disability.

Resumen

Introducción. La discapacidad se acompaña de dificultades físicas, mentales, intelectuales o sensoriales. En el mundo se calcula que el 15 % de la población tiene algún tipo de discapacidad. Esta condición es un concepto dinámico que involucra la relación entre la persona, entorno físico y ambiente social. **Objetivo.** Determinar los factores asociados a gravedad de discapacidad en la Encuesta Nacional de Salud, El Salvador. **Metodología.** Estudio transversal analítico, a partir de la Encuesta Nacional de Salud 2021, incluyó a personas registradas con discapacidad en los ejes: vista, audición, caminar, cognición, autocuidado y comunicación, registrados mediante el cuestionario del Grupo Washington. Se utilizó estadística descriptiva, pruebas U de Mann Whitney; la asociación se determinó por Odds Ratio, intervalos de confianza al 95 % y valor de $p < 0,05$. Se construyó un modelo de regresión logística. **Resultados.** El 17,1 % de las personas presentaron discapacidad, el 58,4 % pertenece al sexo femenino y el 62,9 % a zona urbana. El tipo de discapacidad por indicador de gravedad con mayor frecuencia fue leve con el 63,7 %, el 37,4 % presentó dificultad funcional para ver y la prevalencia total de la condición de discapacidad en los ejes evaluados por la Encuesta Nacional de Salud fue de: 17,1 % (IC 95 %: 16,8-17,4). El factor que presentó mayor asociación fue la presencia de enfermedades crónicas con Odds Ratio de 2,1 (IC 95 %: 1,15-1,76) $p < 0,05$. **Conclusión.** La edad avanzada y la presencia de enfermedades crónicas fueron los factores asociados a la gravedad de la discapacidad.

Palabras clave

Estudios de la Discapacidad, Encuestas de Salud, Análisis de Datos Secundarios, Estadísticas de Secuelas y Discapacidad.

OPEN ACCESS

Factores asociados a la gravedad de las discapacidades en El Salvador

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Introduction

Disability is a condition accompanied by physical, mental, intellectual, or sensory difficulties that affect the full development of a human being and their performance in daily social activities. It is defined as "a condition in which a person has long-term physical, psychosocial, intellectual, or sensory impairments. When interacting with various barriers, these impairments can impede or reduce their full and effec-

tive participation in all areas of society on an equal basis with others."[i]

Worldwide, it is estimated that around 15 % of the population has some disability. [ii] Research reports greater severity and risk of death from stroke in populations with multiple disabilities.[iii]

In Latin America, around 12 % of the population has some type of disability, and it is estimated that a person with a disability dies 20 years earlier than someone without a disability.[ii] By 2015, in El Salvador, it was estimated that 222 595 women and 188 203 men had some disability, of which 80 % of the population belonged to the age group of 25 to 64 years.[iv]

Disability, by nature, is a dynamic concept that involves the relationship between the person and their condition, the physical environment, the social environment, economic factors, and religious beliefs. Different scales allow disability to be classified; one is the Washington Group's short questionnaire, founded in 2001 within the framework of the International Seminar on Disability Measurement, which has been applied to measure this condition in various studies.[vi,vii,viii] This questionnaire allows for assessing disability through short, standardized questions, depending on the respondents' responses.[ix]

Disability is complex, and the term encompasses multiple conditions. A 2021 study of factors associated with disability found that the most significant disability was found in women, those with low education, and comorbidities (diabetes *mellitus* and cardiovascular disease).[x] Meanwhile, another study found that people with severe disabilities are 7.9 times more likely to develop depression compared to those with mild and moderate disabilities.[xii] These findings reinforce the multifactorial nature of disability and the need to understand how various factors, such as age, sociocultural conditions, comorbidities, and others, interact to influence the severity of disability or how a condition can become disabling. This approach is crucial for designing comprehensive prevention and management strategies that reduce the burden of disability and improve the quality of life of people with this condition.

In this context, this study was structured to determine the factors associated with disability severity in Salvadorans who participated in the National Health Survey (ENS, for its acronym in Spanish) during 2021.[xii] Also, the value of this secondary analysis lies in providing scientific evidence on the factors that influence disability severity.

Methodology

It is an analytical cross-sectional study based on data from the National Health Survey of El Salvador, carried out in 2021 by the National Health Institute of El Salvador (INS) [EA1] with the support of the General Directorate of Statistics and Census; this survey collected information from all 14 departments of El Salvador.[xii] The survey included results from 16 500 households nationwide and 62 490 participants. All people registered with any difficulty in the areas assessed by the survey were included in this Research: vision, hearing, gait, cognition, self-care, and communication. People coded as "non-responsive" in the variables of interest were excluded.

This study considered variables such as age, sex, and difficulties with movement, vision, communication, hearing, bathing, understanding, learning, and relating to others, each with four response options: "None," "Yes, little difficulty," "Yes, much difficulty," and "Total." From these variables, the categories "disability" and "severity of disability" were constructed. Other relevant variables were included, such as chronic noncommunicable diseases, department, educational level, area of residence, and health region. All of these data were integrated into a unified database for analysis.

The severity indicators were constructed using the Washington Group's creation tool, using the highest difficulty recorded as the construction method. If a person responded "no difficulty" in any of the assessed areas, they were categorized as having no disability. For the mild disability indicator, participants who did not have any area coded as "total difficulty" or "much difficulty" and who also responded that they had "little difficulty" in at least one area were considered. For moderate disability, participants who did not have any area coded as "total difficulty" and who responded that they have "much difficulty" in at least one area were considered. For the severe disability indicator, those who responded "total difficulty" in some area were considered.

The INS Research Unit provided the database as a linear database with the requested variables of interest. Data quality was verified; the analysis did not include variables with 20 % missing records.

For univariate analysis, frequencies, proportions, and ratios were constructed. Continuous quantitative variables were tested for normality using the Anderson-Darling normality test, with the median as a measure of central tendency and the interquartile range as a measure of disper-

sion. The Mann-Whitney U test was used to determine differences between the median ages by sex. Two-by-two tables were constructed for bivariate analysis, using the prevalence odds ratio (POR) as a measure of association with 95 % confidence intervals and considering $p < 0.05$ as significant. A logistic regression model was performed for multivariate analysis with severe disability as the response variable and age, sex, area, education, and chronic noncommunicable diseases as predictor variables. A global test was performed on the model to determine significance. Statistical analysis was performed using RStudio V1.4.1106. In addition, a map was created using QGIS v3.26 to represent the prevalence of disability by department. This Research was approved by the INS Ethics Committee under document number CEINS/2023/011.

Results

The included population consisted of 10 695 people registered with some type of disability. 58.4 % were female, and 41.6 % were male. 62.9 % were from urban areas, and 37.1% were from rural areas. Table 1 shows the sociodemographic characteristics of the population by severity indicator.

Regarding academic level, 40.0 % had a primary education (between first and sixth grade), followed by 12.8 % a secondary education (seventh to ninth). When analyzing by severity indicator, primary education had the highest proportion of mild disability at 50.0 %, moderate disability at 61.0 %, and severe disability at 62.8 %. The Anderson-Darling test for age yielded a result of 0.69 and a p-value < 0.05; the median age was 53 years (interquartile range: 34–68 years). The female ratio was 1:1. The median age for women was 54 (interquartile range: 37–68 years), and for men, 51 (interquartile range: 31–68 years). The Mann–Whitney U test for median age by sex yielded a p-value < 0.05.

Disability is classified according to three severity indicators: mild, moderate, and severe. Mild disability was present in 63.8 % (95 % CI: 62.8–64.7), moderate disability in 32.8 % (95 % CI: 31.9–33.6), and severe disability in 3.4 % (95 % CI: 3.0–3.7). The most common functional difficulty was "seeing," at 37.4 % (95 % CI: 36.5–38.3), followed by "moving" at 18.9 % (95 % CI: 18.1–19.6), and "understanding" or "learning" at 16.3 % (95 % CI: 15.6–17.0). When severity indicators were assessed, it was identified that 27.4 % (95 % CI: 26.5-28.2) had a mild disability in "seeing," 9.7 % moderate (95 % CI: 9.1-10.2), and 0.4 % severe (95 % CI: 0.2-0.4). The severe indicator was identified in functional difficulties in "moving" with 0.9 % (95 % CI: 0.6-1.0) and in "dressing," "bathing," or "eating" with 0.6 % (95 % CI: 0.4-0.7).

The total prevalence of disability across the axes assessed by the 2021 ENS at the national level was 17.1 % (95 % CI: 16.8-17.4). Five departments are above the national prevalence: Chalatenango with a prevalence of 20.4 % (95 % CI: 19.1-21.8), followed by San Vicente with 18.9 % (95% CI: 17.5-20.2), Cabañas with 18.4 % (95 % CI: 17.3-19.5), and La Libertad with 18.4% (95 % CI: 17.2-19.6). Figure 1 represents the prevalence of total disability by department among participants in the 2021 ENS.

The department with the highest prevalence of mild disability was Sonsonate, with 66.9 % (95% CI: 63.1-70.5). The department of Morazán had the highest prevalence of moderate disability, 36.1 % (95 % CI: 32.8-39.5). The department that reported the highest prevalence of severe disability was Usulután, with 4.7 % (95 % CI: 3.3-6.5).

Bivariate analysis revealed the following results: male sex had an OR of 1.12 (95 % CI: 0.91-1.38; $p = 0.26$), indicating a non-significant association. Residents in rural areas had an OR of 0.81 (95 % CI: 0.65-1.01; $p = 0.07$), which was also without statistical significance. In contrast, those aged over 60 years had an OR of 1.42 (95 % CI: 1.15-1.76; $p < 0.05$), demonstrating a significant association. For the level of education, the OR was 0.91 (95 % CI: 0.34-3.88; $p = 0.88$), without statistical significance. Finally, the presence of chronic diseases showed a strong association, with an OR of 2.96 (95 % CI: 2.38-3.69; $p < 0.05$).

In the multivariate analysis, the results show that the population over 60 years of age had a higher probability of presenting severe disability OR of 1.9 (95 % CI: 1.3-2.6) and a p-value < 0.05. Likewise, the presence of chronic diseases was associated with a higher probability of severe disability with an OR of 2.1 (95 % CI: 1.5-3.0) and a p-value < 0.05. On the other hand, the variables that did not present an association in the model were educational level, area, and sex. Table 2 shows the results of the multivariate analysis of the factors associated with severe disability in the Salvadoran population that participated in the ENS.

Discussion

Disability encompasses a wide variety of conditions and is complex to explain in a unidirectional manner. Multiple factors are interrelated with disability, including the physical environment, the atmosphere in society, economic factors, and religious

Table 1. Sociodemographic characteristics of the population with disabilities from the National Health Survey by severity indicator, 2021.

Variable	Mild disability			Moderate disability			Severe disability		
	N 6823	%	IC 95%	N 3507	%	IC 95%	N 365	%	IC 95%
Sex									
Female	4005	58.6	(57.5 - 59.8)	2040	58.2	(56.5 - 59.7)	203	55.6	(50.4 - 60.6)
Male	2818	41.4	(40.1 - 42.4)	1467	41.8	(40.2 - 43.4)	162	44.4	(39.3 - 49.5)
Area									
Urban	4321	63.4	(62.1 - 64.4)	2160	61.6	(59.9 - 63.1)	246	67.4	(62.4 - 70.0)
Rural	2502	36.6	(35.5 - 37.8)	1347	38.4	(36.8 - 40.0)	119	54.5	(49.3 - 59.5)
Age									
0 a 10	432	6.5	(5.7 - 6.9)	178	5.1	(4.3 - 5.8)	30	8.2	(5.8 - 11.4)
11 a 20	543	7.9	(7.3 - 8.6)	209	6.0	(5.2 - 6.7)	32	8.8	(6.2 - 12.1)
21 a 30	645	9.4	(8.7 - 10.1)	215	6.1	(5.3 - 6.9)	43	11.8	(8.8 - 15.4)
31 a 40	689	10.0	(9.4 - 10.8)	229	6.5	(5.7 - 7.3)	34	9.3	(6.7 - 12.7)
41 a 50	1112	16.4	(15.4 - 17.1)	444	12.7	(11.6 - 3.8)	24	6.6	(4.4 - 9.5)
51 a 60	1340	19.6	(18.7 - 20.6)	591	16.9	(15.6 - 18.1)	40	11.0	(8.1 - 14.5)
> 60	2062	30.2	(29.1 - 31.3)	1641	46.7	(45.1 - 48.4)	162	44.3	(39.3 - 49.5)
Level of education*									
Initial	12	0.2	(0.1 - 0.3)	5	0.2	(0.0 - 0.5)	1	0.6	(0.0 - 3.8)
Kindergarten	111	2.1	(1.7 - 2.4)	34	1.4	(0.9 - 1.9)	7	4.3	(1.8 - 8.9)
Elementary	2692	50.0	(48.6 - 51.3)	1479	61.0	(58.9 - 62.9)	103	62.8	(54.8 - 70.1)
Middle school	977	18.0	(17.1 - 19.1)	369	15.2	(13.8 - 16.7)	22	13.4	(8.7 - 19.8)
General High-school	580	10.8	(9.9 - 11.6)	184	7.6	(6.5 - 8.7)	11	6.7	(3.5 - 11.9)
Vocational Highschool	450	8.4	(7.6 - 9.1)	179	7.4	(6.3 - 8.5)	6	3.7	(1.4 - 8.1)
Higher non-university	99	1.8	(1.5 - 2.2)	25	1.0	(0.6 - 1.5)	3	1.8	(0.4 - 5.6)
University	451	8.4	(7.6 - 9.1)	145	6.0	(5.0 - 7.0)	8	4.9	(2,2 - 9,7)
Special	16	0.3	(0.1 - 0.4)	6	0.2	(0.0 - 0.5)	3	1.8	(0.4 - 5.6)
Department									
Ahuachapán	405	5.9	(5.4 - 6.5)	225	6.4	(5.6 - 7.2)	22	6.0	(3.9 - 9.1)
Santa Ana	463	6.8	(6.2 - 7.4)	233	6.6	(5.8 - 7.5)	25	6.8	(4.5 - 10.0)
Sonsonate	419	6.2	(5.5 - 6.7)	187	5.4	(4.6 - 6.1)	20	5.5	(3.4 - 8.4)
Chalatenango	462	6.8	(6.1 - 7.3)	221	6.3	(5.5 - 7.1)	24	6.6	(4.3 - 9.7)
La Libertad	487	7.2	(6.5 - 7.7)	250	7.1	(6.3 - 7.0)	16	4.4	(2.6 - 7.1)
San Salvador	1356	19.9	(18.9 - 20.8)	671	19.1	(17.8 - 20.4)	67	18.4	(14.5 - 22.7)
Cuscatlán	279	4.0	(3.6 - 4.5)	134	3.8	(3.2 - 4.5)	12	3.3	(1.7 - 5.8)
La Paz	410	6.0	(5.4 - 6.5)	203	5.8	(5.0 - 6.6)	18	4.9	(3.0 - 7.8)
Cabañas	562	8.3	(7.6 - 8.9)	294	8.4	(7.5 - 9.3)	35	9.6	(6.8 - 13.1)
San Vicente	368	5.4	(4.8 - 5.9)	198	5.6	(4.9 - 6.4)	22	6.0	(3.9 - 9.1)
Usulután	414	6.0	(5.5 - 6.6)	218	6.2	(5.4 - 7.0)	31	8.5	(5.9 - 11.9)
San Miguel	372	5.4	(4.9 - 6.0)	199	5.7	(4.9 - 6.4)	23	6.3	(4.1 - 9.4)
Morazán	473	6.9	(6.3 - 7.5)	281	8.0	(7.1 - 8.9)	24	6.6	(4.3 - 9.7)
La Unión	353	5.2	(4.6 - 5.7)	193	5.6	(4.7 - 6.3)	26	7.1	(4.7 - 10.3)

*Note. Classified as 98 or NA in education level for mild disability: 1435, moderate 1081 and severe: 201.

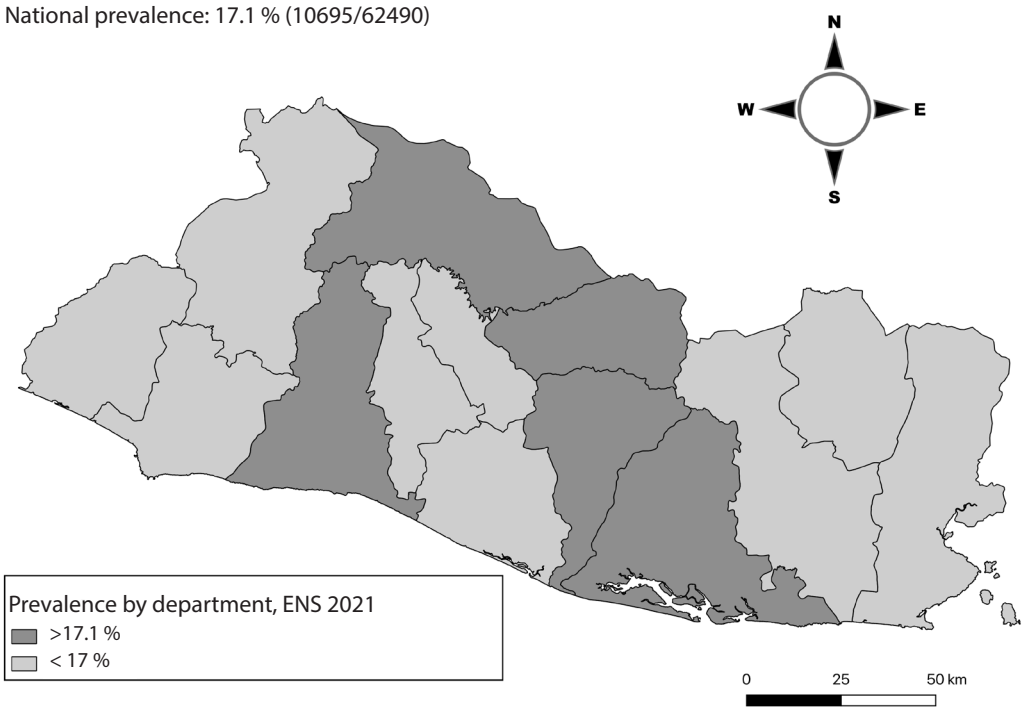

Figure 1. Prevalence of disability in the Salvadoran population participating in the National Health Survey, 2021.

aspects.[xiii,xiv,xv] When determining the age and characteristics at which disability occurs, multiple studies report heterogeneity in these data. For example, a study conducted at an adaptive center for people with disabilities determined that the average age of patients who attended was 52.9 years.[xvi] These data are consistent with those presented in this study, which determined a median age of 53 years and the highest proportion of cases with disabilities occurred in patients over 60 years of age.

Regarding the impact of gender on disability, a 2022 study analyzed and determined that approximately 52 % of women and 47 % of men had some disability. These findings are consistent with this Research's, which observed a higher frequency of cases in women.[xvii] On the other hand, a study conducted in India aimed to estimate the prevalence of disability and analyze its patterns and determinants. They indicated that 75 % of cases were concentrated in rural areas.[xviii] This last figure contrasts with the present Research findings, which show a higher frequency of cases in urban areas.

A secondary analysis of data collected in the Singapore National Survey assessed disability, in which they recorded that the most prevalent type of disability was motor at 1.8 %, followed by visual at 0.8 % and cognitive at 0.5 %. A relevant finding of this study is that most participants had functional vision impairment, and this condition, by severity indicator, was most frequently mild, in contrast to moving or walking, where the indicator with the highest proportion was severe.[xix] Another study conducted in Honduras describes a prevalence in the adult population of 51.2 % and determined that the degree of disability that occurred most frequently was mild.[xx] These data are consistent with those described in this Research, where the prevalence of disability was higher in the mild severity indicator.

A systematic review with meta-analysis of disability studies, published in 2022 in China, revealed a consolidated prevalence of 26.2 %. This figure showed significant variations based on daily activities, gender, and region; prevalence was higher in women and in the central, northeastern, and southwestern regions, demonstrating an influence of the activity scales used in the Research, which were susceptible to prevalence estimates compared to other methodological approaches.[xxi] The review highlights that the scales used to measure prevalence substantially influenced the estimates, highlighting the importance of using standardized and validated instruments such as the one proposed by the Washington group.

Disability has been associated with health conditions such as chronic noncommunicable diseases.[xxii] Research conducted in Cuba describes that diseases such as hypertension, diabetes, arthritis, cataracts, mental illness, and pulmonary embolism were significant in

Table 2. Multivariate analysis of factors associated with severity of disability, ENS 2021.

Variable	Estimator	EE	Z	OR	IC95%	P
Intercept	-419.908	0.33933	-12.375	0.01	(0.0 - 0.0)	0.00
Age over 60 years old	0.65087	0.16811	3.872	1.9	(1.3 - 2.6)	0.00
Chronic illness	0.76669	0.17160	4.468	2.1	(1.5 - 3.0)	0.00
Education	0.00335	0.00634	0.529	1.2	(0.9 - 1.4)	0.59
Area	-0.29303	0.18302	-1.601	0.7	(0.5 - 1.0)	0.10
Sex	0.01355	0.05831	0.32	1.1	(0.9 - 1.2)	0.81

Note:

Overall test of the model $p < 0.05$.

Reference category: age > 60 years, chronic disease (yes), education (yes), rural, female.

the overall disability score.[xxiii] Meanwhile, in El Salvador, according to data from the country profile on the Pan American Health Organization website updated through 2022, chronic noncommunicable diseases such as diabetes reported a prevalence of 12.5 % and high blood pressure 37.0 %.[xxiv]

A study analyzed the contribution of chronic diseases to disability, identifying a high prevalence in older ages. The findings reflect an increase in the incidence of disabling diseases as age increases.[xxv] Another study conducted in 2021 argues that disability is shaped throughout life and that the educational level attained and multimorbidity plays an important role. Advanced age over 70 years was associated with greater disability. The study points to a variation in the reported prevalence ratio; in the United States, the ratio was 1.42, and in countries like Greece, it was 5.04. Furthermore, an education lower than secondary school was associated with disability in all countries reported in that study; for example, in Estonia, a prevalence ratio of 1.49, and in Spain, 2.21. Finally, multimorbidity showed a strong association with disability in all countries, with a prevalence ratio reported in countries like Brazil at 2.07 and the United States at 6.23.[xxvi] These data are consistent with those reported in the present study, as age over 60 years and chronic disease were associated with severe disability. Disability is a condition that can lead to physical inactivity, and physical inactivity is a risk factor for developing chronic noncommunicable diseases.

This research was limited by the fact that it was not possible to measure other aspects that would allow for a comprehensive understanding of the development of disability due to other factors, such as psychosocial, political, or cultural factors. Furthermore, each survey participant self-reported the presence of chronic noncommunicable diseases. It could not be verified through a medical record, which could have led to self-report bias.

Based on the results of this Research, it is recommended to implement specific interventions to improve the quality of life of people with disabilities, especially older adults and those with chronic illnesses, who are more likely to have severe disabilities. It is also important to develop programs that promote social inclusion, access to educational and employment opportunities, and adapt physical infrastructure and environments to the population's specific needs.[xxvii]

The results' external validity could be extended to contexts with similar sociodemographic characteristics. Overall, this study provides useful evidence for designing inclusive public policies and guides future Research that delves deeper into the social determinants, inequalities, and structural factors of disability.

Conclusion

Disability was characterized as more common among women, in urban areas, and in the age group over 60 years. Mild disability predominated when analyzing severity indicators, with visual impairment being the most common type. Factors associated with severe disability were age over 60 years and chronic noncommunicable diseases. These results highlight the importance of targeting specific pre-

vention strategies for these populations with disabilities; furthermore, it is essential to design tailored interventions that consider their characteristics and context. More Research is needed in this field to better understand this population's risk factors and specific needs.

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