

Hearing Disability in Colombia Self-Perception and Associated Factors 2002-2008

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Abstract

Introduction: Hearing disability is a condition that affects normal ear function, as much in adulthood as in the first years of life. According to the 2005 Census, 6.3% of the Colombian population has some type of disability, of which 17.4% have hearing limitations, including those with hearing devices. Elucidating the conditions of this population and identifying the factors related to hearing disability will permit the management of strategies from different sectors to mitigate the consequences associated with this limitation. **Objective:** To estimate the self-perception of hearing disability in Colombia and to determine the factors associated with this limitation. **Materials and Methods:** The present study is cross-sectional, based on the analysis of secondary information obtained from the Registry for Localization and Characterization of Persons with Disability (RLCPD) during the 2002-2008 period. Socio-demographic and healthcare variables were analyzed. **Results:** 13.6% (102,648/750,377) of the population reported hearing limitations even with the use of special hearing devices. 43.52% (44,041) of people over 3 years of age could neither read nor write. 29.39% (30,145) of people who reported this limitation are not affiliated to any sort of health insurance system. Factors found to be associated with hearing limitations were: socioeconomic stratus (OR: 1.33; CI 95% 1.25; 1.42), illiteracy (OR: 1.44; CI 95% 1.42; 1.46) and lack of affiliation to a health insurance system (OR: 1.03; CI 95% 1.01; 1.04). **Conclusion:** People registered with hearing disability live under vulnerable conditions; among them, most/the majority pertained to a segment of the population with low economic resources and had difficulty obtaining/accessing work, education and healthcare services.

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Keywords

Disability, Hearing Loss, Perception, Health Services, Equity in Health

1. Introduction

Hearing disability, or profound neurosensory hypoacusia, or profound deafness, is a condition that affects inner ear function, as much in adulthood as in the first years of life. It can be acquired from, and the principal causes are, infections such as Rubella, Toxoplasmosis, or Meningitis (it can also present at birth due to genetic disorders); however, close to 30% of registered cases are from unknown causes [1].

Depending on the grade and type of hearing loss and the time in life in which it appears, the effects that it will have over language development and the wellbeing of the individual are different. It is estimated that one of every 1000 live births can present profound neurosensory deafness requiring auditory and language rehabilitation [2]. Each year approximately 5000 children in the United States are born with bilateral hearing loss; it is estimated that the prevalence is between 1 in 900 to 1 in 2500 [3]. When there are high risk factors, the incidence of hypoacusia grows between 20 to 40 in 1000 [4].

The frequency of deafness in Colombia has not been clearly established [5]; the World Health Organization (WHO) estimates that 1 in 1000 newborns suffer from profound deafness and that this rate may be as high as 5 in 1000 newborns if all degrees of hypoacusia are included [6]. According to the 2005 Census, 6.3% of the Colombian population has some degree of disability and of these, 17.4% present hearing limitations even with the use of special devices and 13.2% present speech limitations [7].

In any case, early identification of the hearing deficit, followed by an appropriate intervention, will reduce the impact of this disability in each age group, with respect to the ability to communicate and socialize.

The objective of our study is to estimate the self-perception of hearing disability in Colombia according to the information in the Register for the Localization and Characterization of Persons with Disability (RLCPD), and to identify the factors associated with this limitation, in order to highlight social, educational, and health services which could lead to the re-integration, control, and recovery of persons with auditory disability.

2. Materials and Methods

The present study is cross-sectional, based on analysis of secondary information from the RLCPD, carried out by the Administrative Department of National Statistics (DANE), which has been conducted since 2002 and includes information up to 2008. This information allows the identification of the population with disability in all age groups, with the purpose of establishing plans and strategies to improve their situation [8]. Local governors and mayors are in charge of leading the process of registration in their territory in such a way that after informative campaigns in their corresponding territories, persons that perceive themselves as disabled sign up to be registered, and those who are already included in the disability register are subsequently interviewed [8].

The register covers the entire country; since the basic sources of information are the municipalities, however, there exist differences in the degree of registration within the various territories as it is dependent on the participation and will of the local governors and mayors [8]. It should be noted that this register is included within the framework of the International Classification of Functionality, Incapacity, and Health (CIF) [8].

The total number registered for 2002-2008 was 750,277 persons with any degree of auditory disability, of which 102,648 report having permanent hearing limitations even with the use of special hearing devices. In the case of duplicate registrations, the oldest case was discarded. Information was analyzed according to question #30 in the registry: "In your daily activities, do you present permanent difficulties with hearing, even with the use of special hearing devices", since it allows identification of the population that perceives itself with some hearing disability which interferes with their daily activities, in spite of the use of devices to improve hearing.

A descriptive frequency analysis was carried out on the different variables analyzed in the questionnaire such as age, sex, family characteristics, home characteristics, education, work, origin of the disability, and health services, among others. Subsequently, a bivariate analysis was performed, and a statistical regression model was established where the dependent variable was self-perception of hearing disability and the independent variables were sex, age, ethnicity, family characteristics, health services, etc., and those variables which showed an asso-

ciation of $p < 0.10$ in the bivariate analysis, or which were considered important for analysis within the model. A p value of 0.05 was considered significant, with confidence intervals calculated at 95%. Statistical analysis was conducted with Stata 9.0.

3. Results

Self-perception of hearing disability: According to the RLCPD, 13.6% of the persons registered with hearing disability reported hearing limitations even with the use of special hearing devices (102,648/750,377).

3.1. Socio-Demographic Characteristics

A slight predominance was observed in women 50.35% (51,681) over men 49.65% (50,967). Of the 32 departments in the country, the majority of registrations were in Bogotá, with 20.96% (this city is considered a department in the registry), followed by Valle del Cauca 8.79%, Nariño 8.41%, Antioquia 7.52%, Tolima 6.21%, and Cundinamarca 5.74%, with all other departments constituting 42.18%.

Analysis by age showed the following distribution: 0 to 19 years, 17.58% (18,044); 20 to 49, 21.86% (22,432); and 50 and older 60.56% (62,149). The majority belonged to socioeconomic stratus 1, 2, 3 or without stratus (98.86%). By ethnic group, 93.0% (94,225) consider themselves “Mestizos”, 3.71% (3755) of African descent, 2.96% (2995) as indigenous, 0.2% (202) “Raizals”, 0.1% (104) “Palenqueros”, and 0.03% (36) “Gypsies”/“Roma”. **Table 1** details the main sociodemographic characteristic of persons that consider themselves with

Table 1. Principal socio-demographic characteristics of persons who self-perceive with hearing limitations even with the use of special hearing limitations.

Category	n	%
Condition of the household	Their own home	52,065
	Another person's home, not paying	23,629
	Renting or subletting	20,839
	Other	1589
Principal activity in the last 6 months	Unable to work, without pension	32,957
	Housework	20,831
	Employed	11,997
	Other activity	8451
	Studying	6932
	Unable to work, with pension	3794
	Self-sustainment	3206
	Searching for employment	3244
	Pensioned	1592
	Receiving rent	769
Dependents	Yes	15,802
	No	79,542
Socioeconomic stratus	04/05/2006	1166
	1-2-3, no stratus	101,176
Healthcare affiliation	Yes	72,065
	No	29,604
Knows how to read and write (older than 3 years)	Yes	57,158
	No	44,041
Requires the permanent help of another person	Yes	42,179
	No	60,447

hearing limitations even with the use of special hearing devices.

7.46% of persons registered with this limitation live alone; this percentage increased following/after 60 years of age. 16.57% are dependent on another person upon analyzing this variable it was observed that within the last 6 months only 31.49% of these persons were employed 58.90% of those registered particularly in extreme age groups (younger than 10 and older than 60 years), indicated the need for permanent help from another person, this person being a member of the household in 88.98% of cases. Moreover, with respect to education, 43.52% of persons older than 3 years can neither read nor write, and the principal reason for which people of school age are not in school is because of disability (36.04%). Information about/ according to level of education and age can be found in [Table 2](#).

3.2. Origin of the Disability

Of the total number of persons with a self-perceived hearing limitation 37.36% (37,309) do not know the origin of their limitation; of those that do 62.64% (65,263) attribute it to general illness 42.24% (27,565), followed by complications in childbirth or pregnancy 17.67% (11,532), genetic mutations 14.19% (9258) and accidents 13.44% (8769), as seen in [Table 3](#).

Since the RLCPD examines in great depth the origins of work disability, accidents, and difficulties in obtain-

Table 2. Level of education and age of persons who self-perceive with hearing limitations even with the use of special hearing devices.

Maximum level of education	3 to 5		6 to 10		11 to 15		16 to 20		21 to 25		26 and older	
	n	%	n	%	n	%	n	%	n	%	n	%
None	1131	70.20	1694	33.54	1539	25.53	1514	31.87	1330	38.14	32,532	41.96
Preschool	477	29.61	989	19.58	355	5.89	151	3.18	98	2.81	1508	1.94
Primary	0	1.92	2346	46.45	3141	52.11	1549	32.61	986	28.28	34,889	45.00
Secondary	0	0.00	19	0.38	986	16.36	1457	30.67	914	26.21	7179	9.26
University	0	0.00	0	0.00	7	0.12	79	1.66	159	4.56	1429	1.84
Total	1611	100	5051	100	6028	100	4750	100	3487	100	77,537	100

Table 3. Origin of limited hearing in persons that self-perceive with hearing limitations even with the use of special hearing devices.

Their Disability is due to	Hearing limitations even with the use of special hearing devices	
	n	%
General illness	27,565	42.24
Complications during pregnancy or childbirth	11,532	17.67
Genetic disorder	9258	14.19
Accident	8769	13.44
Other	4356	6.67
Occupational disease	1591	2.44
Difficulty in providing health services	1155	1.77
Use of psychoactive drugs	401	0.61
Natural disaster	155	0.24
Self-inflicted injury	481	0.74
Total	65,263	100

ing of healthcare services, it is notable that those that attribute their hearing disability to workplace illness, 61.47% (943) indicated that this was due to physical conditions and workplace safety. Of the 8769 persons who attributed the origin of their disability to accidents, 58.47% (5118) attribute it to traffic accidents, and of the 1155 people that attribute the origin of their disability to slow or deficient medical attention, 59.66% attribute it to slow or deficient medical attention.

3.3. Healthcare

29.11% (29,604) of persons who reported hearing limitations are not affiliated with any type of health insurance system; the majority of those with affiliation to a health insurance service belong to the subsidized group 52.18% and fewer to the contributory group 17.18%. 58.27% of registered persons have not received guidance in how to manage their disability; however, 64.61% have been prescribed special aides, prosthetics, or permanent medications, although only 51.92% actually use them. It is necessary to note that 83.54% of the population believes they still need special help.

82.99% of persons indicate that they are not recovering from their disability, but those that have recovered attribute it principally to health services 39.11%, the help of God 26.98%, and the support of their family 20.63%.

Only 25.80% of persons who perceive themselves with hearing limitations have been subject to speech therapy and 10.40% to occupational therapy. Persons that currently do not receive rehabilitation services (60.14%), 62.98% indicated that this was due to lack of funds.

3.4. Factors Associated with Limited Hearing

The bivariate analysis shows that people that perceive themselves with hearing limitation are more likely to belong to a low socioeconomic stratus (OR: 1.51; CI 95% 1.33 - 1.59), not be affiliated to a health insurance system (OR: 1.05; CI 95% 1.03 - 1.07), live alone (OR: 1.32; CI 95% 1.28 - 1.35), can neither read nor write (OR: 1.45; CI 95% 1.43 - 1.47), require the permanent help of another person (OR: 1.20; CI 95% 1.19 - 1.22), do not know the origin of their disability (OR: 1.11; CI 95% 1.11 - 1.13), or have not worked in the last 6 months (OR: 1.28; CI 95% 1.26 - 1.31), as shown in **Table 4**. In so far as the origin of the/their disability, it was observed that

Table 4. Associated factors in person who self-perceive with hearing limitations even with the use of special hearing devices.

Variable	Bivariate			Multivariate	
	Reference	OR	CI 95%	OR	CI 95%
Socioeconomic stratus	1, 2, 3 or no stratus	1.41	1.33 - 1.50	1.33*	1.25 - 1.42
Sex	Female	0.9	0.88 - 0.91	-	-
Healthcare affiliation	No	1.05	1.03 - 1.07	1.03*	1.01 - 1.04
Knows how to read and write	No	1.45	1.43 - 1.47	1.44*	1.42 - 1.46
Requires the permanent help of another person	Yes	1.2	1.19 - 1.22	-	-
Currently lives alone	Yes	1.32	1.28 - 1.35	-	-
Currently attends an educational institution	No	1.28	1.25 - 1.3	-	-
Knows the origin of their disability	No	1.11	1.1 - 1.13	-	-
By occupational disease	Physical conditions or workplace safety	1.59	1.42 - 1.77	-	-
By accident	Travel or work	1.06	1.02 - 1.11	-	-
Is recovering from their disability	No	1.49	1.47 - 1.52	-	-
Currently uses special help	No	1.36	1.34 - 1.38	-	-
Has receive guidance in the management of their disability	No	1.3	1.28 - 1.32	-	-
Currently uses a rehabilitation center	No	1.2	1.18 - 1.22	-	-
Has received health care in the last year	No	1.18	1.16 - 1.20	-	-
Has worked in the last 6 months	No	1.28	1.26 - 1.31	-	-

workplace illness (OR: 1.59; CI 95% 1.42 - 1.77) and accidents (OR: 1.06; CI 95% 1.02 - 1.11) were associated with limited hearing.

In the multivariate analysis, socioeconomic stratus (OR: 1.33; CI 95% 1.25 - 1.42), illiteracy (OR: 1.44; CI 95% 1.42 - 1.46), and not being affiliated with the healthcare system (OR: 1.03; CI 95% 1.01 - 1.04) continued to be factors associated with limited hearing.

4. Discussion

Because communication permits socialization and autonomy of individuals, hearing deficiency impacts society in an important way from economic and psychosocial perspectives [9]. The present study shows that the group of persons registered who perceive themselves with hearing limitations, including those with the use of special hearing devices, belong to the poorest segment of the population and is composed principally of those above 60 years of age, although there exists an important group between 10 and 19 years (11.26%). The rates of illiteracy, affiliation with a health insurance system, and deficient working conditions show inequality in each of these sectors, affecting the physical, mental, and social well-being of this population and their families.

This limitation has greater impact on young people due to it affecting the education process and the capability of entering the workforce. Given the demographic conditions of the country, a large percentage of people with limited hearing are expected, especially in older adults (It is anticipated, given the demographic conditions of the country, that there will be a large percentage of people with limited hearing, especially in older adults) [10]. Hearing limitation causes communication difficulties in both sexes, which can lead to stigmatization and isolation [11].

Self-perception of limited hearing found within the registry was 13.6%; however it should be noted that according to the 2005 census it was 17.4%, and that in countries such as Brazil and Cuba values from 4.4% to 4.6%, respectively, have been reported [12] [13]. This information should be analyzed with caution, since the register is specialized to measure only the population that self-perceives with hearing disability. The principal limitation of this study is that since it uses secondary information whose procurement depends on the assistance of local governors and mayors [8], there exists a selection bias in certain municipalities or departments where there is greater interest in characterizing the population as disabled and thus does not necessarily reflect all of the disabled population. In addition to using an instrument that identifies self-perception of disability (in this case hearing disability), it is recommended that future investigations estimate hearing disability with the use of audiometric tests.

Several factors are of note with respect to health services: 1) the small percentage of persons who have recovered due to “other help” different from the social healthcare security system, demonstrate failures in the care of this population, and 2) the small percentage of persons who received occupational therapy and speech therapy services highlight the same drawback. It is possible that this situation is related to the low rate of affiliation in the population to a health insurance system, as well as the low availability of these services in isolated and difficult to reach areas. Additionally, it is possible that the doctor-patient relationship is impeded due to difficulties in communication [14] [15].

In so far as the causes of limited hearing, the following are known: hereditary or congenital disease, infections during pregnancy, other infections, complications in the perinatal period, otitis media, noise, trauma, cerebrovascular disease, and old age, among others [16] [17]. The present study shows that general illness, complications related to pregnancy and childbirth, as well as genetic disorders and accidents were the most frequent. The available information did not permit a deeper analysis of said causes, but important information was obtained regarding occupational disease, consumption of psychoactive drugs, accidents, and difficulties in accessing health services, due to the instrument giving said information. In so far as hearing disability by occupational disease, 2.44% of those that knew the origin of their disability attributed it to this cause. In Colombia, neurosensory deafness placed third in occupational disease between 2001 and 2003 and fell to fourth in 2004. Only since 2006 has the country had the “Guide for the Care of Hypoacusia Induced by Noise in the Workplace”, which presents recommendations to workers exposed to noise [18], as well as the legal framework for hypoacusia, specifically Resolution 8321 of 1983 of the Ministry of Health, where the norms for protection and conservation of healthcare are dictated [19]. This is in contrast to some countries where hypoacusia by workplace illness is considered a serious problem, possibly due to legislation specific to the production of noise [20].

In so far as the factors associated with self-perception of hearing limitation, even with the use of special hear-

ing devices, our study found correlations with low socioeconomic status, illiteracy, and the lack of affiliation to a healthcare system, showing the inequity of these persons; several studies have shown that inequalities exist in the socioeconomic level and the use of health insurance services among persons with hearing disability [21] [22]. However, taking into account that the RLCPD does not provide homogenous coverage of the departments of the country, it does not necessarily reflect the factors associated with this limitation in the Colombian population. With respect to the consumption of psychoactive drugs, different studies have shown weak correlations between the use of tobacco and sudden deafness in those that consume more than 20 cigarettes daily (OR: 1.28; CI 0.77 - 2.13). Moreover, the risk grows in those that consume more than 2 servings of alcohol per day (OR: 1.92; CI 1.12 - 3.29) [23]. According to the RLCPD less than 1% of persons who knew the origin of their disability attributed it to use of psychoactive drugs, and of these 74.5% use socially accepted psychoactive drugs (tobacco, alcohol).

The vascular origin hypothesis is plausible because the cochlea is highly vascularized such that it has similar risk factors to other vascular diseases such as coronary disease and infarction [23] [24]. This shows the risk of suffering from this limitation in a society that permits the use of licit drugs such as alcohol and tobacco.

We wish to highlight that although the country has passed the Law 982 of 2005 [25], which expresses the right to identification and early intervention in hearing loss, as well as the right for the hearing disabled to access education and employment, the law has not yet been instated, despite the efforts of different sectors [26]. The law also requires important modifications such as the implementation of auditory screening with the latest technology in those younger than 1 year, and early intervention programs to mitigate the risk of the social, educational, health, and psychological consequences that go along with hearing loss.

5. Conclusion

The present study reveals the inequality, injustice, and social imbalance in the group of people that self-perceive with hearing limitations even with the use of special hearing devices, showing that sustainable and political interventions are required, especially in health, education and employment, which will eliminate barriers so that these people have the same opportunities as other Colombians. The state must invest greater effort so that these people can access health, rehabilitation, and education services to facilitate their integration and to not perpetuate these conditions.

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Declaration of Conflict of Interest

The authors declare that they present no conflict of interest.

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General Considerations

The present study was not submitted to the Ethical Committee, due to it being a study based on the use of secondary sources, that did not have access to the identity of the subjects, and that did not present a risk to the integrity of those persons.

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