

# Quality of life in people with disabilities who use a wheelchair assist device in Medellín, Colombia, 2024

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## Abstract

**Objective:** To determine the perceived quality of life of people with disabilities who use a wheelchair assistance device to get around in Medellín, Colombia 2024.

**Method:** Cross-sectional study, with primary source of information and non-probability sampling. To assess quality of life and obtain the profile in its four domains (Psychological, Environment, Physical and Social relationships) the WHOQOL-BREF scale was used and Internal consistency was validated with Cronbach's Alpha.

**Results:** Device users are from middle and low socioeconomic strata, their ages ranged between 23 and 68 years. 52.5% stated that using the device contributes to improving their mental health, and 37.5% have a positive perception of their quality of life. According to the WHOQOL-BREF domains, the psychological domain obtained the highest average score (M=75.08; SD=18.3), followed by the environmental domain (M=66.75; SD=16.4) and the physical domain (M=64.35; SD=18.4). The social relations domain showed the lowest mean (M=61.28; SD=22.2) and the greatest dispersion (CV=36.3%). All domains presented acceptable internal consistency ( $\alpha \geq 0.7$ ).

**Conclusion:** The device increases psychological well-being and encourages participation, with a positive impact on physical and mental health. This improves the user's quality of life and significantly reduces stress and

anxiety, increasing feelings of happiness. Which makes the device an indispensable tool for improving the quality of life of people with disabilities.

**Keywords:** Persons with Disabilities, Quality of Life; Wheelchairs; Architectural Accessibility; Health of the Disabled; Social Inclusion

### **Introduction**

Mobility is a vital need for every individual; however, achieving it autonomously represents a constant challenge for persons with disabilities (PWD), especially those who use wheelchairs (1). Although accessibility is a fundamental right that enables PWD to fully enjoy all urban spaces, free movement within them is still not a reality. Urban infrastructure, public spaces, and basic services lack reasonable accommodations to meet the needs of PWD, which hinders their mobility and social participation (2,3).

To overcome these barriers, assistive devices can provide a solution. These have a positive impact on PWD by offering benefits in various aspects of life, including education, employment, physical activity, and other activities of daily living related to self-care (4). It is estimated that 1.3 billion people worldwide live with some form of disability, representing approximately 16% of the global population. This figure may continue to rise due to the high prevalence of chronic diseases, the increase in disabilities caused by external factors—such as road traffic incidents and violence—as well as demographic changes and population aging, where the risk of disability is higher among older adults (5,6).

The wheelchair is one of the most widely used assistive devices; the World Health Organization (WHO) estimates that approximately 1% of the global population requires one (7). Additionally, about 1 in 6 people worldwide has some form of disability, which may imply the need for assistive technologies; however, nearly 90% do not have access to these devices (5,7). Disability is part of the human condition, as most individuals will experience some form of functional limitation throughout their lives, especially with advancing age. It is a complex phenomenon that requires diverse and context-specific interventions to overcome associated disadvantages, which are multiple, systemic, and context-dependent (6).

PWD experience significant health inequalities compared to people without disabilities; these disparities are more pronounced depending on the territory, particularly in Latin American countries, where approximately 66 million PWD live. In these contexts, greater unmet needs are reported in health, education, transportation, and universal accessibility (6,8). Barriers

are numerous, especially those related to access to wheelchairs, resulting in many PWD lacking one or receiving inadequate devices due to deficient supply systems and a shortage of trained personnel (9).

The wheelchair, as an assistive device, provides mobility and greater autonomy to those who cannot move using their lower limbs. The integration of new technologies has enabled its adaptation to inaccessible environments, facilitating access to places and activities that would otherwise be unattainable. This allows PWD to better meet their individual needs, increase their safety and autonomy, and enhance their physical and cognitive functions (10,11). Therefore, action is required to address the growing demand for appropriate wheelchairs that meet the needs of PWD and contribute to improving their quality of life across physical, psychological, social, and environmental domains (9).

In Colombia, the prevalence of disability is similar to that of other countries in the region. The 2018 National Population and Housing Census identified 3,134,036 individuals who reported some limitation in performing activities of daily living. Subsequently, with the implementation of the Registry for the Location and Characterization of Persons with Disabilities, between the second half of 2020 and the first half of 2024, 350,732 PWD have been certified (12). Studies conducted in different regions of the country have identified that the main causes of disability include general illness, road traffic incidents, events occurring at home, in work and educational settings, as well as causes associated with pregnancy, violence, occupational diseases, and natural disasters. These conditions are more prevalent among young and low-income populations who, upon acquiring a disability, may lose their source of income and face additional barriers to accessing assistive devices (13).

Addressing the unmet need for assistive devices is essential to advance the 2030 Agenda and the Sustainable Development Goals. In this regard, the WHO has urged Member States to adopt measures to reduce inequality in access to these technologies and to implement Resolution WHA71.8 on improving access to assistive technology (4). The principle of “leaving no one behind” implies ensuring that PWD, older adults, and other vulnerable populations can access these devices, fully integrate into society, and live under dignified and equitable conditions.

Therefore, the objective of this study was to determine the perceived quality of life in persons with disabilities who use a wheelchair as an assistive device for mobility in Medellín, Colombia, in 2024.

## Methodology

A cross-sectional study was conducted using a primary data source. Data were collected through a questionnaire designed and administered via an online form. Given that the target population was small and well-defined, 50% of it was surveyed; the sampling method was non-probabilistic, with participants voluntarily choosing to respond to the instrument.

To assess the quality of life of device users, the WHOQOL-BREF scale was used, an instrument developed by the World Health Organization (WHO) to evaluate quality of life across cultures as a shortened version of the WHOQOL-100. This instrument consists of a total of 26 items: 24 representing the facets of the WHOQOL-100 and two general questions analyzed separately; the first assesses overall quality of life, and the second evaluates general health (14).

The remaining 24 items were grouped into four domains: physical (items 3, 4, 10, 15, 16, 17, and 18), psychological (items 5, 6, 7, 11, 19, and 26), social (items 20, 21, and 22), and environmental (items 8, 9, 12, 13, 14, 23, 24, and 25). Each item was rated on a 5-point Likert scale, where higher scores indicate better quality of life, allowing the construction of a profile across the four domains (14). Domain scores were calculated from individual item responses, reversing the scores of items 3, 4, and 26 due to their negative phrasing.

The obtained scores were transformed to a scale from 0 to 100 to facilitate comparison across domains. Initially, domain scores were multiplied by 4 to place them within a range of 4 to 20, making them comparable to those derived from the WHOQOL-100. Subsequently, they were converted to a 0–100 scale (14).

To assess the internal consistency of the instrument, Cronbach's alpha was used, an index that measures reliability and the correlation among items within a scale. Generally, a set of items measuring the same construct yields high values of this coefficient (15–17).

A pilot test was conducted for validation and application of the instrument, allowing adjustments to questions and response options within the Likert scale. Subsequently, the survey was administered to users of the assistive device who voluntarily agreed to participate. Individuals who used the device but declined participation were excluded. All collected records were included in the analysis, as they met completeness and accuracy criteria.

The questions were configured as mandatory and single-choice within the WHOQOL-BREF scale to reduce information bias and ensure data completeness. This approach enabled characterization of assistive device users according to person, time, and place variables. The description of quality of life was based on the dimensions of the WHOQOL-BREF.

This study complied with the guidelines of Resolution 8430 of 1993 issued by the Colombian Ministry of Health, which establishes scientific, technical, and administrative standards for health research, and classifies this study as risk-free under Article 11, as it involved techniques such as questionnaires that do not identify or modify sensitive aspects of human behavior (18). Participants were neither identified nor individualized; responses were anonymized, ensuring the right to privacy and protection of reputation, in accordance with Article 15 of the Political Constitution of Colombia (19).

Data processing, analysis, and presentation were performed using the Statistical Package for the Social Sciences (SPSS®) version 22, as well as Microsoft Excel® and Microsoft Word®.

## **Results**

Among persons with disabilities (PWD) using the assistive device, 36 (90.0%) were male and 4 (10.0%) were female. Age ranged from 23 to 68 years, with a mean of 41 years (SD = 11) and a mode of 28 years.

According to their health condition, participants presented one or more impairments in body structure; one user reported up to 14 impairments. Among the causes of disability, violence was the most frequent, followed by general illness, other causes, road traffic incidents, and armed conflict (Table 1).

**Table 1.** Origin of disability in assistive device users. Medellín, Colombia, 2024

Row labels	Total	%
Victim of violence	10	25,0
General illness	6	15,0
Other cause	5	12,5
Road traffic incident	4	10,0
Armed conflict	4	10,0
Mother's health conditions during pregnancy	3	7,5
Other incident	2	5,0
Difficulties in the provision of health services	1	2,5
Complications during childbirth	1	2,5
Incident at home	1	2,5
Workplace incident	1	2,5
Inherited genetic disorder	1	2,5
Sports incident	1	2,5
Total	40	100,0

According to socioeconomic stratification—which classifies residential properties for the allocation of public services—device users were mainly located in the lower-middle stratum (stratum 3), with 14 records (35%), followed by the low stratum (stratum 2), with 10 users (25%), and the very low stratum (stratum 1), with 5 users (12.5%).

Users reported that the device greatly helps reduce attitudinal barriers: 34 (85%) indicated this, while 5 (12.5%) stated that the reduction is moderate, and 1 (2.5%) reported that it does not contribute to reducing this type of barrier. Regarding physical barriers, 29 (72.5%) reported that the device greatly reduces them, 8 (20.0%) indicated a moderate reduction, 1 (2.5%) reported a slight reduction, and 2 (5.0%) stated that it does not contribute to their reduction.

In terms of mental health, 21 (52.5%) users stated that continuous use of the device has contributed to its improvement. Additionally, 24 (60.0%) reported that its use significantly reduces stress associated with mobility. Likewise, 25 (62.5%) indicated that their mood improved as they were able to move more autonomously. Anxiety also showed a positive impact, with 36 (90.0%) users reporting its reduction. Furthermore, 20 (50.0%) PWD stated that the use of the device was associated with their sense of happiness (Table 2).

**Table 2.** Impact of the assistive device on users' mental health.

Medellín, Colombia, 2024

<b>The use of the device has contributed positively to improving his mental health</b>	<b>Total</b>	<b>%</b>
He has improved a lot	21	52,5
He has improved quite a bit	13	32,5
He has improved moderately	5	12,5
He has improved very little	1	2,5
<b>Total</b>	<b>40</b>	<b>100</b>
<b>The device helps you reduce the stress associated with mobility</b>	<b>Total</b>	<b>%</b>
Reduces stress a lot	24	60,0
Reduces stress quite a bit	12	30,0
Reduces stress moderately	3	7,5
Does not reduce stress at all	1	2,5
<b>Total</b>	<b>40</b>	<b>100</b>
<b>My mood has improved by being able to move more independently with the device</b>	<b>Total</b>	<b>%</b>
Has improved a lot	25	62,5
Has improved quite a bit	13	32,5
Has improved moderately	2	5,0
<b>Total</b>	<b>40</b>	<b>100</b>
<b>The device has helped me reduce the anxiety I feel when leaving the house</b>	<b>Total</b>	<b>%</b>
It has reduced anxiety quite a bit	19	47,5
It has completely reduced anxiety	17	42,5
It has not reduced anxiety at all	2	5,0
It has moderately reduced anxiety	1	2,5
It has reduced anxiety very little	1	2,5
<b>Total</b>	<b>40</b>	<b>100</b>
<b>He/She believes that the device may be associated with his/her feeling of happiness</b>	<b>Total</b>	<b>%</b>
Always	20	50,0
Sometimes	9	22,5
Many times	6	15,0
Almost always	4	10,0
Only once	1	2,5
<b>Total</b>	<b>40</b>	<b>100,0</b>

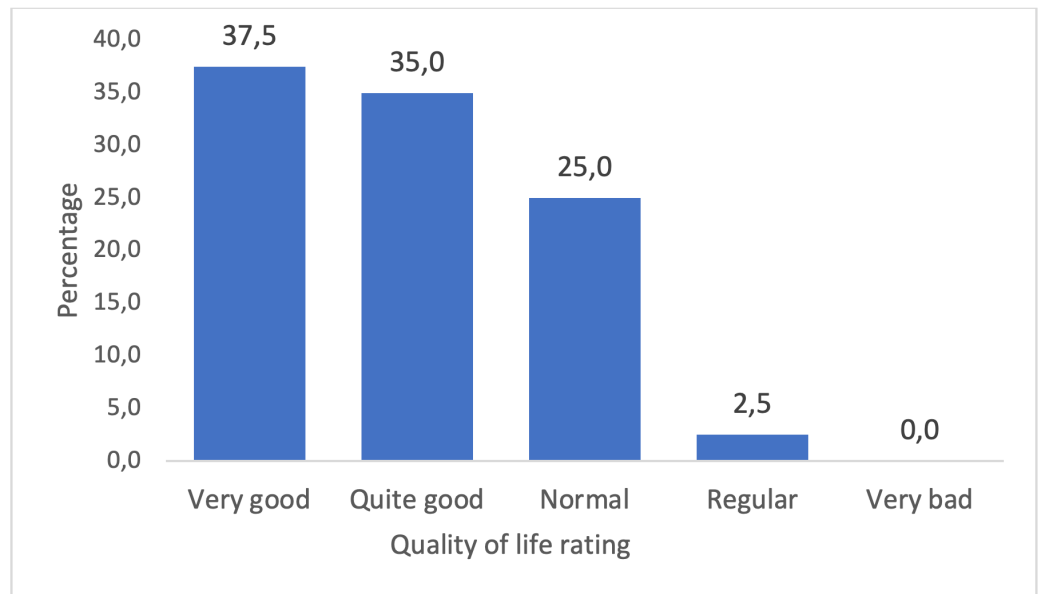
Users reported that the device greatly facilitates participation in social, cultural, or academic activities: 25 (62.5%) indicated this, while 15 (37.5%) stated that it facilitates participation considerably. Likewise, the use of the device has facilitated engagement in routine activities with family, friends,

neighbors, or others; 23 (57.5%) reported that it greatly facilitates these activities, and 12 (30.0%) indicated a moderate level of facilitation.

### Quality of Life

Most persons with disabilities (PWD) using the device reported a positive perception of their quality of life: 15 (37.5%) rated it as very good, 14 (35.0%) as good, 10 (25.0%) as fair, and 1 (2.5%) participant rated it as poor. No participant rated their quality of life as very poor (Figure 1).

**Figure 1.** Quality of life in assistive device users. Medellín, Colombia, 2024



Of the total users, 8 (20.0%) reported being very satisfied with their health status, 12 (30.0%) satisfied, and 12 (30.0%) rated it as normal. On the other hand, 6 (15.0%) stated they were dissatisfied and 2 (5.0%) very dissatisfied (Figure 2).

**Figure 2.** Satisfaction with health status among device users.  
Medellín, Colombia, 2024.



**Physical Domain:**

Composed of seven items assessing physical pain, use of medical treatments, fatigue, mobility, satisfaction with sleep, and work capacity. A median score of 66 points (SD = 18.4) was obtained on the WHOQOL-BREF scale, with values ranging from 19 to 100. This domain showed a coefficient of variation of 28.7%, indicating moderate dispersion in the scores. The confidence interval (CI) ranged from 58.4 to 70.2, suggesting a mid-range perception of physical quality of life. Cronbach’s alpha coefficient ( $\alpha = 0.8$ ) demonstrated adequate internal consistency for the items in this dimension (Table 3).

**Psychological Domain:**

Composed of six items related to life satisfaction, body image, concentration ability, negative and positive feelings, self-esteem, and spirituality. This domain showed the highest score among all domains (median: 70; SD = 18.3), with values ranging from 31 to 100. The coefficient of variation of 24.4% indicated lower dispersion compared to the physical domain, reflecting greater homogeneity in perceptions. The 95% CI (69.2–80.9) supports a favorable perception of psychological well-being. Cronbach’s alpha ( $\alpha = 0.8$ ) confirmed acceptable internal consistency in this dimension (Table 3).

**Social Domain:**

Consisting of three items related to satisfaction with personal relationships, social support, and sexual activity. A score of 69 points (SD = 22.2)

was obtained on the WHOQOL-BREF scale, with a minimum value of 6. The coefficient of variation of 36.3% revealed greater variability in responses, suggesting marked differences in the perception of support and interpersonal relationships. Cronbach's alpha ( $\alpha = 0.7$ ) indicated acceptable internal consistency (Table 3).

### Environmental Domain:

Composed of eight items assessing financial resources, freedom, health-care, accessibility, access to information, participation in recreational activities, and transportation. A median score of 66 points (SD = 16.4) was obtained, with values ranging from 31 to 94. The coefficient of variation of 24.6% indicated moderate variability. Cronbach's alpha ( $\alpha = 0.8$ ) showed good reliability of the scale in this domain (Table 3).

**Table 3.** Quality of life scores across WHOQOL-BREF domains in assistive device users. Medellín, Colombia, 2024

Dimension	n ítems	Minimum	Maximum	Mean	Median	Standard deviation	Coefficient of variation	CI 95%		Cronbach's Alpha
								Li	Ls	
Física	7	19	100	64,35	66,00	18,4	28,7	58,4	70,2	0,8
Psicológica	6	31	100	75,08	75,00	18,3	24,4	69,2	80,9	0,8
Relaciones sociales	3	6	100	61,28	69,00	22,2	36,3	54,1	68,4	0,7
Ambiente	8	31	94	66,75	66,00	16,4	24,6	61,5	72,0	0,8

### Discussion

Disability is part of the human experience; individuals who live with it often face rejection and are frequently excluded from social, academic, community, recreational, and cultural participation, as well as from full access to public spaces. The use of assistive devices is associated with the reduction of architectural barriers and with increased participation and social interaction, as evidenced by the users in this study, most of whom reported that the device facilitates access to public squares and parks—spaces where social interactions occur—and enhances community, academic, and occupational participation.

This pattern of association is consistent with findings from other studies, where architectural barriers are identified as factors limiting community, academic, and labor participation. Addressing these barriers through public health actions and the use of assistive technology can reduce such limitations, promote equity of opportunity, and, at the individual level, foster social integration, thereby contributing to emotional well-being and quality of life among PWD (20,21).

Assistive devices promote social participation under conditions of equality; conversely, lack of access to these technologies increases the risk of isolation, poverty, and dependence on financial support from the state, family, or community. Most PWD belong to middle- and low-income socioeconomic groups with limited purchasing power, which restricts access to such devices. High costs, along with expenses associated with the importation of technology for manufacturing or assembly, increase their price, particularly in low- and middle-income countries, where users face barriers to health-care access and financial constraints in acquiring them. As noted by the United Nations and global studies, between 65% and 95% of individuals requiring assistive devices in low- and middle-income countries do not have access to them (7,22).

The results of this study suggest a positive impact of the device on mental health. This effect is reflected in reduced stress associated with mobility, improved mood, and decreased anxiety when leaving home. Additionally, an association with a sense of happiness was observed. These findings are consistent with prior evidence highlighting the importance of assistive technology in users' mental and emotional health, underscoring its social and psychological value. In this regard, some studies describe these devices as a form of support that provides mental relief, reduces anxiety, and offers a sense of calm and security—factors that promote independence and enhance emotional well-being and quality of life, linked to the reliability of the devices (23).

Similarly, the results show that among users of the evaluated assistive device, the psychological domain of the WHOQOL-BREF had the highest score (75.08), followed by the environmental domain (66.75); in contrast, the lowest scores were observed in the physical domain (64.35) and the social relationships domain (61.28). This pattern suggests that assistive technology has a greater impact on the mental health of PWD, as supported by studies examining the relationship between device use and emotional well-being, in which frequent use is associated with higher levels of well-being, whereas non-use is linked to reduced well-being and physical capacity (24).

The high score in the environmental domain may be explained by the reduction of architectural barriers and the autonomy provided by these devices. It has been reported that individuals' well-being increases when assistive technology helps meet basic needs and facilitates the performance

of activities of daily living, thereby enhancing participation in everyday activities (24). Likewise, studies that have assessed quality of life using the WHOQOL-BREF scale report similar findings, particularly in the psychological domain, with favorable scores (25).

The lower score and greater dispersion observed in the social domain indicate heterogeneity in the influence of the device on social interaction. This finding is consistent with epidemiological studies showing that, although assistive devices can improve access to physical spaces and promote social interaction, participation in academic, occupational, and decision-making settings still depends on factors such as stigma, beliefs, and structural barriers. Additionally, access to and use of the device also play a role, which may explain the observed variability (26,27). Therefore, the effectiveness of these devices in improving inclusion and quality of life requires complementary interventions at the community level, reasonable adjustments in the urban environment, and the implementation, monitoring, and evaluation of public policies that promote cultural change in favor of PWD.

Furthermore, satisfaction with the wheelchair—especially when it incorporates new technologies—has been associated with better levels of quality of life, supporting the importance of having designs that are adjustable to users and adaptable to different environments as key components of physical and mental rehabilitation (28). These results are consistent with the findings of this study, in which most users reported a good or very good perception of their quality of life, and a substantial proportion expressed satisfaction with their health status. Similarly, studies conducted in El Salvador have shown that PWD who have access to a wheelchair report higher levels of quality of life and greater satisfaction with their health status (28).

### **Conclusions**

The use of the device is associated with a favorable perception of psychological well-being among its users and with greater social, family, and academic participation, with a perceived positive impact on physical and mental health. Its consistent use is related to higher levels of quality of life, greater satisfaction with health status, reduced stress and anxiety, and an increased sense of happiness.

These findings suggest that the device represents a relevant assistive tool for improving the quality of life of persons with disabilities (PWD) who use wheelchairs for mobility in urban environments.

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