

Article

## Health-Related Quality of Life and Associated Variables in People With Physical Disabilities

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### ABSTRACT

**Background/objective:** Despite the potential impact of a physical disability on health-related quality of life (HRQoL), few methodologically rigorous investigations on the topic have been conducted. The objective of this study was to determine the potential impact of HRQoL and associated factors in people with physical disabilities. **Methods:** The participants were 479 people with physical disabilities (56.8% women, mean age = 52.3 years). HRQoL domains (i.e., physical health, psychological health, social relationships and environment) were assessed using the World Health Organization Quality of Life Brief Version (WHOQOL-BREF); as well as the sociodemographic, disability, and clinical variables. **Results:** The predictors for the various domains were as follows: physical domain: ethnicity, employment status, medication use, depression, reward, extraversion, and psychoticism; psychological domain: employment status, anxiety, depression, and purpose; social relations domain: employment status, depression, reward, neuroticism, social support, empowerment, optimism and self-esteem; and environment domain: monthly economic income, depression, reward, neuroticism, extraversion, rational problem-solving skills, social support, and empowerment. **Conclusions:** These findings highlight the need to develop evidence-based programs to promote HRQoL in this population that address the specific predictors within each domain, reduce symptomatology predictive of worse HRQoL; and increase psychological and social resources to better support HRQoL.

## Calidad de Vida Relacionada con la Salud y Variables Asociadas en Personas con Discapacidad Física

### RESUMEN

**Antecedentes/objetivo:** Pese al potencial impacto de una discapacidad física sobre la Calidad de Vida Relacionada con la Salud (CVRS), pocas investigaciones metodológicamente rigurosas analizaron esta cuestión. El objetivo de este estudio fue determinar la CVRS y los factores asociados en personas con discapacidad física. **Método:** Los participantes fueron 479 personas con discapacidad física (56.8% mujeres, edad media = 52.3 años) que fueron evaluadas en 4 dominios (i.e., salud física, psicológica, relaciones sociales y ambiente) de CVRS con el cuestionario WHOQOL-BREF; así como variables sociodemográficas, de discapacidad, y clínicas. **Resultados:** Los predictores para el dominio físico fueron etnia, situación laboral, uso de medicación, depresión, reforzamiento, extraversión y psicoticismo. Para el dominio psicológico, situación laboral, ansiedad, depresión y propósito. Para el dominio relaciones sociales, situación laboral, depresión, reforzamiento, neuroticismo, apoyo social, empoderamiento, optimismo y autoestima. Y para el dominio ambiente, ingresos económicos mensuales, depresión, reforzamiento, neuroticismo, extraversión, habilidades de resolución racional de problemas, apoyo social, y empoderamiento. **Conclusiones:** Estos hallazgos subrayan la necesidad de desarrollar programas basados en la evidencia para promover la CVRS en esta población que incorporen los predictores específicos de cada dominio, reduciendo la sintomatología predictora de peor CVRS; e incrementando recursos psicológicos y sociales que predicen mejor CVRS.

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## Introduction

There are around 1 billion people with disabilities in the world, which equates to 15% of the population (World Health Organization [WHO] & the World Bank [WB], 2011). Of the various disability typologies, physical disabilities are the most common (National Council for Disability Equality [CONADIS], 2021) and have been associated with employment and economic challenges (Heeb et al., 2022; Oliver et al., 2012; WHO & WB, 2011), limitations in accessing public spaces (Bezyak et al., 2020), leisure activities, and time usage (Pagán-Rodríguez, 2014), and a decline in Health-Related Quality of Life (HRQoL; Lima-Castro et al., 2020; Ow et al., 2021).

HRQoL is an individual's perception of their position within their cultural context and value system concerning their goals, expectations, standards, and concerns (WHOQOL Group, 1995). It encompasses four domains: (a) physical, related to restrictions in daily activities, medication dependence, energy, mobility, pain, sleep, and work; (b) psychological, related to self-image, feelings, self-esteem, spirituality, thinking, learning, memory, and concentration; (c) social relationships, pertaining to interactions, social support, and sexual activity; and (d) environment, relating to safety, physical environment, economic resources, information, leisure, home, healthcare, and transport (WHOQOL Group, 1998). While a physical disability can impact all these domains (Aminde et al., 2020; Badenhorst et al., 2018; Chang et al., 2012; Chang et al., 2020; Choi et al., 2013; Chuluunbaatar et al., 2016; Estrella-Castillo and Gómez-de-Regil, 2016; Ganesh et al., 2020; Gnanaselvam et al., 2017; Govindharaj et al., 2018; Jeong et al., 2012; Moshi et al., 2021; Phillips et al., 2009; Singh et al., 2021), studies addressing this matter have limitations (Lima-Castro et al., 2020), such as selecting convenience samples recruited from healthcare systems (e.g., Aminde et al., 2020; Estrella-Castillo and Gómez-de-Regil, 2016), overrepresenting severe disabilities, and limiting the generalizability of findings; or not providing a prior estimation of the sample size (Chang et al., 2012; Ganesh et al., 2020), thus compromising the study's power. Additionally, few studies with rigorous methodologies (i.e., followed the STROBE guidelines for reporting on observational study outcomes [von Elm et al., 2007] and had a low risk of bias according to the RTI Item Bank [Viswanathan et al., 2013]) have analyzed different HRQoL dimensions in community-dwelling individuals with physical disabilities (Badenhorst et al., 2018; Gnanaselvam et al., 2017; Phillips et al., 2009).

Likewise, although several studies have examined factors related to the HRQoL domains in individuals with physical disabilities (Aminde et al., 2020; Chuluunbaatar et al., 2016; Ganesh et al., 2020; Paiva et al., 2016), differences in sociodemographic variables have been inconsistent. Similarly, in examining characteristics related to the disabilities, only the percentage of disability is consistently related to HRQoL. Regarding clinical characteristics, robust data exist for anxiety and depression, yet few studies have examined the relationship with other variables, such as resilience (Tan et al., 2021), purpose in life, social support (Bello et al., 2021; Zemed et al., 2021), or self-efficacy (Botero & Londoño, 2013), and overall HRQoL.

The primary objective of this study was to determine HRQoL and the associated sociodemographic, disability, and clinical factors in community-dwelling individuals with physical disabilities.

## Method

### Participants

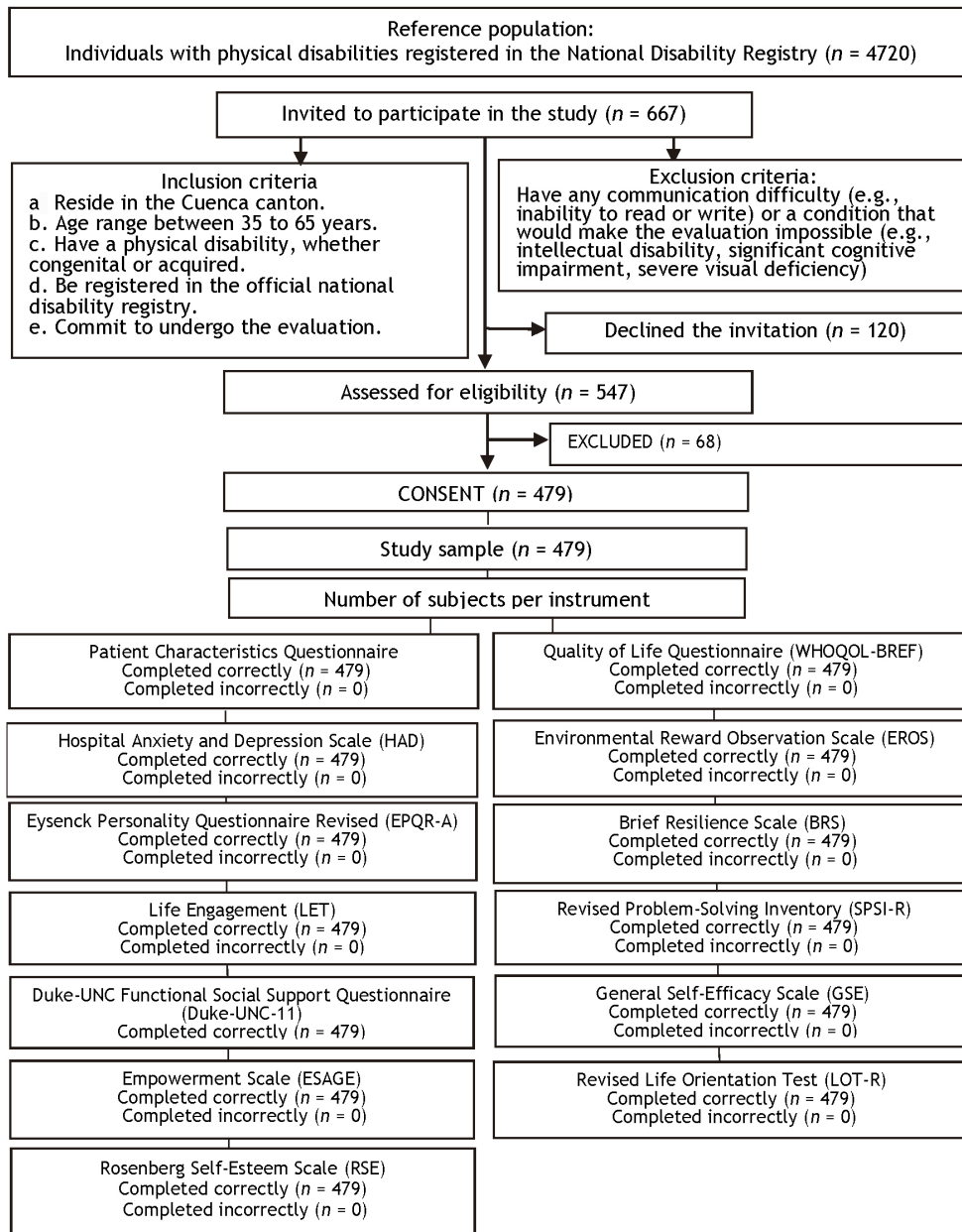
For this cross-sectional study, participants were recruited between September 2017 and April 2018 from the 4,720 individuals aged 35-65 with physical disabilities registered in the National Disability Registry of CONADIS in Cuenca (Ecuador); this was the only age group registered at the time of the study. The criteria for participation included: (a) residing in Cuenca, (b) being 35-65 years old, (c) having a physical disability, (d) being registered in the National Disability Registry, and (e) committing to participate. Those with conditions that made evaluation impossible (e.g., cognitive impairment) were excluded.

667 individuals were invited to participate, 120 declined, and 68 were excluded for not meeting eligibility criteria (response rate = 82%). The final sample consisted of 479 participants with a 95% confidence level and a margin of error of  $\pm 4.0\%$  (see Figure 1); 56.8% were women, aged 35-65 ( $M = 52.3$ ,  $SD = 8.4$ ). Sociodemographic and disability variables are presented in Table 1 and clinical variables in Table 2.

**Table 1**  
Sociodemographic and Disability Variables ( $n = 479$ )

Sociodemographic variables	<i>n</i>	%
Sex		
Man	207	43.2
Woman	272	56.8
Age		
<i>M (SD)</i>	52.3(8.4)	
Range	35-65	
Marital status		
With a partner	280	58.5
Without a partner	199	41.5
Ethnicity		
Mestizo	454	94.8
Other	25	5.2
Monthly economic income		
$\leq 375$ \$	262	54.7
$> 375$ \$	217	45.3
Employment status (Engages in work activity)		
No	297	62.0
Yes	182	38.0
<b>Disability variables</b>	<b><i>n</i></b>	<b>%</b>
Cause		
Musculoskeletal system and connective tissue diseases	232	48.4
Diseases not listed in other categories	100	20.9
Nervous system diseases	79	16.5
Poliomyelitis	34	7.1
Congenital malformations and deformities of the musculoskeletal system	34	7.1
Percentage		
<i>M (SD)</i>	55 (16.8)	
Range	30-100	
Time with disability		
<i>M (SD)</i>	24.5 (16.9)	
Range	1-65	
Comorbidity		
Yes	297	62.0
No	182	38.0
Medication use		
Yes	355	74.1
No	124	25.9

**Figure 1**  
Flowchart of the Participants



**Measurement Instruments**

*Sociodemographic* (i.e., sex, age, marital status, ethnicity, monthly income, employment status) and *disability* (i.e., cause, percentage, time with disability, comorbidity, medication use) variables were collected using an ad hoc questionnaire.

*Quality of Life (QoL)*: QoL was assessed using the Spanish version of the World Health Organization Quality of Life Questionnaire (WHOQOL-BREF; WHOQOL Group, 1996), the gold standard for measuring this construct, with 26 items and four domains: physical, psychological, social relationships, and environment. Subscale ranges vary: 7-35 for the physical domain, 6-30 for psychological, 3-15 for social, and 8-40 for the

environment. Higher scores indicate better QoL in that domain. These scores can be standardized on a 0-100 or 4-20 scale (WHO, Division of Mental Health, 1996). The current study used the 0-100 standardized score. Internal consistency (Cronbach's alpha) according to the manual was .72 for the physical domain, .74 for psychological, .67 for social relationships, and .75 for environment.

*Anxiety and depression*: Symptoms of anxiety and depression were assessed using the Spanish version of the Hospital Anxiety and Depression Scale (HAD; Terol et al., 2007), a 14-item instrument. The internal consistency (Cronbach's alpha) of this adaptation was .77 (anxiety) and .71 (depression).

**Table 2***Clinical Variables*

Variable	
Anxiety	
<i>M (SD)</i>	8.4 (4.7)
Range	0-21
Depression	
<i>M (SD)</i>	6.2 (4.3)
Range	0-20
Reward	
<i>M (SD)</i>	27.5 (5.0)
Range	10-40
Personality Neuroticism	
<i>M (SD)</i>	2.8 (2.1)
Range	0-6
Extraversion	
<i>M (SD)</i>	3.4 (2.2)
Range	0-6
Psychoticism	
<i>M (SD)</i>	1.5 (1.0)
Range	0-4
Resilience	
<i>M (SD)</i>	19.3 (4.7)
Range	9-30
Purpose	
<i>M (SD)</i>	24.1(4.0)
Range	6-30
Social Problem-Solving PPO	
<i>M (SD)</i>	10.6 (4.1)
Range	0-20
RPS	
<i>M (SD)</i>	10.2 (4.0)
Range	0-20
NPO	
<i>M (SD)</i>	7.4 (4.3)
Range	0-20
ICS	
<i>M (SD)</i>	6.7 (3.9)
Range	0-20
AS	
<i>M (SD)</i>	3.7 (4.0)
Range	0-18
Social Support	
<i>M (SD)</i>	39.5 (10.3)
Range	11-55
Self-Efficacy	
<i>M (SD)</i>	28.0 (5.9)
Range	10-40
Empowerment	
<i>M (SD)</i>	50.4 (8.0)
Range	20-69
Optimism	
<i>M (SD)</i>	16.5 (4.0)
Range	5-24
Self-esteem	
<i>M (SD)</i>	30.0 (5.2)
Range	12-40

*Environmental reward:* Environmental reward (hereafter, reward) was assessed using the Spanish version of the Environmental Reward Observation Scale (Barraca and Pérez-Álvarez, 2010); its internal consistency was .86.

*Personality traits:* Personality traits (neuroticism, extraversion, psychoticism) were assessed using the Spanish version of the Eysenck Personality Questionnaire Revised-Short Form (EPQR-A; Sandín et al., 2002), a 24-item tool. Its internal consistencies were .78 (neuroticism), .74 (extraversion), and .63 (psychoticism); this tool also demonstrated adequate psychometric properties in other populations (e.g., Vázquez et al., 2019).

*Resilience:* Resilience was assessed using the Spanish version of the Brief Resilience Scale (BRS; Rodríguez-Rey et al., 2016), a 6-item tool, with an internal consistency of .83.

*Purpose in life:* Purpose in life was assessed using the Spanish version of the Life Engagement Test (LET; Lima-Castro et al. 2021), a 6-item tool with an internal consistency of .81.

*Problem-solving skills:* Problem-solving skills were assessed using the Spanish adaptation of the Revised Problem-Solving Inventory (SPSI-R:S; Maydeu-Olivares et al., 2000), a 25-item tool with five subscales. Its internal consistencies were .68 (positive problem orientation [PPO]), .78 (rational problem resolution [RPS]), .79 (negative problem orientation [NPO]), .79 (impulsive style [ICS]), and .83 (avoidant style [AS]).

*Perceived social support:* Perceived social support was assessed using the Spanish version of the Duke-UNC Functional Social Support Questionnaire (Duke-UNC-11; Bellón et al., 1996), an 11-item tool with an internal consistency of .90.

*Self-efficacy:* Self-efficacy was measured using the Ecuadorian version of the General Self-Efficacy Scale (Bueno-Pacheco et al., 2018), a 10-item tool with an internal consistency of .91.

*Empowerment:* Empowerment was assessed using the Spanish version of the Empowerment Scale (Suriá, 2014), a 28-item tool with an internal consistency of .86.

*Optimism:* Optimism was assessed using the Spanish version of the Revised Life Orientation Test (LOT-R; Otero et al., 1998), a 10-item tool with an internal consistency of .78.

*Self-esteem:* Self-esteem was assessed using the Spanish version of the Rosenberg Self-Esteem Scale (RSE; Atienza et al., 2000), a 10-item tool with an internal consistency of .92.

## Procedure

Study staff (three experienced psychologists) underwent 24 hours of theoretical-practical seminars and role-playing exercises conducted by a professor from the University of Cuenca with 10 years of experience in evaluation. A pilot study was then conducted with 30 participants to assess planned decisions, practice instructions, and gather feedback. No modifications were required.

The sample was then recruited using a simple random sampling procedure (using a random number table) from the population of individuals with physical disabilities living in Cuenca who were registered in the National Disability Registry of CONADIS. Participants were contacted by phone; the study was described, eligibility criteria were assessed, and they were informed of the voluntary and anonymous nature of the study, and informed consent was obtained. Psychologists administered the instruments, either over the phone or in-person at accessible reference institutions for

participants (e.g., hospitals, local associations). The study visits lasted approximately 40 minutes. To minimize participant attrition, recommendations from Newman et al. (2023) and Cummings et al. (2023) were followed, including repeated contacts, presenting the study attractively, avoiding invasive tests, and using an individualized approach.

Participation was voluntary, with informed consent, and there were no economic or other incentives. The study adhered to the Helsinki Declaration (World Medical Association, 2013) and was approved by the Bioethics Committee of the San Francisco de Quito University (Code: 2017-104E).

## Data Analysis

To analyze the data, SPSS (version 24.0) was used. Contingency tables, means, and percentages were utilized for demographic, disability, and clinical characteristics, and QoL domains.

Subsequently, bivariate analyses were conducted between these variables (demographic, disability, and clinical characteristics) and the QoL domains (physical, psychological, social relations, and environment). When the predictor variables were categorical and only had two groups, the Student's t-test for independent samples was used (or the Mann-Whitney U test if assumptions were not met); when the predictor variables were categorical and had more than two groups, one-way analysis of variance (ANOVA) were employed (or the Kruskal-Wallis test if assumptions were not met); and, finally, when the predictor variables were quantitative, Pearson correlation coefficients were used (or Spearman's if the distribution was not normal). All significance tests were two-tailed. Effects were considered statistically significant if they yielded *p*-values less than .05.

Finally, for each domain, multiple linear regression models were constructed that included the statistically significant variables (*p* < .05) in the bivariate analyses.

## Results

### Domains of Health-Related Quality of Life (HRQoL)

The standardized means of the domains were as follows: physical 47.7 (*SD* = 18.9), psychological 59.0 (*SD* = 19.9), social relationships 56.2 (*SD* = 22.1), and environment 55.4 (*SD* = 17.6).

### Factors Associated with HRQoL: Physical Domain

Sociodemographic variables. In the bivariate analyses related to sociodemographic variables, the mean of the physical domain of HRQoL for men was 50.3 (*SD* = 19.9) and for women, 45.7 (*SD* = 17.8); differences between men and women were statistically significant,  $t(477) = -2.68, p = .007$ . A significant inverse correlation was found between age and the physical domain ( $r = -.17, p < .001$ ). The average physical domain score was 47.2 (*SD* = 18.8) for mestizo participants and 56.9 (*SD* = 17.0) for a combined group made up of other ethnic groups; the differences between both groups were statistically significant,  $t(477) = -2.51, p = .012$ . The average physical domain score for those with incomes of 375\$ or less was 42.4 (*SD* = 17.1) and 54 (*SD* = 19.0) for those with incomes higher than 375\$; differences based on income level were statistically significant,  $t(477) = -7.02, p < .001$ . Lastly, the

physical domain mean was 41.7 (*SD* = 17.5) for those not engaged in a work activity and 57.4 (*SD* = 16.9) for those who were; the differences between scores of those not engaged in a work activity and those who were, were statistically significant,  $t(477) = -9.60, p < .001$ .

Disability variables. The physical domain means for the cause of disability are as follows: musculoskeletal and connective tissue diseases = 46.7 (*SD* = 19.8); nervous system diseases = 45.8 (*SD* = 17.7); polio = 56.2 (*SD* = 16.9); prenatal structural anomalies = 52.0 (*SD* = 16.5); and other diseases = 41.1 (*SD* = 18.3). The Kruskal-Wallis test detected significant differences in physical domain HRQoL between groups (*p* < .05).

Regarding the relationship between the percentage of disability and the physical domain score, a significant inverse correlation was found ( $r = -.26, p < .001$ ). Meanwhile, a direct correlation was found between the duration of the physical disability and physical domain mean ( $r = .11, p = .016$ ). Concerning comorbidity, the mean was 43.7 (*SD* = 17.3) for participants with comorbidities and 54.1 (*SD* = 19.6) for those without it; the differences between both groups were statistically significant,  $t(477) = 6.09, p < .001$ . Finally, in relation to medication use, the physical domain mean was 44.3 (*SD* = 17.9) for those who took medication, and 57.4 (*SD* = 18.1) for those who did not, with statistically significant differences between both groups,  $t(477) = 7.02, p < .001$ .

Clinical variables. Lastly, regarding the correlations between the physical domain and clinical variables, significant inverse correlations were found with anxiety ( $r = -.50, p < .001$ ) and depression ( $r = -.60, p < .001$ ); a significant direct correlation with reward ( $r = .60, p < .001$ ); a significant inverse correlation with neuroticism ( $r = -.46, p < .001$ ), a significant direct correlation with extraversion ( $r = .24, p < .001$ ) and psychoticism ( $r = .10, p = .022$ ); significant direct correlations with resilience ( $r = .44, p < .001$ ), purpose in life ( $r = .50, p < .001$ ); positive problem orientation (PPO;  $r = .41, p < .001$ ), rational problem-solving (RPS;  $r = .30, p < .001$ ); and significant inverse correlations with negative problem orientation (NPO;  $r = -.35, p < .001$ ), and avoidant style (AS;  $r = -.18, p < .001$ ); and finally, significant direct correlations with social support ( $r = .36, p < .001$ ), self-efficacy ( $r = .54, p < .001$ ), empowerment ( $r = .57, p < .001$ ), optimism ( $r = .45, p < .001$ ), and self-esteem ( $r = .57, p < .001$ ).

The sociodemographic, disability, and clinical variables that remain significant in the multivariate analysis for the physical domain, along with the B coefficients (and their CI) and  $\beta$ , *t* value, and associated probability, are presented in Table 3. The corrected R<sup>2</sup> coefficient value for the model was 0.527. Belonging to other ethnicities, engaging in a work activity, having higher levels of environmental reward and psychoticism, were predictors of higher HRQoL in the physical domain in the multiple regression; while using medication, higher symptoms of depression, and higher extraversion, were predictors of lower scores in the physical domain of HRQoL.

### Psychological Domain

Sociodemographic variables. For the psychological domain, the average for men was 61.2 (*SD* = 19.6) and 57.4 (*SD* = 19.9) for women, with the differences being statistically significant,  $t(477) = -2.05, p = .041$ . Regarding monthly income, the mean score was

**Table 3**

Multivariate Analysis: Association Between Sociodemographic, Disability, and Clinical Variables and the Physical Domain

Variables	B	$\beta$	t	p	CI (95%)	
					Lower limit	Upper limit
Ethnicity (Other)	5.82	0.07	2.10	.037	0.36	11.29
Employment status (Engages in work activity: Yes)	4.58	0.12	2.79	.005	1.36	7.81
Medication use (Yes)	-6.96	-0.16	-4.34	<.001	-10.11	-3.81
Depression	-0.81	-0.18	-3.12	.002	-1.32	-0.30
Reward	0.74	0.20	3.18	.002	0.28	1.20
Extraversion	-0.94	-0.11	-2.94	.003	-1.57	-0.31
Psychoticism	2.06	0.11	3.41	.001	0.87	3.25

Note: B = unstandardized regression coefficient;  $\beta$  = standardized regression coefficient; CI = Confidence interval.**Table 4**

Multivariate Analysis: Association Between Sociodemographic, Disability, and Clinical Variables and the Psychological Domain

Variables	B	$\beta$	t	p	CI (95%)	
					Lower limit	Upper limit
Employment status (Engages in work activity: Yes)	3.11	0.08	2.25	.025	0.39	5.83
Anxiety	-0.45	-0.10	-2.14	.033	-0.86	-0.37
Depression	1.29	-0.28	-5.47	<.001	-1.75	-0.82
Purpose	0.84	0.17	3.54	<.001	0.37	1.30

Note: B = unstandardized regression coefficient;  $\beta$  = standardized regression coefficient; CI = Confidence interval.

53.9 ( $SD = 18.4$ ) for those with monthly incomes less than or equal to 375\$, and 65.2 ( $SD = 19.9$ ) for those with incomes over 375\$; differences were statistically significant,  $t(477) = -6.433, p < .001$ . Lastly, regarding employment status, the mean for participants who were not employed was 54.1 ( $SD = 19.7$ ), while for those who were employed it was 67.1 ( $SD = 17.3$ ); differences based on employment status were statistically significant,  $t(477) = -7.36, p < .001$ .

Disability variables. In relation to disability variables, a significant inverse correlation ( $r = -.23, p < .001$ ) was observed between the percentage of disability and the psychological domain. Concerning comorbidity, the average in the psychological domain was 56.2 ( $SD = 20.4$ ) for participants with comorbidities, and 63.7 ( $SD = 18.7$ ) for those without another health issue; differences between both groups were statistically significant,  $t(477) = 4.09, p < .001$ . Finally, regarding medication use, the average for participants using medications was 57.5 ( $SD = 19.6$ ), and for those not using them it was 63.4 ( $SD = 19.9$ ); differences between medicated and non-medicated were statistically significant,  $t(477) = 2.90, p = .004$ .

Clinical variables. In bivariate analyses significant inverse correlations of the psychological domain with anxiety ( $r = -.61, p < .001$ ) and depression ( $r = -.72, p < .001$ ); significant direct correlations with reward ( $r = .69, p < .001$ ); a significant inverse correlation with neuroticism ( $r = -.58, p < .001$ ); and a significant direct correlation with extraversion ( $r = .40, p < .001$ ); significant direct correlations with resilience ( $r = .51, p < .001$ ) and purpose in life ( $r = .66, p < .001$ ); significant direct correlations with positive problem orientation ( $r = .52, p < .001$ ), rational problem-solving ( $r = .44, p < .001$ ); and significant inverse correlations with negative problem orientation ( $r = -.45, p < .001$ ), and avoidant style ( $r = -.27, p < .001$ ); and finally, significant direct correlations with social support ( $r = .45, p < .001$ ), self-efficacy ( $r = .65, p < .001$ ), empowerment ( $r = .66, p < .001$ ), optimism ( $r = .57, p < .001$ ), and self-esteem ( $r = .67, p < .001$ ).

The sociodemographic, disability, and clinical variables that remain significant in the multivariate analysis for the psychological domain, along with the B coefficients (and their CI) and  $\beta$ ,  $t$ -value

and associated probability, are shown in Table 4. The corrected  $R^2$  coefficient value for the model was 0.640. Being employed and having higher levels of purpose were predictors of higher QoL in the psychological domain in multiple regression; while higher symptoms of anxiety and depression were predictors of lower scores in the psychological domain of QoL.

### Social Relations Domain

Sociodemographic variables. In the bivariate analyses, a significant inverse correlation was observed between age and the social relations domain ( $r = -.12, p = .009$ ). Regarding marital status, an average score of 58.9 ( $SD = 22.2$ ) was found for those in a relationship, and 52.3 ( $SD = 21.5$ ) for those without a partner; differences based on marital status were statistically significant,  $t(477) = -3.250, p = .001$ . As for monthly income, the average score was 49.3 ( $SD = 21.0$ ) for those with monthly incomes of 375 \$ or less, and 64.4 ( $SD = 20.6$ ) for those with incomes above 375\$; differences based on income level were statistically significant,  $t(477) = -7.928, p < .001$ . Finally, regarding employment status, the average score for participants not engaged in a work activity was 50.8 ( $SD = 21.6$ ), and for those engaged in a work activity, it was 65.0 ( $SD = 20.1$ ); differences based on employment status were statistically significant,  $t(477) = -7.183, p < .001$ .

Disability variables. In relation to the cause of the disability, average scores were 56.1 ( $SD = 21.9$ ) for those with musculoskeletal and connective tissue diseases, 50.4 ( $SD = 23.7$ ) for those with nervous system diseases, 62.0 ( $SD = 17.3$ ) for those with poliomyelitis, 63.5 ( $SD = 22.8$ ) for those with prenatal developmental structural anomalies, and 56.3 ( $SD = 21.7$ ) for those with other diseases; differences between the groups were found in the Kruskal-Wallis test ( $p = .015$ ). Regarding the relationship between the percentage of disability and the social relations domain, a significant inverse correlation was observed ( $r = -.22, p < .001$ ). Concerning comorbidity, the average score for participants with comorbidities was 53.7 ( $SD = 21.9$ ), and for those without comorbidities, it was 60.1 ( $SD = 21.9$ ); differences between those

**Table 5**

Multivariate Analysis: Association Between Sociodemographic, Disability, and Clinical Variables and the Social Relations Domain

Variables	B	$\beta$	t	p	CI (95%)	
					Lower limit	Upper limit
Employment status (Engages in work activity: Yes)	4.04	0.09	2.10	.036	0.27	7.81
Depression	-1.24	-0.24	-4.03	<.001	-1.84	-0.63
Reward	0.82	0.18	2.95	.003	0.28	1.37
Neuroticism	-1.37	-0.13	-2.49	.013	-2.46	-0.29
Social Support	0.55	0.26	6.17	<.001	0.38	0.73
Empowerment	0.41	0.15	2.30	.022	0.06	0.76
Optimism	0.60	0.11	2.02	.044	0.02	1.19
Self-esteem	-0.67	-0.16	-2.43	.016	-1.21	-0.127

Note: B = unstandardized regression coefficient;  $\beta$  = standardized regression coefficient; CI = Confidence interval.

**Table 6**

Multivariate Analysis: Association Between Sociodemographic, Disability, and Clinical Variables and the Environment Domain

Variables	B	$\beta$	t	p	CI (95%)	
					Lower limit	Upper limit
Monthly economic income (> 375 \$)	4.88	0.14	3.49	.001	2.13	7.63
Depression	-0.53	-0.13	-2.19	.029	-1.01	-0.05
Reward	0.57	0.16	2.54	.011	0.13	1.00
Neuroticism	-1.17	-0.14	-2.64	.009	-2.04	-0.30
Extraversion	-0.83	-0.10	-2.71	.007	-1.43	-0.23
RPS	0.55	0.12	2.55	.011	0.13	0.98
Social support	0.27	0.16	3.75	<.001	0.13	0.41
Empowerment	0.42	0.19	2.95	.003	0.14	0.70

Note: B = unstandardized regression coefficient;  $\beta$  = standardized regression coefficient; CI = Confidence interval.

with and without comorbidities were statistically significant,  $t(477) = 3.09, p = .002$ . Finally, concerning medication use, the average score for participants using medication was 54.9 ( $SD = 21.3$ ), and for those not on medication, it was 59.7 ( $SD = 24.0$ ); differences between the two groups were statistically significant,  $t(477) = 2.10, p = .036$ .

Clinical variables. Significant inverse correlations of the social relations domain were found with anxiety ( $r = -.46, p < .001$ ), depression ( $r = -.58, p < .001$ ); a significant direct correlation with reward ( $r = .60, p < .001$ ); a significant inverse correlation with neuroticism ( $r = -.50, p < .001$ ); and a significant direct correlation with extraversion ( $r = .29, p < .001$ ); significant direct correlations with resilience ( $r = .40, p < .001$ ), purpose ( $r = .54, p < .001$ ); with positive problem orientation ( $r = .41, p < .001$ ), and rational problem-solving ( $r = .32, p < .001$ ); and significant inverse correlations with the negative problem orientation subscale ( $r = -.35, p < .001$ ), and avoidant style ( $r = -.22, p < .001$ ); and finally, significant direct correlations with social support ( $r = .55, p < .001$ ), self-efficacy ( $r = .55, p < .001$ ), empowerment ( $r = .58, p < .001$ ), optimism ( $r = .51, p < .001$ ), and self-esteem ( $r = .54, p < .001$ ).

The sociodemographic, disability, and clinical variables that remain significant in the multivariate analysis for the social relations domain, along with the B coefficients (and their CI) and  $\beta$ ,  $t$  value, and associated probability, are presented in Table 5. The corrected R<sup>2</sup> coefficient value for the model was 0.511. Engaging in a work activity, having higher levels of reward, social support, empowerment, optimism, and self-esteem, were predictors of higher QOL in the social relations domain in the multiple regression; while higher levels of depression and neuroticism predicted lower scores in this domain.

## Environment Domain

Sociodemographic variables. A mean score of 57.4 ( $SD = 17.6$ ) for the environment domain was found for those in a relationship, and 52.7 ( $SD = 17.1$ ) for those without a partner; the differences were statistically significant,  $t(477) = -2.961, p = .003$ . Regarding income level, the average score was 49.9 ( $SD = 15.3$ ) for those with monthly incomes of 375\$ or less, and 62.1 ( $SD = 17.9$ ) for those with incomes greater than 375\$; the differences between the two groups were statistically significant,  $t(477) = -7.93, p < .001$ . Lastly, concerning employment status, the average score for participants not engaged in work was 52.3 ( $SD = 17.2$ ), and for those who were, it was 60.6 ( $SD = 17.0$ ); the differences based on employment status were statistically significant,  $t(477) = -5.17, p < .001$ .

Disability variables. A significant inverse correlation was observed between environment domain and the percentage of disability ( $r = -.19, p < .001$ ). Concerning comorbidity, the average environment domain for participants with comorbidities was 53.0 ( $SD = 17.6$ ) and 59.4 ( $SD = 16.3$ ) for those without associated comorbidities; the differences between the two groups were statistically significant,  $t(477) = 3.88, p < .001$ .

Clinical variables. Significant inverse correlations of the environment domain were found with anxiety ( $r = -.47, p < .001$ ), depression ( $r = -.55, p < .001$ ); a significant direct correlation with reward ( $r = .60, p < .001$ ); a significant inverse correlation with neuroticism ( $r = -.51, p < .001$ ); a significant direct correlation with extraversion ( $r = .24, p < .001$ ); significant direct correlations with resilience ( $r = .39, p < .001$ ), purpose ( $r = .56, p < .001$ ); positive problem orientation ( $r = .43, p < .001$ ), rational problem-solving ( $r = .42, p < .001$ ); and significant inverse correlations with negative problem orientation ( $r = -.34, p < .001$ ), and avoidant style ( $r = -.22, p < .001$ ); finally, significant direct correlations with social support

( $r = .51, p < .001$ ), self-efficacy ( $r = .54, p < .001$ ), empowerment ( $r = .61, p < .001$ ), optimism ( $r = .50, p < .001$ ), and self-esteem ( $r = .57, p < .001$ ).

The sociodemographic, disability, and clinical variables that remained significant in the multivariate analysis for the environment domain, along with the B coefficients (and their CI) and  $\beta$ ,  $t$ -value and associated probability, are shown in Table 6. The corrected R2 coefficient value for the model was 0.498. Having higher monthly incomes, higher levels of reward, rational problem-solving, social support, and empowerment, were predictors of higher QoL in the environment domain in multiple regression; while higher levels of depression, neuroticism, and extraversion predicted lower scores in this domain.

### Discussion

The primary aim of this study was to determine the HRQoL and its association with sociodemographic, disability, and clinical factors in individuals with physical disabilities from the community. Scores for all domains were within the range of previous research with individuals having various causes of physical disability (Chuluunbaatar et al., 2016; Heräjärvi et al., 2020; Jeong et al., 2012; Paiva et al., 2016).

For the physical domain, belonging to other ethnicities, engaging in employment, having higher levels of environmental reward, and psychotism predicted higher QoL. In contrast, medication use, more significant depressive symptoms, and increased extraversion were predictors of lower QoL.

Regarding employment, the current study aligns with a previous study (Jeong et al., 2012) that found that individuals who had suffered a stroke and were employed had better QoL in both physical and psychological domains. Concerning the level of environmental reward, no prior evidence shows its role as a possible QoL predictor by domains. However, White et al. (2016) discovered that increased participation correlated with overall higher QoL. As for the relationship between psychotism and better scores in the physical domain of QoL, this finding aligns with a study (Pieczyńska et al., 2022) that found that patients with brain tumors exhibiting high psychotism scored better. This may be because they show lower sensitivity to external stimuli, thus having a decreased risk of overstimulation and mental stress, resulting in reduced fatigue and better physical functioning.

The association between medication use and lower QoL in this domain aligns with some previous findings (e.g., Paiva et al., 2016) but does not align with all findings (e.g., Howitt et al., 2011). A tentative hypothesis is that this research and Paiva et al. (2016) focused on populations with different disabilities, where more medication might indicate increased severity, comorbidities, or adverse reactions, while Howitt et al. (2011) employed a homogenous sample, which could better reflect self-care. Regarding depressive symptoms, their association with reduced QoL across all domains is robust (Howitt et al., 2011; Jeong et al., 2012). While no prior studies have linked ethnicity nor extraversion with the physical domain, findings on ethnicity could be due to the scarcity of non-mestizos in our sample. As for extraversion, the characteristic external activation-seeking behavior of extroverts might mean that they feel the limitations of physical activity more than introverts.

Regarding the psychological domain, being employed and having higher purpose levels predicted greater QoL, whereas higher symptoms of anxiety and depression predicted lower QoL. Findings about employment are consistent with Jeong et al. (2012)'s work on stroke survivors. Those related to depressive symptoms coincide with several studies addressing this matter (Howitt et al., 2011; Jeong et al., 2012). Furthermore, though no prior studies focus on this specific domain, studies on general QoL found correlations with a greater purpose (Bello et al., 2021) and self-efficacy (Botero & Londoño, 2013), and reduced anxious symptoms (Howitt et al., 2011).

Employment, higher levels of reward, social support, empowerment, optimism, and self-esteem predicted higher QoL in the social relationships domain, while higher levels of depression and neuroticism predicted lower scores. The findings for depressive symptoms are consistent with prior research (Howitt et al., 2011; Jeong et al., 2012). On reward and empowerment, although no prior studies have analyzed these variables as predictors of the social relationships domain, previous studies analyzing their relationship with overall QoL found that higher participation correlated with higher overall QoL (White et al., 2016), and empowerment was central to QoL (Loja et al., 2013). Concerning employment, this finding differs from previous studies (Aminde et al., 2020; Jeong et al., 2012), which found no relationship between employment and QoL scores for the social relationships and environment domains.

Although no studies have linked social support and the social domain, Bello et al. (2021) found it associated with better overall QoL. A study on individuals with muscular dystrophy (O'Dowd et al., 2021) reported that higher self-esteem levels correlated with higher scores in the psychological and social relationship domains. As for neuroticism, this finding is consistent with previous works (Huang et al., 2017; Kim et al., 2013), suggesting that people with high neuroticism (a tendency towards depression, stress, and self-blame) might perceive or perform worse in their relationships. Lastly, to our knowledge, no prior studies have analyzed the relationship between optimism and the social relationships domain. However, research on the relationship between optimism and QoL in patients with chronic rheumatic diseases (Kreis et al., 2015) found that higher optimism correlated with higher scores in the QoL's mental dimension, including social function.

Lastly, regarding the environment domain, higher monthly income, greater levels of reward, rational problem-solving, social support, and empowerment predicted better QoL. In contrast, higher levels of depression, neuroticism, and extraversion predicted lower scores in this domain. These findings align with previous studies concerning income (Aminde et al., 2020; Paiva et al., 2016) and depressive symptoms (Grassi et al., 2020; Jeong et al., 2012; Singh et al., 2021). Additionally, although no prior studies provide data specifically for the environment domain, these findings are consistent with previous research on overall QoL concerning reward (White et al., 2016), empowerment (Loja et al., 2013), and social support (Bello et al., 2021). While no prior studies have explored this issue, having positive problem-solving skills might enable people with physical disabilities to access more resources and services. Higher neuroticism and extraversion could relate to a more negative perception of them.



## Limitations

Limitations of the present study include a cross-sectional design, which prevented establishing causal relationships. Furthermore, non-mestizos represented only 5.2% of the sample, so conclusions regarding ethnicity should be interpreted with caution. Despite these limitations, the current study has considerable strengths. It is a significant contribution to the scientific literature on HRQoL and its predictors in individuals with physical disabilities. The study utilized a random sample and validated instruments administered by trained expert clinicians and measured various facets of HRQoL in community-based individuals with physical disabilities.

## Implications

The findings of the current study have implications for public policy, clinical practice, and research. They suggest the importance of designing strategies and interventions to improve HRQoL in this population, based on specific predictors of the affected domain. Interventions for improving HRQoL in the physical domain could be targeted to mestizo individuals, include strategies oriented towards engaging in work activity and reducing medication needs, as well as procedures to decrease depressive symptoms, extraversion, mental strain, and increase environmental reward. Strategies aimed at enhancing HRQoL in the psychological domain should include occupational measures and psychological interventions aimed at reducing symptoms of anxiety and depression and promoting a sense of purpose in life. Interventions to improve HRQoL in the social relations domain should incorporate measures to promote work engagement and psychological techniques to reduce depression and neuroticism, foster environmental reward, social support, and psychological resources like empowerment, optimism, and self-esteem. Finally, measures to enhance HRQoL in the environment domain should encompass policies that ensure appropriate financial resources and psychological interventions that reduce depression, neuroticism, and extraversion and promote environmental reward, rational problem-solving skills, social support, and empowerment. Additionally, consistent with previous studies (Guàrdia-Olmos et al., 2015), these findings underscore the need for additional studies designed to assess the effects of intervention programs on individuals with disabilities to include QoL measures.

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