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**IMPACT OF PARA-ATHLETICS ON THE QUALITY OF LIFE: A CROSS-SECTIONAL SURVEY
 COMPARING HIGH-PERFORMANCE, AMATEUR ATHLETES AND SEDENTARY HEALTHY
 PEOPLE**

**IMPACTO DO ATLETISMO PARALÍMPICO NA QUALIDADE DE VIDA: UMA PESQUISA
 TRANSVERSAL COMPARANDO ATLETAS DE ALTO RENDIMENTO, ATLETAS AMADORES E
 PESSOAS SAUDÁVEIS SEDENTÁRIAS**

**IMPACTO DO PARAATLÉTICO NA CALIDADE DE VIDA: UNA ENCUESTA TRANSVERSAL QUE
 COMPARA ATLETAS DE ALTO RENDIMIENTO, AFICIONADOS E PERSONAS SEDENTARIAS
 SALUDÁVEIS**

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ABSTRACT

The present study analyzed the quality of life of athletes with physical disabilities participated in para-athletics and compared them persons sedentary. Methods: Participants were matched by gender and age (n=228) and divided into four groups: G1 participating in high performance para-athletics (n=57); G2 participating in amateur para-athletics (n=57); G3 – sedentary people with physical disabilities (n=57); G4 – sedentary healthy people (n=57). Results: Athletes with physical disabilities who participate in high performance para-athletics (G1) had the highest scores on all the WHOQOL-BREF domains. Conclusions: Physically disabled athletes reported having a better quality of life in comparison with non-athlete people.

KEYWORDS: Para-athletics. Physical disability. Quality of life. Lifestyle.

RESUMO

O presente estudo analisou a qualidade de vida de atletas com deficiência física praticantes de atletismo paralímpico e comparou-os a pessoas sedentárias. Métodos: Os participantes foram pareados por sexo e idade (n=228) e divididos em quatro grupos: G1 - praticantes de atletismo paralímpico de alto rendimento (n=57); G2 - praticantes de atletismo paralímpico amadores (n=57); G3 - pessoas sedentárias com deficiência física (n=57); G4 - pessoas saudáveis sedentárias (n=57). Resultados: Atletas com deficiência física que praticam o atletismo paralímpico de alto rendimento (G1) apresentaram as maiores pontuações em todos os domínios do WHOQOL-bref. Conclusões: Atletas com deficiência física relataram ter melhor qualidade de vida em comparação com pessoas sedentárias.

PALAVRAS-CHAVE: Atletismo paraolímpico. Deficiência física. Qualidade de vida. Estilo de vida.

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RESUMEN

El presente estudio analizó la calidad de vida de atletas con discapacidad física que participaron en paraatletismo y los comparó con personas sedentarias. Métodos: Los participantes fueron emparejados por género y edad (n=228) y divididos en cuatro grupos: G1 participando en paraatletismo de alto rendimiento (n=57); G2 participando en paraatletismo amateur (n=57); G3 – personas sedentarias con discapacidad física (n=57); G4 – personas sanas sedentarias (n=57). Resultados: Los atletas con discapacidad física que participan en paraatletismo de alto rendimiento (G1) obtuvieron las puntuaciones más altas en todos los dominios del WHOQOL-BREF. Conclusiones: Los deportistas con discapacidad física informaron tener una mejor calidad de vida en comparación con las personas no deportistas.

PALABRAS CLAVE: Para Atletismo. Discapacidad física. Calidad de vida. Estilo de vida.

INTRODUCTION

The WHO defines quality of life (QoL) as “individual perceptions of their position in life, within the context of culture and value system in which they live, and in relation to their goals, expectations, standards, and concerns’ (Anon. 1995). People with physical disabilities, may have different implications for the levels of quality of life, especially in relation to the physical, psychological and social domains (França *et al.*, 2011; Grzebień *et al.*, 2017; Young *et al.*, 2019) i.e., people’s perceptions of their physical, psychological, and social well-being (Grzebień *et al.*, 2017; Tengland, 2006).

In a literature review study, persons with spinal cord injury (SCI) had a lower perception of QoL compared to healthy controls of the healthy people (Boakye; Leigh; Skelly, 2012). Another study of QOL that compared non-disabled persons in the general population to patients with tumors in the locomotor apparatus also showed that impairment in locomotion had a negative impact on QoL (Paredes *et al.*, 2008). These findings suggest that people with physical disabilities may present changes in the domains of QoL (Young *et al.*, 2019). This perspective, sports participation has been used in physical rehabilitation (Greer *et al.*, 2019; Nakanishi *et al.*, 2021), and it plays an important role person's with physically disabilities integration into society (Diaz *et al.*, 2019; LAPE *et al.*, 2018; Lexell; Frontera, 2020).

Although the literature has many studies on QoL, few have evaluated the impact of sports practice on the QoL of people with physical disabilities (Diaz *et al.*, 2019; Mendonça *et al.*, 2017; Oh; So, 2022; Peacock *et al.*, 2019).

In this context, the present study innovates by comparing the QoL between amateur athletes and high-performance athletes with physical disabilities. This study will consider high-performance of para-athletics athletes, those participating in ranked-national competitions and amateur para-athletics athletes, those participating of regional competitions which are not ranked. The initial hypothesis is that there could be a difference in the QoL between these two groups of athletes, because they have different characteristics related to sports practice.



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In this sense, the aim of this study was analyzed the QoL of athletes with physical disabilities who participated in para-athletics at different levels of competitiveness (High-performance para athletics and amateur para athletics) and compared them persons with physical disabilities and sedentary, as well as sedentary healthy people.

METHODS

This cross-sectional, observational study was approved by the Research Ethics Committee of Federal University of Uberlândia (Final analysis N° 423/11 for CEP/UFU registration protocol 062/11).

PARTICIPANTS

Individuals of both sexes, with ages between 15 and 54 years-old were invited to this study, contingent upon their meeting the inclusion criteria for each group. The four groups were matched on a 1:1 ratio by sex, age, and physical disability (congenital or acquired).

The G1 group was composed of 57 athletes of para-athletics athletes, were interviewed during a stage of a national competition held in the city of São Paulo, Brazil. Based on sample size of 57 athletes obtained by G1, hence, the remaining groups consisted of 57 participants matched by sex and age.

Group G2 was composed by amateur athletes with physical disabilities, were recruited during a regional competition of para-athletics. Athletes were approached about participating in the study at competition venues.

The Group G3 was composed of healthy, sedentary people with physical disabilities who were not engage any form of sports or physical exercises. Volunteers were recruited in the institutions of reference in the care of people with disabilities in the city of Uberlândia, state of Minas Gerais /Brazil. The data collection was conducted at the institutions after scheduling by phone.

The Group G4 was formed by healthy people, sedentary, without physical disability. The data collection was conducted either at participants' homes after scheduling by phone.

DATA COLLECTED

Data from all participants (G1, G2, G3 and G4) were obtained through questionnaires, applied as an interview by the researchers. All participants were informed about the purpose of the study and provided written consent to participate in it.

At first, a questionnaire was used to collect demographic data (sex, age, income, education, and marital status), clinical data (congenital or acquired disability and type of sequela), and data on sports participation (years of participating in the sport, frequency of weekly practice, number of competitions per year, and receiving cash grants for participation).

In a second moment, the quality of life was measured with the brief version of the Quality-of-Life World Health Organization (WHOQOL-BREF) scale, which was developed by the World Health



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Organization (The Whoqol Group, 1998) and validated for use with the Brazilian population. The WHOQOL-BREF consists of 26 items, and of these, the first two items assess general QoL and general health status; the other 24 items are divided into four domains: physical (7 items), psychological (6), social (4), and environmental (8). The reliability of the WHOQOL-BREF in this study, as measured by Cronbach's alpha coefficient, varied from 0.50 to 0.68 across the four groups.

STATISTICAL ANALYSES

Descriptive statistical analyses were used to summarize the participants' demographic, clinical, and sports-activity characteristics and to determine their WHOQOL-BREF scores. The chi-square test was used to analyze group differences in the frequency of their answers on items Q1 and Q2 of the WHOQOL-BREF, their marital status and whether the athletes received cash grants (groups G1 and G2). Group differences in WHOQOL-BREF scores were compared using analysis of variance (ANOVA) with the Bonferroni correction. Cohen's d was used to measure effect size (the ratio of the mean group difference to its standard deviation), which indicates the magnitude of the differences in QoL scores among the four groups. The obtained d values were considered high when equal to or higher than 0.80, moderate from 0.40 to 0.79, and small when below 0.40. Power analysis was performed to determine the ability of the statistical tests to find significant differences. Pearson's correlation coefficient was used to measure the association of WHOQOL-BREF scores with the sports data of groups G1 and G2. The significance level was set at $p < 0.05$. Statistical analyses were performed using SPSS software 18.0 (Chicago, IL).

RESULTS

The four groups in the study each contained 57 volunteer participants, for a total of 228 individuals, who were matched by gender and age on a 1:1 ratio. Each group consisted of 41 (71.93%) males and 16 (28.07%) females; their mean age was 31 years-old.

Group G3 reported the lowest family income compared to the other groups ($p = 0.01$). There was a significant difference in level of education only between groups G3 and G4 ($p = 0.00$). Group G4 reported the highest number of common-law marriages ($n = 28, 49.12\%$), whereas G3 reported the lowest number of common-law marriages of the four groups ($n = 18, 31.58\%$) ($p = 0.00$) (Table 1).



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Table 1: General characteristics of the groups

	G1	G2	G3	G4	Pvalue
Family Income Per month (US\$)					
Mean	1131.65 ^{ab}	847.92 ^b	593.54 ^c	1236.01 ^a	0.01*
Standard Deviation (+)	(880.54)	(492.45)	(247.85)	(776.18)	
Schooling (years)					
Mean	11.34 ^{abc}	10.82 ^{abc}	9.74 ^b	12.14 ^c	0.00*
Standard Deviation (+)	(3.40)	(2.87)	(3.95)	(2.85)	
Marital Status					
Common-law marriage	21(36.84%)	20(35.1%)	18(31.58%)	28(49.12%)	0.00 [§]
Non-Common-law marriage	36(63.16%)	37(64.9%)	39(68.42%)	29(50.88%)	

Analysis of variance (ANOVA) with Bonferroni post-test; (p, 0.05). § chi-square test; (p, 0.05). G1=Group 1- physically disabled, high-performance para-athletics athletes; G2= Group 2- physically disabled, amateur para athletics athletes; G3= Group 3- Physically Disabled Sedentary People; G4= Group 4-Non-disabled Sedentary people.

Type of disability was a matching criterion for groups G1, G2, and G3: 19 individuals (33%) reported having a congenital disability and 38 individuals (66.67%) reported having an acquired disability. Paraparesis/paraplegia was the predominant motor limitation: 43.85% (G1), 40.34% (G2), and 40.34% (G3). Other types of limitations included monoplegia/monoparesis = 12.28% (G1), 17.55% (G2), and 29.83% (G3); hemiplegia/hemiparesis = 19.31% (G1), 24.56% (G2), and 10.53% (G3); upper limb amputation = 19.31% (G1), 14.04% (G2), and 15.79% (G3); and other physical impairments = 5.25% (G1), 3.51% (G2), and 3.51% (G3).

The means of groups G1 and G2 differed significantly on all the sports variables ($p = 0.00$): years of participating in the sport (G1 = 5 years, G2 = 2 years), frequency of weekly practice (G1 = 5 days, G2 = 3 days), number of competitions per year (G1 = 6, G2 = 3), and cash grants for athletes (G1 = 46 participants, G2 = 19 participants).

The first aspect of the WHOQOL-BREF analyzed was the self-assessment of QoL (item Q1). Most participants reported their QoL was "very good," with group G2 having the same percent of "very good" and "good" answers; participants in groups G3 and G4 mostly considered their QoL to be "good" ($p = 0.00$).

The second aspect was the satisfaction with the own health. Most participants in groups G1 and G2 reported being "very satisfied" with their health (Q2), with G1 participants giving this response more frequently than G2 participants did. Most of the participants in groups G3 and G4 reported being "satisfied" with their health ($p = 0.00$).

Athletes with physical disabilities who participate in high performance para-athletics (G1)-had the highest scores on all the WHOQOL-BREF domains, and their scores were significantly higher than the scores of sedentary people with physical disabilities (G3) on all four domains ($p = 0.00$). In



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comparison to G4, G1's scores were significantly higher on the psychological domain ($p = 0.00$). The G2 means were higher than the G3 means, except on the environmental domain. G2's mean was also higher than G4's mean on the psychological domain ($p = 0.00$). Group G4 had higher scores than the G3 group on the physical and social relations domains ($p = 0.00$). There were no significant differences between groups G1 and G2 (Table 2).

Table 2: Comparison of WHOQOL-BREF scores among the groups studied

WHOQOL-BREF	G1	G2	G3	G4	Pvalue	Test power	Effect size
Physical							
Mean	79.57 ^a	73.08 ^a	63.09 ^b	76.00 ^a	0.00*	0.68	0.82
Standard Deviation (+)	10.87	13.21	15.08	13.40			
Psychological							
Mean	83.48 ^a	81.72 ^a	69.37 ^b	73.24 ^b	0.00*	0.77	0.80
Standard Deviation (+)	8.06	10.13	14.33	13.72			
Social Relations							
Mean	85.67 ^a	79.53 ^a	64.47 ^b	79.53 ^b	0.00*	0.57	0.24
Standard Deviation (+)	12.47	15.98	20.32	13.73			
Environment							
Mean	66.61 ^a	62.06 ^{ab}	55.37 ^{ab}	61.35 ^{ab}	0.00*	0.71	0.74
Standard Deviation (+)	13.58	12.30	14.59	13.97			

*Variance analysis (ANOVA) with Bonferroni correction ($p < 0.05$). G1=Group 1- physically disabled, high-performance para-athletics athletes; G2= Group 2- physically disabled, amateur para-athletics athletes; G3= Group 3- Physically Disabled Sedentary People; G4= Group 4-Non-disabled Sedentary people

Within-group comparisons did not show significant differences in WHOQOL-BREF scores between participants with a congenital and acquired disability (G1 - $p = 0.10$; G2 - $p = 0.22$; G3 - $p = 0.25$). There was also no significant difference regarding the predominant motor physical disability (paraparesis/paraplegia): (G1 - 25 individuals - $p = 0.19$), (G2 - 23 individuals - $p = 0.12$) and (G3 - 23 individuals - $p = 0.14$).

The QoL scores of both groups G1 and G2 were correlated with the sports variables, years of participation in the sport, frequency of weekly practice, and number of annual competitions. The G1 group had a positive correlation between frequency of weekly practice and physical ($r = 0.29$, $p = 0.02$) and environmental domain scores ($r = 0.31$, $p = 0.01$), and a negative correlation between years of sports participation and physical domain scores ($r = -0.31$, $p = 0.01$). G2 only had a significant correlation between number of annual competitions and psychological domain scores ($r = 0.26$, $p = 0.04$).



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DISCUSSION

Studies comparing the QoL of physically disabled athletes who compete in wheelchair basketball (Alves, 1999; Yazicioglu *et al.*, 2012), archery, air-rifle shooting, and amputee football (Yazicioglu *et al.*, 2012) and the physically disabled sedentary individuals, found that athletes had a better QoL.

This study found significant differences in QoL with respect to sports participation. Sedentary people with physical disabilities and persons without physical disabilities, healthy and sedentary reported a lower QoL in comparison to athletes with physical disabilities who participated in high-performance and amateur para-athletics competitions.

Although other studies previously reported benefits of sports participation for athletes with disabilities (Diaz *et al.*, 2019; Goraczko *et al.*, 2020; Mendonça *et al.*, 2017; Oh; So, 2022; Peacock *et al.*, 2019), the comparison of QoL between sports participants and non-participants have been poorly studied. The present research included a considerably larger sample of volunteers than the samples used in previous studies, used pairing criteria of the samples, and the results demonstrated the importance at the para-athletics participation on QoL among high performance athletes and amateur athletes with physical disabilities.

The present research evaluated sports participation at two performance levels in para-athletics, distinguishing between high-performance and amateurs athletes.

Although the high level of competitiveness among athletes with disabilities may be related to the high frequency of sports injuries, stress and other negative motivational factors (Derman *et al.*, 2018; Fagher *et al.*, 2020; Jarraya *et al.*, 2021; Kissick; Webborn, 2018; Mendonça *et al.*, 2017), high-performance athletes have higher self-esteem, lower anxiety (CAMPBELL, 1995) elevated satisfaction with life (Yazicioglu *et al.*, 2012) and good community integration (Lape *et al.*, 2018; Mcveigh; Hitzig; Craven, 2009).

Additionally, good sports performance can generate financial support and opportunities for national or international travels (Rodrigues; Eliane, 2001). As for athletes with disabilities who practice sports at the amateur level, the simple fact of being engaged in sport already changes their paradigms. The practice of sports allows the person with disabilities to see and feel in a more positive way (Marin-Urquiza; Ferreira; Van Biesen, 2018), favors social integration and adaptation to their physical condition (Lexell; Frontera, 2020; Puce *et al.*, 2017) and also improves mood, regardless of competitive level (Campbell, 1995).

Comparison of QoL between athletes of these two categories had been recommended in previous studies (Mcveigh; Hitzig; Craven, 2009; Yazicioglu *et al.*, 2012), but had not yet been performed. This research compared QoL between high-performance athletes and amateurs of para-athletics and found no significant differences.

It is noteworthy that the two groups of para-athletics athletes (high-performance and amateur) had better overall perception with QoL and overall health satisfaction when compared with sedentary



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healthy people. The para-athletics high-performance and amateur athletes were also significantly superior in the psychological domain compared to the healthy sedentary group.

When comparing QOL between sedentary people with physical disabilities and sedentary healthy people, we found that people with physical disabilities had worse QoL scores in all WHOQOL-BREF domains, with significant differences in physical domains and social relationships. These results reinforce findings already mentioned in previous studies, where people with physical disabilities had a lower perception of QOL compared to healthy controls (Boakye; Leigh; Skelly, 2012; Paredes *et al.*, 2008).

Positive QoL perception of athletics practitioners (high-performance and amateur) may be associated with involvement with this sport. Regular practice of sporting activities enables people with physical disabilities to enjoy a fuller life, which may enhance body image perception, boost self-esteem, help social integration and adapt to their physical condition (Filipic *et al.*, 2021). These psychological benefits obtained through sport generally reflect the working relationships, affective and social life of people with physical disabilities.

CONCLUSIONS

Para-athletics athletes (high performance and amateur) had a better QoL in comparison to sedentary people. The results reinforce benefits of sports participation, particularly para-athletics, on the QoL of people with physical disabilities, regardless of their competitive level.

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IMPACT OF PARA ATHLETICS ON THE QUALITY OF LIFE: A CROSS-SECTIONAL SURVEY COMPARING HIGH-PERFORMANCE, AMATEUR ATHLETES AND SEDENTARY HEALTHY PEOPLE
Robson da Silva Medeiros, Thiago Montes Fidale, Luiz Duarte de Ulhôa Rocha Júnior, Jalusa Andreia Storch Díaz, Elmiro Santos Resende, Rogério Melo Costa Pinto, Carlos Henrique Martins da Silva, Nívea de Macedo Oliveira Morales

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