



## Quality of Life and Association with Running Habits in Middle-Aged Street Runners: A Cross-Sectional Study

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**Abstract:** The study aimed to assess quality of life (QOL) and its association with running habits in middle-aged street runners. This is a cross-sectional study, with a sample of 33 amateur street racers (20 men and 13 women), selected for convenience in a running group in Porto Alegre-RS. Due to the COVID-19 pandemic, all data collection was performed online. Two questionnaires, one to assess running habits, with objective questions about the time, weekly hours of practice, and weekly training frequency, and the other to assess QoL (WHOQOL-bref) were won. As a result, street runners' pair good levels of overall QoL (average: 77 points), as well as in the different domains of QoL (physical domain: 80 points, psychological: 78 points, social: 76 points, and environmental: 75 points, in media). The time of practice was directly associated with higher scores in the overall QoL and physical domain ( $P < 0.01$ ) regardless of age, weekly hours, and weekly frequency. No associations existed between age and running habits in the psychological, social, and environmental domains. The street runners in the running group evaluated showed good QoL, especially in the physical, psychological and overall QoL domains, which was directly and positively associated with the time of practice in the modality.

**Keywords:** Exercise, Running, Aerobic Training, Aging, Mental Health

### 1. Introduction

The search for a good quality of life (QoL) in its different domains (physical, psychological, social, and environmental) is critical to healthy aging (Otero-Rodriguez *et al.*, 2010). Specifically, adults with higher life satisfaction have demonstrated a reduced risk of chronic diseases and mortality (Koivumaa-Honkanen *et al.*, 2000; Strine, Chapman, Balluz, Moriarty, & Mokdad, 2008) and improved mental and physical health status (McAuley *et al.*, 2006). Therefore, maintaining high levels of QoL becomes a significant public health concern. Regular physical activity is one of the most exciting strategies to maintain or improve QoL (Pucci, Reis, Rech, & Hallal, 2012). The classical benefits of physical activity in improving physical fitness positively impact the functional capacity of individuals and the performance of activities of daily living (Lopez *et al.*, 2018). Moreover, this practice is related to better levels of QoL in different populations (Vagetti *et al.*, 2014), a fact that highlights physical

activity as an alternative to improve the QoL of the population (Brown *et al.*, 2003; Oliveira, Oliveira, Arantes, & Alencar, 2010).

Street running is a modality of physical activity practiced for many years, with great popularity and many followers in Brazil (Dias, 2017). The high prevalence of practitioners can be explained by the easy access to places to practice, besides the low cost for the practitioner to start and maintain the activity (van Gent *et al.*, 2007). It involves runners with varied characteristics: men and women of different ages who train in other places, with and without the direct supervision of personal trainers (Buist *et al.*, 2007; McAuley *et al.*, 2006). This modality also allows its practitioners to achieve different goals, such as health promotion, aesthetic improvement, social integration, and escape from the stress of modern life, both in leisure and competition (Salgado & Mikail, 2007). Street running also promotes improvements in

different components of physical fitness, especially cardiorespiratory fitness (Mazini Filho *et al.*, 2015), since low levels of cardiorespiratory fitness are associated with a higher prevalence of chronic diseases and reduced QoL (Kodama *et al.*, 2009).

QoL is directly associated with a healthier life profile directly related to the practice of physical activities (Elavsky *et al.*, 2005). However, few data on QoL levels in amateur street runners are available. In addition, no study verified the association between different running habits such as time of practice (years), weekly hours and weekly frequency (days), and QoL of these runners. Therefore, the study aimed to assess QoL levels and their association with running habits in middle-aged street runners. We hypothesize that running habits would be associated with better scores on the QoL questionnaire.

## 2. Methods

### 2.1 Study design

This is a descriptive cross-sectional study composed of adult street runners submitted to a quality of life questionnaire. This project was submitted and approved on 02/12/2017 by the Research Ethics Council of the Universidade Estadual do Rio Grande do Sul, Brazil, under the number 7692217.4.000.8091. The study protocol was conducted according to the principles of the Declaration of Helsinki. This study was reported following the STrengthening the Reporting of Observational Studies in Epidemiology (STROBE Statement) (Von Elm *et al.*, 2008).

### 2.2 Participants

The sample was composed of 33 amateur street runners, 20 men and 13 women, who were selected in a non-random (convenience) manner as a running group in Porto Alegre, Brazil. The inclusion criteria adopted were age  $\geq 18$  years, practicing street running for over one year, and having a weekly frequency greater than or equal to two days. As exclusion criteria, those who presented some recent musculoskeletal injury or cognitive problem to complete the questionnaire about their quality of life would be excluded. All participants were informed about the procedures they would undergo and signed the consent form.

### 2.3 Assessments

The experimental procedures underwent adaptations throughout the process due to the pandemic of COVID-19 as of the end of March 2020 and the end of collections in May 2020. With this, the collections, which would have been carried out in person, were all adapted to the digital environment through online tools.

The surveys were carried out in two stages. In the first stage, the participants signed the consent form digitally. After signing, primary self-reported anthropometric data were collected. Participants were informed of their height and body mass measurements in an online interview with the study's principal researcher. With the values of body mass and height, their body mass index (BMI) was calculated according to the formula  $\text{mass (kg)}/\text{height(m)}^2$ . In addition, each individual answered an anamnesis that aimed to detail the running habits of each individual (practice time [years], weekly hours [week], and weekly frequency [days]).

In a second moment, all participants received the same explanatory video, guiding how to fill out the quality of life questionnaire (WHOQOL-bref) (Fleck *et al.*, 2000). After watching the video, the questionnaire was filled out using the Google Forms tool, with the results sent by e-mail to the principal researcher. The WHOQOL-bref questionnaire was applied to assess the quality of life of amateur street runners, consisting of 26 questions divided into four domains: physical, psychological, social relations, and environment, and two questions are about the quality of life overall. The results of each domain are converted into a score ranging from 0 to 100, with the highest values related to a better QoL.

### 2.4 Statistical Analysis

Descriptive results are presented as mean and confidence interval (95%). The data were analyzed for normality using the Shapiro-Wilk test. Student's t-test for independent samples was used to compare the WHOQOL-bref questionnaire scores of men versus women. We also aimed to investigate the associations of WHOQOL-bref questionnaire scores with running habits. Were performed multivariable linear regression analysis adopted the following model formulation:

Model: Age + Time of practice (years) + Weekly hours (hours) + Weekly frequency (days).

WHOQOL-bref scores were considered the dependent variable, and running habits and age as the independent variable. Values of  $\alpha \leq 0.05$  were considered statistically significant. The Statistical Package for Social Sciences (SPSS) version 22.0 statistical software was used in the analyses.

A sample size of 30 subjects was calculated to estimate the average of QoL overall with a margin of error of 3 points (with the addition of 5% for possible losses and refusals, this number should be 32). The calculation took into account a 95% confidence level and an expected standard deviation for QoL overall equal to 8 points (Meissner, Legnani, Casamali, & Legnani, 2017). This calculation was carried out using the online version of the PSS Health tool (Borges et al., 2021)

### 3. Results

Table 1 presents the sample characteristics (total and sex) of the 33 street runners evaluated. The street runners were middle-aged adults (mean age: 44 years), and men were heavier and taller than women. Street runners had a mean practice time of 12 years,

and practiced an average of 5 hours a week and 5 times a week.

Table 2 shows the descriptive results for the QoL questionnaire (WHOQOL-bref). The street runners reached scores higher than 75 in all QoL domains. The highest score was observed in the physical domain (80), and the lowest was in the environmental domain (75). As for the overall perception of QoL, street runners reported a total score of 77. No difference was found in the WHOQOL-bref scores when comparing men versus women.

Table 3 presents the results of the multivariable linear regression analysis. The model adjusted for age and running habits showed that the time of practice was directly associated with higher scores in the overall QoL and physical domain. It was estimated that for every increase between 6-7 months in the time of practice in the street running, there would be an increase in the questionnaire scores for overall QoL and physical domain. No associations existed between age and running habits in the psychological, social, and environmental domains.

**Table 1.** Sample Characteristics

Variables	Overall (33)	Women (13)	Men (20)	P-value
Age (years)	44 (41 – 47)	43 (36 – 50)	45 (42 - 48)	0.50
Body weight (kg)	67 (63 -72)	57 (53 – 62)	74 (69 – 79) *	<0.01
Height (m)	1.69 (1.66 – 1.73)	1.63 (1.59 – 1.68)	1.74 (1.69 – 1.79) *	<0.01
BMI (kg/m <sup>2</sup> )	23 (22 – 24)	21 (20 – 23)	24 (23 – 25) *	<0.01
Time of practice (years)	12 (9 – 14)	10 (6 – 14)	13 (8 – 17)	0.15
Weekly hours (hours)	5 (4 – 6)	5 (4 – 6)	5 (3 – 6)	0.72
Weekly frequency (days)	5 (4 – 5)	5 (4 – 6)	5 (4 – 6)	0.80

Values expressed as mean and 95% confidence interval; BMI: body mass index; *P-value*: comparison between male versus female sample characteristics; \* indicates the statistical difference between male versus female

**Table 2.** Descriptive results from the quality of life questionnaire (WHOQOL- bref)

Variable (score)	Overall (33)	Men (21)	Women (12)	P-value
Physical domain (0-100)	80 (77 – 83)	80 (78 – 83)	78 (72 – 85)	0.23
Psychological domain (0-100)	77 (73 – 82)	78 (74 – 82)	78 (72 – 83)	0.91
Social domain (0-100)	76 (72 – 80)	77 (73 – 80)	75 (70 – 79)	0.43
Environment domain (0-100)	75 (71 – 79)	76 (72 – 80)	74 (67 – 80)	0.45
Quality of life - Overall (0-100)	77 (74 – 80)	78 (75 – 81)	76 (71 – 81)	0.38

Values expressed as mean and 95% confidence interval; *P*-value: comparison of quality of life questionnaire scores and their respective domains between men versus women

**Table 3.** Associations of WHOQOL-bref questionnaire scores with running habits

Covariate	Quality of life (Overall)		Physical Domain	
	$\beta$ (95%CI)	<i>P</i> -value	$\beta$ (95%CI)	<i>P</i> -value
Age	-0.12 (-0.54 to 0.30)	0.57	-0.15 (-0.49 to 0.17)	0.34
Time of practice (years)	0.56 (0.10 to 1.02)	<b>&gt;0.01</b>	0.74 (0.38 to 1.13)	<b>&gt;0.01</b>
Weekly hours (hours)	-0.11 (-3.32 to 3.30)	0.94	2.20 (-0.31 to 4.73)	0.08
Weekly frequency (days)	-0.13 (-4.95 to 4.68)	0.95	-0.96 (-4.75 to 2.81)	0.60

#### 4. Discussion

To our knowledge, this is the first study to investigate the QoL levels of middle-aged street runners of both sexes and verify the association of running habits with QoL. We found positive results regarding the QoL of these runners. We observed that the time of practice in street running is directly associated with QoL in overall and the physical domain, independent of age, hours of practice, and weekly frequency.

There is increasing evidence of the benefits of physical activity in improving QoL, and QoL is now known to be an important marker for population health (Andresen, Catlin, Wyrwich, & Jackson-Thompson, 2003). However, most evidence that physical activity improves QoL comes from studies with chronic diseases (Lynch, Cerin, Owen, & Aitken, 2007; Rejeski & Mihalko, 2001) (i.e., cancer, diabetes, cardiovascular disease), evidence for the general population is more limited. Still, some studies consistently show associations between positive measures of physical activity and QoL in healthy individuals (Lima *et al.*, 2011; Vallance, Eurich, Lavalley, & Johnson, 2012). Our study included middle-aged runners whose positive QoL scores were observed, validating street running as an alternative exercise modality capable of improving QoL in middle-aged adults. Previous studies, when assessing QoL in street runners, found heterogeneous results to ours, with lower and higher variations in their scores; possible factors influencing the heterogeneous results found in the studies on QoL scores and its different domains are due to age or training level (amateur or elite runners) (Meissner *et al.*, 2017; Pereira *et al.*, 2021; Tedesco), however, in

both investigations, the street runners showed satisfactory scores in the questionnaire WHOQOL-bref.

Street running on QoL benefits primarily from improved physical fitness, social involvement, relief from tension, and improved mood. Middle-aged street runners are already in the process of a slight decline in physical fitness, health, and QoL (Araújo & Araújo, 2000), with the improvement of physical fitness components (i.e., cardiorespiratory fitness, muscle strength, body composition, flexibility, and balance), the main benefit of performing regular physical activity that directly reflects on the improvement of QoL, especially in the physical domain. Social engagement with another participant, may lead to increased motivation and adherence to street running and impacting QoL, often seen in physical activities performed in groups (Krustrup, Dvorak, Junge, & Bangsbo, 2010). As for relieving tension and improving mood, most runners describe a unique and familiar feeling called "the runner's high" that is due to a feeling of pleasure when running, possibly due to increased norepinephrine and endorphin release, which promotes a better sense of well-being with practice (Callen, 1983). In the present study, runners with a long practice time were associated with better scores in the overall QoL and physical domain. These results corroborate studies using other physical activity modalities (Heesch, van Uffelen, van Gellecum, & Brown, 2012; Vallance *et al.*, 2012). We expected that quantitative aspects related to training (i.e., weekly hours and weekly frequency) would be associated with higher QoL scores. However, it seems that more qualitative factors related to intrinsic motives (general health orientation, self-esteem, life meaning, and belonging to a group) represented in our analysis by

time of practice are associated with better QoL (Ntoumanis *et al.*, 2021; Ryan & Frederick, 1997). Thus, the best benefits of QoL are found in those street runners with a long time of practice in the sport.

The evaluation of only one group and the selection of participants by convenience can be characterized as limitations of the present study. Individual runners may have different outcomes in QOL related to social interaction. In addition, another possible limitation is the data collection during the COVID-19 pandemic, which may have been reflected in the data collected. However, the strengths of this study should be highlighted. We used tools available to us related to methodological and statistical procedures so that the study was carried out even during the pandemic period of COVID-19, in which it was possible to generate interesting results.

## 5. Conclusion and Practical Applications

The street runners in the running group evaluated showed good QoL, especially in the physical, psychological and overall QoL domains. In addition, we identified an association between time of practice the street running and a significant improvement in overall QoL scores and in the physical domain. Each 6-month increase in street running practice was associated with a substantial increase in overall QoL and in the physical domain. These findings highlight the relevant role of street running as a beneficial health promotion strategy, capable of influencing various aspects of QoL.

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### Author Contributions

**Daiane Pedroso Moreira:** Conceptualization, Methodology, and Investigation; **Vinícius M. Schneider:** Formal analysis, Data Curation, and Writing; **Rodrigo Ferrari:** Conceptualization, Writing, and Supervision. All the authors read and approved the final version of the manuscript.

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Ethical approval was gained from the university ethics board

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All participants provided informed consent

### Conflict of interest

There are no conflicts of interest to declare

### Does this article pass screening for similarity?

Yes

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