Practice of physical activity during leisure time and common mental disorders among residents of a municipality of Northeast Brazil

Prática de atividade física no lazer e transtornos mentais comuns entre residentes de um município do Nordeste do Brasil

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Abstract

Objective: To analyze the association between physical activity during leisure time and common mental disorders among residents in urban areas of Feira de Santana City, Bahia. **Methods**: A cross-sectional study was conducted in a representative sample from the urban population. A sample of 3,597 individuals aged 15 years or older (71.4% female) was studied. A questionnaire gathered information about sociodemographic information, self-reported diseases, screening for mental disorders, lifestyle habits and physical activity during leisure time. To evaluate common mental disorders (CMD) the Self-Reporting Questionnaire (SRQ-20) was used. To analyze the association between leisure physical activity (active/inactive) and CMD, prevalence ratios (PR) and their respective 95% confidence intervals were estimated by using multiple logistic regression and the Delta method. **Results**: We found a frequency of 27.7% of individuals who were active during leisure time. The prevalence of CMD was lower among those active in leisure time, after adjustment by sex, age, income, education, alcohol consumption and smoking (PR = 0.78; 95% CI0.70 to 0.87). **Conclusion**: The population of Feira de Santana city has a high frequency of individuals insufficiently active during leisure, and this condition was associated with higher prevalence of CMD. Actions directed to mental health programs must encourage physical activity among the population, considering the association of this behavior with low prevalence of common mental disorders.

Keywords: Physical activity. Mental health. Physical fitness. Leisure Activities. Urban Population.

Resumo

Objetivo: Analisar a associação entre a prática de atividade física no lazer e transtornos mentais comuns entre residentes de áreas urbanas de Feira de Santana, Bahia. **Métodos:** Estudo epidemiológico de corte transversal com amostra representativa da população urbana de Feira de Santana, Bahia, constituída de 3.597 indivíduos com 15 anos ou mais de idade (71,4% do sexo feminino) da população urbana. Foi utilizado um questionário contendo informações sobre aspectos sociodemográficos, doenças referidas, hábitos de vida e atividades físicas no lazer. Para triagem de transtornos mentais comuns (TMC) foi utilizado o SRQ-20. Para avaliar a associação entre atividade física no lazer (ativo/inativo) e TMC foram estimadas as razões de prevalência e seus respectivos intervalos de confiança por meio de regressão logística múltipla e uso do método Delta. **Resultados:** Encontrou-se uma frequência de 27,7% de indivíduos considerados ativos no lazer. A prevalência de TMC foi menor entre os indivíduos ativos no lazer, após o ajuste, num modelo de regressão logística múltipla, por sexo, faixa etária, renda, escolaridade, consumo abusivo de bebidas alcoólicas e tabagismo) (RP = 0.78 [0,70 - 0,87]). **Conclusão:** A população do município de Feira de Santana apresenta uma elevada frequência de indivíduos inativos no lazer, e essa condição estava associada a maior prevalência de TMC. As ações direcionadas à saúde mental devem priorizar programas que favoreçam o incentivo à prática de atividade física entre a população do município, considerando a associação desse comportamento com a prevenção de transtornos mentais comuns.

Palavras-chave: Atividade física. Saúde mental. Aptidão física. Atividades de Lazer. População Urbana.

Introduction

Psychological disorders are one of the main problems faced by the world at present, affecting the health of populations and placing a great burden on public health. The World Health Organization (WHO)[1] points out that one in every four people will have a mental disorder in a certain stage of life.

Common mental disorders (CMD) are characterized by symptoms such as fatigue, forgetfulness, insomnia, difficulty in concentrating, headaches and somatic complaints[2]. These diseases have stood out as the most prevalent mental disorders.

Prospective cross-sectional studies have shown a strong association between mental health problems and low physical activity levels[3;4;5].

Physical activity is an aspect responsible for directly acting on psychological factors (distraction, self-efficacy and social interaction) and physiological factors (increase in neurotransmission of endorphins)[6].

Leisure time physical activities, especially when practiced in group, promote the formation of social relationships. In these activities, mutual support among participants has an important protective effect against mental health problems[6].

Although the benefits of physical activity practice for mental health maintenance are emphasized in the literature, the production of empirical evidence on the relationship between physical activity and mental health factors is still limited. This lack of empirical data is particularly relevant when considering the production of information derived from population-based studies[5].

The present study aimed to analyze the association between leisure time physical activity and common mental disorders among residents living in urban areas of the city of Feira de Santana, BA, Brazil.

Thus, apart from generating information about mental health status, researchers intend to assess whether leisure time physical activity, characterized as a non-drug treatment, can contribute to mental health

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maintenance, thus providing resources for health care policies in this city.

Methods

The data of the present study derived from the household survey entitled "*Caracterização da Saúde Mental do Município de Feira de Santana, Bahia*" (Characterization of Mental Health in the City of Feira de Santana, Bahia), performed by the Epidemiology Center of the *Universidade Estadual de Feira de Santana* in 2007. A cross-sectional study was conducted with a representative sample of the population aged 15 years or more living in the urban areas of the city of Feira de Santana, as defined by the *Instituto Brasileiro de Geografia e Estatística* (IBGE – Brazilian Institute of Geography and Statistics)[7] of this city.

Feira de Santana is 116 km far from Salvador, the capital city of the state of Bahia. This is the second largest city in the state, the 31st largest city in Brazil, and the 13th most populous city in this country, excluding the capital cities. In 2007, the population of this city was 571,997 inhabitants[7].

An estimated prevalence of mental common disorders of 25% (according to the WHO[1]), sampling error of 3% and confidence interval of 95% were considered to calculate the sample size. Based on these parameters, the sample totaled 800 individuals. When the effect of the study design (cluster sampling) and refusals and losses of approximately 20% were taken into consideration, the final sample size was comprised of 1,920 individuals.

The selection of study areas was performed by stratified sampling per subdistrict, adopting random procedures based on census data from the *Fundação Instituto Brasileiro de Geografia e Estatística* (Brazilian Institute of Geography and Statistics Foundation)[7], where the household was the sample unit. All individuals aged 15 years or more were considered to be eligible for this study. Researchers established that up to three visits would be conducted to reduce possible losses.

As the present study was not specifically designed to study the association between leisure time physical activity and common mental disorders, the sample size was recalculated to observe whether the study had sufficient strength to assess this association. The following parameters were used to estimate the sample size: an estimated frequency of common mental disorders expected among individuals exposed (inactive during leisure time) of 33.3%; an estimated frequency of common mental disorders expected among non-exposed individuals (active during leisure time) of 19.7%; a 95% confidence interval; and power of 80%. Based on these parameters, the sample was set at 456 individuals. The parameters of frequency expected for the event studied were determined according to the database analyzed.

The study sample was comprised of 3,597 individuals, 71.4% of which were females and 28.6% were males of the urban population aged more than 15 years who lived in the city of Feira de Santana. Consequently, the number of individuals studied was higher than the sample size required to evaluate the association analyzed.

Data were collected with a questionnaire that included structured questions about socio-demographic aspects (sex, age group, marital status, ethnicity, level of education, income), lifestyle habits (smoking and alcohol drinking), leisure time physical activity and mental health (CMD). This questionnaire was applied to eligible residents from the households selected, using individual interviews conducted by previously trained interviewers. A manual of conduct and procedures was designed to standardize data collection.

Leisure time physical activity, the main exposure factor analyzed in this study, was assessed considering the following: regular participation (in the last month) or not in leisure time activities and the physical effort involved in the activity performed. Physical activities were categorized as light, moderate and vigorous, according to

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the intensity of physical effort involved in metabolic equivalents of task (MET): light (<3 METs), moderate (3-6 METs) and vigorous (>6 METs)[8].

Based on the classification of types of activities, two groups were established for comparison: one with individuals who were active during leisure time and another with inactive individuals. Participants who ranked their physical effort during leisure time as moderate (walking, cycling, dance lessons or physical activity for at least two hours per week) or vigorous (running, gymnastics, swimming, games played with a ball or physical activity for at least four hours per week) were considered to be active. Individuals were inactive when they reported not participating in light physical activities during leisure time (card games, chess, dominoes, slow walking, for at least two hours per week). The procedure used to define/categorize active and inactive participants was similar to those of other studies found in the literature[9;10;11].

Common mental disorders (CMD), the response variable investigated, were assessed by the Self-Reporting Questionnaire (SRQ-20). This instrument was developed by the World Health Organization (WHO)[1] and validated by Mari and Williams[12] in Brazil. It aims to assess the level of suspected mental disorder, not providing a specific diagnosis of the existing type of disorder. Studies on SRQ-20 validation conducted in Brazil have shown good performance of this instrument[13] to assess psychological morbidity. A cut-off point of seven or more positive responses was used to define suspected CMD, a procedure adopted and recommended in other studies[14;15].

Income was assessed through a question about participants' mean monthly income, which was grouped according to the number of minimum wages in the analysis (up to one minimum wage and one minimum wage or more).

Alcohol abuse was defined according to the following conditions: men who reported drinking more than two drinks of alcoholic beverages per day and women who reported drinking more than one drink of alcoholic beverages per day in the last 30 days.

Smoking was categorized as follows: Smokers – individuals who smoked at least 100 cigarettes throughout life and smoked at the time of study; and Non-smokers – those who did not meet these criteria.

In addition, the type of physical activity performed was analyzed to better characterize leisure time activities (soccer, gymnastics, swimming, walking, yoga).

Socio-demographic characteristics and lifestyle habits were included in the analysis as co-variables. The selection of these co-variables was performed according to studies on mental health that emphasized social determinants (expressed in variables such as level of education and income) as important predictors of health status. Age and sex are also variables frequently associated with psychological morbidity.

The frequencies of socio-demographic data (sex, age group, marital status, ethnicity, level of education, income), lifestyle habits (smoking and alcohol abuse) and leisure time physical activity were analyzed and the prevalence of CMD was estimated.

Prevalence ratios (PR) and respective 95% confidence intervals were used to assess the association between variables of interest (leisure time physical activity and CMD, analyzed in a dichotomous way – active/inactive and with CMD/without CMD, respectively). Pearson's chi-square test was used to analyze the statistical significance, adopting a significance level of $p \leq 0.05$. The co-variables included in the analysis were the previously mentioned socio-demographic characteristics and lifestyle habits (alcohol abuse and smoking).

A multiple logistic regression analysis (MLRA) was performed to assess the simultaneous effect of the variables studied, when confounding variables were adjusted at the same time, thus enabling the behavior of the outcome variable to be predicted while the co-variables studied are simultaneously present[14].

MLRA was conducted according to the procedures recommended by Hosmer

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and Lemeshow[16], including the following stages: 1st) Selection of variables based on study objectives and literature review; 2nd) Verification of model assumptions; 3rd) Pre-selection of variables (univariate analysis) to be included in the analysis through the verisimilitude ratio test, adopting a p-value 0.25; 4th) Simultaneous analysis of all preselected variables with the assessment of the association measures with and without the variable under study, using the backward procedure. The criterion of significance of $p<0.10$ was adopted to obtain the final model.

First-order interaction terms were tested, including the main exposure variable and each of the co-variables included in the analysis. The change in effect was analyzed by the verisimilitude ratio test, adopting a significance level of 20%.

The magnitude of variation of the estimated coefficients of the main exposure variable and CMD was observed to analyze potentially confounding variables by introducing other variables in the model. The effect on the main association was assessed by observing whether the co-variables produced changes of approximately 10% in this association through the comparison between the complete model and the model without the potential confounding variables. A variation higher than 10% in the estimated coefficient of the main predictor indicated the presence of confounding. After this presence was observed, the final model was adjusted for confounding variables.

Considering the fact that the prevalence of CMD estimated in the study population was high (29.6%), becoming more distant from the parameters estimated for OR (odds ratio), the estimates of PR (prevalence ratios) and their respective confidence intervals were calculated, using the Delta method procedures developed by Oliveira et al.[17].

The assessment of the performance of the final model obtained was performed using goodness-of-fit and analyses of ROC curve and influential values. The Le Cessie-van Houwelingen-Copas-Hosmer test[16] was used to assess the goodness-of-fit of the

model, whose purpose is to observe whether this model adjusts the data satisfactorily. The area under the ROC curve was used to identify the model and the analysis of the influence of co-variable patterns was assessed by making a comparison between the estimate of the parameters obtained by eliminating patterns of co-variables considered to be influential and the estimate of parameters obtained by maintaining these patterns.

The database was developed with the use of the Epidata software, version 3.1b, and analyses were performed with the SPSS (version 9.0) and R software programs, version 2.7.2.

This research project followed the ethical principles of the Declaration of Helsinki and Resolution 196/96 of the *Conselho Nacional de Saúde* (National Health Council). Research protocols were evaluated and approved by the Human Research Ethics Committee of the *Universidade Estadual de Feira de Santana* (Official Opinion 042/06) and participants signed an informed consent form.

Results

The characteristics of the sample are shown in Table 1. A higher percentage of women was observed (71.4%). The 15 to 29 year age group (38.9%) and the group of married individuals or those cohabitating (48.7%) were the ones that predominated. With regard to income and level of education, 81.7% earned less than one minimum wage and 47.2% had completed primary school.

In terms of behavioral characteristics, 11.8% reported smoking and 28.1% drank an excessive amount of alcohol (Table 1).

The frequency of participation in leisure time physical activities was low; only 27.3% (n=981) of individuals were categorized as active during leisure time. Table 2 shows the association between physical activity and socio-demographic and behavioral characteristics. The frequency of leisure time physical activity is higher among males, single individuals and those in younger

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age groups, with an income higher than one minimum wage and with a lower level of education.

The frequency of leisure time physical activity was higher among individuals who reported drinking an excessive amount of alcohol and lower among smokers.

The overall prevalence of CMD among participants was 29.6%. The assessment of prevalence of CMD according to socio--demographic characteristics and lifestyle habits is shown in Table 3. The prevalence of CMD was higher in women (35.3%). With regard to age group, this prevalence increased with age. Individuals with an income lower than or equal to one minimum wage

Table 1 - Distribution of residents in urban areas according to sociodemographic characteristics and lifestyle habits, Feira de Santana, BA, 2007.

Tabela 1 - *Distribuição dos residentes em áreas urbanas segundo características sociodemográficas e hábitos de vida, Feira de Santana, BA, 2007.*

Variable	Frequency	
	n	%
Sex		
Female	2569	71.4
Male	1028	28.6
Age (years)		
Up to 25	1078	30.0
26-39	972	27.0
40-59	983	27.4
60 and more	561	15.6
Self-reported ethnicity		
Black/ Mixed	2741	76.9
White	532	14.9
Other*	292	8.2
Marital Status		
Single	1305	36.4
Married	1743	48.7
Separated/widower	533	14.9
Level of education		
Has no formal education/knows how to read and write	240	6.7
Primary education	1656	46.2
Secondary education/ Higher education	1692	47.1
Monthly income		
Up to one minimum wage	2938	81.7
More than one minimum wage	658	18.3
Smoking		
No	3169	88.2
Yes	423	11.8
Alcohol abuse		
No	2586	71.9
Yes	1010	28.1
Physical activity and leisure time		
Active	981	27.3
Inactive	2616	72.7

*Indian and asian / *Indígena e amarela
Note: Missed data: 16 for marital status, schooling for 9, 1 for income, 9 for smoking and 9 for alcohol consumption.
Nota: Informações perdidas: 16 para situação conjugal, 9 para escolaridade, 1 para renda, 9 para tabagismo e 9 para etilismo.

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per month had a higher prevalence of CMD (32.5%), when compared to those who earned more than one minimum wage (16.7%). Individuals who had a low level of education (38% had no formal education) and lived without a partner (separated/widowed) had a higher prevalence of CMD.

The estimates of CMD according to type of physical activity performed during leisure time showed that only soccer (p=0.001) and cycling (p=0.039) were statistically associated with the occurrence of CMD (Table 4).

Table 2 - Physical activity during leisure time according to sociodemographic characteristics and lifestyle habits, Feira de Santana, BA, 2007.
Tabela 2 - Prática de atividades físicas no lazer segundo características sociodemográficas e hábitos de vida, Feira de Santana, BA, 2007.

Variable	Active during leisure time		p-value
	n	%	
Sex			
Female	481	46.8	< 0.001
Male	500	19.5	
Age (years)			
Up to 25	367	34.0	< 0.001
26-39	267	27.5	
40-59	243	24.7	
60 and more	103	18.4	
Self-reported ethnicity			
Black/ Mixed	161	30.3	0.021
White	747	27.3	
Other*	62	21.2	
Monthly income			
Up to one minimum wage	277	42.1	< 0.001
More than one minimum wage	704	24.0	
Level of education			
Has no formal education/knows how to read and write	546	33.0	< 0.001
Primary education	404	23.9	
Secondary education/ Higher education	29	12.1	
Marital Status			
Single	436	33.4	< 0.001
Married	441	25.3	
Separated/widower	100	18.8	
Smoking			
No	636	28.1	0.002
Yes	89	21.0	
Alcohol abuse			
No	636	24.6	<0.001
Yes	345	34.2	

*Indian and asian / *Indígena e amarela
**Smoking - Yes: being a smoker or have smoked 100 or more cigarettes in his/her lifetime; No: never having smoking or had smoked up to 99 cigarettes in his/her lifetime / **Fumo - Sim: ser fumante ou ter fumado 100 ou mais cigarros durante a vida; Não: nunca ter fumado ou ter fumado até 99 cigarros na vida.
***Alcohol abuse - Yes: Man: drink two or more drinks of alcohol in the last 30 days; Woman: drinking one or more drinks of alcohol per day in the last 30 days / *** Consumo abusivo - Sim: Homem: beber duas ou mais doses de álcool por dia nos últimos 30 dias; Mulher: beber uma ou mais doses de álcool por dia nos últimos 30 dias

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The analysis of change in effect did not identify a relationship between leisure time physical activity and the variables analyzed (socio-demographic characteristics and lifestyle habits).

The analysis of the crude association between leisure time physical activity (active and inactive) and CMD revealed that exposed individuals, i.e. those active during leisure time, had a prevalence of CMD that was

Table 3 - Prevalence of Common Mental Disorders according to sociodemographic and behavioral characteristics and physical activity during leisure time. Feira de Santana, BA, 2007.

Tabela 3 - Prevalência de Transtornos Mentais Comuns de acordo com características sociodemográficas, comportamentais e prática de atividade física no lazer. Feira de Santana, BA, 2007.

Variable	Prevalence		PR	95%CI	p-value
	n	%			
Sex					
Female	156	15.2			< 0.001
Male	908	35.3	2.32	1.99-2.71	
Age (years)					
Up to 25	261	24.2	-	-	< 0.001
26-39	285	29.3	1.07	1.01-1.13	
40-59	339	34.5	1.15	1.09-1.22	
60 and more	177	31.6	1.10	1.03-1.18	
Self-reported ethnicity					
Black/ Mixed	115	21.6	-	-	< 0.001
White	840	30.6	1.13	1.07-1.18	
Other*	99	33.9	1.18	1.08-1.30	
Monthly income					
Up to one minimum wage	954	32.5	1.94	1.62-2.32	< 0.001
More than one minimum wage	110	16.7			
Level of education					
Has no formal education/knows how to read and write	93	38.8	1.26	1.13-1.39	< 0.001
Primary education	593	35.0	1.18	1.13.1.24	
Secondary education/ Higher education	378	22.8	*		
Marital Status					
Single	184	34.5	1.15	1.07-1.46	< 0.001
Married	558	32.0	1.30	1.16-1.46	
Separated/widower	320	24.5			
Smoking					
No	881	27.8	*		< 0.001
Yes	180	42.6	1.53	1.35-1.73	
Alcohol abuse					
No	787	30.4	*		0.073
Yes	276	27.3	0.89	0.79-1.00	
Physical activity and leisure time					
Light	622	30.1	1.54	1.31-1.80	< 0.001
Moderate	152	19.5			
Intense	41	20.3	1.05	1.01-1.54	

*Grupo de referência / *Reference group.*

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17% lower than that of inactive individuals (Table 5) at statistically significant levels.

Apart from the main exposure variable, the final model obtained in the multiple logistic regression analysis included the following co-variables: sex, age group, income, alcohol abuse and smoking. The inverse association between physical activity and occurrence of CMD maintained its significance after adjusting for these confounding variables (Table 5). Individuals who were active during leisure time (performing moderate to vigorous physical activities) had a lower prevalence of CMD than inactive individuals (not performing physical activities or performing light physical activities) and this prevalence was 22% lower in the first group.

Assessment of goodness-of-fit of the model, as performed by the Le Cessie-van Houwelingen-Copas-Hosmer test (p=

0.1855) and the area under the ROC curve (ROC =0.6586), showed that this model adjusted the data satisfactorily.

Discussion

The majority of participants were categorized as inactive during leisure time. Evidence in the literature indicate that a great part of the population do not meet the current recommendations with regard to physical activities. When only physical activities performed during leisure time are assessed, the prevalence of physical inactivity is higher.[3;5;10]

The prevalence of CMD in the population studied was 29.6%. Other studies found results similar to those observed in the present study. Puertas, Rios and Valle Fortes[18] found a prevalence of CMD of 27.2% in the population living in the suburbs of

Table 4 - Prevalence of CMD according to type of physical activity during leisure time and CMD, Feira de Santana, BA, Brazil, 2007

Tabela 4 – Prevalência de TMC segundo tipo de atividade física praticada no lazer e TMC, Feira de Santana, BA, 2007.

Variable	Prevalence (%)	PR	95%CI	p-value
Aerobics				
Yes*	20.0	-	-	0.057
No	26.9	1.09	1.00-1.18	
Walking				
Yes*	24.0	-	-	0.108
No	27.2	1.04	0.99-1.09	
Soccer				
Yes*	12.4	-	-	0.001
No	28.7	1.22	1.17-1.28	
Cycling				
Yes*	18.3	-	-	0.039
No	26.9	1.11	1.02-1.21	
Dancing				
Yes*	29.3	-	-	0.831
No	26.5	0.96	0.79-1.17	
Other activities				
Yes*	30.0	-	-	0.668
No	26.5	0.95	0.75-1.20	

* Grupo de referência / * Reference group.

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Table 5 - Prevalence Ratios Crude and adjusted* and confidence intervals (95%) between physical activity during leisure and TMC, Feira de Santana, BA, 2007.

Tabela 5 - *Razões de prevalências bruta e ajustadas* e intervalos de confiança (95%) entre atividade física no lazer e TMC, Feira de Santana, BA, 2007.*

		CMD			
		PR_{crude} [95%CI]	p-value	$PR_{adjusted}$ [95%CI]	p-value
Physical activity and leisure time	**Inactive**	1	<0.001	1	<0.001
	Active	0.83 (0.79-0.86)		0.78 (0.70-0.87)	

*Note: The adjustments were made to the variables in the final model obtained in the multiple logistic regression analysis (gender, age, income, education level, alcohol abuse and smoking) / *Nota: Os ajustes foram feitos para as variáveis que permaneceram no modelo final obtido na análise de regressão logística múltipla (sexo, faixa etária, renda, escolaridade, consumo abusivo de álcool e hábito de fumar).*

cities of Colombia. Ludermir, Melo Filho[19] (2002) reported a prevalence of 35% among individuals aged 15 years or more who lived in the city of Olinda, PE, Brazil.

However, Fortes, Villano, Lopes[20] found a higher prevalence (56%) among users cared for in the Family Health Program of the city of Petrópolis, RJ. Researchers observed that the CMD are a serious public health problem. The set of data on the mental health status of the populations of Brazil generated until now reveals that the situation is very alarming and points to the need to reflect on the creation, implementation and monitoring of far-reaching mental health policies. In this sense, the present study sought to produce knowledge about a factor that may contribute to mental health promotion and protection: physical activity during leisure time.

The results found in this study support the hypothesis that individuals who are active during leisure time have lower prevalences of CMD than inactive ones. In addition, they show that factors such as age, age group, income, level of education, alcohol abuse and smoking are associated with CMD. It should be noted that these variables were also relevant for physical activity or inactivity during leisure time. The relevance of socio-demographic factors and lifestyle habits for mental health has been consistently observed in the literature[18,19,20].

With regard to alcohol abuse, it could be assumed that the formation of social networks during leisure time physical activities may promote the excessive use of alcohol and other illicit drugs. The frequency of participation in physical activities during leisure time was higher among individuals who drank an excessive amount of alcohol, in a survey conducted with the population who lived in the city of Pelotas, RS[21], and in a study conducted by Gomes et al.[22] with users of the Family Health Program who lived in the city of Guanambi, BA, which also corroborated the findings of the present study.

The type of physical activity was associated with the prevalence of CMD in the case of soccer and cycling exclusively. Soccer and cycling have different characteristics in terms of the energetic system used (anaerobic alactic and aerobic, respectively) and in terms of the characteristics of the activity. Soccer is a group activity, whereas cycling can be performed alone, although it is common for people to gather in groups to perform this activity during leisure time, thus promoting social interaction[6,23,24].

The literature indicates that changes in ß-endorphin concentrations, which are responsible for the feeling of well-being and important in CMD treatment, as a response to exercising are influenced by the type/intensity/volume of physical effort[25,26], as evidenced in the present study.

Leisure time physical activity was inversely associated with CMD. Current evidence corroborates this finding. Wiles et al.[3] observed that individuals who were active during leisure time were 46% less likely to have suspected CMD at the end of a five-year period. Zaitune et al.[27] identified a positive association between CMD and

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physical inactivity during leisure time in the elderly population of the city of Campinas, SP. Considering certain CMD markers in a survey conducted with elderly individuals of the city of Florianópolis, SC, Benedetti et al.[28] found that physically inactive individuals were 2.74 and 2.38 times more likely to have dementia and depression, respectively, than active individuals.

Leisure time physical activity promotes social interaction and self-efficacy; improves depressive symptoms, anxiety and tolerance to stress; and increases self-esteem and the feeling of well-being[6;29;30;31]. In this sense, public health strategies aimed at the adoption of an active lifestyle can contribute to a reduction in mental health problems[31].

One of the limitations of this study was its cross-sectional design, as this prevents implicit causal relationships between variables studied from being established.

The instrument used to analyze leisure time physical activity was not specifically constructed to investigate physical activity, but rather a population survey primarily aimed at analyzing the mental health status of residents living in the city's urban areas, which could be an important limitation to this study. The analysis of leisure time physical activity was defined after data collection and there was no validation, nor was the questionnaire's test-retest agreement verified with this purpose. However, a pilot study was conducted to analyze and reconstruct the questions of the questionnaire. In addition, selection bias may have occurred, especially with regard to the number of women in the sample, well above the expected number when compared to men. Although random selection methods have been used and conducts have been established to prevent losses (three visits) in the sample composition, they do not appear to have been efficient to reduce losses of males. Nonetheless, it should be emphasized that data on leisure time physical activity and CMD with regard to sex found in this study are similar to the results observed in the literature. In this sense, although the occurrence of possible selection bias cannot be disregarded, this does not seem to be the factor responsible for the results obtained.

On the other hand, even if possible limitations to this study are taken into consideration, it should be emphasized that a population-based study was conducted, investigating a significant number of individuals, and that it adopted data collection and analysis procedures which were recognized as valid. In addition, the foundation for the main association studied (leisure time physical activity and CMD) found in the literature shows that the results observed support the evidence on explanatory models of development of CMD in the population, providing useful information for public health policies and actions.

Conclusions

Participation in leisure time physical activities was associated with the prevalence of CMD. This prevalence was lower among physically active individuals, when compared to inactive ones.

Evidence on the association between physical activity practice and psychological disorders is an important aspect that will support the redefinition of mental health promotion policies in the city of Feira de Santana.

Similarly to several cities in Latin America, Feira de Santana does not have a sufficient number of public spaces for physical activities during leisure time, nor does it offer public policies to promote this practice. The few existing spaces are restricted to the city's central areas, so that individuals living in the suburbs do not have access to leisure facilities.

In this sense, it is recommended that certain strategies should be adopted to increase the population's physical activity level: a) an increase in the number of existing leisure facilities (sports courts, walking tracks, soccer fields); b) construction of leisure facilities, such as parks, squares, swimming pools and gyms; and c) development and implementation of educational

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and health programs aimed at behavioral changes and the adoption of an active lifestyle.

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