Analysis of health status of older adults users of a municipal physical activity program

Análise da situação de saúde dos idosos usuários de uma política municipal de atividades físicas

Análisis de la situación de salud de los adultos ancianos de una política municipal de actividad física

Fernando Matos Dourado-Neto[1] , Nórton Luis Oliveira[2] , Luiza Isnardi Cardoso Ricardo[3] , Leandro dos Santos[1] , Angélica Trevisan de Nardi[1] , Cíntia Ehlers Botton[2] , Lucinéia Orsolin Pfeifer[1] , Laura Milán Vasques[1] , Lucas Porto Santos[1] , Larissa Neves da Silva[1] , Bruna Góes Moraes[2] , Lucas Helal[1] , Daniel Umpierre[1]

[1]Universidade Federal do Rio Grande do Sul – Porto Alegre (RS), Brazil
[2]Hospital de Clínicas de Porto Alegre – Porto Alegre (RS), Brazil.
[3]Universidade Federal de Pelotas – Pelotas (RS), Brazil.

Abstract

Introduction: Intersectoral public policies on health are population (and ecological) interventions widely used to reduce the global burden of disease and optimize both financial and human resources. **Objective:** The objective of this study was to analyze the health status of older adults users of a municipal policy on physical activities. **Methods:** This is a cross-sectional study with a sample based on community centers (N community centers=11), which provide body movement practices and others, funded by the Municipal Department of Social Development and Sports (SMDSE), City Hall of Porto Alegre (state of Rio Grande do Sul – RS, Brazil). The users' sample was weighted by the number of users of each center, by simple random sampling. Data collection took place between April 2018 and February 2019, in which the collection team went to the users' assigned territory to conduct a self-administered health survey and functional assessment; conversely, the users attended a collection center for laboratory tests (without fasting). **Results:** A total of 351 users (mean±SD, 70±6 years old) were included. For cardiovascular risk factors, the prevalence of hypercholesterolemia was 54.2% and 49.3% for systemic arterial hypertension — the highest levels. Sleep disorder was prevalent in 55.3% of the sample. Among the self-reported diseases, participants listed cardiovascular (14.3%), previous cancer (14.6%), diabetes (13.2%), rheumatoid arthritis/rheumatism (29.6%), and depression (without major/minor depression discrimination) (18.6%). Functional capacity, estimated by the six-minute walk test, and handgrip strength, predictors of cardiovascular mortality and injuries, had mean values of 498.05±78.96 m and 27.08±8.14 kg, respectively. **Conclusions:** The findings of this study allow contrasting prevalence rates estimated in older adults participants of a public physical activity program with other estimates in comparison groups, enabling the analysis of health status based on different behaviors and risk factors. All in all, our study enabled to monitor public interventions for older adults at the community level, serving as a baseline for future monitoring.

Keywords: Elderly; Physical exercise; Diagnosis of health situation; Public health.

Resumo

Introdução: Políticas públicas intersetoriais em saúde são intervenções populacionais (e de cunho ecológico) muito utilizadas para a redução da carga global de doença e otimização de recursos tanto financeiros quanto humanos. **Objetivo:** O objetivo deste estudo foi analisar a situação de saúde de usuários idosos de uma política municipal de atividades físicas. **Métodos:** Trata-se de um estudo transversal com amostragem baseada em centros comunitários (N dispositivos comunitários=11), que disponibilizam práticas de movimentos corporais e outros, subsidiados pela Secretaria Municipal de Desenvolvimento Social e Esporte (SMDSE), Prefeitura Municipal de Porto Alegre (RS). A amostragem de usuários foi ponderada para o total de usuários atendidos por centro, adotando seleção aleatória simples. A coleta de dados ocorreu entre abril de 2018 e fevereiro de 2019, em que a equipe de coleta se deslocou ao território adscrito dos usuários para a condução de inquérito de saúde autoaplicado e a avaliação funcional; de forma contrária, os usuários compareceram a um centro de coleta para a série laboratorial (sem jejum). **Resultados:** Foram incluídos e analisados 351 usuários (média±desvio padrão, 70±6 anos). Para fatores de risco cardiovasculares, a prevalência de hipercolesterolemia foi de 54,2% e de 49,3% para hipertensão arterial sistêmica — as mais elevadas. O transtorno de sono foi prevalente em 55,3% da amostra. Entre as doenças autorrelatadas, os participantes listaram as cardiovasculares (14,3%), câncer prévio (14,6%), diabetes (13,2%), artrite reumatoide/ reumatismo (29,6%) e depressão (sem discriminador de depressão maior/ menor) (18,6%). A capacidade funcional, estimada pelo teste de caminhada em 6 minutos e a força de preensão manual, preditores de mortalidade cardiovascular e agravos, tiveram valores médios encontrados de 498,05±78,96 m e 27,08±8,14 kg, respectivamente. **Conclusão:** Os achados do presente estudo permitem contrastar prevalências estimadas em idosos participantes de um programa público de atividades físicas com outras estimativas em grupos de comparação, possibilitando a análise de situação de saúde com base em diferentes comportamentos e fatores de risco. Por fim, o trabalho viabilizou a monitorização de intervenções públicas para idosos em nível comunitário, sendo um ponto de base para acompanhamento futuro.

Palavras-chave: Idoso; Atividade física; Análise de situação de saúde; Saúde coletiva.

Resumen

Introducción: Las políticas de salud pública intersectoriales tienen el potencial de destacar la reducción de la carga global de enfermedad y la optimización de los recursos financieros y humanos. **Objetivo:** El objetivo de este estudio fue analizar la situación de salud de los usuarios, ancianos, de una política municipal de actividades físicas. **Métodos:** Se trata de un estudio transversal con muestreo a partir de centros comunitarios (N dispositivos comunitarios=11), que brindan prácticas de movimiento corporal y otras, subsidiadas por la Secretaria Municipal de Desenvolvimento Social e Esporte (SMDSE), Prefeitura Municipal de Porto Alegre (RS). El muestreo de usuarios fue ponderado por el total de usuarios atendidos por centro, adoptando selección aleatoria simple. La recolección de datos ocurrió entre abril/2018 y febrero/2019, cuando el equipo de recolección viajó al territorio asignado de los usuarios para realizar una encuesta de salud auto aplicada y evaluación funcional; por el contrario, los usuarios acudían a un centro de recogida de series de laboratorio (sin ayuno). **Results:** Se incluyeron y analizaron 351 usuarios (media±DP, 70±6 años). Para los factores de riesgo cardiovascular, la prevalencia de hipercolesterolemia fue de 54,2% y de hipertensión arterial sistémica de 49,3%, la más alta. El trastorno del sueño fue prevalente en el 55,3% de la muestra. Entre las enfermedades auto informadas, los participantes enumeraron enfermedades cardiovasculares (14,3%), cáncer previo (14,6%), diabetes (13,2%), artritis reumatoide/reumatismo (29,6%) y depresión (sin discriminación de depresión mayor/menor) (18,6%). La capacidad funcional, estimada por la prueba de la marcha de 6 minutos, y la fuerza de prensión manual, predictores de mortalidad y lesiones cardiovasculares, tuvieron valores medios de 498,05±78,96 m y 27,08±8,14 kg, respectivamente. **Conclusiones:** Los hallazgos de este estudio permiten contrastar las prevalencias estimadas en participantes ancianos de un programa público de actividades físicas con otras estimaciones en grupos de comparación, lo que permite el análisis de la situación de salud basado en diferentes comportamientos y factores de riesgo. Por último, el trabajo ha facilitado la monitorización de intervenciones públicas para personas mayores a nivel comunitario, sirviendo como punto de partida para un seguimiento futuro.

Palabras clave: Anciano; Actividad física; Diagnóstico de la situación de salud; Salud pública.

INTRODUCTION

The current epidemiological transition, with increased prevalence in chronic noncommunicable diseases (NCDs), reduction in early mortality, and inversion of the Brazilian age pyramid (i.e., the increase in the proportion of older people) directly imply an increase in the demand for services and, consequently, the costing of healthcare services in Brazil.[1] The Brazilian Ministry of Health has shown major concern with the increase in the burden of NCDs in the country. The most current estimate of the Global Burden of Diseases places the attributable fraction for the total deaths in Brazil in 2019, from NCDs, at 75.92% (95% confidence interval – 95%CI 75.12 to 77.19%). Taking this into consideration, it should be noted that Brazil has specific strategic planning to combat mortality and injuries due to NCDs — The Strategic Action Plan

for Combating Chronic Noncommunicable Diseases in Brazil (2021–2030), led by the Ministry of Health/ Department of Health Surveillance.

In this sense, in 2014, the Ministry of Health redefined the National Health Promotion Policy (*Política Nacional de Promoção da Saúde* – PNPS),[2] which addresses social determinants of health, such as sociodemographic characteristics, level of education, access to healthcare services; and medial disease factors, especially those linked to lifestyle. In this context, health promotion and prevention actions gain prominence in the PNPS, among which the incentive to practice physical activity and healthy lifestyle habits are highlighted.[3] In addition, the incentive to research in the implementation of health promotion and disease prevention strategies is noteworthy, and should be based on the triad efficiency, efficacy/safety and effectiveness, as well as the feasibility in the budgetary context and decision-making by managers in the definition of priorities at the national, state, and municipal levels.

The City Hall of Porto Alegre (*Prefeitura Municipal de Porto Alegre* – PMPA), through the Municipal Department of Social Development and Sports (*Secretaria Municipal de Desenvolvimento Social e Esporte* – SMDSE), has a public program of recreation and sports with activities aimed at health promotion, with potential impact on the primary and secondary prevention of diseases. This is because the concept of health promotion, in essence, goes beyond the provision of health actions and should, ideally, start before the presentation of risk factors for diseases — and, above all, aim not only to reduce the burden of disease, but also to increase health. Most users of the program benefit from the provided initiatives aimed at the control of risk factors or even the prevention of new diseases.

The program includes 16 centers that offer physical activity, is currently linked to SMDSE and serves approximately five thousand people per month, of which approximately 50% are over 60 years of age or older. In this context, our objective was to analyze the health status of older adults users of a public program of physical activity practices, using the program provided by SMDSE as a model. This cross-sectional, sample-based analysis of the health status of the users of this program enabled us to know sociodemographic characteristics, social and biological determinants of their disease, justifying the performance of the study to support managers and incorporate similar services by intersectoral means in other practice settings.

METHODS

Compliance to policies on transparency and reproducibility in research

This project complies with the current policies regarding open science, transparency, and reproducibility in research — throughout the project lifecycle. The project and materials are available in public repository (https://preprints.scielo.org/index.php/scielo/preprint/view/1678). This manuscript was written based on Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement[4] in its extension to cross-sectional studies. Finally, the authorship criteria strictly follow the recommendations of the International Committee of Medical Journal Editors (ICMJE) as well as the veracity of the declaration of potential conflicts of interest. This manuscript was previously published as a preprint and has undergone the following changes:
a. order of authorship;
b. writing and standardization of results (https://preprints.scielo.org/index.php/scielo/preprint/view/1678).

Study design

This is a cross-sectional study that analyzes the health status of individuals aged 60 years or over, users of a program in the city of Porto Alegre (RS) that offers physical activity.

Population and sample

All practice settings of the program were included with at least 2% of representativeness in the total number of visits (14 out of 16 centers). However, three practice settings could not be visited due to managerial and logistical issues. Of the total number of enrolled users aged 60 years or over, a numerically representative sample of the SMDSE of Porto Alegre (RS) was estimated. Among the physical activities/body movement activities offered in the centers are strength, rhythm activities, and/or recreational sports. Data collection took place from April 2018 to February 2019.

The inclusion criteria were participants aged 60 years or older, of both sexes, enrolled in and regularly attending the program (i.e., maximum of three absences in the month of interview for eligibility). The exclusion criteria were self-report of activities that prevented participation (e.g., difficulty in locomotion) or that posed a risk to users concerning the analyses to be performed. In order to maintain the representativeness of male participants in the centers that had 15 or fewer male users enrolled, considering that the vast majority of users of the program were women, all of them were invited to participate in the study.

Users' sampling process

The users' sampling process was random and probabilistic, weighted according to the number of users aged 60 years or over per center, considering the representativeness of each center in relation to the total number of older adults participating in the program (Appendix 1). The variable with the highest expected prevalence to be obtained by the survey (i.e., systemic arterial hypertension – SAH) was used to calculate the users' sample size. Based on an active search of users per centers in a randomized list, without their replacement, the authors followed the procedure:
1. telephone contact made for clarification about the study and tracking of eligibility criteria;
2. invitation to interested individuals who apparently met the eligibility criteria to participate in Visit 1 (detailed next), which began with explanations about the study procedures and the application of the Informed Consent Form.

Collection procedures and variables

The team of researchers of the study followed a manual of standardized operating procedures during collections. Data were collected in two visits, as described next.

Visit 1 took place in practice settings (i.e., community centers where physical activity/body movement activities were offered) and used the following instruments:
1. Sociodemographic and health determinants questionnaire: 62 questions regarding sociodemographic and environmental aspects, risk factors and life habits, morbidities and health perception. The questionnaire included questions from the 2013 National Health Survey.[5]

Among the criteria used for the categorization of questionnaire data, the following are listed:

a. intake of vegetables: defined as "recommended" for reporting the intake of at least two daily servings of raw or cooked vegetables on at least five days/week;[6]

b. regular binge drinking: more than 14 doses/week;[7]

c. polypharmacy: use of five or more medications concomitantly;[8]

d. sleep disorder: assessed by two questions in relation to the two weeks prior to the application of the questionnaire, addressing:

I. quality of sleep (according to the number of times waking up at night or difficulty falling asleep); and

II. number of hours of sleep.

Sleep disorder was defined when the response options were:

I. for quality of sleep, "more than half the days" (more than seven days) or "almost every day";[9] or

II. for the number of hours of sleep, less than 5 hours or 5 to 6 hours per day.

2. Quality of life questionnaire (Short-Form Six-Dimension – SF-6D): six self-administered questions, with six domains — functional capacity, physical and emotional aspects, social aspects, pain, mental health, and vitality. The questionnaire generates a score between 0.29 and 1.00, in which 1 is equal to the state of full quality of life.

3. Questionnaire of depression and depressive symptoms for older adults (Geriatric Depression Scale – GDS-15): consisting of 15 questions, each positive response associated with depression represents one point, thus generating scores from 0 to 15. Scores of six or more were used as cutoff points suggestive of depression.[10]

4. Regarding sex, considering that most users were women, in centers that had 15 or fewer male users, all men were invited to participate in the study, seeking to allow a greater sample balance between sexes. Six-minute walk test: evaluation of functional capacity, considering the distance covered for six minutes, with standard encouragement, and procedures based on an established protocol.[11]

In each Visit 1, groups of 15 to 25 users were scheduled for collection, which began with explanations about the data collection procedures for the users. They had unrestricted time to fill out the questionnaires, with the availability of researchers to resolve any doubts or assist those with comprehension difficulties. Visit 2 took place at the Clinical Research Center (*Centro de Pesquisa Clínica*) of Hospital de Clínicas de Porto Alegre (CPC/HCPA), as provided for in the study protocol (https://osf.io/q4r69/), based on the evaluations described next.

5. Office blood pressure: measured after five minutes of rest, in silence, with the feet resting on the ground and without crossing arms or legs, in both arms. In the arm with the highest measurement, two other measurements were performed, at one-minute intervals, to obtain the mean in mmHg (HEM-7130, Omron Healthcare Ltd., Kyoto, Japan).

6. Handgrip strength: three measurements were performed, with one-minute intervals, in each hand, and the highest value reached in Kg.F^{-1} (Jamar, model 2A, Asimow Engineering Co., Santa Monica, USA) was considered as the result.

7. Anthropometric measurements: waist circumference (i.e., smaller circumference in the abdominal region) and hip circumference (i.e., largest circumference in the gluteal region) with the use of

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an inelastic anthropometric tape. The cutoff points used to define waist circumference above the recommended values were, respectively, 84 and 90 cm for women and men. Body mass (kg) and height (cm) were measured on a scale and stadiometer (Líder, P-200C, Brazil).[12]

The Visit 2 series consisted of laboratory tests collection without fasting (glycated hemoglobin – Variant Turbo II, Bio-Rad, USA), total cholesterol, high-density lipoprotein (HDL cholesterol), and triglycerides (Alinity c, Abbott, USA). Low-density lipoprotein cholesterol (LDL-C) was calculated using the Friedewald formula.[13]

Sample size calculation and statistical analysis

The sample size calculation was performed considering a 95% confidence interval, type 1 error of 5% and power of 80% to detect the proportion of 0.5 (50%) of the highest expected prevalence among all the variables that were surveyed (SAH). This resulted in a total of 385 research participants. Assuming possible losses and refusals (~15%), we predicted the need for contact and invitation to 443 users of the program.

Data analysis was performed using descriptive statistics. Data were presented as mean ± standard deviation (SD) or median ± interquartile range (p25% to p75%). Categorical data were presented as relative and absolute frequencies and 95% confidence intervals. The variables "recommended intake of vegetables," "regular binge drinking," "sporadic binge drinking," and "number of medications" were originally collected as counting variables and redistributed into categories based on the criteria previously presented (item "sociodemographic and health profile questionnaire"). The analyses present their respective number of evaluated participants, without imputation for missing data. The Stata 14.0. statistical package was used for all analyses.

Ethical aspects

The study was approved by the Research Ethics Committee of Hospital de Clínicas de Porto Alegre (Certificate of Presentation for Ethical Consideration – CAAE 84093317.6.3001.5338) and by the Ethics Committee of the Municipal Department of Health of the city of Porto Alegre (RS). The procedures were guided by the resolution of the National Health Council – CNS 466/2012. The researchers read the Informed Consent Form for all the participants of the study together, and they also had sufficient time to read it on their own and, then, to sign the Informed Consent Form in case of informed consent before starting the evaluations in Visit 1. There was no need for consent from the research team to participate in the study.

RESULTS

Protocol deviations

The unplanned changes occurred due to the noninclusion of three physical activity centers. In one of them, we did not obtain the list of participants, which made it impossible to invite users. In two of them, contacts were not made due to contingencies of the research team for the study. In total, the three centers represent 71 individuals not included and 15% of the previously estimated sample.

Main results

We evaluated 351 individuals aged 60 years or over users of the municipal physical activity programs in the city of Porto Alegre (RS), from 11 centers effectively sampled in the study. In Figure 1 we show the distribution of physical activities practiced in general, not exclusively in the centers of Porto Alegre (RS), and the subjects could report more than one activity performed. A total of 157 users (45.4%) reported practicing physical activity once a week; 141 (40.8%) reported practicing it twice a week; and 23 (6.6%), three times a week.
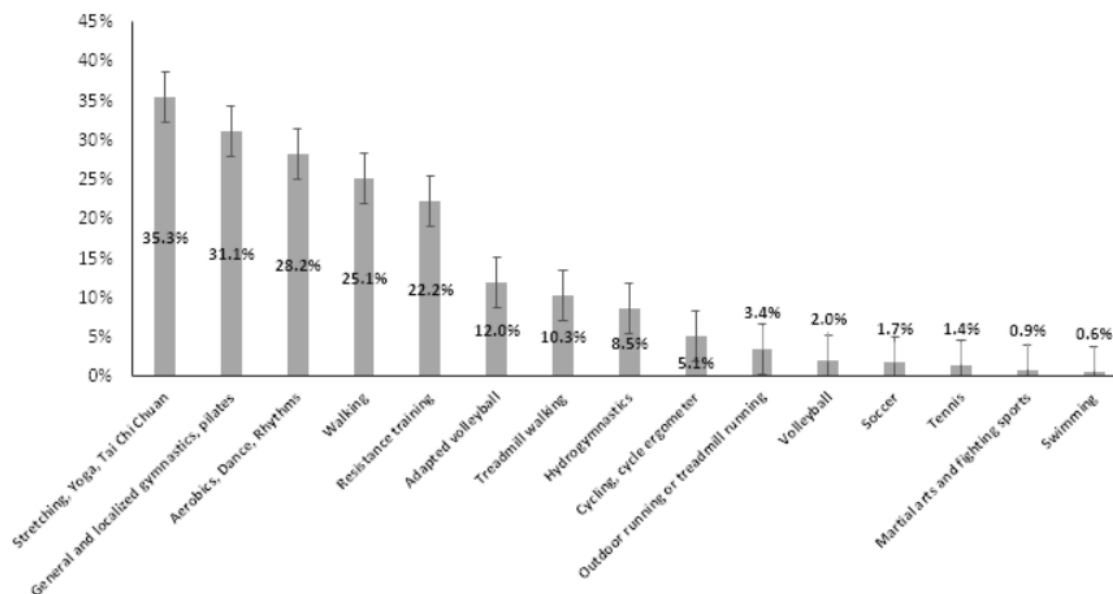

Figure 1. Distribution of activities performed at the physical activity center and respective confidence interval (95%CI).

The sample had a mean age of 70±6 years, and 59.5% of the users were in the age group between 60 and 69 years (Table 1). Most of the analyzed users were women, with 82.1% representativeness of all analyzed users.

The level of education was heterogeneous, and complete high school was the most prevalent (32.5%). Most users self-reported to be white (79.9%) and 40.5% reported having a marital relationship. Regarding family income, 73.8% reported living on up to four minimum wages, with outstanding importance for the prevalence of 34.9% of people living on up to two wages per month, even though access to supplementary health is reasonably satisfactory (47.7%).

Regarding health information and quality of life, 47.3% of users were overweight, and 84.4% of women (n=243/288) and 76.2% of men (n=48/63) had waist circumference values above the cutoff points recommended by the World Health Organization (WHO) (up to 80 cm for women and up to 94 cm for men).

The mean systolic and diastolic blood pressure for participants with self-reported SAH ([49.3%] [95%CI 44–54.5]) was 123.86±16.33 and 71.95±9.16 mmHg, respectively, comparable to that of participants who did not report SAH (120.15±17.60 and 71.98±9.97 mmHg). The prevalence of self-reported diabetes (DM) was ([13.2%]) [95%CI 9.6–16.7]). The mean glycated hemoglobin (HbA1c) values were 5.54±0.42 and 6.90±1.39%, according to the presence or absence of self-reported DM, respectively. As for the lipid profile, although (54.2% [95%CI 48.9–59.4]) of the participants reported having a diagnosis of hypercholesterolemia, the mean values of total cholesterol, HDL and LDL were within desirable ranges.

Table 1. Description of the sample according to sociodemographic and anthropometric variables of users of public programs in Porto Alegre (RS), Brazil (2019).

Variable	%
Biological sex (n=351)	
Men	17.9 (14.2–22.3)
Women	82.1 (77.6–85.7)
Age (years; n=351)	
60–69	59.5 (54.2–64.5)
70–79	33.6 (28.8–38.7)
≥80	6.8 (4.6–10.0)
Body mass index (n=334)	
Low weight ≤22 kg/m^2	14.1 (10.7–18.2)
Adequate weight >22 kg/m^2 and >27 kg/m^2	38.6 (33.5–43.9)
Overweight ≥27 kg/m^2	47.3 (41.9–52.6)
Waist circumference (n=335)	
Women (n=281)	89.98±10.67
Men (n=54)	98.52±10.24
Level of education (n=351)	
Some elementary school	17.7 (14.0–22.0)
Elementary school	8.8 (6.2–12.3)
Some high school	6.2 (4.1–9.3)
High school	32.4 (27.7–37.5)
Some college	5.6 (3.6–8.6)
College degree	16.8 (13.2–21.1)
Specialization Degree	12.2 (9.1–16.1)
Marital status (n=348)	
I have never got married	15.2 (11.8–19.4)
Married	40.5 (35.4–45.7)
Widowed	23.2 (19.1–28.0)
Divorced	20.9 (16.9–25.5)
Race/ethnicity (n=349)	
White	79.9 (75.3–83.8)
Black	10.3 (7.5–13.9)
Mixed-race	2.2 (1.1–4.5)
Indigenous	7.4 (5.1–10.7)
Family income (minimum wages; n=347)	
Up to 2	34.8 (30.0–40.0)
From 2 to 4	38.9 (33.8–44.1)
From 4 to 10	20.4 (16.5–25.0)
From 10 to 20	5.7 (3.7–8.7)
Health insurance (n=350)	
Yes	47.7 (42.5–52.9)
No	52.2 (47.0–57.4)

Note: data expressed as mean±standard deviation; median (p25 to p75%) or prevalence (%) (95%CI); Waist circumference: cm.

Triglyceride levels (170.75±86.77 mg/dL) were at the desirable limit for evaluation without fasting. Self-reported cardiovascular diseases and risk factors were present in ([14.3%] [95%CI 10.6–18]) of the studied sample, with angina pectoris being the most prevalent ([3.7%] [95%CI 1.7–5.6]).

Other prevalent diseases were those of rheumatic etiology — rheumatoid arthritis/rheumatism ([29.6%] [95%CI 24.7–34.4]); and mental disorders — depression ([18.6%] [95%CI 14.5–22.7]). Depression, when assessed by the GDS-15 questionnaire, had a similar prevalence to users' self-report — of ([19.6%] [95%CI 15.3–23.7]). Among the diseases of the upper and lower respiratory tracts and pulmonary diseases ([9.1%] [95%CI 6.1–12.1]), the most prevalent was chronic bronchitis, with an estimated point of 59.5%. Regarding cancer and neoplasms, the self-reported prevalence was ([14.6%] [95%CI 10.8–18.3]), with breast cancer being the most prevalent ([36.1%] [95%CI 21.9–50.4]). The level of quality of life, assessed by the SF-6D questionnaire, was estimated at 0.87±0.06.[14] For more results, see Table 2.

Regarding lifestyle and mobility, the recommended intake of vegetables was reached only by 30.9% of the population; chronic binge drinking had an estimated prevalence of 1.0%; for smoking habit, 7.0%. The weekly periodicity of physical activity practice had a median (p25 to p75%) of 3 (2 to 4) days and 49.4% of the participants reported practicing physical activity regularly for more than ten years. Regarding sedentary behavior, we highlight that 33.4% of users remain seated between 2 and 3 hours/day, with an average range of 203.5±123.8 min; and, on weekends, 236.1±163.9 min. Concerning falls, 14.3% of the participants reported at least one episode in the last 12 months requiring medical care, of which 6.0% required surgical procedures. Of these procedures, 100% were covered by the Brazilian Unified Health System (SUS). Finally, 81.6% of users considered the current stress level low or moderate. Additional results are available in Table 3.

In the functional evaluation, the users reached an average of 486.6±73.70 m and 551.1 ±81.4 m among men and women, respectively — these results are comparable to the reference values.[15] The mean handgrip strength of men and women was 24.56±5.12 kg/F and 40.04±8.49 kg/F (Table 4).

The final results refer to the use of medications. Among the users, 221 (63.0%) use between one and four medications of continuous use and 58 (16.5%), at least five medications or more, which characterizes polypharmacy.[8,16,17] The most commonly used classes of medications were antihypertensive drugs (65.9%) — beta-blockers, diuretics, calcium channel blockers, angiotensin-converting enzyme inhibitors, and angiotensin-I receptor blockers — followed by oral lipid-lowering agents (47.0%), antidepressants/anxiolytics (17.9%), and oral hypoglycemic agents/insulin (16.8%).

DISCUSSION

This study presents a representative survey of people aged 60 years or over participating in a program offered by the City Hall of Porto Alegre (RS), not linked to the Municipal Department of Health, and which offers body movement practices and physical activity, reinforcing the intersectoral strength of public management. In the present study, we describe absolute frequencies and prevalence of social determinants in health, diseases and injuries that can support the decision-making of public management toward primary, secondary, and tertiary prevention policies in NCDs as well as health promotion policies.

Overall, we observed that 47.4% of the sample reported using two or three activities offered by the same service, which, from the technical point of view, are aimed at increasing physical fitness and conditioning and determining physical capacities such as speed, flexibility, balance, pace, and agility. In this context, the evaluations by the six-minute walk and handgrip strength tests showed that the sample

Table 2. Information on health and quality of life of users of public programs in Porto Alegre (RS), Brazil (2019).

Variable	%
Self-reported hypertension (n=347)	
No	46.4 (41.1–51.6)
Yes	49.2 (44.0–54.5)
Only during pregnancy	4.3 (2.6–7.0)
Office Blood Pressure	
No self-reported SAH (n=161)	
SBP (mmHg)	120.15±17.60
DBP (mmHg)	71.98±9.97
With self-reported SAH (n=165)	
SBP (mmHg)	123.86±16.33
DBP (mmHg)	71.95±9.16
Self-reported diabetes mellitus (DM) (n=348)	
No	85.0 (80.8–88.4)
Yes	13.2 (10.0–17.2)
Only during pregnancy	1.7 (0.7–3.7)
HbA1c	
No self-reported DM (n=285)	5.54±0.42
With self-reported DM (n=285)	6.90±1.39
Self-reported hypercholesterolemia (n=349)	
No	45.8 (40.6–51.1)
Yes	54.1 (48.8–59.3)
Total cholesterol (n=332)	192.14±38.47
HDL cholesterol (n=336)	57.13±16.60
LDL cholesterol (n=331)	101.28±34.40
Triglycerides (n=336)	170.75±86.77
Self-reported cardiovascular disease (n=349)	
No (n=299)	85.7 (81.5–88.9)
Yes (n=50) *	14.3 (11.0–18.4)
Angina (n=10)	20.0 (11.0–33.5)
Infarction (n=10)	20.0 (11.0–33.5)
Heart failure (n=9)	18.0 (9.5–31.3)
Other (n=0)	0.0 (-)
Self-reported CVA (n=349)	
No (n=331)	94.8 (91.9–96.7)
Yes (n=18)	5.1 (3.2–8.0)
Self-reported arthritis/rheumatism (n=341)	
No (n=241)	70.4 (65.2–75.0)
Yes (n=101)	29.6 (24.9–34.7)
Self-reported depression (n=349)	
No (n=284)	81.4 (76.9–85.1)
Yes (n=65)	18.6 (14.8–23.0)

Table 2. Continuation.

Variable	%
Depression score (GDS-15; n=351)	
No (n=282)	80.4 (75.8–84.1)
Yes (n=69)	19.6 (15.8–24.1)
Self-reported respiratory disease (n=350)	
No (n=318)	90.8 (87.3–93.4)
Yes (n=32)	9.2 (6.5–12.6)
Chronic bronchitis (n=19)	59.3 (41.5–75.0)
Pulmonary emphysema (n=10)	31.2 (17.5–49.3)
COPD (n=2)	6.2 (1.5–22.2)
Other (n=1)	3.1 (0.4–19.7)
Self-reported cancer (n=349)	
No (n=298)	85.4 (81.2–88.7)
Yes (n=51)*	14.6 (11.2–18.7)
Breast (n=17)	36.9 (23.9–52.1)
Skin (n=14)	30.4 (18.5–45.6)
Cervix (n=6)	13.0 (5.7–26.7)
Prostate (n=5)	10.8 (4.4–24.2)
Lung (n=2)	4.3 (1.0–16.5)
Intestine (n=2)	4.3 (1.0–16.5)
FH of cardiovascular disease (n=349)	
No (n=256)	73.4 (68.4–77.7)
Yes (n=93)	26.6 (22.2–31.5)
Myocardial revascularization (n=349)	
No (n=334)	95.7 (92.9–97.3)
Yes (n=15)	4.2 (2.6–7.0)
Hospitalization in the last 12 months (n=345)	
No (n=317)	91.9 (88.4–94.3)
Yes (n=28)	8.1 (5.6–11.5)
Fall requiring medical care in the last 12 months (n=349)	
No (n=299)	85.7 (81.5–88.9)
Yes (n=50)	14.3 (11.0–18.4)
Sleep disorder (n=351)	
No (n=157)	44.7 (39.5–49.9)
Yes (n=194)	55.2 (50.0–60.4)
Self-rated general health status (n=349)	
Very good (n=95)	27.2 (22.7–32.1)
Good (n=181)	51.8 (46.5–57.0)
Regular (n=63)	18.1 (14.3–22.4)
Poor (n=7)	2.0 (0.9–4.1)
Very poor (n=3)	0.8 (0.2–2.6)
SF-6D Quality of Life Score (n=339)	0.87±0.06

Note: CVA: cerebrovascular accident; GDS: geriatric depression scale; FH: family history; SAH: systemic arterial hypertension; HbA1c: glycated hemoglobin (%); DBP: diastolic blood pressure; SBP: systolic blood pressure; SF-6D: Short Form 6 Dimensions; COPD: chronic obstructive pulmonary disease; lipid series in mg/dL.*n: number of members of the self-reported subgroup.

Table 3. Factors associated with the lifestyle of users of public programs in Porto Alegre (RS), Brazil (2019).

Variable	Count (%) or measures of central tendency (see caption)
Recommended intake of vegetables (n=346)	
No	239 (69.1)
Yes	107 (30.9)
Regular binge drinking (n=306)	
No	303 (99.0)
Yes	3 (1.0)
Sporadic binge drinking (n=333)	
Men (n=55)	
No	47 (85.5)
Yes	8 (14.5)
Women (n=278)	
No	257 (92.4)
Yes	21 (7.6)
Current tobacco consumption (n=341)	
No	317 (93.0)
Yes	24 (7.0)
Weekly periodicity of physical activity (days) (n=351)*	3 (2 to 4)
Number of activities practiced in the SMDSE units (n=346)	1.77±0.91
Time of regular exercise practice (years, n=350)	
Does not currently exercise	12 (3.4)
Less than 1	25 (7.1)
1–2	40 (11.4)
2–5	47 (13.4)
5–10	53 (15.1)
More than 10	173 (49.4)
Average daily time watching television (hours, n=350)	
Less than 1	13 (3.7)
Between 1 and 2	66 (18.9)
Between 2 and 3	117 (33.4)
Between 3 and 4	70 (20.0)
Between 4 and 5	47 (13.4)
Between 5 and 6	15 (4.3)
6 or more	11 (3.1)
Do not watch television	11 (3.1)
Average daily time using computer/tablet/smartphone (hours, n=340)	
Less than 1	59 (17.4)
Between 1 and 2	107 (31.5)
Between 2 and 3	95 (27.9)
Between 3 and 4	41 (12.1)
Between 4 and 5	18 (5.3)
Between 5 and 6	7 (2.1)
6 or more	3 (0.9)
Do not use computer/tablet/smartphone	10 (2.9)

Table 3. Continuation.

Variable	Count (%) or measures of central tendency (see caption)
Mean sitting time (n=332)	
Weekdays (min)	203.54±123.78
Weekend (min)	236.11±163.93
Current self-reported stress level (n=348)	
Very high	20 (5.7)
High	44 (12.6)
Moderate	144 (41.4)
Low	140 (40.2)
Perception of the influence of stress on health (n=350)	
Considerable	45 (12.9)
Some	122 (34.9)
Almost none or none	183 (52.3)

*Data expressed as median and 25 and 75% percentiles. SMDSE: Municipal Department of Social Development and Sports.

Table 4. Walking capacity and muscle strength (handgrip) of users of public programs in Porto Alegre (RS), Brazil (2019).

Variable	Mean±SD
Six-minute walk test (meters)	
Overall (n=350)	498.05±78.96
Women (n=288)	486.62±73.70
Men (n=62)	551.15±81.43
Handgrip strength of the dominant hand (kilogram-force)	
Overall (n=332)	27.08±8.14
Women (n=278)	24.56±5.12
Men (n=54)	40.04±8.49

presented normal values[18,19] — which makes us suggest the possible effectiveness of the program (i.e., in our understanding, a categorical causal affirmation is not prudent, considering the cross-sectional design of the study). The most prevalent activities, according to Figure 1, were stretching and oriental practices (Yoga, Tai Chi Chuan — 35.3%). It is noteworthy that the oriental practices, with high acceptance by users, can be incorporated into the SUS as integrative and complementary practices (*Práticas Integrativas e Complementares* – PICS), establishing an important dialogue with transversal actions of health promotion in the municipality.

Approximately eight out of ten users considered their general health to be good or very good and claimed to have low or moderate stress levels. In addition, half of the users reported that stress has minimal influence on their health and, additionally, the participants' quality of life values indicated high scores. Although evidence indicates a positive association between levels of physical activity and quality of life,[20] there is a possibility that individuals with low stress levels and good quality are those able to engage in a physical activity program (reverse causality). It is noteworthy that sleep disorder was a very prevalent condition (55.3%) and that this manifestation has a strong association with age,[21] in such a way that monitoring sleep quality may be relevant in programs aimed at older adult users.

NCDs and risk factors for cardiovascular diseases among the evaluated users were high. According to a national population-based telephone survey, in 2021,[22] there was a 60.7% prevalence of overweight/

obesity in Brazil (95%CI 58.8–62.6) among older adults, compared to 47.3% in the present study. The SAH diagnosis was reported by 49.3% of users, which is below other Brazilian estimates[23] such as that presented by Vigitel (Surveillance of Risk and Protective Factors for Chronic Diseases by Telephone Survey) 2021[22] — 61% (95%CI 59–63). Some factors must be considered to analyze this difference. Age is a risk factor for SAH. The age groups used by Vigitel 2021[22] start at 64 years old, while our sample includes participants aged 60 years and older. Considering the structured sessions of physical activity — i.e., exercising two to four days a week — and the fact that 78% of the interviewed users have been exercising regularly for at least two years, there may have been an interaction of effects with blood pressure control, especially considering that our sample demonstrates that there is optimal pressure control (pressure levels consistent with the pressure target despite the diagnosis).[24,25]

The prevalence of self-reported diabetes mellitus (13.2%) was considerably lower than the estimate of Vigitel 2021[22] among the older adults, 28.4% (95%CI 26.5–30.2). The use of hypoglycemic medications was reported by virtually the same proportion, 16.8% of the participants, and the overall mean of HbA1c was at the lower limit of the prediabetes diagnosis range. In patients at risk of developing diabetes mellitus, it is expected that the regular practice of physical activity and other structural components of an intervention made by a multidisciplinary team, whether in Primary Health Care (PHC) or by offering sports and leisure programs, will lead them to an adequate glycemic level and its consequences.[26]

Regarding the users' mental health, the diagnosis of self-reported depression was 18.6%. Conversely, when assessed by the GDS-15,[10] an instrument recommended by the Ministry of Health for its applicability, accuracy, validity, and psychometric properties for screening for geriatric depression in different scenarios, it was 19.6%.[27] Our findings overestimated the global prevalence provided by the WHO, of 7.5% in women and 5.5% in men aged 55 to 74 years[28] and findings from the city of Porto Alegre itself, which estimated the prevalence of 30.6% with the same instrument[10]. We emphasize the importance of dialogue with the sectors of social assistance, health, education, and socioeconomic development, primarily.

It is also of paramount importance that the professionals involved in this program have knowledge of the Psychosocial Care Networks (*Redes de Atenção Psicossocial* – RAPS) that integrate the Psychosocial Care Centers (*Centros de Atenção Psicossocial* – CAPS) — at different levels up to tertiary mental health care, if necessary, with an adequate system of referral and counter-referral.[29] The new National Mental Health Policy (*Política Nacional de Saúde Mental* – PSNM)[30] has undergone substantial transformations, with humanized outpatient care, anti-asylum, to those who need psychic assistance.

It is worth mentioning that, both in the PNSM and in the National Primary Healthcare Policy (*Política Nacional de Atenção Básica* – PNAB), the latter being the facilitator of health care via the Family Health Strategy (FHS) with Family Health Teams (FHT), body movement practices are fundamental components, with therapeutic purposes and providing job opportunities for professionals of the human movement (i.e., Physical Education professionals) despite changes in the performance of Family Health Support Centers (*Núcleos de Apoio à Saúde da Família* – NASF).[31] Furthermore, the dialogue with the Multiprofessional Residency Programs in Health (*Programas de Residência Multiprofissionais em Saúde* – PRMS) and permanent education policies with the professionals already employed in the services is desirable, if not necessary, for optimal care.[32]

This study has limitations. There was a deviation from the protocol due to the noninclusion of users from three eligible locations, with a consequent reduction in sample size and geographical representativeness. The low prevalence of men also compromised the representativeness of users and eventual comparisons, with reflections on the distribution of characteristics of the users of the program. Moreover, the use of

self-reported research is susceptible to memory and measurement bias in the face of direct measures. Additional measurements, such as structure or personnel, are also a limitation of the study for the delivery of the complete scenario of the service offered, essential for the decision-maker, as well as the absence of evaluation of users' satisfaction.

Health surveys are important for monitoring actions and programs aimed at health promotion. Thus, we conclude that the present study can inform future comparisons of prevalence between different surveys in older people, as well as provide data for strategies that aim to address health promotion and prevention according to the cultures and opportunities existing in other Brazilian cities, as recommended in physical activity guidelines for the population.[33]

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CONFLICT OF INTERESTS

Nothing to declare.

AUTHORS' CONTRIBUTIONS

FMD: Project administration, Conceptualization, Writing – original draft, Writing – review & editing, Investigation, Methodology, Resources, Validation, Visualization. NLO: Project administration, Conceptualization, Writing – review & editing, Investigation, Methodology, Supervision, Validation, Visualization. LICR: Formal analysis, Writing – review & editing, Software, Validation, Visualization. LS: Writing – review & editing, Investigation, Software, Validation, Visualization. ATN: Writing – review & editing, Investigation, Software, Validation, Visualization. CEB: Writing – review & editing, Investigation, Software, Validation, Visualization. LOP: Writing – review & editing, Investigation, Software, Validation, Visualization. LMV: Writing – review & editing, Investigation, Software, Validation, Visualization. LPS: Writing – review & editing, Investigation, Software, Validation, Visualization. LNS: Writing – review & editing, Investigation, Software, Validation, Visualization. BGM: Writing – review & editing, Investigation, Software, Validation, Visualization. LH: Project administration, Formal analysis, Conceptualization, Data curation, Writing – review & editing, Investigation, Methodology, Software, Supervision, Validation, Visualization. DU: Project administration, Formal analysis, Conceptualization, Data curation, Writing – review & editing, Investigation, Methodology, Funding acquisition, Resources, Software, Supervision, Validation, Visualization.

REFERENCES

1. Piola SF, Servo LMS, Sá EB, Paiva AB. Estruturas de financiamento e gasto do sistema público de saúde. In: Fundação Oswaldo Cruz. A saúde no Brasil em 2030: prospecção estratégica do sistema de saúde brasileiro: estrutura do financiamento e do gasto setorial. Rio de Janeiro: Fiocruz/Ipea/Ministério da Saúde/Secretaria de Assuntos Estratégicos da Presidência da República; 2013. p. 19-70.

2. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Secretaria de Atenção à Saúde. Política Nacional de Promoção da Saúde: PNPS: Anexo I da Portaria de Consolidação nº 2, de 28 de setembro de 2017, que consolida as normas sobre as políticas nacionais de saúde do SUS/Ministério da Saúde, Secretaria de Vigilância em Saúde, Secretaria de Atenção à Saúde [Internet]. Brasília: Ministério da Saúde; 2018 [cited on Feb. 24, 2021]. Available at: https://bvsms.saude.gov.br/bvs/publicacoes/politica_nacional_promocao_saude.pdf

3. Ding D, Lawson KD, Kolbe-Alexander TL, Finkelstein EA, Katzmarzyk PT, van Mechelen W, et al. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. Lancet 2016;388(10051):1311-24. https://doi.org/10.1016/S0140-6736(16)30383-X

4. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. J Clin Epidemiol 2008;61(4):344-9. https://doi.org/10.1016/j.jclinepi.2007.11.008

5. Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional de Saúde 2013. Percepção do estado de saúde, estilos de vida e doenças crônicas 2013 [Internet]. Rio de Janeiro: IBGE; 2014 [cited on Nov. 26, 2020]. Available at: https://biblioteca.ibge.gov.br/visualizacao/livros/liv91110.pdf

6. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Guia alimentar para a população brasileira [Internet]. Brasília: Ministério da Saúde; 2014 [cited on Feb. 24, 2021]. Available at: https://bvsms.saude.gov.br/bvs/publicacoes/guia_alimentar_populacao_brasileira_2ed.pdf

7. World Health Organization. Global status report on alcohol and health 2018 [Internet]. Geneva: WHO; 2018 [cited on Nov. 26, 2020]. Available at: https://www.who.int/publications/i/item/9789241565639

8. Skinner M. A literature review: polypharmacy protocol for primary care. Geriatr Nurs 2015;36(5):367-71.e4. https://doi.org/10.1016/j.gerinurse.2015.05.003

9. Wendt A, Costa CS, Machado AKF, Costa FS, Neves RG, Flores TR, et al. Sleep disturbances and daytime fatigue: data from the Brazilian National Health Survey, 2013. Cad Saúde Pública 2019;35(3):e00086918. https://doi.org/10.1590/0102-311X00086918

10. Krishnamoorthy Y, Rajaa S, Rehman T. Diagnostic accuracy of various forms of geriatric depression scale for screening of depression among older adults: systematic review and meta-analysis. Arch Gerontol Geriatr 2020;87:104002. https://doi.org/10.1016/j.archger.2019.104002

11. ATS Committee on Proficiency Standards for Clinical Pulmonary Function Laboratories. ATS statement: guidelines for the six-minute walk test. Am J Respir Crit Care Med 2002;166(1):111-7. https://doi.org/10.1164/ajrccm.166.1.at1102

12. World Health Organization. Obesity: preventing and managing the global epidemic [Internet]. Geneva: WHO; 2020 [cited on Nov. 26, 2020]. Available at: https://apps.who.int/iris/handle/10665/42330

13. Friedewald WT, Levy RI, Fredrickson DS. Estimation of the concentration of low-density lipoprotein cholesterol in plasma, without use of the preparative ultracentrifuge. Clin Chem 1972;18(6):499-502. PMID: 4337382

14. Campolina AG, Bortoluzzo AB, Ferraz MB, Ciconelli RM. O questionário SF-6D Brasil: modelos de construção e aplicações em economia da saúde. Rev Assoc Med Bras 2010;56(4):409-14. https://doi.org/10.1590/S0104-42302010000400012

15. Casanova C, Celli CR, Barria P, Casas A, Cote C, Torres JP, et al. The 6-min walk distance in healthy subjects: reference standards from seven countries Eur Respir J 2011;37(1):150-6. https://doi.org/10.1183/09031936.00194909

16. Pereira KG, Peres MA, Iop D, Boing AC, Boing AF, Aziz M, et al. Polifarmácia em idosos: um estudo de base populacional. Rev Bras Epidemiol 2017;20(2):335-44. https://doi.org/10.1590/1980-5497201700020013

17. Medeiros-Souza P, Santos-Neto LL, Kusano LTE, Pereira MG. Diagnosis and control of polypharmacy in the elderly. Rev Saúde Pública 2007;41(6):1049-53. https://doi.org/10.1590/S0034-89102006005000050

18. Peters MJH, van Nes SI, Vanhoutte EK, Bakkers M, van Doorn PA, Merkies ISJ, et al. Revised normative values for grip strength with the Jamar dynamometer. J Peripher Nerv Syst 2011;16(1):47-50. https://doi.org/10.1111/j.1529-8027.2011.00318.x

19. Kadikar A, Maurer J, Kesten S. The six-minute walk test: a guide to assessment for lung transplantation. J Heart Lung Transplant 1997;16(3):313-9. PMID: 9087875

20. Barbosa AP, Teixeira TG, Orlandi B, Oliveira NTB, Concone MHVB. Level of physical activity and quality of life: a comparative study among the elderly of rural and urban areas. Rev Bras Geriatr Gerontol 2015;18(4):743-54. https://doi.org/10.1590/1809-9823.2015.14182

21. Suzuki K, Miyamoto M, Hirata K. Sleep disorders in the elderly: diagnosis and management. J Gen Fam Med 2017;18(2):61-71. https://doi.org/10.1002/jgf2.27

22. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise em Saúde e Vigilância de Doenças não Transmissíveis. Vigitel Brasil 2021: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre frequência e distribuição sociodemográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2021 [Internet]. Brasília: Ministério da Saúde; 2021 [cited on Feb. 24, 2021]. Available at: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/svsa/vigitel/vigitel-brasil-2021-estimativas-sobre-frequencia-e-distribuicao-sociodemografica-de-fatores-de-risco-e-protecao-para-doencas-cronicas

23. Picon RV, Fuchs FD, Moreira LB, Fuchs SC. Prevalence of hypertension among elderly persons in urban Brazil: a systematic review with meta-analysis. Am J Hypertens 2013;26(4):541-8. https://doi.org/10.1093/ajh/hps076

24. Malachias MVB, Amodeo C, Paula RB, Cordeiro Júnior AC, Magalhães LBNC, Bodanese LC. 7th Brazilian Guideline of Arterial Hypertension: chapter 8 - hypertension and associated clinical conditions. Arq Bras Cardiol 2016;107(3 Suppl 3):44-8. https://doi.org/10.5935/abc.20160158

25. Cornelissen VA, Smart NA. Exercise training for blood pressure: a systematic review and meta-analysis. J Am Heart Assoc 2013;2(1):e004473. https://doi.org/10.1161/JAHA.112.004473

26. Umpierre D, Ribeiro PAB, Kramer CK, Leitão CB, Zucatti ATN, Azevedo MJ, et al. Physical activity advice only or structured exercise training and association with HbA1c levels in type 2 diabetes: a systematic review and meta-analysis. JAMA 2011;305(17):1790-9. https://doi:org.10.1001/jama.2011.576

27. Barbosa AP, Teixeira TG, Orlandi B, Oliveira NTB, Concone MHVB. Level of physical activity and quality of life: a comparative study among the elderly of rural and urban areas. Rev Bras Geriatr Gerontol 2015;18(4):743-54. https://doi.org/10.1590/1809-9823.2015.14182

28. World Health Organization. Depression and other common mental disorders [Internet]. Geneva: WHO; 2017 [cited on Dec. 9, 2020]. Available at: https://apps.who.int/iris/handle/10665/254610

29. Oliveira DV, Lima MCC, Oliveira GVN, Bertolini SMMG, Nascimento Júnior JRA, Cavaglieri CR. O comportamento sedentário é um fator interveniente na prática de atividade física no idoso? Rev Bras Geriatr Gerontol 2018;21(4):472-9. https://doi.org/10.1590/1981-22562018021.180091

30. Almeida JMC. Política de saúde mental no Brasil: o que está em jogo nas mudanças em curso. Cad Saúde Pública 2019;35(11):e00129519. https://doi.org/10.1590/0102-311X00129519

31. Bispo Júnior JP, Moreira DC. Núcleos de apoio à saúde da família: concepções, implicações e desafios para o apoio matricial. Trab Educ Saúde 2018;16(2):683-702. https://doi.org/10.1590/1981-7746-sol00122

32. Carvalho MAP, Gutiérrez AC. Quinze anos da Residência Multiprofissional em Saúde da Família na Atenção Primária à Saúde: contribuições da Fiocruz. Ciênc Saúde Coletiva 2021;26(6):2013-22. https://doi.org/10.1590/1413-81232021266.44132020

33. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Departamento de Promoção da Saúde. Guia de atividade física para a população brasileira [Internet]. Brasília : Ministério da Saúde; 2021 [cited on Feb. 14, 2021]. Available at: http://bvsms.saude.gov.br/bvs/publicacoes/guia_atividade_fisica_populacao_brasileira.pdf