# Male aging symptoms: the positive influence of moderate and total physical activity

## Sintomas do envelhecimento masculino: a influência positiva da atividade física moderada e total

Melissa de Carvalho Souza Vieira[1]
Allana Alexandre Cardoso[1]
Adriana Coutinho de Azevedo Guimarães[1]

**Abstract** – The aim of the research was to analyze the association of physical activity (PA) intensity and duration with male aging symptoms. This is a cross-sectional study of probabilistic sample involving 416 men from two cities in southern Brazil. Data collection used a questionnaire divided into six parts: sample characteristics; anthropometric measurements; economic level by the Brazilian Institute of Geography and Statistics (IBGE); International Physical Activity Questionnaire (IPAQ short-version); Behavioral Risk Factors Surveillance System Questionnaire (BRFSS) and Male Aging Symptoms Scale (AMS). The sample was divided into two groups: with and without male aging symptoms, making use of descriptive and inferential statistics. The presence of male aging symptoms was identified in 61.6% of men, especially somatic and psychological symptoms. Most were considered sufficiently active (60.1%), highlighting men without male aging symptoms (p = 0.026), with a possible effect of moderate and total PA on low-intensity symptoms (p = 0.027; p = 0.015). This study identified relationships between PA duration and intensity and intensity of male aging symptoms. PA practice with specific intensity and duration is suggested in order to obtain health benefits related to male aging symptoms.

**Key words**: Physical activity; Men; Symptoms.

**Resumo** – O objetivo da pesquisa foi analisar a associação da intensidade e duração da atividade física (AF) com sintomas do envelhecimento masculino. Caracterizando-se como um estudo transversal, de amostra probabilística em que participaram 416 homens, de duas cidades no sul do Brasil. Para a coleta de dados utilizou-se um questionário dividido em seis partes: características da amostra; medidas antropométricas; estrato econômico pelo Instituto Braisleiro de Geografia e Estatística (IBGE); Questionário Internacional de Atividade Física (IPAQ-versão curta); Behavioral Risk Factors Surveillance System Questionaire (BRFSS); Escala dos Sintomas do Envelhecimento Masculino (AMS). A amostra foi dividida em dois grupos: com e sem sintomas do envelhecimento masculino, fazendo-se uso da estatística descritiva e inferencial. A presença dos sintomas do envelhecimento masculino foi identificada em 61,6% dos homens, com destaque para os sintomas somáticos e psicológicos. A maioria foi considerada suficientemente ativa (60,1%), sobressaindo os homens sem sintomas do envelhecimento masculino (p= 0,026). Percebendo-se uma possível influência da AF moderada e total na sintomatologia de intensidade leve (p= 0,027; p=0,015). O presente estudo identificou relações entre duração e intensidade de AF com a intensidade dos sintomas do envelhecimento masculino. Sugere-se a necessidade da prática de AF com intensidade e duração específica a fim de se obter benefícios à saúde relacionada aos sintomas do envelhecimento masculino.

**Palavras-chave**: Atividade motora; Homens; Sintomas.

# INTRODUCTION

Male aging symptoms affect men from the age of 40 years[1], which is a period comprising functional, physiological and psychological changes taking place as part of aging, and the main findings are observed in the sexual aspect, mainly by decreased blood levels of testosterone[2]. Studies have suggested that symptoms associated with this process with different intensities[3,4] can be divided into three blocks: psychological, somatic and sexual symptoms, thus characterizing the overall symptoms of male aging, i.e., the set of signs and symptoms observed in this period. In this process, there is a significant distinction with menopause, equivalent process in women, especially at physiological and hormonal level. This is because, while for women, there is a specific symptom marking the transition that is the disruption of the menstrual cycle, in men aging symptoms occur in a slowly progressive condition[4]. Worldwide, approximately 20% of men from the age of 40 years have the above symptoms and, at the age of 50, the prevalence exceeds 50%[4]. In Brazil, approximately 44.1% of middle-aged men already report some symptoms[1].

Epidemiological studies have shown measures to minimize the occurrence of these symptoms, with the use of drugs and hormone replacement[5-7]. Some results have shown that in addition to these measures, PA (physical activity) can be considered as an important means to mitigate the negative effects of these symptoms on the health of men[8,9], demonstrating to be effective in controlling psychological, somatic and sexual aspects[9]. However, there is lack of knowledge regarding the relationship between PA duration and intensity and male aging symptoms.

Thus, there is need to investigate how male aging symptoms behave against different PA intensities and durations and maximize the benefits of PA to the health of men experiencing this process. Based on the above, the present study aimed to analyze the association between PA level, intensity and duration and male aging symptoms.

# METHODOLOGICAL PROCEDURES

## Study characterization

This is an exploratory analytical observational study with cross-sectional design, which is part of a more comprehensive research that examines the prevalence of male aging symptoms and its association with PA and quality of life related to health in middle-aged men. All participants signed the Informed Consent Form and the study was approved by the Ethics Research Committee in Human Beings (CEPSH) of the State University of Santa Catarina, under Protocol No. 535,729.

## Population and sample

Study participants were middle-aged men (40-59 years)[10] from Florianópolis and São José, southern Brazil. Cities had similar economic characteristics

and over 200 thousand inhabitants[11]. Florianópolis has 51,740 middle-aged men and São José 20,939, making the study population of 72,679 men.

The population was stratified by economic level conglomerates according to the IBGE classification[11]. To calculate the sample size, according to Luiz and Magnanini[12], prevalence of 20% of male aging symptoms for men aged 40 years and over[13], tolerable error of four percentage points, 95% confidence level and 1.5 effect design were adopted. In addition, 10% were added for losses and refusals, and the final sample was composed of 631 men.

Exclusion criteria were: individuals with diseases (cancer, cardiovascular diseases, diabetes, hypertension and paraplegia), institutionalized (resting homes, prisons, hospitals and barracks), and also those with inability to understand the questionnaire. For statistical analysis purposes, the sample was divided in two groups, with male aging symptoms and without male aging symptoms.

## Research Tools

For data collection, a standardized questionnaire was used, which was divided into seven parts.

a) General sample characteristics:
   In order to obtain information regarding the sample characteristics, questions related to age, marital status, educational level, occupation, presence of diagnosed diseases, smoking and use of drugs for diseases and sexual performance were asked.

b) Anthropometric measures:
   Anthropometric data were collected in a self-reported way. Body mass index (BMI) was obtained by the ratio between body weight and squared height (kg / m2), and participants were classified according to protocol of the World Health Organization[14]. For statistical purposes, categories have been grouped into: not overweight (underweight and normal weight) and overweight (overweight and obesity).

c) Economic class:
   The IBGE[11] criteria were used, classifying the population according to the average monthly family income, and for statistical analysis, data were grouped into high (A and B), intermediate (C) and low economic class (D and E).

d) Health Perception:
   Health perception was obtained according to the Behavioral Risk Factors Surveillance System Questionnaire (BRFSS)[15], which ranks the answers on a "Likert" scale ranging from 1 to 5, where 1 is excellent; 2 very good; 3 good; 4 regular; 5 poor. Answers 1 to 3 were grouped into very good and answers 4 and 5 into poor.

e) Physical activity:
   The International Physical Activity Questionnaire - IPAQ (short version) was used to evaluate PA, which was validated by the Laboratory of Physical Fitness of São Caetano do Sul, IPAQ coordinator in

Brazil[16]. For PA classification according to Pardini et al.[16], the number of times in which an individual made at least 10 continuous minutes of walking, moderate or vigorous activity in the last week in the occupational, domestic, leisure and commuting context was quantified. PA was divided into walking, moderate, moderate + vigorous, vigorous and total in minutes / day. The sum of the duration and frequency of different activities was carried out to establish the following criteria: active: a) vigorous PA ≥ 3 days / week and ≥ 20 minutes / session; b) moderate ≥ 5 days / week and ≥ 30 minutes / session; c) any added activity: ≥ 5 days / week and ≥ 150 min / week; very active: a) vigorous ≥ 5 days / week and ≥ 30 min / session; b) vigorous ≥ 3 days / week and ≥ 20 min / session + moderated ≥ 5 days / week and ≥ 30 min / session. For statistical purposes, individuals were grouped into sufficiently active (active + very active) and insufficiently active (those who did not meet the above criteria).

Total PA measured by IPAQ considers those with minimum requirement of 3.3 METs and therefore relates to moderate intensity activity[17].

f) f) Male aging symptoms:

For evaluation of male aging symptoms, the Aging Male Symptoms Scale in the Portuguese version[13] was used, which consists of 17 questions divided into three blocks of symptoms: psychological, somatic and sexual. The overall symptom score was categorized, and subjects with score ≥ 12 points were classified as having psychological symptoms; those with score ≥ 13 points with somatic symptoms, and ≥ 8 points as sexual symptoms. To analyze the overall score, those with score ≥ 27 points were classified as having aging symptoms, and lower values as no symptoms. Those with score between 27 and 36 points were considered with "mild symptoms"; between 37 to 49 points, with "moderate symptoms"; and greater than or equal to 50 points, with "severe symptoms"[13].

## Data collection

To collect data, a team of seven individuals with at least complete high school was trained. The zip codes of each neighborhood of Florianopolis and São José were cataloged in a spreadsheet in the Microsoft Excel software version 2010, according to economic classes. This software was used to draw zip codes, representing the street to be traveled.

Later, the first domicile to be included in the study was selected. The interval between domiciles was according to the number of domiciles found on every street in which men aged 40-59 years could be found. Domiciles were considered excluded from the study after the third attempt to contact or refusal to provide data. This process was reproduced in all economic classes.

Overall, 1,150 domiciles were contacted. In 338, no man at the age group of interest was found, in 396 domiciles, men refused to participate in the study and finally, in 416, men who agreed to participate in the study

were found. Thus, a cluster sample was randomly composed of 416 men with mean age of 49 ± 6 years, 24 of economic class A, 89 of economic class B, 234 of economic class C and 69 of economic class D, representing 66% of the necessary sample of 631 men.

The questionnaire was applied in an interview format; however, in the block of sexual symptoms in the scale of male aging symptoms, the participant could answer individually, if he felt embarrassed due to the intimate nature of questions.

## Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) - version 20.0 and Bioestat version 5.3. Descriptive analysis was performed by calculating the mean, standard deviation and percentage values. Data normality was verified by the Kolmogorov-Smirnov test. The associations of the sample characteristics and PA levels among men with and without symptoms were performed by the Chi-square test. To compare PA intensities among men with and without symptoms, the Mann-Whitney U test was used. The comparison of PA intensities and intensity of symptoms was performed by the Kruskal-Wallis test with *post hoc* Student-Neuman-Keuls test. The significance level was 5%.

## RESULTS

Table 1 shows the characteristics of participants with and without male aging symptoms. There were significant differences in variables use of drugs for diseases and health perception (p = 0.032; p <0.001). Men without symptoms used fewer medications (92.5%) and perceived their health as very good (92.5%). The remaining variables showed no differences; however, the group without symptoms had complete high school (32.5%) belonged to the high economic class (39.4%) were self-employed (61.6%) lived with a partner (83.8%), showed no disease (85.6%), did not used medication to improve sexual performance (99.4%) had normal weight (30%) and did not smoke (83.8%).

**Table 1.** Sample characteristics according to male aging symptoms (%). Florianópolis and São José 2014 (n = 416)

|  | Total | With symptoms | 95%CI | Without symptoms | 95%CI | p-value |
|---|---|---|---|---|---|---|
| Schooling |  |  |  |  |  | 0.265 |
| Elementary school | 12.7 | 14.8 | 10-19 | 9.4 | 05-14 |  |
| High school | 31.5 | 30.9 | 25-37 | 32.5 | 25-40 |  |
| Higher education | 55.8 | 33.4 | 48-60 | 22.4 | 50-66 |  |
| Economic class |  |  |  |  |  | 0.287 |
| High | 37.6 | 36.5 | 31-42 | 39.4 | 32-47 |  |
| Middle | 34.9 | 33.3 | 28-39 | 37.5 | 30-45 |  |
| Low | 27.5 | 30.2 | 25-36 | 23.1 | 17-30 |  |
| Occupation |  |  |  |  |  | 0.646 |
| Self employed | 59.8 | 58.8 | 52-65 | 61.6 | 54-69 |  |

Continue...

| | Total | With symptoms | 95%CI | Without symptoms | 95%CI | p-value |
|---|---|---|---|---|---|---|
| Retired | 3.8 | 4.6 | 02-07 | 2.6 | 0-05 | |
| Public servant | 36.1 | 36.2 | 30-42 | 35.8 | 28-43 | |
| Marital status | | | | | | 0.434 |
| Living together | 81.9 | 80.7 | 76-86 | 83.8 | 78-90 | |
| Living separately | 18.1 | 19.3 | 14-24 | 16.2 | 10-22 | |
| Presence of diseases | | | | | | 0.104 |
| Yes | 18.3 | 20.7 | 16-26 | 14.4 | 09-20 | |
| No | 81.7 | 79.3 | 74-84 | 85.6 | 80-91 | |
| Medication for disease | | | | | | 0.032 |
| Yes | 11.8 | 14.5 | 10-19 | 7.5 | 03-12 | |
| No | 88.2 | 85.5 | 81-90 | 92.5 | 88-97 | |
| Medication for sexual performance | | | | | | 0.258* |
| Yes | 1.7 | 2.3 | 0-04 | 0.6 | -01-02 | |
| No | 98.3 | 97.7 | 96-100 | 99.4 | 98-100 | |
| Weight status | | | | | | 0.636 |
| No overweight | 28.7 | 27.8 | 22-33 | 30.0 | 23-37 | |
| Overweight | 71.3 | 72.2 | 67-78 | 70.0 | 63-77 | |
| Health perception | | | | | | <0.001 |
| Very good | 82.9 | 77.0 | 72-82 | 92.5 | 88-97 | |
| Poor | 17.1 | 23.0 | 18-28 | 7.5 | 03-12 | |
| Smoking | | | | | | 0.283 |
| Yes | 13.9 | 12.5 | 08-17 | 16.2 | 10-22 | |
| No | 86.1 | 87.5 | 83-92 | 83.8 | 78-90 | |

**Table 2.** Prevalence of male aging symptoms according to intensity (%). Florianópolis and São José 2014 (n = 416).

| | Symptoms | None | Mild | Moderate | Severe | Total* |
|---|---|---|---|---|---|---|
| Psychological | General symptoms | 38.5 | 39.2 | 17.8 | 4.6 | 61.5 |
| | Irritability | 30.1 | 37.3 | 24.3 | 8.2 | 69.9 |
| | Restlessness | 32.0 | 37.0 | 22.6 | 8.4 | 68.0 |
| | Anxiety | 49.6 | 28.7 | 14.0 | 7.6 | 50.4 |
| | Depressed mood | 61.8 | 23.9 | 11.4 | 2.9 | 38.2 |
| | Feeling exhausted | 65.4 | 22.6 | 9.1 | 2.9 | 34.6 |
| Somatic | Muscle and joint pain | 22.6 | 35.8 | 32.2 | 9.4 | 77.4 |
| | Excessive sweating | 65.6 | 18.8 | 12.0 | 3.6 | 34.4 |
| | Sleeping problems | 43.0 | 24.5 | 22.8 | 9.6 | 57.0 |
| | Increased need for sleep | 38.6 | 32.0 | 24.0 | 5.3 | 61.4 |
| | Physical exhaustion | 41.0 | 35.9 | 16.9 | 6.3 | 59.0 |
| | Decreased muscle strength | 38.1 | 36.9 | 21.9 | 3.1 | 61.9 |
| | Reduced welfare sensation | 38.0 | 36.8 | 23.3 | 1.9 | 62.0 |
| Sexual | Sensation to have reached the peak | 51.6 | 29.0 | 15.8 | 3.6 | 48.4 |
| | Decreased beard growth | 85.3 | 8.4 | 5.5 | 0.7 | 14.7 |
| | Decreased sexual performance | 47.4 | 33.3 | 17.1 | 2.2 | 52.6 |
| | Decreased number of morning erections | 51.2 | 27.3 | 18.8 | 2.7 | 48.8 |
| | Decreased libido | 59.4 | 23.3 | 14.4 | 2.9 | 40.6 |

 * Total = mild, moderate and severe symptoms.
Chi-square test * Fisher's exact test.

Table 2 shows male aging symptoms and their intensities. Most men showed general symptoms (61.5%). There was a higher prevalence of somatic symptoms such as muscle and joint pain (77.4%); reduced welfare sensation (62%); decreased muscle strength (61.8%); increased need for sleep (61.3%) and physical exhaustion (58.9%); followed by psychological symptoms such as irritability (69.7%) and restlessness (68.0%). The only sexual symptom was decreased sexual performance (52.6%). All symptoms, including general symptoms, often occurred in mild intensity.

PA level showed a significant difference (p = 0.026), in which the majority of men were classified as sufficiently active (60.1%), especially those without male aging symptoms (66.9%) (Figure 1).
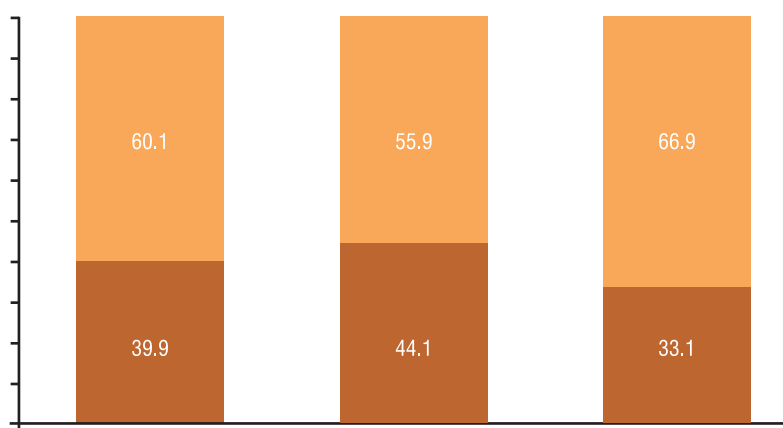


**Figure 1.** PA level according to male aging symptoms (%). Florianópolis and São José 2014 (n = 416). Chi-square test; p = 0.02

Based on results of Table 3, men without symptoms showed higher walking time (49 ± 50 min / day) moderate PA (46 ± 50 min / day) moderate + vigorous PA (80 ± 76 min / day) and total PA (128 ± 99 min / day) with significant difference (p = 0.038; p = 0.008; p = 0.020; p = 0.005).

**Table 3.** Comparison of physical activity duration and time spent sitting among men with and without symptoms (mean and standard deviation). Florianópolis and São José 2014 (n = 416)

|  | Total | With symptoms | Without symptoms | p-value |
|---|---|---|---|---|
| Walking (min/d) | 42±44 | 37±40 | 49±50 | 0.038 |
| Moderate PA (min/d) | 38±46 | 34±43 | 46±50 | 0.008 |
| Vigorous PA (min/d) | 31±44 | 30±42 | 34±46 | 0.352 |
| Moderate + vigorous PA (min/d) | 67±74 | 63±72 | 80±76 | 0.020 |
| Total PA (min/d) | 111±95 | 101±89 | 128±99 | 0.005 |

PA: Physical Activity. Mann-Whitney U test. Min / d: Minute / day

The result of the comparison of PA intensities with the intensity of symptoms is shown in table 4. Individuals with mild symptoms spent more time in moderate and total PA (39 ± 46min / day: 113 ± 94min / day) compared to those with moderate and severe symptoms (p = 0.027; p = 0.015).

**Table 4.** Comparison of PA intensity with the intensity of male aging symptoms of men with symptoms (mean and standard deviation). Florianópolis and São José 2014 (n = 256)

| PA | Male aging symptoms | | | p-value | Post hoc |
|---|---|---|---|---|---|
| | Mild[A] | Moderate[B] | Severe[C] | | |
| Walking (min/d) | 38±37 | 35±43 | 41±50 | 0.806 | - |
| Moderate PA (min/d) | 39±46 | 25±37 | 20±34 | 0.027 | A>C,B |
| Total PA (min/d) | 113±94 | 83±79 | 67±73 | 0.015 | A>C,B |

Kruskal Wallis test - Post hoc Student Newman Keuls. A = Mild; B = Moderate; C = Severe.

# DISCUSSION

Based on the results above, it was observed that the frequency of general symptoms were present in most men. High prevalence of somatic and psychological symptoms was identified, corroborating a population-based study conducted in 18 state capitals in Brazil[1].

Regarding somatic symptoms, most complaints reported in this study were related to muscle and joint pain, which affected more than 70% of the sample. In the prevalence of psychological symptoms, most men reported irritability and restlessness of mild intensity. These symptoms have also been reported by other male populations aged over 40 years in national and international studies[1,19].

This study showed a significant association between symptoms and health-related characteristics such as use of medications and health perception, thus identifying that most men do not use drugs and perceive their health as very good, showing no symptoms. Similarly to a study carried out in southern Brazil, where Corrêa et al.[20] found that men with negative health perception had severe male aging symptoms. Health perception is identified as a predictor of mortality and associated to chronic diseases in men[21]. Thus, those who perceive their health in a positive way are possibly healthy men, justifying the lower prevalence of symptoms in this group.

It is noteworthy that the general male aging symptoms are composed of somatic, psychological and sexual aspects, and PA practice corroborates these aspects in general[22], making it possible to infer that it is able to reduce the prevalence of male aging symptoms[20]. Regarding somatic aspects, it was observed that PA mitigates the negative effects of aging on muscle strength [23].

In longitudinal analysis, it was specified that the high prevalence of PA practice in individuals aged 50 years serves as a protective measure for the development of depression, reducing the risk by up to 94%[24]. Related to sexual aspect, Cheng and Ng[25] highlight the important benefits of PA to the erectile function, thus influencing in sexual performance. Regarding the PA level of the study participants, it was observed that most of them were sufficiently active, with significant association between PA level and male aging symptoms. This result corroborates the findings of Corrêa et al.[9,20], who used the same scale used in this study to evaluate the symptoms and the IPAQ to measure PA. The authors reported that the men who reach the recommendations of 150 minutes / week of PA practice in general have lower prevalence of symptoms[20].

Although the results obtained indicate significant associations between PA level and male aging symptoms, it is noteworthy that there is still no evidence associating PA intensity and duration with symptoms. Thus, based on the results obtained, it was identified that longer time of moderate and total PA (39 ± 46min / day: 113 ± 94min / day) is associated with lower intensity of symptoms.

 A study with Brazilian men found that the PA practice at moderate intensity lasting at least 180 minutes per week has been linked to health benefits, as a discriminator of absence of arterial hypertension, thus aiding in the control of cardiovascular comorbidities[26]. In middle-aged individuals, this practice can reduce from 20 to 40% mortality due to cardiovascular diseases[27]. Specifically for the male population at this age group, the benefits of moderate PA may be similar to higher intensity PA, since throughout life, individuals maintain a high PA level [27].

According to literature data and the results obtained in this study, the practice of moderate and total PA can be beneficial to middle-aged individuals, positively acting on male aging symptoms and the intensity in which they occur. Thus, these benefits can mitigate the negative effects of aging regarding the somatic, psychological and sexual aspects.

However, the results of this study should be interpreted with caution because the sample did not reach the population representativeness. There was difficulty in finding individuals in their domiciles, since the age group of interest is considered active in the labor market, and when the contact was made after business hours, many claimed to be tired or did not show interest in participating in the study. There were also other limitations such as the cross-sectional design, due to the possibility of reverse causality.

This study is highlighted due to the use of a probabilistic sampling design, allowing the sample randomization. The study used standardized questionnaires such as the Scale of Male Aging Symptoms, which is the tool most widely used in national and international studies[9], as well as the IPAQ, the instrument used to evaluate PA most widely used in Brazil[28]. Finally, the fact of researching a topic little explored in the national literature enables a better understanding of the health of middle-aged men related to male aging symptoms and highlights the importance of PA practice as a measure of prevention and / or treatment of general symptoms for this population.

## CONCLUSION

This study found relationships between PA duration and intensity and the intensity of male aging symptoms. Men with mild symptoms spend more time in moderate and total PA.

Finally, further studies with longitudinal design should be carried out in this area as a means of identifying major contributions of PA practice in the prevalence of general male aging symptoms.

# REFERENCES

1.   Abdo CHN, Afif-Abdo J. Estudo populacional do envelhecimento (EPE): primeiros resultados masculinos. Rev Bras Med 2007; 74(8):379-83.

2.   Rohden F. A "criação" da andropausa no Brasil: articulações entre ciência, mídia e mercado e redefinições de sexualidade e envelhecimento. Psicol Conocimiento soc 2012; 2(2):196-219.

3.   Cairoli CED. Deficiência androgênica no envelhecimento masculino (DAEM). Rev AMRIGS 2004; 4(48):291-9.

4.   Heinemann LA. Aging Males' Symptoms scale: a standardized instrument for the practice. J Endocrinol Invest. 2005; 28(11):34-38.

5.   Cunningham GR. Andropause or Male Menopause? Rationale for Testosterone Replacement Therapy in Older Men with Low Testosterone Levels. Endocr Pract 2013; 19(5):847-52.

6.   Hohl A, Marques MO, Coral MH, Walz R. Evaluation of late-onset hypogonadism (andropause) treatment using three different formulations of injectable testosterone. Arq Bras Endocrinol Metab 2009; 53(8): 989-95.

7.   Lang PO, Samaras D, Samaras N. Testosterone Replacement Therapy in Reversing "Andropause": What Is the Proof-of-Principle? Rejuvenation Res 2012; 15(5):453-65.

8.   Cheng JY, NG EM. Body mass index, physical activity and erectile dysfunction: An U-shaped relationship from population-based study. Int J Obes 2007; 31(10): 1571-8.

9.   Corrêa LQ, Silva MC, Rombaldi AJ. Associação entre nível de atividade física nos diferentes domínios e sintomas do envelhecimento masculino. Rev Bras Ativ Fís Saúde 2014; 19(2): 186-94.

10.  Andrews M. The seductiveness of agelessness. Ageing Soc 2000; 19(3):301-18.

11.  Instituto Brasileiro de Geografia e Estatística/IBGE. Projeção da população do Brasil/censo 2010; Disponível em: http//www.ibge.gov.br. [2013 set 02].

12.   Luiz M, Magnanini MMF. A lógica da determinação do tamanho da amostra em investigações epidemiológicas. Cad Saúde Coletiva 2000; 8(2):9-28.

13.  Heinemann LAJ, Saad F, Zimmermann T, Novak A, Myon E, Badia X, Potthoff P, T'Sjoen G, Pöllänen P, Goncharow NP, Kim S, Giroudet C. The Aging Males' Symptoms (AMS) scale: update and compilation of international versions. Health Qual Life Outocomes 2003; (1).

14.  World Health Organization/ WHO. The International Classification of adult underweight, overweight and obesity according to BMI, 2004; Disponível em: http://apps.who.int/bmi/index.jsp?introPage=intro_3.html.  [2013 jul 23].

15.  Center for Disease Control and Prevention/CDC. Behavioral risk factor suveillance system questionnaire. Altanta: CDC; 1999.

16.  Pardini R, Matsudo S, Matsudo V, Araújo T, Andrade E, Braggion G, et al. Validation of international physical activity questionnaire (IPAQ): pilot study in brazilian young adults. Med Sci Sports Exerc 1997; 29(6):S5-S9.

17.  Ainsworth BE, Haskell WL, Whitt MC, Irwin ML, Swartz AM, Strath SJ, et al. Compendium of Physical Activities: an update of activity codes and MET intensities. Med  Sci Sports Exerc 2000; 31(suppl.9):S498-S504.

18.  Salazar A, Paravic T, Barriga OA. Percepción de los hombres y sus parejas sobre la calidad de vida en el climaterio masculino. Rev Chil Obste Ginecol 2012; 77(1): 11-17.

19.  Ichioka K, Nishiyama H, Yoshimura K, Itoh N, Okubo K, Terai A. Aging males' symptoms scale in Japanese men attending a multiphasic health screening clinic. Urology 2006; 67(3): 589-93.

20.  Corrêa LQ, Rombaldi AJ, Da Silva MC, Domingues MR. Aging male's symptoms in a Southern Brazil population: lifestyle effects after the age of 40. Aging Male 2010; 13(2): 93-9.

21. Asfar T, Ahmad B, Rastam S, Mulloi TP, Ward KD, Maziak W. Self-rated health and its determinants among adults in Syria: a model from the Middle East. BMC Public Health 2007; 7: 177.

22. Hearon BA, Quatormoni PA, Mascoop JL, Otto MW. The role of anxiety sensitivity in daily physical activity and eating behavior. Eat Behav 2014; 15(2):255-8.

23. Hansen AW, Beyer N, Flensborg-Madsen T, Gronbaek M, Helge JW. Muscle strength and physical activity are associated with self-rated health in an adult Danish population. Prev Med 2013; 57(6):792-8.

24. Pereira SMP, Geoffroy MC, Power C. Depressive symptoms and physical activity during 3 decades in adult life: bidirectional associations in a prospective cohort study. JAMA Psychiatry 2014; 71(12):1373-80.

25. Cheng JY, Ng EM. Body mass index, physical activity and erectile dysfunction: An U-shaped relationship from population-based study. Int J Obes 2007; 31(10):1571-8.

26. Pitanga FJG, Almeida LAB, Freitas MM, Pitanga CPS, Beck CC. Atividade física como discriminador da ausência de hipertensão arterial em homens adultos. Rev Bras Med Esporte 2014; 20(6):456-60.

27. Ramírez-Velez R, González-Ruíz K, García S, Agredo-Zúñiga RA. Sex differences in the relationship between vigorous vs moderate intensity exercise and risk markers of overweight and obesity in healthy adults. Endocrinol Nutr 2012; 59(8):491-5.

28. Hallal PC, Dumith SC, Bastos JP, Reichert FF, Siqueira FV, Azevedo MR. Evolução da pesquisa epidemiológica em atividade física no Brasil: uma revisão sistemática. Rev Saúde Pública 2007; 41(3):453-60.

**CORRESPONDING AUTHOR**

Melissa de Carvalho Souza
Rua Júlio Dias, 614, apto 405,
Coqueiros,
Florianópolis, Santa Catarina,
Brasil.
CEP: 88080-060
E-mail: mecarvalho.s@gmail.com