

## Physical Activity and its Association with Emotional State in the Elderly with Obesity

### Actividad física y su asociación con el estado emocional en adultos mayores con obesidad

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#### Summary

**Objective:** to determine the physical activity and the association with emotional state in adults from 60 to 70 years with obesity. **Methods:** analytical cross-sectional study, carried out at the Family Medicine Unit No. 75 of the Mexican Institute of Social Security, from May to July 2019, participants were included through a non-randomized sample by convenience. The anthropometric measures assessed were: weight, size, and abdominal girth to classify the class of obesity. The International Physical Activity Questionnaire (IPAQ) and the mood rating scale (Escala de Valoración de Estado de Ánimo) were applied. The results shown are measures of central tendency, frequencies and percentages; the statistical test  $\chi^2$  was used, considering a significant value of  $p < 0.05$  for the association of physical activity and emotional state. **Results:** 275 adults participated, with an average age of 65.1 years, 39.6% were men and 60.4% women. Of the total population studied, 63.6% presented obesity class I, 29.1% class II, 7.3% class III; 28.7% presented low physical activity. In relation to emotional state, joy predominated in 40.7% of the cases that carried out physical activity. Evaluating the association between low physical activity and altered emotional state (depression, anxiety, and anger), an OR of 1.9 was detected (1.1, 3.3). **Conclusion:** low physical activity is associated with an emotional state characterized by anxiety, depression and anger.

**Keywords:** Obesity, Physical Activity, Emotions, Elderly

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## Resumen

**Objetivo:** determinar la actividad física y su asociación con el estado emocional en adultos de 60 a 70 años con obesidad.

**Métodos:** estudio transversal analítico, realizado en la Unidad de Medicina Familiar No. 75 del Instituto Mexicano del Seguro Social, de mayo a julio de 2019, se incluyeron participantes mediante un muestreo no probabilístico por conveniencia. Se evaluaron medidas antropométricas como: peso, talla y circunferencia abdominal para clasificar el grado de obesidad. Se aplicó el Cuestionario Internacional de Actividad Física (IPAQ) y la Escala de Valoración de Estado de Ánimo (EVEA). Los resultados se muestran con medidas de tendencia central, frecuencias y porcentajes; se utilizó la prueba estadística  $\chi^2$ , considerando un valor significativo de  $p < 0.05$  para la asociación de actividad física y estado emocional. **Resultados:** participaron 275 adultos, con una media de 65.1 años de edad, 39.6% fue hombres y 60.4% mujeres. Del total de la población estudiada 63.6% presentó obesidad grado I, 29.1% grado II, 7.3% grado III; 28.7% presentaron actividad física baja. En relación con el estado emocional, la alegría predominó en 40.7% de los casos que realizaban actividad física. Al evaluar la asociación entre actividad física baja y estado emocional alterado (depresión, ansiedad e ira) se detectó un OR de 1.9 (1.1, 3.3). **Conclusión:** realizar actividad física baja se asocia con un estado emocional caracterizado por ansiedad, depresión e ira.

**Palabras clave:** obesidad, actividad física, emociones, adultos mayores

## Introduction

Obesity is a chronic disease and is considered a pandemic, it is defined as

excess of body fat and is determined with a body mass index greater than 30 kg/m<sup>2</sup>.<sup>1,2</sup>

Worldwide, more than 650 million of adults over the age of 60 suffer from obesity, which favors the emergence of cardiovascular, cognitive and bone disorders, and decreases the quality of life.<sup>3,4</sup>

In Mexico, the National Survey of Health and Nutrition of Medio Camino 2016 (Ensanut MC 2016) reported that 9.7% of the population corresponds to the elder population, of which 71.5% present some degree of obesity.<sup>5</sup> Its etiology is of multifactorial origin and although environmental characteristics have a fundamental role, it is known that a large number of genes influence its emergence and development.<sup>6</sup>

Obesity causes cognitive deterioration and limits daily activities, which can intervene in the degree of physical activity and, in turn, influence the emotional state of the elderly, conditioning a greater risk of depression.<sup>7</sup> Physical activity is defined as the body movement produced by the contraction of muscles and joints, generating energy expenditure, therefore daily life activities such as cleaning, gardening, occupation, leisure and transportation are considered physical activity, this activity contributes to the maintenance or improvement of physical condition, in addition to providing an improvement in emotional state.<sup>8,9</sup>

It has been established that older adults spend at least 150 minutes per week in moderate aerobic physical activity, or some type of vigorous physical activity for 75 minutes, always taking into account risks and benefits in this age group, this will impact in the improvement of cardiorespiratory and muscular functions, reduction of alterations in emotional state and cognitive deterioration.<sup>10</sup>

On the other hand, in the emotional state adaptive behaviors intervene, from perceptive, cognitive and interoceptive processes, in response to different stimuli.<sup>11</sup> In this context, it has been determined that physical activity is psychostimulant since it increases beta endorphins. Physical activity is also related to higher levels of self-esteem, decreased cardiovascular risk, and improved life expectancy, in addition to promoting an appropriate relationship with the environment and greater participation in community activities.<sup>12,13</sup>

Despite the positive effects of physical activity in adults, many of them have movement limitations, which prevent it from taking place; this conditions mood alterations and increases the risk of anxiety and depression, common problems in this age group.<sup>14,15</sup>

Mood swings play an important role in the loss of health and decreased quality of life; that is why they must be identified in an early stage.<sup>16</sup> The purpose of this study was to determine whether physical activity influences the emotional state of the elderly with obesity.

## Methods

Analytical cross-sectional study carried out at the Family Medicine Unit (FMU) No. 75 of the Mexican Institute of Social Security (IMSS) in the State of Mexico, from May to July 2019.

Sample size was calculated for a proportion, considering a population of 2601 adults between 60 and 70 years old with obesity; the frequency of the event was 71.5%. A non-randomized sampling of consecutive cases was carried out until the sample of 275 participants was completed, including older adults with comorbidities such as type 2 diabetes mellitus, high blood

pressure or dyslipidemia. Patients previously diagnosed with cardiovascular disease, dementia, psychiatric disease, and disability (sensory or physical) were excluded.

With prior informed consent, the following sociodemographic data were collected: sex, age, marital status, schooling and occupation. Weight, height and abdominal girth were taken using a scale with a calibrated stadimeter and a tape measure, in accordance with the recommendations of the clinical practice guide for the prevention, diagnosis and treatment of overweight and exogenous obesity IMSS-046-18.<sup>17</sup>

To evaluate physical activity, the International Physical Activity Questionnaire (IPAQ), created by the World Health Organization in 2002, with a Cronbach's alpha of 0.80, was used. It evaluates the following characteristics: physical activity during recreation time, domestic or gardening activities, activity performed at work and during transportation. The calculation of the scores requires the sum of the duration (in minutes) and frequency (days) for all types of activities; obtaining some degree of physical activity, classifying it as: low, moderate and vigorous.<sup>18</sup>

With respect to mood, the Mood Rating Scale (EVEA)<sup>19</sup> was used. It has 16 items, each one composed of a Likert-type scale (from 0 to 10), with a short statement of a group of moods in its left margin, obtaining the predominant one with the sum of these, classified as: joy, depression, anger/hostility and anxiety.

The analysis of the quantitative variables of age and abdominal girth was carried out through measures of central tendency and standard deviation. For the qualitative variables of physical activity, emotional state, gender, schooling,

occupation and body mass index, the percentages and frequencies were used.

To determine the association between physical activity and emotional state, the statistical test  $\chi^2$  was used, with a significance level of  $p < 0.05$  and a confidence index of 95%. The data obtained were analyzed using the statistical package SPSS v. 22. This study was approved by the local research and ethics committee 14018, with registration number R-2019-1401-037.

### Results

A population of 275 adults from 60 to 70 years old with obesity were studied, of which 39.6% were male ( $n=109$ ) and 60.4% female ( $n=166$ ), the average was 65.1 years old ( $\pm 3.8$ ), the socio-demographic characteristics are mentioned in table 1.

39.6% of men obtained an abdominal girth  $>90\text{cm}$  ( $n=109$ ), while in 60.4% of women was  $>80\text{cm}$  ( $n=166$ ). 70.9% registered some comorbidity (diabetes, hypertension or dyslipidemia) ( $n=195$ ), while 29.09% declared not having any of these ( $n=80$ ).

When evaluating physical activity and emotional state, it was determined that 11.6% of the participants who had low physical activity presented joy, see Figure 1.

Of the total patients, 28.7% presented low physical activity, in relation to emotional state, 13.8% of men presented joy ( $n=15$ ), 8.3%, depression ( $n=9$ ) and 4.6%, anxiety as well as anger/hostility ( $n=5$ ). While 11.4% of women had anxiety ( $n=19$ ), 10.8%, joy ( $n=18$ ), 3%, anger/hostility ( $n=5$ ) and 1.8%, depression ( $n=3$ ).

**Table 1. Socio-demographic Characteristics in the Elderly from 60 to 70 years of age with Obesity**

| Characteristics    | Men       | Women      | Total      | P     |
|--------------------|-----------|------------|------------|-------|
|                    | n=109     | n=166      | n = 275    | 0.03  |
| Marital Status     | n (%)     | n (%)      | n (%)      |       |
| Single             | 32 (11.6) | 71 (25.8)  | 103 (37.5) | 0.011 |
| Married            | 67 (24.4) | 88 (32)    | 155 (56.4) |       |
| Civil union        | 10 (3.6)  | 7 (2.5)    | 17 (6.2)   |       |
| Schooling          | n (%)     | n (%)      | n (%)      |       |
| Illiterate         | 18 (6.5)  | 21 (7.6)   | 39 (14.2)  | 0.116 |
| Elementary         | 33 (12)   | 80 (29.1)  | 113 (41.1) |       |
| Junior-high school | 29 (10.5) | 37 (13.5)  | 66 (24)    |       |
| High school        | 20 (7.3)  | 17 (6.2)   | 37 (13.5)  |       |
| Bachelor's degree  | 9 (3.3)   | 11 (4)     | 20 (7.3)   |       |
| Occupation         | n (%)     | n (%)      | n (%)      |       |
| Employed           | 17 (6.2)  | 26 (9.5)   | 43 (15.6)  | 0.199 |
| Unemployed         | 79 (28.7) | 127 (46.2) | 206 (74.9) |       |
| Worker             | 7 (2.5)   | 4 (1.5)    | 11 (4)     |       |
| Sales person       | 6 (2.2)   | 9(3.3)     | 15 (5.5)   |       |

n: Value

‰: Percentage

$\chi^2$  Statistical Test

By applying the statistical test of  $\chi^2$  on the variables of physical activity and emotional state, a statistically significant association was determined between both with a value  $p=0.012$ . When evaluating the body mass index of the participants it was determined that more than 50% had obesity class I, while 7.5% had obesity class III, see figure 2.

When evaluating the emotional state related to occupation, it was determined that most of the participants who presented some emotional problem were unemployed, see figure 3.

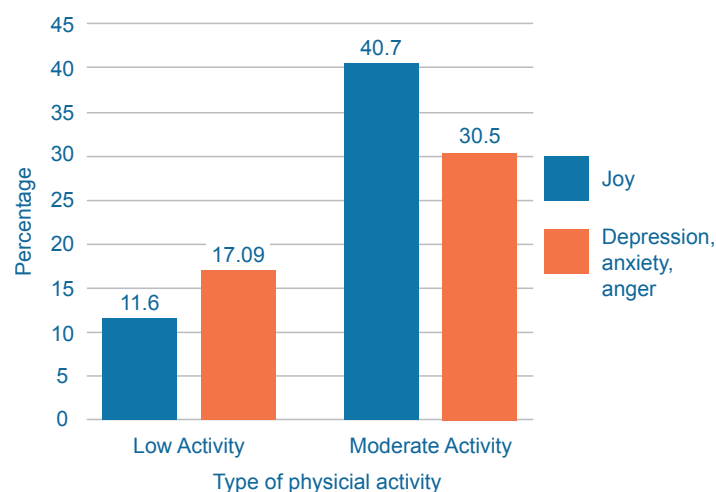
When evaluating the distribution between mood and class of obesity, it was observed that about 50% of the participants with some degree of obesity reported having joy, this was more evident when analyzing obesity class I, see figure 4.

## Discussion

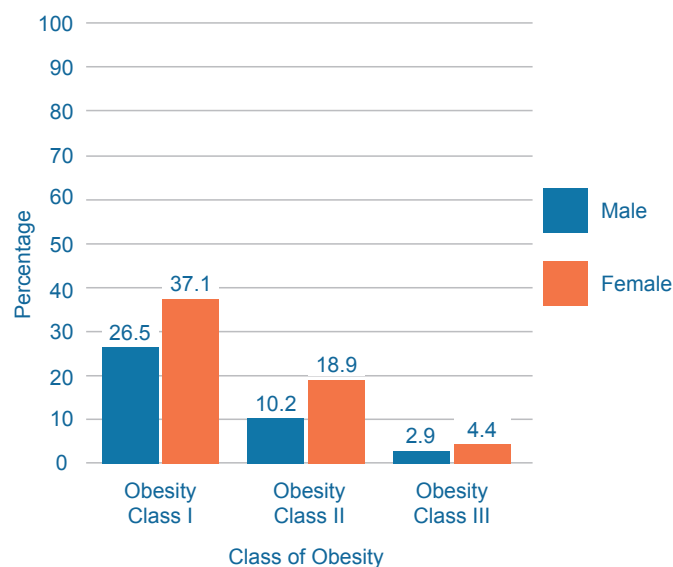
In this research, the association between physical activity and emotional state was reported. Nearly 50% of patients presented alterations in emotional state (depression, anxiety or anger) with an OR of 1.95 (CI 95%, 1.15-3.38,  $p=0.012$ ), while 40.7% of participants who engaged in moderate physical activity presented joy, this is similar to what was reported by Blaszcak et al,<sup>20</sup> who detected that emotional state is significantly associated with this type of physical activity, which improves symptoms of depression and anxiety ( $p<0.05$ ). In this study, obesity class I predominated in 63.6% of the cases, a similar value to other studies,<sup>21</sup> in this regard, strategies must be generated to reduce the impact that high body mass indexes have in the exacerbation of multiple diseases.

A higher prevalence of obesity was detected in women with 60.4% com-

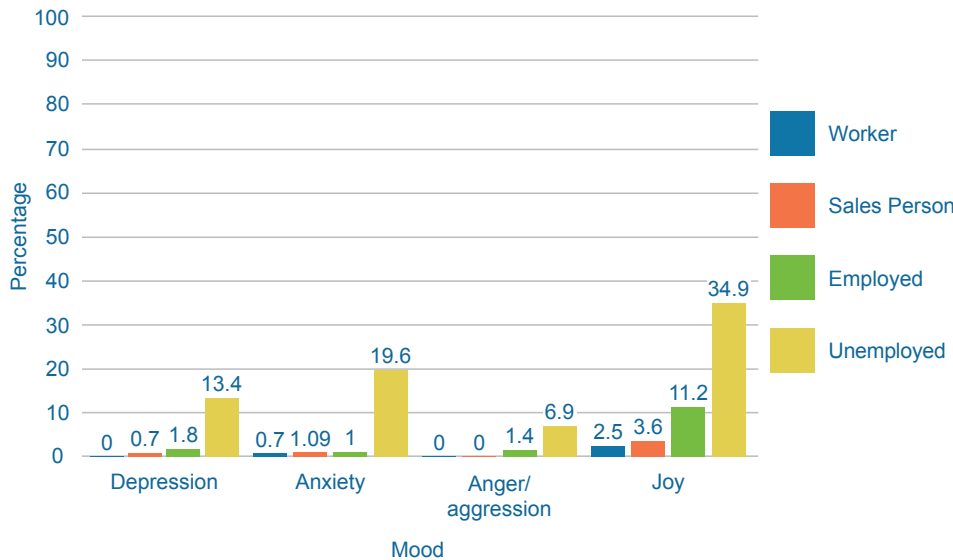
**Figure 1. Global Characterization of Emotional State in Relation to Physical Activity Performed**



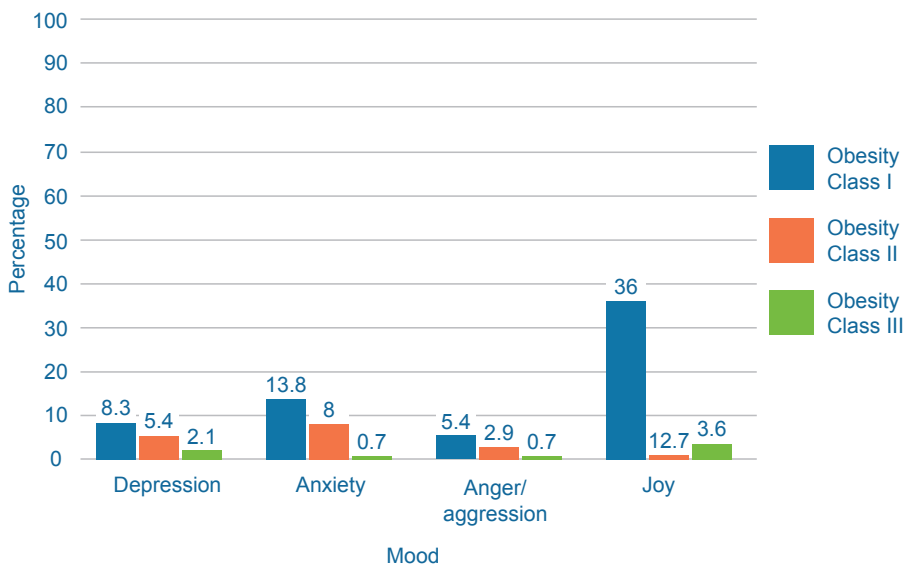
**Figure 2. Body Mass Index According to Gender in Obese Patients**



**Figure 3. Mood and Employment in the Elderly with Obesity**



**Figure 4. Emotional State and Class of Obesity**



pared to men (39.6%), this is similar to what was reported by Lemamsha et al,<sup>22</sup> which indicates that there is higher prevalence in women, possibly because, they are the ones who attend medical units more frequently.

With regard to physical activity, 71.2% of adults reported moderate physical activity, in contrast to what was reported by Boateng et al.,<sup>23</sup> who said that 68.6% of obese older adults have low physical activity. This may be due to biases caused by applicator expectation.

It has been pointed out that physical activity should be done with the recommended parameters to promote a balance of the emotional state. In contrast to this research, 30.5% presented depression in spite of having moderate physical activity and 17.9% with low physical activity. In this regard, it has been established that if people do not have moderate or vigorous physical activity, there is a greater risk to present severe depression which impacts significantly on both positive and negative moods.<sup>24-26</sup>

In this study, an important part of the participants who had moderate physical activity reported suffering from anxiety, in contrast to what Cillian et al. mention,<sup>26</sup> who pointed out that after physical activity there is a decrease in anxiety disorder (or=0.54, CI: 95%= 0.3, n=3).

Biing et al.<sup>27</sup> indicate that emotions can be triggered by external factors, among others, stand out environmental, social, individual and occupational conditions; in this study no relationship was found between occupation and emotional state, however, it has been noted that productive activity shows a positive influence on mental health of the elderly.<sup>28</sup>



It was detected that seven out of ten participants presented comorbidities such as diabetes, hypertension and dyslipidemia, aspects closely related to increase body mass index. These comorbidities increase the risk of coronary disease;<sup>29</sup> for this reason, it is necessary to prevent, diagnose and control these pathologies from the first contact since they can limit physical activity and emotional state.

The limitations of the present study were that the instruments used do not include the type of diet, nor the degree of motivation for physical activity, so these factors may modify the emotional state of the adults; likewise, there may be biases due to the expectation of the applicator, which may limit the scope of this study.

## Conclusion

It was determined that low physical activity is associated with an emotional state characterized by anxiety, depression, and anger in obese older adults. Therefore, it is important to notice that in order to obtain the benefits of physical activity, as well as a balanced emotional state and decrease in body weight, it is necessary to comply with the established time of 150 minutes of moderate physical activity or 75 minutes of vigorous physical activity per week, always taking into account the needs and risks of its realization in this age group.

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