ORIGINAL ARTICLE

Nutritional status and depression among young adults treated in an outpatient consultation service at a national hospital in Junín, Peru, 2023

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ABSTRACT

Objective: To assess the association between nutritional status and depression among young adults treated in an outpatient consultation service at a national hospital in Junín in 2023. **Materials and methods:** This quantitative, cross-sectional study was conducted on 346 young adults treated at Hospital Regional Docente Clínico Quirúrgico Daniel Alcides Carrión in Junín, Peru. Depression levels were assessed using the Beck Depression Inventory, while nutritional status was determined through anthropometric measurements such as weight, height, waist circumference (WC) and neck circumference (NC). The statistical analysis was performed using the Kolmogorov–Smirnov normality test, followed by the nonparametric chi-square test with IBM SPSS Statistics 27. The study received approval from the Hospital's Ethics Committee. **Results:** A total of 54.91 % of the participants were female, and the predominant age group was 18 to 24 years. Moderate to severe depression was observed in 27.46 % of the participants and over 50 % showed some degree of depression. Additionally, 25.72 % were overweight, 4.05 % were obese, 17.34 % were at high risk for central obesity and 22.83 % were at high cardiometabolic risk. However, when assessing the association between the indicators of nutritional status and depression, no statistically significant relationships were found, evidenced by a *p* value of 0.283 for body mass index (BMI), 0.095 for WC and 0.069 for NC. **Conclusions:** Among young adults in the sample, no association was found between the nutritional status of those with central obesity and cardiometabolic risk and their depression levels.

Keywords: Nutritional Status; Depression; Waist Circumference; BMI-Age (Source: MeSH NLM).

INTRODUCTION

According to the World Health Organization (WHO), in 2015, the global prevalence of depression was 4.4 % (322 million individuals), with a higher rate observed among females (5.1 %) [1]. In 2021, a study in Peru reported that 25.2 % of a sample of 2,375 individuals over the age of 20 experienced depression [2]. In Lima, 28 % of adolescents aged 12 to 17 experienced a major depressive episode [3].

Depression in young adults may be associated to immune system dysregulation and cause changes in appetite, which can adversely affect nutritional status and potentially lead to malnutrition [4]. Nutritional imbalances can also influence mood and neurological function; indeed, inadequate nutritional status may contribute not only to metabolic disorders but also to neurological conditions [5].

Furthermore, excess weight has been linked to chronic inflammation, characterized by elevated levels of pro-inflammatory cytokines and acute-phase proteins, which have been related to the pathogenesis of depression [6]. Environmental factors, such as obesity and nutrient-poor diets, can elevate inflammatory markers like C-reactive protein (CRP). Higher CRP levels have been associated with increased cell permeability of the blood-brain barrier, which may raise the risk of episodes of depression, schizophrenia and bipolar disorder [7].

A study by Cofré et al. examined the relationship between depression, anxiety and nutritional status among adolescents. The findings revealed that 83.6 % of the participants exhibited mild, moderate and severe depressive symptoms, and among them, 58.8 % were classified as overweight based on their body mass index (BMI) [8]. Similarly, a study by Mantzorou et al. involving older adults found that 35 % were at risk of malnutrition, 11.3 % were malnourished and 32.3 % exhibited symptoms of depression [9].

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According to Silva et al., anthropometric parameters, body image and BMI were associated with depression in adults. Women tended to overestimate their body size, influenced by the idealization of a lean body, whereas men often perceived themselves as underweight or expressed dissatisfaction with their appearance due to the idealization of a larger body [10].

Depression is increasing among young adults [1], with women being particularly affected [1]. Its consequences can impair the immune system, disrupt sleep and appetite, reduce academic performance, and contribute to suicidal ideation—ultimately affecting personal development [9]. Assessing the nutritional status of individuals with depression is essential, as poor nutrition may compromise overall health and contribute to the development of other comorbidities, whether related to excess weight (overweight or obesity), low weight (underweight) or eating disorders such as anorexia [7].

The aim of this study was to assess the association between nutritional status and depression among young adults treated in an outpatient consultation service at a national hospital in Junín in 2023.

MATERIALS AND METHODS

Study design and population

This was a quantitative, cross-sectional study [11]. The population consisted of young adults aged 18 to 30 treated in an outpatient consultation service at a national hospital in Junín, first in the triage unit and subsequently in dentistry, nutrition, general medicine and specialty offices. Individuals undergoing pharmacological treatment with psychostimulants were excluded. A non-probability convenience sampling method was used. A sample size of 281 young adults was previously calculated, based on a 95 % confidence level, a z-score of 1.96 and a maximum allowable margin of error of 5 %. The formula for estimating a mean in a finite population was applied, using a reference prevalence of depression (25.2 %) reported in a nationwide study of young adults [2].

Variables and measurements

The Beck Depression Inventory was used to assess depression levels, with the following cut-off points: severe (29–63), moderate (20–28), mild (14–19) and minimal (0–13) symptoms. This instrument evaluates the severity of depressive symptoms and is widely used internationally. In Peru, it has demonstrated high internal consistency (average Cronbach's alpha = 0.91), content validity, and the ability to discriminate between depressed and nondepressed individuals [12,13].

Nutritional status was determined through anthropometric measurements such as weight, height, waist circumference (WC) and neck circumference (NC). Data collection was carried out in coordination with hospital administration, following approval from the Hospital's Ethics Committee to collect patient information. A formal communication was also sent to the heads of each department to inform them about the study. Participants were recruited in the triage unit, where anthropometric data were recorded using a patient data sheet. For this purpose, a mechanical scale with a measuring rod (Seca 700; capacity: 220 kg; precision: 0.1 kg) was used, along with an anthropometric tape measure (Lufkin; precision: 0.1 cm) to assess central obesity, overweight, obesity and cardiometabolic risk factors [14]. Anthropometric measurements were taken by researchers and technical staff in the triage unit. Data collection was conducted during June, July and September 2023.

Statistical analysis

The statistical analysis was performed using the Kolmogorov–Smirnov normality test, yielding a *p* value of 0.001, which indicated a non-normal distribution. Descriptive statistics were used, including measures of central tendency (median) and dispersion (interquartile range). Frequency tables were generated for categorical variables. To examine the associations between variables, the chi-square test was applied, with a 95 % confidence level. All analyses were conducted using IBM SPSS Statistics 27.

Ethical considerations

This study was approved by the Ethics Committee of Hospital Regional Docente Clínico Quirúrgico Daniel Alcides Carrión (Report No. 005-2023-DRSJ-HRDCQ-DAC-HYO-CEI; File No. 4625966) and endorsed by the Graduate Program Steering Committee of Universidad Nacional Mayor de San Marcos (UNMSM) (Ruling No. 000717-2023-UPG-VDIP-FM/UNMSM). All participants provided informed consent prior to their inclusion in the study. The principles of the Declaration of Helsinki were followed, and each participant had the right to decide whether or not to participate in the study. Confidentiality was ensured by assigning a unique identification code to each participant.

RESULTS

A total of 346 young adults were evaluated, the majority of whom were female and aged between 18 and 30 years. The median age was 23 years (interquartile range = Q3–Q1 = 4). The predominant age group was 18 to 24 years. Among those evaluated, 6.94 % presented with severe depression, just under one-third exhibited moderate symptoms, 28.90 % had mild symptoms and 43.64 % presented with minimal depressive symptoms (Table 1).

In terms of nutritional status, more than half of the participants had a normal weight, a normal WC and a low risk of cardiometabolic disease. The statistical analysis showed no significant association between depression levels and BMI-for-age, WC or NC, with *p* values greater than 0.05 for all variables (Table 1).

Table 1. Description of the sample and statistical analysis in relation to depression levels (*n* = 346)

Characteristics	*n*	%	Chi-square
Sex			
Female	190	54.91	-
Male	156	45.09	-
Age group			
18-24	253	73.12	-
25-30	93	26.88	-
Depression levels			
Severe	24	6.94	-
Moderate	71	20.52	-
Mild	100	28.90	-
Minimal	151	43.64	-
Anthropometric indicators			
BMI			0.283
Normal weight	243	70.23	-
Overweight	89	25.72	-
Obesity	14	4.05	-
WC			0.095
Normal	286	82.66	-
High risk	60	17.34	-
NC			0.069
High risk	79	22.83	-
Low risk	267	77.17	-

One-third of the sample presented signs of overnutrition (overweight or obesity), and among them, 30 % exhibited moderate to severe depression and more than 50 % showed some degree of depressive symptoms. Less than one-third were at high risk for central obesity, out of whom 36.6 % reported moderate to severe depression. Similarly, 22.8 % of the sample was classified as having a high cardiometabolic risk, and within this group, 34 % exhibited moderate to severe depressive symptoms (Table 2).

Table 2. Nutritional status and depression levels in young adults treated at a national hospital in Junín (*n* = 346)

Anthropometric Indicators	Severe *n* (%)	Moderate *n* (%)	Mild *n* (%)	Minimal *n* (%)
BMI				
Normal weight	21 (87.50)	43 (60.56)	69 (69.00)	110 (72.85)
Overweight	3 (12.50)	24 (33.80)	27 (27.00)	35 (23.18)
Obesity	0 (0.00)	4 (5.63)	4 (4.00)	6 (3.97)
WC				
Normal	22 (91.67)	51 (71.83)	85 (85.00)	128 (84.77)
High risk	2 (8.33)	20 (28.17)	15 (15.00)	23 (15.23)
NC				
High risk	3 (12.50)	24 (33.80)	22 (22.00)	30 (19.87)
Low risk	21 (87.50)	47 (66.20)	78 (78.00)	121 (80.13)

DISCUSSION

The study sample showed signs of depression. Nearly one-third of the participants exhibited moderate to severe symptoms, and more than half showed some degree of depressive symptoms, a prevalence that contrasts with lower rates reported in previous studies. For instance, research by Álvarez et al. found that 28 % of the adolescents who participated in their study showed signs of depression [3]. Similar findings were reported by Vinaccia, Ortega, who observed that 32.2 % of young adults exhibited depressive symptoms [15], while Pacheco, Guerrero identified a 25 % prevalence among adults over 20 years old [2]. Conversely, Cerecero-García et al., in a Mexican sample of 143,874 adults, reported a prevalence of 15 % [16]. In contrast, countries such as Chile have reported rates closer to those of the present study. For example, research by Cofré et al. found a 26.6 % prevalence of moderate depressive symptoms and 42.6 % of severe depression [8]. However, the present study revealed predominantly minimal to mild depression, indicating some divergence in symptom severity. Likewise, Prieto et al. reported a 39 % prevalence of depressive symptoms [17], while Astocondor et al. found a 42.3 % prevalence of depression among university students [18], findings that closely align with the results of the current study.

Regarding the relationship between BMI and depression, the findings differ from those reported by Nour et al., who observed a significant positive correlation between the two variables (p = 0.006). In their study, 26.4 % of the participants were overweight, 21 % obese and 43.3 % depressed, with mild depression being the most common at 25.2 % [19]. Similarly, Miranda et al. reported that among their obese participants, 6.9 % had depressive syndrome and 34.5 % exhibited depressive symptoms—figures consistent with the present study's findings regarding excess weight [20].

As for the association between cardiometabolic and central obesity risks and depression, Tolentino found no significant relationship; in his study, 91 % of participants with minimal depression were at low risk [21]. Likewise, Arenas reported no significant association between overweight and depression (p = 0.167), although he found that obesity increased the likelihood of depression by 1.88 times compared to non-obese individuals (p = 0.001). He also examined the relationship between at-risk WC and depression but no significant association was observed (p = 0.07) [22]. In line with these findings, Cofré et al. reported no association between nutritional status (overweight and obesity) and depression levels (p = 0.220) [8]. Chauca also found no statistically significant relationship between excess weight and depression (p = 0.752) [23]. Similarly, Gutiérrez et al. reported no significant association between obesity types and depression in adolescents (p = 0.578) [24].

The findings of the present study are therefore consistent with the most recent literature, which suggests a bidirectional relationship between excess weight and depression. That is, depression may be both a cause and a consequence of excess weight. Both conditions are linked to dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, as well as to pro-inflammatory and oxidative stress responses. Central obesity, for example, produces pro-inflammatory cytokines such as interleukin-6, interleukin-1ß and tumor necrosis factor alfa (TNF-α), which can cross the blood-brain barrier and promote neuroinflammation. In addition, excess weight can lead to elevated cortisol and leptin levels, which in turn intensify inflammation and may worsen depressive symptoms [25,26].

It is also important to consider diet as a modifiable behavioral factor, as a healthy diet may play a positive role in preventing depression and anxiety [27,28]. The connection between eating patterns and mental health deserves particular attention, as poor eating habits may predispose individuals to depression—or, conversely, depression may negatively influence eating behaviors. Most depressive disorders are accompanied by anxiety, which can increase appetite and weight. In contrast, melancholic or severe depression is often associated with reduced appetite and weight loss, along with lower intake of fruits, vegetables, cereals, dairy products and animal proteins such as fish and poultry [29].

The presence of depression is also influenced by other variables, including life experiences, socioeconomic status, eating habits and nutrient deficiencies. Among these, vitamin D plays a key role in neuromodulation, neuroplasticity and neuroprotection, and helps regulate the secretion of brain-derived neurotrophic factor (BDNF). Deficiencies in vitamin B12 and iron are also notable. For example, anemia is considered a risk factor for depression, particularly in older adults, as this stage of life—like depression—is associated with elevated levels of pro-inflammatory markers such as interleukin-6. This cytokine promotes the synthesis of hepcidin, a regulator of iron metabolism. Additionally, other pro-inflammatory markers such as interleukin-1, TNF-α and interferon-γ inhibit the proliferation of erythroid progenitor cells, further linking iron deficiency to depressive symptoms [6,30]. These findings highlight the need for healthcare professionals to conduct thorough and careful assessments of both nutritional deficiencies and overall nutritional status in patients with mental health concerns.

The limitations of the present study included the additional time required to take measurements in the triage unit and the inconsistencies in how technical staff performed them across the unit's various stations.

In conclusion, the results of this study suggest that in young adults, nutritional status—defined by excess weight (overweight and obesity), central obesity and cardiometabolic risk—was not significantly associated with depression.

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