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ORIGINAL RESEARCH

Association Between Emotional Eating, Sociodemographic Characteristics, Physical Activity, Sleep Duration, and Mental and Physical Health in Young Adults

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Background: Emotional eating (EmE) is one of the most common eating behaviors maladaptive among young adults, however, in the Peruvian context, it remains unexplored.

Objective: The aim of the study was to determine the association between negative EmE, sociodemographic characteristics, physical activity, sleep duration, and mental and physical health in young adults.

Methods: A cross-sectional study was conducted in 400 young Peruvian adults living in three regions of Peru (coast, jungle, and highlands). An online survey was used to collect information on sociodemographic characteristics, physical activity, sleep duration, depressive symptoms, anxiety, hypertension, and negative EmE. In addition, self-reported anthropometric data were collected to calculate body mass index (BMI).

Results: Approximately 55.8% of women presented negative EmE. Logistic regression analysis revealed that participants aged 30–39 years were less likely to have negative EmE in both female and male gender, OR; 0.24, 95% CI; 0.08–0.66, p<0.01 and OR; 0.40, 95% CI; 0.16–0.97, p<0.05, respectively. Perform physical activity 3 to 4 times 5.22 (95% CI: 1.31–20.78), 1 to 2 times a week 5.77 (95% CI: 1.91–17.44), and never 15.18 (95% CI: 3.90–59.00) were associated with negative EmE. Moreover, sleeping less than 7 hours per day (OR; 2.26, 95% CI; 1.04–4.90), depressive symptoms (OR = 6.29, 95% CI: 1.27–31.19), anxiety (OR = 14.13, 95% CI: 2.46–80. 97, p<0.01), hypertension (OR = 7.58, 95% CI: 1.24–46.17), and BMI ≥25 (overweight/obese) (OR = 1.51, 95% CI: 1.66–3.41) were associated with negative EmE.

Conclusion: The findings show that there is an association between negative EmE, sociodemographic characteristics, physical activity, sleep duration, and mental and physical health in young adults.

Keywords: emotional eating, anxiety, body mass index, depression, mental health, sleep duration, physical activity

Introduction

Emotional eating (EmE) is one of the most common unhealthy eating behaviors maladaptive among young adults,[1] and is defined as the behavior of overeating in response to a variety of negative emotions, such as anxiety, depression, anger, and loneliness.[2] EmE is a mechanism used by people to cope with negative affectivity and eat in emotional situations for reasons other than hunger.[2] In recent decades, the number of people affected by EmE increased significantly and the trend is steadily rising.[3–5] A cross-sectional electronic survey conducted among young adults found that 52.7% of respondents reported a high level of EmE.[6]

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Moreover, it should be mentioned that although people can consume food in the presence of negative emotions, there is also evidence that shows that food can be consumed in the presence of positive emotions.[4,7] It is suggested that being cheerful, particularly in the context of celebrations and socializing, can lead to hedonic overeating.[8–10] For example, a study evaluating 107 women and 103 men found that hedonic eating was rated higher during joy than during other emotions such as anger, fear, or sadness.[10] Similarly, another study reported that the appetite of cheerful participants was increased by reporting a greater tendency to consume chocolate.[8] In fact, a field study conducted on a small sample of university students reported that food consumption associated with positive emotions occurred as frequently as eating associated with negative emotions.[11] This implies that both negative and positive emotions can lead to increased food consumption and overeating.[3,12] However, the consumption of food in the presence of positive emotions does not necessarily lead to disordered eating.[3–5] In contrast, food consumption in response to negative emotions such as bad mood, negative feelings, among others, can lead to an increased risk of eating disorders such as binge eating.[4,5,12]

In recent years, EmE has been positioned as an important psychological determinant of food intake.[13] Studies have documented that EmE influences food intake.[13–15] Particularly, EmE has been associated with the consumption of high-calorie dense foods, also known as "comfort foods".[14,15] In fact, results from a cross-sectional analysis of the NutriNet-Santé cohort that included a total of 7378 men and 22862 women found that higher EmE was associated with higher consumption of energy-dense snacks, such as sweet and fatty foods; these associations were particularly stronger in women with depressive symptoms.[13] Furthermore, findings from other studies suggest a relationship between excessive alcohol consumption and EmE (binge eating disorder).[16,17] Therefore, the implementation of health interventions to prevent EmE and avoid unhealthy eating behaviors is important.

Research has addressed the impact of sociodemographic characteristics, such as age, gender, and other sociodemographic characteristics on the eating behavior outcomes of individuals. One study reported that young people aged 19 to 20 years reported a higher proportion of EmE.[6] In addition, young people are not enthusiastic about making changes in their own dietary behaviors,[18,19] and they may be subject to emotional pressures, such as academic and work load, academic stress, lack of adequate time management, among others, which can impact food consumption.[18,19] Regarding gender, it was reported that women are more vulnerable to restrained, uncontrolled eating behaviors and are more likely to present negative EmE.[20,21] Although women show greater EmE, however, this aspect should not be underestimated in men. Generally, women are more likely to report that they consume food in response to negative emotions, such as anxiety, anger, frustration, and depression; more specifically, women eat more emotionally compared to men.[22] Possible reasons why women, unlike men, experience more EmE could be associated with mood swings caused by hormonal changes related to the menstrual cycle.[23,24]

On the other hand, another factor associated with EmE is physical activity. In fact, regular physical activity can promote healthy eating behavior by limiting EmE.[25] Likewise, sleep duration may play an important role in the occurrence of EmE. Short sleep duration is associated with changes in eating behaviors and food choices.[26] In particular, a study conducted in 553 women and 911 men found a significant interaction between EmE and sleep duration in women, but not in men.[27] Short sleep duration is a public health problem and represents an indicator of the development of unhealthy eating habits and obesity.[26] It is worth mentioning that young adults often adopt unhealthy behaviors, including preference for evening hours, prolonged exposure to artificial light instead of natural light due to prolonged screen exposure during the late evening hours, these aspects contribute to later sleep.[28] In addition, circadian preference for night or nocturnal types, later sleep, and prolonged wakefulness are associated with emotional disorders, such as depression and anxiety;[29] which, in turn, are linked to energy-dense food and nutrient intake and the appearance of negative EmE.[30] Furthermore, short-term sleep deprivation has been shown to lead to reduced physical activity, which, in turn, may be related to EmE characterized by increased consumption of snacks and comfort foods.[31] Therefore, gender, physical activity, and sleep duration are all factors associated with negative EmE.[20,21,25,27,32] Therefore, interventions aimed at preventing negative EmE must consider these factors for effective outcomes, particularly in young adults.

Mental disorders, such as depression and anxiety, are a health concern for public health systems.[33] In fact, more than 26% of Peruvian adults living in the metropolitan area of Lima, the capital, presented some mental health problems at some time in their lives, with depressive symptoms being the most frequent mental problems (6.2%).[34] Negative emotional conditions are associated with unhealthy eating behaviors in young adults,[33] which, in turn, will gradually increase the number of people with EmE.[6] The consumption of high-calorie foods rich in saturated fats, free sugars, and sodium are the result of changes in the mental state, such as anxiety and depression.[35,36] Similarly, one study found that EmE was associated with elevated depressive

symptoms in both men and women.[37] The persistence of these factors can lead to an increase in non-communicable diseases, such as obesity and hypertension.[35] However, few studies have examined EmE in these chronic conditions.

EmE has become an important psychological determinant in the onset of obesity.[13] This maladaptive eating behavior could lead to the consumption of unhealthy food, which consequently promotes excess body weight.[38] People who have EmE habits are more likely to have an elevated BMI compared to those who do not eat low on this behavior.[36,38] Particularly, EmE can negatively impact dietary intake and body weight status.[39] Therefore, the literature suggests temporal relationships between weight and EmE.

To date, there have been few studies related to EmE in the Peruvian population. However, other studies carried out in young Peruvian populations reveal a tendency towards the consumption of foods characterized by a high energy content.[40] In addition, in relation to mental health problems (depression and anxiety) and excess body weight, previous studies have shown a growing concern among young Peruvian adults, a situation that has worsened with the advent of the COVID-19 pandemic.[33,41,42] Therefore, it is necessary to assess the extent to which negative EmE is influenced by these factors. Understanding negative EmE and associated factors can be useful in planning and implementing health education programs that can contribute to non-communicable diseases prevention efforts. This study aims to determine the association between negative EmE, sociodemographic characteristics (age, gender, among others), physical activity, sleep duration, and mental (depression and anxiety) and physical health (BMI ≥25 and arterial hypertension) in young Peruvian adults.

Materials and Methods

Study Design and Participants

A descriptive cross-sectional study was conducted online between January and March 2022. Participants of both genders, those who did not present any pathology [acute illness of any kind (eg, asthma attack, bronchitis, among others) or vegetative symptoms] and who were within the age range (18 years and more) were included. Loss criteria: participants who did not give electronic informed consent and who could not read and write. All participants lived in the three regions of Peru (coast, jungle, and highlands). The sample was selected by non-probabilistic convenience sampling. Data were collected through an online survey composed as follows: (a) sociodemographic data (eg, age, gender, background, place of residence, among others), (b) mental and physical health data); and (c) three questionnaires to measure participants' emotional eating and mental and physical health status. The survey was distributed publicly via email and social networks, such as WhatsApp and Facebook Messenger. Likewise, the Google Form platform was used to administer the survey. The time it took participants to complete the survey was approximately 16 minutes.

Ethical Considerations

Considering the ethical aspects related to scientific research, in the first instance, the approval of the Research Ethics Committee of the Health Sciences Faculty of the Universidad Peruana Unión was requested (reference number: 2021-CE-EPG-0000121). Subsequently, prior to data collection, electronic informed consent was requested from all potential participants. In addition, they were informed that their participation in the study was voluntary and that they could stop participating at any time if they wished. They were also informed that the data collected would be handled anonymously and confidentially and would be used exclusively for research purposes. Finally, the study was conducted in accordance with the criteria established in the Declaration of Helsinki.

Data Collection Instruments

Emotional Eating Questionnaire: To measure emotional eating, the Spanish version of the emotional eating questionnaire was used.[43] It comprises 10 questions and has a Likert-type response scale (0 = never, 1 = sometimes, 2 = usually, and 3 = always). A higher score indicates a greater effect of negative emotions on eating habits. It should be mentioned that the measurement of the construct (EmE) was carried out using a measurement instrument that was created in Spain[43] and validated in Chile[44] because, to date, there is no validation in the Peruvian population. Therefore, we performed the Cronbach's alpha evaluation of the instrument, using the total sample size (400 participants) and the result was 0.68.

Sociodemographic and economic data registration form: Socio-demographic and economic data were collected, such as age in years (18–29, 30–30, and ≥40), gender (men and women), origin (jungle, coast, and highlands), residence

(urban and rural), educational level [basic (primary and secondary), technical, and university], marital status (being in a couple and single), family income in soles (<2149. 00, 2149.00–10,746.00, and >10,746.00), religious denomination (Catholic, Protestant, and no religion), tobacco consumption (yes, no), consumption of alcoholic beverages (yes, no), and consumption of soft drinks (yes, no).

Assessment of physical activity and sleep duration: To assess activity, participants were asked the following questions: how many times a week do you engage in physical activity? The response items were; 1) never; 2) 1 to 2 times per week; 3) 3 to 4 times per week, and 4) > or equal to 5 times per week.[45] On the other hand, sleep duration was evaluated through the following question: How many hours do you sleep per day? The response alternatives were; 1) < 7 hours per day = short sleep; 2) 7 to 9 hours per day = normal sleep; and 3) >9 hours per day = prolonged sleep.[46]

Mental Health

Generalized Anxiety Disorder (GAD-2): To measure anxiety symptoms, the Generalized Anxiety Disorder Scale (GAD-2) was used. It is considered as basic criteria to identify anxiety. It is composed of GAD-7 item 1 "Feeling nervous, anxious, or on edge" and item 2 "Not being able to stop or control worrying" and are evaluated as follows: Please indicate how often you have suffered the following problems in the last 15 days.[47] These items have 4 response options (never = 0, less than half the days = 1, more than half the days = 2, and almost every day = 3). A cut-off score greater than or equal to 3 on the GAD-2 is an indicator of a probable clinically relevant anxiety disorder, while a score less than 3 indicates the absence of anxiety symptoms.[48] Total scores range from 0 to 6.[49–51] In this study, the version adapted and validated for the Peruvian population was used and presented an adequate alpha coefficient (Cronbach's $\alpha = 0.80$).[52]

Patient Health Questionnaire-2 (PHQ-2) Depressive symptoms were assessed using the Patient Health Questionnaire-2 (PHQ-2) scale. It is composed of the first 2 items of the PHQ-9, which are considered a basic criteria for depressive disorders. These items are: (1) Feeling down, depressed, or hopeless and (2) Little interest or pleasure in doing things[47] and are assessed by the following question: In the last 2 weeks, how often have you been bothered by any of the following problems? The scale is composed of a response scale where, no day = 0, several days = 1, more than half the days = 2, and almost every day = 3. This scale aims to assess the degree to which the participant experiences depressive symptoms during the last 14 days. It is scored between 0 and 6.[53] On the PHQ-2, cutoff scores of ≥3 are indicative of depression, whereas cutoff scores <3 are indicators of absence of depressive disorder.[54–57] It was evidenced that the evaluation of internal consistency through the alpha coefficient ($\alpha = 0.75$) and the omega coefficient ($\omega = 0.76$) were acceptable in the Peruvian adult population.[58]

Physical Health

BMI ≥ 25 (overweight/obesity) and hypertension Self-reported data on weight and height were collected. Subsequently, BMI was calculated as weight/height^2 (kg/m^2) according to the parameters established by the World Health Organization.[59] BMI was categorized as <25 and ≥ 25 (kg/m^2). As for hypertension, it was self-reported; participants were asked the following question: "Has a doctor or other healthcare professional ever told you that you had hypertension or high blood pressure?". The response was dichotomized (yes or no).[60]

Statistical Analysis

A Microsoft Excel spreadsheet was used for data collection and coding. Subsequently, the statistical software package IBM SPSS, version 26 (SPSS Inc., Chicago, IL, USA) was used for data processing and analysis. The descriptive analysis of the variables was performed using tables of absolute frequencies and percentages. For the comparative analysis, the chi-square test was used. For the analysis of factors associated with emotional eating, odds ratios (OR) and their respective 95% confidence intervals (95% CI) were determined using bivariate and multivariate logistic regression models. P values <0.05 were considered statistically significant in all analyses.

Results

The study consisted of 400 participants aged 18 to 59 years. Table 1 shows the association between the variables negative EmE and sociodemographic characteristics of the respondents. It was evident that the highest proportion of the

Table 1 Association Between Negative EmE and Sociodemographic Characteristics of the Participants

	Total		Negative EmE				*p*-value
			Yes		No		
Variable	**n**	**%**	**n**	**%**	**n**	**%**	
Gender							
Female	214	53.5	153	55.8	61	48.4	0.167
Male	186	46.5	121	44.2	65	51.6	
Age (years)							
18–29	228	57.0	166	60.6	62	49.2	0.041*
30–39	106	26.5	64	23.3	42	33.3	
≥ 40	66	16.5	44	16.1	22	17.5	
Origin							
Coast	183	45.8	124	45.2	59	46.8	0.383
Highlands	61	15.3	38	13.9	23	18.3	
Jungle	156	39.0	112	40.9	44	34.9	
Place of residence							
Rural	354	88.5	240	87.6	114	90.5	0.401
Urban	46	11.5	34	12.4	12	9.5	
Level of education							
Basic	35	8.8	26	9.5	9	7.1	0.715
Technical	78	19.5	54	19.7	24	19.0	
University	287	71.8	194	70.8	93	73.8	
Marital status							
Single	303	75.8	210	76.6	93	73.8	0.539
Being in a couple	97	24.3	64	23.4	33	26.2	
Monthly income (PEN)**							
<2149.00	262	65.5	186	67.9	76	60.3	0.043*
2149.00–10,746.00	123	30.8	75	27.4	48	38.1	
>10,746.00	15	3.8	13	4.7	2	1.6	
Religious denomination							
Catholic	155	38.8	109	39.8	46	36.5	0.317
Protestant	228	57.0	151	55.1	77	61.1	
No religion	17	4.3	14	5.1	3	2.4	

Notes: *p<0.01; statistical significance by Chi-square test; **The Peruvian Sol (PEN) is the national currency of Peru. The ISO code for the Peruvian currency is PEN, a standardized 3-letter code according to the ISO-4217 currency code standard.

Abbreviation: EmE, emotional eating.

participants who presented negative EmE were women (55.8%), however, there was no significant association (p>0.05). On the other hand, negative EmE was significantly higher in participants aged 18–29 years (p>0.05). Likewise, an association was observed between the level of monthly income and negative EmE (p>0.05). Specifically, the highest proportion (67.9%) of respondents who reported EmE had a monthly income <2149.00 PEN.

Table 2 shows the relationship between negative EmE, physical activity, sleep duration, and mental and physical health. It was revealed that a higher proportion of emotional eaters did not perform physical activity or performed it less frequently in compassion to those who did not present this condition; these differences were significant (p<0.05). Moreover, negative EmE was significantly higher in participants who slept <7 h/day (66.1%, p<0.05). The proportion of participants reporting alcoholic beverage consumption (p<0.05), symptoms of depression (p<0.001) and anxiety (p<0.001), hypertension (p<0.05), and BMI ≥25 (overweight/obese) (p<0.05), was significantly higher in those who ate in response to negative emotions (negative EmE) compared to those without such eating behavior.

Table 2 Association Between Negative EmE, Physical Activity, Sleep Duration, and Emotional and Physical Health

Variable	Total		Negative EmE				*p*-value
			Yes		No		
	n	%	n	%	n	%	
Physical activity							
No practice	107	26.8	83	30.3	24	19.1	0.002*
1–2 times a week	168	42.0	111	40.5	57	45.2	
3–4 times a week	77	19.2	57	20.8	20	15.9	
≥ 5 times a week	48	12.0	23	8.4	25	19.8	
Sleep duration							
< 7 h/day	251	62.8	181	66.0	70	55.5	0.046*
7–9 h/day	141	35.2	89	32.5	52	41.3	
>9 h/day	8	2.0	4	1.5	4	3.2	
Smoke							
Yes	81	20.2	60	21.9	21	16.7	0.227
No	319	79.8	214	78.1	105	83.3	
Alcoholic beverages							
Yes	239	59.8	174	63.5	65	51.6	0.024*
No	161	40.2	100	36.5	61	48.4	
Soft drinks							
Yes	331	82.8	226	82.5	105	83.3	0.834
No	69	17.2	48	17.5	21	16.7	
Depressive symptoms							
Yes	98	24.5	84	30.7	14	11.1	<0.001*
No	302	75.5	190	69.3	112	88.9	

(*Continued*)

Table 2 (Continued).

Variable	Total		Negative EmE				*p*-value
			Yes		No		
	n	%	n	%	n	%	
Anxiety symptoms							
Yes	107	26.8	98	35.8	9	7.1	<0.001*
No	293	73.2	176	64.2	117	92.9	
Hypertension							
Yes	33	8.3	29	10.6	4	3.2	0.012*
No	367	91.7	245	89.4	122	96.8	
BMI							
<25	245	61.2	183	63.5	62	55.4	0.002*
≥25	155	38.8	105	36.5	50	44.6	

Note: *p<0.01; statistical significance by Chi-square test.
Abbreviations: EmE, emotional eating; BMI, body mass index.

Sociodemographic factors associated with negative EmE are described in Table 3. The logistic regression model adjusted for male and female revealed that participants aged 30–39 years were less likely to emotionally eat (OR = 0.24, 95% CI: 0.08–0.66, p<0.01) and (OR = 0.40, 95% CI: 0.16–0.97, p<0.05), respectively.

Table 3 Sociodemographic Factors Associated with Negative EmE in Respondents

Variable	OR[a]	Men (95% CI)	OR[a]	Women (95% CI)
Age (years)				
18–29	1	Reference	1	Reference
30–39	0.24	(0.08–0.66) **	0.40	(0.16–0.97)*
≥ 40	0.34	(0.09–1.21)	0.52	(0.17–1.53)
Origin				
Highlands	1	Reference	1	Reference
Coast	1.21	(0.40–3.61)	2.08	(0.73–5.94)
Jungle	1.33	(0.41–4.29)	3.03	(0.98–9.41)
Place of residence				
Rural	1	Reference	1	Reference
Urban	0.83	(0.25–2.72)	0.48	(0.14–1.64)
Level of education				
Basic	1	Reference	1	Reference
Technical	2.05	(0.46–9.13)	0.20	(0.03–1.38)
University	1.11	(0.31–3.93)	0.23	(0.03–1.54)

(*Continued*)

Table 3 (Continued).

Variable	OR[a]	Men (95% CI)	OR[a]	Women (95% CI)
Marital status				
Single	1	Reference	1	Reference
Being in a couple	1.54	(0.53–4.45)	0.85	(0.36–2.00)
Monthly income (PEN)[†]				
<2149.00	1	Reference	1	Reference
2149.00–10,746.00	1.78	(0.73–4.36)	0.97	(0.42–2.23)
>10,746.00	5.73	(0.39–83.05)	4.11	(0.45–37.38)
Religious denomination				
Protestant	1	Reference	1	Reference
Others	1.85	(0.73–4.66)	0.78	(0.34–1.78)

Notes: OR[a], Odds ratio adjusted for level of education, Physical activity, Sleep duration, Smoke, Alcoholic and Soft drinks, Depressive symptoms, Anxiety symptoms, BMI, and Hypertension; CI95%, Confidence interval 95%; *p<0.05 or **p<0.01, statistical significance by logistic regression. [†]The ISO code for the Peruvian currency is PEN, a standardized 3-letter code according to the ISO-4217 currency code standard.

Table 4 reports physical activity, sleep duration, and mental and physical health associated with negative EmE. The regression model adjusted for the male gender showed that participants who performed physical activity 3 to 4 times, 1 to 2 times a week, and never had, respectively, 5.22 (95% CI: 1.31–20.78), 5.77 (95% CI: 1.91–17.44), and 15.18 (95% CI: 3.90–59.00) more EmE points compared to those who performed physical activity more than 5 times a week. Moreover, men who slept less than 7 hours per day (OR = 2.26, 95% CI: 1.04–4.90, p<0.05) were more likely to report EmE.

Table 4 Physical Activity, Sleep Duration, and Mental and Physical Health Associated with Negative EmE in Respondents

Variable	OR[a]	Men (95% CI)	OR[a]	Women (95% CI)
Physical activity				
>5 times a week	1	Reference	1	Reference
3–4 times a week	5.22	(1.31–20.78)*	1.58	(0.36–6.85)
1–2 times a week	5.77	(1.91–17.44)**	0.94	(0.25–3.53)
No practice	15.18	(3.90–59.0)**	1.63	(0.41–6.39)
Sleep duration				
7–9h/day	1	Reference	1	Reference
<7h/day	2.26	(1.04–4.90)*	1.24	(0.59–2.61)
>9h/day	0.03	(0.00–0.68)*	1.02	(0.04–2.79)
Smoke				
No	1	Reference	1	Reference
Yes	0.71	(0.25–2.02)	1.12	(0.27–4.70)

(*Continued*)

Table 4 (Continued).

Variable	OR[a]	Men (95% CI)	OR[a]	Women (95% CI)
Alcoholic beverages				
No	1	Reference	1	Reference
Yes	1.02	(0.35–2.96)	2.14	(1.90–5.06)*
Soft drinks				
No	1	Reference	1	Reference
Yes	1.28	(0.47–3.50)	1.78	(0.66–4.79)
Depressive symptoms				
No	1	Reference	1	Reference
Yes	6.29	(1.27–31.19)*	1.08	(0.43–2.71)
Anxiety symptoms				
No	1	Reference	1	Reference
Yes	14.13	(2.46–80.97)**	4.22	(1.59–11.23)**
BMI				
<25	1	Reference	1	Reference
≥25	1.51	(1.46–3.41)*	0.66	(0.31–1.39)
Hypertension				
No	1	Reference	1	Reference
Yes	7.58	(1.24–46.17)*	2.10	(0.43–10.18)

Notes: OR[a], Odds ratio adjusted for level of education, physical activity, sleep duration, smoke, alcoholic and Soft drinks, depressive symptoms, anxiety symptoms, BMI, and hypertension; 95% CI, 95% Confidence interval; *p<0.05 or **p<0.01, statistical significance by logistic regression.
Abbreviation: BMI, body mass index.

However, those who slept more than 9 hours per day (OR = 0.03, 95% CI: 0.00–0.68, p<0.05) were less likely. In relation to mental health, depressive (OR = 6.29, 95% CI: 1.27–31.19, p<0.05) and anxiety symptoms (OR = 14.13, 95% CI: 2.46–80.97, p<0.01) were associated with EmE. Similarly, regarding physical health, BMI ≥25 (overweight/obese) (OR = 1.51, 95% CI: 1.66–3.41, p<0.05) and hypertension (OR = 7.58, 95% CI: 1.24–46.17, p<0.05) presented a positive association with EmE. On the other hand, the logistic regression model in women evidenced that the consumption of alcoholic beverages (OR = 2.14, 95% CI: 1.90–5.06, p<0.05) and anxiety (OR = 4.22, 95% CI: 1.59–11.23, p<0.05) were positively associated with EmE.

Discussion

This study aimed to determine sociodemographic characteristics (eg, age, gender, among others), physical activity, sleep duration, and mental (depressive and anxiety symptoms) and physical health (BMI ≥25 and arterial hypertension) and to analyze their association with negative EmE. The main findings of the current study were as follows: (a) participants aged 30 to 39 years were less likely to present negative EmE; (b) physical activity was strongly associated with negative EmE; (c) sleeping less than 7 hours per day were associated with negative EmE; (d) depressive symptoms were strongly associated with negative EmE in men; (e) anxiety symptoms are associated with negative EmE; (f) high blood pressure presented positive association with negative EmE; and (g) BMI ≥25 (overweight/obese) was associated with negative EmE.

The literature has documented the influence of age and gender on eating behaviors, more precisely, on EmE.[6,20,21] Findings from the current study show that negative EmE was significantly higher in participants aged 18 to 29 years; in addition, participants aged 30 to 39 years were less likely to report negative EmE compared to those who were 18 to 29 years old. Similarly, a study examining factors associated with negative EmE found that participants aged 19 and 20 years, respectively, were more likely to report EmE compared to the older ones.[6] Although several studies have reported that young people may be more concerned about their own health in reality, however, they are not enthusiastic about changing their own dietary behaviors[18,19] and may be subject to emotional pressures, which can impact food consumption. Therefore, they follow an unhealthy lifestyle, which leads to health-related complications.[18,19] In fact, young adults often adopt inappropriate eating behaviors and unhealthy lifestyles.[18] Generally, this could be due to the fact that young people are more sensitive to opinions and perceptions of their own bodies.[61]

Likewise, in this study, it was evidenced that women were more likely to present negative EmE compared to men. Similarly, relevant findings from other studies support the results of the present study reporting that women are more likely to report EmE.[20,21] In general, women are more likely to report eating in response to negative emotions, such as anxiety, anger, frustration, and depression; more specifically, women eat more emotionally compared to men.[22] While women have been shown to exhibit greater EmE, however, this aspect should not be underestimated in men. In any case, these findings suggest the development of strategies to improve young adults' eating behaviors considering gender differences in EmE factors and emotional symptomatology profiles.

In negative EmE, food is usually consumed excessively in response to various negative emotions with or without hunger stimuli.[2] The beneficial effects of physical activity on emotional well-being are irrefutable.[62] In particular, regular physical activity has a positive impact on the regulation of negative emotions.[63] In fact, frequent and intense physical activity can induce positive emotions.[64] In the current study, we found that physical activity was strongly associated with negative EmE. The results of the present study are generally consistent with previous studies regarding the association between EmE and physical activity.[25,65] One study reported that physical activity can promote healthy eating behavior and limit EmE.[25] However, results from other studies show that changes in physical activity can lead to EmE.[65] Indeed, decreased physical activity may be a risk factor for the triggering of EmE.[66] Future research needs to examine the causal relationship between physical activity and negative EmE in young adults.

Sleep is critical for mental health and psychosocial adjustment throughout life.[67] Inadequate or interrupted sleep is a risk factor for a variety of psychiatric disorders, such as anxiety and low mood.[67] As an indicator of unhealthy eating habits, short sleep duration represents a public health problem.[26,32] In the present study, we found that sleeping less than 7 hours per day is associated with negative EmE. Negative changes in sleep duration may play an important role in the occurrence of negative EmE.[68] Particularly, findings from a study conducted in 553 women and 911 men found that EmE was significantly associated with sleep duration in women, but not in men.[27] One of the possible justifications linking sleep and mental health is the regulation of emotions.[68] Evidently, sleep duration is a binding factor to EmE.[27,68] Therefore, interventions aimed at preventing emotional symptomatology, particularly negative EmE in young adults should consider the sleep factor for effective results.

In recent years, negative EmE has positioned itself as an important psychological determinant of food and beverage intake.[13] Findings of the present study report a positive association between alcohol consumption and negative EmE. Excessive alcohol consumption represents one of the major risks to the health and well-being of adolescents and young adults, accounting for 7% of disability-adjusted life years in people aged 10–24 years globally.[69] The results of the current study are consistent with results from other studies that suggest a relationship between excessive alcohol consumption and EmE (binge eating disorder).[16,17] These findings suggest addressing EmE and excessive alcohol consumption to decrease the risk of presenting associated diseases. This could be considered as a promising intervention strategy to prevent and address the biopsychosocial demands of individuals, particularly young adults.

Other relevant findings of the current study are that participants who presented symptoms of depression and anxiety were more likely to present negative EmE compared to those without these symptoms. Depression and anxiety are prevalent worldwide and constitute a health concern for public health systems.[33] These psychological factors are associated with unhealthy eating behaviors among young adults,[33] which, in turn, will gradually increase the number of people with EmE.[6] The emotional consumption of high caloric density foods, rich in saturated fats, free sugars, and

sodium, are partly the result of changes in mental health.[35,36] In fact, EmE has been associated with elevated levels of depressive symptoms in population-based and other non-clinical samples.[37,70] In the current study, only in men was an association between depression and negative EmE observed; however, one study found that EmE was associated with elevated depressive symptoms in both men and women.[37] Possible reasons why people eat in response to negative emotions could be due to their inability to differentiate hunger from other aversive internal conditions,[71,72] the use of food as a strategy to regulate emotions,[71,72] and overeating as a result of the desire to escape aversive self-consciousness.[73]

Despite these results, it should be emphasized that the positive association between depressive symptoms and negative EmE does not imply that all people with high depressive symptomatology are vulnerable to overeating in response to negative emotions. This is because the diagnosis of depression includes criteria, such as increased appetite with weight gain and decreased appetite with weight loss, which are possible symptoms of depression.[74] The persistence of these factors can lead to an increase in obesity and other non-communicable diseases, such as hypertension.[35]

The evidenced link between age, physical inactivity, and short sleep duration with negative EmE could also be seen from another point of view. For example, it is important to mention that young adults often adopt other types of unhealthy behaviors, such as a preference for evening hours, prolonged exposure to artificial light instead of natural light due to prolonged screen exposure during nighttime hours, which may contribute to later sleep.[28] In turn, circadian preferences for night or evening types, later sleep, and prolonged wakefulness have been shown to be associated with lifestyles that are adverse to health and emotional disorders, such as depression and anxiety.[29] Such unhealthy lifestyles include inappropriate eating behaviors (intake of high-calorie dense foods and nutrients) and the occurrence of negative EmE.[30] In addition, depressive symptoms and anxiety, which have been associated with circadian disturbances, in turn, are related to EmE, as mentioned above.[29] These factors could be considered as potential predictors of an increased risk of obesity.[75] Another possible explanation behind the association between chronotype and unhealthy eating behaviors is sedentary lifestyles. In fact, short-term sleep deprivation has been shown to lead to reduced physical activity, which, in turn, may be related to unhealthy snacking and other dietary habits.[31]

Furthermore, the findings of this study demonstrate that BMI ≥25 (overweight/obese) was associated with negative EmE. Similarly, one study reported that EmE was more common among obese individuals compared with those with normal weight and underweight.[75] The findings of our study could be at least partially due to the fact that a significant proportion of the participants who presented depressive symptoms reported negative EmE. In fact, depression is associated with greater emotional eating, which, in turn, predicts a greater increase in BMI, independent of depressive symptoms.[76] Therefore, we can mention that elevated BMI could be considered as one of the possible consequences of unhealthy eating behaviors, including negative EmE.[76,77] Some studies reported that people with EmE are more likely to have an elevated BMI compared to those who do not eat under this unhealthy behavior.[36,38] People with disordered eating behaviors tend to have a higher BMI than those who eat healthy.[77] This could be due to the fact that emotional eating leads to food consumption of unhealthy foods, which consequently promotes weight gain. Negative EmE is presented as an important emotional determinant in the onset of obesity.[13] The findings of the present study suggest future research in which temporal relationships between BMI and emotional eating are considered, taking into account that negative EmE may negatively impact dietary intake and body weight status.

Finally, the study showed that hypertension was positively associated with negative EmE. Hypertension is among the most common chronic diseases globally and is widely considered an important risk factor for other noncommunicable diseases, such as myocardial infarction, stroke, heart failure, and renal failure.[78] Unhealthy eating behaviors are associated with an increased likelihood of hypertension.[79] More specifically, an unhealthy diet with calorically dense foods is an important modifiable behavioral risk factor in the development of hypertension.[80] Negative EmE is associated with the consumption of high-calorie foods rich in saturated fat and sodium. Therefore, emotional eating could be considered as an important predictor of high blood pressure.[35,36]

Limitations

The results of this study should be interpreted considering some limitations. First, caution should be taken in generalizing these findings because the sample is not representative, because it is a sample that was selected through a non-probability sampling. Secondly, the information collected on the variables was self-reported, which would imply underestimation or overestimation of the data. More specifically, in relation to BMI, considering that people tend to underestimate current weight and overestimate height, it is possible that respondents may not be reporting truthful data. Third, for the assessment of physical activity, we did not use a validated questionnaire, but rather a question that considered a single item where participants were asked "how many times a week did they engage in physical activity?" The response was self-reported rather than objective, which could lead to bias. However, this question has been used in other studies to evaluate physical activity.[45] Fourth, the study has a cross-sectional characteristic, so the results do not suggest causal relationships between the variables evaluated. Therefore, a longitudinal study is needed to identify more precisely the sequence of associations suggested by the present study. Finally, we have not used a validated survey in the Peruvian population to measure negative EmE, however, the survey was validated in Chile, a country whose population shares several sociocultural aspects (language, for example) with the Peruvian population.

However, despite these limitations, we believe that the study has relevance. These results may provide new opportunities for further research on the variables under study. In addition, the findings may favor the implementation and execution of intervention programs aimed at encouraging healthy behaviors, such as physical activity and adequate sleep, and preventing some mental and physical conditions, such as symptoms of depression and anxiety, obesity, and hypertension. Likewise, these interventions could be used to improve the eating behaviors of young adults taking into account gender differences.

Conclusion

The aim of the study was to determine the association between negative EmE, sociodemographic characteristics, physical activity, sleep duration, and mental and physical health in young adults. In this study, we found that a higher proportion of women presented negative EmE. Additionally, participants aged 30 to 39 years reported less negative EmE. Physical activity was associated with negative EmE. Sleeping less than 7 hours per day and depressive symptoms were strongly associated with negative EmE in men; whereas anxiety symptoms was associated with negative EmE in both genders. Finally, in relation to physical health, participants reporting hypertension and BMI ≥25 (overweight/obese) were more likely to have negative EmE compared to those with normal weight. These findings add to the growing body of evidence for factors associated with negative EmE. Our findings suggest that interventions aimed at preventing negative EmE should consider these associated factors for effective outcomes in preventing noncommunicable diseases, particularly in young adults.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Disclosure

The authors declare that there is no conflict of interest.

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