








## Lifestyle, psychological well-being, and body mass index of indigenous women

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**Abstract: Lifestyle, psychological well-being, and body mass index of indigenous women. Introduction.** Obesity is more common in women and has also been found to be present in indigenous populations. During university studies, obesity-related lifestyles are in the process of consolidation, and although this is known, research is limited to addressing physical activity and diet, ignoring other lifestyle components, such as life appreciation. Additionally, there is a need to corroborate whether psychological well-being contributes to excess weight in indigenous women. **Objective.** To determine whether there is an association between lifestyle, psychological well-being, and body mass index (BMI) in indigenous women. **Materials and methods.** A cross-sectional study was conducted among 110 female Zapotec university students in Juchitán, Oaxaca, Mexico. The Psychological Well-Being Scale, the Healthy Lifestyle Scale for University Students, and a questionnaire about personal data were used. Body weight and height were measured to calculate BMI. **Results.** There was a negative correlation between BMI, self-acceptance ( $r = -0.33$ ;  $p < 0.01$ ), and life appreciation ( $r = -0.22$ ;  $p < 0.05$ ). Positive correlations were found between lifestyle and psychological well-being dimensions, with the strongest correlations being observed between life appreciation and purpose in life ( $r = 0.55$ ) and self-acceptance ( $r = 0.48$ ). The multivariable models determined that life appreciation and self-acceptance are associated with BMI. **Conclusion.** Life appreciation and self-acceptance are predictors of BMI and are even more strongly associated than exercise and nutrition behaviors. **Arch Latinoam Nutr 2022; 72(1): 43-49.**

**Keywords:** lifestyle, mental health, body mass index, population groups, university students.

**Resumen: Estilos de vida, bienestar psicológico e índice de masa corporal en mujeres indígenas. Introducción.** La obesidad es más frecuente en mujeres, aún en poblaciones indígenas. Durante los estudios universitarios, los estilos de vida relacionados con la obesidad se encuentran en proceso de consolidación, y aunque esto es conocido, las investigaciones se limitan a abordar la actividad física y la dieta, ignorando otros componentes del estilo de vida, como la apreciación por la vida. Adicionalmente, es necesario corroborar si el bienestar psicológico contribuye al exceso de peso en mujeres indígenas. **Objetivo.** Determinar si existe asociación entre los estilos de vida, el bienestar psicológico y el Índice de Masa Corporal (IMC) en mujeres indígenas. **Materiales y métodos.** Se realizó un estudio transversal en 110 mujeres zapotecas estudiantes universitarias en Juchitán, Oaxaca, México. Se utilizó la escala de bienestar psicológico, la escala de estilos de vida saludables para estudiantes universitarias y un cuestionario sobre datos personales. Se midió el peso corporal y la estatura para calcular el IMC. **Resultados.** Hubo correlación negativa entre el IMC, la autoaceptación ( $r=-0,33$ ;  $p<0,01$ ) y la apreciación por la vida ( $r=-0,22$ ;  $p<0,05$ ). Se encontraron correlaciones entre las dimensiones de estilos de vida y las dimensiones de bienestar psicológico: las correlaciones más fuertes se observaron entre apreciación por la vida y propósito en la vida ( $r 0 0.55$ ) y autoaceptación ( $r = 0.48$ ). La apreciación por la vida y la autoaceptación son factores predictores del IMC. **Conclusión.** La apreciación por la vida y la autoaceptación son predictores del IMC, incluso más fuertemente asociados que el ejercicio físico y la alimentación. **Arch Latinoam Nutr 2022; 72(1): 43-49.**

**Palabras clave:** estilo de vida, salud mental, índice de masa corporal, grupos de población, estudiantes universitarias.

### Introduction

Overweight and obesity are the most prevalent health issues that continue to affect youth of increasingly younger ages, and even more, its prevalence is generally higher in women (1). In Mexico, 74.4% of female adults with social vulnerability and residents of locales with

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< 100,000 inhabitants were reported to have excess body weight (2). Nearly 47.6 % of mestizo female undergraduate students and 41.4% of female Zapotec university students had excess body weight (3). Although it has been observed that the prevalence of excess body weight is similar among these ethnic groups, looking after diet is more frequent in Zapotec females when compared to mestizo females (3).

Contrary to what is observed in other ethnic groups that tend to disappear due to discrimination and the pressures of globalization, young Zapotec women in Oaxaca have shown pride in their indigenous affiliation and a strong ethnic family identity that is positively related to healthy lifestyles, additionally, being the daughter of a Zapotec mother is associated with a lower risk of being overweight (4).

The prevalence of short stature in Mexico is higher in indigenous areas, especially in women, and short stature in women has been identified as a factor related to a greater probability of obesity (2). An overweight prevalence of 37.5% and an obesity prevalence of 38.4% have been observed in the indigenous population (2). Therefore, it is necessary to increase knowledge about the behavior of obesity in young Zapotec women.

Even though excess body weight has multiple causes, lifestyle, particularly those associated with a sedentary lifestyle and unhealthy nutrition, have been identified as strategic elements when approaching the epidemic among young women (5). Nevertheless, lifestyles are not limited to these two components. They also consist of behavior patterns that favor or create hazards for life, such as regular behavior, health risk behavior, health responsibility, social support, stress management, and life appreciation (6). Considering that these dimensions of lifestyles are linked to the emergence and permanence of excess body weight (7), they could explain the higher prevalence of obesity in women when compared to men.

In addition, the six dimensions of the psychological well-being model, including self-acceptance, personal growth, purpose in life, positive relations with others, environmental mastery, and autonomy

(8), appears as a controversial element that contributes to obesity (9). There is evidence that increasing body mass index (BMI) decreases well-being (10), but it has also been observed that psychological well-being can be a precursor to healthy eating habits (11). Additionally, unbalanced dimensions of psychological well-being, in particular exceedingly high autonomy, may contribute to a poor weight loss outcome (12).

University studies generally take place during a developmental stage that has been identified as critical to create healthy lifestyles, since it is a period of transition between adolescence and adulthood (13). Research is limited to physical activity and nutrition while ignoring other components of lifestyle. In addition, research on lifestyle and psychological well-being that concerns its relationship with obesity in indigenous women is very limited. This study aimed to determine whether there is an association with lifestyle, psychological well-being, and BMI. The initial hypothesis was that there is an inverse correlation between BMI, lifestyle, and psychological well-being.

## **Material and methods**

### *Study design and participants*

A cross-sectional study was carried out on 111 women using simple random sampling. The calculation was based on a correlation coefficient of 0.30 (14), a statistical power of 90 % and a confidence level of 95%. The sample consisted of 149 Zapotec women nursing students of all semesters from a public university located in Juchitán de Zaragoza, Oaxaca, Mexico, during October 2018. All students who agreed to participate and met the selection criteria were included. The response rate was 98 % of the sample studied.

### *Selection criteria*

The students who identified themselves as Zapotec were included. Those who had a disability, who were pregnant, who had a low body weight, who had not completed the inventories, or who had not attended the anthropometry sessions were excluded.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments

or comparable ethical standards. All of the individual participants signed an informed consent to participate in the study, and the jury assigned by the Instituto de Salud Publica de la Universidad Veracruzana approved the research protocol with consent registration number DGI: 405002015124.

### *Instruments*

The Psychological Well-Being Scale, the Healthy Lifestyle Scale for University Students and a questionnaire about personal data were used.

**Psychological Well-Being Scale.** An adapted version of the Psychological Well-Being Scale by Ryff was used (15). It consists of 39 items with a response format with scores ranging from 1 (strongly disagree) to 6 (strongly agree). It has six dimensions—self-acceptance (six items), autonomy (eight items), personal growth (seven items), environmental mastery (six items), purpose in life (six items), and positive relations with others (six items). The sample showed a high internal reliability according to Cronbach's alpha coefficient ( $\alpha = 0.872$ ).

**Healthy Lifestyle Scale for University Students.** This scale contains 38 items divided into eight dimensions—social support (six items), life appreciation (five items), regular behavior (four items), nutrition behavior (four items), exercise behavior (four items), health risk behavior (four items) stress management (five items), and health responsibility (six items) (6). The instrument uses a Likert scale response format regarding the frequency of behavior statements ("never," "rarely," "sometimes," "usually" or "always"), with scores ranging from 1 to 5. The sample proved to have high internal reliability according to Cronbach's alpha coefficient ( $\alpha = 0.863$ ).

**Instruments and procedures for anthropometry.** A Taylor precision scale, previously calibrated to measure body weight, was used. After a bladder evacuation, barefooted, and wearing very little clothing, the subjects were weighed. A Seca TM precision stadiometer was used to measure height, and subjects wore nothing on their heads. Body measurement data were collected using standardized examination procedures (16) and were taken by five previously trained nutritionists.

### *Measures*

In order to determine the nutritional status the BMI

measurements were as follows: BMI below 18.5 kg/m<sup>2</sup>, underweight or malnourished; BMI between 18.5 and 24.9 kg/m<sup>2</sup>, normal weight; BMI from 25.0 to 29.9 kg/m<sup>2</sup>, overweight; and BMI over or equal to 30.0 kg/m<sup>2</sup>, obesity (17). Adjustment to the Mexican population was considered. This adjustment sets the cutoff at 25.0 kg/m<sup>2</sup> for obesity in women who are less than 1.50 meters tall, since they are considered to be short (18).

### *Statistical analyses*

Frequency and central tendency measures were used to describe the sample. Student's t-test was used to compare the group of women with normal weight with the group of women with excess body. Pearson correlations were calculated to identify associations among variables. Two multivariate models were built using the BMI as a dependent variable, the dimensions of lifestyles and of psychological well-being were included respectively. Effect size was applied in both cases. IBM "Statistical Package for the Social Sciences" (SPSS) software was used for data analysis. Probability levels of  $p < 0.05$  were considered significant.

## **Results**

The average age was  $20.4 \pm 1.7$  years. Overall, 58.6 % ( $n = 65$ ) of the participants had a body weight within the normal range, 28.8 % ( $n = 32$ ) of the participants were overweight, and 12.6 % ( $n = 14$ ) of the participants were obese. Altogether, 41.4 % of the students showed excess body weight.

Both groups had similar averages in most subscales of psychological well-being. Higher scores were noticed only in self-acceptance and environmental mastery in women with normal weight when compared to women with excess body weight (Table 1). Those who were at normal weight had similar scores in connection with lifestyle when compared to those who were at excess body weight

While BMI was inversely correlated with self-acceptance ( $r = -0.33$ ;  $p < 0.01$ ) and life

Table 1. Average of psychological well-being and lifestyles among female Zapotec students with normal weight and excess body weight

Variable	Normal weight (n = 65)		Excess body weight (n = 46)		ES	p
	x	SD	x	SD		
Psychological well-being						
Self-acceptance	28.1	±4.1	25.1	±4.0	0.36	<0.001
Autonomy	34.9	±5.5	33.8	±5.1	0.10	0.294
Personal growth	34.5	±3.8	32.7	±5.1	0.20	0.051
Environmental mastery	28.1	±3.9	26.5	±4.1	0.22	0.030
Purpose in life	30.7	±4.1	29.7	±4.0	0.12	0.222
Positive relations with others	26.9	±4.6	25.9	±5.5	0.10	0.320
Lifestyle						
Social support	21.9	±3.7	21.5	±4.2	0.05	0.596
Life appreciation	21.1	±2.7	20.5	±2.9	0.11	0.270
Regular behavior	13.8	±3.1	12.7	±3.2	0.17	0.076
Nutrition behavior	13.1	±3.2	12.0	±2.8	0.17	0.074
Exercise behavior	9.0	±3.7	7.8	±3.0	0.18	0.058
Health risk behavior	15.2	±2.0	15.0	±1.5	0.05	0.574
Stress management	16.9	±2.7	17.1	±3.3	0.03	0.739
Health responsibility	24.7	±2.7	24.1	±2.5	0.11	0.237

SD = standard deviation; ES = effect size

appreciation ( $r = -0.22$ ;  $p < 0.05$ ), most lifestyle subscales were associated with psychological well-being subscales—life appreciation and regular behavior had a positive correlation with

all psychological well-being subscales (see details in Table 2). However, these correlation coefficients were even higher among the total scales of psychological well-being and lifestyle ( $r = 0.55$ ;  $p < 0.001$ ). The highest psychological

Table 2. Correlations between body mass index, lifestyle and psychological well-being

	BMI	Self-acceptance	Autonomy	Personal growth	Environmental mastery	Purpose in life	Positive relations with others
BMI	1.0	-0.33**	0.01	-0.11	-0.17	-0.17	-0.05
Social support	-0.02	0.18	0.29**	0.12	0.31**	0.31**	0.34**
Life appreciation	-0.22*	0.48**	0.34**	0.26**	0.34**	0.55**	0.29**
Regular behavior	-0.16	0.38**	0.24*	0.27**	0.31**	0.33**	0.26**
Nutrition behavior	-0.06	0.41**	0.23*	0.17	0.08	0.34**	0.15
Exercise behavior	-0.15	0.27*	0.28**	0.24**	0.11	0.34*	0.11
Health risk behavior	-0.07	0.16	0.18	-0.02	0.06	0.18	0.08
Stress management	-0.02	0.37**	0.23*	0.27**	0.11	0.33**	0.11
Health responsibility	-0.06	0.36**	0.15	0.21*	0.25**	0.34**	0.26**

\* $p < 0.05$ ; \*\* $p < 0.01$

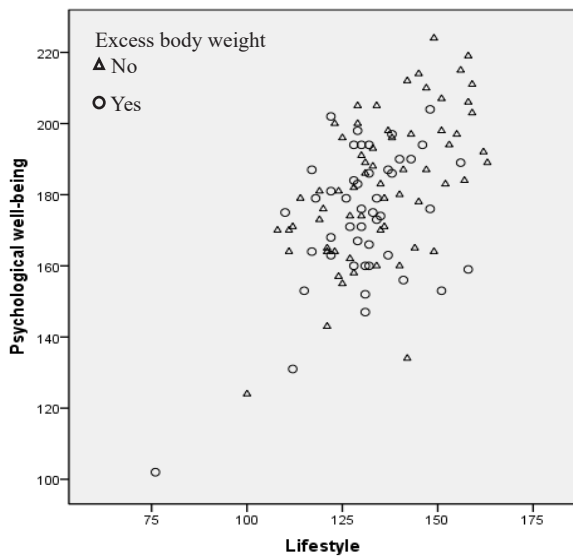


Figure 1. Correlation between psychological well-being and lifestyles with or without excess body weight (triangle or circle, respectively)

Table 3. Multivariate regression analysis for lifestyle and psychological well-being in all study subjects (dependent variable: body mass index)

Independent variables	B	Standard error	$\beta$	t	p
Model 1. Lifestyle					
Constant	30.700	5.596		5.843	0.000
Social support	0.121	0.122	0.104	0.991	0.324
Life appreciation	-0.417	0.181	-0.257	-2.299	0.024
Regular behavior	-0.306	0.167	-0.213	-1.836	0.069
Nutrition behavior	0.199	0.179	0.133	1.111	0.269
Exercise behavior	-0.228	0.150	-0.172	-1.519	0.132
Health risk behavior	-0.178	0.242	-0.071	-0.733	0.465
Stress management	0.319	0.184	0.205	1.735	0.086
Health responsibility	-0.043	0.194	-0.025	-0.220	0.827
Model 2. Psychological well-being					
Constant	30.581	3.884		7.873	0.000
Self-acceptance	-0.523	0.142	-0.495	-3.687	0.000
Autonomy	0.232	0.098	0.272	2.360	0.020
Personal growth	-0.040	0.107	-0.039	-0.374	0.709
Environmental mastery	-0.114	0.140	-0.102	-0.813	0.418
Purpose in life	0.114	0.163	0.101	0.703	0.483
Positive relations with others	0.048	0.093	0.052	0.518	0.606

well-being scores were found in the group of young women who did not have excess body weight (Figure 1).

Life appreciation showed an inverse association with BMI in the multivariate model that included lifestyle (Table 3). Self-acceptance had an inverse association with BMI, while autonomy had a positive association in the second multivariate model that included psychological well-being (Table 3).

### Discussion

The results of this research clearly show that the lifestyles traditionally studied (physical activity and eating habits) to address the prevention and treatment of excess body weight are not necessarily the key to the approach for all population groups. This research shows that life appreciation is inversely correlated with BMI in Zapotec students. These results suggest that much of the current efforts that focus on exercise and nutrition may be limited in scope if other elements that involve lifestyles are not considered as protective factors.

Noticeably, life appreciation is usually one of the subscales with the highest scores among adolescent females (19). Perhaps this component of health lifestyles plays a key role when tackling the excess body weight epidemic among young women. These findings suggest that a young female with low life appreciation will be more likely to develop an unhealthy BMI, which would explain the marked increase in the prevalence of excess body weight in recent years. At the same time, it provides some ideas about the routes to prevent it. Considering the appreciation that a young female has for life will be a determining factor in her behaviors and will have consequences for her health.

The findings of the present study suggest the presence of cultural characteristics in this indigenous group that require a new approach to lifestyles. These results are complemented by the evidence that being the daughter of a Zapotec mother is related to better dietary habits and physical activity

(4). As a result, further study of these indigenous women can support the understanding of the problem of obesity and its approach.

Furthermore, the higher well-being scores in women with normal weight compared to those with excess body weight are consistent with previous research (20). This means that it is necessary to broaden the view when addressing excess body weight in indigenous women and to review the emotional health conditions that could be a basis for the success of interventions or even be a causal factor in indigenous women.

Although the inverse correlation found between self-acceptance and BMI is controversial, the results were inconclusive to confirm the relationships between self-acceptance and BMI. In fact, it is still unclear whether psychological well-being leads to the occurrence of excess body weight or vice versa (21), but it does point out that further studies are required. To include psychological well-being elements in prevention strategies and in the excess body weight approach as complementary to the work done on lifestyles is critical (12) because of the high correlation found between them. Life appreciation was identified as a key component because it is associated with all of the subscales of psychological well-being and it is modifiable (22).

These findings allow us to hypothesize about the limitations in maintaining the change of eating habits and physical activity in women (23). This could mean a crucial difference when working with women through reinforcing self-acceptance and life appreciation. While it is true that exercise and proper nutrition, as part of a healthy lifestyle, are directly related to the control and prevention of obesity, it is also clear that we must focus on more subjective characteristics that allow young people to tackle these kinds of issues.

The positive correlation between BMI and autonomy is surprising. This result may seem illogical, as it points to a higher BMI when there is a greater autonomy or vice versa. This may be related to the development stage. Indeed, these young people have to cope with instability, major

life changes, self-identity, and parental separation. For example, a preliminary study on college students identified an inverse correlation between autonomy and self-esteem (14). This result shows that it is necessary to help young people in the process of autonomy reinforcement to prevent it from affecting their health. Further studies with mestizo populations are recommended to assess the permanence of these relationships in order to understand to what extent the dimensions of the lifestyles found in this study as related to the BMI found in other ethnic groups. However, it may be necessary for obesity management strategies to consider processes of cultural adaptation that allow achieving the objectives in diverse populations, considering that the obesity problem affects all of the ethnolinguistic groups, but prior studies point to a different behavior between them.

### **Conclusion**

Life appreciation and self-acceptance are predictors of BMI and are even more strongly associated than exercise and nutrition behaviors in indigenous woman. Strategies for addressing excess body weight should go beyond traditional interventions that focus on healthy lifestyles (diet and physical activity) and move toward life appreciation. Similarly, it is necessary to include strategies that support psychological well-being and to prioritize self-acceptance for addressing excess body weight in female Zapotec students.

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### **Conflict of interest**

None.

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