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Factors Associated with Perceived Change in Weight, Physical Activity, and Food Consumption during the COVID-19 Lockdown in Latin America

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Abstract: Quarantine and the restrictions necessitated by the COVID-19 pandemic have generated problems in nutrition and physical condition around the world. We aimed to determine factors associated with changes in perceived weight and lifestyle factors during the COVID-19 quarantine in Latin America, conducting a cross-sectional study based on a survey administered in more than a dozen countries during June–August 2020. Perceptions of weight changes and alterations in other habits were investigated and were associated with social factors and self-reported diseases. Of 8800 respondents, the majority perceived that they had gained weight and had been less physically active. Being female, living in Bolivia, obesity, and stress were factors associated with a higher perception of weight gain. A higher perception of physical activity was also associated with living in Chile, being of older age, being female, having diabetes, obesity, and stress. When living in Paraguay and Mexico, being female, obesity, anxiety, and stress were associated with a higher perception of unhealthy food consumption. When living in Bolivia, women, obesity, and stress were associated with a higher perception of consuming larger food portions. In conclusion, the perceived changes in weight and lifestyle during the pandemic were more evident in women, people with comorbidities, and those with emotional distress. Differences in the perception of weight changes were minimal among Latin American countries. This information suggests the possible metabolic implications in at-risk individuals that should be further addressed by researchers for timely intervention.

Keywords: changes in body weight; eating behavior; COVID-19; Latin America

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1. Introduction

It is undeniable that the COVID-19 pandemic brought many repercussions, which were the result of events such as social immobilization, the mandatory quarantine that dominated in many countries, and the fear that the disease generated in people, among other aspects that changed the behavior of society [1,2]. Consequences such as those that have emerged from this pandemic period were largely unexpected. Families' obligations to stay at home resulted in a decrease in those physical activities that were performed in open spaces.

These events also affected the obtaining of food due to COVID-19 restrictions, limiting food consumption, among others [3,4]. For this reason, changes have been documented in several areas regarding human behavior; one of them is possible weight gain or weight dysregulation [4,5]. In addition, sedentary lifestyles have been reported to be on the increase due to the lack of opportunities for physical activity in open areas or for the regular practice of any type of individual or group sport [6]. Likewise, anxiety and stress have been demonstrated an upward trend, which has possibly caused people to have an unhealthy and/or excessive diet as compensation [7,8]. To this could be added the fact that the recorded weight gain and weight loss may be associated with olfactory and gustatory deficits that are considered common symptoms in the long sequelae of acute COVID-19 [9]. In addition, reduced taste perception is associated with an increased body mass index (BMI); this correlation becomes more pronounced with the greater age of the subjects [10].

Previous literature has suggested that the pandemic had a serious influence on health behaviors in the general population [11], most especially in individuals with metabolic disorders, children, and adolescents [12–14]. This has been reported in countries such as Italy, where a survey was administered to 3533 people. Here, one out of every two participants stated that they perceived an increase in their body mass [5]. Another study in northern Italy showed that 92% of participants had a sedentary lifestyle, which also contributed to weight gain [15]. Furthermore, in Lithuania, a cross-sectional study of 2447 people reported that 49% of people had eaten more than usual and had ingested more sugary drinks. Hence, 32% of them gained weight, leading to their being overweight, obese, and having cardio-metabolic disorders, largely due to their sedentary lifestyle [16]. Information on perceived changes in weight and lifestyle are indirect measures of possible emotional distress and may allow the early detection of metabolic disorders. However, weight gain perception has not been reported in Latin America. This knowledge would lead to a better understanding of the lifestyle profiles of the population in this region and build a basis of knowledge that could identify individuals at risk of serious conditions, such as obesity and type 2 diabetes. It is also important to consider that these countries were seriously affected by the pandemic compared to other countries because of the fragility of their healthcare systems [17]. Therefore, we aimed to determine the factors associated with the perception of weight change and healthy habits during quarantine due to COVID-19 in Latin America.

2. Materials and Methods

We conducted a cross-sectional study in twelve Latin American countries from June to August 2020, during the lockdown period. People aged over 18 years, who stated that they had resided in the surveyed country during the quarantine period, who agreed to take part in the study, and who answered the four questions on their perception of weight and lifestyle changes were included. People who responded inadequately or with repetitive patterns to some of the questions were excluded (an exclusion of less than 10%).

This population was accessed using a convenience sampling method, through a virtual survey written in Spanish and posted on the Google Forms platform (see the Supplementary Materials). We chose this option because almost all these countries had a mandatory quarantine and the participants could not attend health centers or other facilities, which prevented us from taking measurements properly. However, this methodology is valid according to the procedure followed in other research because it allows the researcher to determine the perceptions of the respondent regarding weight gain or loss. This data collection methodology was also used by Di Renzo et al., who disseminated the survey through their institutional and private social networks [5]. Similarly, Kriaucioniene et al. distributed the link provided to access their questionnaire through social networks, such as Facebook and specific institutions' websites [16]. In the United Arab Emirates, Ismail et al. also used this online survey distribution methodology in their study [18].

The DASS-21 questionnaire was used to measure depression, anxiety, and stress. This instrument is composed of 21 items and has shown adequate reliability for anxiety

(Cronbach's $\alpha = 0.82$), depression (Cronbach's $\alpha = 0.076$), and stress (Cronbach's $\alpha = 0.75$) [19]. The categorization of each mental disorder ranges from normal to mild, moderate, severe, and extremely severe. For depression, the cutoff points for each category are 0–9, 10–13, 14–20, 21–27, and 28+. For anxiety, the cutoff points are 0–7, 8–9, 10–14, 15–19, and 20+. For stress, they are 0–14, 15–18, 19–25, 26–33, and 37+.

The dependent variables were the perception of body weight change ("I have the perception that I have gained weight during these months"), change in sedentary lifestyle ("I have the perception that I have been less physically active than before"), an increase in the amount of food intake ("I have had the perception that I have consumed larger amounts of food"), and an increase in junk food intake as part of the diet ("I have had the perception that I have consumed more unhealthy food") during the pandemic. These variables were measured using a 5-point Likert scale (from 1 = "Strongly disagree" to 5 = "Strongly agree"). The independent variables were age, sex, country of residence, self-reported comorbidity (heart disease, obesity, and diabetes), depression, anxiety, and stress.

All these questions were extracted from the virtual survey posted on the Google Forms platform. Then, quality control was performed to select the population that would be included in the study. Subsequently, this was exported to a database in Stata (version 11.1) for later analysis and for the presentation of results.

In the descriptive statistical analysis, frequencies and percentages were estimated for each of the four main questions (which were taken individually for the survey). These descriptive analyses were performed in both forms, globally and according to the country where the survey was administered. Age was expressed as the median and 25th–75th percentiles. Then, a multivariate analysis was performed, wherein the prevalence ratios (PR), 95% confidence intervals (95%CI), and *p*-values were estimated using generalized linear models, the Poisson family of distribution, the log link function, and robust variance. A statistical significance level of 5% was used. Variables that did not reach statistical significance in the bivariate model did not enter the final (multivariate) model. The variance inflation factor (VIF) was estimated to assess the multicollinearity.

This study is a secondary data analysis of a sports nutrition diploma course approved by the institutional review board of the Universidad Privada Antenor Orrego, Lima, Peru, with code no. 0234-2020-UPAO. The primary study [20] complied with the considerations of the Declaration of Helsinki, and informed consent was obtained from the participants on the initial page of the online survey.

3. Results

Of the 8800 respondents, the median age was 22, 59.4% were women, 53.4% came from Peru, 4% had heart disease, 1.7% had diabetes, and 6.4% had obesity. Severe depressive symptoms were experienced by 10%, severe anxiety by 13.4%, and severe stress by 9.3% of individuals (Table 1).

The main perception was of weight gain. Out of the total number of participants, 57% agreed that they had gained weight during quarantine (24% strongly agreed and 33% agreed). In addition, another main perception was to have performed less physical activity (18% strongly agreed and 29% agreed). Figure 1 shows the variations in responses by sex.

Multivariate analysis showed that, compared to Peru, participants from Paraguay (adjusted prevalence ratio, aPR: 1.12; 95% CI: 1.03–1.22) and Colombia (aPR: 1.15; 95% CI: 1.04–1.26) had a higher perception of having gained weight. Being female (aPR: 1.24; 95% CI: 1.19–1.30), obesity (aPR: 1.35; 95% CI: 1.26–1.45), and stress (aPR: 1.16; 95% CI: 1.06–1.28) were also significantly associated with a higher perception of weight gain, adjusted for depression and anxiety (Table 2). The log pseudo-likelihood value was −6276 and the Akaike information criterion (AIC) value was 1.65. No multicollinearity was shown (mean VIF = 1.18).

Table 1. Characteristics of the participants.

Characteristics	N (%)
Age *	22 (20–30)
Sex	
Male	3560 (40.6)
Female	5205 (59.4)
Country	
Peru	4682 (53.4)
Chile	852 (9.7)
Paraguay	656 (7.5)
Mexico	531 (6.1)
Colombia	127 (1.5)
Bolivia	442 (5.0)
Panama	396 (4.5)
Ecuador	300 (3.4)
Costa Rica	215 (2.5)
El Salvador	203 (2.3)
Honduras	185 (2.1)
Guatemala	99 (1.1)
Other countries	82 (0.9)
Heart disease	
No	8192 (96.0)
Yes	344 (4.0)
Diabetes	
No	8393 (98.3)
Yes	143 (1.7)
Obesity	
No	7988 (93.6)
Yes	548 (6.4)
Depression	
≤ Moderate	7557 (90.0)
≥ Severe	843 (10.0)
Anxiety	
≤ Moderate	7313 (86.7)
≥ Severe	1127 (13.3)
Stress	
≤ Moderate	7583 (90.7)
≥ Severe	779 (9.3)

* Age was expressed in median and 25th–75th percentiles.

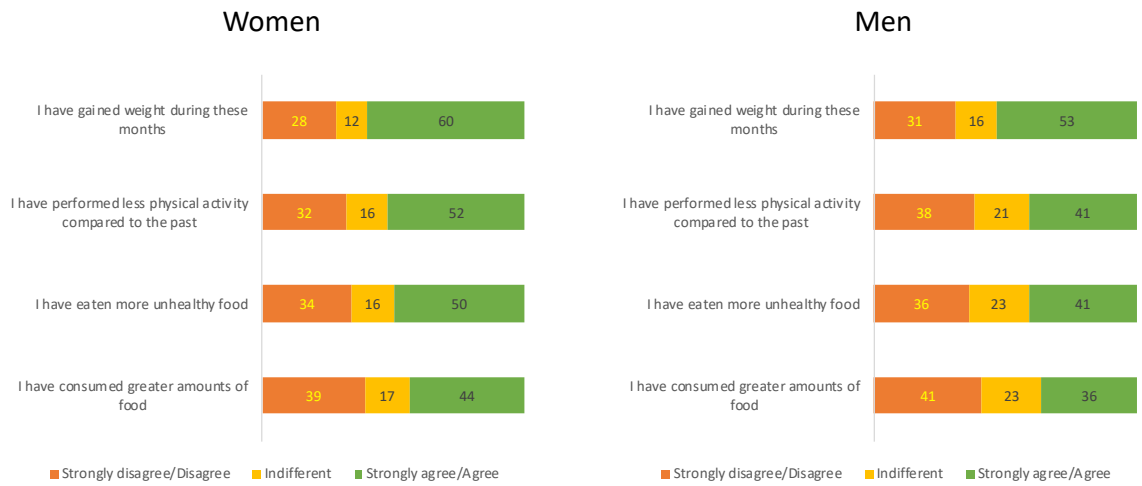

Figure 1. Responses regarding the perceived changes in weight and lifestyle features during the first wave of the COVID-19 pandemic in Latin America, stratified according to sex.

Table 2. Factors associated with weight gain perception in the Latin American population during the first wave of the COVID-19 pandemic.

Variable	Weight Change		Bivariate Analysis PR (95% CI) *p*-Value	Multivariate Analysis PR (95% CI) *p*-Value
	No, *n* (%)	Yes, *n* (%)		
Total	4625 (52.6%)	4175 (47.4%)	- - -	- - - -
Country				
Peru	2511 (53.6%)	2171 (46.4%)	Ref.	Ref.
Chile	409 (48.0%)	443 (52.0%)	1.12 (1.04–1.20) 0.002	1.07 (0.99–1.15) 0.080
Paraguay	300 (45.7%)	356 (54.3%)	1.17 (1.08–1.26) < 0.001	1.12 (1.03–1.22) 0.007
Mexico	262 (49.3%)	269 (50.7%)	1.09 (0.99–1.19) 0.052	1.04 (0.95–1.14) 0.370
Colombia	71 (55.9%)	56 (44.1%)	0.95 (0.78–1.16) 0.619	0.91 (0.73–1.12) 0.366
Bolivia	201 (45.5%)	241 (54.5%)	1.18 (1.07–1.29) < 0.001	1.15 (1.04–1.26) 0.004
Panama	233 (58.8%)	163 (41.2%)	0.89 (0.79–1.00) 0.055	0.88 (0.77–1.01) 0.060
Ecuador	174 (58.0%)	126 (42.0%)	0.91 (0.79–1.04) 0.155	0.88 (0.76–1.02) 0.092
Costa Rica	120 (55.8%)	95 (44.2%)	0.95 (0.82–1.11) 0.538	0.93 (0.78–1.09) 0.355
El Salvador	119 (58.6%)	84 (41.4%)	0.89 (0.76–1.05) 0.180	0.89 (0.74–1.06) 0.178
Honduras	114 (61.6%)	71 (38.4%)	0.83 (0.69–0.99) 0.045	0.84 (0.69–1.02) 0.075
Guatemala	57 (57.6%)	42 (42.4%)	0.91 (0.73–1.15) 0.452	0.87 (0.68–1.11) 0.250
Other countries	40 (48.8%)	42 (51.2%)	1.10 (0.89–1.37) 0.361	1.02 (0.81–1.29) 0.847
Age (years) *	22 (20–30)	22 (20–30)	1.00 (0.99–1.00) 0.487	Did not enter the model
Sex				
Male	2092 (58.7%)	1468 (41.2%)	Ref.	Ref.
Female	2513 (48.3%)	2692 (51.7%)	1.25 (1.20–1.31) < 0.001	1.24 (1.19–1.30) < 0.001
Heart disease				
No	4334 (52.9%)	3858 (47.1%)	Ref.	
Yes	169 (49.1%)	175 (50.9%)	1.08 (0.97–1.20) 0.155	Did not enter the model
Diabetes				
No	4434 (52.8%)	3959 (47.2%)	Ref.	
Yes	69 (48.3%)	74 (51.7%)	1.10 (0.93–1.29) 0.256	Did not enter the model
Obesity				
No	4307 (53.9%)	3681 (46.1%)	Ref.	Ref.
Yes	196 (35.8%)	352 (64.2%)	1.39 (1.30–1.49) < 0.001	1.35 (1.26–1.45) < 0.001
Depression				
≤ Moderate	4037 (53.4%)	3520 (46.6%)	Ref.	Ref.
≥ Severe	354 (42.0%)	489 (58.0%)	1.25 (1.17–1.33) < 0.001	1.05 (0.96–1.15) 0.275
Anxiety				
≤ Moderate	3934 (53.8%)	3379 (46.2%)	Ref.	Ref.
≥ Severe	484 (43.0%)	643 (57.0%)	1.23 (1.17–1.31) < 0.001	1.06 (0.98–1.16) 0.120
Stress				
≤ Moderate	4083 (53.8%)	3500 (46.2%)	Ref.	Ref.
≥ Severe	298 (38.3%)	481 (61.7%)	1.34 (1.26–1.42) < 0.001	1.16 (1.06–1.28) 0.002

Prevalence ratios (left), 95% confidence intervals (within parentheses), and *p*-values (right) were obtained with generalized linear models (Poisson family, log link function, and robust variances). * Age was expressed as median and 25th–75th percentile. Ref.: Reference value.

It was found that participants from Chile (aPR: 1.11; 95%CI: 1.05–1.18; *p*-value = 0.001) and Bolivia (aPR: 1.10; 95%CI: 1.01–1.19; *p*-value = 0.023) had a higher perception of having done less physical activity compared to participants from Peru, adjusted for past history of heart disease, depression, and anxiety. Those who were older (aPR: >1.00; 95%CI: >1.00–>1.00; *p*-value < 0.001), women (aPR: 1.12; 95%CI: 1.08–1.17; *p*-value < 0.001), and those with diabetes (aPR: 1.17; 95%CI: 1.04–1.32; *p*-value = 0.008), obesity (aPR: 1.09; 95%CI: 1.02–1.17; *p*-value = 0.016), and stress (aPR: 1.22; 95%CI: 1.13–1.33; *p*-value < 0.001) had a higher perception of having done less physical activity, adjusted for past history of heart disease, depression, and anxiety (Table 3). The log pseudolikelihood value was −6769 and the AIC value was 1.79. No multicollinearity was shown (mean VIF = 1.17).

Table 3. Factors associated with the perception of having performed less physical activity, as reported in a Latin American population during the first wave of the COVID-19 pandemic.

Variable	Less Physical Activity		Bivariate Analysis PR (95%CI) *p*-Value	Multivariate Analysis PR (95%CI) *p*-Value
	No *n* (%)	Yes *n* (%)		
Total	3761 (42.7%)	5039 (56.3%)	- - -	- - - -
Country				
Peru	2021 (43.2%)	2661 (56.8%)	Ref.	Ref.
Chile	291 (34.2%)	561 (65.8%)	1.16 (1.10–1.22) <0.001	1.11 (1.05–1.18) 0.001
Paraguay	262 (39.9%)	394 (60.1%)	1.06 (0.99–1.13) 0.107	1.05 (0.97–1.13) 0.207
Mexico	233 (43.9%)	298 (56.1%)	0.99 (0.91–1.07) 0.754	0.97 (0.90–1.06) 0.546
Colombia	61 (48.0%)	66 (52.0%)	0.91 (0.77–1.08) 0.299	0.90 (0.75–1.07) 0.246
Bolivia	169 (38.2%)	273 (61.8%)	1.09 (1.01–1.17) 0.035	1.10 (1.01–1.19) 0.023
Panama	185 (46.7%)	211 (53.3%)	0.94 (0.85–1.03) 0.186	0.95 (0.86–1.06) 0.367
Ecuador	149 (49.7%)	151 (50.3%)	0.89 (0.79–0.99) 0.039	0.90 (0.80–1.01) 0.076
Costa Rica	99 (46.1%)	116 (53.9%)	0.95 (0.84–1.08) 0.418	0.91 (0.80–1.05) 0.201
El Salvador	97 (47.8%)	106 (52.2%)	0.92 (0.80–1.05) 0.215	0.90 (0.78–1.04) 0.158
Honduras	97 (52.4%)	88 (47.6%)	0.84 (0.72–0.98) 0.023	0.88 (0.76–1.03) 0.123
Guatemala	50 (50.5%)	49 (49.5%)	0.87 (0.71–1.06) 0.177	0.85 (0.69–1.05) 0.134
Other countries	35 (42.7%)	47 (57.3%)	1.01 (0.84–1.22) 0.930	0.96 (0.78–1.18) 0.714
Age (years) *	22 (20–28)	22 (20–31)	1.00 (1.00–1.00) <0.001	1.00 (1.00–1.00) < 0.001
Sex				
Male	1664 (46.7%)	1896 (53.3%)	Ref.	Ref.
Female	2081 (40.0%)	3124 (60.0%)	1.13 (1.08–1.17) < 0.001	1.12 (1.08–1.17) < 0.001
Heart disease				
No	3531 (43.1%)	4661 (56.9%)	Ref.	Ref.
Yes	130 (37.8%)	214 (62.2%)	1.09 (1.00–1.19) 0.038	0.98 (0.89–1.08) 0.748
Diabetes				
No	3620 (43.1%)	4773 (56,9%)	Ref.	Ref.
Yes	41 (28.7%)	102 (71.3%)	1.25 (1.13–1.39) < 0.001	1.17 (1.04–1.32) 0.008
Obesity				
No	3464 (43.4%)	4524 (56.6%)	Ref.	Ref.
Yes	197 (36.0%)	351 (64.0%)	1.13 (1.06–1.21) < 0.001	1.09 (1.02–1.17) 0.016
Depression				
≤ Moderate	3284 (43.5%)	4263 (56.5%)	Ref.	Ref.
≥ Severe	284 (33.7%)	559 (66.3%)	1.17 (1.11–1.24) < 0.001	1.04 (0.97–1.12) 0.294
Anxiety				
≤ Moderate	3187 (43.6%)	4126 (56.4%)	Ref.	Ref.
≥ Severe	398 (35.3%)	729 (64.7%)	1.15 (1.09–1.20) < 0.001	1.00 (0.93–1.07) 0.947
Stress				
≤ Moderate	3324 (43.8%)	4259 (56.2%)	Ref.	Ref.
≥ Severe	226 (29.0%)	553 (71.0%)	1.26 (1.20–1.32) < 0.001	1.22 (1.13–1.33) < 0.001

Prevalence ratios (left), 95% confidence intervals (within parentheses), and *p*-values (right) were obtained with generalized linear models (Poisson family, log link function, and robust variances). Age was taken in its quantitative format. * Age was expressed as median and 25th–75th percentile. Ref.: Reference value.

Participants from Chile (aPR: 1.11; 95% CI: 1.02–1.21; *p*-value = 0.019), Paraguay (aPR: 1.22; 95% CI: 1.11–1.34; *p*-value < 0.001), Mexico (aPR: 1.20; 95% CI: 1.08–1.32; *p*-value < 0.001), and Bolivia (aPR: 1.13; 95% CI: 1.00–1.27; *p*-value = 0.045) had a higher perception of having consumed more unhealthy food during quarantine compared to participants from Peru, adjusted for diabetes and depression. Women (aPR: 1.21; 95% CI: 1.14–1.28; *p*-value < 0.001), and those with obesity (aPR: 1.29; 95% CI: 1.18–1.40; *p*-value < 0.001), anxiety (aPR: 1.13; 95% CI: 1.02–1.24; *p*-value = 0.013), and stress (aPR: 1.17; 95% CI: 1.05–1.30; *p*-value = 0.005) also had a higher perception of having consumed more unhealthy food during quarantine, after adjustment for diabetes and depression (Table 4). The log pseudo-likelihood value was −5858 and the AIC value was 1.54. No multicollinearity was shown (mean VIF = 1.17).

Table 4. Factors associated with the perception of having consumed more unhealthy food, as reported in a Latin American population during the first wave of the COVID-19 pandemic.

Variable	More Consumption of Unhealthy Food		Bivariate Analysis PR (95% CI) *p*-Value	Multivariate Analysis PR (95% CI) *p*-Value
	No, *n* (%)	Yes, *n* (%)		
Total	5202 (59.1%)	3598 (40.9%)	- - -	- - - -
Country				
Peru	2865 (61.2%)	1817 (38.8%)	Ref.	Ref.
Chile	467 (54.8%)	385 (45.2%)	1.16 (1.07–1.26) <0.001	1.11 (1.02–1.21) 0.019
Paraguay	335 (51.1%)	321 (48.9%)	1.26 (1.16–1.37) <0.001	1.22 (1.11–1.34) <0.001
Mexico	277 (52.2%)	254 (47.8%)	1.23 (1.12–1.36) <0.001	1.20 (1.08–1.32) <0.001
Colombia	68 (53.5%)	59 (46.5%)	1.20 (0.99–1.45) 0.064	1.16 (0.95–1.42) 0.135
Bolivia	245 (55.4%)	197 (44.6%)	1.15 (1.03–1.28) 0.014	1.13 (1.00–1.27) 0.045
Panama	256 (64.7%)	140 (35.3%)	0.91 (0.79–1.05) 0.185	0.94 (0.81–1.09) 0.401
Ecuador	192 (64.0%)	108 (36.0%)	0.93 (0.79–1.08) 0.343	0.89 (0.75–1.06) 0.184
Costa Rica	117 (54.4%)	98 (45.6%)	1.17 (1.01–1.37) 0.036	1.15 (0.98–1.35) 0.091
El Salvador	125 (61.6%)	78 (38.4%)	0.99 (0.83–1.18) 0.913	0.99 (0.82–1.20) 0.957
Honduras	127 (68.7%)	58 (31.3%)	0.81 (0.65–1.00) 0.053	0.83 (0.66–1.04) 0.108
Guatemala	68 (68.7%)	31 (31.3%)	0.81 (0.60–1.08) 0.153	0.86 (0.64–1.15) 0.298
Other countries	44 (53.7%)	38 (46.3%)	1.19 (0.94–1.51) 0.140	1.09 (0.84–1.42) 0.512
Age (years) *	22 (20–30)	22 (20–30)	0.99 (0.99–1.00) 0.145	Did not enter the model
Sex				
Male	2265 (63.6%)	1295 (36.4%)	Ref.	Ref.
Female	2917 (56.0%)	2288 (44.0%)	1.20 (1.14–1.27) < 0.001	1.21 (1.14–1.28) < 0.001
Heart disease				
No	4856 (59.3%)	3326 (40.7%)	Ref.	
Yes	202 (58.7%)	142 (41.3%)	1.01 (0.89–1.15) 0.836	Did not enter the model
Diabetes				
No	4984 (59.4%)	3409 (40.6%)	Ref.	Ref.
Yes	74 (51.8%)	69 (48.2%)	1.19 (1.00–1.41) 0.049	1.15 (0.95–1.38) 0.154
Obesity				
No	4805 (60.2%)	3183 (39.8%)	Ref.	Ref.
Yes	253 (46.2%)	295 (53.8%)	1.35 (1.24–1.47) < 0.001	1.29 (1.18–1.40) < 0.001
Depression				
≤ Moderate	4546 (60.2%)	3011 (39.8%)	Ref.	Ref.
≥ Severe	404 (47.9%)	439 (52.1%)	1.31 (1.22–1.40) < 0.001	1.06 (0.95–1.17) 0.306
Anxiety				
≤ Moderate	4437 (60.7%)	2876 (39.3%)	Ref.	Ref.
≥ Severe	547 (48.5%)	580 (51.5%)	1.31 (1.23–1.39) < 0.001	1.13 (1.02–1.24) 0.013
Stress				
≤ Moderate	4589 (60.5%)	2994 (39.5%)	Ref.	Ref.
≥ Severe	350 (44.9%)	429 (55.1%)	1.39 (1.30–1.49) < 0.001	1.17 (1.05–1.30) 0.005

Prevalence ratios (left), 95% confidence intervals (within parentheses), and *p*-values (right) were obtained with generalized linear models (Poisson family, log link function, and robust variances). * Age was expressed as the median and 25th–75th percentiles. Ref.: Reference value.

Compared to Peru, participants from Paraguay (aPR: 1.18; 95%CI: 1.09–1.28; *p*-value < 0.001) and Bolivia (aPR: 1.22; 95%CI: 1.12–1.34; *p*-value < 0.001) had a higher perception of having consumed more unhealthy food during quarantine, adjusted for diabetes and depression. Older participants (aPR: >1.00; 95% CI: >1.00–>1.00; *p*-value = 0.003), female sex (aPR: 1.21; 95% CI: 1.15–1.28; *p*-value < 0.001), obesity (aPR: 1.21; 95%CI: 1.11–1.31; *p*-value < 0.001), and stress (aPR: 1.24; 95%CI: 1.13–1.37; *p*-value < 0.001) were also significantly associated with a higher perception of having consumed more food portions during the quarantine, adjusted for depression and anxiety (Table 5). The log pseudo-likelihood value was −6190 and the AIC value was 1.63. No multicollinearity was shown (mean VIF = 1.17).

Table 5. Factors associated with the perception of having consumed more food portions, as reported in the Latin American population during the first wave of the COVID-19 pandemic.

Variable	More Consumption of Food Portions		Bivariate Analysis PR (95% CI) *p*-Value	Multivariate Analysis PR (95% CI) *p*-Value
	No, *n* (%)	Yes, *n* (%)		
Total	4722 (53.7%)	4078 (46.3%)	- - -	- - - -
Country				
Peru	2546 (54.4%)	2136 (45.6%)	Ref.	Ref.
Chile	456 (53.5%)	396 (46.4%)	1.02 (0.94–1.10) 0.642	1.00 (0.92–1.09) 0.957
Paraguay	293 (44.7%)	363 (55.3%)	1.21 (1.12–1.30) <0.001	1.18 (1.09–1.28) <0.001
Mexico	281 (52.9%)	250 (47.1%)	1.03 (0.94–1.14) 0.518	1.00 (0.91–1.11) 0.974
Colombia	61 (48.0%)	66 (52.0%)	1.14 (0.96–1.35) 0.133	1.12 (0.94–1.34) 0.197
Bolivia	193 (43.7%)	249 (56.3%)	1.23 (1.13–1.35) <0.001	1.22 (1.12–1.34) <0.001
Panama	233 (58.8%)	163 (41.2%)	0.90 (0.80–1.02) 0.098	0.91 (0.80–1.03) 0.147
Ecuador	165 (55.0%)	135 (45.0%)	0.99 (0.87–1.12) 0.835	0.98 (0.85–1.12) 0.750
Costa Rica	127 (59.1%)	88 (40.9%)	0.90 (0.76–1.06) 0.194	0.92 (0.77–1.09) 0.350
El Salvador	126 (62.1%)	77 (37.9%)	0.83 (0.70–0.99) 0.043	0.84 (0.69–1.01) 0.065
Honduras	114 (61.6%)	71 (38.4%)	0.84 (0.70–1.01) 0.067	0.83 (0.68–1.01) 0.066
Guatemala	61 (61.6%)	38 (38.4%)	0.84 (0.65–1.08) 0.178	0.83 (0.64–1.08) 0.167
Other countries	47 (57.3%)	35 (42.7%)	0.94 (0.73–1.20) 0.606	0.80 (0.60–1,08) 0.141
Age (years) *	22 (20–31)	22 (20–29)	1.00 (1.00–1.00) < 0.001	1.00 (1.00–1.00) 0.003
Sex				
Male	2106 (59.2%)	1454 (40.8%)	Ref.	Ref.
Female	2600 (50.0%)	2605 (50.0%)	1.23 (1.17–1.29) < 0.001	1.21 (1.15–1.28) < 0.001
Heart disease				
No	4390 (53.6%)	3802 (46.4%)	Ref.	
Yes	195 (56.7%)	149 (43.3%)	0.93 (0.83–1.06) 0.272	Did not enter the model
Diabetes				
No	4509 (53.7%)	3884 (46.3%)	Ref.	
Yes	76 (53.2%)	67 (46.8%)	1.01 (0.85–1.21) 0.890	Did not enter the model
Obesity				
No	4341 (54.3%)	3647 (45.7%)	Ref.	Ref.
Yes	244 (44.5%)	304 (55.5%)	1.22 (1.12–1.31) < 0.001	1.21 (1.11–1.31) < 0.001
Depression				
≤ Moderate	4125 (54.6%)	3432 (45.4%)	Ref.	Ref.
≥ Severe	372 (44.1%)	471 (55.9%)	1.23 (1.15–1.31) < 0.001	0.97 (0.88–1.06) 0.509
Anxiety				
≤ Moderate	4032 (55.1%)	3281 (44.9%)	Ref.	Ref.
≥ Severe	492 (42.7%)	635 (56.3%)	1.26 (1.19–1.33) < 0.001	1.08 (0.99–1.18) 0.080
Stress				
≤ Moderate	4183 (55.2%)	3400 (44.8%)	Ref.	Ref.
≥ Severe	297 (38.1%)	482 (61.9%)	1.38 (1.30–1.47) < 0.001	1.24 (1.13–1.37) < 0.001

Prevalence ratios (left), 95% confidence intervals (within parentheses), and *p*-values (right) were obtained with generalized linear models (Poisson family, log link function, and robust variances). Age was taken in its quantitative format. * Age was expressed as the median and 25th–75th percentile. Ref.: Reference value.

4. Discussion

This study showed that the majority of respondents perceived themselves to have gained weight and to have been less physically active. Participants in Bolivia, females, and those with obesity and stress were associated with a higher perception of weight gain. A higher perception of lesser physical activity was associated with living in Chile, older age, being female, and having diabetes, obesity, and stress. Living in Paraguay and Mexico, being female, and having obesity, anxiety, and stress were associated with a higher perception of unhealthy food consumption. Living in Bolivia, being female, and having obesity and stress were associated with a higher perception of consuming more food portions.

Regarding the perception of physical activity, a systematic review of 16 studies reported that a decrease in physical activity had a negative impact on physical and mental health during the period of confinement [21]. Social isolation may especially accelerate

physical and psychological decline in vulnerable populations, including older adults [22]. Another study in patients with diabetes indicated that physical activity is necessary to maintain glycemia at adequate levels [23]. It has also been reported that physical activity is an adequate tool by which to maintain physical and mental health during social isolation [24,25]. Likewise, the American College of Sports Medicine recommends that the practice of physical activity should be seen as an adjuvant factor in the treatment of COVID-19 [26]. Therefore, all these reports show how important it is to maintain regular physical activity during the stage of confinement.

On the other hand, previous research has shown that the decrease in physical exercise is associated with sedentary behaviors, which leads to an increased risk of different diseases or the worsening of pre-existing conditions of the cardiovascular, muscular, pulmonary, and nervous systems and, indirectly, with the endocrine, digestive, immune, and renal systems [24,27]. A study conducted on obese outpatients in northern Italy reported that there was an increase in weight in the first month of COVID-19 confinement [15]. This increase was related to a low cultural level, anxiety/depression, a lack of healthy food choices, higher quantities of snack consumption, and a decrease in physical activity and training [15].

It was observed in this study that the older the age of the participant, the less physical activity was perceived. This result could also be seen in a study conducted in Spain [28], where it was found that depression, fatigue, and social relationships directly affected the physical activity performed by older adults during quarantine. Living alone reduced the respondents' physical activity levels during the pandemic, which suggests that this factor could influence physical well-being by affecting mental health. In addition, the study reported that older adults had a greater perception of overeating [15]. This result was similar to other research results [29] showing that decreased physical activity had a direct relationship with overeating as a way of coping with the stress caused by the pandemic.

In our study, people with obesity reported having gained weight more frequently than those without this condition. A previous study reported that BMI was positively correlated with age during confinement due to the pandemic ($p < 0.01$). This correlation was still significant after adjustments for sex, education, exercise, and sleep. In addition, participants with obesity or those who were overweight gained an average weight of 1 kg and 0.7 kg, respectively ($p < 0.05$) [30].

It was evident that participants with diabetes more frequently reported being less physically active in comparison with people without this condition. This result was similar to a study in which a significant increase in the daily hours of sitting and physical inactivity was observed [31]. Regarding time spent walking, the same study showed a significant decrease during quarantine compared to the amount in previous periods. In addition, a decrease in the average weekly time spent performing any type of moderate physical activity was shown [31].

Participants with obesity more frequently reported less physical activity during the last few months, compared to those without obesity. Similarly, one study reported that the factors associated with decreased physical activity during confinement were weight gain perception (PR 2.01; 95% CI: 1.35–3.25) and being overweight (PR 1.80; 95% CI: 1.17–2.76) [32]. Likewise, participants with obesity reported having an increased food intake more frequently, compared to those without obesity. This result coincides with a study that showed a general increase in carbohydrate consumption [33]. Sugar-sweetened beverages, ice cream, and homemade or packaged sweet foods showed an increase in daily or weekly consumption of up to 70%. It was also observed that homemade pizza, fresh bread, pasta, and rice were the most consumed foods by the Italian and Spanish populations [33]. Likewise, another study showed an increase (28.4%) in the intake of caloric and salty foods during the initial containment period in France [34]. In addition, participants with obesity more frequently reported having increased their intake of junk food, compared to those without obesity. Something similar was reported in Spain, Italy, Brazil, Colombia, and Chile since

there was a 19% increase in the consumption of these foods per week in 820 adolescents from those countries [33].

In participants who reported symptoms of stress, the perception of having gained weight was 16% more frequent than in those without this emotional response. One study evidenced a significantly higher weight gain and BMI increase in people with anxiety and depression, with a weight gain greater than 3.18 kg ($p < 0.001$) and a BMI increase greater than 1.21 ($p < 0.001$) [15]. Furthermore, participants with stress more frequently reported less physical activity than those without such an emotional response (22%). A study conducted during the pandemic reported that physical inactivity was associated with loneliness (odds ratio (OR) 1.32; 95% CI 1.02–1.70), sadness (OR 1.34; 95% CI 1.01–1.77), and anxiety (OR 1.71; 95% CI 1.30–2.25) [35]. In addition, it was observed that people with depression who reported physical inactivity presented with a higher probability of loneliness and sadness [35].

It was also reported that participants with stress and anxiety more frequently reported having increased their junk food intake by 17% and 13%, respectively. Previously, a study conducted during the quarantine in Brazilian adults showed that a previous diagnosis of depression increased the likelihood of consuming ultra-processed foods (OR 1.49; 95% CI 1.21–1.83) [36]. This is added to the fact that we found that patients with stress had a higher frequency (24%) of having perceived an increase in the amount of food eaten. This is similar to a study that showed that, during confinement, mood negatively affected eating, with differences for sex (affirmative responses in 39% of women, vs. 29% of men). The negative effect of mood was greater in participants with obesity, reaching 62% [30].

This research has several limitations. First, there is a measurement bias since it was not possible to have an objective measurement for weight gain or loss, which is justified by the current context of self-reporting. Although other studies have performed the same technique, this measurement should be ratified in subsequent studies. Second, there is a selection bias, given that the sampling was made using a non-probability method. This prevents us from extrapolating the findings to the entire Latin American population. Third, the cross-sectional design limits causal inferences between variables. Fourth, the classification of individuals according to weight was limited by the lack of a more detailed question. Fifth, disproportionate responses across countries occurred because most participants were from Peru, the main location of the study authors. The original study idea was conceived in this place, but then, new collaborators from Latin American countries were included to expand the study hypothesis. Sixth, the COVID-19 restrictions established by each Latin American country were different, possibly based on economic and cultural differences. This could have generated more emotional distress in some individuals than others and, therefore, a deeper perception of weight and lifestyle changes. Nevertheless, we have managed to capture a wide diversity of data, drawn from participants residing in more than a dozen countries in the region. Therefore, this research offers important baseline results throughout Latin America. This can be useful for various specialists and institutions when patients return to their doctor's office and then exhibit complications derived from a probable increase in weight and the impairment of their metabolism, due to the influence of the pandemic.

This study has shown changes in weight and lifestyle during the pandemic, which could have long-term repercussions for the health of individuals. No data, as far as we are concerned, were published in this regard in the Latin American population. The findings provide baseline results to compare in future research, showing how this context has influenced serious public health concerns, such as obesity, hypertension, and type 2 diabetes. It also allows researchers to classify potentially at-risk groups and countries that would need to implement various interventions related to lifestyle.

5. Conclusions

Our results show that, during quarantine, the perception of changes in body weight and health habits were different according to the country of residence, sex, age, obesity, and

exposure to stress. The perceived change in weight and lifestyle during the pandemic were more evident in women, in people with comorbidities, and in those suffering emotional distress. Differences in perception were minimal between Latin American countries. This information suggests the possible metabolic implications in at-risk individuals that should be further addressed by researchers for timely intervention.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su15032382/s1.

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