Changes in dietary behaviours and lifestyle as risk factors for weight gain during the covid-19 lockdown in chile: A cross-sectional study

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Short title: Risk factors for weight gain during lockdown

ABSTRACT

Domiciliary confinement of people is one of the main strategies to limit the impact of COVID-19. However, lockdowns have led to changes in lifestyle, emotional health, and eating habits. We aimed to evaluate the effect of changes in dietary behaviours and lifestyle on weight gain during the COVID-19 lockdown in Chile. In this cross-sectional analytical study, five surveys were condensed into a single 86-item online questionnaire comprising general and sociodemographic history, eating habits before and during confinement, measurement of the emotional influence on eating behaviour, lifestyle before and during confinement, and food safety. The survey was previously validated by experts in nutrition and public health and subsequently sent to 1000 potential participants of the university community; it was kept online for 28 days to be answered. Of the 639 respondents, the mean weight gain during confinement was 1.99 kg and 0.7 units of body mass index (BMI). The increases in dietary intake of most food groups were associated with greater weight gain, BMI and percentage weight gain. Lifestyle deterioration, worsening eating habits, and increased consumption of sweet or filled cookies and cakes were the main risk factors associated with weight gain. Only 2% of BMI changes were explained by the interaction between lifestyle changes and emotional influence, whereas 64% of changes were due to a deterioration in lifestyle during confinement. In conclusion, changes in dietary behaviours (mainly increased consumption of ultra-processed foods), as well as quality of life deterioration were the main factors associated with weight gain during lockdown.

Key words: COVID-19; eating habits; home confinement; lifestyles; weight gain,

BACKGROUND

One important aspect of the study of epidemics is understanding how societies react to contagious disease[1]. In this sense, the coronavirus disease (COVID-19) pandemic has continuously struck countries and societies in the year 2020 and lockdowns at the country and regional levels have been one of the first strategies to limit the spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)[2].

It is estimated that nearly 4 billion people have been forced to self-quarantine at home during the pandemic, which could result in a high prevalence of psychological distress, manifested as moodiness and irritability, emotional disturbances, disturbed sleep and diet, post-traumatic stress, and depressive symptoms[3–5]. The impact of these restrictions on health behaviours and lifestyles remains to be fully characterised, although some studies have started to address this globally[6–10]. It is essential to further investigate the consequences of lockdowns to conceive strategies to limit their impact in case of future disease outbreaks that may require domiciliary confinement of people.

In Chile, the first case of COVID-19 was detected on 3 March 2020; mitigation strategies (including lockdowns) were shown to slow the spread of SARS-CoV-2 and limit the impact of COVID-19 up to October 2020[11]. Chilean universities were provisionally closed on 18 March 2020[12] and presential activities were not restored for the rest of the year 2020[13]. Preliminary studies have found a perceived negative emotional impact and concerns about the future in vulnerable groups including young people and women[14], as well as changes in dietary habits of adolescents in Chile[15], however, their impact on weight gain remains to be elucidated.

In this study, we sought to evaluate the effect of changes in dietary behaviours and lifestyles on weight gain of students, academics, and administrative members of the University of Bío-Bío during the COVID-19 pandemic-derived lockdown in Chile.

METHODS

Study design and participants

We conducted a cross-sectional analytical study consisting of an online survey delivered to students, administrative officials and teachers of both sexes and all ages belonging to the University of Bío-Bío, Chile. Five surveys were condensed into a single 86-item questionnaire that included general and sociodemographic history, eating habits before and during domiciliary confinement, measurement of emotional influence on eating behaviour, lifestyle before and during confinement, and food insecurity. The survey was delivered via Google Forms and was previously validated by experts in nutrition and public health using a sample population of 57 participants. People who were not part of the educational community or who did not give their consent to participate in the study were excluded. The study was developed within the framework of the DIUBB 191220 3 / R project, with the approval of the Bioethics and Biosafety Committee of the University of Bío-Bío. Once informed consent was obtained, participants were able to access the survey that was kept online for 28 days (from July 21 to August 19). 1000 participants were invited to complete the survey. The complete survey is provided in the supplementary materials.

The general and sociodemographic history collected in the survey were the following: place of residence, type of household, age, occupation, sex, level of studies, and university campus of origin. Participants were asked to place within the

questionnaire their usual weight as measured before confinement, and they were asked to weigh themselves within a couple of days before answering the questionnaire; weight measurement was requested to be carried out with prior 8-hour fasting and with the support of a companion who would take weight measurements while the participant maintained an erect position and frontal gaze.

For the measurement and evaluation of eating habits before and during lockdown, a Food Consumption Frequency Questionnaire (CFCA) was applied in which different groups of foods typically consumed in the Chilean population were included.

For the measurement of the emotional influence on eating behaviour, the Emotional Eating Survey[16] was used and adapted to the Chilean population. This survey includes 11 questions; responders are classified into: no emotional influence (0 to 5 points), little emotional influence (6 to 10 points), some emotional influence (11 to 20 points), and emotional eater (21 to 30 points).

To evaluate lifestyle before and during lockdown, we used the Fantastic questionnaire[17]. This questionnaire has 10 sections which correspond to: family and friends, relationships and physical activity, nutrition, tobacco, alcohol, and other drug consumption, sleep and stress, work and personality type, introspection, control of health and sexual behaviour, and other behaviours. The following scores were used: 0 to 46 points corresponded to the danger zone; 47 to 72, could be better; 73 to 84, adequate; 85 to 102, right path; and 103 to 120, fantastic lifestyle.

We used the Household Food Insecurity Access Component Scale (HFIAS)[18] to evaluate food safety, which consists of 9 questions and its results are classified into 4 categories, where: 1 = safe, 2 = mildly unsafe, 3 = moderately unsafe, and 4 = severely unsafe.

Statistical analysis

Descriptive data are shown as frequencies and percentages, and as mean with standard deviation (SD). Differences in weight and body mass index (BMI) before and during lockdown were calculated; the percentage weight gain was also calculated. Quantitative comparisons were made with the dependent samples t-test to determine the difference between weight and BMI before and during lockdown; the difference in weight, BMI, and percentage weight gain between subjects who maintained or decreased their food intake and those who increased it, were assessed with the independent samples t-test.

Different linear regression models were applied to determine the ability of increased food intake to predict weight and BMI increases, as well as percentage weight gain. The Stepwise Forward method was applied and variables with $p < 0.1$ were included in the final linear regression model. Similarly, a multivariable logistic regression model was created to estimate the risk of experiencing an increase of ≥5% in body weight; initially, univariate analyses of demographic variables, eating habits and increased dietary intake were performed, followed by the creation of a multivariable model with the Stepwise Forward method, in which the variables that had significance of $p < 0.1$ and that were considered a risk factor were included. The goodness of fit of the final model was evaluated with the Hosmer–Lemeshow statistic, and the discrimination of the model was determined by calculating the area under the curve (AUC). A multinomial regression model was created to determine the risk of experiencing a weight increase of 5-9% or ≥10% due to increases in food intake; the variables included in this model were determined by the Enter method and the results were adjusted for sex and age. For all linear regression models, data

are presented as B coefficients, whereas the results of logistic regression models are provided as odds ratio (OR) with their respective 95% confidence intervals (95%CI).

We created a random effects model in which we determined the impact of lifestyle changes during lockdown, emotional influence, and their interaction with weight gain, increase in BMI, and percentage weight gain. The effect size of each factor and that of the interaction was calculated with partial eta squared. We plotted the means and their 95%CI for each level within lifestyle changes; the Bonferroni test was applied to make pairwise comparisons between levels of emotional influence.

A value of $p<0.05$ was considered as statistical significance. All statistical analyses were performed in the SPSS statistical software v.21; graphs were created in GraphPad Prism v.8.0.1.

RESULTS

Out of 1000 potential survey participants, 639 answered the questionnaire; 66.8% were women. The mean age of participants was 28.9 (SD:13.2) years, with an age range of 18 to 88 years. Descriptive characteristics of the population are provided in Table 1. The mean weight gain during confinement was 1.99 Kg and 0.7 units of BMI (both $p <0.0001$) (supplementary Figure 1). In supplementary Table 1 we show the frequencies of dietary consumption for every food group before and during confinement. The increases in the dietary intake of most food groups were associated with a greater weight, BMI and percentage weight gain. The food groups with the highest content of simple carbohydrates, refined sugars and saturated fats were had the greatest increases observed (Table 2).

We created 3 different prediction models for increase of weight, BMI, and percentage weight gain. In all models, processed foods and foods rich in saturated fats and sugars had the best predictions of linear increase in weight, BMI and percentage weight gain. Together, these food groups were good predictors of weight gain (Table 3). Conversely, in an univariate way, the increase in raw and/or cooked vegetables and natural fruits (excluding juices) were associated with a decrease in weight (Vegetables: B=-1.41, p = 0.0003, Fruits: B=-1.19, p=0.002), BMI (Vegetables: B=-0.51, p=0.0004, Fruits: B=-0.44, p=0.001) and percentage weight gain (Vegetables: B=-1.67, p=0.002, Fruits: B=-1.61, p=0.002) (supplementary Table 2).

In the multilevel logistic regression models to determine the risk of experiencing a weight gain ≥5% according to the frequencies of dietary consumption during confinement, we observed that the risk of weight gain has higher with increasing frequencies of consumption of industrialized foods (supplementary table 3). Similarly, we analysed the different demographic and sedentary factors (supplementary figure 2), lifestyle and eating habits (supplementary figure 3), and the increases in dietary intake (supplementary figure 4) to determine the main risk factors associated with an increase of ≥5% in body weight; we observed that a deterioration in lifestyle, worsening eating habits, and an increase in consumption of sweet or stuffed cookies and cakes were the main factors associated with weight gain (Goodness of fit: Hosmer-Lemeshow X^2=6.775, p=0.5; AUC:0.75, 95%CI:0.71-0.79, p<0.0001) (Table 4). We determined the main dietary factors associated with weight gains of 5-9% or ≥10% using multinomial regression models, observing that industrialised products were the main risk factors for weight gain in both outcomes. In contrast, increased consumption of processed meats and sausages, as well as

rice, potatoes, noodles, or quinoa were only associated with the risk of experiencing increases in weight ≥10% (Table 5).

Since deterioration in lifestyle and emotional influences were the main factors associated with increases in weight ≥5% in the univariate logistic regression models (supplementary Figure 3), we created a random effects model to determine the corresponding increases in weight, BMI and percentage weight gain during lockdown. We found that weight gain was explained by changes in lifestyle regardless of emotional influence; subjects with deterioration in their lifestyle had a greater weight and percentage weight gain than those who did not present lifestyle changes or who had improvements. Similar findings for BMI notwithstanding, if there was an interaction between lifestyle changes and emotional influence, only 2% of changes in BMI were explained by this interaction, whereas 64% of the changes were due to a deterioration in lifestyle during confinement (Figure 1).

DISCUSSION

There is currently little evidence of the impact of lockdowns on weight variations and food consumption and their impact on body weight. In this cross-sectional analytical study consisting of an online survey, we sought to evaluate the effect of changes in dietary behaviours and lifestyles on weight gain of students, academics, and administrative members of the University of Bío-Bío during the COVID-19 pandemic-derived lockdown in Chile.

Our study differed from others with a similar study design in that we were interested not only in changes in lifestyles, including eating habits, but also weight variations and the factors associated with body weight increases during lockdown. We found

that the average weight gain during confinement was 1.99 Kg and 0.7 BMI units. These increases are greater than would be expected as a result of seasonal fluctuations, since even considering that the present study was carried out during winter in the southern hemisphere (July 21 to August 21), seasonal variations have only been accountable for increases of up to 0.7 kg and 0.5 units of BMI[19,20].

As other authors have reported, weight gain is often the result of the increase in the amount of food eaten, but particularly of those rich in simple carbohydrates and saturated fats[6,21–23]. For this reason, we developed three models for predicting increases in weight, BMI, and percentage weight gain. We observed that the linear increases are mainly due to consumption of these foods together with processed foods, a situation that could potentially be circumvented with a higher consumption of fruits and vegetables[8,24]. This is important since weight losses of 5% may improve productivity and prevent the deterioration of health-related quality of life[25]. Furthermore, we found that as the frequency of consumption of industrialized foods (cookies and sweet or filled cakes) increases, the risk of weight gain increases.

The main factors associated with a weight gain ≥5% of body weight were lifestyle deteriorations and emotional influences; weight gain is attributable to changes in lifestyle and, unlike other studies, it was independent of emotional influence[26–28]. Weight gain and increases in BMI and percentage body weight were present to a greater extent in subjects with a worsening lifestyle, and, although the emotional influence did affect BMI, most of the effect was due to lifestyle deterioration during lockdown.

When we evaluated dietary factors associated with weight gains greater than or equal to 10%, we observed that the determining risk factors were the consumption

of industrialized foods, but unlike those observed with for weight gains of 5-9%, the consumption of starchy foods such as rice, potatoes, noodles, or quinoa was an aggregated risk factor. Weight gains of 10% are enough to significantly modify the brain, which may cause alterations in personality, leading to impulsiveness and lesser resistance to desires[29].

Lockdowns are local or regional interventions that involve people remaining confined in their households as long as possible, under new socially restrictive norms[30]. Lockdowns have been observed to cause loss of habits and routines, as well as psychosocial stress[31] that can trigger unhealthy habits like disordered or unhealthy eating, ceasing physical activity, or altered sleep patterns[8,9,32].

There are currently no sufficiently proven interventions for COVID-19 that may decrease mortality and complication rates at every stage of disease. Comorbidities like obesity, hypertension and diabetes mellitus worsen the prognosis of the disease[33–36]. Furthermore, disruptions in the gut microbiome have been hypothesized to be associated with disease progression in COVID-19[37]. Thus, understanding how changes in lifestyle and eating habits impact distinct populations during lockdown is important to envision strategies that could prevent weight gain attributable to the aforementioned.

The main strength of this study is that it is one of the first studies evaluating different factors that may lead to weight gains between 5-9% and even greater than 10% during lockdown. Another strength is that our study was carried out approximately four months after the state of catastrophe was declared in Chile, which is when people suffered greater distress and fatigue due to prolonged confinement.

Our study sheds light on the main factors associated with weight gain during lockdown, which could be useful for health authorities, as well as nutrition personnel to guide dietary recommendations to follow during lockdown, including foods that should be avoided. Strategies based on these findings could be directed to limit the impact of changes in lifestyle and dietary behaviours during current and future lockdowns during infectious disease outbreaks.

The main limitation of this study is that the survey was self-reported, which could have led to recall bias. Furthermore, weight was not measured directly before and during confinement by trained observers, being self-reported by respondents. However, these limitations could be nearly impossible to overcome when considering the challenges of conducting such a study during pandemic lockdown in a similar target population of people confined in their households. Lastly, our study is representative of university academics, students, and administrative workers from a single region of Chile, thus, further characterisation of the impact of lockdowns in different populations is granted to guide decision-making.

CONCLUSION

To the best of our knowledge, this is the first study evaluating changes in lifestyle, eating habits, emotional eating, and food safety, as well as their impact on weight gain during lockdown. We have characterised the factors that are associated with increases in total body weight between 5-9% and greater than or equal to 10%. Changes in dietary behaviours, mainly the increase in ultra-processed foods, as well as quality of life deteriorations were the main factors associated with weight gain during the COVID-19 lockdown in Chile.

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Ethical standard disclosure: This project was reviewed and approved by the Bioethics and Safety Committee of the Universidad del Bio Bio.

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Table 1. Descriptive characteristics of the population, disaggregated by sex.

	Total n=639	Women n=427	Men n=212
Age, years*	28.9 (13.2)	28.5 (12.4)	29.9 (14.6)
Height, cm*	164.9 (9.4)	160.8 (7.4)	173.5 (7)
Weight before confinement, Kg*	68.3 (13.8)	64.7 (12.2)	75.6 (14.1)
Current weight, Kg*	70.3 (14.4)	66.6 (12.6)	77.7 (14.9)
BMI before lockdown*	25.1 (4.8)	25.1 (5.2)	25.1 (4.1)
BMI after lockdown*	25.8 (5.0)	25.9 (5.3)	25.8 (4.4)
Place of residence			
Urban	546 (85.4)	361 (84.5)	185 (87.3)
Rural	93 (14.6)	66 (15.5)	27 (12.7)
Educational level			
Basic (incomplete)	4 (0.6)	3 (0.7)	1 (0.5)
Basic (complete)	30 (4.7)	19 (4.4)	11 (5.2)
Technical (incomplete)	6 (0.9)	5 (1.2)	1 (0.5)
Technical (complete)	26 (4.1)	23 (5.4)	3 (1.4)
University (incomplete)	405 (63.4)	272 (63.7)	133 (62.7)
University (complete)	71 (11.1)	49 (11.5)	22 (10.4)
Postgraduate	97 (15.2)	56 (13.1)	41 (19.3)
Telecommuting from home	622 (97.3)	416 (97.4)	206 (97.2)
Time for sedentary activities			
One to two hours a day	32 (5)	21 (4.9)	11 (5.2)
Three to four hours a day	70 (11)	39 (9.1)	31 (14.6)
Five to six hours a day	109 (17.1)	78 (18.3)	31 (14.6)
Seven to eight hours	161 (25.2)	112 (26.2)	49 (23.1)
Nine o ten hours a day	108 (16.9)	77 (18)	31 (14.6)
Ten or more hours a day	159 (24.9)	100 (23.4)	59 (27.8)
Household members			
Lives alone	28 (4.4)	21 (4.9)	7 (3.3)
Lives with family (parents and/or siblings or partner and children)	529 (82.8)	357 (83.6)	172 (81.1)
Lives with relatives who are not parents and siblings	28 (4.4)	17 (4)	11 (5.2)
Lives with friends	7 (1.1)	5 (1.2)	2 (0.9)
Lives with other people who are not family members	9 (1.4)	4 (0.9)	5 (2.4)
Lives with partner	35 (5.5)	21 (4.9)	14 (6.6)
Other	3 (0.5)	2 (2)	1 (0.5)
Lunch	365 (57.1)	232 (54.3)	133 (62.7)
Away from home	297 (81.4)	199 (85.8)	98 (73.7)
Packed lunch for work	206 (69.4)	159 (79.9)	47 (47.9)
Change of habits			
Yes, it has gotten worse	268 (41.9)	191 (44.7)	77 (36.3)
Yes, it has improved	190 (29.7)	133 (31.1)	57 (26.9)
No, it has stayed the same	181 (28.3)	103 (24.1)	78 (36.8)
Mealtimes before the pandemic			
Breakfast	521 (81.5)	348 (81.5)	173 (81.6)
Mid-morning snack	263 (41.2)	200 (46.8)	63 (29.7)
Lunch	613 (95.9)	409 (95.8)	204 (96.2)
Mid-afternoon snack	291 (45.5)	208 (48.7)	83 (39.2)
Snack before dinner	517 (80.9)	351 (82.2)	166 (78.3)
Dinner	141 (22.1)	90 (21.1)	51 (24.1)
Late-night snack	119 (18.6)	70 (16.4)	49 (23.1)
Snacking between meals	219 (34.3)	151 (35.4)	68 (32.1)
Mealtimes after the pandemic			
Breakfast	504 (78.9)	335 (78.5)	169 (79.7)
Mid-morning snack	164 (25.7)	111 (26)	53 (25)

Lunch	623 (97.5)	416 (97.4)	207 (97.6)
Mid-afternoon snack	294 (46)	214 (50.1)	80 (37.7)
Snack before dinner	529 (82.8)	363 (85)	166 (78.3)
Dinner	163 (25.5)	98 (23)	65 (30.7)
Late-night snack	214 (33.5)	144 (33.7)	70 (33)
Snacking between meals	319 (49.9)	219 (51.3)	100 (47.2)
Snack between meals			
Does not snack between meals	95 (14.9)	58 (13.6)	37 (17.5)
Same as before	120 (18.8)	83 (19.4)	37 (17.5)
More than before	282 (44.1)	190 (44.5)	92 (43.4)
Less than before	142 (22.2)	96 (22.5)	46 (21.7)
Emotional eater			
No emotional influence	121 (18.9)	59 (13.8)	62 (29.2)
Little emotional influence	204 (31.9)	131 (30.7)	73 (34.4)
Some emotional influence	260 (40.7)	191 (44.7)	69 (32.5)
Emotional eater	54 (8.5)	46 (10.8)	8 (3.8)
Lifestyle before the pandemic			
Fantastic lifestyle	76 (11.9)	47 (11)	29 (13.7)
Right path	306 (47.9)	202 (47.3)	104 (49.1)
Adequate	164 (25.7)	114 (26.7)	50 (23.6)
Could be better	89 (13.9)	61 (14.3)	28 (13.2)
Danger zone	4 (0.6)	3 (0.7)	1 (0.5)
Lifestyle after the pandemic			
Fantastic lifestyle	26 (4.1)	13 (3)	13 (6.1)
Right path	177 (27.7)	119 (27.9)	58 (27.4)
Adequate	167 (26.1)	102 (23.9)	65 (30.7)
Could be better	242 (37.9)	181 (42.4)	61 (28.8)
Danger zone	27 (4.2)	12 (2.8)	15 (7.1)
Food Safety			
Safe	222 (34.7)	148 (34.7)	74 (34.9)
Mildly unsafe	265 (41.5)	185 (43.3)	80 (37.7)
Moderately unsafe	86 (13.5)	54 (12.6)	32 (15.1)
Severely unsafe	66 (10.3)	40 (9.4)	26 (12.3)

Data presented as frequency and percentage.
* Mean and standard deviation are shown

Table 2. Comparison of the difference in weight, BMI, and percentage weight change before and after confinement between subjects who maintained or decreased their intake and those who increased it, by food groups.

	Weight difference			BMI difference			Percentage weight change		
	Maintained or decreased intake	Increased intake	p value	Maintained or decreased intake	Increased intake	p value	Maintained or decreased intake	Increased intake	p value
White or whole wheat bread	1.68 ± 1.97	2.92 ± 0.32	0.002	0.61 ± 0.07	1.08 ± 0.11	0.001	2.61 ± 0.27	4.27 ± 0.45	0.002
Rice, potatoes, noodles, or quinoa	1.59 ± 0.21	2.85 ± 0.29	<0.001	0.58 ± 0.07	1.06 ± 0.11	<0.001	2.45 ± 0.28	4.25 ± 0.41	<0.001
Raw and / or cooked vegetables	2.33 ± 0.18	0.93 ± 0.38	0.001	0.85 ± 0.06	0.35 ± 0.14	0.001	3.43 ± 0.26	1.76 ± 0.52	0.005
Natural fruit (excludes juices)	2.32 ± 0.18	1.13 ± 0.37	0.005	0.85 ± 0.06	0.41 ± 0.14	0.004	3.47 ± 0.26	1.86 ± 0.5	0.005
Dried vegetables	2.14 ± 0.19	1.68 ± 0.33	0.2	0.78 ± 0.07	0.62 ± 0.12	0.2	3.21 ± 0.27	2.61 ± 0.45	0.2
Milk, yogurt, or kefir	2.18 ± 0.18	1.46 ± 0.36	0.08	0.80 ± 0.06	0.53 ± 0.13	0.08	3.27 ± 0.26	2.34 ± 0.49	0.1
Cheeses (aged, fresh, farm, etc.)	1.79 ± 0.19	2.66 ± 0.35	0.03	0.65 ± 0.07	0.98 ± 0.13	0.03	2.75 ± 0.26	4.04 ± 0.49	0.02
Meat (pork, chicken, beef, lamb, etc.)	1.85 ± 0.19	2.66 ± 0.36	0.07	0.68 ± 0.06	0.97 ± 0.13	0.07	2.78 ± 0.26	4.15 ± 0.5	0.03
Processed meats and sausages	1.65 ± 0.18	3.43 ± 0.36	<0.001	0.60 ± 0.06	1.26 ± 0.12	<0.001	2.55 ± 0.26	4.98 ± 0.47	<0.001
Fresh and canned seafood	2.07 ± 0.18	1.76 ± 0.36	0.4	0.76 ± 0.06	0.64 ± 0.13	0.4	3.09 ± 0.26	2.82 ± 0.50	0.6
Eggs	1.97 ± 0.18	2.05 ± 0.37	0.9	0.72 ± 0.06	0.75 ± 0.13	0.9	2.97 ± 0.26	3.19 ± 0.50	0.7
Nuts (excludes raisins)	2.08 ± 0.18	1.65 ± 0.41	0.3	0.75 ± 0.06	0.62 ± 0.14	0.4	3.11 ± 0.26	2.71 ± 0.54	0.5
Butter, margarine, vegetable oil or fats of animal origin	1.77 ± 0.21	2.64 ± 0.28	0.03	0.65 ± 0.07	0.96 ± 0.10	0.03	2.73 ± 0.27	3.88 ± 0.42	0.03
Sweet or filled cookies, cakes, etc.	1.33 ± 0.19	3.59 ± 0.31	<0.001	0.48 ± 0.07	1.33 ± 0.11	<0.001	2.07 ± 0.26	5.34 ± 0.43	<0.001
Chocolates & chocolate-based products	1.46 ± 0.19	3.43 ± 0.30	<0.001	0.53 ± 0.07	1.26 ± 0.11	<0.001	2.23 ± 0.27	5.16 ± 0.42	<0.001
Salty snacks	1.36 ± 0.19	3.59 ± 0.29	<0.001	0.49 ± 0.07	1.32 ± 0.11	<0.001	2.15 ± 0.27	5.23 ± 0.41	<0.001
Drinks or juices whit added sugar	1.57 ± 0.19	3.49 ± 0.31	<0.001	0.57 ± 0.07	1.30 ± 0.11	<0.001	2.39 ± 0.26	5.26 ± 0.45	<0.001
Alcoholic drinks	1.87 ± 0.18	2.61 ± 0.40	0.1	0.68 ± 0.06	0.69 ± 0.15	0.09	2.84 ± 0.26	3.98 ± 0.54	0.08
Sugar (white or brown)	1.68 ± 0.19	3.37 ± 0.31	<0.001	0.61 ± 0.07	1.26 ± 0.11	<0.001	2.63 ± 0.26	4.81 ± 0.44	<0.001

Comparisons were made with Student's t test for independent samples
Data are presented as mean ± standard error of the mean.

Table 3. Multivariable linear regression models for the prediction of increases in weight, BMI, and percentage weight percentage from increased food intake

	Coefficients	Standard error	p value
Weight gain model			
Constant	0.67	0.23	0.004
Increased consumption of sweet or stuffed cookies, cakes, etc.	1.33	0.39	0.001
Increased consumption of salty snacks	1.23	0.40	0.002
Increased consumption of processed meats and sausages	0.88	0.43	0.04
Increase in sugar consumption (white or brown)	0.95	0.43	0.03
Increased consumption of rice, potatoes, noodles or quinoa	0.77	0.35	0.03
Model for BMI increase			
Constant	0.23	0.08	0.005
Increased consumption of sweet or stuffed cookies, cakes, etc.	0.49	0.15	0.001
Increased consumption of salty snacks	0.45	0.15	0.002
Increase in sugar consumption (white or brown)	0.37	0.16	0.02
Increased consumption of rice, potatoes, noodles or quinoa	0.29	0.13	0.02
Increased consumption of processed meats and sausages	0.32	0.16	0.04
Model for percentage weight gain			
Constant	1.25	0.31	<0.001
Increased consumption of sweet or stuffed cookies, cakes, etc.	2.15	0.54	<0.001
Increased consumption of salty snacks	1.47	0.58	0.01
Increased consumption of sugary drinks or juices	1.59	0.59	0.004
Increased consumption of rice, potatoes, noodles or quinoa	1.19	0.49	0.02

Table 4. Multivariable logistic regression model for predicting a ≥5% increase in body weight after confinement

	B	Standard error	OR	95% CI	p value
Constant	-2.71	0.74	-	-	<0.0001
Fantastic lifestyle			Reference		
Right path	1.14	.764	3.128	(0.69-13.99)	0.1
Adequate	1.33	.765	3.761	(0.84-16.85)	0.08
Could be better	1.47	.762	4.343	(0.98-19.34)	0.05
Danger zone	2.64	.914	13.996	(2.34-83.88)	0.004
Worsening eating habits	1.25	.200	3.475	(2.35-5.14)	<0.001
Increased consumption of sweet or stuffed cookies, cakes, etc.	0.76	.200	2.139	(1.45-3.16)	<0.001

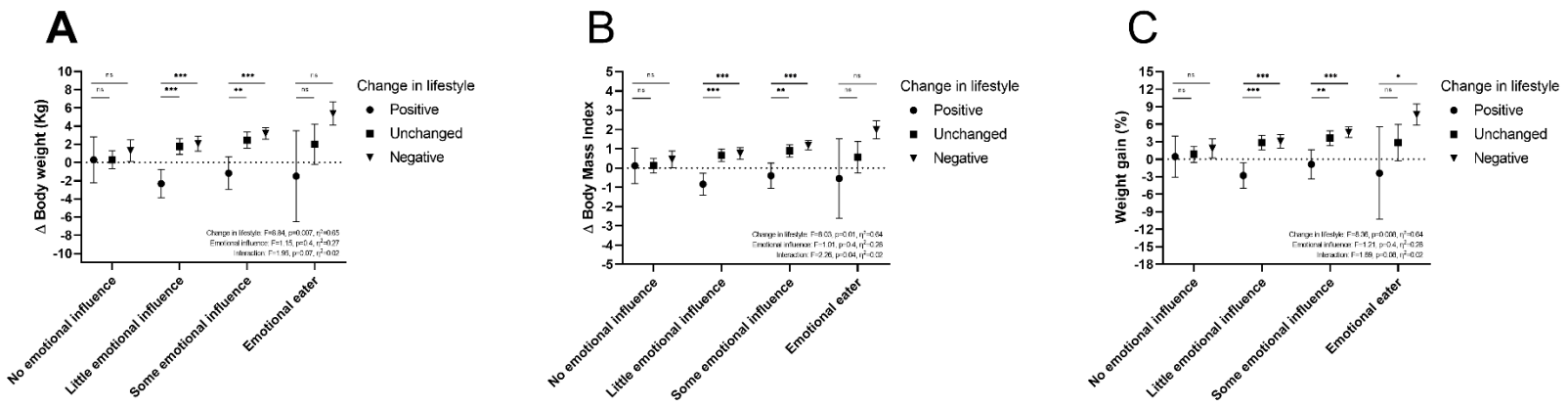
B: Regression coefficient, OR: Odds ratio, 95% CI: 95% confidence interval.

Table 5. Results of the multinomial logistic regression analysis to determine the risk of 5-9% or ≥10% weight gain due to increased dietary intake

	5-9% weight gain			≥10% weight gain		
	OR	95% CI	p value	OR	95% CI	p value
White or whole wheat bread	1.20	0.78-1.82	0.4	1.73	0.99-3.01	0.05
Rice, potatoes, noodles, or quinoa	1.41	0.95-2.07	0.09	2.25	1.33-3.81	0.003
Raw and / or cooked vegetables	0.87	0.57-1.34	0.5	0.61	0.32-1.17	0.1
Natural fruit (excludes juices)	0.87	0.58-1.30	0.5	0.59	0.31-1.11	0.1
Dried vegetables	0.93	0.63-1.38	0.7	0.89	0.51-1.56	0.7
Milk, yogurt, or kefir	1.11	0.74-1.67	0.6	0.74	0.40-1.38	0.3
Cheeses (aged, fresh, etc.)	1.42	0.94-2.17	0.1	1.21	0.66-2.22	0.5
Meat (pork, chicken, beef, lamb, etc.)	1.19	0.74-1.91	0.5	1.65	0.89-3.044	0.1
Processed meats and sausages	1.54	0.98-1.42	0.06	2.61	1.46-4.67	0.001
Fresh and canned seafood	0.87	0.57-1.33	0.5	1.19	0.67-2.10	0.6
Eggs	1.13	0.74-1.72	0.6	1.22	0.68-2.18	0.5
Nuts (excludes raisins)	0.94	0.60-1.48	0.8	1.01	0.54-1.88	0.9
Butter, margarine, vegetable oil or fats of animal origin	1.28	0.85-1.92	0.2	1.21	0.68-2.16	0.5
Sweet or filled cookies, cakes, etc.	3.23	2.18-4.79	<0.001	3.61	2.11-6.20	<0.001
Chocolates and chocolate-based products	3.28	2.21-4.88	<0.001	2.33	1.33-4.07	0.003
Salty snacks	2.92	1.97-4.32	<0.001	2.79	1.62-4.81	<0.001
Drinks or juices with added sugar	2.01	1.31-3.07	0.001	2.39	1.35-4.23	0.003
Alcoholic drinks	1.71	1.06-2.76	0.03	1.44	0.70-2.98	0.3
Sugar (white or brown)	1.40	0.89-2.22	0.2	1.56	0.84-2.92	0.2

OR: Odds ratio, 95% CI: 95% confidence intervals
Models adjusted for sex and age

Figure 1. Results of the random effects models for the differences in weight, BMI, and percentage weight gain from changes in lifestyle adjusted for emotional influence.



Average and 95% CI are shown
Δ: Difference, NS: No significance. *: p <0.05, ** p <0.001, *** p <0.0001