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Original Article

Rapid survey on lifestyle changes and body weight gain among Algerians during COVID-19 lockdown

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Abstract

Objectives: To assess the potential influence of lifestyle changes during the first month of COVID-19 lockdown on body weight gains (WG) in an Algerian population cohort. **Subjects and Methods**: A sample survey, carried out using a self-administered questionnaire, sent on social networks to a random sample (172 participants). Anthropometric measurements were obtained as well as lifestyle factors including physical activity, diet habits, sleep, and screen time. **Results:** The average WG was; 1.02 ± 3.36, 1.18±2.15, and 0.95±3.79 (kg) for the total sample, men and women respectively. Δ-BMI (body mass index difference before and after one month of lockdown period) increased as following; 0.42±1.43, 0.39±0.68, and 0.43±1.66 (Kg/m²) for the total sample, men and women respectively. WG induced slightly changes from the normal BMI category to the overweight category for the total cohort (24.87±6.74 vs 25.28±7.19 kg/m²), women (25.13±7.65 vs 25.56±8.19 kg/m²) whereas no effect was reported in men (24.28±4.03 vs 24.67±4.15 kg/m²). A significant difference ($p < 0.001$) was revealed in men and women for sport practicing (53.33 vs 40.90 % respectively) and nighttime snacking (56.60% for men against 43.55% for women). Positive correlation between body WG and number of meals/day in men (r=0,341, p=0,012), while for women there was a positive correlation between WG change and both food intake (r=0.170, $p=0.066$) and nighttime snacking (r=0,228, $p=0,013$). Furthermore, a negative correlation between WG and sport practicing was found in women (r =-0.221, $p=0.016$). **Conclusions:** Significant WG was found during a short COVID-19 lockdown. The WG results presented herein were positively associated with certain lifestyle variables during the COVID-19 lockdown.

Keywords: Algerian population, BMI, COVID-19, lifestyle changes, lockdown, weight gain.

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1 Introduction

The first case of COVID-19 disease in Algeria was reported on 25 February 2020. Since then, it has progressed rapidly and the number of cases grows exponentially each day [1]. In order to contain the outbreak during the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak and during 2014 for Ebola outbreak in West African countries, traditional intervention measures such as lockdown, quarantine, and border control were found to be useful [2]. Coronavirus disease-2019 outbreak has also seen many countries asking people who have potentially come into contact with the infection to isolate themselves at home or in a dedicated quarantine facility [3]. Entire cities in China effectively were placed under mass quarantine, while many thousands of foreign nationals returning home from China have been asked to self-isolate at home or in state-run facilities [4]. Other intervention measures implemented during the outbreak include temperature monitoring, hand washing, restricted access to all medical facilities, fever screening at designated local hospitals, as well as mandatory face mask-wearing while in hospitals, public transportation, and other enclosed public places [2]. For this reason, drastic control measures have been taken by the Algerian government, by implementing several preventive strategies mainly, social distancing, movement restriction, quarantine, and lockdown. People are invited to isolate themselves or to be in quarantine and can only leave their homes if necessary [1, 5]. Despite quarantine and isolation can be very effective in protecting or restoring public health [6]. It is well known that it is often an unpleasant experience for those who undergo it. Separation from loved ones, the loss of freedom, uncertainty over disease status, and boredom can, on occasion, create undesirable consequences[3]. One of these consequences is the changes in the nutritional

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Table 1: Participants' characteristics before and after one month of lockdown period

Characteristics	Men (N=53)		Women (N=119)		Total (n=172)	
	Before	After	Before	After	Before	After
Age (years)	33.31±9.51		31.02±9.13		31.74±9.31	
Height (m)	1.77±0.08		1.62±0.11		1.67±0.12	
Weight (kg)	75.98±13.10	77.16±13.36	64.60±11.75	65.55±12.18	68.11±13.24	69.13±13.62
Δ–Weights	1.18±2.15		0.95±3.79		1.02±3.36	
p-value	*P = 0.633*		*P = 0.461*		*P = 0.417*	
BMI (kg/m²)	24.28±4.03	24.67±4.15	25.13±7.65	25.56±8.19	24.87±6.74	25.28±7.19
Δ–BMI	0.39±0.68		0.43±1.66		0.42±1.43	
p-value	*P = 0.532*		*P = 0.611*		*P = 0.453*	

habits due to reduced goods availability and a switch to unhealthy food, and the reduction of physical activities due to preventive measures applied by governments, to limit the spread of the virus infection, by prohibiting the majority of outdoor physical activities and gyms [2]. This study was conducted in order to assess the effects of the COVID-19 lockdown on the weight gain of an Algerian population cohort. We analyzed the results of a sample survey, which covered 172 participants, and we tried to establish the correlation between weight gain and individual habits and behaviors.

2 Subjects and Methods

The data of the current study were obtained using a sample survey, carried out through a self-administered questionnaire submitted to 172 participants randomly selected during the lockdown imposed by the Algerian government following the spread of the COVID-19 pandemic in Algeria (between March and April 2020). The questionnaire, drafted in two languages (Arabic and French), was sent by the internet in social networks and instant messaging platforms, focusing on anthropometric measurements data (Height, weight and Δ–weight, BMI and Δ–BMI) as well as the individual habits and behaviors (diet habits, physical activities, sleep and screen time). Changes in outcomes, over the two study time points (prior and over one month of lockdown period), were evaluated for significance using paired t-tests. Pearson correlations were conducted to analyze the relationship between lifestyle-related behaviors and Δ–BMI. Statistical analysis was performed by Sigma-Plot software and all data were expressed by means ± SD at $p < 0.05$ of significance.

3 Results

One hundred and seventy-two participants (age 31.73 ± 6.42 years) were composed of 69.66% women (n = 119) and 30.34% men (n = 53). Table 1 indicates that the weight gain averaged (Δ–weight) was 1.02 ± 3.36 kg, 1.18±2.15kg, and 0.95±3.79 kg for the total studied group, men and women respectively. Nevertheless, there was no statistically significant difference (p=0.417, p=0.461 and p=0.633 respectively) in body weight gain (WG) between groups. BMI increased between two point's time (Δ–BMI) by an average of 0.42±1.43, 0.39±0.68, and 0.43±1.66 for the total sample, men and women respectively. This WG caused a slight shift from the normal BMI category to the overweight category for the women (From 25.13±7.65 to 25.56±8.19). For men, no effect was reported (from 24.28±4.03 to 24.67±4.15). Figure 1 indicates WG as a function of the number of kilograms gained. 1.26% of cases had gained 6 kg, 4.40%: +5 kg, 3.77%: +4 kg, 9.43% : +3 kg, 14.74%: +2 kg, and 15.72%: +1 kg. While, the remaining cases represent those who have registered no body weight gain (25.79%) or less than 1 kg (24.89%).

Table 2 presents the results of the lifestyle questionnaire evaluation. No significant change was observed for eating frequency, sleep time, and screen time between men and women (p=0.909, p=0.507, and p=0.691 respectively). However, a significant difference (p<0.001) was observed between the two genders for sport (53.33% for men *versus* 40.90% for women) and nighttime snacking (56.60% for men *versus* 43.55% for women).

Table 2: Results of lifestyle-related behaviors questionnaire

Characteristics	Men (N=53)	Women (N=119)	*p-value*
Eating frequency (Meals/day)	3.04±0.93	2.99±0.71	P = 0.909
Night-time snacking (%-yes)	56.60%	43.55%	P < 0.001
Sleep time (h/day)	7.79±2.52	7.41±2.43	P = 0.507
Sports (%-yes)	53.33%	40.90%	P < 0.001
Screen time (h/day)	3.72±4.39	3.04±3.48	P = 0.691

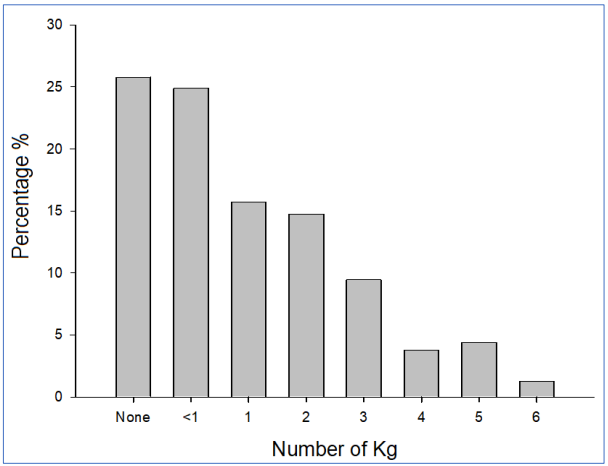

Figure 1: Frequency of weight gain based on the number of kilograms accumulated

Table 3 shows that the increase in body weight during the study period was correlated with three characteristics of lifestyle-related behaviors (eating frequency, night-time snacking and sport practicing). In men, there was a positive correlation between body WG and the number of meals/day (r=0.341, p=0.012), while for women there was a positive correlation between change in body weight and both eating frequency (r=0.170, p=0.066) and nighttime snacking (r=0.228, p=0.013), and a negative correlation with sport practicing (r=-0.221, p=0.016). Knowing that the pairs of variables with positive correlation coefficients and P values less than 0.050, tend to increase together. While the pairs with negative correlation coefficients and p values less than 0.050 when one variable tends to decrease, the other increases. In addition, for pairs with p values greater than 0.050, there is no significant relationship between the two variables.

Table 3: Result of the correlation study between Δ-BMI and lifestyle-related behaviors

	Men (N=53)		Women (N=119)	
	r	p-value	r	p-value
Δ–BMI vs Eating frequency	0.341	0.012	0.170	0.066
Δ–BMI vs Nighttime snacking	-0.114	0.419	0.228	0.013
Δ–BMI vs Sleeptime	-0.114	0.451	0.032	0.729
Δ–BMI vs Sports	-0.121	0.393	-0.221	0.016
Δ–BMI vs Screen time	-0.045	0.747	-0.054	0.560

4 Discussion

It is well known that confinement is often an unpleasant experience for those who undergo it and can occasionally lead to undesirable consequences [3]. These consequences concern nutritional habits changes and the reduction of physical activity due to preventive measures applied by governments, to limit the spread of the virus infection, by prohibiting the majority of outdoor physical activities and gyms [2]. Rundle *et al.* [7], in their study on COVID-19-related school closings and risk of WG among children, anticipate that this pandemic will likely double out of school time closings for several children in the United States and will exacerbate the risk factors for WG associated with summer recess. Furthermore, the study of Cooper *et al.* [8], on vacation weight gain in adults during a period of one to three-week vacation indicated that vacations resulted in significant weight gain (0.32 kg), and this WG persisted at the 6-week follow-up period. The WG appeared to be driven by increased energy intake above energy requirements. This gain could be a significant contributor to yearly weight gain in adults and therefore affect obesity prevalence. Previous studies on weight gains during the holiday season reported weight gains ranging from 0.4–0.8 kg [9, 10] with an average WG across all studies of 0.5 kg [11].

The WG in our findings was slightly upper than that reported in the previously cited studies, showing an increase in body WG of 1.02±3.36 kg of the questioned subjects during a period of one month. This WG caused a slight shift of BMI from the normal BMI category to the overweight category for women with no effect on men. A South African study, conducted on 1143 participants (aged 40–60 years), aimed to assess the socio-demographic, behavioral, and biological determinants of BMI, displayed an increase in obesity levels, particularly in women, despite evidence of high physical activity and a relatively low daily energy intake and the prevalence of overweight-obesity was 76% in women and 21% in men [12]. Other investigations indicated also that BMI was significantly higher in women than men and confirm our sex-specific variation in BMI [13, 14]. The present study showed that the increase in body weight was correlated with three characteristics of lifestyle-related behaviors (eating frequency, nighttime snacking, and sport practicing). In men, there was a positive correlation between body WG and eating frequency (r=0.341, p=0.012), while for women there was a positive correlation between change in body weight and both eating frequency (r=0.170, p=0.066) and nighttime snacking (r=0.228, p=0.013), and a negative correlation with sport practicing (r=-0.221, p=0.016). An investigation on socio-demographic, behavioral, and biological factors associated with BMI among men and women in Nairobi slums showed that bread consumption by men and sedentary life among women were the main risky behaviors that need urgent targeted interventions [15]. Another study conducted to examine demographic, behavioral, and dietary correlates of the frequency of fast-food restaurant use in 891 adult women showed that the

frequency of fast-food restaurant use was associated with higher energy and fat intake and greater body weight, and could be an important risk factor for excess weight gain in the population [16]. Colles *et al.* [17] indicated that night eating snacking was positively associated with BMI in the male gender. O'Connor *et al.* [18] showed that snacking frequency may be associated with higher or lower adiposity, with the direction of the association being differential by BMI status and dependent on snack food choice. Another study showed that social factors and television use during meals and snacks is associated with higher BMI [19]. A study conducted to compare the influence of different sports on fat mass and lean mass in growing girls conclude that practicing sports at an early age ensures a lower fat mass and higher lean mass compared to those who do not practice. These results may be useful as a preventive method of adult obesity. The study of Mikulovic *et al.* [20] conducted to assess the relationship between overweight, physical, behavioral, and psychological characteristics on 570 participants practicing sports for an average of 5.7 h / week, showed that the most important risk factor was gender. Women were at higher risk than men of being overweight (53.9% versus 39.9%) and obese (28.2% versus 9.5%).

5 Conclusion

To the best of our knowledge, this is the first study reporting the effects of a COVID-19 lockdown period (one month) on weight changes among Algerian population cohort. A significant body weight gain (1.02±3.36 kg) occurred during this period, which caused a slight shift of BMI from the normal BMI category to the overweight category for women, but had no effect on men. Furthermore, the weight gain we recorded was directly correlated to some lifestyle changes (eating habits and sports practicing) during the COVID-19 lockdown.

Like any scientific study, our investigation has some limitations, including the fact that our data was acquired in a small sample. This may be due to the lack of interaction with the self-administered questionnaire which represents a new concept for the participants receiving this questionnaire. However, of all questionnaires sent, only 187 (i.e. 78.57% of questionnaires sent) were returned to the investigator. After excluding participants who had been made an unusable questionnaire (lack of information) the survey involved only 172 participants (i.e. 72.27% of questionnaires sent.).

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