Study of the Association Between Quarantine and Risk Factors for Eating Disorders (ED) in Moroccan Adolescents During the COVID-19 Pandemic.

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ABSTRACT

Introduction: The quarantine caused by the COVID -19 pandemic has profound repercussions that can affect the daily lives of the population in different ways. Adolescents are among the age groups most vulnerable to these disruptions.

Objective: The objective of the present study is to identify the links between confinement and the appearance of risk factors for eating disorders (henceforth **ED**) in Moroccan adolescents.

Method: This is a cross-sectional study; aimed at some Moroccan adolescents aged 10 to 19 years, by using Google Forms for an online survey. A total of 375 adolescents participated in this national survey. The statistical analysis of the results allowed, on the one hand, detecting the effect of confinement on the eating behaviors of adolescents, and on the other hand, to predict the variables that could constitute risk factors for the onset of **ED** or relapse of **ED**.

Results: The analysis of the results shows that the appearance of anxiety in adolescents during confinement represents a highly significant risk factor for **ED** (OR = 14.10 [95% CI: 2.82 - 70.96] $p=0.001$).

Conclusion: The analysis of these results allowed us to conclude that confinement has a strong impact on the eating behavior of Moroccan adolescents, making them highly susceptible to developing an **ED**, hence the need to implement effective environmental prevention strategies to prevent the onset or relapse of **ED** in adolescents during future confinements.

Keywords: Adolescents - Confinement - Eating Disorders - Risk factors- COVID-19- Morocco

Introduction

In the context of the fight against COVID -19 and in order to limit its spread, countries are invited to continue to strengthen their preparedness for health emergencies, in accordance with the international health regulations ([https, 2020](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports)). In this situation, most countries, including Morocco, have declared a state of health emergency and home confinement. Morocco, which announced, via an official statement, the state of health emergency and quarantine from Friday, March 20, 2020 (Kaniasty,2020).The confinement and the social distancing are adopted to preserve the self and the other, and carrying they are also vectoring of isolation and feeling of powerlessness, even of uncertainty and exclusion (Kaniasty,2020).

The measures practiced during the home confinement could affect the daily life of the general population in different dimensions (economic, social, educational and health) and therefore, they could modify the lifestyles and daily habits of the human population (individuals). Indeed, several recent studies have shown the possibility that home confinement would have negative repercussions on the emotions and behaviors of the general population and those of children and adolescents. It can induce a brutal and durable disruption of rhythms, habits, social relations, etc. (Mengin, 2020). Home confinement leads to environmental changes that cause stress, which can lead to different reactions in children and adolescents. They may be more clingy, anxious, withdrawn, angry or agitated, or suffer from nocturnal disorder, among others ([https, 2020](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports)).

Indeed, home confinement would constitute a favorable environment for the appearance of risk behaviors that start at the age of adolescence (Michel et. al., 1999). It is accompanied by symptoms of anxiety, depression and negative emotions, as well as boredom, domestic violence and social isolation which are all risk factors for food restriction (anorexia nervosa), emotional eating and binge eating (Brooks, 2020, Stice, 2002 & Leehr et. al., 2015).

In this context, in Morocco, the abrupt cessation of schooling and the imprisonment of

adolescents at home, imposed by the confinement measures, are all factors that can disrupt the cognitive and affective balance in adolescents. Consequently the relationship: emotion-food that could be unbalanced, which puts this class of the population in front of a real danger of the emergence of the **ED** or relapse of the **ED**. In reason of these concerns, maintaining normal eating patterns during the COVID-19 pandemic among school-going adolescents is a necessity to preserve metabolic, psychological, cognitive, and emotional balances and to combat the negative effects of confinement. The recent nature of the epidemic does not allow us to have typical data on the impact of COVID-19-related confinement on **ED**.

Nevertheless, the literature suggests a risk of amplification of pre-existing **ED** and an increased risk of **ED** relapse (Mengina, 2020). For this reason, the present work seeks to identify in an implicit way the variables that could constitute latent traits of **ED** in adolescents. Several studies have shown the negative effect of life in quarantine on different variables that would constitute risk factors of **ED**: anxiety, lack of appetite, snacking, nutritional profile, physical activity, sleep disorder, depression, etc. (Schubnel,2008, Tourette-Turgis,2021, Ali,2019 & Brooks, 2020).

Therefore, the objective of the present work is to identify changes in eating habits and associated factors caused by home life during the COVID-19 pandemic and to determine the odds ratio (**OR**) of risk factors for eating disorders (**RFED**). All this to analyze the links between confinement and the onset of **RFED** in order to conquer a prediction that would help us to better protect adolescents from falling into the vicious cycle of **ED** and to better prevent the onset of **ED**.

1. Methods

2.1 Participants and Target Audience

The strict quarantine decreed by the Moroccan government as early as March 20, 2020, to contain the COVID -19 pandemic and which lasted for three successive months, could trigger profound health repercussions among adolescents. in this context The present study was conducted between April 10, 2020, and the end of June 2020. The survey targeted Moroccan adolescents between the ages of 10 and 19 from several Moroccan regions. The adolescents interviewed agreed to participate in the study online, via a digital questionnaire on Google forms.

2.1. Ethical Aspects

Prior to completing the questionnaire, the procedures and objectives of the study were explained to the adolescent participants in this study and their parents, and only after their consent were the study procedures applied to them.

All information collected on individuals was kept confidential and anonymous.

2.2.Properties and Survey Typology

This cross-sectional study used data collected via an anonymous online questionnaire with 31 items focusing on the lifestyle and dietary behaviors of Moroccan adolescents during the confinement period.

We distributed the questionnaire through different social networks (WhatsApp, Facebook, Twitter) In addition; the researchers involved in this project shared the questionnaire with their relatives and work colleagues.

The lifestyle and dietary habits of Moroccans were assessed, through the questionnaire items, in a comparative manner between before and after the confinement via four components:

- socio-demographic and family data;
- physical, health and psychological condition;
- eating practices and habits;
- sleep and physical activity.

During the development of the questionnaire items, both behavioral risks and living conditions of the population were considered in order to assess whether the concepts of health promotion and health education are well practiced during confinement.

To assess the consistency and reliability of the items developed, we examined the questionnaire through expert consensus in order to validate the choice of dimensions as well as the formulation of the questionnaire items, considering the targeted objectives and the initial research question. To measure the internal consistency of the questionnaire and its items, the results collected from the pilot survey were subjected to all the tests and statistical analyses (homogeneity test, conformity test, Cronbach's alpha).

2.3.Data Collection

Before collecting the survey data and to assess the internal consistency of the questionnaire, as well as the validity and reliability of the items, we distributed the questionnaire to a very small sample of 30 participants. The collected data are analyzed statistically which allowed us to increase the reliability of the questionnaire through the deletion of some items and the rewording of others, this leads us to a satisfactory reliability coefficient for this type of survey with Cronbach's alpha is equal to 74% (Martin & Douglas).

The data collection was carried out through a structured questionnaire created in Google Forms.

2.4.Data Analysis

As with any population survey, the data collected through this questionnaire is declarative. They are based on online questioning. As such, they are subject to a certain amount

of uncertainty (omission, involuntary omission, error, interpretation, exaggeration, social desirability, etc.). These uncertainties will be considered when interpreting and analyzing the survey data.

The data collected were imported using Excel and after preliminary operations (cleaning and coding), we analyzed them using the Statistical Package for Social Sciences (SPSS) version 25 software.

The data collected were analyzed first in an exploratory and descriptive manner to illustrate the sociodemographic information of the participants in relation to the binary variable that concerns the type of confinement (partial or total) (**Table1**).

Subsequently and to identify the correlation between the type of confinement (partial/total) and the probable risk factors of ED: anxiety - lack of appetite - snacking - sleep disorder - weight tendency - nutritional profile - physical activity, the data are submitted to the Chi2 test with a significance level $p < 0.05$, the intensity of the relations between the type of confinement and the factors of **ED** is determined via Cramer's V (Htts, 2020)

Finally, in order to identify the variables that could constitute risk factors for **ED** during confinement, we first screened cases with probable eating disorders or a tendency to **ED** via the Eating Attitudes Test (EAT-26). This self-report instrument consists of 26 items that assess the symptomatology and concerns characteristic of an **ED**. It is one of the most used instruments for the identification of anorexia and bulimia in clinical and general populations (Leichner et. al., 1994). Subsequently, we analyzed the data of the variables involved: tendency to **ED** as a dependent variable and the other explanatory variables (anxiety - lack of appetite - snacking - sleep disorder - weight tendency - nutritional profile - physical activity) as independent variables by means of binary logistic regression in order to identify the links between confinement and the occurrence of risk factors for **ED**.

2. Results

2.1 Descriptive Analysis of the Data

2.1.1 Socio-Demographic Data of the Sample Studied

The data collected concern 357 adolescents who participated in this survey. They belong to several regions of Morocco. The most frequent age range of the surveyed adolescents was 17 to 19 years (61.1%), with a predominance of girls (53.2%) compared to boys (46.8%), the sex ratio (M/F) is equal to 0.88. Regarding the level of education, 3% stated that they had no schooling, 6% had primary schooling, 28.9% had College secondary, 30.5% had Secondary school and 39.8% stated that they had a university degree (**Table 1**).

Table 1: Main Socio-Demographic Data of the Sample (N=357)

Variables	Sample %	Variable	Sample %
Gender (N=357)		Level of education(N=357)	
Girls	53.2	Without	3
Boys	46.8	Primary	6
Age groups (N=357)		college	28.9
[10-13 years old]	13.7	Secondary school	30.5
[14 -16 years old]	25.2	University	39.8
[17-19 years old]	61.1		

The descriptive analysis of the results obtained shows that most of the individuals who participated in the survey practice total confinement (**86.80%**) with very close percentages according to the gender variable, while the results related to partial confinement note that there is a predominance of the male gender (**72.30%**) at the expense of the female gender (**27.7%**) (**Table 2**).

Table 2: The Nature of Confinement Practiced by Adolescents by Gender (N=357)

N=357	Total Quarantine	Partial Quarantine	Total	Risk α
Male	49.70%	72.30%	52.70%	0.05
Female	50.30%	27.70%	47.30%	
Total	86.80%	13.20%	100%	

2.2 Anthropometric Characteristics

Anthropometric variables are processed via WHO instructions (Https, 2020). According to the statements of the surveyed adolescents, the average height is 166 cm with a standard deviation of 9.5 cm (95% CI [130 -192]), while the average weight is 58.88 kg $\pm$ 11.69 (95%CI [31 - 118]); the body mass index (BMI) is on average equal to 21.40 kg /m² $\pm$ 4 .34 (95 % CI [12.35-51.07]) (Table 3).

Table 3: Anthropometric Indices of the Sample (N=357)

Gender (N=357)	Statistical indices	Weight (Kg)	Height (m)	BMI (Kg/m2)
Males	Average	57.84	1.6896	21.8624
	Standard deviation	10.318	0.07934	4.27171
	Median	56.50	1.6400	21.3000
Females	Average	60.04	1.6399	20.8905
	Standard deviation	12.984	0.10469	4.36708
	Median	57.00	1.6800	20.4500
Total	Average	58.88	1.6634	21.4023
	Standard deviation	11.692	0.09537	4.33834
	Median	57.00	1.6500	20.8100

Anthropometry is applicable to assess body Height, its measurements reflect nutritional and health status, but it can also be used to predict ability, health status and survival (Https, 2020).

The BMI measurements of the Moroccan adolescents participating in this study allowed us to make the following interpretation: the sample is subdivided into four categories: **category 1**: underweight, it represents 24.4%, **category 2**: normal weight is the category that dominates and presents 60.8%, **category 3**: overweight, it constitutes 10.9%, **category 4**: obese, it represents the rest (3.9%) **Figure 1**.

Figure (1): Body Categories by BMI among Adolescents (N=357)

2.3 Analytical Study

2.3.1 Quarantine, Eating Habits and Practices

In order to identify the links that might exist between the type of confinement (partial or total) practiced by the adolescents surveyed and their eating habits and practices, we processed the data collected by the chi-2 test, only the variables that notable and significant results are reported and discussed. (Table 4).

Table 4: Links Between type of Confinement, Eating Habits and other Associated Variables

N =357		Type of confinement		Pearson's chi-square (Risk $\alpha = 0.05$)				V of Cramer
		Total	Partial	Value	ddl	Theoretical minimum staffing	Asymptotic significance (bilateral)	
Anxiety	Yes	89.8%	10.2%	28.762	1	4.21	0.000	0.284
	No	56.3%	43.8%					
Nibbling	Yes	98.9%	1.1%	171.952	1	9.87	0.000	0.694
	No	41.3%	58.7%					
Loss of appetite	Yes	91.1%	8.9%	57.077	1	4.21	0.000	0.40
	No	43.8%	56.3%					
Nature of	Sweet	97.3%	2.7%	68.657	2	6.85	0.000	0.44

food consumed	Fat	75.9%	24.1%					
	Salted	57.7%	42.3%					
Weight trend	No change	41.7%	58.3%	29.562	2	1.85	0.000	0.28
	Weight gain	94.7%	5.3%					
	Weight loss	84.5%	15.5%					
Sleep disturbance	Yes	94.1%	5.9%	40.587	1	13.56	0.000	0.34
	No	68.9%	31.1%					
Physical activities	Yes	7.4%	92.6%	141.57	1	7.77	0.000	0.63
	No	83.5%	23.4%					

Psychic and Emotional State

The comparison between the adolescents who lived in total confinement and those who lived in partial confinement shows that there is a very significant dependence ($p < 0.001$) between the type of confinement practiced and the presence or not of anxiety in them (Pearson Chi-square= 28.7), with a medium intensity of dependence (v. Cramer=0.28).

The result of our present study shows that being a fully confined adolescent increase the probability of falling into an anxiety state to 89.8% instead of 10.2% in the case of partial confinement.

Nibbling

The result obtained shows that there is a very significant dependence between the type of confinement practiced by the adolescents surveyed and the appearance of a snacking type of ED (Pearson's Chi-square= 171.95) with a strong relationship intensity (v. Cramer = 0.69)

In fact, it was found that most of the confined adolescents fell into a snacking type (98.9%),

as for those partially confined their percentage does not exceed (1.1%).

Appetite

The chi-square test notes that there is a highly significant dependence between the type of confinement (total or partial) and the loss of appetite (Pearson chi-square= 57.08), the strength of dependence between the two variables studied has a medium intensity (v. Cramer=0.40).

The results of this study reveal that most fully confined adolescents report that they have lost their appetite (91.1 %) compared to 8.9 for those who are partially confined.

Nutritional profile

The study of the dependence between the type of confinement practiced by the adolescents and the change in their nutritional profile, allowed us to find that there is a very significant relationship between the two variables studied (Pearson's Chi-square= 60.37) with a mean intensity of dependence (V. Cramer=0.41).

With certainty, the result of the collected statements shows that there is a marked difference in the nutritional profile between the totally confined and partially confined adolescents, so that the analysis of the data detects a significant tendency of the totally confined adolescents towards foods rich in sugars (97.3 %) and a tendency towards fatty foods (75.9%).

Body Weight Trend

The analysis of the data from the adolescents' declarations reveals that there is a very significant link between the variation of the adolescents' body weight trend and the type of confinement (Pearson's Chi-square= 29.56) and the strength of the link between the two variables is reported as average (**V. Cramer=0.28**). In fact, the body weight of most

of the adolescents participating in the survey who were completely housebound underwent a change (58.3%) either towards a gain in body weight (94.7%) or towards a loss of body weight (84.5%).

Sleep mode

The data processing by means of chi-square test, allowed us to detect a very significant dependence between the sleep disturbance of the confined adolescents and the type of confinement (Pearson chi-square= 40.59), with average intensity of dependence (V. Cramer=0.34). 94.1% of the totally confined adolescents declared that their sleep pattern was disturbed against 5.9 of the same declarations for the partially confined adolescents.

Physical activities

The study of the dependence between the physical activities practiced by the adolescents and the confinement indicates the existence of a very significant link between the practice of physical activities and the type of confinement (Pearson Chi-square= 171.69) and that this link is classified as very strong (V. Cramer=0.69). In this context, it should be noted that among all the adolescents surveyed and totally confined, 7.4% only affirmed that they did not do any physical activity during the confinement period, however 92.6 % of the partially confined adolescents affirmed that they regularly practiced physical activities.

2.3.2 Quarantine and Risk Factors for ED

The recent ownership of the pandemic does not allow us to detect specific data of the impact of COVID- 19 related quarantine on **ED**. Nevertheless, the literature suggests a risk of worsening pre- existing **ED** and an increased risk of **ED** relapse (Mengin, 2020). Indeed, processing the data collected through binary logistic regression allowed us to identify, among the variables studied, those that could constitute risk factors for **ED**.

This analysis is a prognostic study to predict odds ratios to see if these factors would be triggers for adolescent **ED** during confinement (**Table 5**).

The statistical indices obtained via this analysis show that the onset of anxiety in adolescents during confinement significantly represents a risk factor for **ED** (OR = 14.10 [95% CI: 2.82 - 70.96]

$p = 0.001$). Similarly, the occurrence of snacking in confined adolescents is highly significant as a risk factor for **ED** in confined adolescents (OR = 7.26 [95% CI: 3.18 - 16.56] $p < 0.001$).

Another variable that was found to be a risk factor for **ED** in homebound adolescents was loss of appetite (OR = 04.60 [95% CI: 1.02 - 20.77] $p = 0.047$). On the other hand, according to our study and the analytical analysis of its outcome, sleep disorder is not a risk factor in a significant way (OR = 12.82 [95% CI: 0.83-198.33] $p = 0.069$).

On the contrary, regular physical activity was a highly significant protective factor against the development of APD (OR = 0.01 [95% CI: 0.004 - 0.023] $p = 0.000$).

Table 5: Odds Ratio Estimates for Selected Habits in Fully Confined Adolescents

N=357	ddl	p-value	Odds Ratio	95% confidence interval for OR	
				Lower	Superior
Anxiety	1	0.001	14.141	2.818	70.958
Nibbling	1	0.000	7.256	3.180	16.558
Loss of appetite	1	0.047	4.602	1.020	20.770
Sleep disorder	1	0.068	12.820	0.829	198.330
Practice of the activities Physics	1	0.000	0.01	0.004	0.023

3. Discussion

The results of current study show that there are links between confinement and the appearance of risk factors that disturb eating behavior in adolescents. Indeed, several studies have shown that confinement has a profound negative impact on the health of

individuals in general and adolescents in particularity. When children are out of school, they experience decreased physical activity, much longer periods of screen time, irregular sleep patterns, less favorable diets and weight gain (Brazendale, 2017). These manifestations become more severe in confined adolescents. In this context, the results of several studies concerned with the effect of confinement on the habits of adolescents are consistent with those of current investigation. Nevertheless, current work detected in addition to that, the variables that could constitute risk factors for **ED** in adolescents during confinement.

Confinement can significantly affect human behavior, psychological, emotional and lifestyle states of individuals. Several studies have assessed the mental health status of the population in the first weeks of confinement. During this period, one study showed that **29%** moderate to severe anxiety symptoms were recorded in 1210 participants from the general population (Wang et. al., 2020). Another study showed that 56% of the adolescents surveyed showed a loss of pleasure, 48% anxiety, 46% sadness, 43% irritability, 43% attention difficulties, and 33% negative thoughts (Xavier, 2020).

In this context, our study states that there is a very significant link between confinement and the appearance of anxiety in adolescents. Indeed, on the one hand, home confinement leads to a total detachment to the events of the outside world; this will lead to a significant limitation of real social contact replaced in most cases by virtual groupings, and on the other hand, confinement constitutes a favorable context to trigger the risk factors of anxiety (family conflict, fear of the pandemic, feeling of insecurity...). Indeed, the feeling of hunger and the motivation to eat are increased under the effect of a negative emotion such as tension or anger (Macht, 2000) while the intensity of the emotions felt would tend to inhibit food intake (Macht, 2008). In this context, confinement constitutes a favorable environment to trigger these emotional disturbances.

It should also be noted that the increase in time spent in front of screens encourages snacking, reduces sleep time (which leads to an increase in food intake) and disrupts the

rhythm of life (Jean, 2020). Indeed, there are interrelations between the different factors studied. The disturbance of the Psychological state in adolescents leads to a disorganization of their emotional state in relation to food intake. The relationship between emotions and food consumption has been extensively studied in psychology and nutrition sciences. According to the concept of emotional eating, derived from the psychosomatic theoretical model, individuals may eat in response to negative emotions, such as sadness, anger or anxiety (Kaplan et. al., 1975).

Indeed, during quarantine life, the consumption of sugars would allow to fulfill the emotional needs of individuals. Thus, the sweet taste and sensory signals associated with high energy density could improve mood and reduce the effects of stress via the brain's dopaminergic and opioid neurotransmission (Adam & Epel, 2007). It should be noted that living in quarantine generates many visual, auditory, and olfactory stimuli that could induce adolescents to consume the food at every moment or continue to consume even when satiated; this puts adolescents, during confinement, at risk of falling into **ED**.

In summary, the home context is influenced by several dimensions (environmental, social, economic, and political) and one of their impacts could be manifested as **ED**.

An individual's eating behavior is determined by a set of biological, physiological and psychological factors (Bellisle, 2005) therefore the simultaneity of these factors with the phase of physical, emotional, and psychological instability in adolescents will amplify the risk of triggering or relapsing into binge eating disorder in them. According to the analysis

Figure (2): Relationship between Home Confinement, Eating Behavior and Associated Variables

of the results obtained, confinement increases the Odds Ratio (OR) of several variables (anxiety, loss of appetite, snacking...) that would contribute to the onset of **ED** in adolescents, so we can consider the variations of these variables as a precursor of **ED** onset in adolescents (**Figure 2**).

It is necessary to point out that the subject is integrated in his environment, the subject is at the same time autonomous but also dependent on the environment in which he draws his food (Morin, 1980).

Indeed, the eating behavior of adolescents depends on intrinsic factors that are related to physiological, psychological and emotional changes as well as epigenetic

determinants and other environmental factors related to the contexts in which adolescents live, the two types of factors do not operate separately, but there are permanent interactions between them.

Living at home, in the first place, means a profound change in the environmental context, which is subsequently translated into the appearance of risk factors that could disrupt behaviors in general among individuals and eating behaviors among adolescents in particularity (**Figure 3**).

Figure 3: Main Factors Influencing Eating Behavior

A reflection on this dependent autonomy should also lead to going beyond the strictly educational framework to look at the transformation of the environmental context from a health promotion perspective.

4. Conclusion

In conclusion, this work provides a descriptive and analytical analysis of how the COVID-19 pandemic has changed the dietary patterns of Moroccan adolescents. Quarantine generates new contexts that lead to profound disruptions in adolescents' lifestyles.

The concordance of the confinement with the physiological, psychic and emotional instability that characterizes the phase of adolescence makes the appearance of some variables, during this period, real risk factors of triggering or relapse of **ED**. These new habits could be established and have a subsequent impact on public health. The present study has both a prognostic and preventive objective to combat the negative impact of confinement on adolescent behavior.

Therefore, in order to better orient health prevention measures and to preserve the emotional eating balance in adolescents, it is important for decision makers and healthcare actors to know the contexts in which the relationship between confinement and its impact on eating behavior in adolescents operates.

In addition, health promotion strategies and actions must take into account the influence and interaction of environmental factors related to confinement and individual factors related to the demands of the adolescent self on adolescent eating behavior.

Analysis of the contexts and risk factors for **ED** during quarantine life may provide insight into how preventive measures can be adopted and guide health policymakers to encourage adolescents to adopt healthy habits.

Discriminating between factors and contexts associated with confinement on the one hand and factors and contexts associated with the adolescent self on the other could appropriately target nutritional measures and interventions from a realistic perspective and guide the implementation of effective environmental prevention strategies to prevent the onset or relapse of **ED** in adolescents during future confinements.

References

<https://www.who.int/fr/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/q-a-coronaviruses>. [Accessed August 5, 2020].

Adam, T C, Epel, "eating and the reward system. *Physiol Behav*," pp. 449-458, E. S. (2007).

Ali, Mahmoud A. Al-Shaikh. "Attitudes of Obese Women Toward Group Therapy as A method of Increasing Compliance with Therapeutic Program in Gaza Strip, Palestine."3(1),2019

Brazendale K, and al, "Understanding the differences between children's summer and school obesogenic behaviors: the structured days hypothesis," *International Journal of Behavioral Nutrition and Physical Activity* , vol. 100, p. 14, 2017.

Brooks K, and al, "The psychological impact of quarantine and how to reduce," *The Lancet*, pp. 912-920, February 26, 2020.

Brooks S, Webster R, Smith L, and al, "The psychological impact of quarantine and how to reduce it: rapid review of the evidence," *Lancet*, no. %1395(10227):912-20, 2020.

E. Morin, "La Vie de la vie," *Paris: Le seuil*, 1980.

F. Bellisle, "Hunger and satiety, control of food intake," *Endocrinology Nutrition*, vol. 10.1016, no. 1S1155- 1941(05)24795-9 , p. 10, 2005.

G. Michel, C. Marie and S. Mouren, *Comportements de prise de risque à l'adolescence*, Éditions GREUPP éd, 1999, p. 401.

<https://lemakistatheux.wordpress.com/2013/05/31/le-v- de-cramer/>. [Accessed November 5, 2020].

https://www.who.int/childgrowth/publications/physical_status/fr/#:~:text=Les%20mesures%20anthropom%C3%A9triques%20sont%20le,de%20sant%C3%A9%20et%20la%20survie. [Accessed November 2020].

Jean PT , Interviewee, "When covid-19 invites itself to the table..." (Endocrinology and Nutrition, Clin. Univ. St-Luc, UCL; BASO), 2020.

Kaniasty K, "Social support. interpersonal, and community dynamics following disasters caused by natural hazards," *Curr Opin Psychol*, 2019.

Kaplan H I , Kaplan H S, *Nerv J*, "The psychosomatic concept of obesity", 1957.

Leehr E, Krohmer K ,Schag K, and al, "Emotion regulation model in binge eating disorder and obesity - a systematic review. *Neurosci Biobehav: a systematic review*," *Rev* 2015;49:125-34.

Leichner P, Steiger H, et al, "Validation of an eating attitude scale in a French-speaking Quebec population," *Canadian Journal of Psychiatry*, vol. 39, pp. 49-54, 1994.

Macht M, Simons G, "Emotions and eating in everyday life," *Appetite*, vol. 35(1), pp. 65-71, 2000.

Macht M, "How emotions affect eating: a five-way model," *Appetite*, vol. 50(1), pp. 1-11, 2008.

Martin B J, Douglas A G, "Statistics notes: Cronbach's alpha," *BMJ*, vol. 314, no. 7080, p. 572.

Mengin A, "Psychopathological consequences of confinement," *Encephale*, June 2020.

Mengin A, and al, "Psychopathological consequences of confinement," *The Brain* , vol. 46, pp. 43-52, 2020.

Mengina A, and al, "Psychopathological consequences of confinement," *Encephale*, no. %11258, p. 10, 2020.

Schubnel C A E, "Major behavioral disorders of the confined **ED**," *Pet Medical and Surgical Practice*, vol. 43, no. %1Issue 2, pp. 63-70, 2008.

Stice E, " Risk and maintenance factors for eating pathology: a meta-analytic review. *Psychol Bull*: a systematic review," 2002;128(5):825.

Tourette-Turgis M C, "Lifestyle changes and psychosocial impact of COVID-19-related quarantine," *Medicine of Metabolic Diseases*, vol. 15, no. %1Issue 1, pp. 40-44, February 2021.

Wang C, Pan R, Wan X, and al, "Immediate psychological responses and associated factors during the initial stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China," *Int J Environ Res Public Health*, vol. 1729, p. 17, 2020.

Xavier B, and al, "Impact of confinement on the emotional state of children and adolescents in care for psychological disorders: a study on a clinical population followed in the Amiens region," [Online]. Available: <https://www.sfsa.fr>. [Accessed December 22, 2020].