Effects of COVID-19 in endocrine patients: results of a sicilian experience

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Abstract

In March 2020 the World Health Organization declared the "pandemic state" due to COVID-19 imposing strict confinement of the world population. People were forced to spend more time at home, changing some daily routines, including social interactions, the possibility to perform sports, and diet habits. These changes could exert a greater impact on patients suffering from chronic diseases, such as endocrine patients. This study aimed to assess the effects of Covid-19 induced quarantine on daily habits in a group of patients with endocrine disorders, focusing on food consumption, eating, and sleep habits during the confinement.

Eighty-five endocrine patients were enrolled. A structured interview was administered investigating: socio-demographic information, general medical conditions and habits adopted during the quarantine. All patients underwent the Spielberger State Anxiety Inventory (STAI-Y1) to assess state anxiety.

Subjects had mainly a sedentary lifestyle. We found a significant increase in the number of cigarettes in smokers, an increase of meals consumed during the confinement and a high rate of sleep disorder occurrence, especially insomnia.

The changes of daily habits were, probably, due to the alterations of routine, that determined more bore and inactivity during the day.

Keywords: COVID-19; Lockdown; endocrine diseases; daily habits; food consumption; sleep disorders; anxiety.

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Introduction

In December 2019 China was affected by **Severe Acute Respiratory Syndrome Coronavirus 2** (**SARS-CoV-2**). It reached Italy at the end of February 2020, hitting primarily the Lombardia and then spreading throughout the territory [1]. As with other respiratory pathogens, the virus could be transmitted from human-to-human, so isolation represented the best way to contain this epidemic. On March 11, the World Health Organization (WHO) declared the "pandemic state" leading governments of the mainly affected countries to impose strict confinement on their citizens. In Italy, on March 8, the Government had already established extraordinary measures to limit viral transmission; the quarantine of the population has been implemented since on March 10 [2]. This event exerted the strongest impact on the life of every individual on many levels (personal, work, social, economic and psychological) after the Second World War. Some new rules had imposed, such as working from home and closing schools, shops, restaurants and any business or service considered non-essential in order to slow down the spread of the contagion and thereby prevent the collapse of health care systems [3]. These measures had a great impact on population's general health; therefore, it was necessary to create and disseminate screening and treatment programs to ensure the population and workers health [4]. The imposed lockdown, indeed, forced people to spend more time at home, changing some daily routines, including social interactions, the possibility to perform sports, and diet habits. Interruption of work routine could lead to boredom, and continued exposure to information about COVID-19 from the media can be stressful. Both these conditions lead people to eat too much, preferring sugar-rich "comfort foods" [5], but also to upset their circadian rhythms, which are no longer punctuated by daily activities [6].

Studies showed that dysfunctional eating behaviors are often related to endocrinological disorders [5; 7; 8]: endocrine signals emerged as a particularly important aspect of eating physiology [9]. The malfunction of the endocrine system can have important repercussions on nutrition. For this reason,

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in this study, we aimed to assess the effects of Covid-19 induced quarantine on daily habits in a group of patients with endocrine disorders. In particular, we focused on food consumption, eating and sleep habits during the confinement, taking into account the relationship between these aspects, the presence of anxious symptoms and the specific endocrine syndrome (thyroiditis, osteoporosis, etc).

Materials and Methods

This is a retrospective study, based on a structured interview on food-related habits during the Covid-19 pandemic, conducted on eighty-five patients with endocrine disorders admitted as outpatients. They were patients known in the surgery, followed by the endocrinologist also during the lockdown thanks to periodic check / consultation calls (once every 15/20 days).

The structured interview included 3 sections: a section relating to socio-demographic information; a section relating to general medical conditions (present pathologies and comorbidities); a section on habits adopted during the quarantine, especially dietary behavior, social interactions, sleep routine, physical activity and the adoption of healthy habits (i.e., taking supplements, eating healthier, reducing salt and soft drinks, etc.). Moreover, the Spielberger State Anxiety Inventory (STAI-Y1) was administered to assess anxiety caused by a specific condition (state anxiety) [10].

All subjects signed informed consent and anonymity was guaranteed. The patients were included in this study, according to the following criteria: (i) the presence of endocrinological pathologies also in comorbidity (osteoporosis, metabolic diseases, thyroid dysfunctions); (ii) age over 18 and under 80. While, exclusion criteria were: (i) neurological or psychiatric disorders; (ii) story of eating disorders or malnutrition.

Study population

Eighty-five subjects (18 males and 67 females) with mean age of 59.4 ± 13.8 years and with education of 10.6 ± 3.5 years were enrolled in this study. A more detailed description of the sample is reported in Table 1.

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Statistical Analysis

Descriptive analysis of sample was report on demographic and clinical variables. Continuous variables were expressed as Mean ± standard deviation, whereas categorical variables in frequencies and percentages. A nonparametric analysis was carried out because the results of the Shapiro normality test indicated that most of the target variables not were normally distributed. Thus, the Wilcoxon sum rank test was used to compare continuous variables, whereas the χ^2test with continuity correction was used to assess for statistical differences in proportions. Correlations between variables were assessed by mean of the Spearman's rank correlation coefficient. Finally, a multiple logistic regression was performed with the aim of investigating possible predictors of sleep disorder among clinical (anxiety, comorbidity, physical wellness) and socio-demographic (age, gender, education, type of job) variables. We applied a backward elimination stepwise procedure for the choice of the best predictive variables according to the Akaike information criterion (AIC). Analyses were performed using an open source R3.0 software package (R Foundation for Statistical Computer, Vienna, Austria). Statistical significance was set at $p<0.05$.

Results

General clinical picture

Around 80% of the subjects suffered from a chronic disease, indifferently by gender ($\chi^2(1) < 0.001$; $p = 0.99$). Nobody resulted to be infected by the COVID-19 virus, and only 6% had a family member or an acquainted infected.

Lifestyle and habits

Subjects had mainly a sedentary lifestyle: 52.9% did not practice sport, 10.6% practiced sport less than one hour per week, 31.8% practiced sport more than 2-3 hours per week, 4.70% practiced sport 4 hours per week. Although 78.8% of subjects were no-smokers, about 72.2% of smokers had a significant increase in the daily number of cigarettes ($\chi^2(1) = 51.69$; $p < 0.001$). About 63.5% of subjects declared an increase of meals consumed during the COVID-19 quarantine, with an increase

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of 1-2 kg in 63.5% of subjects, and of more than 3 kg in 30.6%. Indeed, around 62.4% of subjects consumed several snacks and light meal, besides the three main meals (i.e. breakfast, lunch, dinner). However, only 33% of subjects declared of being motivated to follow a health-diet after the quarantine.

Physical wellness and anxiety

The mean physical wellness of the interviewed, measured on a 0-10 range scale, was 6.3 ± 1.4, which resulted to be correlated with age ($r = -0.24$; $p < 0.05$) and education ($r = 0.25$; $p < 0.05$). No significant correlation between the physical wellness and anxiety emerged ($r = -0.14$; $p = 0.2$). However, around 34% of subjects presented anxiety, although this was only significant associated with the presence of sleep disorders ($\chi^2(3) = 18.86$; $p < 0.001$). Notably, the proportion of insomnia in anxious subjects was significantly higher than in people without anxiety symptoms ($\chi^2(1) = 6.8$; $p < 0.01$).

Sleep disorders

We found a high rate of sleep disorder occurrence (62.4%), especially insomnia (36.5%). Thus, we divided the sample in two groups by the presence/absence of sleep disorder. The backward elimination stepwise procedure identified the logistic model including as predictors physical wellness, anxiety, and type of job. Notably, physical wellness resulted to be a predictive factor (OR = 0.38; 95%CI = [0.95,0.66]), whereas anxiety (OR = 1.22; 95%CI = [1.10,1.40]) was a risk factor for sleep disorder, as well as working in public and private offices and being a student (Table 2).

Discussion and Conclusions

The literature on the effects of COVID-19 and lockdown on the western population has underlined that this radical and unexpected change of habits and freedom, led to an increase in psychiatric symptoms [2; 6]. The main stressors have resulted to be the duration of the quarantine were fears of infection, frustration and boredom, inadequate supplies and inadequate information [11].

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In Italy, the first country in Europe seriously affected, the distribution of cases has been concentrated more in the north (especially Lombardy, Emilia Romagna and Veneto). Maugeri et al. [12], found a smaller proportion of cases in Sicily, with a case fatality risk stably stood around 0.7%. A plausible explanation was that Sicily's regional health system did not experience the same emergency observed in north Italian regions. For this reason, we could hypothesize that in Sicily the emotional effect was less than in other regions: these data could explain our findings, which are in contrast with literature data [2; 5; 13] . Only a part of our sample recorded some significant changes in daily routine and no significant results was found in the onset of psychiatric symptoms due to quarantine. A significant change was found in the sleep routine. This fact can be explained both as somatization of anxious symptoms or as an effect of the changes imposed by the lockdown that may have altered the circadian rhythms. Indeed, insomnia could be a result of worries, tension, and alertness, due to the adverse outcomes of this epidemic [14]. Anxiety was a predictor of insomnia symptoms, as well as working in public and private offices and being a student. Moreover, the change in sleep routines could be due also to the alterations of daily habits, that determined more bore and inactivity during the day. These elements could be responsible for other significant data, such as the increase of meals consumed during the confinement (with an increase of 1-2 Kg) and the increase in daily numbers of cigarettes in smokers. It would be interesting to investigate what are the single factors that have brought about a change in the sleep routine: going to bed late, waking up late, sleeping in the afternoon, exercising, not feeling tired or being too bored, for example. We have not found any relationship between endocrine pathologies and changes in food consumption, daily habits or psychiatric symptoms. So we could affirm that the presence of chronic disease did not exert any effects on how the pandemic was addressed. Indeed, despite the drastic and sudden change, our patients have not undergone trauma or changes in disease management, contrary to what other studies have claimed.

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Probably, our contrasting results are due to the good management they have had of their illness, also supported by the availability of the medical-health team, who followed them over the phone even during the lockdown.

However, a limitation of our study was that a questionnaire on adherence to pharmacological and non-pharmacological therapies was not included; moreover, we could study the patient-medical relationship and the role of a multidisciplinary team. Another limitation was that it could be aimed at a larger population, but we preferred to interview patients immediately after the pandemic to have more likely data on the conduct related to the pandemic.

In addition to placing emphasis on prevention, future research should focus on the importance of patient adherence and care, this was a very encouraging interpretation of the results of our study as despite the pandemic, patients did not have their clinical conditions worsened.

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Authors Contributions:

Conceptualization, Elisabetta Morini and Francesco Corallo; Methodology, Rosanna Palmeri, Giuseppa Maresca, Maria Cristina De Cola and Lilla Bonanno; Formal Analysis, Maria Cristina De Cola and Lilla Bonanno; Investigation, Rosanna Palmeri and Elisabetta Morini; Resources, Adriana Andaloro, Santina Caliri and Rosanna Palmeri; Data Curation: Adriana Andaloro, Santina Caliri and Rosanna Palmeri, Writing – Original Draft Preparation, Rosanna Palmeri, Maria Cristina De Cola, Lilla Bonanno, Giuseppa Maresca; Writing – Review & Editing, Francesco Corallo, Giuseppa Maresca, Elisabetta Morini.; Visualization, Francesco Corallo.; Supervision, Francesco Corallo, Giuseppa Maresca, Elisabetta Morini and Placido Bramanti”

Disclosure of interest

The Authors declare no conflicts of interest

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Table 1. Demographic characteristics of the sample.

Characteristics	**All**	**Males**	**Females**	**p-value**
Participants, N (%)	85	18 (21.2)	67 (78.8)	-
Age (years)	59.4 ± 13.8	65.83±7.35	57.71±14.71	**0.02**
Education (years)	10.6 ± 3.5	9.94±3.55	10.76±3.53	0.39
Marital Status, N (%)				0.28
Single	10 (11.8)	0	10 (14.92)	

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Married	69 (81.2)	18 (100)	52 (77.61)	
Separated/ Divorced	3 (3.5)	0	2 (2.98)	
Widowed	3 (3.5)	0	3 (4.48)	
Children, N (%)				0.44
No	74 (87.1)	1 (5.55)	10 (14.92)	
Yes	11 (12.9)	17 (94.44)	57 (85.07)	
Family members, N (%)				0.71
1	6 (7.1)	1 (5.55)	5 (7.46)	
2	34 (40.0)	9 (50)	25 (37.31)	
> 2	3 (52.9)	8 (44.44)	37 (55.22)	
Job, N (%)				**< 0.01**
Pensioned	26 (30.6)	11(61.11)	15 (22.39)	
Unemployed	6 (7.1)	0	6 (8.95)	
Housewife	20 (23.5)	0	20 (29.85)	
Student	3 (3.5)	0	3 (4.48)	
Public Employee	13 (15.3)	2 (11.11)	11 (16.42)	
Private Employee	7 (8.2)	2 (11.11)	5 (7.46)	
Freelance Professional	2 (2.4)	1 (5.55)	1 (1.49)	
Artisan/Trader	5 (5.9)	2 (11.11)	3 (4.48)	
Laborer	3 (3.5)	0	3 (4.48)	

Significant differences are in bold.

Table 2. Backward Logistic regression: significant predictors of sleep disorder in COVID-19 quarantine.

Predictors	Odds Ratio	Std. Err.	Wald z	[95% Conf. interval]		p-value
Physical wellness	0.383	0.31	-3.12	0.95	0.66	< 0.01
Anxiety	1.222	0.06	3.33	1.10	1.40	< 0.001
Job – public employee	326.849	1.96	2.95	11.10	2674.69	< 0.01
Job – private employee	46.136	1.86	2.06	1.65	291.58	0.04
Student	60.249	1.97	2.08	1.62	478.53	0.04

Pseudo-R^2=0.57; Prob > $\chi^2(10)$ < 0.001

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