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Impact of COVID-19 Confinement on the Lifestyle and Metabolic Control of Adult Patients with Type 2 Diabetes Mellitus in the City of Buenos Aires (Argentina)

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ABSTRACT

In 2020 in our country, a new pandemic with high social impact is added to the growing incidence of type 2 diabetes mellitus (DM2): COVID-19. In this context, it is necessary to obtain evidence as to whether the isolation measures to stop the spread of the virus brought about changes in the lifestyle and in the clinical-metabolic parameters of patients with DM2 treated at the Italian Hospital of the Autonomous City of Buenos Aires. Changes in lifestyle were evaluated using a questionnaire designed ad hoc. The clinical-metabolic parameters were obtained from the clinical history of each patient. Descriptive statistics were used for data analysis using IBM SPSS software. The sample consisted of 83 patients, with an average age of 64 ± 8 years and a prevalence of the male gender (69%). 52% perceived that the months of confinement did not affect their diet, indicating that they had continued with the same consumption of fruits, vegetables and snacks, fried or processed (53%, 54% and 45%, respectively). The majority (74%) mentioned doing less physical activity and 65% had presented at least one negative emotion. Body Mass Index (BMI), body weight, and HbA1c were significantly ($p<0.05$) higher after isolation. In the population studied, ASPO was associated with reduced physical activity, negative emotions, and increased BMI, body weight, and HbA1c.

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Abbreviations
ASPO: Preventive and Mandatory Social Isolation
BMI: Body Mass Index
DM2: Diabetes Mellitus Type 2
HbA1c: Glycosylated Hemoglobin

Introduction

At the beginning of 2020, Argentina, like everyone else, was affected by a pandemic: COVID-19, caused by the SARS-CoV-2 coronavirus [1]. In March of the same year, the national government ordered throughout the Argentine territory, the Preventive and Mandatory Social Isolation (ASPO) as a measure to reduce the circulation of the virus and the consequent contagion of the population. Despite the measures adopted, the Metropolitan Area of Buenos Aires (AMBA) was the region where most of the cases from all over the country were concentrated and, therefore, where the mandatory confinement was most extended [2]. The loss of freedom, uncertainty and monotony, were aspects that were making it a difficult stage to travel [3]. As a consequence, most of the daily spheres of people were affected, bringing with them a strong impact at the social level, especially in the patient with some associated chronic pathology [4].

Type 2 diabetes mellitus (DM2) is a chronic, progressive disease with a multihormonal background [5], with high prevalence worldwide. The clinical course, metabolic control and prognosis of this endocrine disorder have been associated with lifestyle components, such as type of diet, physical activity, and chronic stress, among others. Talking about control in DM2 means achieving goals in glycemia, glycosylated hemoglobin (HbA1c), lipids, and anthropometric measures related to fat accumulation [6]. So much so that, given the sudden irruption of the COVID-19 pandemic in the lifestyle of the population, some authors considered that social confinement would bring with it an increase in the number of patients with uncontrolled diabetes and its complications [7].

In order to obtain evidence on the impact of ASPO on patients with type 2 diabetes mellitus, the present work aimed to evaluate the lifestyle and metabolic control of these patients treated at the Italian Hospital of the Autonomous City of Buenos Aires, before and after ASPO due to COVID-19.

Material and Methods

To this end, a retrospective, observational, longitudinal study was carried out in 83 patients with DM2 between 42 and 75

years of age, of both sexes, treated at the Italian Hospital of the Autonomous City of Buenos Aires. As an inclusion criterion, those patients with a year or more of evolution of their diabetes at the time of the beginning of the mandatory isolation (March 20, 2020), and those who had two biochemical controls in 2020 participated in the study: one prior to the start of the ASPO (before March 20), and another after the end of the ASPO in the AMBA (from November 9) [8]. Patients who were hospitalized, suffered from COVID-19 and/or had changes in their pharmacological scheme for diabetes during the period March-November 2020, as well as those with chronic complications of diabetes and pregnant or breastfeeding women, were excluded from the study.

Lifestyle changes were assessed through an ad hoc questionnaire, consisting of a total of thirteen questions and disseminated through Google Forms. The metabolic control data corresponding to the values of HbA1c and body weight were obtained from the clinical history of each patient before and after the ASPO.

The data obtained from the questionnaire, together with those obtained from the medical history, were systematized and uploaded to a database through Microsoft Office Excel. Statistical analyses were performed with IBM SPSS v23.0 software. To describe quantitative variables, the mean was used as a measure of central tendency, and the standard deviation was used as a measure of dispersion. The qualitative variables were presented with absolute frequencies and their respective percentages. T-tests from dependent samples were used to assess whether the mean differences in HbA1c and body weight were significant between the values found before and after the ASPO. The statistical significance α was 0.05.

Results

The sample consisted of a total of 83 patients, with a predominance of the male gender (69%) and an average age of 64 ± 8 years. 42% had between 5 to 15 years of evolution of their diabetes. In relation to the type of treatment received, the majority (93%) was under pharmacological scheme.

Lifestyle

Regarding the impact of ASPO on food, more than half of respondents (52%) perceived that ASPO did not affect their diet and 12% did so sparingly. The percentage of patients who indicated maintaining fruit and vegetable consumption during the time of confinement was 53% and 54%, respectively. Likewise, almost half (45%) said they did not modify the amount of snacks, fried foods and processed as a result of the ASPO, 31% indicated that they reduced their intake and 24% that they increased their intake. 58% of patients indicated that they did not change the number of meals made in the day, while 34% expressed that they increased the frequency.

In relation to the consumption of alcohol and tobacco, this was not modified as a result of isolation in those who had the habit (59% and 12%).

With regard to physical activity, the majority of patients (74%) reported having reduced physical activity as a result of as PU, 14% said they had not been affected while the remaining 12% were able to perform more. In relation to the emotional impact, 65% reported having presented at least one negative emotion during the ASPO, with anxiety, anguish and anger being the most mentioned among those who suffered them (38%, 35% and 31%).

Diabetes Management

59% of patients felt that their diabetes was not affected by the mandatory confinement; while 14% perceived that the ASPO had little influence on the management of their disease and the remaining 27% that it did so to a large extent. So much so that all patients who were under pharmacological treatment (n=77), continued with the taking of medication and / or application of insulin in the period of confinement studied.

Metabolic Control Parameters

Body weight increased significantly ($p<0.05$) after ASPO. Among those who gained weight during confinement (47%), the majority (54%) had a gain of between 1 to 3kg, 28% from 3 to 6kg, and 18% from more than 6kg.

With respect to HbA1c, statistically significant differences were found between the mean before and after the March-November period (6.87 ± 0.9% vs. 7.01 ± 0.99%).

Discussion

In our work, it was observed that the intake of foods with immunomodulatory potential, such as fruits and vegetables, remained unchanged for more than half of the patients. With regard to the consumption of snacks, fried or processed, the same trend was evidenced as for the group described above: the majority continued to consume the same amount, finding that almost a quarter of the respondents increased their intake. Similar results were shown by authors who evaluated the effects of confinement in patients with DM2 from the State of Kerala, India, observing that the consumption of fruits and vegetables was lower than before isolation for 22% and 10% respectively, while they found that 25% of the studied population increased the intake of snacks, frying or processed [9]. Other studies evaluated dietary changes from confinement in Argentina and Poland, finding that fruit and vegetable intake was the same as before isolation for most participants [3, 10].

In relation to the number of daily meals, in our work it was observed that 58% of patients did not modify the number of meals made in the day, while 34% made more meals than before. Another research assessed the same aspect in northern India, noting that 23% of DM2 patients included in their study maintained the number of meals per day [7]. The effects of three months of COVID-19 confinement were studied on obese patients in the city of Valladolid, Spain, finding no change in the number of daily meals [11]. Other authors were observed, in people from the city of Galicia, Spain, an increase in the number of meals, with less healthy food choices [12, 13]. Likewise, those who participated in the study realized in Mexico City reported eating all the time during the months of restrictions, behavior that they did not have before experiencing that period [14].

The results of the work carried out show the impact of the months of isolation on physical activity, as one of the aspects of lifestyle where health measures most influenced, coinciding with authors who showed that, as a result of the months of confinement lived, physical activity was reduced, noting a greater sedentary lifestyle [15, 3, 16]. So much so that, in our study, 74% (almost 3/4 of the patients) indicated having done less activity than before the start of the restrictions, while 12% reported doing more and 14% indicated having continued with the same physical activity. Similar findings were described by authors who evaluated changes in physical activity from confinement in patients with DM2, in the city of Madrid, Spain, demonstrating a significant decrease in the time spent doing some type of activity [17, 18]. Other research revealed

that the COVID-19 lockdown had a negative effect on all activity levels and an increase in the time people spent sitting, while a study conducted in Spain in patients with chronic diseases found that one of the most commented drawbacks was the difficulty in doing physical activity [13, 19, 20].

Not only physical activity was affected during this time, but also mental health. The data found in our research show that a large part of the patients (65%) presented at least one negative emotion, with anxiety being the most selected, followed by anguish and anger (38%, 35% and 31%, respectively), coinciding with what was found by other authors where exposure to epidemics and confinements is consistently related to negative psychological effects [14]. In this regard, in a study carried out in the city of Andalusia, Spain, express that people with chronic diseases experienced difficulties during confinement beyond the risk of contagion, related to their emotional experience, generating an emotional state of uncertainty and fear, intensified by being considered "risk groups" [20]. In a study conducted in Fujian Province, China, argue that the period of isolation negatively impacted the psychological state of subjects with DM2, while other authors observed that 87% of patients with DM2 in northern India were affected due to the psychological stress experienced during quarantine [7, 21].

The majority of the patients included in our study (73%) perceived that the confinement did not have an impact on the management of their diabetes or that it did so scarcely, not coinciding with what was mentioned by other authors about the health measures taken hindered the continuity in the care that all chronic disease supposes [22].

With regard to nutritional status, the majority of patients (94%) of our work were overweight (overweight or obese) at the time of initiation of health measures. However, after the ASPO, they showed a significant increase ($p<0.05$) in body weight, reflected in an increase in their Body Mass Index (BMI). Almost half of the patients (47%) gained weight, with the average gain being 3.7 ± 2.6 kg. 54% had an increase of between 1 to 3kg and 18% suffered an increase of more than 6 kg as a result of the months of confinement studied.

Similar results were observed in research of elderly people with DM2 in Italy, where both body weight and BMI presented significant differences ($p<0.05$) before and after confinement [23]. The same aspect was studied by other authors in the same country, observing that the confinement due to the COVID-19 pandemic had a negative impact on the anthropometric parameters evaluated in patients with DM2, manifesting itself in a significant increase in BMI and body weight [24]. Likewise, a significant increase in body weight ($p<0.05$) was found in patients with DM2 after six months of confinement [25]. In this regard, in an observational study conducted in Italy in patients with obesity (BMI ≥ 30kg/m2) it was found that both body weight and BMI were significantly higher ($p<0.001$) after the first month of confinement [19]. However, authors observed that BMI in patients with DM2 was the same before and after the state of emergency [26].

Other researches have shown a weight gain in patients with DM2 during the pandemic months studied [7, 27]. In a study conducted worldwide, it was found that 40% of Argentines surveyed mentioned having gained weight, with an average of 7.5 kg [28]. In turn, a study in our country finding that 42% of patients with DM2 reported an increase in their body weight and 16% reported increasing more than 5 kg [29].

In relation to glycemic control, the patients included in the present study showed a statistically significant increase ($p<0.05$) in HbA1c as a result of the months of confinement studied ($6.87 \pm 0.9\%$ vs. $7.01 \pm 0.99\%$). Researches conducted during the COVID-19 pandemic have shown that adult subjects with DM2 manifested worse glycemic control, probably due to the impact of quarantine on lifestyle [21]. Numerous authors pointed out that the prolongation of restrictions exacerbated the situation of people with diabetes, contributing to metabolic deterioration [30]. Similar results were presented by some authors who observed that the levels of this parameter were significantly higher compared to before the start of sanitary measures [18, 24, 26].

The COVID-19 disease has become one of the most important pandemics worldwide, producing a new public health crisis that threatens humanity. Within this framework, the preventive and mandatory social isolation (ASPO) measures had important repercussions on patients with DM2, in the Autonomous City of Buenos Aires, Argentina.

The aspects in the impact of isolation were observed were on the performance of physical activity and on the mental health of the patients studied. The confinement hindered the continuity of the prescribed physical activity, noting a reduction in the amount performed. In turn, a high percentage of patients were affected emotionally, manifesting anxiety and anguish mainly.

In the present work, no significant variations were found in the eating behaviors studied before and after the ASPO, observing that most patients continued to consume the same number of fruits, vegetables, snacks, fried and processed foods, and to make the same number of meals a day. Likewise, the practices of alcohol and tobacco consumption, in those who had the habit previously, were not modified by the confinement. However, during this time the patients reduced physical activity, manifested negative emotions and presented alterations in the metabolic parameters studied, evidencing an increase in their BMI, body weight and HbA1c.

Conflict of Interest

The authors declare that there is no conflict of interest.

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