



ORIGINALES

Impact on chronic patients in a Basic Health Zone of Toledo in the COVID-19 Pandemic

Repercusiones en pacientes crónicos de una Zona Básica de Salud de Toledo en la Pandemia COVID-19

Soledad Gómez-Escalonilla Lorenzo¹

Daniel Susín López¹

Xaime Santiago Subiela¹

Blanca Notario Pacheco²

¹ Centro Salud de Torrijos. Unidad Docente Multiprofesional de la Gerencia Atención Primaria de Toledo. Toledo. Spain. solefuensa@hotmail.com

² Faculty of Nursing, University of Castilla-La Mancha, Cuenca, Spain.

<https://doi.org/10.6018/eglobal.540881>

Received: 1/10/2022

Accepted: 19/01/2023

ABSTRACT:

Introduction: People with chronic diseases are vulnerable to disruption of care and stress with the COVID-19 pandemic. Their post-confinement cardiovascular risk needs to be reassessed.

Objective: To assess the impact of confinement and modifications in health care system on the health of people with chronic diseases in a Basic Health Zone in Toledo during COVID-19 pandemic.

Methods: Analytical, observational, longitudinal, retrospective study. Patients with chronic pathologies. Random sample 420. Review of clinical records to collect clinical/metabolic parameters before and after confinement. Number and type of nursing visits and hospital admissions before, during and after confinement.

Results: 349 records were evaluated. Mean age 65.36 and 52.7% were men. It was found that after confinement there was a significant decrease in weight ($p=0.046$) and increase in diastolic blood pressure ($p=0.018$) in the whole sample. The decrease in weight was greater in women, patients aged >65 years, those with hypertension and those with hyperlipidemia. In terms of clinical variables that increased post-confinement figures, an increase in LDL cholesterol was observed in patients aged >65 ($p=0.005$). Increased diastolic blood pressure in women ($p=0.005$), patients aged >65 ($p=0.022$) and those with hypertension ($p=0.038$) and increased systolic blood pressure in women ($p=0.041$).

Increased post-confinement admissions ($p=0.001$); 57.1% of admissions were related to their chronic pathology and a decrease in nursing visits during and post-confinement ($p=0.000$).

Conclusions: Chronic patients have worsened conditions related to their pathology during and after confinement. Decreased face-to-face patient care during this period could be a contributing factor to this situation.

Keywords: Coronavirus infections; COVID-19; chronic disease; Noncommunicable diseases; impacts on health.

RESUMEN:

Introducción: Las personas con enfermedades crónicas son población vulnerable a la interrupción de la atención y al estrés producido con la pandemia por COVID-19. Se necesita reevaluar su riesgo cardiovascular postconfinamiento.

Objetivo: Evaluar el impacto del confinamiento y modificaciones en sistema de atención sanitaria en la salud de personas con enfermedades crónicas de una Zona Básica de Salud de Toledo durante la pandemia COVID-19.

Métodos: Estudio analítico, observacional, longitudinal, retrospectivo. Pacientes con patologías crónicas. Muestra aleatoria 420. Revisión historias clínicas para recogida parámetros clínicos/metabólicos antes y después confinamiento; N.º y tipo visitas enfermería e ingresos hospitalarios antes, durante y después confinamiento.

Resultados: Se evaluaron 349 historias. Edad media 65,36 y el 52,7% fueron hombres. Se encontró que tras el confinamiento hubo una disminución significativa de peso ($p=0,046$) y aumento de presión arterial diastólica ($p=0,018$) en toda la muestra. La disminución de peso fue mayor en mujeres, mayores de 65, hipertensos y personas con hiperlipidemias. En cuanto a variables clínicas que incrementaron sus cifras postconfinamiento, se observó aumento colesterol LDL en mayores de 65 ($p=0,005$). Aumento presión arterial diastólica en mujeres ($p=0,005$), mayores de 65 ($p=0,022$) e hipertensos ($p=0,038$), y aumento de presión arterial sistólica en mujeres ($p=0,041$).

Aumento ingresos postconfinamiento ($p=0,001$); 57,1% de ingresos estuvo relacionado con su patología crónica y una disminución visitas enfermería durante y postconfinamiento ($p=0,000$).

Conclusiones: Los pacientes crónicos han empeorado sus condiciones relacionadas con su patología durante y después del confinamiento. La atención presencial disminuida durante este período podría ser un factor que ha contribuido a esta situación.

Palabras clave: Infecciones por coronavirus; COVID-19; enfermedad crónica; enfermedades no transmisibles; impactos en la salud.

INTRODUCTION

In December 2019, the first confirmed case of severe acute respiratory syndrome infection (SARS-CoV-2) was reported in Wuhan, China, triggering an outbreak that was declared a pandemic by the World Health Organization (WHO) on 11 March 2020⁽¹⁻⁴⁾.

In Spain, a state of alert was declared on 14 March 2020, which implied home confinement to reduce the number of infections and deaths caused by SARS-CoV-2 infection. This state of alert lasted for more than 3 months and ended on 20 June 2020⁽⁵⁾.

During confinement, almost all activities were restricted, and only essential activities were allowed. Mobility was limited to the purchase of food and medication, with telecommuting encouraged and any outdoor activity or exercise prohibited. Around the world, government restrictions have cancelled, postponed, or limited priority primary care and hospital visits. In addition, fear of acquiring SARS-CoV-2 has kept people away from their health care providers.^(2-4,6,7)

In addition, most global health resources are focused on the care of people with COVID-19 disease. This can hold back the follow-up of patients with chronic non-communicable diseases (NCDs)^(2,6,8-11). Diseases affected by this reduction in resources include diabetes^(9,12), chronic obstructive pulmonary disease (COPD)⁽⁹⁾, high blood pressure (HBP)^(9,13), heart diseases^(8,9,11), asthma^(11,14), cancer^(8,9) and depression^(8,9).

Routine checkups were interrupted by Public Health measures put in place to prevent SARS-CoV-2 infection (2,3,6,9,10,15,16). In the Study of the Impact of COVID-19 on people with chronic diseases conducted by the Platform of Patients' Organizations, we found that up to 69% of the participants had several consultations cancelled (15).

Delays in diagnosis and inefficient management of chronic diseases during the months of March to June have caused an increase in complications and mortality not associated with COVID-19. (7,11,17). On the other hand, the pandemic has increased the risk of depression and feelings of isolation and loneliness, even more so since confinement (2,8,10,14,18). These symptoms can lead to increased blood pressure, elevated glucose levels and increased occurrence of asthma attacks (14).

This scenario has required the use of new strategies to maintain the care of people with NCDs (8-10), telephone consultations (9,10), telehealth (7,8), telematic platforms for psychological support (7-10). Thus, 14% of health professionals recognize that they continue with face-to-face follow-up for all consultations, 35% indicate that they attend part face-to-face and part by telephone, and 45% carry out all consultations by telephone (9).

A direct consequence of the cancellation of face-to-face care was the lack of adherence to drug treatment. The study conducted by the Platform of Patients' Organisations found that nearly 25% of respondents sometimes forgot to take their medication, and 6.7% were even left without medication. (15).

However, research on the status and management of these chronically ill patients in the context of COVID-19 as well as the consequences of confinement in chronic diseases remains very limited (3,15). People with NCDs are a population particularly vulnerable to disruption of care and stress from situations such as the COVID-19 pandemic (2,8). A significant proportion of mortality in the post-disaster phase is due to the failure of health services to meet the needs of patients with NCDs (3,17). Preparedness is needed to address the likely increased burden of cardiovascular risk following the period of confinement. To this end, cardiovascular risk should be re-evaluated in these patients, assessing their physical status, metabolic parameters, and psychological state (2,19).

Therefore, the overall objective of this study was to assess the overall impact of confinement and modifications in the health care system during the COVID-19 pandemic on the health of people with chronic diseases. As specific objectives we established: 1) to compare the clinical and metabolic parameters of this population group before and after confinement; 2) to analyze the frequency and modality of visits (nursing consultations, hospital admissions) of chronically ill patients before, during and after confinement.

MATERIALS AND METHODS

Design, population, and sample

This is an analytical, observational, longitudinal, and retrospective study carried out in the Basic Health Zone of Torrijos. This health area is made up of 9 localities with a total population of 24,132 inhabitants.

The study population consisted of patients with chronic pathologies in this Basic Health Zone under periodic follow-up by nurses in Primary Care (PC). The people with chronic pathologies most frequently seen in these consultations are people with high blood pressure, type 2 diabetes mellitus, obesity, hyperlipidemia, chronic heart failure (CHF), chronic renal failure (CKD) and chronic obstructive pulmonary disease (COPD).

The inclusion criteria were:

- Patients over 18 years of age.
- To be registered with a health card in the Basic Health Zone of Torrijos.
- People with the chronic pathologies specified above.
- Acceptance of the informed consent form by telephone.
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The exclusion criteria were:

- Patients with chronic pathology diagnosed after 1 September 2019.
- Institutionalised patients.
- Patients with no clinical and/or metabolic parameters recorded in their medical history from 1 January 2019 until the start of the alarm state.

A request was made to the Primary Care Management Department of Toledo for a list of patients with the pathologies described above and for permission to access the medical histories of these patients, in accordance with the current regulations of SESCAM (Castilla-La Mancha Health Service) (Circular 1/2009).

A search was carried out in the Data Exploitation Module of the Computerized Clinical History System of Primary Care of the SESCAM (Turriano), obtaining a total of 3720 patients.

To calculate the sample size, the "Sample Size Calculator" software was used: <https://www.surveysystem.com/sscalc.htm>; assigning an error of 5% and a confidence level of 95%, obtaining a sample of 348 patients.

The type of sampling used was simple randomized. Randomization was performed by a person outside the study, in this case, belonging to the Teaching Unit of the Primary Care Management Department of Toledo. In the randomization, 20% more patients were included to make up for the exclusions due to lack of registration in the medical histories ⁽²⁰⁾, making a total of 420.

Variables of the study

The study variables were:

- Sociodemographic: Sex, age, and locality of the Basic Health Zone.
- Clinical variables: morbidities, whether the patient has had COVID-19 infection, total number of active medicines in the clinical history.
- Laboratory parameters of scheduled analyses: glycated haemoglobin, basal glycaemia, total cholesterol, LDL, triglycerides, and creatinine.
- Somatometry: weight and BMI (body mass index).

- Blood pressure (BP) figures: measurements taken in consultation: The mean of the BP of two measurements taken in consultation in the 6 months before and 6 months after confinement.
- Related to the frequency and modality of nursing consultations of these patients: Total number of nursing consultations 6 months before the alarm state, during the alarm state and 6 months after the alarm state; type of consultation in each of the periods described above: N° of telephone consultations/ N° of face-to-face consultations/ N° of home consultations.
- N° of admissions and whether they are related to a decompensation of these pathologies: Total number of hospital admissions 6 months before the state of alarm, during the state of alarm and 6 months after the state of alarm; specify whether the reason for admission is related to their chronic pathologies.

Data collection procedure.

For each variable (except socio-demographics), the last measurements before confinement ⁽⁶⁾, on March 14th 2020, were selected and compared with the first one after home confinement ⁽²¹⁾, on May 1st 2020, since from this date onwards, non-professional physical activity in the open air was allowed during the health crisis caused by COVID-19.

A data collection sheet was used with the study variables specified above, which was completed by reviewing medical records. The data were obtained from the Computerized Primary Health Care History or from the Clinical Viewer, which allows us to consult the Hospital's history.

Statistical analysis

Firstly, a descriptive analysis of the different variables collected was carried out. Quantitative variables were expressed as means and standard deviation (SD) and qualitative variables as absolute and relative frequencies.

The Kolmogorov-Smirnov test was used to check the normality of the data.

To determine whether there are differences between the different clinical and metabolic parameters, the parametric Student's t-test, or the non-parametric Wilcoxon test for two related samples was used. And the non-parametric Friedman test for three related samples.

In all analyses, a value of $p < 0.05$ (95% confidence interval) has been established to be considered statistically significant.

SPSS version 25.0 (SPSS Science, Chicago, Illinois, USA) was used for data analysis.

Ethical considerations

This research obtained a positive evaluation from the Clinical Research Ethics Committee of the Area of Health from Toledo, Spain on May 26th 2021, (Reg. N° 725). The participants' data have been processed in accordance with Organic Law 3/2018, of December the 5th, on the Protection of Personal Data and the Guarantee of Digital Rights.

RESULTS

Characteristics of the participants

Of the 420 medical records reviewed, 349 participants met the inclusion criteria and made up the final study sample.

52.7% (184) are men with a mean age of 64.84 years (SD=14.732), while that of women is 69.67 years (SD=14.167).

Participants have a mean number of diseases of 2.77 (SD=1.320). The included patients have a mean of 6.17 (SD=4.104) active medicines on the medication sheet of their primary care medical record.

Of these chronic patients, 12.9% (45) have had COVID-19 infection. The characteristics of the sample are described in Table 1.

Table 1: Socio-demographic/clinical characteristics of the sample

Variable		N	%
Sex	Men	184	52.70%
	Women	165	47.30%
Age	< 65 years	140	40.10%
	> 65 years	209	59.90%
Chronic disease	High blood pressure	288	82.50%
	Hyperlipidemias	205	58.70%
	Diabetes Mellitus	136	39%
	Obesity	131	37.50%
	Chronic Renal Failure	18	5.20%
	Chronic Obstructive Pulmonary Disease	14	4.00%
	Chronic Heart Failure	8	2.30%
COVID-19 infection	Yes	45	12.90%
	No	304	87.10%

Relationship between clinical and metabolic parameters before and after confinement

All chronic patients

In general, all clinical parameters increased after home confinement, finding statistically significant differences only in diastolic blood pressure (DBP) ($p=0.018$). The only variable that decreased after confinement was weight ($p=0.016$), (Table 2).

Table 2: Clinical parameters before and after confinement

Parameters	Before confinement Mean (SD) n	After confinement Mean (SD) n	p*
Glycated hemoglobin	6.44 (1.14) n=132	6.74 (1.17) n = 84	0.907
Basal glycaemia	112.74 (38.04) n =315	118.28 (48.44) n = 225	0.503
Total cholesterol	179.47 (35.05) n = 191	181.79 (38.63) n= 191	0.271
LDL-cholesterol	101.02 (30.90) n = 153	104.14 (33.83) n = 153	0.09
Triglycerides	141.08 (81.46) n = 296	146.58 (109.64) n = 296	0.551
Creatinine	0.98 (0.73) n = 305	1.00 (0.96) n = 214	0.120
Weight	80.76 (15.98) n = 202	77.67 (17.83) n = 106	0.016
BMI	30.43 (5.18) n = 200	29.68 (4.99) n = 103	0.111
SBP	133.14 (13.82) n = 286	136.51 (17.06) n = 188	0.080
DBP	78.24 (8.74) n = 286	79.89 (9.70) n = 188	0.018

* Paired Student's t-test or the non-parametric Wilcoxon test for two related samples.

SD=Standard deviation.

SBP=Systolic blood pressure. DBP=Diastolic blood pressure.

Relationship between parameters by age group (≤65 and >65 years)

In the age group ≤65 years no parameter shows statistically significant differences.

In the age group >65 years, a statistically significant increase in LDL (p=0.005), a decrease in weight (p=0.008) and an increase in DBP (p=0.022) were observed.

Relationship between the parameters by gender

In men, there were no statistically significant differences in any of the parameters.

In women there was an increase in systolic blood pressure (SBP) (p=0.041) and in DBP (p=0.005) and a significant decrease in weight (p=0.039).

Relationship between the parameters by chronic disease

In hypertensive patients there is a significant increase in DBP after confinement (p=0.038) and a significant decrease in weight (p=0.005). There is a loss of 81 hypertensive patients without blood pressure recordings after the confinement period.

In patients with hyperlipidemia there is a statistically non-significant increase in cholesterol, LDL and triglycerides, and a significant decrease in weight (p=0.033). There is also a loss of 52 patients in the records of total cholesterol, 38 in the records of LDL and 45 in the records of triglycerides after confinement.

In diabetic patients there is an increase in glycosylated haemoglobin, basal glycaemia, and a reduction in weight, not statistically significant. There is a loss of 30 patients in the records of glycosylated haemoglobin, 36 patients in the records of basal glycaemia and 37 patients in the recording of weight after confinement.

In patients with a diagnosis of obesity there is a decrease in weight and BMI, not statistically significant. Loss of 46 patients in the weight record after confinement.

Although the group of patients with chronic renal failure is less numerous, a statistically significant increase in creatinine is observed in these patients ($p=0.013$).

In patients with chronic heart failure, there were statistically non-significant changes: decreased weight and increased SBP and DBP.

There are no significant differences in the parameters of chronic patients who have been infected with SARS-CoV-2.

Hospital admissions and reasons for admission

There is a decrease in hospital admissions during confinement and an increase in admissions after confinement, which are statistically significant ($p=0.001$).

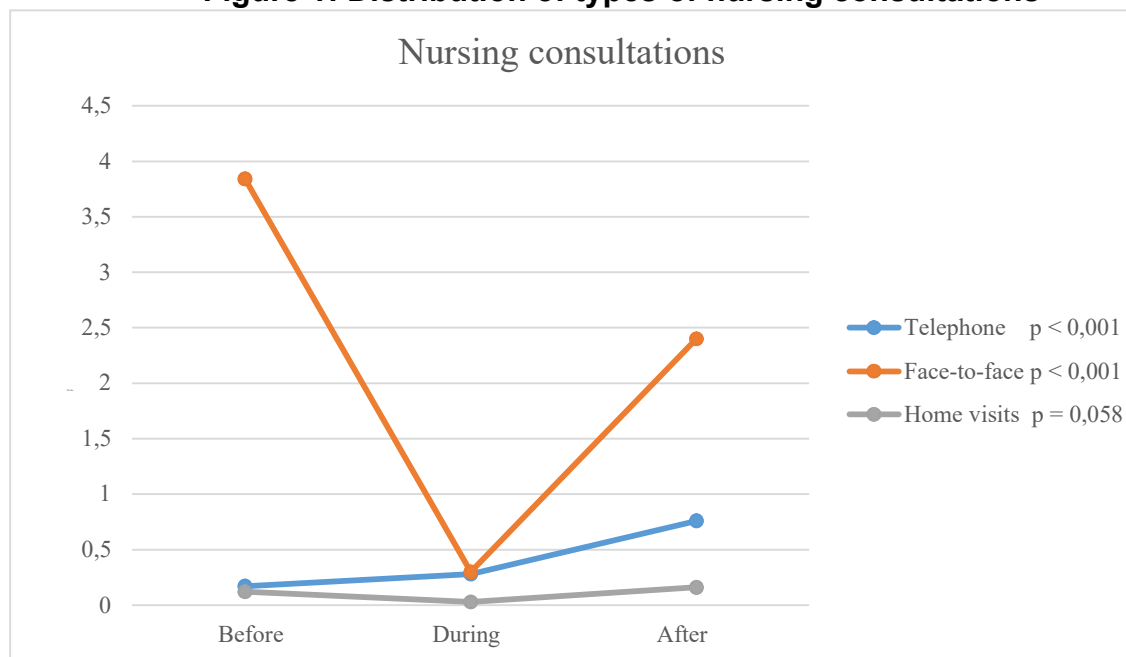
There is an increase in hospital admissions related to the underlying chronic pathology after confinement (57.1%).

Frequency and type of nursing consultations

There is a considerable decrease in the total number of nursing consultations during and after confinement, which is statistically significant ($p=0.000$).

Figure 1 shows the distribution of nursing consultations before, during and after confinement. During confinement there is a reduction in face-to-face and home visits and an increase in telephone visits.

Figure 1: Distribution of types of nursing consultations



Discussion

Main findings

During the SARS-CoV-2 outbreak, health systems began to postpone and reduce some aspects of routine chronic disease management, outpatient visits and non-urgent surgeries to avoid unnecessary hospital visits, reduce the burden on hospitals and reduce the risk of infection (2,3,6,7). It is known that even the patient considered clinically stable, considered to be low risk, requires close clinical follow-up, because there is evidence of silent disease progression and a significant incidence of events even in the presence of apparent stability (8,16,22).

The aim of this study was to assess the overall impact of confinement and modifications in the health care system on the health of chronically ill people in a Basic Health Zone during the COVID-19 pandemic. This study found a significant reduction in weight in the total sample, over 65 years, women and patients with hypertension and patients with hyperlipemia. There was also an increase in DBP in the total sample, over 65 years, women, and patients with hypertension, although this increase did not lead to clinically relevant changes, from a mean of 78.24 mmHg to 79.89 mmHg. There was a significant increase in LDL in patients aged 65 years, which has clinical relevance since for these patients with average cardiovascular risk in the SCORE tables, the therapeutic objective would be an LDL < 100 mg/dl, so this variation could imply the need to prescribe pharmacological treatment (23).

In the study population, we observed an increase in admissions after confinement and how these admissions are mainly related to decompensation and/or complication of their underlying chronic pathology.

In relation to the change in the nursing consultations, the reduction in the total number of visits of these patients with confinement may be related to the loss in the records of

each clinical/metabolic parameter that occurs in these patients, since the follow-up of these patients is mainly performed in the nursing consultations.

In terms of the type of visits, there was an increase in telephone consultations during and after confinement, and a decrease in face-to-face consultations. It should also be noted that consultations at home increase after confinement, which may indicate that there are chronic patients who require this type of care, as they are unable to get to the Health Centre.

Comparison with other studies

Regarding the weight reduction that appears in our sample, there are several reviewed articles that also identify modifications in weight ^(24,25,26). In the study by Bello Torres ⁽²⁴⁾, an increase in BMI is described. Martínez-Ferrán ⁽²⁷⁾ indicates that a reduction in physical activity leads to an increase in fat mass and a reduction in lean mass in overweight people.

The increase we describe in patients' DBP can be explained within the negative effects of confinement. Thus, Flaherty ⁽⁸⁾ states that confinement has negative socio-economic and psychological consequences, which are risk factors for atherosclerotic vascular disease. Mattioli ⁽¹⁹⁾ also links increased sympathetic nervous activity due to confinement with a negative effect on the heart and vessels. However, in Di Tano's study ⁽¹⁶⁾, in a sample of CHF patients, 78.4% remained unchanged in BP.

In relation to the increase in LDL in those over 65 years of age and also, in people with hyperlipidemia, Martínez-Ferrán ⁽²⁷⁾ indicates in his review that physical inactivity leads to an increase in total cholesterol, LDL and triglycerides. Changes in dietary habits have also been described that may have an impact on the metabolic control of chronic diseases ^(2,4,27). The combination of a balanced diet and regular physical exercise should serve to maintain a stable metabolic balance ⁽²⁷⁾.

In diabetic patients the increase in control parameters is possibly related to the change of habits during confinement. Increased consumption of sugary foods during confinement seems to have affected glycemic control in type 2 diabetics ⁽⁴⁾. Martínez-Ferrán ⁽²⁷⁾ suggests that reduced physical activity may worsen glycemic control in healthy adults, overweight people, and the elderly. Ghosal et al. have developed a predictive model to explore the impact of confinement in diabetic patients and have demonstrated the presence of a direct relationship between the duration of confinement and non-compliance with treatment, leading to an increase in glycaemia ⁽²⁸⁾. On the other hand, other studies show that the level of glycemic control improved or was maintained during confinement in patients with type 1 diabetes ^(12,25,29). In a study involving patients with DM2, the incidence of hypo- or hyperglycemia did not vary significantly ⁽²⁵⁾. These results have been related to the fact that taking time off work reduced their stress levels, gave them more time and allowed for greater adherence to healthy lifestyle habits ^(12,25).

People with chronic renal failure and chronic heart failure are recognized as one of the most vulnerable groups of chronic patients ^(8,16), so they are more at risk of severe COVID-19 ^(8,16), and the interruption of regular follow-up visits may affect them more than other chronic groups ^(2,8,16). Although in studies of patients with chronic heart

failure, postponement of scheduled visits did not cause significant clinical relapses^(16,30).

With regard to changes in nursing consultations, the adaptation to the situation caused by the pandemic has led to an increase in telephone consultations⁽⁸⁻¹⁰⁾ and a decrease in face-to-face consultations^(2,8-10). Some articles indicate that these changes in healthcare can have a negative impact on patients' health, delaying the diagnosis of serious pathologies or worsening chronic pathologies^(13,14,17,25,27). In our context, there is a significant loss in the records of clinical/metabolic parameters in chronic patients. On the other hand, the increase in hospital admissions related to chronic pathology after confinement, without being able to establish a clear causal relationship, may be related to the decrease in the number of face-to-face consultations during and after confinement. In this sense, more research on long-term complications is needed.

Strengths and limitations of the study

The main strength of our study is the fact that it provides more information on the impact of confinement on the follow-up of chronic patients, and it has been conducted in the context of Primary Care, which is where the usual follow-up of these patients takes place. Thus, we will be able to reorient and update health care systems to be able to cover and provide adequate follow-up to these patients, modifying the frequency and type of follow-up visits and/or reinforcing healthy behaviours and habits. Another strength is that it includes all chronic patients, with the pathologies that most frequently require follow-up. Probability sampling was used to select participants, which guarantees the representativeness of the population and makes selection bias less likely.

The limitations of the study are the usual limitations of a retrospective design. The project is based on a review of medical records, and therefore depends on adequate recording by the professionals attending the patient.

The records of the different parameters will be made at different times of the pandemic with different restrictions, so the conditions at the time of measurement will not be the same for all patients.

CONCLUSIONS

Changes were found in clinical/metabolic parameters of chronic patients and increased post-confinement admissions related to the underlying chronic pathology. One of the positive changes in the parameters is the decrease in weight in the whole sample and in some of the groups analysed; further research is needed to identify the causes of this change.

A decrease in nursing visits is described, which may be related to a loss in the records of these patients' parameters, since most of the follow-up of these patients is carried out in primary care nursing consultations.

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ISSN 1695-6141

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