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ORIGINAL ARTICLE

Effects of COVID-19 lockdown on the demand for health care of children and adolescents with burns

Efectos del confinamiento por COVID-19 en la demanda de atención de niñas, niños y adolescentes con quemaduras

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What do we know about the subject matter of this study?

During the COVID-19 pandemic, the studies on the demand for care of children with burns come from Europe, in small samples, and refer mainly to hospitalized patients. In outpatients, the results are contradictory regarding the demand for care.

What does this study contribute to what is already known?

In the initial phase of the COVID-19 pandemic, with strict confinement, there was a decrease in the demand for outpatient care for burn injuries, affecting patients with acute injuries and those requiring rehabilitation of sequelae equally.

Abstract

COVID-19 pandemic has meant adapting to a different reality, with long-term lockdowns that might cause an increase of burns in children at home. **Objective:** To compare the epidemiological situation of patients admitted to the *Corporación de Ayuda al Niño Quemado* (COANIQUEM) due to outpatient burn injuries management at the beginning of COVID-19 lockdown with the same period the year before. **Patients and Methods:** Analytical and cross-sectional study. A population of 2,027 patients under the age of 20, who were admitted to COANIQUEM for the first time with burn injuries, between April and July of 2019 and 2020 was analyzed. The number of patients admitted each month was registered as well as their demographic, social, and clinical characteristics. The monthly percentage variation was calculated by comparing patient data in both years. **Results:** During 2020, there was a 48.7% decrease in overall outpatient admissions. There was a relative increase of 10.5% in burns in patients under 5 years old, 18.3% in scalds, 33.1% in the number of burns in 3 or more body locations, and 16.8% in burns occurring at home. These parameters were not influenced by

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geographic location, sex, or socioeconomic level. **Conclusions**: In the first period of the COVID-19 pandemic, with strict lockdown strategies, there was a decrease in the demand for burn care, affecting both outpatients with acute burns and those who were admitted for sequelae rehabilitation, as a result of the effective decrease in the burns incidence and the reduced access to health care.

Introduction

The COVID-19 pandemic has meant changes in the daily life of society, affecting all sectors, forcing them to limit capacity, restrict services, and adapt public attention to this new reality. It has also affected health care providers, who have had to adapt to national and international standards for handling the crisis.

In Chile, the first confirmed case of COVID-19 was recorded on March 3, 20201. Since then, the outbreak has spread throughout the country, reaching all regions². On March 18, 2020, the President of the Republic decreed a "constitutional state of disaster emergency "for 90 days3. On June 15, and by Supreme Decree No. 104 of 2020 of the Ministry of the Interior and Public Security, the state of emergency was extended for a further 90 days4. On March 22, 2020, a curfew was announced to restrict the movement of people from that day on - between 22:00 and 05:00 hours - throughout the national territory, without a date limit and keeping supply lines and health and emergency care services operational^{5,6}. Preschool and school classes were completely suspended at the beginning of April⁷⁻⁹.

The government, through the Ministry of Health (MINSAL), has had as one of its objectives the prevention of the spread of the disease by urging the population to stay at home, the practice of handwashing, physical distancing, mandatory use of face masks, quarantine of infected cases, travel restrictions, closure of non-essential services buildings, cancellation of mass events, regional quarantine, and general confinement. Cases reported as infected with COVID-19 increased slowly initially in the country and rose steadily between May and July with a peak in June 2020¹⁰.

The COVID-19 pandemic has also led to a change in lifestyles regarding work, education, family, and social activity within the home. In studies before the pandemic, it has been observed that 88% of burns in children occurred at home^{11,12} and that the numbers increased in the colder months when they were in the house¹². Therefore, it could be expected that the longer children stay inside, the greater the demand for burn care, especially in autumn and winter. This led the Burned Child Aid Corporation (COANIQUEM) to carry out an intense burn prevention campaign through social

networks to warn the population of the most frequent mechanisms that cause these injuries.

Several burn patient care centers worldwide, in a period limited to the beginning of the pandemic, have reported their experience about the operation and management¹³⁻¹⁹, epidemiological changes^{20,21}, calls to the community^{22,23}, or studies on consultations, hospitalizations, and length of hospital stay²⁴.

COANIQUEM's rehabilitation centers located in Antofagasta (North Zone), Santiago (Central Zone), and Puerto Montt (South Zone) through an assistance agreement with the MINSAL are reference centers of the public health network, for outpatient care of children and adolescents with burn injuries, either in acute stage by spontaneous consultation, by referral from emergency services, or hospital discharge from various health care centers throughout the country, to start the rehabilitation of their sequelae²⁵.

Following the COVID 19 ministerial guidelines for prevention, the three facilities maintained face-to-face care for the population requesting initial health care, postponing follow-up visits that were not essential, and providing electronic consultation (e-consults) for patients in the follow-up stage of their treatment for sequelae.

The objective of this study is to present COANIQUEM's internal experience of care and the epidemiological situation of the population of children and adolescents in the first period of greater severity of the COVID-19 pandemic, in a comparative analysis with the same period of the previous year.

Patients and Method

Analytical and cross-sectional study. We worked with the database of the Institution's Computer System (IN-FOQUEM), obtaining authorization from the Scientific Ethical Committee of COANIQUEM to process the database with encrypted personal data of the patients (Certificate CEC_06-08-2020).

The population consisted of children and adolescents under 20 years of age, seen for the first time in COANI-QUEM in its Antofagasta, Santiago, and Puerto Montt Centers, between April 1 and July 31, 2019 and 2020, consulting in the "Wound Care Polyclinic" for burns

in acute stage caused by any causal agent or admitted for rehabilitation in the "Polyclinic of Sequelae". Children and adolescents with sequelae of another origin (dog bite, trauma, or post-surgical wound) were excluded.

The number of patients seen each month in the aforementioned Centers was collected, identifying specifically the residents in the commune of Pudahuel where the Santiago Rehabilitation Center is located. The following demographic, social, and clinical variables were recorded: sex, age, area of origin, health care insurance (as an indicator of socioeconomic level), care center, where the injury occurred, with whom the child lives, causal agent, depth of the burn, location, number of locations, time the injury occurred, and treatment in place of occurrence.

The percentage of change in the number of patients seen in COANIQUEM and the commune of Pudahuel, where the institution is located, between April and July, was calculated, comparing the year 2019 with 2020. Likewise, 2020 was compared with the 3 previous years to evaluate possible variations due to climatic changes. The demographic, social, and clinical characteristics of the selected years were included in an Excel spreadsheet and processed with the SPSS software version 25. Tests of independence based on Chi-square distribution were obtained for the variables studied. A p < 0.05 value was considered for all tests.

Results

From the database consisting of 2,315 patients seen in the three outpatient centers in the period studied between 2019 and 2020, 241 (10.4%) were eliminated because they were patients seen due to scars of another origin (dog bite, trauma, or post-surgical wound). Also, 47 patients (2%) older than 20 years were excluded.

The overall percentage change in the number of patients seen in the months studied between 2019 and 2020 was a decrease of 48.7% in the pandemic year and compared with 2017-2019, there was a decrease of 49.4%. The largest decrease (64.3%) was observed in May compared with 2019 and 65.3% compared with the previous triennium period. Admissions of residents of the commune of Pudahuel in total decreased by 52.5% in the years compared and by 81.5% in May (Table 1).

Among the demographic and social characteristics, changes were significant in age ($p \le 0.0263$), increasing the percentage of children under 5 years of age with burns in 2020; the place where the injury occurred due to an increase in the proportion of children burned within their own home ($p \le 0.0001$); and the increa-

se in the percentage of children living only with their mother ($p \le 0.001$) (Table 2).

Regarding the clinical characteristics, there was a significant change in the causative agent, mainly in hot liquid burns ($p \le 0.001$), the number of burn locations (3 or more lesions) ($p \le 0.03$), and the initial treatment in place of occurrence, showing an increase in applying only water to the burn, which can be observed in the pandemic period ($p \le 0.001$). (Table 3)

Discussion

In the period studied in 2020, there was a significant decrease in the number of outpatients admitted to COANIQUEM (48.7%) compared with the previous year. This decrease could be explained, in part, by the strict quarantine during the first months of the pandemic, which made it difficult for patients to travel, especially from other cities, and by the fear of being infected by SARS CoV-2 when going to a health care center and using public transportation. However, the reduction in admissions of patients from the commune of Pudahuel (Table 1), who had fewer transport difficulties because they lived near the Rehabilitation Center, would support the assumption that the lower number of burns was not due to this factor

At the international level, reports are contradictory. Some centers report an increase in admissions and hospitalizations as is the case of the Pediatric Care Center in Turkey, with 52% and 60%, respectively, for the population under 18 years between March 11 and June 11, 2020, attributable to the "everyone stay at home" health measures²⁶. Likewise, in an analysis between January and March of 2016 to 2020, the Pediatric Trauma Center in Poland records a significant difference from March 2020 with a 2.7-fold increase of hospitalized cases due to burns. The authors comment that the increase in the number of cases of pediatric burns could be related to the fact that children stayed at home with their parents, who had to take care of them but also telework at home²⁷.

Other articles share our findings, such as that of the UK Children's Burn Centre which, in a retrospective comparison over five weeks of government-mandated confinement from March 23, 2020, to April 30, 2020, with a similar period of 2019, find a 37% decrease in outpatients²⁰ or the one by the Pediatric Care Center in Bucharest, Rumania, which, in a comparative study from March 16, 2020, to May 15, 2020, with the same period in 2019, found 50.8% decrease in the total number of patients presenting to the emergency department with trauma and burns, and admissions of children with burns decreased by 41%.

It should be noted that in these international reports,

Month	COANIQUEM			change % in 2017-	change % in	Municipality of Pudahuel		change %
	average 2017-2019	2019	2020	2019 and 2020	2019-2020	2019	2020	
April	281	310	129	-54.1	-58.4	23	7	-69.6
May	337	328	117	-65.3	-64.3	27	5	-81.5
June	366	307	217	-40.7	-29.3	30	23	-23.3
July	384	395	224	-41.7	-43.3	38	21	-44.7
Total	1357	1340	687	-49.4	-48.7	118	56	-52.5

the numbers of patients seen are small and with observation periods from 1 to 3 months1^{3-14,18-21,24,26-30}. In the literature, there is more agreement on that mild cases and those secondary to contact with hot objects have decreased^{20,28,30,31} and that some patients with more serious burns have consulted with delay^{29,31}.

There are no official figures yet on hospitalizations of the most serious cases in the country to assert that these have also decreased due to the pandemic. However, patients admitted to COANIQUEM due to sequelae for rehabilitation, decreased in a similar proportion to patients who consult due to recent injuries in the Wound Care Polyclinic. These patients have less serious lesions because they only require outpatient treatment. On the other hand, the admissions to rehabilitation correspond to those patients whose hospitalization could not be postponed due to the greater depth or extension of their burn. These results could indicate a lower incidence of burns in children and adolescents in general, which was not initially expected due to the epidemiological antecedents of the high incidence of burns at home.

In the central zone of Chile, where most of our patients come from, temperatures drop progressively between April and July with the onset of winter³². Conversely, the number of children with burns increases (Table 1) due to the use of heating elements, consumption of hot liquids, and greater permanence of children inside the home, which facilitate their presence in kitchens.

When contrasting the admissions to COANIQUEM in 2020 with those of 2019, there was a considerable decrease in patients. However, when comparing June between these two years, the decrease in admissions does not follow the same trend as the other months. This is considered a one-off when comparing the average admissions of the previous three years, therefore ruling out any climatic factor affecting such a comparison. Moreover, the trend of increasing cases between April and July is more clearly seen when looking at the average admissions in the same months between 2017 and 2019, with average totals similar to 2019.

There was no significant difference in both periods in

terms of sex, but there was a significant age difference. The relative increase of 10.5% in children under five years of age with burns in 2020 could be because children of that age usually burn the most within the home, where they have had to stay the longest because of restrictions.

The lower demand for care affected the three centers equally, with no noticeable effect due to residence in different geographical areas of the country. The lower socioeconomic level did not cause a difference in the lower incidence in 2020, compared with the other groups.

In 2020, there was a 16.8% decrease in burns outside of one's own home, since the parents were also confined to their homes, without going to their workplaces, and did not leave their children in the care of other relatives or neighbors. Likewise, the risk of burns was higher in single-parent households consisting only of the mother due to the overloading of the woman and the fewer possibilities of supervising the children, which is probably achieved in nurseries and kindergartens and that, due to the pandemic, did not work in a face-to-face manner.

The relative increase in admissions due to hot liquid agents (18.3%) could be explained by the simultaneous decrease in burns due to hot objects. The latter could be influenced by the lower use of heating elements in April and May 2020 due to the unusually warmer temperatures during that year and because hot objects cause smaller injuries, which is why parents could decide not to consult and provide home care.

The increase in multiple lesions with 3 or more locations per patient (33.1%) is due to the higher relative percentage of burns by hot liquids in 2020. The decrease in hand burns would also be related to less exposure to hot objects, although it did not reach statistical significance.

An interesting finding was the better initial management of burns by using water alone or in combination, which would indicate favorable dissemination of preventive advice among parents, in this case as secondary prevention. However, there is not enough evidence to

	Year					
Characteristic	20 N°	119 %	2020 N° %		— p-value	
	1340	100.0	687	100.0	<u> </u>	
	1340	100.0	087	100.0		
Gender						
Femenine	658	50.2	331	48.2	0.1323	
Masculine	682	49.8	356	51.8	01.1025	
Age						
0-4	791	59.0	448	65.2		
5-9	310	23.1	122	17.8	0.0263	
10-14	156	11.6	78	11.4		
15-19	83	6.2	39	5.7		
Average ± DS	5.93 ±	4.38	5.08 ± 4.70			
Health care system						
Public system (A)*	468	34.9	220	32.0		
Public system (B,C y D)**	636	47.5	324	47.2	0.2490	
Private system***	183	13.7	118	17.2		
Data not available	53	4.0	25	3.6		
Origin location						
North of Chile	199	14.9	108	15.7		
Metropolitan Region	833	62.1	436	63.5		
South of Chile	304	22.7	141	20.5	0.7249	
Foreign	4	0.3	2	0.3		
Treatment center	7	0.5	2	0.5		
Antofagasta	152	11.3	90	13.1		
Metropolitan Region	934	69.7	460	67.0	0.3867	
Puerto Montt	254	19.0	137	19.9	0.5607	
	254	15.0	157	15.5		
Injury setting	1000	70.4	625	03.4		
Own home	1060	79.1	635	92.4		
A relative's or neighbour's home	189	14.1	41	6.0		
Public spaces	23	1.7	5	0.7		
Open air	22	1.6	3	0.4	< 0.0001	
Nursery school/school	16	1.2	-			
Other	11	0.8	-			
Data not available	19	1.4	3	0.4		
Housesharing with						
Both parents	863	64.4	428	62.3		
Only with mother	373	27.8	229	33.3		
Another relative	39	2.9	9	1.3		
Only with father	9	0.7	9	1.3	0.0009	
Other	4	0.3	2	0.3		
No data available	52	3.9	10	1.5		

^{*}FONASA A: People living in poor conditions and migrants, eligible for family subsidies (Law 18020). 100% public coverage. **FONASA B: People with a monthly income before tax \leq \$USD 427. 100% public coverage, and purchase of a free choice treatment coupon (in public or private systems). 1 \$USD = 788 \$CLP (oct.2020). **FONASA C: People with a monthly income before tax \leq \$USD 624,4. 90% public coverage, or purchase of a free choice treatment coupon (in public or private systems). **FONASA D: People with a monthly income before tax \leq \$USD 624,4. 80% public coverage, or purchase of a free choice treatment coupon (in public or private systems). ***Includes private insurance and the Army.

	Year				
Characteristic	2019	2020			
	Frequency	%	Frequency	%	
Total	1340	100.0	687	100.0	
Type of injury					
Acute	1179	88.0	611	88.9	0.2208
Sequelae	161	12.0	76	11.1	
Agent					
Hot liquid	695	51.9	422	61.4	0.0012
Hot object	566	42.2	224	32.6	
Fire and embers	39	2.9	18	2.6	
Friction	11	0.8	5	0.7	
Electricity	9	0.7	10	1.5	
Chemical/cold substance	11	0.8	4	0.6	
Unknown	9	0.7	4	0.6	
Depth					
Upper layer	279	20.8	143	20.8	0.0846
Intermediate layer	929	69.3	494	71.9	
Deep	108	8.1	46	6.7	
No data available	24	1.8	4	0.6	
N° of locations					
1	865	64.6	414	60.3	0.0374
2	272	20.3	135	19.7	
3-5	173	12.9	114	16.6	
6-10	30	2.2	24	3.5	
Time of injury					
0-8	92	6.9	33	4.8	0.2382
9-12	226	16.9	121	17.6	
13-16	245	18.3	149	21.7	
17-20	457	34.1	218	31.7	
21-24	295	22.0	153	22.3	
No data available	25	1.9	13	1.9	
Average ± DS	16.358 ±	5.218	16.498 =	± 5.903	
Location					
Hand	522	39.0	241	35.1	0.3614
Upper limb*	237	17.7	122	17.8	
Lower limb**	217	16.2	113	16.4	
Thorax/abdomen	159	11.9	81	11.8	
Face/neck	109	8.1	73	10.6	
Foot	63	4.7	43	6.3	
Perianal-genital zone	21	1.6	8	1.2	
Scalp	10	0.7	6	0.9	
No data available	2	0.1	-	-	
Treatment at the injury setting					
Only water	912	68.1	495	72.1	0.0006
Nothing	139	10.4	60	8.7	
Water + other substances	127	9.5	82	11.9	
Other	69	5.1	27	3.9	
Water+ice+other substances	56	4.2	12	1.7	
Oil+other substances	21	1.6	3	0.4	
Unknown	16	1.2	8	1.2	

affirm this since no studies are referring to the period analyzed on the impact of the communication campaign in social networks carried out by COANIQUEM. In any case, our results indicate a decrease in the number of burn patients, which would already be positive with respect to the initial hypothesis.

During the months studied, there was the greatest increase in the monthly number of SARS CoV2 infections in the country during 2020, peaking in June. The curve of this epidemiological phenomenon does not correlate significantly with the evolution of the demand for care of burn patients, which could indicate that the population's respect for confinement measures was maintained uniformly throughout the period due to the fear of contagion.

The limitations of the study include its duration, which refers to the initial and most critical period of the pandemic in the country. A review of a longer period is necessary to observe what may have happened to patients who did not consult with injuries that have caused minor sequelae and who could seek consultation in a period farther away from the initial episode when conditions for travel from distant locations of the facilities improve. This situation has also affected the publications that have been made on this subject, several of which correspond to letters to the editor and refer mostly to the period between March and June 2020.

Conclusions

In the initial period of the SARS CoV2 pandemic, with strict confinement, there was a decrease in the demand for outpatient care for burns in COANIQUEM, contrary to expectations, affecting both outpatients with acute injuries and patients requiring rehabilitation of sequelae, secondary to the reduced possibility of resorting to health care centers and an effective decrease in the occurrence of burns

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: This study was approved by the respective Research Ethics Committee, which, according to the study's characteristics, has accepted the non-use of Informed Consent.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

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