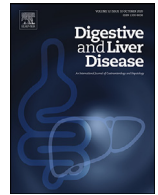




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## Correspondence

## Successful coping with SARS-CoV-2 infection of adult celiac patients assessed by telemedicine

Dear Editor,

Since December 2019, a severe acute respiratory syndrome-coronavirus-2 (SARS-CoV2) has spread worldwide from China. In March 2020 the World Health Organization has declared the pandemic. Globally, the number of reported confirmed cases exceeded 81.9 million at this time [1]. Western Countries have been severely affected by COVID-19. Since the beginning of the epidemic, Italy represents one of the most affected European countries with more than 2.1 million cases [1]. SARS-CoV-2 pandemic is having a drastic impact on routine healthcare of most hospital units that are obviously focused on the SARS-CoV-2 emergency. To minimize the spreading of the infection and to protect patients and healthcare workers, most hospitals have shut down non-urgent and routine outpatient consultations replacing them with telemedicine in order to properly establish and continue to ensure medical assistance also to patients with chronic diseases such as celiac disease (CeD) [2]. Indeed, several studies have demonstrated the value and benefits of telemedicine in several chronic disorders such as diabetes, cardiovascular and gastrointestinal diseases [3].

CeD is a chronic disease characterized by an immune-mediated enteropathy affecting approximately 1% of the Western population [4]. Concerning the risk of viral respiratory infections in CeD, some authors have demonstrated an increased risk of viral respiratory complications due to Influenza virus in some celiac patients probably linked to an excess of osteopontin, a pro-inflammatory cytokine leading to a reduction of CD8 T cell responses with a consequent more severe lung damage [5].

Only a few studies have recently been published to assess the relationship between CeD and SARS-Cov-2 infection; none of these showed a higher risk to develop new Coronavirus disease (COVID-19) in CeD patients respect the general population [6,7]. In addition, scant data are currently available on the management of celiac patients during the SARS-Cov-2 pandemic, especially regarding adherence to GFD [8,9].

On the basis of this scenario, we aimed to use telehealth to remotely evaluate the occurrence of COVID-19 infection, patients' risk perception, quality of life (QoL) changes, the impact of SARS-CoV-2 pandemic on GI symptoms and gluten-free diet (GFD) adherence during the pandemic in a cohort of CeD patients.

In this cross-sectional study, we focused on patients with CeD diagnosis followed by a Central Italy academic tertiary referral centre for CeD (Sant' Andrea University Hospital of Rome, Lazio). Telephone interviews were performed from 12<sup>th</sup> March to 30 April 2020 and adult CeD patients, without refractory CeD diagnosis, were included when they had GFD lasting at least 1 year from CeD diagnosis and the last outpatient visit within the last 12 months in

**Table 1**  
Features of the study population.

	Included patients n = 111 (%)
Female Gender (%)	76 (68.5)
Median age, years (range)	41 (18–76)
Comorbidities:	32 (28.8)
-Autoimmune disorders	28 (85.7)
Persistent GI <sup>a</sup> symptoms <sup>b</sup>	33 (29.7)
New onset GI symptoms	13 (11.7)
Referred GI symptoms	
-Nausea/vomiting	6 (5.4)
-Epigastric burning	6 (5.4)
-Regurgitation	8 (7.2)
-Dyspepsia	6 (5.4)
-Dysphagia	1 (0.9)
-Diarrhea	9 (8.1)
-Constipation	7 (6.3)
-Abdominal pain	9 (8.1)
-Abdominal bloating	19 (17.1)
GFD <sup>c</sup> compliance	
-Biagi score 0–2	5 (4.5)
-Biagi score 3–4	106 (95.5)
SARS-CoV2 diagnosis	0
Pneumonia diagnosis	0
Respiratory symptoms	
Total of patients	19 (17.1)
-Fever (more than 3 days)	10 (9)
-Cough (more than 1 week)	6 (5.4)
-Asthenia/arthromyalgia	10 (9)
-Anosmia/ageusia	2 (1.8)
Quality of life items	
-definitely better	1 (0.9)
-a little better	6 (5.4)
-almost the same	88 (79.3)
-a little worst	15 (13.5)
-far worst	1 (0.9)
SARS CoV-2 infection risk perception <sup>d</sup>	
-0	62 (55.9)
-1-4	16 (14.4)
-5-6	14 (12.6)
-7-10	19 (17.1)

<sup>a</sup> GI= Gastrointestinal

<sup>b</sup> Already present at the last face-to-face visit

<sup>c</sup> GFD= Gluten-free diet

<sup>d</sup> Verbal rating scale from 0 (not at all) to 10 (very high)

which GFD adherence and symptoms were assessed through validated scores.

Of the 165 CeD includible patients, 111 (67.3%, median age 46, range 19–79 years; F:M ratio=2:1) adhered to the telehealth interview. Features of the study population were shown in Table 1. Among 28.8% of the included CeD patients, autoimmune diseases were the most frequent associated comorbidities; in detail, autoim-

mune thyroiditis and psoriasis represented the most frequent associated disorders (87.5%); nobody was taking immunosuppressive therapy during the pandemic. No other comorbidities potentially leading to a more negative prognosis for COVID-19 infection were found among the interviewed patients. During the whole study period, no verified cases (positive nasopharyngeal swabs) of SARS-CoV-2 infection have been identified in the studied population. During the pandemic, 17.1% of included CeD patients complained of self-limiting respiratory symptoms suspicious for SARS-CoV-2 infection such as fever ( $>37.5$  °C) in 9%, cough in 5.4% and anosmia/ageusia in 1.8%. 4.5% ( $n = 5$ ) of these patients presented an association of two different symptoms (for example fever + cough or cough + anosmia) and 5.4% ( $n = 6$ ) three respiratory symptoms simultaneously. Furthermore, acute GI symptoms, lasting at least three days, were declared by six CeD patients (5.4%). In detail, four patients experienced vomiting, two more cases had vomiting associated with fever, and the last two patients complained of acute diarrhea without fever.

Using one item of SF-36 validated questionnaire (question no. 2) to assess self-QoL perception, 79.3% of patients stated no substantial variations, while 6.3% declared an improvement and 14.4% a worsening of their QoL during the pandemic than in the period before it. Considering the self-risk perception of being infected with SARS-CoV-2, more than half of CeD patients (55.9%) did not perceive any type of risk during the pandemic.

With regard to lifestyle changes due to lockdown, 95 patients (85.6%) stayed or worked at home (smart working), while of the remaining 16 patients (14.4%) 11 had 'at risk' jobs, such as health-workers ( $n = 6$ ), police officers ( $n = 2$ ) and supermarket clerks ( $n = 3$ ). The 72.7% of these patients felt a high risk (7–10 at 0–10 at the verbal rating scale).

Concerning GI symptoms, 29.7% ( $n = 33$ ) of CeD patients complained of persisting symptoms such as abdominal bloating, epigastric burning, dyspepsia and constipation, while 11.7% ( $n = 13$ ) complained of new onset GI symptoms. New GI symptoms were mainly represented by mild or self-limiting diarrhea (more than 3 bowel movements/day), abdominal bloating or abdominal pain not requiring pharmacological treatment.

During the COVID-19 pandemic, 95.5% of the interviewed patients reported an adequate GFD (Biagi score=3–4). The median duration of GFD among interviewed CeD patients was 7 years (range 1–21 years). The proportion of CeD patients with inadequate GFD (Biagi score= 0–2) decreased from 8% ( $n=9$ ) at the last face-to-face visit to 4.5% ( $n=5$ ) at the telehealth interview ( $p = 0.4$ ). Patients with inadequate GFD were significantly younger than those with adequate GFD (median age 35, range 21–36 vs median age 41.5 range 19–79;  $p = 0.005$ ), while no significant differences with regard to GI symptoms presence and gender were found between the two groups. Overall, during the SARS-CoV-2 pandemic, most patients (72.1%) perceived the daily GFD management as easier and this perception was referred to be mainly related to self-awareness of avoiding gluten contamination during the lockdown.

COVID-19 pandemic has changed the standard healthcare management of patients with chronic diseases [2]. Since the lockdown and the required physical distancing needed to avoid COVID-19 dissemination, telemedicine has increasingly replaced usual face-to-face visits [2]. The favorable course of CeD and the common quite young median age of celiac patients make CeD a chronic disease particularly suitable for telemedicine [9]. In fact, the totality of celiac patients adhering to telehealth has completed the interview thus indicating a positive perception of this alternative visit modality confirming the result of a recently published survey-based on remote telemedicine visits conducted by Siniscalchi et al. [8]. Although some studies [5] demonstrated a potential increased risk for encapsulated bacterial infections among celiac patients, few

data are available in literature on SARS-Cov-2 infection risk in CeD [6,7]. Overall, no verified cases of SARS-CoV-2 infection were identified in our CeD cohort during the whole study period. The young median age and the few associated comorbidities of CeD included patients together with the low prevalence of SARS-CoV-2 infection in the Latium Region during the telehealth interview period may have influenced this result.

Most of the interviewed patients did not report any substantial variations on QoL during the pandemic and declared a low-risk perception for SARS-CoV-2 infection. This awareness was probably related to the young median age, the absence of multiple comorbidities and the increased "smart working" strategy during the lockdown among included patients. Only patients with high-risk jobs reported in fact a higher perceived risk of being infected with SARS-CoV-2.

Concerning GI symptoms, about 1/3 of CeD interviewed patients complained of persisting GI symptoms without substantial variations in intensity or frequency during pandemic compared to the last face-to-face visit. New GI self-limiting symptoms may be on the one hand related to functional GI disorders associated with fear and anxiety due to pandemic, while on the other hand they could be ascribed to possible changes of habits due to "smart working" and "stay-at-home" strategy implemented during the lockdown.

Another interesting data assessed by the telehealth interview was about GFD. The evaluation of GFD adherence is, in fact, the cornerstone of follow-up visits in CeD patients. Even if the number of patients with inadequate GFD (Biagi 0–2) turned out to be halved albeit without reaching statistical significance (from 8% to 4.5%), most of the interviewed patients with adequate GFD (72.1%) perceived the daily GFD management during SARS-CoV-2 pandemic as easier. This perception of patients was more frequently related to the impossibility of eating out or travelling and a consequent lower risk of inadvertent gluten contamination. Our results have been confirmed by a recently published paper aiming to assess GFD adherence during the SARS-Cov2 pandemic [10].

In conclusion, the findings of the current study show that the majority of the interviewed CeD patients successfully coped with the SARS-CoV-2 pandemic. About 1/10 of CeD patients experienced new GI symptoms during the pandemic and GFD management was perceived as easier due to the stay-at-home strategy thus not being negatively affected by lockdown. Telemedicine was well accepted by CeD patients and it may be considered a useful tool to offer medical care to adult patients with CeD in time of health emergency.

## Declaration of Competing Interest

All authors declare no conflict of interests.

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## Research ethics and patient consent

The study was approved by the ethical board of Sant'Andrea University Hospital, Rome, Italy [no. 3405/2020, 11/03/2020]. Verbal informed consent was obtained from each patient included in the study at the beginning of telephone interview. The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki.

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