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Clinical Communication: A Telemedicine intervention with a clinical and educational
Pathway to manage asthma during Covid-19 pandemic.
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Clinical Communication

Title: A Telemedicine intervention with a clinical and educational Pathway to manage asthma during Covid-19 pandemic.

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Clinical Implications box:

- 1) During COVID-19 pandemics, Telemedicine caring for asthma in children can be effectively provided by a standardized Diagnostic Therapeutic Educational Pathway.
- 2) Use of telemedicine can provide an optimal asthma control for both allergic and non allergic children.

Coronavirus disease 2019 (COVID-19) has become a global pandemic. Italy was the first European exposed country; Lombardy is the most affected region and Brescia the second city by number of cases. Beginning the COVID-19 epidemic, the Italian Government implemented restrictive measures to reduce the risk of infection, blocking all the non-urgent outpatient services.

In this context, implementation of Telemedicine (TM) can improve the health care outcome of asthmatic patients and minimize their risk to be infected by SARS-CoV-2 (1). Moreover, remote caring of patients can be greatly improved when patients are already enrolled into a structured pathway to manage their chronic disease.

In 2005, we developed a Diagnostic Therapeutic Educational Pathway (DTEP) for asthma management and care in children (named as IOEASMA), which is conducted together with primary care physicians (2). The DTEP is based on three evaluations at 6-8 weeks, 4-6 months, and then, after 6 and 12 months.

During their first visit, patients and their parents are trained with a therapeutic educational course conducted by a healthcare assistant, which is focused primarily on prevention measures, early recognition of symptoms and intervention with a personalized action plan developed by the allergist (3). After 6/8 weeks, the primary care physician checks asthma control and therapy adherence.

Because of the interruption of outpatient activities for allergic children due to the health emergency, from March 30th, we started the TM protocol which allowed to care remotely more than 200 patients, in line with the recommendations given by both NICE and GINA (4,5) to minimize face-to-face contact during COVID-19 pandemic (6).

After a call by a healthcare assistant or a nurse, patients could choose between a TM evaluation or, if asthma was well controlled, to reschedule a follow-up visit in the following months. During this call, parents were asked up to answer a COVID-19 related questionnaire and to report the diary of symptoms.

During each TM visit the doctor evaluated the occurrence of flare-ups (as amount of medications used during exacerbations and number of hospital accesses), the level of asthma control, following the recommendations of GINA guidelines, and the need of daily therapy for asthma or/and rhinitis. This evaluation corresponds to what was performed during the DTEP (7,8).

Based on these clinical data, the allergist could modify the therapy. If a new drug was prescribed, a video tutorial or an educational card was provided.

At the end of the visit, the medical report and the satisfaction questionnaire were sent by email.

Out of 323 asthma patients who were scheduled for face-to-face visit, 99% answered the call from our healthcare assistant or nurse. Among them, 253 (80.25%) accepted the TM visit, while 59 (17.55%) postponed their appointment because they were asymptomatic. About 2.2% refused TM.

Herein we describe the clinical and demographic features of 253 patients (Table 1). Clinical manifestations of COVID-19 were investigated by a questionnaire which was answered by 140 patients. Out of 140 patients, 45 patients were reported to have themselves or their parents symptoms compatible with COVID-19, while 37 patients presented cough and/or rhinitis without fever. Of note, 31 of these 37 patients were allergic. Indeed, the occurrence of the spring allergy season in our region during the Covid-19 epidemic caused worsening of symptoms in patients with allergic rhinitis and asthma.

Analysis of symptoms diary and patients response to questionnaire have shown that the percentage of asthma control by age was comparable to what observed in our previous studies (2). We detected that 91.18 % of children aged < 6 years old showed good asthma control without recent exacerbations, probably because they did not attend the maternal school or nursery, due to quarantine.

In other age groups asthma was controlled in 81.08%; the remaining patients not controlled were allergic to pollen, in conjunction with the tree and grass blooms in Lombardy (Figure 1).

Our results suggest that the “IOEASMA” DTEP can effectively help in the implementation of guidelines for asthma care (5), improve patients adherence to therapeutic strategies and empower the self-management of the disease (9).

The use of TM constitutes an important resource for remotely caring, especially in chronic diseases, such as asthma.

We believe that, to improve our TM experience, we should take advantage of technological tools for daily home-monitoring, such as oximeter, home spirometer, peak flow and electronic metered-dose inhaler, which will be even more important for patients with uncontrolled or difficult to treat asthma.

Table 1: Demographic data of patients evaluated by a standardized Telemedicine DTEP.

*Flu-like symptoms: fever $>37.5^{\circ}$ plus at least one of: cough, cold, anosmia, ageusia, malaise, muscle pain, diarrhea, headache, sore throat.

	Female	Male	Total
	% (n)	% (n)	% (n)
Patients	41.11 (104)	58.89 (149)	100 (253)
Age			
<6 years old	9.88 (25)	17.00 (43)	26.88 (68)
Allergic	3.16 (8)	7.11 (18)	10.27 (26)
Non allergic	6.72 (17)	9.88 (25)	16.60 (42)
06-11 years old	20.55 (52)	23.32 (59)	43.87 (111)
Allergic	15.41 (39)	19.37 (49)	34.78 (88)
Non allergic	5.14 (13)	3.95 (10)	9.09 (23)
≥ 12 years old	10.67 (27)	18.58 (47)	29.25 (74)
Allergic	9.88 (25)	18.18 (46)	28.06 (71)
Non allergic	0.79 (2)	0.39 (1)	1.18 (3)
Nationality/Ethnicity			
Italian	31.62 (80)	46.25 (117)	77.87 (197)
East European	2.37 (6)	2.37 (6)	4.74 (12)
African	5.14 (13)	7.11 (18)	12.25 (31)
Asian	1.58 (4)	2.77 (7)	4.35 (11)
South American	0.39 (1)	0.39 (1)	0.78 (2)
Covid-19 questionnaire			
Number of patients	24,11 (61)	31,22 (79)	55,33 (140)
Patients with fever and flu-like symptoms *	7,14 (10)	9,29 (13)	16,43 (23)
Patients and/or parents with flu-like symptoms *	2,14 (3)	2,14 (3)	4,29 (6)
Patients with cough and/or rhinitis without fever	10,00 (14)	16,43 (23)	26,43 (37)
(<i>Allergic</i>)	7,14 (10)	15,00 (21)	22,14 (31)
Patients asymptomatic with parents with symptoms*	5,71 (8)	5,71 (8)	11,43 (16)
Asymptomatic patients and parents	17,86 (25)	20,00 (28)	37,86 (53)
Other symptoms (diarrhea, sore throat)	0,71 (1)	2,86 (4)	3,57 (5)

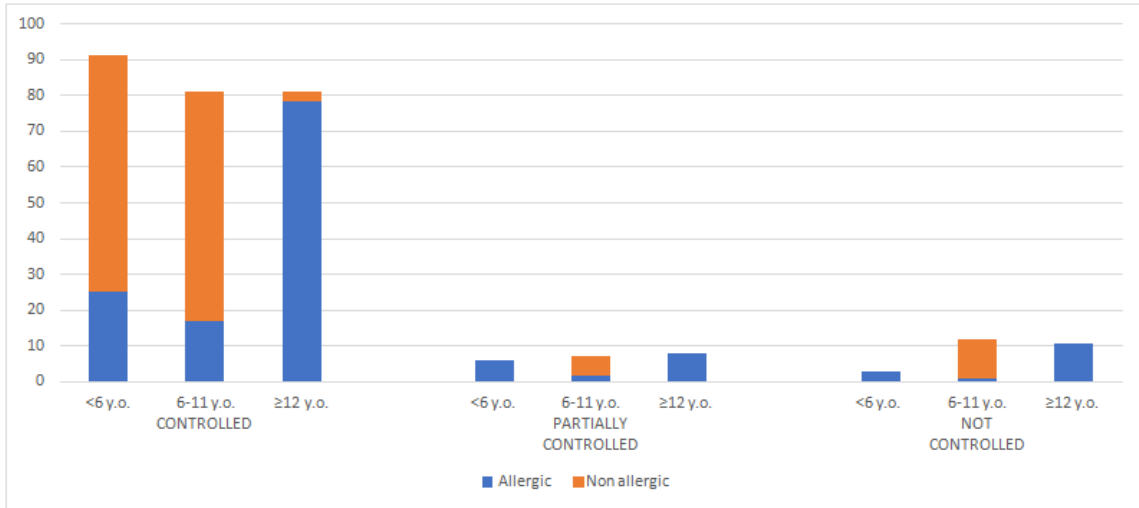


Figure 1: Asthma control during the telemedicine intervention

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