

mildly symptomatic COVID-19 patients.<sup>10</sup> The low rate of past history of chilblain or Raynaud phenomenon highlights the absence of associated autoimmune disease in most cases.<sup>10</sup>

In conclusion, our study reinforces the hypothesis that the association between CLLs and COVID-19 infection is not fortuitous. It also places TD as a good alternative for face-to-face consultations for detecting early dermatological manifestations during times of crisis.

### IRB approval status

AP-HP Henri Mondor IRB# 00011558 and CEERB Paris Nord IRB# 00006477.

### Conflicts of interest

None to declare.

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## SARS-CoV-2: skin diseases, mask wearing and unpleasant sensations

Editor

The requirement to wear masks as part of barrier measures to prevent the transmission of SARS-CoV-2 has generated many

**Table 1** Demographic data

	No skin disease N = 5196		Skin disease not involving the face N = 1075		Skin disease involving the face N = 950		P value
Country	N	%	N	%	N	%	<0.001
France	1445	27.8	213	19.8	227	23.9	
Germany	1044	20.1	177	16.5	179	18.8	
Spain	1319	25.4	359	33.4	325	34.2	
Italy	1388	26.7	326	30.3	219	23.1	
Age	49 ± 28		45 ± 24		35 ± 25		<0.001
Sex	N	%	N	%	N	%	
Women	2544	49	555	51.6	542	57.1	<0.001
Men	2652	51	520	48.4	408	42.9	
Area	N	%	N	%	N	%	0.003
Urban area	2451	47.2	536	49.9	474	49.9	
Semi-urban area	1627	31.3	334	31.1	322	33.9	
Rural area	1118	21.5	205	19.1	154	16.2	
Wear Mask	N	%	N	%	N	%	<0.001
0–4 h	2861	55.1	514	47.8	370	38.9	
4–8 h	1604	30.9	384	35.7	369	38.8	
>8 h	731	14.1	177	16.5	211	22.2	
Unpleasant sensation	1846	35.5	571	53.1	655	68.9	<0.001
Itch	722	13.9	233	21.7	292	30.7	<0.001
Tingling	714	13.7	246	22.9	321	33.8	<0.001
Sensation of tightness	612	11.8	168	15.6	210	22.1	<0.001
Burning sensation	299	5.8	111	10.3	128	13.5	<0.001
Protect from others look	2180	42	383	35.6	554	58.3	<0.001

Variable	N	Odds ratio	p
<b>Age</b>	7221	0.83 (0.80, 0.86)	<0.001
<b>Sex</b>	Men	Reference	
	Women	1.10 (0.99, 1.21)	0.082
<b>Country</b>	France	Reference	
	Germany	2.48 (2.12, 2.90)	<0.001
	Spain	1.22 (1.05, 1.41)	0.008
	Italy	1.38 (1.20, 1.59)	<0.001
<b>Area</b>	Urban area	Reference	
	Semi-urban area	0.95 (0.84, 1.07)	0.365
	Rural area	0.91 (0.79, 1.05)	0.208
<b>Skin Disease</b>	No Skin Disease	Reference	
	Skin Disease Not Involving the Face	2.02 (1.76, 2.33)	<0.001
	Skin Disease Involving the Face	3.20 (2.73, 3.76)	<0.001
<b>Wear Mask</b>	0-4 Hours	Reference	
	4-8 Hours	2.24 (2.00, 2.52)	<0.001
	> 8 Hours	2.69 (2.32, 3.13)	<0.001
<b>Protect from others look</b>	7221	1.26 (1.14, 1.40)	<0.001

**Figure 1** Multivariate analysis with uncomfortable sensations as outcome.

dermatological issues, for healthcare professionals (HCP) and the general population.<sup>1</sup> These problems may be related to skin changes due to occlusion, i.e. increased temperature and humidity, water loss, friction etc.<sup>2</sup> While some studies focussed on skin changes in the general population, others suggested that facial skin diseases worsen with wearing permanently a mask.<sup>3</sup> To date, no study has evaluated these consequences in real-life settings in a large population-based multinational representative sample.

We performed a survey in 4 countries (France, Italy, Spain, Germany), in a representative sample generated using the quota method.

We first compared the population with no skin diseases, those with skin diseases not involving the face and those with a skin disease involving the face using the chi-square test for categorical variables and Kruskal–Wallis for the responders’ age. Patients we asked about different skin sensation due to the mask and those reporting at least one were categorized as having ‘uncomfortable sensation due to the mask’ which we used as outcome in a multivariate logistic regression.

Among the 8077 respondents, 7221 had to wear a mask during the day (89.4%). The median age was 32.00 IQR [46.00–60.00]; they were 3641 (50.4%) women (Table 1). Among them, 28% (*n* = 2021) declared to suffer from skin diseases [atopic dermatitis/eczema (7.73%; *n* = 558) – psoriasis (4.06%; *n* = 293) – acne (6.44%; *n* = 465) – rosacea (2.60%; *n* = 188) –

chronic hand eczema (1.48%; *n* = 107) – vitiligo (1.25%; *n* = 90) – hidradenitis suppurativa (0.46%; *n* = 3)].

Unpleasant sensation due to wearing a mask was reported by 3072 (42.5%) respondents (itch 17.3%, tingling 17.7%, burning sensation 7.5%, sensation of tightness 13.7%). Each type of unpleasant sensations was more prevalent in subjects with dermatoses and among them in those with dermatoses involving the face (Table 1). The multivariate analysis with uncomfortable sensations as outcome (Fig. 1) showed an OR of 2.02 IC 95% [1.76, 2.33], (*P* < 0.001) for skin diseases without face involvement and of 3.2 IC 95% [2.73, 3.75], (*P* < 0.001) for skin diseases with face involvement. The longer the responders wore their mask the more they reported unpleasant sensations: for 0–4 h vs 4–8 h OR 2.24 IC 95% [2, 2.52], (*P* < 0.001) and vs >8 h the OR 2.69 IC 95% [2.32, 3.13], (*P* < 0.001).

Studies from Poland showed that pruritus is a major symptom caused by mask wearing, affecting up to 30% of HCP.<sup>4</sup> Similar symptoms were reported in the general population. Worsening of face skin conditions such as seborrheic dermatitis, acne and rosacea has been reported and was confirmed by our study.<sup>3,5</sup> Moreover, pruritus was reported having increased in HCP with facial dermatosis while acne seems worsened in almost half of the responders.<sup>4,6</sup> Increased sweating was also reported.<sup>2</sup>

These issues are not only inconvenient; they also cause the frequent manipulation of the mask, a factor that has been reported to

be involved in viral transmission. This is particularly relevant in people with facial skin diseases, especially when they are HCP. Thus, it may be critical to consider in the future all symptoms when designing the inside part of masks. Obviously, side effects of prolonged mask wearing are not new, with similar findings already observed during the SARS epidemic.<sup>7,8</sup> However, today these inconveniences have been observed in a much larger population and thus may have important consequences in terms of wearing correctly the mask helping to protect oneself and the others.

Therefore, dermatologists play an important role in public health by managing skin conditions related to wearing masks.

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### Conflicts of interest

MSA is employee of Pierre Fabre Dermo-Cosm etique, and other authors do not have any conflict of interest to declare.

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## SARS-CoV-2 mRNA vaccine-associated fixed drug eruption

Dear Editor,

A 26-year-old, healthy, female nurse on no regular medication developed a mildly pruritic, erythematous, annular patch with faint, central clearing on her left shoulder (Fig. 1a). The patient had received the first dose of the Pfizer-BioNTech (Pfizer Inc., New York City, NY, USA) SARS-CoV-2 mRNA vaccine in the same arm 15 days prior to the development of the lesion. The injection site was 7 cm distal to the evolving patch. Over the span of 2 days, the patch developed a shallow, central erosion surrounded by a halo of erythema (Fig. 1b) and subsequently started to resolve spontaneously. The patient had also experienced facial flushing 15 minutes after the vaccine was administered.

An identical erythematous patch re-emerged 14 days after the patient was administered the second Pfizer-BioNTech SARS-CoV-2 mRNA vaccine dose. This time, the patch was accompanied by prominent vesiculation within its dusker centre (Fig. 1c). The vesicles eventually ruptured and scabbed, giving the lesion a targetoid appearance (Fig. 1d). Of note, the patient had self-medicated with a stat dose of hydroxyzine an hour prior to receiving the second vaccine to abate facial flushing. She had otherwise not taken any prescribed or over-the-counter medications.

Self-medication with topical 1% hydrocortisone and terbinafine applied twice daily for a couple of days on the second eruption proved ineffective. The patient was referred for a dermatological opinion. A diagnosis of fixed drug eruption (FDE) was suspected, and a diagnostic punch biopsy was carried out.

Histology showed skin covered by a variably acanthotic and atrophic epidermis with overlying crust (Fig. 2a). A patchy lymphohistiocytic infiltrate was present in the upper dermis, focally extending into the mid dermis around skin adnexal structures. Eosinophils were inconspicuous. Lymphocytic infiltration of the basal layer of the epidermis was noted. This was associated with basal cell vacuolar damage, Civatte body formation and pigment incontinence (Fig. 2b). Incipient clefting at the dermal–epidermal junction was also appreciated. The overall findings were those of lichenoid interface dermatitis, consistent with a fixed drug eruption.

To the best of our knowledge, this is the first reported case of SARS-CoV-2 mRNA vaccine-associated FDE. FDEs represent a cutaneous adverse drug reaction (ADR) clinically characterized by the appearance of recurrent, quasi-identical, cutaneous eruptions in the same anatomical location upon exposure and re-exposure to the offending drug. The delay between drug administration and FDE ranges from 0 to 40 days, manifesting most commonly as a single lesion with a propensity for the upper limbs.<sup>1</sup> Intraepidermal interferon  $\gamma$ -secreting, CD8<sup>+</sup> T cells are the key cellular mediators of this type IV