





Self-Reported Skin Sensation by People Who Have Experienced Containment During COVID-19 Pandemic

This article was published in the following Dove Press journal:
Clinical, Cosmetic and Investigational Dermatology

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Efforts to curb the spread of the new coronavirus (SARS-CoV-2) have led to an unprecedented simultaneous containment of almost two-thirds of the world's population. The excessive use of hand washing and hand disinfection has been associated with an increased incidence of irritant and allergic contact eczema in health care workers.¹ Face masks and headgear worn tightly for prolonged hours are also responsible for various cutaneous conditions, such as contact allergies, irritation, friction dermatitis, abrasions and aggravation of chronic dermatoses.² Some authors also suspect that chilblains ("COVID toes"), which were widely reported in spring 2020, could be related to the containment rather than to direct SARS-CoV-2 infection.³ In addition, sensitive skin is a frequent condition in Western countries, ranging from 26 to 57% of the population, depending on the country.⁴ Sensitive skin is defined by the occurrence of unpleasant sensations in response to stimuli that should not normally provoke such sensations. The causative factors of skin sensitivity include physical (heat, cold, wind, or ultraviolet radiation), chemical (cleansers, cosmetics, water, or pollutants), psychological (emotional change or stress), or hormonal (menstrual cycle) factors.^{4,5}

Perceived consequences of containment on skin conditions have not been addressed to date in large-sized populations and in individuals suffering from sensitive skin. We performed an international online survey on a representative sample of people over 18 years of age from five countries (Brazil, France, Russia, China and the United States). The data collection procedure was identical to that in previous studies.⁶⁻⁹ For each country, a representative sample of the adult general population aged ≥ 18 years was recruited using a stratified proportional sampling with replacement design. Based on a database with the e-mail addresses of Internet users in each country, who agreed to participate in surveys (Megabase, Kantar Health, New York, NY, USA), fixed quotas of subjects fulfilling predefined socio-demographic criteria were decided. These quotas were based on the following aspects: sex, age, socio-professional status and regional distribution, thereby ensuring accurate representation of the sample population. Proportional quota sampling was used to make the study population representative of each country. Each selected participant was contacted by e-mail. If contact was not achieved, another potential participant with the same characteristics was randomly selected. Each participant agreed to complete a digital questionnaire.

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Table 1 Characteristics of the Respondents

	Total N=11,100	Men N=5486 (49.4%)	Women N=5614 (50.6%)	Fisher's Exact Test p<0.05 Men vs Women
Age group				
18–24	1367 (12.3)	694 (12.6)	673 (24.3)	NS
25–34	2430 (21.9)	1214 (22.1)	1216 (43.3)	NS
35–44	2289 (20.6)	1126 (20.5)	1163 (40.7)	NS
45–54	2093 (18.9)	1036 (18.9)	1057 (37.3)	NS
55–64	1781 (16.0)	893 (16.3)	888 (31.7)	NS
65–74	1140 (10.3)	523 (9.5)	617 (20.3)	0.01
Residency				
Large-sized city	6240 (56.2)	3084 (56.2)	3156 (56.2)	NS
Middle-sized city	3111 (28.0)	1546 (28.2)	1565 (27.9)	
Outside the city	1746 (15.8)	856 (15.6)	893 (15.9)	
Skin type				
Dry	2529 (22.8)	1059 (19.3)	1470 (26.2)	<0.00001
Greasy	2770 (24.9)	1803 (32.9)	967 (17.2)	<0.00001
Mixed	3823 (34.4)	1407 (25.6)	2416 (43.0)	<0.00001
Normal	1978 (17.8)	1217 (22.2)	761 (13.6)	<0.00001
Sensitive skin				
Yes (very sensitive or sensitive)	5063 (45.6)	2246 (40.9)	2817 (50.2)	<0.00001
Containment				
Yes	7170 (64.6)	3365 (61.3)	3805 (67.8)	<0.00001
Skin modification due to containment				
Yes	1500 (20.9)	560 (16.6)	940 (24.7)	<0.00001
Skin modification				
Drier skin	667 (44.5)	212 (37.9)	455 (48.4)	0.00007
Greasier skin	405 (27.0)	182 (32.5)	223 (23.7)	0.000213
Skin rash	440 (29.3)	142 (25.4)	298 (31.7)	0.009
Redness	259 (17.3)	110 (19.6)	149 (15.8)	NS
Itch	368 (24.5)	154(27.5)	214 (22.8)	0.04
None of the above	166 (11.1)	53 (9.5)	113 (12.0)	NS
Containment				
Sensitive skin	3410 (67.3)	1427 (63.5)	1983 (70.4)	<0.00001
No sensitive skin	3760 (62.3)	1938 (59.8)	1822 (65.1)	-
Skin modification				
Sensitive skin	944 (27.7)	353 (24.7)	591 (29.8)	NS
No sensitive skin	556 (14.8)	207 (10.7)	349 (19.1)	-
Patients with sensitive skin				
Drier skin	418 (44.3)	132 (37.4)	286 (48.4)	0.001
Greasier skin	255 (27.0)	122 (34.6)	133 (22.5)	0.00005
Skin rash	298 (31.6)	95 (26.9)	203 (34.3)	0.017
Redness	211 (22.3)	89 (25.2)	122 (20.6)	NS
Itch	265 (28.1)	113 (32.0)	152 (25.7)	0.037
None of the above	82 (8.7)	19 (5.4)	63 (10.7)	0.005
		p<0.05 vs Patients with sensitive skin		

(Continued)

Table 1 (Continued).

	Total N=11,100	Men N=5486 (49.4%)	Women N=5614 (50.6%)	Fisher's Exact Test p<0.05 Men vs Women
Patients without sensitive skin				
Drier skin	249 (44.8)	-	-	NS
Greasier skin	150 (27.0)			NS
Skin rash	142 (25.5)			0.013
Redness	48 (8.6)			<0.00001
Itch	103 (18.5)			0.00003
None of the above	84 (15.1)			0.00012

Abbreviation: NS, not significant.

Table 2 Detailed Characteristics of the Respondents by Country

	Brazil N=2000	China N=3050	France N=2000	Russia N=2000	US N=2050
Sensitive skin					
Yes (very sensitive or fairly sensitive)	732 (36.6)	1229 (40.3)	1040 (52)	1227 (61.3)	835 (40.7)
Containment					
Yes	1706(85.3)	1190 (39)	1640 (82)	1323 (66.1)	1311 (63.9)
Skin modification due to containment					
Yes	477 (28.0)	274 (23.0)	278 (17.5)	215 (16.2)	247 (18.8)
Skin modification					
Drier skin	224 (47.0)	97 (35.4)	137 (47.7)	100 (46.5)	109 (44.1)
Greasier skin	140 (29.3)	103 (37.6)	50 (17.4)	53 (24.6)	59 (23.9)
Skin rash	149 (31.2)	54 (19.7)	87 (30.3)	(32.6)	80 (32.4)
Redness	69 (14.5)	56 (20.4)	39 (15.6)	46(21.4)	49 (19.8)
Itch	118 (24.7)	78 (28.5)	63 (21.9)	31 (14.4)	78 (31.6)
None of the above	43 (9.0)	32 (11.7)	39 (13.6)	20 (9.3)	32 (13.0)
Skin modification if					
Sensitive skin	250 (38.9)	167 (33.7)	196 (22.4)	162 (19.8)	169 (29.2)
No sensitive skin	227 (21.3)	107 (15.4)	91 (11.9)	53 (10.5)	78 (10.7)
Patients with sensitive skin					
Drier skin	117 (46.8)	66 (39.5)	92 (46.9)	72 (44.4)	71 (42.0)
Greasier skin	75 (30)	61 (36.5)	34 (17.3)	41 (25.3)	44 (26.0)
Skin rash	82 (32.8)	32 (19.2)	62 (31.6)	58 (35.8)	64 (37.9)
Redness	48 (19.2)	44 (26.3)	36 (18.4)	41 (25.3)	42 (24.8)
Itch	66 (26.4)	60 (35.9)	52 (26.5)	27 (16.7)	60 (35.5)
None of the above	15 (6.0)	13 (7.8)	25 (12.8)	14 (8.6)	15 (8.9)
Patients without sensitive skin					
Drier skin	107 (47.1)	31 (29.0)	45 (49.4)	28 (52.8)	38 (48.7)
Greasier skin	65 (28.6)	42 (39.2)	16 (17.6)	12 (22.6)	15 (19.2)
Skin rash	67 (29.5)	22 (20.6)	25 (27.5)	12 (22.6)	16 (20.5)
Redness	21 (9.2)	12 (11.2)	3 (3.3)	5 (9.4)	7 (9.0)
Itch	52 (22.9)	18 (16.8)	11 (12.1)	4 (7.5)	18 (23.1)
None of the above	28 (12.3)	19 (17.8)	14 (15.4)	6 (11.3)	17 (21.8)

A total of 11,100 individuals (2,000 each in Brazil, France and Russia, 3050 in China and 2050 in the United States) participated between April and May 2020.

We first inquired about socio-demographics, sensitive skin, and self-reported changes observed during containment (dry skin, skin rash, redness, and itching). The second part addressed facial skin sensitivity. The subjects were requested to rate their skin as “very sensitive,” “sensitive,” “slightly sensitive,” or “not sensitive.” Subjects with “sensitive” or “very sensitive” skin were considered to belong to the “sensitive skin” group, and those having “not very sensitive” or “not sensitive at all” skin belonged to the “non sensitive skin” group, as previously published elsewhere.^{4,10–12}

We did not inquire whether respondents had been diagnosed with COVID-19. As this study did not involve any patient contact and was completely anonymous, approval from the ethical review board was not necessary.

A total of 64% (n=7170) of the respondents reported that they complied with the containment procedures (Table 1), ranging from 39% in China to 85.3% in Brazil (Table 2).

The prevalence of skin changes ranged from 16.2% in Russia to 28% in Brazil. Women were more likely than men to report a change in their skin condition (24.7% vs 16.6%, respectively, $p < 0.00001$). There was a positive correlation between the age and skin complaints (Spearman's rho $r = 0.202$, $p < 0.01$). Drier skin was the main complaint in all five countries. Overall, the three main reported complaints during containment were drier skin (44.5%), skin rash (29.3%), and greasier skin (27%). Women were more likely than men to report drier skin (48.4% vs 37.9%, respectively, $p = 0.0007$) and skin rash (31.7% vs 25.4%, respectively, $p = 0.0007$).

A total of 40.9% of the men (n=2246) and 50.2% of the women (n=2817) reported having a “sensitive” skin (Table 1). The difference between the 2 sexes was significant ($p < 0.001$).

Among those, 20.9% (n=1500) reported a modification of their skin in relation to containment.

Patients with sensitive skin were more likely to report skin changes during containment (27.7% vs 14.8%, $p < 0.00001$). The difference was significant for both sexes ($p < 0.00001$). Patients with sensitive skin were more likely to report skin rash, itch and redness (Table 1).

Our study shows that women and individuals who reported sensitive skin perceived that containment was responsible for their subjective skin changes. In the current context, dryness of the skin, exacerbation of pruritus and rashes may be attributed to frequent use of soap and/or

hydroalcoholic solutions, as well as to the use of facial masks outside of home.^{13–15} Stress of containment and uncertainty of the global situation, as well as an exacerbation of preexisting dermatoses, cannot be excluded. Geographic and seasonal climatic variations, as well as the way of life, may also have an impact. The limitations of our study include the declarative nature of the responses. In daily practice, dermatologists must integrate the notion of containment in the anamnesis over the next months as a possible clue to cutaneous symptoms.

Funding

Funding source: La Roche Posay.

Disclosure

Caroline Le Floc'h, Margot Niore, Véronique Delvigne, and Guénaële Le Dantec are Employees of La Roche Posay. The authors report no other potential conflicts of interest for this work.

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