

Sensitive scalp: does this condition exist? An epidemiological study

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Background: The concept of the 'sensitive scalp' is vague. However, the 'sensitive skin syndrome' is probably not limited to the face.

Objectives: To evaluate and analyse sensitive scalp conditions.

Patients and method: 1011 individuals, representative of the French population, were investigated.

Results: 44.2 % declared suffering from a 'sensitive scalp' (47.4% of women versus 40.8% of men). Of these subjects, 11.5% reported having an associated scalp disease versus 1.1% of non-sensitive subjects. Hair loss was significantly associated with scalp sensitivity. The scalp was dry for 24%, normal for 58%, greasy for 16% and mixed for 1%. 13% complained of prickling, 25% of itching and 2% of burning or pain. These symptoms were more frequent among those with a 'sensitive scalp'. The main triggering factors were considered to be pollution, heat, emotions and shampoos. No other area of skin sensitivity was specifically associated with scalp sensitivity.

Conclusion: 'Scalp sensitivity' exists and occurs frequently. Triggering factors are numerous. Symptoms appear different from those of facial skin sensitivity. Further studies to define and assess sensitive scalp conditions are needed.

Key words: scalp; sensitivity; sensitive skin. © Blackwell Munksgaard, 2008.

Accepted for publication 29 August 2007

Sensitive skin (or reactive, hyperreactive, intolerant, and irritable skin) is defined (1–4) as the onset of prickling, burning, or tingling sensations (possibly pain or pruritus) caused by various factors, which may be physical (ultraviolet radiation, heat, cold, and wind), chemical (cosmetics, soap, water, and pollution), psychological (stress), or hormonal (menstrual cycle). Erythema is frequently but not necessarily associated with sensitive skin. A few tests are able to confirm or establish the diagnosis and are useful exploratory methods: the stinging test, the thermal sensitivity test, and the capsaicin test.

The phenomenon of sensitive skin is insufficiently understood (5). A decrease in the 'skin's tolerance threshold' is not directly related to any immune or allergic mechanism. Vasodilatation and an inflammatory infiltrate are infrequent findings. An impaired skin barrier function, together with an increase in transepidermal water loss, which could increase exposure to irritants, has been reported (6). The presence of abnormal sen-

sations and vasodilatation shows the involvement of the skin's nervous system (7). Neurogenic inflammation probably results from the release of neurotransmitters such as substance P, calcitonin gene-related peptide, and vasoactive intestinal peptide, which induce vasodilatation and mast cell degranulation. Non-specific inflammation may also be associated with the release of interleukin (IL)-1, IL-8, prostaglandin E₂, prostaglandin F₂, and tumour necrosis factor- α (8). The only proteins that can be activated by both chemical and physical factors belong to the transient receptor potential (TRP) family, such as TRPV1.

Sensitive skin is a common condition. Several epidemiological studies have been conducted in the UK (2), the USA (3), and in France (9, 10). These studies showed that half of the population in these countries is affected (approximately 60% of women and 40% of men). The quality of life is adversely decreased, mainly through the mental component (9), although it does not induce depression (11).

Sensitive skin and very sensitive skin are more frequently observed in summer than in winter (11).

Sensitive skin is reported on the face, but a recent study (12) showed that it could occur in other localizations. Among them, involvement of hands and scalp were the most frequent. It has been shown that human scalp irritation by sodium lauryl sulfate was lower than irritation on the skin of the back (13). We know of no study concerning scalp sensitivity. The aim of the present study was to perform an epidemiological study so as to determine the existence of scalp sensitivity, and to evaluate its prevalence and characteristics.

Patients and Methods

An opinion poll was conducted by CSA-Santé. This sample (1011 persons) was drawn from a representative national sample of the French population aged 15 years or older, according to the quota method (sex, age, occupation of household head, type of geographical area, and region). Interviewees responded to a series of questions.

Quantitative variables were compared between study groups using a Student's *t*-test (if 2 groups) or using an ANOVA design (if more than 2 groups). If conditions required for these tests were not met, nonparametric tests were performed, in particular, the Wilcoxon and Kruskal–Wallis tests. Qualitative variables were compared using chi-squared tests or the Fisher's exact test, if conditions for application were not met. Statistical analyses were performed using SAS software version 8.2 (SAS Institute, Raleigh, NC, USA).

Results

Among 1011 subjects, 1004 were able to say if they considered themselves to have a sensitive scalp or not, and 444 (44.22%) reported suffering from a sensitive or a very sensitive scalp (Fig. 1). Women suffered more frequently from a sensitive or very sensitive scalp than men (47.40% versus 40.82%, $P < 0.05$). We noted differences according to age: 30.76% under 35 years, 27.20% from 35 to 50 years, and 42.04% over 50 years.

Only 5.65% reported suffering from a current scalp disease: 11.51% among subjects with sensi-

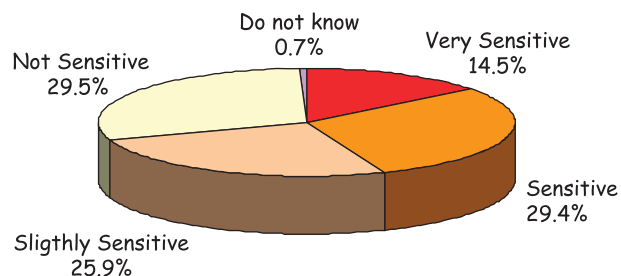


Fig. 1. Declared scalp sensitivity.

tive or very sensitive scalp and 1.07% among people without sensitive scalp or with a slightly sensitive scalp ($P < 0.001$). A history of atopic dermatitis was declared by 13.51% of those who were interviewed, without any significant difference ($P < 0.05$) between groups with (16.63%) or without scalp sensitivity (11.07%).

On the day of the interview, 20% declared having hair loss (25.15% men and 15.16% women; $P < 0.001$), 26.58% with sensitive or very sensitive scalp, and 14.82% with slightly or not sensitive scalp ($P < 0.001$). Among patients with current hair loss, 58.71% reported sensitive or very sensitive scalp, whereas there were only 40.62% without current hair loss ($P < 0.001$).

A history of hair loss was noted in numerous interviewed subjects: 14.36% (6.50% men and 26.58% women; $P < 0.001$) reported reactional hair loss, 17.33% chronic hair loss, and 19.31% reported recent hair loss. In addition, reactional hair loss was more frequently reported in subjects with sensitive or very sensitive scalp than other subjects (19.49% subjects with sensitive or very sensitive scalp versus 7.23% subjects with slightly or not sensitive scalp).

A total of 988 people responded to the question about scalp dryness or greasiness. The majority (58.75%) considered that their scalp was normal, whereas 24.35% thought that it was dry, and 16.90% greasy. There was no significant relation between scalp sensitivity and scalp dryness, greasiness, or sex. Scalp sensitivity varied according to these characteristics, and was more frequent and intense in patients with greasy or dry scalps (Table 1).

Table 1. Scalp sensitivity and characteristics of scalp ($P < 0.001$)

Scalp sensitivity	Total		Dry		Normal		Greasy	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Very sensitive	144	14.57	59	24.38	47	8.10	38	22.89
Sensitive	290	29.35	87	35.95	144	24.83	59	35.54
Slightly sensitive	261	26.42	50	20.66	179	30.86	32	19.28
Not sensitive	293	29.66	46	19.01	210	36.21	37	22.29
Total	988	100.00	242	100.00	580	100.00	166	100.00

Prickling scalp was reported by 13.05% (18.92% in patients with sensitive or very sensitive scalp versus 8.39% in subjects with slightly sensitive or not sensitive scalp; $P < 0.001$), itching in 25.40% (37.61% versus 15.71%; $P < 0.001$), and burning in 2.39% (4.50% versus 0.71%; $P < 0.001$). Patients with current hair loss did not have significantly more prickling, but they complained more frequently of itching (34.16%; $P < 0.001$) and burning (4.46%; $P < 0.05$).

Triggering factors of symptoms (Table 2) were heat, cold, pollution, emotions, dry air, wet air, water, and mainly shampoos. Eating citrus fruits was cited by only 6.25%. There was no difference between those who declared having scalp sensitivity and the others, with a notable exception; emotions. Cold was more frequently reported as a triggering factor in patients with current hair loss (35.63% versus 20.25%; $P < 0.005$).

Shampoo was noted as a triggering factor of these symptoms in 52.50%, but we did not find

any difference between subjects with sensitive or not sensitive scalp (57.6% subjects with sensitive or very sensitive scalp versus 48.76% subjects with slightly sensitive or not sensitive scalp; $P = 0.126$). Nonetheless, we observed that subjects with sensitive or very sensitive scalp were more frequently irritated by shampoo than subjects with slightly or not sensitive scalp (Table 3): 52.37% subjects with sensitive or very sensitive scalp had never been irritated by shampoo versus 75.36% subjects with slightly sensitive or not sensitive scalp ($P < 0.001$).

The presence of skin sensitivity was declared by 56.58% of 1011 people answering to the opinion poll. There were 65.77% among those with scalp sensitivity and 49.46% among the others ($P < 0.001$).

Discussion

To our knowledge, this study is the first epidemiological approach of scalp sensitivity. It enables us

Table 2. Triggering factors of scalp sensitivity

	Total		Sensitive or very sensitive scalp		Slightly sensitive or not sensitive scalp		P value (χ^2)
	n	%	n	%	n	%	
Heat							
Yes	136	42.24	82	40.20	54	45.76	0.330
No	186	57.76	122	59.80	64	54.24	
Total	322	100.00	204	100.00	118	100.00	
Cold							
Yes	79	24.53	56	27.59	23	19.33	0.096
No	243	75.47	147	72.41	96	80.67	
Total	322	100.00	203	100.00	119	100.00	
Pollution							
Yes	175	56.45	116	58.88	59	52.21	0.254
No	135	43.55	81	41.12	54	47.79	
Total	310	100.00	197	100.00	113	100.00	
Emotions							
Yes	153	48.73	105	53.03	48	41.38	0.046
No	161	51.27	93	46.97	68	58.62	
Total	314	100.00	198	100.00	116	100.00	
Water							
Yes	89	27.99	61	30.05	28	24.35	0.277
No	229	72.01	142	69.95	87	75.65	
Total	318	100.00	203	100.00	115	100.00	
Citrus fruits							
Yes	20	6.45	12	6.22	8	6.84	0.829
No	290	93.55	181	93.78	109	93.16	
Total	310	100.00	193	100.00	117	100.00	
Dry air							
Yes	71	22.19	43	21.29	28	23.73	0.612
No	249	77.81	159	78.71	90	76.27	
Total	320	100.00	202	100.00	118	100.00	
Wet air							
Yes	66	20.82	42	21.00	24	20.51	0.918
No	251	79.18	158	79.00	93	79.49	
Total	317	100.00	200	100.00	117	100.00	
Shampoo							
Yes	153	47.96	103	51.24	50	42.37	0.126
No	166	52.04	98	48.76	68	57.63	
Total	319	100.00	201	100.00	118	100.00	

Table 3. Comparison of scalp irritation by shampoos between subjects declaring scalp sensitivity and people with slightly sensitive or not sensitive scalp ($P < 0.001$)

	Total		Sensitive or very sensitive		Slightly or not sensitive	
	n	%	n	%	n	%
Is your scalp irritated by shampoos?						
Always	11	1.10	6	1.35	5	0.89
Often	48	4.79	30	6.77	18	3.21
Sometimes	156	15.55	88	19.86	68	12.14
Rarely	134	13.36	87	19.64	47	8.39
Never	654	65.20	232	52.37	422	75.36
Total	1003	100.00	443	100.00	560	100.00

to confirm that this phenomenon does exist and, moreover, it seems to be very common, occurring in 44% of respondents and more frequent in women, but not age related.

This study was conducted on a representative sample of the French population by an institute recognized for its polling abilities. The non-response rate was negligible, which indicates that the term 'sensitive scalp' has a meaning for the majority of French people. This meaning is appropriate because subjects who reported sensitive skin had, in fact, skin reactions triggered by one or, in general, several factors, thus meeting the definition of sensitive skin (14). Surveys are therefore a suitable method for conducting an epidemiological study on sensitive skin. Moreover, it is the method that was used in other epidemiological studies about sensitive skin (2, 3, 9, 11).

There was no link between scalp sensitivity and any specific scalp disease; yet, people with scalp sensitivity suffered more frequently from a scalp disease or hair loss. A specific question concerning the presence of dandruff was lacking from our study. There was a weak but significant difference between people with or without scalp sensitivity regarding the relationship with declared atopic dermatitis. Atopic dermatitis is considered by many to be a possible predisposing condition of skin sensitivity (2, 15) and this association appears to be confirmed with scalp sensitivity. Scalp sensitivity was more frequent in patients with current hair loss. Scalp sensitivity varied notably according to scalp characteristics and was clearly more frequent and intense in patients with greasy or dry scalps. Scalp sensitivity, probably, belongs to sensitive skin syndrome and most patients declared sensitive skin in another area.

Hence, predisposing factors of scalp sensitivity could be a history of atopic dermatitis and an associated sensitive skin. Greasy or dry scalp and current hair loss are associated symptoms: are they predisposing factors or symptoms of scalp sensitivity? This question underlines the question of symptoms of scalp sensitivity. Erythema could be present but is not easily observable by patients

and is not a complaint, contrary to face sensitivity. To our knowledge, the prevalence of each symptom in subjects with sensitive facial skin has not been studied, although we guess that they are not the same as those of scalp sensitivity. Indeed, burning appears to be very rare (4.5%) in scalp sensitivity, whereas itching was frequent (37.6%).

Trichodynia has been defined as 'discomfort, pain, or paresthesia of the scalp' (16). Several studies reported its association with hair loss: in 14% patients who had consultation for hair loss (17), 34% women with hair loss (16) or 20% women and 9% men consulting for hair loss (18). Another study found 29% of trichodynia in patients with hair loss versus 3% in controls (19). They found more frequent trichodynia in patients suffering from telogen effluvium than in those with androgenetic alopecia, but it could be because of different sex ratios. We suggest that trichodynia could be a part of scalp sensitivity.

Triggering factors of scalp sensitivity were heat, cold, pollution, emotions, dry air, wet air, water, and mainly shampoos. It is interesting to remark that the frequencies of declared triggering factors are quite identical for scalp sensitivity and skin sensitivity (9), and that shampoos are triggering factors in 49% of scalp sensitivity, whereas cosmetics are the triggering factors in 43% of skin sensitivity (9).

In conclusion, scalp sensitivity exists and belongs to skin sensitivity syndrome (4). Hence it could be interesting to define its symptoms better.

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