

INVESTIGATIVE REPORT

Differences in Itch Characteristics Between Psoriasis and Atopic Dermatitis Patients: Results of a Web-based Questionnaire

Jenna L. O'NEILL¹, Yiong Huak CHAN², Stephen R. RAPP³ and Gil YOSIPOVITCH^{1,4}

Departments of ¹Dermatology, ²Psychiatry and Behavioral Medicine and ⁴Neurobiology and Anatomy, Wake Forest University School of Medicine, Winston-Salem, NC, USA, and ³Biostatistics Unit, Yong Loo Lin School of Medicine, National University Health System, Singapore

Differences in itch characteristics between different inflammatory dermatoses are not well described. The aim of this study was to assess differences in itch characteristics between patients with psoriasis and atopic dermatitis using a previously validated web-based questionnaire that was made available through the National Psoriasis Foundation and National Eczema Association for Science and Education websites. Participants rated frequency and intensity of itch, associated symptoms, itch descriptors, and effect of scratching. A total of 524 subjects with atopic dermatitis and 195 subjects with psoriasis completed the survey. Atopic dermatitis responders experienced more frequent and more intense itch. Associated sweating and heat sensation were also more common in atopic dermatitis. Scratching was considered pleasurable in both atopic dermatitis and psoriasis; pleasurability correlated weakly with itch intensity in atopic dermatitis. Psoriasis respondents reported higher embarrassment associated with itch. Itch sensation is experienced differently among patients with atopic dermatitis and psoriasis. Future therapeutic interventions may be developed to target these differences. Key words: itch; pruritus; atopic dermatitis; eczema; psoriasis; questionnaire.

(Accepted January 28, 2011.)

Acta Derm Venereol 2011; 91: 537–540.

Gil Yosipovitch, Department of Dermatology, Wake Forest University School of Medicine, Medical Center Boulevard, Winston-Salem, NC 27157-1071, USA. E-mail: gyosipov@wfubmc.edu

Itch is a predominant feature of many inflammatory skin conditions, such as atopic dermatitis (AD) and psoriasis, and is increasingly recognized as having serious psychosocial impact. Patients with itch have impaired quality of life and poor sleep, as well as fatigue from scratching at night (1, 2). In a recent web-based questionnaire of 304 individuals with AD, itch was described as “annoying”, “bothersome” and “unpleasant” (3). The sensation of itch is extremely subjective and may be experienced differently within and among sufferers of different skin conditions. The impact of itch, a key symptom in the clinical diagnosis of AD, (4) is often under-recognized. Although it is generally accepted that patients with AD

experience more intense itch than patients with psoriasis, objective data is lacking. In a survey of members of the National Psoriasis Foundation (NPF), itch was the second most common symptom, experienced by 79% of survey respondents (5).

To date, there have been no prospective studies comparing itch characteristics among the two most common itchy dermatoses; AD and psoriasis. Understanding the perception of itch sensations in patients with common, chronic skin conditions will guide the development of better treatment strategies that account for the impact of itch on quality of life.

METHODS

The web-based “Characteristics of Itch” questionnaire was adapted from the Eppendorf itch questionnaire (6) and its reliability and validity has been reported in a previous study (3) (Appendix SI; available from: <http://www.medicaljournals.se/acta/content/?doi=10.2340/00015555-1126>). The questionnaire was made available via links on two websites: for the National Eczema Association for Science and Education (NEASE; www.nationaleczema.org), a patient support group with approximately 40,000 members, and the NPF (www.psoriasis.org), with approximately 46,000 members. The survey was available over the course of 5 months, from November 2006 through April 2007. Institutional Review Board approval was waived due to the anonymous nature of the survey.

The design of the questionnaire has been detailed previously (3). Survey participants were asked if they currently suffer from itch, and about its frequency, duration and locations, as well as associated symptoms, such as pain, sweating, heat sensation and cold sensation. Participants also rated 32 descriptors of itch, such as “sharp,” “stinging,” “annoying,” and “uncontrollable,” from 0 (“not at all”) to 4 (“to a great extent”). The temporal pattern of itch was assessed by asking about itch at different times of day and in different seasons. Participants were asked to rate the intensity of a typical episode of itch within the past 2 weeks on a scale of 1 (none) to 10 (unbearable). They were asked to identify the effect of scratching a typical episode of itch on a scale of +5 to –5, where +5 = “highly pleasurable” and –5 = “highly unpleasurable”. The web-based design ensured that only one survey could be submitted from a single computer. Questionnaires with incomplete data were excluded from statistical analysis.

Statistical analysis

All analyses were performed using SPSS 15.0 software (SPSS Inc., Chicago, IL, USA). Descriptive statistics for quantitative variables were presented as mean ± standard deviation (SD) and as percentages for qualitative variables. The association

between itch intensity and itch characteristics with demographic information was assessed using χ^2 or Fisher's exact test, with odds ratios (OR) reported where applicable. Spearman's correlation coefficients were presented to assess relationships between quantitative and ordinal qualitative outcomes. Statistical significance was set at $p < 0.05$.

RESULTS

The web-based questionnaire was completed by 524 subjects with AD and 195 subjects with psoriasis. Sixteen questionnaires from respondents with AD and 10 from respondents with psoriasis were excluded due to incomplete data. Demographic characteristics of survey respondents are displayed in Table I. The majority of survey respondents in both groups were women and Caucasian. Patients with AD were more likely to experience itch (OR 9.3; 95% confidence interval (CI) 3.4–25.6; $p < 0.001$) compared with those with psoriasis. Mean itch episode severity was also higher in subjects with AD compared with those with psoriasis (8.2 ± 1.95 vs. 6.8 ± 2.45) ($p < 0.001$). Nearly one-third of respondents with psoriasis and 40% of those with AD reported greater than 10 episodes of itch per day. Pain associated with itch was reported in more than half of patients in both groups (Table II). Other associated symptoms, such as sweating (OR 2.1; 95% CI 1.3–3.4; $p = 0.002$) and heat sensation (OR 2.6; 95%

CI 1.8–3.6; $p < 0.001$) were reported more commonly in patients with AD. Itch severity was rated as greater at night and during the winter in both groups.

Scratching was considered pleasurable in both groups, with mean \pm SD scratch effect scores of 1.8 ± 3.4 in AD and 1.6 ± 3.2 in psoriasis ($p = 0.438$) on a Likert scale ranging from -5 (highly unpleasurable) to 5 (highly pleasurable) (Fig. 1). Scratch pleurability was weakly positively correlated with itch episode intensity in patients with AD ($r = 0.135$; $p = 0.002$), though this correlation was not present among patients with psoriasis ($r = 0.063$; $p = 0.395$). There was a trend toward greater scratch pleurability in participants with higher levels of education in both groups.

Patients with AD rated higher levels of itch over different body locations (Table II). While both groups reported a high level of itch on the scalp, subjects with AD reported more itch on the face (OR 5.0, 95% CI 3.2–7.8) ($p < 0.001$). Patients with AD also reported more itch on flexor surfaces of the upper extremities, a commonly involved location. In contrast, patients with psoriasis reported slightly more itch in the groin and buttocks. There was a trend in patients with psoriasis toward greater itch on extensor surfaces, particularly on lower extremities, where psoriatic plaques characteristically occur. However, the relationship between itch and the presence of skin lesions was not clear cut in either disease.

In general, patients with AD reported greater negative impact of their skin condition on their daily lives. Psoriasis respondents reported more embarrassment associated with itch (5 ± 1.2) than did patients with AD (2.6 ± 2.3) ($p = 0.44$).

Table I. Demographic information of survey participants. A total of 524 patients with atopic dermatitis (AD) and 195 patients with psoriasis responded to the survey

Characteristics	AD n (%)	Psoriasis n (%)	p-value
Gender			
Male	128 (24.4)	59 (30.3)	
Female	396 (75.6)	136 (69.7)	0.113
Age, mean \pm SD	37.6 \pm 13.3	49.9 \pm 13.2	< 0.001
Family			
Married	267 (51)	130 (67.4)	
Never married	179 (34.2)	28 (14.5)	
Divorced/separated	66 (12.6)	31 (16)	
Widow/widower	10 (1.9)	4 (2.1)	< 0.001
Ethnicity			
White	411 (78.4)	180 (92.3)	
Asian	43 (8.2)	6 (3.1)	
Black	31 (5.9)	2 (1)	
Hispanic	18 (3.4)	4 (2.1)	
Pacific Islander	7 (1.3)	1 (0.5)	
Other	14 (2.7)	2 (1)	0.5010
Education			
Graduate/professional degree	116 (22.1)	50 (25.9)	
College degree	215 (41.2)	85 (44.1)	
High school	171 (32.8)	16 (8.3)	
No formal education	20 (3.8)	40 (20.7)	< 0.001
Employment			
Employed	343 (65.5)	120 (61.9)	
Student	78 (14.9)	8 (4.1)	
Retired	33 (6.3)	43 (22.2)	
Unemployed	69 (13.2)	23 (11.8)	< 0.001

SD: standard deviation.

DISCUSSION

This study describes similarities and differences in the phenotype of itch, a common symptom experienced by patients with AD and psoriasis. Survey respondents with AD were more likely to currently experience itch and had a higher mean itch episode intensity.

Sweating was more aggravating to patients with AD, which may be related to the presence of autonomic over-reactivity in this condition (7). Patients with AD exhibit an overactive sympathetic response to itch and scratching, and show less physiological adaptability in response to stress (8). Pain was also a commonly reported associated symptom, which confirms findings of a previous study demonstrating that itch can coincide with pain (3). This supports the hypothesis that chronic itch and chronic pain may have overlapping neural networks, which may be stimulated by either sensation (9).

Variations in the location of itch were also noted among patients with AD and those with psoriasis. Itch in the groin and buttocks areas was slightly more prevalent in patients with psoriasis. Vulvar pruritus and

Table II. Itch characteristics of survey participants. Survey respondents were asked to rate itch characteristics and locations within the past 2 weeks

Characteristics	Atopic dermatitis (n=524)	Psoriasis (n= 195)	p-value	OR (95% CI)
Itch severity				
Episode intensity (mean ± SD)	8.2 ± 1.95	6.8 ± 2.45	<0.001	
Associated symptoms, n (%)				
Pain	300 (57.3)	101 (51.8)	0.190	–
Sweating	119 (22.7)	24 (12.3)	0.002	2.1 (1.3–3.4)
Heat sensation	282 (53.8)	61 (31.3)	<0.001	2.6 (1.8–3.6)
Location, n (%)				
Face	228 (43.5)	26 (13.3)	<0.001	5.0 (3.2–7.8)
Scalp	214 (40.8)	114 (58.5)	<0.001	0.49 (0.35–0.69)
Shoulder	195 (37.2)	31 (15.9)	<0.001	3.1 (2.1–4.8)
Armpit	113 (21.6)	27 (13.8)	0.020	1.7 (1.1–2.7)
Chest	203 (38.7)	39 (20.0)	<0.001	2.5 (1.7–3.7)
Abdomen	215 (41.0)	57 (29.2)	0.004	1.7 (1.2–2.4)
Back	226 (43.1)	82 (42.1)	0.795	–
Buttocks	160 (30.5)	71 (36.4)	0.134	–
Groin	135 (25.8)	53 (27.2)	0.701	–
Dorsal hand	210 (40.1)	48 (24.6)	<0.001	2.0 (1.4–3.0)
Palmar hand	209 (39.9)	38 (19.5)	<0.001	2.7 (1.8–4.1)
Extensor forearm	244 (46.6)	47 (24.1)	<0.001	2.7 (1.9–4.0)
Flexor forearm	179 (34.2)	33 (16.9)	<0.001	2.5 (1.7–3.9)
Extensor arm	242 (46.2)	44 (22.6)	<0.001	2.9 (2.0–4.3)
Flexor arm	200 (38.2)	40 (20.5)	<0.001	2.4 (1.6–3.5)
Extensor thigh	210 (40.1)	48 (24.6)	<0.001	2.0 (1.4–3.0)
Flexor thigh	176 (33.6)	43 (22.1)	0.003	1.8 (1.2–2.6)
Extensor shin	190 (36.3)	64 (32.8)	0.391	–
Flexor shin	156 (29.8)	44 (22.6)	0.055	–
Dorsal foot	134 (25.6)	47 (24.1)	0.686	–
Plantar foot	102 (19.5)	41 (21.0)	0.641	–

OR: odds ratio; CI: confidence interval; SD: standard deviation.

burning are commonly reported symptoms in women with psoriasis, and do not necessarily correlate with the presence of vulvar psoriatic plaques. Depressive symptoms are more common in women with vulvar discomfort (10). Although psoriatic plaques are typically located on extensor surfaces, sensations of itch were not just limited to these areas. These findings support previous work in which itch intensity did not correlate with Psoriasis Area and Severity scores (11). There was,

however, a trend toward itch localized to extensor surfaces, especially on the lower extremities. A significant correlation between itch intensity and psoriasis severity was demonstrated in another study, (12) therefore all patients with psoriasis should be questioned regarding itch and treated appropriately.

The major limitation of this study is that identification of survey participants as having either AD or psoriasis relied upon subjects’ self reporting. The survey was publicized through the NEASE and NPF websites, which increases the likelihood of accurate self-reporting of AD or psoriasis, but also introduces the possibility of selection bias for individuals frequenting these websites. The number of survey respondents was a small portion of the total membership of the two organizations. In addition, there were more than twice as many AD respondents compared with participants with psoriasis. Furthermore, participants’ disease severity was not assessed objectively; therefore it was not possible to associate participants’ responses with their level of disease severity or distribution. It would be of interest in future studies to correlate itch characteristics with objective disease severity, assessed by validated tools. Correlating parameters of itch with quality-of-life, using the recently reported Itchy Quality of Life (ItchyQoL) tool (13), would reveal more about the impact of itch on patients’ lives.

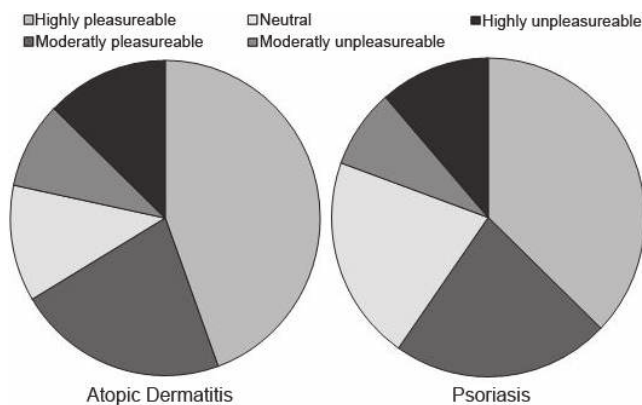


Fig. 1. Scratch pleurability in atopic dermatitis and psoriasis. Although scratching may aggravate itch, the majority of survey respondents identified scratching as pleasurable. $p=0.295$ for difference in responses between atopic and psoriatic survey respondents.

ACKNOWLEDGEMENTS

The authors would like to thank Nicholas Rassette for his assistance with data collection. We would also like to thank Richard Seiden from NPF and Vicki Kalabokes from NEASE and their staff for publicizing the survey on their websites.

The authors declare no conflict of interest.

REFERENCES

1. Patel T, Ishiujji Y, Yosipovitch G. Nocturnal itch: why do we itch at night? *Acta Derm Venereol* 2007; 87: 295–298.
2. Reich A, Hrehorow E, Szepietowski JC. Pruritus is an important factor negatively influencing the well-being of psoriatic patients. *Acta Derm Venereol* 2010; 90: 257–263.
3. Dawn A, Papoiu AD, Chan YH, Rapp SR, Rassette N, Yosipovitch G. Itch characteristics in atopic dermatitis: results of a web-based questionnaire. *Br J Dermatol* 2009; 160: 642–644.
4. Stander S, Steinhoff M. Pathophysiology of pruritus in atopic dermatitis: an overview. *Exp Dermatol* 2002; 11: 12–24.
5. Krueger G, Koo J, Lebwohl M, Menter A, Stern RS, Rolstad T. The impact of psoriasis on quality of life: results of a 1998 National Psoriasis Foundation patient-membership survey. *Arch Dermatol* 2001; 137: 280–284.
6. Darsow U, Scharein E, Simon D, Walter G, Bromm B, Ring J. New aspects of itch pathophysiology: component analysis of atopic itch using the 'Eppendorf Itch Questionnaire'. *Int Arch Allergy Immunol* 2001; 124: 326–331.
7. Boettger MK, Bar KJ, Dohrmann A, Muller H, Mertins L, Brockmeyer NH, et al. Increased vagal modulation in atopic dermatitis. *J Dermatol Sci* 2009; 53: 55–59.
8. Tran BW, Papoiu AD, Russoniello CV, Wang H, Patel TS, Chan YH, et al. Effect of itch, scratching and mental stress on autonomic nervous system function in atopic dermatitis. *Acta Derm Venereol* 2010; 90: 354–361.
9. Yosipovitch G, Carstens E, McGlone F. Chronic itch and chronic pain: analogous mechanisms. *Pain* 2007; 131: 4–7.
10. Zamirska A, Reich A, Berny-Moreno J, Salomon J, Szepietowski JC. Vulvar pruritus and burning sensation in women with psoriasis. *Acta Derm Venereol* 2008; 88: 132–135.
11. Yosipovitch G, Goon A, Wee J, Chan YH, Goh CL. The prevalence and clinical characteristics of pruritus among patients with extensive psoriasis. *Br J Dermatol* 2000; 143: 969–973.
12. Szepietowski JC, Reich A, Wisnicka B. Itching in patients suffering from psoriasis. *Acta Dermatovenerol Croat* 2002; 10: 221–226.
13. Desai NS, Poindexter GB, Monthrope YM, Bendeck SE, Swerlick RA, Chen SC. A pilot quality-of-life instrument for pruritus. *J Am Acad Dermatol* 2008; 59: 234–244.