SHORT COMMUNICATION

Hand Eczema in High School Students in Poland: A Cross-sectional Study

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Hand eczema (HE) is regarded as a common dermatological condition (1). Frequent hand hygiene procedures during the SARS-CoV-2 (COVID-19) pandemic increased the prevalence of HE (2). HE presents with various clinical manifestations, ranging from minimal skin lesion to very severe ones. Common symptoms reported by patients include, among others, itching and pain (1, 3). HE has severe psychosocial consequences, leading to decreased quality of life, increased level of stigmatization, and increased risk of depression and anxiety (4, 5). Very little is known about the prevalence and subjective symptoms of HE in paediatric and adolescent populations. Moreover, it has been proven that the COVID-19 pandemic enormously influenced the exacerbation and increased prevalence of HE in healthcare workers and the general population. The increased use of disinfectant soaps and cleaning chemicals led to the development of more severe, itchy lesions (6–8).

The aim of the current study is to assess the prevalence of HE among high school students after the COVID-19 pandemic in Poland. A further aim is to determine the clinical and psychosocial characteristics of HE among this group of subjects.

MATERIALS, METHODS AND RESULTS

This cross-sectional study included a group of 258 high school students in south-west Poland (Wroclaw). The ethics committee of Wroclaw Medical University approved the project (KB-663/2022). Informed consent was obtained from all students above the age of 18 years. At least 1 parent of younger students agreed to have their child considered for the current study. A specially designed questionnaire was used by investigators to collect demographic data of participants, including age, sex, personal and family history of atopy, as well as active smoking status. The lifetime prevalence of HE was assessed with the simple, previously used question "Have you ever had hand eczema?" (9). The point prevalence of the disease was established with the following question, "Do you currently have hand eczema (in the last 7 days)?". The clinical intensity of the disease was self-reported by participants based on a validated colour photographic guide for assessing the severity of chronic HE (10). Moreover, those students who reported the presence of hand lesions during the previous week completed the following Polish language validated questionnaires: Dermatology Life Quality Index (DLQI) (11), 6-Item Stigmatization Scale (6-ISS) (12), Hospital Anxiety of Depression Scale (HADS) (13). Intensity of worst itch and pain during the last 3 days was measured with a numerical rating scale (NRS) (3, 14, 15). The severity of quality of life impairment (DLQI) was considered as follows: 0–1 point, no effect; 2–5 points, small effect; 6–10 points, moderate effect; 11–20 points, very large effect; and 21–30 points, extremely large effect on patients' life (16). The following cut-off points were used for itch severity: less than 3 points, mild itch; 3–7 points, moderate itch; 7–9 points, severe itch; and more than 9 points, very severe itch (3, 14, 15). Intensity of pain was assessed based on the following cut-off score: ≤ 5 points, mild pain; >5–7 points, moderate pain; >7–10 points, severe pain (3, 14, 15). Statistical analysis was performed with the IBM SPSS Statistics v. 26 (SPSS Inc., Chicago, IL, USA) software. Numerical variables were assessed with the Mann–Whitney *U* test; categorical data were analysed with a χ^2 test. The Bonferroni correction was applied for multiple variables. The Spearman's rank correlation test was used to assess relationships between studied parameters. *p*-values less than 0.05 were considered statistically significant.

A total of 243 students completed all requested questionnaires; l a response rate of 94.2%. There were 117 (48.1%) females and 126 (51.9%) males. Their age ranged from 14 to 18 years, with a mean value of 16.0 ± 1.7 years. Personal atopy history was found in 50 (20.6%) participants, family atopy history was reported by 63 (25.9%) students. Twenty-five (10.3%) of the whole group considered themselves active smokers.

The point prevalence of HE within high school students was assessed at 11.1% (27 subjects) and the lifetime prevalence of HE at 28% (68 participants). There was no statistically significant difference in both the point and lifetime prevalence of HE in female and male subjects (9.4% vs 12.7% and 30.8% vs 25.4%, respectively) (**Table I**). The personal atopy background was significantly more common ($p<0.001$) in subjects with HE (13 (48.1%)) than in those without hand lesions (37 (7.1%)). A similar phenomenon was observed for family history of atopy ($p=0.005$). Thirteen (48.1%) students with HE reported positive family atopy history, in contrast to only 50 (23.1%) in those without clinical manifestation of HE. Active tobacco smoking did not predispose to HE (**Table II**). The vast majority of students with HE (19 (70.4%)) assessed the severity of the disease as minimal (almost clear) and the remainder (8 (29.6%)) as mild. There was 1 subject with moderate and severe HE. Itch and pain were reported by 48.1% of students with current hand lesions. The intensity of the worst itch during the last 3 days was assessed as 3.23 ± 2.2 points, indicating mild itch. The mean intensity of the worst pain within last 3 days was measured at 2.4 ± 1.7 points which is consistent with pain of mild intensity. The mean DLQI was 3.5 ± 4.3 points documenting mild effect of the disease on subjects' life. The mean 6-ISS was measured at 2.7 ± 3.9 points. Regarding the HADS questionnaire, anxiety was significantly ($p=0.033$) more common in students with HE (66.7% vs 47.3%). Moreover, HADS-A scorings were significantly ($p=0.015$) higher in subjects with than without HE (12.0 ± 4.0 points and 10.0 ± 4.1 points, respectively). Assessing depressive symptoms, we were only able to find the significant

Table I. Prevalence of hand eczema in high school students

Prevalence	Whole group, *n*; %	Females, *n*; %	Males, *n*; %	*p*-value
Point prevalence	27; 11.1	11; 9.4	16; 12.7	NS
Lifetime prevalence	68; 28.0	36; 30.8	32; 25.4	NS

NS: not significant.

Table II. Characteristics and psychosocial aspects of high school students with hand eczema (HE)

Characteristics	Whole group $n=243$	Without HE $n=216$	With HE $n=27$	p-value
Personal atopy history, *n* (%)	50 (20.6)	37 (17.1)	13 (48.1)	<0.001
Family atopy history, *n* (%)	63 (25.9)	50 (23.1)	13 (48.1)	0.005
Smoking, *n* (%)	25 (10.3)	20 (9.3)	5 (18.5)	NS
Self-assessed severity, *n* (%)				
Almost clear	NA	NA	19 (70.4)	NA
Mild	NA	NA	8 (29.6)	NA
Itch, *n* (%)	NA	NA	13 (48.1)	NA
Itch intensity (mean±SD)	NA	NA	3.23±2.2	NA
Pain, *n* (%)	NA	NA	13 (48.1)	NA
Pain intensity (mean±SD)	NA	NA	2.4±1.7	NA
DLQI (mean±SD)	NA	NA	3.5±4.3	NA
6-ISS (mean±SD)	NA	NA	2.7±3.9	NA
HADS A (mean±SD)	10.2±4.1	10.0±4.1	12.0±4.0	0.015
Borderline anxiety, *n* (%)	59 (24.3)	55 (25.5)	4 (14.8)	NS
Anxiety, *n* (%)	115 (47.3)	97 (44.9)	18 (66.7)	0.033
HADS D (mean±SD)	9.3±4.1	9.2±4.2	9.3±3.3	NS
Borderline depression, *n* (%)	49 (20.2)	37 (17.1)	12 (44.4)	0.001
Depression, *n* (%)	104 (42.8)	96 (44.4)	8 (29.8)	NS

SD: standard deviation; DLQI: Dermatology Life Quality Index; 6-ISS: 6-Item Stigmatization Scale; HADS: Hospital Anxiety and Depression Scale; A: anxiety; D: depression; NA: not applicable; NS: not significant.

($p=0.001$) difference in borderline depression between HE students and subjects without HE (44.4% vs 17.1%). Neither itch nor pain intensity correlated with DLQI, 6-ISS, HADS-A and HADS-D. In addition, itch intensity did not correlate with pain severity (detailed data not shown).

DISCUSSION

Prevalence of HE among adolescents is a subject of significantly fewer studies than in the adult population. The lifetime self-reported prevalence of HE oscillates between 9.7% and 10.4% (17, 18). While the age of the studied population was similar to that in the current patient cohort, the results noticeably differed from the self-reported lifetime prevalence of 28%. The low number of studies on the adolescent population makes it difficult to compare the prevalence of HE after COVID-19 to the situation before the pandemic. Disinfectants and other hand hygiene products, such as hand soaps, are well-known factors increasing the risk of HE. Numerous studies showed a correlation between regular use of alcohol-based disinfectants and the occurrence of HE. Furthermore, frequent hand washing makes it easier for the allergens and irritants to disrupt the hydro-lipid barrier. Therefore, it can even lead to chronic HE in an individual (2, 19). It has also been reported that 74–84.6% of healthcare workers (HCW) who worked during the COVID-19 pandemic experienced hand-skin damage. Furthermore, those who washed their hands more frequently (more than 10 times a day) were at a 2.17-times higher risk of developing HE-like lesions than those who washed their hands less frequently (6, 20). In almost 70% of cases, lesions were associated with skin dryness (21). Although the studies concentrate mainly on HCW, the general population was also at risk of developing similar lesions. The increased use of soap and water leads to potential skin barrier damage and skin dryness (21). The current study clearly confirmed previous observations (1) that the atopic personal and family background predisposes to the development of HE. However, we were not able to correlate the suggested tobacco smoking (1) with the occurrence of HE.

HE is known to cause pain and itch in most of its clinical subtypes (3). Numerous studies have reported the impact of HE on the quality of the patients' life (4). Although it is difficult to find publications regarding the youth, adults with HE reported significantly higher levels of distress, depression and anxiety compared with controls (4). In the current study, the psychosocial consequences turned out not be significant, while only borderline depression occurrence was significantly higher in students with HE. However, it is notable that the current study population included only subjects with very mild clinical forms of HE. Interestingly, almost half of surveyed students in the current study presented symptoms suggesting anxiety or depression. A high percentage of depressed or anxious Polish students was also found in the study by Borawska-Kowalczyk and Sands (22). Thus, further research might be needed to assess the prevalence of depression and its correlation with other illnesses.

This study has a number of limitations. It is a single-centre study with a limited number of subjects. The small number of HE-diagnosed subjects does not allow for the generalization of the results on disease severity and psychosocial parameters. On the other hand, the high response rate of 94.2% allows us to believe that the group may be diverse enough to generalize the results. It is important to emphasize that it was a self-reported HE project; hence one cannot completely exclude the possibility that at least some skin lesions considered as HE by participants could have been of a different origin (e.g. tinea or viral warts). Moreover, the study used a photographic severity scale validated for physicians rather than for patients. Hence the results should be considered with caution. A larger, multicentre study with HE patients diagnosed by dermatologists is needed to confirm the current results.

REFERENCES

1. Agner T, Elsner P. Hand eczema: epidemiology, prognosis and prevention. J Eur Acad Dermatol Venereol 2020; 34: 4–12.
2. Techasatian L, Thaowandee W, Chaiyarit J, Uppala R, Sitthikarnkha P, Paibool W, et al. Hand hygiene habits and prevalence of hand eczema during the COVID-19 pandemic. J Prim Care Community Health 2021; 12: 21501327211018013.
3. Zalewski A, Krajewski PK, Szepietowski JC. Prevalence and characteristics of itch and pain in patients suffering from chronic hand eczema. J Clin Med 2023; 12: 4198.
4. Marron SE, Tomas-Aragones L, Navarro-Lopez J, Gieler U, Kupfer J, Dalgard FJ, et al. The psychosocial burden of hand eczema: data from a European dermatological multicentre study. Contact Dermatitis 2018; 78: 406–412.
5. Szepietowska M, Dabrowska A, Dziasek S, Lisicki B, Skinderowicz K, Wilczynski B, et al. Perception of hand eczema among adolescents in Poland: a cross-sectional study. Con-

tact Dermatitis 2023; 89: 68–70.
6. Lan J, Song Z, Miao X, Li H, Li Y, Dong L, et al. Skin damage among health care workers managing coronavirus disease-2019. J Am Acad Dermatol 2020; 82: 1215–1216.
7. Wollenberg A, Flohr C, Simon D, Cork MJ, Thyssen JP, Bieber T, et al. European Task Force on Atopic Dermatitis statement on severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) infection and atopic dermatitis. J Eur Acad Dermatol Venereol 2020; 34: e241–e242.
8. Stefaniak AA, Bialynicki-Birula R, Krajewski PK, Matusiak L, Goldust M, Szepietowski JC. Itch in the era of COVID-19 pandemic: an unfolding scenario. Dermatol Ther 2020; 33: e13477.
9. Bingefors K, Svensson A, Isacson D, Lindberg M. Self-reported lifetime prevalence of atopic dermatitis and co-morbidity with asthma and eczema in adulthood: a population-based cross-sectional survey. Acta Derm Venereol 2013; 93: 438–441.
10. Coenraads PJ, Van Der Walle H, Thestrup-Pedersen K, Ruzicka T, Dreno B, De La Loge C, et al. Construction and validation of a photographic guide for assessing severity of chronic hand dermatitis. Br J Dermatol 2005; 152: 296–301.
11. Finlay AY, Khan GK. Dermatology Life Quality Index (DLQI) – a simple practical measure for routine clinical use. Clin Exp Dermatol 1994; 19: 210–216.
12. Lu Y, Duller P, van der Valk PGM, Evers AWM. Helplessness as predictor of perceived stigmatization in patients with psoriasis and atopic dermatitis. Dermatol Psychosom 2003; 4: 146–150.
13. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983; 67: 361–370.
14. Cheung HN, Chan YS, Hsiung NH. Validation of the 5-D Itch Scale in three ethnic groups and exploring optimal cutoff values using the itch numerical rating scale. Biomed Res Int 2021; 2021: 7640314.
15. Chien CW, Bagraith KS, Khan A, Deen M, Syu JJ, Strong J. Establishment of cutpoints to categorize the severity of chronic pain using composite ratings with Rasch analysis. Eur J Pain 2017; 21: 82–91.
16. Hongbo Y, Thomas CL, Harrison MA, Salek MS, Finlay AY. Translating the science of quality of life into practice: what do dermatology life quality index scores mean? J Invest Dermatol 2005; 125: 659–664.
17. Ljubojevic Hadzavdic S, Stulhofer Buzina D. The prevalence of hand eczema in an adolescent population. J Eur Acad Dermatol Venereol 2022; 36: 490–491.
18. Wang J, Tischer C, Standl M, Weidinger S, von Berg A, Herberth G, et al. Lifetime prevalence and determinants of hand eczema in an adolescent population in Germany: 15-year follow-up of the LISA cohort study. J Eur Acad Dermatol Venereol 2022; 36: 547–556.
19. Pradhan S, Kroumpouzos G, Goldust M. Hand eczema due to frequent hand washing in combat with COVID-19. J Cosmet Dermatol 2020; 19: 2474–2475.
20. Lin P, Zhu S, Huang Y, Li L, Tao J, Lei T, et al. Adverse skin reactions among healthcare workers during the coronavirus disease 2019 outbreak: a survey in Wuhan and its surrounding regions. Br J Dermatol 2020; 183: 190–192.
21. Kim S, Ly BK, Ha JH, Carson KA, Hawkins S, Kang S, et al. A consistent skin care regimen leads to objective and subjective improvements in dry human skin: investigator-blinded randomized clinical trial. J Dermatolog Treat 2022; 33: 300–305.
22. Borawska-Kowalczyk U, Sands D. [Depression and Anxiety Scale (HADS) - application in a group of healthy teenagers and teenagers suffering from cystic fibrosis in Poland]. Pediatria Polska 2014; 89: 27–32 (in Polish).