Prevalence of skin disorders in primary and secondary school age children in Canakkale, Turkey: a community-based survey

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Abstract

Introduction: Skin lesions may be of dermatological importance, affect appearance, and cause problems communicating with peers and may be especially more significant in childhood.

Aim: Information on the prevalence of pediatric dermatoses in Western Turkey. This study was aimed to define the existing data.

Material and methods: A cross-sectional study was conducted in Canakkale, Turkey, in September-December 2013. It involved 1,957 students from five randomly selected primary and secondary schools. Each student was interviewed for age, gender, and family history, and a dermatologic examination was performed by a dermatologist. Data were coded and analyzed.

Results: Of the students, 79.9% revealed at least one dermatosis. The most common disease was benign neoplasms (76%), followed by pigmentary disorders (26.8%), and xerosis (5.8%). In primary schools, the acquired melanocytic nevus, hypopigmented macule, and xerosis; in secondary school the acne was statistically significantly more common. Acne and xerosis was more common in girls, and pityriasis alba was statistically more common in boys. Students who had at least one dermatosis were positively correlated with monthly income.

Conclusions: In Turkish school age children, the prevalence of dermatosis is 79.9%. It may be due to not using preventive means for adequate protection from the sun and other environmental factors. Infectious dermatosis and atopic dermatitis are rare and it may depend on the adequacy of public health work.

Key words: dermatosis, pediatrics, prevalence.

Introduction

Epidemiological studies to detect skin lesions in childhood emphasize the prevalence and importance of the disease in the population and have an effect on directing health policies and actions. These epidemiological studies are difficult, due to both time and costs but have the characteristic of carrying clues about the health of future generations.

The majority of skin lesions in the childhood period are due to acutely developing diseases. Additionally, diseases like psoriasis, atopic dermatitis, and vitiligo affect patients for a lifetime. Skin lesions may be of dermatological importance, affect appearance, and cause problems communicating with peers and may be especially more significant in childhood.

Aim

This study is a community-based study to determine skin lesions in the pediatric period in Turkey, and was aimed to determine the prevalence and characteristics of skin lesions in primary and secondary school children in a provincial city, Canakkale, in Western Turkey.

Material and methods

The study had a cross-sectional design and was completed in September-December 2013 in primary and secondary schools in the city center of the Canakkale province. The study was completed by a team from the Canakkale Onsekiz Mart University, Medical Faculty, Family Practice, Public Health, Pediatrics, Dermatology, Physical Therapy and Rehabilitation, and Ear, Nose and Throat Departments under the name School Health Screening Project. Some of the findings identified during this project were shared in this study.

Population

The population of the study was 5–14 year-old students enrolled in primary and secondary schools in the city of Canakkale. In the city of Canakkale, there were a total of 7,579 students enrolled in primary and secondary schools for the 2012–2013 education year [1]. As the population is known, the sample size was calculated to be 366 students. However, as no previous health screening has been conducted in the region, no prevalence results were available in this region. Additionally, in the School Health Screening Project, one school was randomly selected from each of the five neighborhoods in the city of Canakkale. The minimum sample size was determined as 366 × 5 = 1,830 and we aimed to reach all students enrolled in these schools. A total of 1,957 students attending the five schools participated in the project at a rate of 66.1%. The total enrollments in the schools and project participation rates are shown in Table 1.

Permission and consent

This study was planned under the auspices of the School Health Screening Project. Completed by the teaching staff from Canakkale Onsekiz Mart University, Medical Faculty, Family Practice, Public Health, Pediatric Health and Diseases, Dermatology, Physical Therapy and Rehabilitation, and Ear, Nose and Throat Departments, this project received permission from the Canakkale Onsekiz Mart University Ethics Committee dated 27.12.2012 and numbered 050.99-214 and from the Provincial National Education Directorate dated 23.09.2013.

Meetings were held with the administrators of the schools planned to participate in the Health Screening Project and permission was sought. In the schools, they were asked to provide an appropriate location for the team to conduct examinations. The project aims and methods were explained to the parents of students at a meeting and they were requested to provide written and verbal permission by completing a Parental Consent Form.

Participants

Volunteers who accepted participation were included in the study. Those without parental consent were excluded from the study. Permission was granted to parents who wished to accompany their children to the examination. A total of 1,957 students agreed to participate in the study.

Survey

The Parental Consent Form given to parents to complete also included questions regarding the sociodemographic characteristics of the child and family and contact information. This form requested the student's prenatal and natal history, history of allergies, chronic diseases, the parents' height and weight, chronic diseases and habits and monthly income levels. The students' identifying information, anthropometric measurements, and examination information were noted on the Examination Form used during the study.

Measurements

Height measurement: Among anthropometric measurements, height was measured standing with shoes removed using a Standing Height Measure.

Weight measurement: Weight was measured using a calibrated digital scale with 0.01 kg sensitivity. During measurements the digital scale was placed on the floor, the student removed his or her shoes, and any other heavy objects, and stood with the weight spread evenly between the feet.

Waist and hip circumference measurement: Waist and hip circumference measurements were made with a non-elastic tape measure. Waist circumference measurements were taken midway between the lowest rib on the right and the crest of the iliac bone with the abdomen relaxed. Hip measurements were made with the student standing tall, at the highest point of the hip. Measurements had sensitivity of 0.01 cm. Waist and hip

Table 1. Schools and participation rate of the Project

Schools	Total, n	Participation rate of the Project, n (%)
1	430	361 (84.5)
2	615	438 (71.2)
3	572	482 (84.3)
4	688	412 (59.8)
5	655	264 (40.3)
Total	2660 (100.0%)	1957 (66.1)

Table 2. Distrubition of students demografic variables

Demografic variables	Primary school (n = 1386)	Secondary school (n = 571)	Statistical analysis*	P-value
Gender:				
Girls	693 (35.4%)	257 (13.1%)	$\chi^2 = 4.403$	0.045
Boys	693 (35.4%)	55 (16.0%)		
Age	7.31 ±1.24	11.63 ±1.16	$t = -71.432$	< 0.001
History of allergy	204 (13.8%)	60 (4.1%)	$\chi^2 = 2.245$	0.101
Monthly income (TL)	1893.7 ±1226.6	1439.6 ±1025.3	$t = 4.491$	< 0.001
Antropometric measurements:				
Height, mean ± SD [cm]	126.8 ±8.7	149.4 ±10.1	$t = -49.461$	< 0.001
Weight, mean ± SD [cm]	27.4 ±0.2	44.4 ±0.5	$t = -36.716$	< 0.001
BMI, mean ± SD [kg/m^2]	16.8 ±2.9	19.6 ±4.3	$t = -16.993$	< 0.001

*t – independent t test, χ^2 – chi-square test, p < 0.05 is significant. TL – Turkish lira, BMI – body mass index.

circumference measurements were taken when the students were behind a screen.

Practice

Students were taken to a previously arranged and organized examination room. The students were divided into groups of five and accompanied by class teachers and parents. The boys and girls were taken inside at separate times. The skin lesion examinations were completed by a member of the Dermatology Department in an environment with sufficient light, in screened units. During the examination, the students could not see or touch each other. The students were examined without clothes and their skin lesions were noted. The whole body was examined, excluding the genital region. The examination findings were recorded on examination forms unique to each student.

Statistical analysis

Data were evaluated with SPSS version 18.0. Descriptive statistics of variables such as mean, median,

Table 3. The dermatologic conditions

Pediatric dermatosis	N	Percentage
1	623	31.8
2	559	28.6
3	261	13.3
4	86	4.4
5	26	1.3
6	7	0.4
7	2	0.1
8	1	0.1

standard deviation values, and frequency values were calculated. Skin findings were evaluated with the Kolmogorov-Smirnoff test for normal distribution. It was observed that skin variables were in accordance with normal distribution. To evaluate the relationship between variables, the independent t-test, χ^2 test, and Mann-Whitney U-test were applied. Correlations were evaluated with the Kendal tau b test.

Results

Participants

The study included 1,957 students in five schools in the city center of Canakkale, in grades 1–8, with students between the ages of 5 and 14 years. The distribution of students in primary and secondary school according to the Turkish education system are shown in Table 2.

Dermatological findings

There were 392 (20.1%) students with no skin findings and 1 (0.1%) student with eight findings. The prevalence of skin lesions among students is given in Table 3.

The distribution of gender and dermatosis of students in primary and secondary school according to the Turkish education system is given in Table 4.

In primary school students, there was greater acquired melanocytic nevus ($\chi^2 = 28,696$; $p < 0.05$), hyper and hypopigmented macules ($\chi^2 = 29.039$; $p < 0.05$), and xerosis ($\chi^2 = 4.747$; $p < 0.05$), while in secondary school students, there was greater acne ($\chi^2 = 205.205$; $p < 0.05$) in a statistically significant amount.

Primary school students had acquired melanocytic nevus, hypo/hyper pigmentation, and xerosis, while secondary school students had acquired melanocytic nevus, acne, and hypo/hyperpigmentation, in that order. Seventy-six (3.9%) students were referred to the dermatology

Table 4. Frequencies and percentages of pediatric dermatosis

Variable**	Primary school n (%)	Secondary school n (%)	Total* (%)	Variable**	Primary school n (%)	Secondary school n (%)	Total* (%)
Dermatitis:				Sweat gland disorders:			
Atopic dermatitis	64 (4.7)	12 (1.8)	3.9	Miliaria	1 (0.1)	5 (0.9)	0.3
Contact dermatitis	9 (0.7)	6 (1.1)	0.7	Benign neoplasms and hyperplasia:			
Seborrhoeic dermatitis	14 (1.0)	10 (1.8)	1.2	Milia	22 (1.6)	7 (1.2)	1.5
Nummular dermatitis	0 (0.0)	2 (0.4)	0.1	Congenital melanocytic nevus	39 (2.8)	41 (7.2)	4.1
Pityriasis alba	76 (5.5)	25 (4.4)	5.2	Hemangioma	18 (2.0)	2 (0.4)	1.0
Viral infections:				Acquired melanocytic nevus	973 (70.2)	297 (52.0)	64.9
Warts	40 (2.9)	11 (1.9)	2.6	Spitz nevus	1 (0.1)	0.0	0.1
Herpes simplex	16 (1.2)	5 (0.9)	1.1	Nevus flammeus	2 (0.1)	0.0	0.1
Fungal infections:				Becker nevus	2 (0.1)	1 (0.2)	0.2
Tinea pedis	12 (0.9)	6 (1.1)	0.9	Mongolian spot	2 (0.1)	0.0	0.1
Tinea corporis	6 (0.4)	8 (1.4)	0.7	Scar	41 (3.0)	29 (5.1)	3.6
Tinea unguium	7 (0.5)	5 (0.9)	0.6	Keloid	6 (0.4)	0.0	0.3
Pigmentation disorders:				Other	0	2 (0.4)	0.1
Café au lait	32 (2.3)	20 (3.5)	2.7	Nail dystrophy	20 (1.4)	3 (0.5)	1.2
Freckles	64 (4.6)	20 (3.5)	4.3	Unclassified other group diseases:			
Leukoderma	10 (0.7)	3 (0.5)	0.7	Keratosis pilaris	66 (4.8)	22 (3.9)	4.5
Vitiligo	4 (0.3)	2 (0.4)	0.4	Xerosis	91 (6.6)	23 (4.0)	5.8
Albinism	1 (0.1)	0.0	0.1	Xeroderma	2 (0.1)	1 (0.2)	0.2
Post-inflammatory hypopigmentation	214 (15.4)	37 (6.5)	12.8	Pityriasis capitis simplex	2 (0.1)	6 (1.1)	0.4
Post-inflammatory hyperpigmentation	90 (6.5)	24 (4.2)	5.8	Striae distensae	1 (0.1)	5 (0.9)	0.3
Hair disorders:				Ecchymosis	24 (1.7)	1 (0.2)	1.3
Alopecia areata	3 (0.2)	0.0	0.2	Insect bite	21 (1.5)	0.0	1.1
Hypertrichosis	4 (0.3)	3 (0.5)	0.4	Telangiectasia	30 (2.2)	12 (2.1)	2.1
Sebaceous gland disorders:				Livedo reticularis	69 (5.0)	18 (3.2)	4.4
Acne	15 (1.1)	103 (5.3)	6.0	At least one skin finding	1142 (82.4)	423 (74.1)	79.90
Papulosquamous diseases:				Non-cutaneous manifestations	244 (17.6)	148 (25.9)	20.10
Psoriasis	3 (0.2)	3 (0.5)	0.3	Total	1386 (100)	571 (100)	100.00
Lichen nitidus	32 (2.3)	5 (0.9)	1.9				

*Column percentage is taken, **more than one diagnoses is defined.*

clinic after the skin examination. 2.4% of students were referred to the clinic because of the acquired melanocytic nevus evaluation. The most common dermatoses are given Table 5.

Factors related to dermatological findings

There was a weak positive correlation between students with at least one dermatosis and monthly income levels (Kendal τ b $r = 0.102$; $p < 0.05$), but no correlation with age (Kendal τ b $r = 0.15$; $p > 0.05$). There was

a weak positive correlation between the presence of acne and age (Kendal τ b $r = 0.267$; $p < 0.05$) and BMI (Kendal τ b $r = 0.182$; $p < 0.05$).

Discussion

In the current study, conducted on school-age children, at least one skin finding was found in 79.9% of students aged 5–14 years. The most frequent skin findings in primary school children were acquired melanocytic nevus, post-inflammatory hypopigmentation, and

Table 5. The most common dermatoses among children by gender

Dermatosis	Girls n (%)	Boys n (%)	χ^2	P-value*
Acquired melanocytic nevus	659 (69.3)	611 (60.7)	16.237	< 0.001
Post-inflammatory hypopigmentation	112 (11.8)	139 (13.8)	16.732	0.183
Acne	78 (8.2)	40 (4.0)	15.498	< 0.001
Xerosis	64 (6.7)	50 (5.0)	2.797	0.094
Pityriasis alba	34 (3.6)	67 (6.7)	9.440	0.002

*P < 0.05 is significant.

xerosis, while in secondary school children, the most frequent findings were acquired melanocytic nevus, acne, and post-inflammatory hypopigmentation. When comparisons were made based on gender, girls had acquired melanocytic nevus and acne, while male students had acquired melanocytic nevus, post-inflammatory hypopigmentation, and pityriasis alba. Acne frequency increased with age. Monthly income levels increased with at least one dermatosis, and body mass index (BMI) increased the presence of acne. The prevalence of infectious dermatosis was low.

Prevalence of dermatologic findings

Population-based studies show differences in the prevalence of skin lesions depending on the region. Total prevalence was 86.9% in a population-based study in Egypt in all age groups, while prevalence was 35.0% in primary school children in Nigeria, 31.3% of 6–21-year-olds in Hong Kong and 45.3% of the population above 5 years in India had at least one skin finding [2–5]. In Turkey, the prevalence of at least one dermatosis in the preschool age group was found to be 30.3% in a community-based study [6]. In the current study, the prevalence of at least one skin lesion was 79.9%. This rate is very high, though the prevalence of benign lesions was greater.

Of those reporting to dermatology clinics in Japan, in the 6–10 age group, the most frequent complaints were atopic dermatitis, warts, and dermatitis, while in the 11–15 age group, acne was most frequent [7]. In Switzerland and China, the most frequent complaints of 6–10 year-old children were atopic dermatitis, acquired melanocytic nevus, and warts [8, 9]. In a study of school-age children in Egypt, the most frequent skin lesion was benign neoplasm known as melanocytic nevus, milia, and hypertrophic scars with a prevalence of 87.0% [10]. Davis *et al.* [11] scanned American data and determined that the most frequent skin findings according to race and roots were acne and eczema. Henderson *et al.* [12] retrospectively evaluated visits to a dermatology clinic in the 10–11-year old age group in the United States, and determined acne, dermatitis, and nevus were most frequent.

In a study in Turkey by Tamer *et al.* [13], the researchers found that the most frequent complaints were contact dermatitis, warts, and atopic dermatitis for children aged 6–10 years, while acne, contact dermatitis, and warts were the most frequent among children aged 11–15 years that reported to the clinics. In the current study, the most frequent skin findings in primary school children were acquired melanocytic nevus, post-inflammatory hypopigmented macules, and xerosis, while in secondary school children, the most frequent findings were acquired melanocytic nevus, acne, and post-inflammatory hypopigmented macules.

Psoriasis and vitiligo are chronic skin diseases that may affect social life in the early stages of life. The prevalence of psoriasis in Germany is 0.1–0.8% in children aged 1–18 years [14]. In China, the life-long prevalence of vitiligo is 0.56% [15]. In the current study, the prevalence of vitiligo is 0.1% and of psoriasis is 0.4%, with similar rates in other countries.

The most important factors affecting the prevalence of skin lesions are weather and environmental conditions. In regions with poor sanitation and humid climates, infectious skin lesions are more frequently encountered. Epidemiological studies have shown that the season of the study may affect results. The current study was completed in the fall, when schools were newly-opened, according to the Turkish National Education System, in a town with moderate climatic conditions. As a result, the distribution of skin lesions in children was dominated by hypo-/hyper-pigmented macular lesions and freckles, linked to sun exposure with no protection. The population of the main city in the province, on the coast of the Aegean Sea and located on the Canakkale straits is 120,000. Due to appropriate environmental and social conditions, children play outside. As other studies in different regions of Turkey have not been population-based ones, but were completed in dermatology clinics, they do not fully reflect the dermatological findings in the population. In the current study, the frequency of atopic dermatitis was 5.1%. Atopic dermatitis had the highest incidence in Switzerland and India, with the second highest incidence in Japan, while in Nigeria, yearly incidence more than doubled, and in Denmark, the life-long prevalence was determined as 21.3% [5, 8, 16, 17]. We believe the lower incidence of atopic dermatitis compared to other skin findings is due to the community-based na-

ture of the study and may be linked to the climatic and natural conditions in the province of the study.

Frequently, in school-age children, the etiology of infectious skin diseases includes bacterial, parasitic, viral, and fungal causes. Nigeria has most fungal infections with 36.1%, with a rate of 31.2% of pediculosis capitis in primary school children. In Egypt, infectious diseases, mostly pediculosis capitis, had a rate of 50.2% in school children [10, 18]. Epidemiological studies in Europe have found the prevalence of infectious diseases to be very low with pediculosis capitis having the highest prevalence [8]. In the current study, the most frequent infectious skin diseases were warts and herpes simplex infections. Pediculosis capitis infection in public areas such as schools may affect the entire population. This infection may not have been found due to the seasonal characteristics of the study. Environmental health precautions may have been appropriately applied to prevent the formation and spread of the infection.

Conclusions

Though in Turkish school-age children the prevalence of at least one skin lesion was 79.9%, mostly these were benign findings due to environmental conditions. The high prevalence of skin lesions due to exposure to the sun may be related to not using protective factors. The infectious skin findings were very low, and formed no risk to public health. The prevalence of atopic dermatitis was lower than in other races in this population-based study.

Conflict of interest

Authors declare no conflict of interest.

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