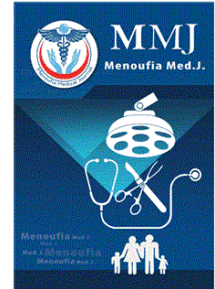




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ORIGINAL STUDY

Prevalence of Skin Diseases Among Primary School Children in Benha City, Kalubia Governorate, Egypt

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Abstract

Objectives: To assess the prevalence and types of skin diseases among primary school children in Benha City, Kalubia Governorate, Egypt.

Background: Skin diseases are common among school-aged children, and many of such diseases are distressing for children in this age group.

Patients and methods: An analytical cross-sectional study was performed on 400 primary school children of both sexes in Benha City, Kalubia Governorate, Egypt, in the period from April 2019 to February 2022. A well-designed interviewer-based questionnaire was applied to collect their demographic data and medical history, whereas signs of any skin disease were checked by the researcher through using a checklist.

Results: The mean age of the studied participants was 9.65 ± 1.33 years. More than half of them were females (55.0%). Overall prevalence of skin diseases among them was 76.0%. The most common diseases were pediculosis capitis (23.0%), followed by pityriasis alba (10.0%), scabies (6%), and papular urticaria (6%). Residency, mother's work, computer use, per capita income, family size, crowding index, and nutritional status were determinants for disease occurrences ($P < 0.05$).

Conclusion: Skin diseases were common among primary school children in Benha City. The most common diseases were pediculosis capitis followed by pityriasis alba and then papular urticaria and scabies. Focused health education sessions are very crucial for school children, their parents, as well as their teachers to prevent such diseases. School health programs have to be empowered for early detection of any skin diseases through regular investigation of school children.

Keywords: Children, Health education, Papular urticaria, Pediculosis capitis, Pityriasis alba, Scabies, Skin diseases

1. Introduction

The skin is not a simple inert covering of the body but a sensitive dynamic boundary and is an important organ of social contact. Body image, which is deeply rooted within the culture of any given social group, is profoundly affected by the appearance of the skin and its associated structures [1].

Skin disorders occur all over the world at a significant level and pose a significant public health burden in both developing and developed countries [2]. It affects people of all ages, yet children are one

of the most common victims of skin diseases as their skin is thin and more delicate [3].

The school environment carries a higher risk for school children, making them vulnerable to cross-transmission of communicable skin diseases because they engage in different activities that involve interpersonal contact, especially during games or play [4].

Pediculosis capitis infestation (head lice) is the manifestation of the obligate ectoparasite, *Pediculus humanus capitis*, which affects the human scalp. It is a highly contagious disease and commonly affects young children aged 3–12 years [5]. In Egypt, few

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previous studies have reported that pediculosis is the most common skin diseases among school children: 48.2% in Beni Suef [6], 47.5% in Damietta [7], 37.6% in South Sinai [8], and 35.8% in Menoufia [9].

Pityriasis alba is a common, benign skin disorder occurring predominantly in children and adolescents. The word pityriasis refers to its fine scales and alba to its pale color (hypopigmentation) [10]. It accounts for 19.8% prevalence among school-aged children in Egypt [11].

Scabies is a common parasitic infection caused by the mite *Sarcoptes scabiei*. Its prevalence among school children in Egypt is 4.4% [12].

Despite many studies in Egypt have evaluated different types of skin disorders among children, up to our knowledge, previous studies have been carried out among school children in Kalubia Governorate regarding this issue. Therefore, this study aimed to assess the prevalence and different types of skin diseases among primary school children in Benha City, Kalubia Governorate, Egypt.

2. Patients and methods

An analytic cross-sectional study was conducted during the period from April 2019 to February 2022 in Benha City, El-Kalubia governorate, which was selected by the multistage stratified random sampling technique.

The total number of primary schools in Benha City is 23 schools. Five primary schools were randomly selected from Benha City: El-Haras El-Watany1 (680 students), Hamza Bd EL-Mottaleb (836 students), El-Haras El-Watany new, (230 students), 25-January Primary School (540 students), and El-Emam Mohamed Abdou Primary School (450 students).

The sample size was calculated using EPI-INFO V.7.0. Based on the total number of primary school children in Benha City, which was 4000, and the prevalence of skin diseases among children from the previous literature studies, which was 68.2% [13], the sample size was estimated to be 371 at confidence interval 95% and increased to be 400 students. It was chosen from the selected schools and proportionally allocated according to the total number of children in these schools. Parents included in the study were 400, who might be mothers or fathers.

Written informed consent was taken from their parents and caregivers after explaining to them the aim of the study. Approval of the study protocol was obtained from the Ethical Scientific Committee of Menoufia Faculty of Medicine.

Inclusion criteria were all children from both sexes attending the selected schools in the academic year 2019–2020, and their parents as well.

A written consent was obtained from the parents of each participant after explaining to them the study purpose. Then, detailed medical history about the children was obtained using a self-designed questionnaire, and complete examination was conducted for all participating children and their parents.

A structured interviewing questionnaire for children and their parents was constructed to cover the following items: the first part included sociodemographic characteristics of school children such as age, sex, residence, parent's education and occupation, per capita income, family size, crowding index (number of chambers in house/children number), and water and waste disposal, using the sheet for social classification by El-Gilany et al. [14]. The second part included history of skin diseases among children, which is composed of 13 questions such as contact dermatitis, atopic dermatitis, pityriasis alba, scabies, pediculosis capitis, traction alopecia, alopecia areata, papular urticaria, herpes simplex, warts, angular stomatitis, tinea versicolor, bacterial folliculitis, and impetigo contagiosum. The third part inquired about healthy lifestyle of the children and composed of five questions such as frequency of bathing/week, frequency of hair washing/week, and nutritional habits.

Detailed history taking included past, family, and parent history, which included history of skin diseases, any medications, family history of skin diseases, developmental history, nutritional history, and medical history.

In the school clinic, a checklist was used by the investigators to identify different skin diseases such as contact dermatitis, atopic dermatitis, pityriasis alba, scabies, pediculosis capitis, alopecia areata, papular urticaria, herpes simplex, warts, angular stomatitis, tinea versicolor, bacterial folliculitis, and impetigo contagiosum.

Before starting the main study, a preliminary visit to the selected schools was conducted to get rough basic information about the environment of the research, gaining the approval from authorities for conduction of the research, and conduct an administration awareness regarding the objectives of this study, magnitude of such problem, and their role in its management. The study participants were evaluated through face-to-face interview in Arabic language, involving both children and their parents.

A pilot study was performed on 40 children (not from the main study sample) of a primary school from both sexes to check the tools' reliability and

the study feasibility. The results were excluded from the study results.

2.1. Statistical analysis

The results were tabulated and statistically analyzed using a standard computer program, Statistical Package for the Social Sciences V.25 program (SPSS Inc., Chicago, Illinois, USA). Two types of statistics were done: descriptive statistics, in which quantitative data were presented in the form of mean, SD, and median, whereas qualitative data were presented in the form numbers and percentages. Analytical statistics included χ^2 test. A value of *P* value less than 0.05 was considered statistically significant.

3. Results

The mean age of the studied participants was 9.65 ± 1.33 years. More than half of the studied children were females (55.0%). Approximately 62.0% of them were living in rural areas. Most of children's mothers (44.0%) had secondary education, whereas 46.0% of fathers had university education. More than half of children's mothers were housewives (54.0%). Approximately 40% of them had never used a computer. Moreover, half of the children (50.0%) did not have enough per capita income and had taken out a small loan. Approximately 38.0% of children had a family size of six persons, and more than half (56.0%) had a crowding index of more than or equal to two (Table 1).

The overall prevalence of skin diseases was 76.0%. Most common diseases among them were pediculosis capitates, with a percentage of 23.0%, followed by pityriasis alba in 10.0%, scabies in 6%, and papular urticaria in 6% (Table 2).

Overall, 43.47% of the studied children underwent bathing and washing of their hair once a week. Moreover, more than half of them (55%) had poor nutritional status (Table 3).

Age and sex of the studied children were not significantly different in disease occurrence. However, rural residency, low level of mothers' and fathers' education, and nonworking mothers were significantly associated with disease occurrence ($P = 0.005$, $P < 0.001$, and $P < 0.001$, respectively). Additionally, computer use, per capita income, large family size, more crowding index, water and waste disposal, low frequency of bathing and hair washing, and poor nutritional habits were significantly related to skin disease occurrence ($P < 0.001$) (Table 4).

Table 1. Distribution of the studied group regarding sociodemographic data.

Variables	The studied group (N = 400) [n (%)]
Age (years)	
Mean \pm SD	9.65 \pm 1.33
Minimum–maximum	6–12
Sex	
Male	180 (45.0)
Female	220 (55.0)
Residence	
Rural	248 (62.0)
Urban	152 (38.0)
Level of mother education	
Read and write	4 (1.0)
Primary or preparatory	48 (12.0)
Secondary or diploma	176 (44.0)
University	164 (41.0)
Postgraduate	8 (2.0)
Level of father education	
Primary or preparatory	24 (6.0)
Secondary or diploma	176 (44.0)
University	184 (46.0)
Postgraduate	16 (4.0)
Mother work	
Yes	184 (46.0)
No	216 (54.0)
Father work	
Yes	4 (1.0)
No	396 (99.0)
Computer use	
Never	160 (40.0)
Sometimes	156 (39.0)
Many times	84 (21.0)
Per capita income	
Not enough (not paid)	8 (2.0)
Not enough (big loan)	32 (8.0)
Not enough (small loan)	200 (50.0)
Just enough	160 (40.0)
Family size	
More than seven	12 (3.0)
Six	152 (38.0)
Five	132 (33.0)
Four or less	104 (26.0)
Crowding index	
Two or more	224 (56.0)
Less than two	176 (44.0)
Water disposal	
No	64 (16.0)
Yes	336 (84.0)
Waste disposal	
No	172 (43.0)
Yes	228 (57.0)

Factors that augment occurrence of different skin diseases among primary school children were mothers' education, both parents' occupation, computer use, family size, crowding index, residence, and child nutritional status ($P = 0.027$, 0.049 ,

Table 2. Distribution of the studied group regarding history of diseases.

Skin disease	Studied children (N = 400) [n (%)]
No skin diseases	96 (24.0)
Contact dermatitis	16 (4.0)
Atopic dermatitis	16 (4.0)
Pityriasis alba	40 (10.0)
Scabies	24 (6.0)
Pediculosis capitates	92 (23.0)
Traction alopecia	4 (1.0)
Alopecia areata	16 (4.0)
Papular urticarial	24 (6.0)
Herpes simplex	16 (4.0)
Warts	16 (4.0)
Angular stomatitis	16 (4.0)
Tinea versicolor	8 (2.0)
Bacterial folliculitis	8 (2.0)
Impetigo contagiosus	8 (2.0)

Table 3. Distribution of the studied group regarding healthy lifestyle.

	Studied children (N = 400) [n (%)]
Frequency of bathing (week)	
Once	172 (43.0)
Twice	164 (41.0)
Three times	64 (16.0)
Frequency of hair washing (week)	
Once	188 (47.0)
Twice	168 (42.0)
Three times	44 (11.0)
Nutritional habit	
Poor	220 (55.0)
Good	136 (34.0)
Excellent	44 (11.0)

0.001, 0.037, 0.036, 0.024, 0.015, 0.012, and 0.045, respectively) (Table 5).

4. Discussion

Dermatological problems, especially infectious dermatoses, affect a high proportion of school children in developing countries. Skin disorders in children may result in considerable discomfort, parental anxiety, and embarrassment to the child and unnecessary absence from school and work. This, in turn, leads to loss of self-confidence and disruption of social relations, feeling of stigmatization, and major changes in lifestyle.

Primary education, which is obligatory in Egypt, makes schools representative of the great majority of the child population. Thus, this study aimed to assess prevalence of skin diseases among primary school children in Benha City, Kalubia Governorate, Egypt. The study was conducted on a representative sample of 400 children—parents dyad chosen from

the selected primary schools in Benha City, El-Kalubia Governorate.

In this study, the prevalence of skin diseases was 76.0% of the studied children. The most common diseases were pediculosis capitis, with a percentage of 23.0%, followed by pityriasis alba (10.0%), scabies (6%), and papular urticaria (6%). The same was found by Jose et al. [13], where the prevalence of skin disorders among school children was 68.2%. Infectious dermatoses in their study were represented in 50.73%. Pediculosis capitis was the leading presentation found in 21% of their children, followed by scabies in 11%, and bacterial infections in 8.52%. Among the noninfectious dermatoses, eczema (11.86%) and pityriasis alba (9.23%) and then pigmentary disorders such as postinflammatory pigmentation (3.81%), and papular urticaria (2.63%) were prominent.

Currently, age and sex of the studied children were not significantly different in disease occurrence. However, residence differed significantly as disease had occurred in more than half of children who lived in rural areas. This is consistent with the study conducted by Khalifa et al. [15], who found no significant association between the prevalence of skin diseases and age or sex, a finding which is the same as that reported from Romania by Popescu et al. [16]. Another survey was done by Abdel-Hafez et al. [17], which reported the prevalence rate of detected skin disorders among the studied rural population of Assiut Governorate, Upper Egypt, to be 86.93%. On the contrary, Ali et al. [18] found a significantly higher prevalence of skin diseases among females than males (42.83, 38.37%). Rural communities carry a higher risk for occurrence of skin diseases owing to low public education and poor sanitation in comparison with urban areas.

The current study showed that disease occurrence was significantly higher among mothers and fathers who had secondary or diploma education, whereas there was no significant relation between fathers' work and disease occurrence. This is in agreement with the finding of Ciftci et al. [19], who concluded that lower maternal education level was a predisposing factor to scabies acquisition. It could be stated that educated mothers are more able to appreciate and utilize disease prevention and health care services for their children. These results are in line with previous studies by Karim et al. [20] and Feldmeier et al. [21], which also demonstrated that illiteracy of adult household members was a very good predictor of the presence of scabies in developing and industrialized countries.

The present study reported that computer use, per capita income, family size, crowding index, and

Table 4. Comparison between disease occurrence regarding demographic data, and healthy lifestyle.

Variables	Disease occurrence [n (%)]		χ^2	P value
	Yes (N = 304)	No (N = 96)		
Age				0.71
Median (IQR)	10 (9–10)	10 (8–11.75)	0.37	
Sex				0.85
Male	136 (44.7)	44 (45.8)	0.035	
Female	168 (55.3)	52 (54.2)		
Residence				0.005 ^a
Rural	200 (65.8)	48 (50.0)	7.72	
Urban	104 (34.2)	48 (50.0)		
Level of mother education				139.68
Read and write	4 (1.3)	0		<0.001 ^a
Primary or preparatory	48 (15.8)	0		
Secondary or diploma	168 (55.3)	8 (8.3)		
University	84 (27.6)	80 (83.3)		
Postgraduate	0	8 (8.3)		
Level of father education				152.1
Primary or preparatory	24 (7.9)	0		<0.001 ^a
Secondary or diploma	176 (57.9)	0		
University	104 (34.2)	80 (83.3)		
Postgraduate	0	16 (16.7)		
Mother work				14.41
No	156 (51.3)	28 (29.2)		<0.001 ^a
Yes	148 (48.7)	68 (70.8)		
Father work				0.29
No	4 (1.3)	0		0.58
Yes	300 (98.7)	96 (100)		
Computer use				154.19
Never	160 (52.6)	0		<0.001 ^a
Sometimes	120 (39.5)	36 (37.5)		
Many times	24 (7.9)	60 (62.5)		
Per capita income				32.57
Not enough (not paid)	8 (2.6)	0		<0.001 ^a
Not enough (big loan)	32 (10.5)	0		
Not enough (small loan)	164 (53.9)	36 (37.5)		
Just enough	100 (32.9)	60 (62.5)		
Family size				46.91
Seven or more	12 (3.9)	0		<0.001 ^a
Six	136 (44.7)	16 ((16.7)		
Five	100 (32.9)	32 ((33.3)		
Four or less	56 (18.4)	48 (50.0)		
Crowding index				10.53
Two or more	184 ((60.5)	40 (41.7)		<0.001 ^a
Less than two	120 (39.5)	56 (58.3)		
Water disposal				24.06
No	64 (21.1)	0		<0.001 ^a
Yes	240 (78.9)	96 (100)		
Waste disposal				95.29
No	172 (56.6)	0		<0.001 ^a
Yes	132 (43.4)	96 (100)		
Bathing (week)				105.05
Once	172 (56.6)	0		<0.001 ^a
Twice	104 (34.2)	60 (62.5)		
Three times	28 (9.2)	36 (37.5)		
Hair washing (week)				80.99
Once	180 (59.2)	8 (8.3)		<0.001 ^a
Twice	104 (34.2)	64 (66.7)		
Three times	20 (6.6)	24 (25.0)		
Nutritional habit				143.93
Poor	204 (67.1)	16 (16.7)		<0.001 ^a
Good	96 (31.6)	40 (41.7)		
Excellent	4 (1.3)	40 (41.7)		

^a Statistically significant P value less than 0.05.

Table 5. Multinomial logistic regression analysis for factors associated with skin disorders among primary school children in Benha City, Kalubia Governorate, Egypt.

Variables	β	SE	Significance	Exp.B	95% confidence interval for Exp.B	
					Lower bound	Upper bound
Age	0.113	0.181	0.533	1.120	0.785	1.598
Sex	-0.097	0.503	0.847	0.907	0.338	2.433
Mother education	2.083	0.024	0.027 ^a	1.791	0.452	7.091
Father education	0.218	0.684	0.750	1.243	0.325	4.755
Mother job	1.160	0.074	0.049 ^a	1.258	0.404	2.597
Father job	14.109	0.000	0.001 ^a	1.218	0.325	1.431
Computer use	1.276	0.052	0.037 ^a	1.927	0.335	3.566
Income	2.084	0.025	0.036 ^a	1.872	0.492	2.405
Family size	3.197	0.008	0.024 ^a	2.218	0.708	5.638
Crowding index	2.090	0.022	0.015 ^a	1.894	0.802	5.928
Water disposal	-0.476	0.695	0.493	0.621	0.159	2.424
Waste disposal	-0.304	0.405	0.452	0.738	0.334	1.631
Number of weekly hair wash	1345	0.425	0.417	1.412	0.613	3.251
Nutritional status	3.480	0.003	0.012 ^a	1.619	0.291	2.315
Residence	1.330	0.014	0.045 ^a	1.391	0.533	3.629

^a Statistically significant *P* value less than 0.05.

water and waste disposal were significantly related to disease occurrence. Disease occurrence was more prevalent among parents who did not have enough income. This is consistent with many studies, such as Ali et al. [18], Khalifa et al. [22], Inanir et al. [23], Onayemi et al. [24], and Al-Rubaiy et al. [25]; all revealed that low socioeconomic groups had a higher prevalence of skin diseases than other groups.

In this study, bathing, hair washing, and nutritional status were significantly related to disease occurrence. Similarly, Amin et al. [26] also found a significant association between infrequent washing of clothes and infrequent bathing with soap in their study. Overcrowding, poor housing conditions, and lack of awareness of personal hygiene were accounted for the high prevalence of contagious diseases. Moreover, Jose et al. [13] reported that the incidence of these diseases appears to be increasing and is influenced by public health, nutritional, environmental, and climatic factors, as well as the genetic make-up of the population studied. On the contrary, Zarrin et al. [27] reported that mothers gave hair bath with shampoo to their child regularly at once-a-week interval, and there was no relationship between the hair bath to the child and skin diseases.

4.1. Strengths and limitations

This study faced some limitations that should be acknowledged. First, the type of the study was a cross-sectional one, which gives us a quick and superficial view about the skin disorders among school children without in-depth understanding of

the factors associated with its occurrence. Second, it is a screening study for skin disorders; therefore, it carries the risk for false-positive and false-negative cases. In spite of previous limitations, this study possesses many strengths. First, it is the first study to be executed among quite a large number of primary school children in Al-Kalubia Governorate. Second, this study checked for a large number of skin disorders among a vulnerable group like primary school children. Third, the researchers asked the caregivers of diseased children to consult a primary health care clinic to start management, whether with treatment or referral to secondary care. Fourth, it highlights the most common skin disorders among school children; thus, the school community can be aware of these disorders and its risk factors and take measures to prevent them.

4.2. Recommendations

This study found that skin diseases were common among primary school children in Benha city, and the most common recorded diseases were pediculosis capitis, pityriasis alba, papular urticaria, and scabies. Rural residency, low parental education level, and socioeconomic characteristics were significantly related to skin disease occurrence in primary school children. Based on the previous conclusion, this study recommends application of focused health education sessions for school children, their parents, as well as their teachers to prevent such diseases. School health programs have to be empowered for early detection of any skin diseases through regular investigation of all school children.

Conflict of interest

There are no conflicts of interest.

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