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Assessment of Clinical Profile and Impact of Different Risk Factors among Scabietic Children at Khartoum Teaching Hospital

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ABSTRACT

Background: Scabies is a widespread health issue that is currently underappreciated, mostly in developing nations. The WHO's strategy for neglected tropical diseases 2021–2030, which aims to achieve the unmet Sustainable Development Goals, recently included scabies.

Objective: This study aimed to assess the clinical profile and the impact of the different risk factors in scabietic children at Khartoum Teaching Hospital for Dermatology and Venereology, aiming to put scabies in focus and exploring definitive measures for its control, clarifying the impact of placing scabies control as an achievable and valuable objective in Sudan.

Subjects and methods: A prospective cross-sectional study was carried out among all dermatological cases of children that attend Khartoum Teaching Hospital for Dermatology and Venereology in the period from November 2018 to January 2019, among them 144 cases were diagnosed as scabies according to the hospital protocol. one hundred children aged 1-16 years, were selected according to calculating sample size and applying inclusion criteria. Data were collected by using pre-designed questionnaire and then analyzed by computer using SPSS.

Results: The overall prevalence of scabies was 6.98%. The highest percent of cases were recorded in the age group between 6-10 years 41 (41%), 80 cases (80.0%) were presented with nocturnal itching. The site of lesion was in the finger webs in 92 (92.0%) children,70 cases (70.0%) had burrow lesions, 97 (97.0%) children had 1-10 family members, 96 (96.0%) children were sharing bed, animals in house were found with18 (18.0%) children.

Conclusion: Scabies prevalence in children in Sudan is high compared to other developing countries. Comprehensive control strategies are urgently needed. Improvement of socioeconomic conditions, implementing appropriate educational programs and surveillance system for applying preventive measures, rapid diagnosis and definitive treatment of scabietic cases are necessary in order to reduce the overall prevalence of scabies.

Keywords: Scabies, Itching, Risk factors, Children.

INTRODUCTION

The obligatory human parasite mite *Sarcoptes scabiei var.* hominis is the source of scabies, a skin condition that is extremely infectious [1]. This mite is regarded as a human host-specific, obligate cutaneous parasite. Over 175 million individuals are thought to be infected with scabies globally, according to estimates from the WHO's Strategic and Technical Advisory Group (STAG) for neglected tropical diseases (NTDs) in 2017 [2]. The first known human illness with a recognised aetiology may be scabies. More than 130 million individuals are thought to be affected at any given moment worldwide [3].

Scabies infestation has negative effects on patients' quality of life, especially in underdeveloped and resource-limited nations. It is most common in children and elderly, immunocompromised persons, and it has the potential to cause significant morbidity and even fatality in susceptible people, particularly in underdeveloped regions with little access to quality treatment. It can appear as minor epidemics in wealthy nations in times of conflict and during natural catastrophes [4].

Since the disease is mostly spread by direct skin-to-skin contact, it is usual for family members to contract it. According to estimates, a patient with traditional scabies requires 15 to 20 minutes of intimate contact with another person in order to spread the mites. The involvement of mites is debatable, but other writers assert that it is plausible given that they can survive outside of humans for more than three days, and this is further confirmed by the recall of live mites from dust samples taken from clothing, bedding, furniture, and floors [5].

Strong lymphocyte, histiocyte, and eosinophilic perivascular, dermal, and perivascular inflammatory infiltrates characterise scabies, which will eventually have high antibody titers that are specific for parasite antigens. Interleukin-6 (IL-6) and vascular endothelial growth factor (VEGF) production from healthy human epidermal keratinocytes has increased significantly, but granulocyte colony stimulating factor (G- CSF) secretion has only slightly increased. It is well known that IL-6 stimulates the growth of keratinocytes, whilst IL-8 and G-CSF encourage the development of dendritic cells from monocytes and the growth of neutrophils. Additionally, IL-6 is known to stimulate Th1 CD4+ cells to secrete IL-2, which encourages their proliferation and differentiation, as well as Th2 CD4+ cells to produce IL-4, which drives antibody production and is known to increase vascular permeability and trigger inflammation, which explains the edoema seen in scabies lesions. These processes are all known to be induced by IL-6 [6].

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In order to better understand the genetics and transmission dynamics of S. scabiei, molecular methods have made significant progress. Several distinct genes have been discovered using information from complementary DNA (cDNA) libraries of S. scabiei. There are homologues of the well-known house dust mite allergens glutathione-S transferase, paramyosin, and cathepsin-L among the cDNAs encoding for S. scabiei [7]. A significant clinical problem is scabies. Delays in diagnosis are frequently caused by the variety of cutaneous manifestations, particularly odd picture that affects newborns and young children, and the existence of concomitant symptoms [8].

Scabies diagnostic techniques have some significant drawbacks. The identification of clinical symptoms and microscopic analysis of skin scrapings are still the mainstays of diagnosis today. However, the difficulty is in the lack or obscurity of common skin lesions and burrows, which are typically covered by eczematous changes. These symptoms are frequently mistaken for a number of different illnesses and ailments, including psoriasis, bacterial impetigo, folliculitis, insect bites, contact dermatitis, and bullous pemphigoid [9].

Due to the low mite density in typical scabies, microscopic inspection of skin scraping has a poor sensitivity of just 50%. Although dermatoscopy is also often used for diagnosis, its effectiveness, accessibility, and cost have restricted its use [10]. Due to the low mite populations, PCR also exhibits limited sensitivity. ELISA has now been utilised to analyse data in addition to PCR testing, although it always requires more time and work [11].

The development of accurate intradermal testing and other immunological assays has been hampered by the ongoing difficulties in producing a culture to gather sufficient numbers of S. scabiei organisms. Whole-mite extracts have been produced using animal models, but the end products were unrefined, variable in effectiveness, and composed primarily of host antigens and other house dust mite cross-reactants [10]. There are currently no rapid bedside tests available to diagnose scabies [11].

The IACS released the standards that serve as the foundation for a practical and exacting diagnostic scheme of clinical characteristics and techniques that is intended to standardise scabies diagnosis. The criterion divides the diagnosis of scabies into three categories with eight subcategories (for example, confirmed, clinical, or suspected scabies). The direct identification of the mites or their byproducts is necessary to determine Level A (confirmed scabies). Using clinical signs and symptoms, level B (clinical scabies) and level C (suspected scabies) diagnoses are made. By applying the appropriate level and subcategories of diagnosis, the criteria are to be implemented in research, clinical settings, and public health [12].

Given that the mite causes both innate and long-term adaptive immunity in people who have the disease, the development of a scabies vaccine is currently viewed as a serious possibility [13-15].

This study aimed to assess the clinical profile and the impact of the different risk factors in scabietic children at Khartoum Teaching Hospital for Dermatology and Venereology, aiming to put scabies in focus and exploring definitive measures for its control, clarifying the impact of placing scabies control as an achievable and valuable objective in Sudan.

PATIENTS AND METHODS

This is a descriptive, prospective cross-sectional hospital-based study that was conducted during the period from November 2018 to January 2019, at Khartoum Teaching Hospital for Dermatology and Venereology (KTHDV), which is considered as a tertiary hospital in Sudan receiving patients from Khartoum State and other parts of the Country.

The study population were all children with scabies who attended the clinic at KTHDV during the period of the study. After consent was taken, all participants aged from 1-16 years were interviewed and clinically examined by the dermatologists and researcher to confirm the diagnosis of scabies. Diagnostic criteria was according to the hospital protocol, which follows the STARD criteria for studies of diagnostic accuracy [16].

Exclusion criteria: Children with other dermatological diseases. And children whose parents/caregivers refused to participate in the study.

Out of all diagnosed scabietic children, 100 child were chosen according to the inclusion and exclusion criteria to assess the prevalence, clinical profile and epidemiological profile of scabies. Data were collected from parent/caregivers or child by pre-designed questionnaire (attached).

Dependent variables of the study were scabies, children, housing condition, sharing clothes and bed, house animals, clinical presentation (Itching, Time of itching, duration of itching), history of similar condition, lesion and Morphology of lesion. Independent variables were: Age, sex, child education level, mother education level, father education level, Social class.

Ethical approval:

Ethical clearance was submitted to Ethics Review Committee of the Sudan Medical Specialization Board, Council of Dermatology for approval of the study. The permission to conduct the survey was requested from administrators of hospitals that were selected as study area. The concept of the study was explained to parent or caregiver and written agreement was taken. Coding the data collection sheet for confidentiality.

Statistical analysis:
Statistical Package for Social Sciences (SPSS) version 25 for Windows was used to code, process, and analyse the obtained data (IBM SPSS Inc., Chicago, IL, USA). Using the Shapiro Walk test, the distribution of the data was examined for normality. Frequencies and relative percentages were used to depict qualitative data. To determine differences between two or more sets of qualitative variables, the chi square test was used. Quantitative data were presented as mean ± SD (Standard deviation). Two independent groups of normally distributed variables were compared using the independent samples t-test (parametric data). P value ≤ 0.05 was regarded as significant.

RESULTS

Out of 2063 child, presented to Khartoum Teaching Hospital in the period from November 2018 to January 2019, 144 children were diagnosed as scabies with a prevalence of 6.38%. One hundred scabietic children were enrolled in this study according to the calculated sample size and applying the inclusion and exclusion criteria to determine the clinical profile and impact of different risk factors among them.

The sociodemographic data of study population and results of clinical profile of disease were presented below as follow: From the selected 100 child, 58 (58.0%) were males and 42 (42.0%) were females, the mean age was 14.3 ± 2.5 years, 37 (37.0%) were in age group 1-5 years, 41 (41.0%) in age group 6 - 10 years and 22 (22.0%) children in age group 11-16 years **(Figure 1).**

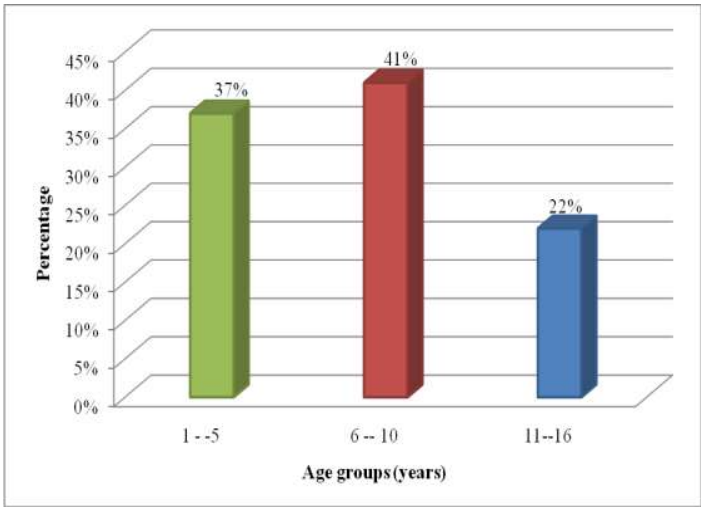

Figure (1): Distribution of children in the study according to age group (n = 100)

Table (1): showed educational level of studied children, 27 (27.0%) were primary school pupils, 19 (19.0%) had Khalwa education, 18 (18.0%) were pre-school pupils, 7 (7.0%) were secondary school pupils and 29 (29.0%) were uneducated.

Table (1): Distribution of studied children according to educational level

Educational level	Frequency	Percentage (%)
Primary school	27	27.0
Khalwa	19	19.0
Preschool	18	18.0
Secondary school	7	7.0
Uneducated	29	29.0
Total	**100**	**100.0**

Regarding educational level of mothers, 38 (38.0%) women illiterate, 17 (17.0%) had Khalwa education, 24 (24.0%) had primary school level, 15 (15.0%) had secondary level, 4 (4.0%) had university educational level and 2 (2.0%) were postgraduate.

Distribution according to job of mothers, showed that the majority of the mothers 86 (86.0%) were housewives, 11 (11.0%) were workers, while 3 (3.0%) were employees. Regarding educational level of fathers, 21 (21.0%) fathers were illiterate, 16 (16.0%) had Khalwa education, 22 (22.0%) had primary school level, 25 (25.0%) had secondary level, 14 (14.0%) had university educational level and 2 (2.0%) were postgraduate.

According to the job of father, 78 (78.0%) fathers were workers, 19 (19.0%) employers and 3 (3.0%) had other jobs. The majority of children in this study, 85 (85.0%) are of low socioeconomic status, 15 (15.0%) of moderate socioeconomic status, and there were no high socioeconomic status in this study **(Figure 2).**

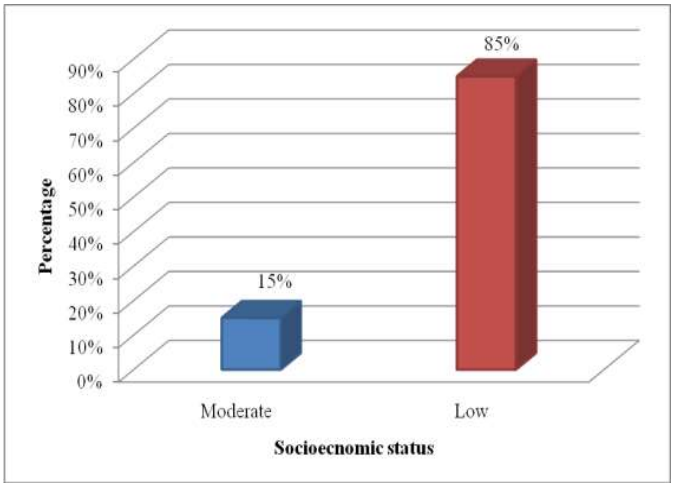

Figure (2): Distribution of children in the study according tosocioeconomic status (n = 100)

In this study, 38 (38.0%) children had one rooms in their houses, 46 (46.0%) children had two rooms, 14 (14.0%) child had three rooms in their houses and 2 (2.0%) children had four rooms in their houses. In this study, 97 (97.0%) children had 1-10 family members and 3 (3.0%) children had 11-20 family members.

In this study, 49 (49.0%) children were sharing cloths, while 51 (51.0%) were not. The majority 96 (96.0%) children were sharing bed while 4 (4.0%) were not **(Table 2).**

Table (2): Distribution of children in the study according to sharing bed

Sharing bed	Frequency	Percentage
Yes	96	96.0
No	4	4.0
Total	**100**	**100.0**

Animals in house were found with 18 (18.0%) children, which included dogs with 6 (33.3%) children, birds with 5 (27.8%) children, goat with 4 (22.2%) children, donkey with 2 (11.1%) children and monkey with 1 (5.5%) child.

Bathing habits, 19 (19.0%) children had bathing 2 per day, 13 (13.0%) children had bathing once per day, 36 (36.0.0%) children had bathing 1- 4 per week, while 32 (32.0%) children had bathing more than 5/week (**Table 3).**

Table (3): Distribution of children in the study according to bathinghabit

Frequency of bathing habit	Frequency	Percentage
2 per day	19	19.0
1 per day	13	13.0
1 - 2 per week comment	24	24.0
3 – 4 per week comment	12	12.0
More than 5 per week comment	32	32.0
Total	**100**	**100.0**

Regarding severity of itching among the study population, the majority 59 (59.0%) presented with severe itching, 38 (38.0%) presented with moderate itching, while 3 (3.0%) presented with mild itching **(Figure 3).** This study recorded that 80 (80.0%) presented with nocturnal itching, while 20 (20.0%) presented with itching all day.

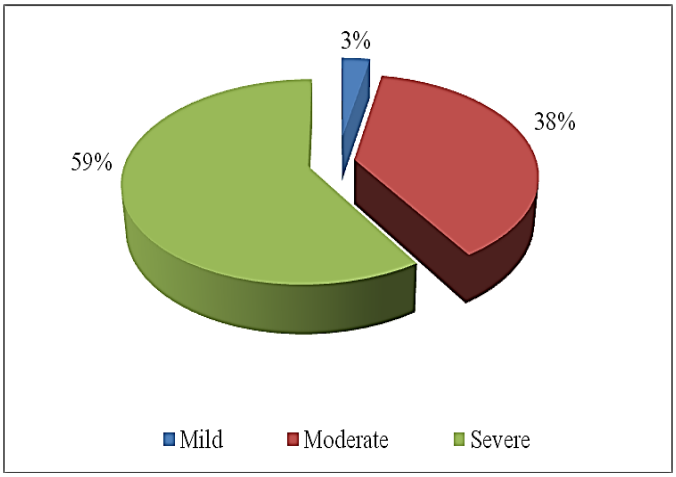

Figure (3): Distribution of children in the study according to itchingseverity (n = 100).

In this study, the majority of the study population 94 (94.0%) had 1 - 4 week history of itching, 4 (4.0%) had 5- 8 week history of itching, and 2 (2.0%) had more than nine week history of itching. History of similar condition was found in 96 (96.0%) children. Similar condition in same house was found in 68 (70.8%) children, in school was found in 14 (14.6%) children, in neighbor in 12 (12.5%) children, while in same house and neighbor was found in 2 (2.1%) children.

In this study, the most common site of lesion was finger webs in 92 (92.0%) children, followed by umbilical in 77 (77.0%), wrist in 70 (70.0%), abdomen in 68 (68.0%), genital in 61 (61.0%) children, arm pit in 32 (32%) children, palms and sole in 24 (24.0%) children, all body in 4 (4.0%) children, nipples and neck in 3 (3.0%) children and face in 2 (2.0%) children **(Table 4).**

Table (4): Distribution of children in the study according to the site oflesion (n = 100)

Site of lesion	Frequency	Percentage
Finger web	92	92.0
Umbilical	77	77.0
Wrist	70	70.0
Abdomen	68	68.0
Genital	61	61.0
Arm pit	32	32.0
Palms	24	24.0
Soles	24	24.0
All body	4	4.0
Nipples	3	3.0
Neck	3	3.0
Face	2	2.0

In this study, regarding morphology of lesions, the majority of the study population 70 (70.0%) had burrows lesions, 54 (54.0%) had vesicles, 39 (39.0%) had papules, 38 (38.0%) infected scabies, 36 (36.0%) had excoriation, 18 (18.0%) crust and 15 (15.0%) had nodules **(Table 5).**

Regarding the common clinical types of scabies in this study, 76 (76.0%) children had classical type, 13 (13.0%) children had nodular type and 11 (11.0%) had scabies in infant.

Table (5): Distribution of children in the study according tomorphology of lesion (n = 100)

Morphology of lesion	Frequency	Percentage
Barrows	70	70.0
Vesicles	54	54.0
Pustules	39	39.0
Infected scabies	38	38.0
Excoriation	36	36.0
Crust	18	18.0
Nodule	15	15.0

DISCUSSION

Studies [17, 18] on the epidemiology of scabies infestations provide significant findings about the risk factors involved, assist in laying the groundwork for the choice of preventative and control measures, and support treatment services. The findings of this study showed that male children had a greater frequency of scabies. This was consistent with findings from a prior research conducted in a rural hospital in Southern Ethiopia, where a total of 324 children (59.6%) were included [19], as well as findings from a different study conducted in Ethiopia, where around 56.28% of respondents were males. In Ethiopia, the same research also revealed that 53.94% of the pupils were in grades 5 through 8 [20].

This is consistent with the findings of the present study, in which the age group 6 to 10 years was shown to have the highest frequency of scabies infestation [19], as well as with those of other studies conducted in Iran. This could be because buddies at this age have more direct physical interaction with one another. Physical contact is a factor in the transmission of scabies, according to several previous research [18, 20].

The findings showed that children with low educational levels and parents with low levels of education were more likely to have scabies. In several areas, Iran has reported outcomes that are similar [19, 20, 21]. The parental education levels and the children's educational attainment often have a significant effect in the prevention of numerous infectious illnesses. Higher educated parents are often better able to comprehend the effects of various risk factors and are more likely to implement healthcare and preventative measures for their kids [18].

The current study' findings have proven the link between scabies infestation and family size, poor socioeconomic level, and residing in small-roomed homes. Previous researches from Iran, Cameron, Ethiopia, Saudi Arabia, and other countries have validated these findings [23, 24, 25].

Overcrowding results from larger families living in tiny homes with poor socioeconomic status households are risk factors. The risk of scabies transmission is increased when family members are in close quarters and share bedding, clothing, and other items [18]. This study and related ones carried out in Iran and Bangladesh both shown that the usage of shared items like towels and clothing had an impact on the incidence of scabies in this particular institution [22, 26]. Children who shared beds were shown to have more severe scabies infections and to relapse more frequently, according to reports of these investigations.

According to earlier research [18, 25], the present study found that children with worse personal hygiene had a greater incidence of scabies, and those who bathed less frequently, less than twice a week, had a two-fold increased risk of contracting the disease. Additionally, earlier research from Nigeria, Saudi Arabia, and Cameron showed a link between bathing frequency and scabies infection [24, 25, 27].

The web gaps between the fingers were the most frequent sites for scabies lesions in this investigation, and burrows lesions were the most frequent morphology. Similar investigations revealed that the web gaps between the fingers had the highest risk of scabies infection [18, 21]. Handling items that are mite-contaminated frequently results in hand and wrist illness [22].

This study showed that the most common clinical type of scabies is classical type, this result is supported by many reviews which reported that the classic type of scabies is the most prevalent type and although it is not a fatal disease, it usually results in severe morbidity and poor quality of life [18, 22].

CONCLUSION AND RECOMMENDATIONS

The most common clinical presentation of scabies among studied children was severe itching specially in the finger webs. The risk factors for scabies were low socioeconomic status, overcrowding, sharing clothes and beds, history of similar condition and presence of animals in the house. Although scabies is not a fatal disease yet morbidity, disability, and the psychosocial impacts of this disease has important influence on the population.

Also there are many important gaps in scabies research in terms of prevention and treatment especially in developing countries. Scabies impacts were recently recognized by the WHO and thus it was included as a part of the WHO roadmap for NTD 2021–2030. Nevertheless, efforts to eradicate infection by this ectoparasite is still required. Raising educational awareness towards the disease risk factors, presenting symptoms, and ways of prevention are mandatory at a population level. Further research on scabies improving control effort is recommended.

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