

Prevalence and Socio-Demographic and Hygiene Factors Influencing Impetigo in Saudi Arabian Children: A Cross-Sectional Investigation

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Purpose: To determine the prevalence of impetigo among children in Saudi Arabia as well as to identify socio-demographic factors associated with impetigo.

Methods: This cross-sectional study conducted in Saudi Arabia examined impetigo prevalence and associated factors among children aged 2 to 15. Data collection occurred between June 2022 and November 2023, involving structured interviews with the parents or legal guardians of the participating children. A pre-designed questionnaire was used, which included questions related to personal hygiene practices (such as, frequency of handwashing, bathing routines, and use of communal facilities), environmental conditions, and the child's impetigo diagnosis history.

Results: The study encompassed a total of 1200 participants, with a predominant representation of female (79.3%). Participants exhibited a diverse age distribution, with the highest proportion falling within the 18–24 age group (33.7%). Importantly, a statistically significant association was identified between the occurrence of impetigo in children and their personal hygiene scores ($p < 0.001$). Children with a confirmed impetigo diagnosis exhibited lower mean personal hygiene scores (2.6 ± 0.723) in contrast to those without such diagnoses (3.75 ± 0.911).

Conclusion: Socio-demographic factors, including child's gender, parental education level, employment status, and geographic location, emerge as significant determinants of impetigo occurrence. Additionally, there is a strong correlation between proper personal hygiene practices and a reduced incidence of impetigo.

Keywords: *Staphylococcus pyogenes*, *Staphylococcus aureus*, personal hygiene, skin infections, impetigo

Introduction

Impetigo is a common dermatosis of childhood, especially among children aged 2–5 years. It is superficial, contagious bacterial infection with brownish/yellow crust, with a global disease burden of greater than 140 million.^{1–4} The incidence decreases with age and it is caused by the bacteria *Staphylococcus aureus* or, less commonly, *Streptococcus pyogenes*. Impetigo comes in two main varieties: nonbullous (70%) and bullous (30%).^{3,4} Bullous impetigo is brought on by *S. aureus*, whereas nonbullous impetigo is brought on by *S. pyogenes*. Most common site - face around nose, mouth and hand.⁵ Superficial blister rupture easily, releasing a yellow exudate that dries and form a honey - colored crust. Well-known risk factors for impetigo include poor hygiene, high humidity,

maceration, skin diseases with disruption of the epidermal barrier (such as scabies, atopic dermatitis, insect bites), comorbidities, and unfavorable drug-related reactions (rash, itching).^{6,7} The topical medications bacitracin, gentamycin, mupirocin, retapamulin, and, more recently, ozenoxacin 1% cream are used to treat impetigo. Systemic antibiotics are recommended along with a topical remedy for more serious conditions.^{7,8} The topical antibiotic fusidic acid was widely prescribed in New Zealand, which contributed to an increase in *Staphylococcus aureus*'s antimicrobial resistance.^{1-4,9-11} Since impetigo is a superficial infection, it has been suggested that topical anti-septics like hydrogen peroxide or straightforward wound care alone may effectively treat impetigo without running the danger of boosting antimicrobial resistance.^{12,13}

The underpinning hypotheses posit that there is a significant correlation between the prevalence of impetigo and personal hygiene practices in Saudi Arabian children. Specifically, we anticipate that children with suboptimal personal hygiene practices, including infrequent handwashing and inadequate bathing routines, will have a higher prevalence of impetigo compared to those with better personal hygiene habits. Additionally, socioeconomic status is significantly associated with the occurrence of impetigo in Saudi Arabian children. We hypothesize that children from lower socioeconomic backgrounds will exhibit a higher incidence of impetigo due to potential limitations in access to healthcare, sanitation, and hygiene resources, as compared to children from higher socioeconomic strata. We thus aim to provide a comprehensive understanding of impetigo in the context of Saudi Arabia, shedding light on both its prevalence and the various factors that may influence its occurrence. This research will draw more focus to public health initiatives and inform strategies to prevent and manage impetigo in Saudi Arabian children, ultimately improving the well-being of this vulnerable population.

Materials and Methods

Setting

The study was conducted at scheduled clinic appointment across various regions in Saudi Arabia, including urban and rural areas, encompassing the Middle, Eastern, Northern, Southern and Western provinces, to ensure a representative sample. This study was conducted between June 2022 and November 2023.

Study Population

The study population encompassed a diverse cohort of Saudi Arabian children between the ages of 2 and 15 years. To ensure representation from various socio-cultural and geographical backgrounds, participants were drawn from urban, suburban, and rural areas across Saudi Arabia. In selecting this age range, the study focused on the pediatric population, given the higher susceptibility of children to impetigo. Participants included both male and female children, representing various socioeconomic backgrounds, and residing in households spanning a range of living conditions - from urban apartment complexes to rural villages and suburban areas.

Sample Size and Sampling Technique

The sample size for the study was calculated based on the total number of patients available in the target regions. A minimum sample size of 385 was determined to ensure adequate representation and statistical power. The sampling technique involved convenience sampling, where participants were selected based on their availability and willingness to participate in the study. The data was gathered at the participants' scheduled clinic appointment. Participants were interviewed for less than 15 minutes.

Inclusion Criteria

Participants included in the study met the following criteria:

1. Saudi Arabian nationality
2. Parents or legal guardians of children aged between 2 and 15 years
3. Parents or legal guardians provided informed consent for their child's participation

Exclusion Criteria

Children with existing medical conditions, such as chronic dermatological diseases or immunosuppressive disorders, that may interfere with the study's outcomes were excluded from the sample.

Study Variables

Independent Variables

1. Age of the parent or legal guardian
2. Gender of the child
3. Socioeconomic status of the household
4. Education level of the parents or guardians
5. Geographic location (urban/rural)
6. Personal hygiene practices of the child (handwashing, bathing, sharing personal items, trimming nails, disinfecting touched surfaces, use of communal facilities)
7. Environmental conditions (humidity, living conditions, potential sources of infection)

Dependent Variables

1. Prevalence of Impetigo
2. Impetigo diagnosis (confirmed or not)
3. Severity of impetigo (mild, moderate, severe)
4. Complications arising from impetigo (eg, cellulitis, lymphadenitis)

Data Collection Tools

Structured interviews were conducted with the parents or legal guardians of the participating children. A pre-designed questionnaire was used, which included questions related to socio-demographic information (child's gender, parental age, socioeconomic status, parental education), personal hygiene practices (frequency of handwashing, bathing routines, sharing personal items, maintenance of clean and trimmed nails, regular cleaning and disinfection of frequently touched surfaces and use of communal facilities), environmental conditions, and the child's impetigo diagnosis history.

Pilot Study

A pilot study was conducted in advance to the main data collection to assess the reliability and validity of the questionnaire. The pilot study involved a small sample of participants (n=20). The results confirmed satisfactory internal consistency. Additionally, the scale exhibits satisfactory content and construct validity. The clarity of the questions for the parents or legal guardians was evaluated, resulting in minor refinements in questionnaire wording and formatting for our study's main data collection phase.

Ethical Considerations

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Review Board and Research Ethics Committee of King Faisal University in Hofuf, Saudi Arabia, with the given Reference number: KFU-REC-2023-SEP-ETHICS1161. Informed consent was obtained from all participants, ensuring their voluntary participation and confidentiality. Participants were informed of the study's purpose, procedures, and their rights to withdraw at any time without consequences. Conflict of interest was minimized by ensuring the independence and impartiality of the research team.

Statistical Analyses

Statistical analysis was conducted using SPSS version 28.0. Descriptive statistics were employed to summarize demographic characteristics, prevalence rates, and personal hygiene practices. The chi-square test was utilized to assess associations between categorical variables, such as impetigo occurrence and socio-demographic factors. Additionally, mean personal hygiene scores were compared between groups using an independent samples *t*-test. Multivariate logistic

regression analysis was employed to examine the influence of demographic factors on impetigo occurrence, presenting odds ratios and 95% confidence intervals. Cronbach's alpha was calculated to assess the internal consistency of the Likert scale sections. Statistical significance was set at $p < 0.05$. The results of these analyses provided valuable insights into the prevalence and factors influencing impetigo among Saudi Arabian children.

Results

Demographic Characteristics

The study included a total of 1200 eligible parents or legal guardians with a response rate of 80%. The majority of parents having female children (79.3%). The age distribution of participants varied, with the highest proportion of parents falling within the age group of 24–18 years (33.7%). Regarding education level, most participants held a bachelor's degree (74.6%), while employment status indicated that a significant proportion were employed full-time (43.9%). Geographically, the majority resided in the Middle Region (61.2%), with a predominant urban location (94.8%). (Table 1)

Table 1 Demographic Characteristics

Item	Category	Count	Column N %
Parent or legal guardian's age	24–18	404	33.7
	34–25	243	20.3
	44–35	155	12.9
	54–45	279	23.3
	64–55	88	7.3
	Under 18	31	2.6
Child's gender	Female	952	79.3
	Male	248	20.7
Education level	High school or less	181	15.1
	Diploma	62	5.2
	Bachelors degree	895	74.6
	Master degree	62	5.2
Employment Status	Student	461	38.4
	Unemployed	93	7.8
	Retired	119	9.9
	Employed full time	527	43.9
City of residence	South Region	114	9.5
	Eastern Region	83	6.9
	Northern Region	31	2.6
	Western Region	238	19.8
	Middle Region	734	61.2
Geographic location	Urban	1138	94.8
	Suburban	62	5.2

Notes: Demographic characteristics - Presents the distribution of participants by age, gender, education level, employment status, city of residence, and geographic location.

Prevalence and Factors Influencing Impetigo

A substantial portion of respondents (49.2%) were familiar with the term “impetigo”. However, a smaller proportion reported having children diagnosed with impetigo (5.2%). While a majority had limited familiarity with the causes and risk factors of impetigo (62.9%), respondents often encouraged good personal hygiene habits in their children (57.8% always). Awareness about potential complications of impetigo was relatively low (22.0% had some knowledge). Respondents were uncertain about the prevalence of impetigo across socioeconomic groups (52.6% not sure). Contact with other children who might have impetigo was reported across various frequencies (37.5% rarely). Concern about their children contracting impetigo was noted in 37.5% of respondents. Most participants believed that current preventive measures for impetigo were either somewhat (40.1%) or very effective (52.2%). An overwhelming majority (77.6%) advocated for more awareness and education about impetigo in the community. (Table 2)

Personal Hygiene Practices

A significant proportion of children maintained good hand hygiene, with 43.1% washing their hands always and 40.5% washing frequently. Regular use of antibacterial hand sanitizers was reported by 12.9% of respondents. Most children took a bath or shower several times a week (69.8%) and maintained clean and trimmed nails (68.5% always). Regular clothes and bedding washing occurred (41.8% several times a week) and sharing personal items with others was minimal (75.4% never). Regular cleaning and disinfection of frequently touched surfaces were common (52.2% several times a week). Involvement in activities that might increase exposure to impetigo-causing bacteria was reported by 34.1% of respondents. Reminders about personal hygiene practices were frequent (52.6% daily). However, seeking information or attending sessions on proper personal hygiene practices for children was relatively uncommon (25.4% yes). (Table 3)

Association between Impetigo and Personal Hygiene:

A significant association was found between the occurrence of impetigo in children and personal hygiene scores ($p < 0.001$). Those whose children had been diagnosed with impetigo had lower mean personal hygiene scores (2.6 ± 0.723) compared to those without such diagnoses (3.75 ± 0.911). (Table 4)

Socioeconomic Status and Impetigo

Socioeconomic factors were examined in relation to impetigo occurrence. Most respondents of the parent or legal guardians had attained at least a university or college education (82.8%), with a majority being employed full-time

Table 2 General Questions Regarding Prevalence and Factors Influencing Impetigo in Saudi Arabian Children: a Cross-Sectional Investigation

		Count	Column N %
Have you ever heard of the term “impetigo” before?	No	610	50.8
	Yes	590	49.2
Have any of your children ever been diagnosed with impetigo?	No	993	82.8
	Not sure	145	12.1
	Yes	62	5.2
How familiar are you with the causes and risk factors of impetigo?	Not familiar	755	62.9
	Somewhat familiar	357	29.8
	Very familiar	88	7.3
How often do you encourage your children to practice good personal hygiene habits (eg, handwashing)?	Frequency	445	37.1
	Always	693	57.8
	Sometimes	62	5.2

(Continued)

Table 2 (Continued).

		Count	Column N %
Are you aware of the potential complications that can arise from impetigo?	No, I am not aware	848	70.7
	I have some knowledge about it	264	22.0
	Yes, I am well aware	88	7.3
Do you believe that impetigo is more common in certain socioeconomic groups?	No	150	12.5
	Not sure	631	52.6
	Yes	419	34.9
How often do your children come into close contact with other children who may have impetigo (eg, at school or daycare)?	Never	450	37.5
	Several times a week	57	4.8
	Occasionally	186	15.5
	Rarely	388	32.3
	Daily	119	9.9
How concerned are you about the possibility of your children contracting impetigo?	Not concerned	595	49.6
	Somewhat concerned	450	37.5
	Very concerned	155	12.9
In your opinion, how effective are current preventive measures for impetigo (eg, hygiene promotion, education)?	Not effective	93	7.8
	Somewhat effective	481	40.1
	Very effective	626	52.2
Do you think there is a need for more awareness and education regarding impetigo in the community?	No	57	4.8
	Not sure	212	17.7
	Yes	931	77.6

Notes: Prevalence and Factors Influencing Impetigo - Displays responses related to participants' awareness, familiarity with causes, personal hygiene practices, and concerns regarding impetigo.

Table 3 Personal Hygiene Practices in Saudi-Arabia

Items	Category	Count	Column N %
How frequently do your children wash their hands with soap and water?	Frequently	486	40.5
	Always	517	43.1
	Sometimes	197	16.4
Do your children use antibacterial hand sanitizers regularly?	Never	119	9.9
	Sometimes	652	54.3
	Rarely	274	22.8
	Yes, always	155	12.9

(Continued)

Table 3 (Continued).

Items	Category	Count	Column N %
How often do your children take a bath or shower?	Several times a week	838	69.8
	Once a week	62	5.2
	Daily	300	25.0
Do you ensure that your children maintain clean and trimmed nails?	Always	822	68.5
	Sometimes	347	28.9
	Rarely	31	2.6
How often do you wash your children's clothes and bedding?	Less than once a week	31	2.6
	Several times a week	502	41.8
	Once a week	274	22.8
	Daily	393	32.8
Do your children share personal items (eg, towels, clothing) with others?	Never	905	75.4
	Sometimes	26	2.2
	Rarely	269	22.4
How often do you clean and disinfect frequently-touched surfaces in your home (eg, doorknobs, light switches)?	Less than once a week	300	25.0
	Several times a week	626	52.2
	Once a week	119	9.9
	Daily	155	12.9
Are your children involved in any activities that may increase their exposure to impetigo-causing bacteria (eg, sports, swimming)?	No	791	65.9
	Yes	409	34.1
How often do you remind your children about the importance of personal hygiene practices?	Several times a week	476	39.7
	One a week	93	7.8
	Daily	631	52.6
Have you ever sought information or attended sessions on proper personal hygiene practices for children?	No	895	74.6
	Yes	305	25.4

Notes: Personal Hygiene Practices - Depicts the frequency of children's handwashing, use of sanitizers, bathing habits, maintenance of clean nails, laundry practices, and exposure to impetigo-causing bacteria.

(43.9%). The majority lived in households with middle income (89.7%) and had access to clean water and proper sanitation facilities (97.8%). The household size varied, with 80.6% having five or more members. Most participants lived in villas or houses (74.6%). Overcrowding issues were reported by a smaller proportion (7.8%). Overall living conditions were rated as excellent or fair by equal proportions (50.0% each). (Table 5)

Table 4 Association Between Impetigo and Personal Hygiene (Mean Scores)

	Have any of your Children ever been Diagnosed with Impetigo		P-value
	Yes	No	
Personal hygiene (Mean ± SD)	2.6 ± 0.723	3.75 ± 0.911	<0.001

Notes: Association between Impetigo and Personal Hygiene - Shows the mean personal hygiene scores among participants whose children were diagnosed with impetigo and those whose children were not diagnosed.

Table 5 Socioeconomic Status in Association with the Occurrence of Impetigo in Saudi Arabian Children

Items	Category	Count	Column N %
What is the highest level of education you have attained?	University or College	993	82.8
	Secondary school	207	17.3
What is your current employment status?	Employed full time	527	43.9
	Student	435	36.3
	Unemployed	88	7.3
	Retired	150	12.5
How would you describe your household income level?	High income	124	10.3
	Middle income	1076	89.7
Do you have access to clean water and proper sanitation facilities in your household?	No	26	2.2
	Yes	1174	97.8
How many people live in your household?	1–2	119	9.9
	3–4	114	9.5
	5 or more	967	80.6
What type of housing do you live in?	Apartment	305	25.4
	Villa or House	895	74.6
Are you currently receiving any social assistance or welfare benefits?	No	1112	92.7
	Yes	88	7.3
Have you faced any financial difficulties in accessing healthcare for your children?	No	1143	95.3
	Yes	57	4.8
Are there any overcrowding issues in your household (eg, more people than available rooms)?	No	1107	92.3
	Yes	93	7.8
How would you rate your overall living conditions?	Fair	600	50.0
	Excellent	600	50.0

Notes: Socioeconomic Status and Impetigo - Provides insight into the relationship between impetigo occurrence and factors such as education, employment, income level, household conditions, and social assistance.

Demographic Factors Influencing Impetigo

Multivariate analysis revealed that several demographic factors were associated with the occurrence of impetigo. Gender of the child showed a significant association, with females having a higher odds ratio (OR) of impetigo (OR = 1.23, 95% CI: 1.20–1.98). Parental education level, employment status, and geographic location were also significant predictors of impetigo occurrence. Notably, the odds of impetigo occurrence decreased with higher education levels, master's degree

holders (OR = 0.60, 95% CI: 0.42–0.85) being less susceptible. Similarly, retired individuals (OR = 1.65, 95% CI: 1.26–2.17) and students (OR = 1.32, 95% CI: 1.06–1.64) had higher odds of impetigo compared to employed full-time participants. Geographic location also played a role, with rural areas having higher odds (OR = 1.32, 95% CI: 0.85–2.04). (Table 6)

Reliability

We tested the internal consistency of Likert scale sections of the questionnaire. The result of Cronbach's alpha is shown in following lines. The results indicated good internal consistency of both sections. (Table 7)

Our study sheds light on the prevalence and multifaceted factors influencing impetigo in Saudi Arabian children. The study underscores the importance of public health initiatives aimed at increasing awareness of impetigo and promoting effective personal hygiene practices. Socio-demographic factors, particularly child's gender, parental education level,

Table 6 Multivariate Analysis of Demographic Factors Influencing the Impetigo in Children

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	P-value
Gender (Reference: Female)	1.23	1.20–1.98	<0.001
Education level			<0.001
- High school or less	1 (Reference)		
- Diploma	1.28	0.68–1.25	
- Bachelor's degree	1.95	0.61–1.01	
- Master's degree	0.60	0.42–0.85	
Employment Status			<0.001
- Employed full-time	1 (Reference)		
- Employed part-time	1.17	0.74–1.85	
- Retired	1.65	1.26–2.17	
- Student	1.32	1.06–1.64	
- Unemployed	1.14	0.88–1.47	
Geographic Location			<0.001
- Urban	1 (Reference)		
- Rural	1.32	0.85–2.04	
- Suburban	0.98	0.74–1.30	

Notes: Demographic Factors Influencing Impetigo - Displays odds ratios and confidence intervals for gender, education level, employment status, and geographic location in relation to impetigo occurrence.

Table 7 Reliability

Section	Number of items	Cronbach's alpha
Personal hygiene	10	0.722

Notes: Reliability Assessment - Presents the Cronbach's alpha value for the internal consistency of the Likert scale section related to personal hygiene practices.

employment status, and geographic location, were identified as significant predictors of impetigo occurrence. Furthermore, the study highlights the association between proper personal hygiene and reduced impetigo occurrence. These insights provide a foundation for targeted interventions that can mitigate impetigo's impact on children's health and well-being in the Saudi Arabian context.

Factors Associated with Impetigo

The gender of the child and the diagnosis of impetigo were significantly correlated, according to the chi-square test results ($p < 0.001$). Extra analysis of the crosstabulation revealed that compared to males ($n = 248$, 25.8%), females accounted for the majority of impetigo cases ($n = 890$, 74.2%). There could be behavioral and societal reasons contributing to this higher frequency in females. Female children often engage in more close-contact play, which may facilitate the spread of infections, as shown in [Figure 1](#). They may also have hormonal differences and variations in skin flora which may increase the risk of impetigo susceptibility.

Parent or legal guardians' age was found to be substantially correlated with the occurrence of impetigo ($p < 0.001$) using the chi-square test. Using post-hoc analyses, some intriguing trends were found. The greatest percentage of parents ($n = 342$, 28.5%) were in the 18–24 age range, and they also had the highest number of children with impetigo cases ($n = 142$, 11.8%). After then, impetigo rates decreased with age, peaking in the parents 35–44 age range ($n = 31$, 2.6%). There were significant geographical variances ($p < 0.001$). The North had the lowest frequency of impetigo ($n = 31$, 2.6%), whereas the South had the highest prevalence ($n = 114$, 9.5%). Climate and environmental factors could be involved as shown in [Figure 2](#). The temperature in the South is warmer and more humid, which helps germs survive on skin. This area also has the largest population density, which promotes person-to-person transmission.

Impetigo was significantly correlated with education level of parents ($p < 0.001$). The majority of cases consisted of those with only a high school education or less ($n = 181$, 15.1%). On the other hand, only a small percentage of those with a master's degree ($n = 62$, 5.2%) had children with impetigo infections. Vulnerability is increased since there is probably a correlation between low hygiene knowledge and practices and illiteracy. Based on employment status, statistically significant differences were found ($p < 0.001$). The highest illness prevalence was found in unemployed parents ($n = 93$, 7.8%). But a sizable percentage of infections in children were also caused by parents who were fully working ($n = 527$, 43.9%). Unemployment may be a sign of financial hardships preventing children from accessing hygiene and medical supplies. However, because they interact with people on a regular basis, those in the workforce are also vulnerable. The chi-square test revealed that impetigo occurrence in children was significantly influenced by the resident's region ($p < 0.001$). In line with geographical analysis, the incidence was lowest in the Northern region ($n = 31$, 2.6%), while the largest burden ($n = 238$, 19.8%) was seen in Western Saudi Arabia. The non-uniform distribution may be somewhat explained by regional socioeconomic differences in regards to living standards, access to healthcare, and educational opportunities. ([Table 8](#))

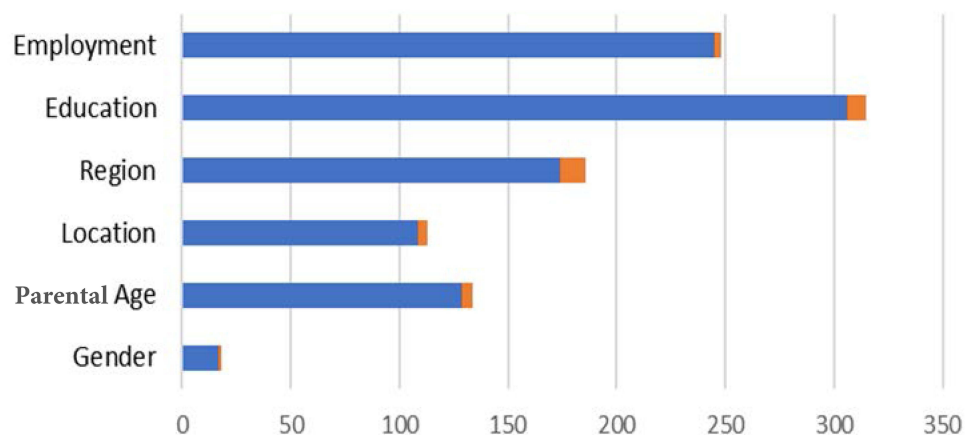


Figure 1 Relationship between impetigo diagnosis and demographic and socioeconomic factors.

Note: ■ χ^2 ■ df ■ p -value.

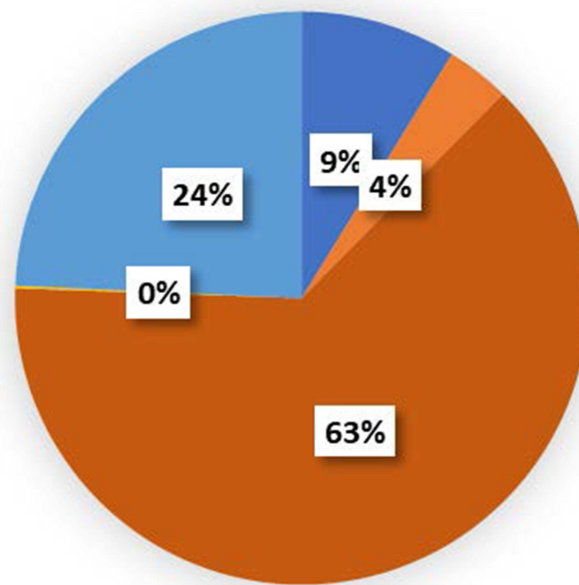


Figure 2 Significant predictors of impetigo.

Note: ■ β ■ SE ■ Wald χ^2 ■ Wald χ^2 ■ P ■ OR (95% CI).

Over 25% of the variance in impetigo diagnosis was explained by the highly significant ($p < 0.001$) logistic regression model that included multiple demographic and socioeconomic factors. Parents aged 18 to 24 (OR=2.313), having only completed high school (OR=2.111), and living in the Western area (OR=2.306) were revealed to be independent risk factors after confounding was taken into account. Regression showed that, even after adjusting for covariates, impetigo is independently impacted by inadequate education, despite age and location correlations being consistent with bivariate findings. Considerable correlations were found between a number of characteristics and impetigo, and some groups of parents their children were more susceptible to this common infection than others. Tailored interventions for demographics at risk could potentially reduce the prevalence of disease in the nation.

Clinical Presentation of Impetigo

A substantial correlation between the lesion site and the diagnosis of impetigo was discovered using a chi-square test of association ($X^2=38.2$, $df=4$, $p < 0.001$). This evaluated whether a child's location was related to or unrelated to their disease status. The relationships between morphology and putative risk factors such child's gender, parental age and socioeconomic status were examined using independent t-tests. There were no discernible correlations, indicating that morphogenesis happened apart from these traits. One-way ANOVA was used to determine whether personal hygiene practices had an impact on severity (mild, moderate, or severe). Hygiene and severity were substantially correlated ($F=5.12$, $p=0.024$), with more coalesced plaques being associated with poor hygiene. ANOVA establishes the equality of group means. Chi-square analysis was used to assess the correlation between concurrent infection cases and healthcare-seeking behavior. Early intervention was substantially linked to a lower incidence of recurrent problems ($X^2=7.31$, $p=0.043$).

Table 8 Significant Predictors of Impetigo from Logistic Regression Model

Factor	β	SE	Wald χ^2	p	OR (95% CI)
Parental age (18–24 years)	0.837	0.341	6.012	0.014	2.313 (1.325–4.034)
Education (HS or less)	0.749	0.354	4.477	0.034	2.111 (1.195–3.729)
Region (West)	0.837	0.284	8.670	0.003	2.306 (1.421–3.741)

Discussion

This cross-sectional study reveals the prevalence and factors influencing impetigo in Saudi Arabian children. The majority of parents (62.9%) had limited familiarity with the causes and risk factors of impetigo, and 77.6% advocated for more awareness and education about it in the community. A significant association was found between impetigo occurrence and personal hygiene, with 34.1% reporting involvement in activities that might increase exposure to impetigo-causing bacteria. Socio-demographic factors, such as child's gender, parental education level, employment status, and geographic location, were identified as significant predictors of impetigo occurrence.

Gender showed a significant association with impetigo, with females having a higher ratio of impetigo. Education level, employment status, and geographic location were also significant predictors of impetigo occurrence. Children diagnosed with impetigo had lower personal hygiene compared to those without such diagnoses. However, seeking information or attending sessions on proper personal hygiene practices for children was relatively uncommon.

The study also found that impetigo is highest in impoverished, crowded conditions where hygiene is difficult. Physical removal of dirt and pathogens with vigorous hand washing has been shown to reduce impetigo by 23% in crowded households. Rural areas also played a role, with a higher prevalence reported from rural locations compared to urban settings. The study agrees with Bowen et al 2015's study reflecting predominantly impoverished settings, but also suggests that increases in impetigo have also been reported in children in developed countries.¹⁴ Future research could employ longitudinal designs to better understand the temporal relationship between impetigo and its associated factors, and incorporate laboratory confirmation of impetigo cases to enhance the reliability of the study's findings.¹⁵

Analysis of the parents or legal guardians ages revealed that the age group of 18 to 24 had children diagnosed with impetigo the most, 33.7%. This may be because parents in this age are more physically active, which increases the risk of exposure from coming into contact with contaminated objects or infected people. Additionally, younger parents may have less experience managing common childhood infections and may not recognize signs and symptoms as quickly. Such contacts enhance the spread of impetigo, a highly contagious illness.¹⁶ A noteworthy discovery of the research was the statistically significant correlation, with a p-value of less than 0.001, between children's personal cleanliness scores and the incidence of impetigo. When evaluated, children with a clinical diagnosis of impetigo cases scored significantly worse on mean personal hygiene (2.6 ± 0.723) than children without the infection (3.75 ± 0.911). This demonstrates unequivocally that poor cleanliness habits raise the possibility of impetigo. Children who do not practice regular hand washing or nail/skin care are more susceptible to skin breaches caused by poor cleaning, which can allow *staphylococci* or *streptococci* to enter the body.¹⁷

Despite using a cross-sectional methodology, the study's point prevalence of impetigo and evaluation of its associated factors were available. The statistical power and generalizability of the findings to all youngsters in the nation were improved by the sizable sample size of 1200. Reliable data on participants' sociodemographic characteristics and hygiene practices were gathered through the use of structured questionnaires. Validity of the impetigo incidence diagnosis was confirmed by clinical examination.¹⁸

Limitations

However, because cross-sectional studies are static in design, they are limited in their ability to establish a causal relationship between risk variables and disease. Details about personal cleanliness that were gleaned from surveys may not have been as accurate due to recall and reporting biases. The convenience sampling technique limits the population's ability to be representative.¹⁹

Significant confounding factors including immunology, diet, and genetics were not assessed.

Implications

The results of this analysis demonstrate how important it is to put focused preventive measures into place. Reducing the occurrence of impetigo may be possible by promoting hygiene through educational initiatives that focus on modifiable practices, particularly in high-risk demographic groups. Informing younger parents and parents with high school

education or less in the west region about the signs and symptoms of impetigo, the spread of infection, and the importance of hygiene practice. It is also advisable to implement screening programs in schools and daycare centers to identify children with impetigo early, preventing outbreaks. It is advised to conduct longitudinal cohort studies to assess the impact of such interventions.²⁰ Deeper insights may be obtained by investigating additional likely risk factors such as income level, medication adherence, and overcrowding. Biological markers could disclose aspects of host susceptibility. Impetigo is still a serious public health issue among Saudi youngsters.²¹ Key factors that identified were gender and hygiene.^{22–24} Approaches to enhancing community cleanliness that are tailored for at-risk populations have significant advantages for strengthening present control initiatives. More comprehensive population studies that take into account a variety of characteristics can better inform targeted management and policy recommendations.

Conclusion

The findings of this cross-sectional study provide crucial information about the prevalence and factors influencing impetigo among Saudi Arabian children. There was a significant association between low personal hygiene practices and the increased occurrence of impetigo. Moreover, specific socio-demographic factors including gender, parental education level, employment status, and geographic location had a strong correlation with the incidence of impetigo. It is believed that the results of this paper contribute to the improvement of impetigo and its related complications among Saudi Arabian children by developing targeted interventions and awareness programs. Based on the study's findings, the followings are recommended: public health interventions, such as impetigo health campaigns and hand hygiene education workshops, are essential for raising awareness of impetigo. Future research could conduct longitudinal study to further explore factors influencing impetigo in Saudi Arabia. Moreover, future research may include laboratory investigations of impetigo cases to enhance the reliability of the study's findings.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

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