

Pattern of skin diseases in a university hospital in Jeddah, Saudi Arabia: age and sex distribution

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BACKGROUND: Previous studies have investigated the pattern of dermatological diseases in some regions of Saudi Arabia, but studies on the prevalence of skin diseases in Jeddah are lacking.

OBJECTIVES: Assess the pattern of skin diseases in Jeddah based on age and sex differences and compare the results with those of previous studies conducted in other regions of Saudi Arabia and the Middle East.

DESIGN: A cross-sectional prevalence study, retrospective.

SETTING: Dermatology clinic of King Abdulaziz University hospital.

PATIENTS AND METHODS: Data obtained from electronic medical records were summarized and analyzed. We only included new patients, who first visited the clinic in 2017.

MAIN OUTCOME MEASURES: Descriptive epidemiological data and statistical comparisons.

SAMPLE SIZE: 1244.

RESULTS: Among 3458 patients who attended the dermatology clinic, 1244 were new patients. There were 365 (29.3%) men and 879 (70.7%) women for a male-to-female ratio of 1:2.4. The mean (SD) age of the total population was 35 (3.8) years. The most common dermatological disease was dermatitis (n=266, 21.4%), followed by acne (n=195, 15.7%) and fungal infection (n=136, 10.9%). Atopic dermatitis was the most prevalent dermatome in children (41.7%), while acne was the most prevalent disease in adults (19.5%). The chi-square test indicated a significant difference between acne and sex ($P=.007$), with adult women being more commonly affected (79%) and for alopecia and sex ($P<.001$), with women being more commonly affected (91.2%).

CONCLUSIONS: There are slight differences in the prevalence of dermatological diseases in Jeddah, as shown in this study and other studies from other regions in Saudi Arabia and the Middle East. We recommend initiating awareness campaigns to increase knowledge about skin diseases, particularly in men, and improving dermatology-related training programs for primary health care physicians. A population-based study is warranted to clarify the prevalence of skin diseases in Saudi Arabia.

LIMITATIONS: The inclusion of patients who visited the dermatology clinic only in 2017 and data collection from only registration records.

CONFLICT OF INTEREST: None.

Dermatological diseases are one of primary reasons for referral to general practitioners and dermatology clinics. These diseases are found in more than 50% of the adult population¹ and account for 14% of primary health care visits.² The incidence of skin conditions mostly depends on the ethnic or genetic constitution of the community. However, dietary, social, hygiene, and weather conditions are contributing factors as well.³

According to reports from developed countries, approximately one in three individuals has a skin disease at any point in time.⁴ Dermatological diseases are currently considered the 15th most common group of medical problems.⁴ Though rarely fatal they still have considerable effects in terms of treatment costs, psychological distress, and absenteeism.⁵

Early diagnosis of common treatable skin diseases is crucial, as this not only benefits patients but also aids in preventing the transmission of infectious diseases.⁶ It is essential for all dermatologists to recognize the epidemiology of common dermatological diseases. The most reliable method for determining the prevalence and incidence of any disorder is to perform a population-based study. However, this can be a time-consuming and challenging task in a large population, such as the Saudi population, particularly with respect to dermatological diseases. Hence, to the best of our knowledge, most studies evaluating the prevalence and incidence of skin diseases have been hospital based.³

Previous studies have investigated the pattern of dermatological diseases in some regions of Saudi Arabia, such as Qassim, Najran, Asir, Al-Khobar, and Hail.⁷⁻¹¹ All these studies were hospital based and were conducted in large referral tertiary health care centers, which may reflect the pattern and rate of skin diseases in these regions. In Jeddah, a previous study examined the pattern of skin diseases from July 1997 to June 1998 in the King Khalid National Guard Hospital for national guard military personnel and their families,¹² but studies on the prevalence of skin diseases that consider age and sex distribution in Jeddah are lacking. This has further led to inadequacy in health planning and treatment services; improvement is required in these sectors. Hence, this study aimed to assess the pattern of skin diseases with respect to age and sex in Jeddah, and to compare the results with those of previous studies conducted in other regions of Saudi Arabia and the Middle East.

PATIENTS AND METHODS

This cross-sectional prevalence study was conducted in King Abdulaziz University Hospital (KAUH), a ma-

ior tertiary hospital in Jeddah with a capacity of 1002 beds and more than 200 general and specialized clinics. KAUH is the main academic teaching hospital in the western region of the country. Located in the western region near the Red Sea with a population of almost 3.5 million, Jeddah is one of the main cities of Saudi Arabia. The weather is hot and humid during the summer with dusty winds during the spring.

The study included new patients who attended the dermatology clinic from January 2017 to December 2017. We only included new cases (no previous admission) based on clinical diagnosis, histopathological examination, or laboratory investigations. Follow-up patients who were initially diagnosed earlier than 2017, and attending the clinic in the same study period, were excluded. For patients with different medical conditions at each visit, we included any other new dermatological diagnosis in the same study period. The institutional review board of KAUH approved this study (reference number: 174-18), and the requirement for informed consent was waived owing to the retrospective nature of the study.

Age, sex, nationality, and dermatological diagnosis were obtained from electronic medical records. Diagnoses were categorized according to the International Statistical Classification of Diseases and Related Health Problems version 10 (ICD 10) as closely as possible, and classified into groups and subgroups to simplify the study. Results were subsequently compared with those of similar studies performed in other regions of Saudi Arabia and nearby countries.

Data were coded, checked, and entered into SPSS version 23 (IBM Corp., Armonk, NY, USA). Categorical variables including primary variables are expressed using a frequency table, whereas continuous variables for normally distributed data are expressed as a mean, standard deviation, and range. Statistical significance was calculated using the chi-square test. A *P* value less than .05 was considered significant.

RESULTS

Among the 3458 cases examined in the dermatology clinic during the 12-month period, 1244 were new cases and included 365 (29.3%) men and 879 (70.7%) women (male-to-female ratio, 1:2.4). The mean age for both sexes was 35 (3.8) years. There were 809 (65%) Saudi patients and 435 (35%) non-Saudi patients. By age group, there were 127 children (<13 years) (10.2%), 982 adults (13–60 years) (78.9%), and 135 elders (>60 years) (10.9%). Dermatome diseases were divided into 14 groups according to ICD 10 (**Table 1**). The most common dermatological disease was dermatitis

(n=266, 21.4%), followed by acne (n=195, 15.7%), fungal infection (n=136, 10.9), and alopecia (n=113, 9.1%). The most common dermatome diseases were dermatitis in children (41.7%), with atopic dermatitis being the most prevalent type, and acne in adults (19.5%) (Table 2). Fungal infection was more common in the elderly (17.8%) than in the other age groups, with dermatophytosis being the most common type of fungal infection. Tables 3 and 4 show a comparison of the frequency of skin conditions between the present study and other studies in Saudi Arabia, and between this study and studies performed in other countries in the Middle East, respectively.

The differences in frequency between males and females were statistically significant for acne ($P=.007$) and alopecia ($P<.001$) (Table 5). Adult women (13 to 60 years old) were mostly affected (79%) by acne ($P<.001$); only four children had acne. Furthermore, alopecia significantly correlated with sex, with women being more commonly affected (91.4%) than men (8.8%). Alopecia was predominant in adults ($P<.001$) (Table 5). A significant difference was observed among age groups ($P<.001$) with dermatitis being predominant in adults; however, there was no sex-specific variation.

Table 1. Common skin diseases in the study population.

Dermatome disease	Number of patients	Percentage
Dermatitis	266	21.4
Acne	195	15.7
Fungal infection	136	10.9
Alopecia	113	9.1
Papulosquamous disorders	99	8
Viral infection	81	6.5
Bacterial infection	70	5.6
Urticaria and erythema	68	5.5
Pigmentary disorder	48	3.9
Benign neoplasm	17	1.4
Parasitic infection	10	0.8
Radiation-related disorder	10	0.8
Malignant neoplasm	10	0.8
Bullous	9	0.7
Other	112	9
Total	1244	100%

DISCUSSION

As KAUH is a major hospital accessible to numerous citizens and residents in the western region, our study includes a heterogeneous population. Our study cohort differs from those of other studies conducted in some hospitals with a limited number of patients, such as King Khalid National Guard Hospital,¹² which only represents a specific group of the population (military personnel and their families). We do not claim that our study reflects the actual prevalence of diseases, as this study was limited by its hospital-based design; however, it provides a good estimate of the incidence of common dermatological conditions in Jeddah.

Jeddah is a coastal city located on the western coast of Saudi Arabia, and it is characterized by hot and humid weather during the summer and dusty winds during the spring. These conditions are considered predisposing factors for skin diseases in all tropical areas, including Jeddah.

Female patients were predominant in our study. Several studies performed worldwide, including studies from Saudi Arabia, have reported that female patients more frequently visit dermatology clinics than male patients. Females were more prevalent in each age group than males, except among children aged <13 years. This finding could be attributed to the sensitivity of women to health and cosmetic problems. Aside from medical issues, women visit clinics because they care more about their appearance and have more awareness of health problems than men. Moreover, some studies have reported that the epidermal layer is thinner in women than in men, particularly among aged and postmenopausal women because of insufficient estrogen, which plays a major role in maintaining skin thickness and stimulating the immune system.¹³ However, in a study conducted in Asir in the southern area of Saudi Arabia,¹⁰ men were predominant visitors to the dermatology clinic, which may be due to the social restrictions imposed on women in these regions.

In the present study, dermatitis was determined to be the most prevalent dermatome disease, with atopic dermatitis being the most common among all types of dermatitis. This finding was similar to that of other studies, which reported the same results in Al-Khobar,⁷ Asir,¹⁰ Hail,¹¹ Riyadh,¹⁴ and Al-Jouf.¹⁵ The frequency of dermatitis ranged between 19.6% in Al-Khobar and 48.2% in Al-Qunfudhah,¹⁶ as shown in Table 3. Approximately 42% of children have dermatitis, which is the most common skin disease in this age group. The higher rate of dermatitis in all regions of Saudi Arabia is likely due to antiseptics, foods, vegetables, allergens, microbes, hot weather, moisture, anxiety, and hormonal

Table 2. Distribution of skin conditions by demographic characteristics.

Dermatome disease	Children (<13 y)		Adults (13–60 y)		Elders (>60 y)		Number of cases	Percent by group	Percent of total cases
	Male	Female	Male	Female	Male	Female			
Dermatitis	26	27	42	129	16	26	266	100	21.4
Atopic dermatitis	17	20	26	65	7	12	147	55.3	11.8
Contact dermatitis	5	4	6	38	1	4	58	21.8	4.7
Seborrheic dermatitis	0	2	7	11	4	3	27	10.1	2.2
Other	4	1	3	15	4	7	34	12.8	2.7
Acne	3	1	38	153	0	0	195	100	15.7
Fungal infection	3	7	35	67	11	13	136	100	10.9
Candidiasis	1	1	0	3	0	2	7	5.2	0.6
Pityriasis versicolor	0	0	7	8	1	2	18	13.2	1.4
Dermatophytosis	2	6	28	56	10	9	111	81.6	8.9
Bacterial infection	4	1	27	27	5	6	70	100	5.6
Viral infection	2	9	20	39	6	5	81	100	6.5
Zoster	0	2	6	16	2	3	29	35.8	2.3
Herpes simplex	2	3	2	4	0	0	11	13.6	0.9
Warts	0	4	12	19	4	2	41	50.6	3.3
Parasitic infection	3	0	3	4	0	0	10	100	0.8
Scabies	3	0	2	2	0	0	7	70	0.6
Leishmaniasis	0	0	1	2	0	0	3	30	0.2
Alopecia	1	3	9	99	0	1	113	100	9.1
Urticaria and erythema	4	3	17	38	1	5	68	100	5.5
Papulosquamous disorders	3	1	25	56	6	8	99	100	8
Psoriasis	2	1	14	37	5	5	64	64.6	5.1
Lichen planus	0	0	6	13	1	3	23	23.3	1.8
Pityriasis rosea	1	0	5	6	0	0	12	12.1	1
Pigmentary disorders	5	6	2	31	0	4	48	100	3.9
Vitiligo	3	3	1	11	0	1	19	39.6	1.5
Post-inflammatory hyperpigmentation	0	2	0	8	0	1	11	22.9	0.9
Other	2	1	1	12	0	2	18	37.5	1.4
Bullous	0	1	1	6	0	1	9	100	0.7
Radiation-related disorder	1	0	0	6	2	1	10	100	0.8
Benign neoplasm	1	0	3	9	3	1	17	100	1.4
Melanocytic nevi	1	0	0	3	2	1	7	41.2	0.6
Other	0	0	3	6	1	0	10	58.8	0.8
Malignant neoplasm	0	0	2	5	3	0	10	100	0.8
Melanoma	0	0	1	2	3	0	6	60	0.5
Other	0	0	1	3	0	0	4	40	0.3
Other	8	4	22	67	2	9	112	100	9
Total	64	63	246	736	55	80	1244		100

Table 3. Frequency of common dermatological conditions in the present study and other studies performed in different regions of Saudi Arabia.

Dermatome disease	Jeddah	Asir ¹⁰	Hail ¹¹	Al-khobar ⁷	Najran ⁹	Qunfudah ¹⁶	Riyadh ¹⁴	Al-jouf ¹⁵
Dermatitis	21.4	25.7	25	19.6	37	48.2	21.3	34.1
Acne	15.7	5.5	20	13.8	12.8	13.8	11.9	9.6
Pyoderma	5.6	3.2	2.8	4.8	5	2.9	3	10.9
Fungal Infection	10.9	6.2	6.2	9.6	5.6	0.5	4.5	7.8
Viral Warts	3.3	2.4	7	6.2	9.1	-	8.6	2.9
Alopecia	9.1	-	8	7.2	6.7	2	-	3.98
Papulosquamous Disorders	8	4.8	-	6.5	6.7	4.2	-	7.47
Pigmentary Disorders	3.9	4.6	7	9.7	10.8	7.7	10.2	4.87
Urticaria and Erythema	5.5	5.9	-	5.7	6.3	3	1.6	4.95

Data are percentages.

Table 4. Frequency of common dermatological conditions in the present study and other studies performed in different countries in the Middle East.

Dermatome disease	Jeddah	Cairo	Yemen	Gaza	Abu Dhabi	Iran	Qatar
Dermatitis	21.4	12.94	27.2	30.2	21	18.3	24.6
Acne	15.7	6.1	15.2	25	9	21.2	8.4
Bacterial infection	5.6	10.3	3.2	2.6	2.6	2.1	2.6
Fungal infection	10.9	15.83	8.8	4.5	8.5	8.8	11.4
Viral infection	6.5	7.35	4.2	1.5	7.4	5.7	13.3
Alopecia	9.1	6.73	2.4	0.3	2.26	1.3	3.2
Papulosquamous disorders	8	4.69	7.3	1	-	3.3	4.2
Vitiligo	1.5	2.1	4	1	3.18	3.3	1.9
Urticaria and erythema	5.5	5.62	6.2	-	-	2.8	4.1

Data are percentages.

Table 5. Associations between demographic data and dermatome disease.

Dermatome disease	Age group			P value ^a	Sex		P value ^a
	Children (<13 y)	Adults (13–60 y)	Elders (>60 y)		Male	Female	
Dermatitis	53 (19.9)	171 (64.3)	42 (15.8)	<.001	84 (31.6)	182 (68.4)	.408
Acne	4 (2.0)	191 (98.0)	0 (0)	<.001	41 (21)	154 (79)	.007
Alopecia	4 (3.5)	108 (95.5)	1 (1)	<.001	10 (8.8)	103 (91.2)	<.001

Values are n (%). ^aChi square test.

differences.¹⁷ Genetic predisposition might be involved in some types of atopic dermatitis, as the percentage of consanguineous marriages is high in Saudi Arabia.¹⁸

Acne was the second most common dermatome disease. This finding was also reported in Al-Khobar,⁷ Najran,⁹ Hail,¹¹ Riyadh,¹⁴ and Al-Qunfudah.¹⁶ In comparison, acne was the third most common in other studies performed in Asir¹⁰ and Al-Jouf.¹⁵ Based on our results, women reported this condition more frequently, and the difference was statistically significant, especially among adolescents ($P=.007$). This could be attributed to higher self-image awareness among adolescents in Saudi Arabia and easy accessibility to free medical facilities. Factors such as stress, anxiety, seasonal variation, and premenstrual period may affect the severity of acne.¹⁹ Moreover, patients with acne believe that foods such as chocolate, nuts, oily food, cake, eggs, coffee, tea, and others cause acne.²⁰ Various studies that have evaluated the psychological effects of acne have shown a high susceptibility to low self-esteem and impaired self-image and being embarrassed or angry.²¹ Thus, patients with acne require effective treatment to improve and maintain a productive social life. In addition to being a cosmetic issue, dermatological diseases can result in serious psychosocial effects and should be evaluated according to not only symptoms but also physical, psychological, and social aspects. Counseling and psychiatric medication use can help patients with depression or anxiety related to dermatological diseases. Further, in some cases, consulting a dermatologist or psychiatrist can be remarkably helpful.

One interesting finding is that among 113 patients with alopecia, 103 were women. Women more frequently had alopecia than men, which is consistent with the results of studies performed in Al-Khobar,⁷ Najran,⁹ and Hail.¹¹ A possible explanation for this might be the increased hair loss in women during the postpartum period.^{22,23} Furthermore, women more frequently apply hair dyes that contain chemicals than men, leading to hair damage.²⁴ Moreover, systemic lupus erythematosus, which is more prevalent in women, affects the hair and is supposed to be due to the effect of endogenous sex hormones.²⁵

In the present study, 10.9% of the population had fungal infection, which is almost equal to that in Al-Khobar (9.6%). In addition to being a coastal city, similar to Al-Khobar, Jeddah has hot and humid weather, which creates an environment conducive to fungal infections. Infections were the most common skin disease in Cairo,²⁶ and this finding was likewise reported in other developing countries where poor hygiene, low educational level, and poverty play important roles. Hence,

the rate of infection reflects the standard of hygiene in a society. Elderly patients were more affected by fungal infection, as shown in **Table 2**. This could be attributed to their low immune status and chronic diseases, such as diabetes.²⁷

In this study, the incidence of scabies was low, affecting less than 1% of all patients. However, an outbreak of scabies occurred in May 2018 in the western region of Saudi Arabia, which started in Makkah, and many cases were discovered in the southern region of Jeddah. However, our results do not reflect the actual prevalence of scabies, as we included only patients seen in 2017.

Sexually transmitted diseases (STDs) are among the most common undiagnosed health problems worldwide. Numerous individuals with STDs are asymptomatic and remain undiagnosed. Data are limited on STDs in Islamic countries where religion forbids homosexuality and having multiple sexual partners. The incidence of STDs was lower in Saudi Arabia than in other countries such as the United States.^{28,29} STDs are considered one of the underreported diseases, as most patients with such diseases tend to visit a private clinic rather than a general hospital for privacy reasons.

Ultraviolet rays from the sun augment DNA destruction that causes inflammatory responses and tumorigenesis. In Saudi Arabia, most days are sunny. Nevertheless, the prevalence of skin tumors was low, accounting for only 2.2% of all patients in the present study. A possible explanation for this might be related to the dress culture in Saudi Arabia, in which most of the body is covered. In Saudi Arabian culture, women wear an abaya, a full-length outer garment, whereas men wear a thobe, an ankle-length Arab garment. Thus, many body parts are protected from ultraviolet rays. In addition, some patients seek medical advice from other clinics; in particular, patients with cutaneous neoplasms or connective tissue diseases visit a plastic surgery clinic or a rheumatology clinic.

This study has some limitations. First, we only included patients who presented to the dermatology clinic in 2017. There may have been a different disease distribution of skin diseases in 2017 compared with that of other years. Thus, we may not have accurately estimated the disease distribution. Second, most studies on dermatological patterns rely on the prevalence of dermatological diseases based on hospital records and doctor-patient interviews. In our study, we only collected data from registration records. Our study population was relatively small because some dermatological diagnoses were not written and coded in medical records. The cases in this study may represent the more serious, difficult to treat or chronic cases be-

cause they were referred to this teaching hospital, as easily treated cases are usually dealt with in the primary care clinics.

In conclusion, dermatitis was the most prevalent disease among all dermatological diseases, followed by acne and fungal infection. Overall, there were slight differences in the prevalence of skin conditions in Jeddah compared with that in other regions, as shown by the comparison between the results of the present study and those of other studies performed in different regions. Moreover, the results generally provide some information about the existence of important skin diseases in the country. Most of these skin diseases can be diagnosed and treated by primary health care physicians. We recommend initiating awareness cam-

paigns to increase knowledge about skin diseases, particularly in men, and improving dermatology-related training programs for primary health care physicians. These strategies will help reduce referrals to dermatology clinics and allow early diagnosis and treatment of several skin diseases. A population-based study is warranted to clarify the prevalence of skin diseases in Saudi Arabia in further detail.

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