The histopathological pattern of benign and non-neoplastic skin diseases at King Fahad Hospital, Madinah, Saudi Arabia

Abdulkader M. Albasri, MBBCH, PhD, *Irfan A. Ansari,* MBBS, MD.

ABSTRACT

الأهداف: يهدف البحث إلى دراسة الأنماط الهيستوباثولوجية لأمراض الجلد الحميدة في منطقة المدينة المنورة.

الطريقة: هذه هي دراسة استرجاعية لجميع حالات أمراض الجلد الحميدة التي تم تشخيصها في قسم علم الأمراض بمستشفى الملك فهد بالمدينة المنورة في الفترة من يناير 2006 إلى ديسمبر 2017، حيث تم إدخال البيانات ومن تم تحليلها وتصنيف الحالات بناءأ على التشخيص الهيستوباثولوجي.

النتائج: من بين 1125 حالة، كانت هناك 579 (51.5%) حالة عند الذكور و 546 (48.5%) حالة عند الإناث، بنسبة ذكور الى إناث 1:1.1. تراوحت أعمار المرضى من 1 الى 101 سنة بمتوسط عمر 36.9 سنة. كانت الأمراض الجلدية الأكثر شيوعًا التي لوحظت في هذه الدراسة هي أمراض الزوائد الجلدية (29.6%)، والأورام الحميدة (18.3%)، واضطرابات التصبغ (11.9%)، والأمراض الحطاطية الحرشفية (11.4%)، والتهاب الجلد/الأكزيما (10%). في مجموعة أمراض الزوائد الجلدية، كان تكيس البشرة الأكثر شيوعًا للمرض الذي يمثل 20.4% من الحالات، يليه كيس غمد جذر الشعرة بنسبة 9.2% من إجمالي الحالات. كان متوسط أعمار المرضى كان 35 سنة و 36.7 سنة على التوالي.

الخاتمة: شوهدت مجموعة متنوعة من الأمراض الجلدية الحميدة في هذه الدراسة في مجموعة واسعة من مختلف الأعمار. الأمراض الجلدية الأكثر شيوعًا التي لوحظت في هذه الدراسة هي أمراض الزوائد الجلدية، والأورام الحميدة، واضطرابات التصبغ، والأمراض الحطاطية الحرشفية.

Objectives: To characterize and compare the histopathological pattern of benign skin diseases in patients from Madinah region of Saudi Arabia.

Methods: This retrospective study was conducted at the Department of Pathology, King Fahad Hospital, Madinah, Saudi Arabia, and contained cases of benign skin diseases for 11 years (from January 2006 to December 2017). The findings were tabulated in Microsoft Excel sheet and classified based on histopathological diagnosis.

Results: Of 1,125 skin tissues reviewed, 579 (51.5%) specimens were from male patients and 546 (48.5%) specimens were from females giving a male: female ratio of 1.1:1. The ages ranged from 1 to 101 years with a mean age of 36.9±9.8 years. Most of the skin diseases (n=639; 57%) were seen in the age group 20-49 years. The most common skin diseases observed were disorders of skin appendages (29.6%) followed by benign tumors (18.3%), disorders of pigmentations (11.9%), papulosquamous lesions (11.4%), and dermatitis/eczema (10%). In the group of skin appendages disorders, epidermal inclusion cyst was the most common disease entity representing 20.4% of cases, followed by trichilemmal cyst accounting for 9.2% of the total cases. Mean ages of the patients were 35±8.5 years and 36.7±9.7 years respectively.

Conclusion: A variety of benign skin lesions were seen in the present study in a wide age distribution range. The most common skin diseases observed in this study were skin appendage disorders, benign skin and adnexal tumors, pigmentation disorders, and papulosquamous lesions.

Saudi Med J 2019; Vol. 40 (6): 548-554
doi: 10.15537/smj.2019.6.24205

From the Department of Pathology (Albasri) and from the Department of Pathology (Ansari), Taibah University, Al-Madinah Al-Munawwarah, Kingdom of Saudi Arabia.

Received 11th February 2019. Accepted 29th April 2019.

Address correspondence and reprint request to: Dr. Abdulkader M. Albasri, Department of Pathology, Faculty of Medicine, Taibah University, Al-Madinah Al-Munawwarah, Kingdom of Saudi Arabia.
E-mail: abdbasri@hotmail.com
ORCID ID: https://orcid.org/0000-0002-1824-4025

Disclosure. Authors have no conflict of interests, and the work was not supported or funded by any drug company.

The skin or integument is the largest organ in the human body, and it performs many functions, including protection from microbial infections, body temperature regulation, and the perception of various sensations. Although it is a complex organ, the 3 main histological components of the skin can be classified as the epidermis and adnexae, the melanocytic system and dermis, and the subcutis.[1] An imbalance in the skin functions can affect skin cell homeostasis, which results in various skin diseases. Skin diseases occur quite frequently, and there are thousands of specific skin diseases ranging from benign acne, eczema, and blisters to extremely fatal malignancies, including melanoma.[2] Benign skin diseases are extremely common, with a wide array of lesions and various pathological processes ranging from inflammatory to infectious to autoimmune mechanisms. Every individual encounters some kind of benign skin disease at some point in his or her lifetime.[3] Interestingly, most benign skin diseases are not notifiable, and they are not regarded as significant health problems, although their effects on the quality of life can be undesirable.[4] The skin disease prevalence depends on various factors, including individual genetic and racial constitutions, customs, hygiene, nutritional statuses, and climatic conditions, and it varies from one country to another and in different regions of the same country.[5] The histopathological patterns of benign skin diseases vary, and they constitute a wide range of morphologies; however, the clinical presentations are limited to only a few changes, such as pigmentation variations (hypo or hyperpigmentation), macules, papules, nodules, vesicles, and ulcers. These clinical presentations may be common to different diagnoses; therefore, a histopathological examination is required for a definitive diagnosis. It has been observed that most benign skin disorders are diagnosed on the basis of the patient's history and clinical examination alone, while a histopathological diagnosis is used mainly in the management of unresponsive lesions. Therefore, clinicopathological corroboration between the treating dermatologist and the diagnosing pathologist is crucial, and it plays a vital role in the management of skin diseases.[6] Most of the data available on benign skin diseases in the current English literature is based mainly on the clinical findings rather than the histopathological evaluations, and these studies have been conducted principally by dermatologists. Very few studies have been carried out by pathologists or dermatopathologists. Moreover, there is a lack of histopathologically-based data on benign skin diseases in Saudi Arabia.[7]

Therefore, the main objective of the present study was to provide comprehensive data on the histopathological patterns of benign skin diseases in the histopathology laboratory of King Fahad Hospital in Al-Madinah Al-Munawwarah, Saudi Arabia.

Methods. This retrospective study included 1,125 skin biopsy specimens received from January 2006 to December 2017 at the Department of Pathology, King Fahad Hospital, Madinah, Saudi Arabia.This hospital is the key referral and tertiary care hospital in the Madinah region with more than 500 bed capacity. The specimens were preserved in 10% buffered formalin as a fixative, and a team of consulting histopathologists provided reports on the skin biopsies after routine slide staining with hematoxylin and eosin. In addition, special staining, such as periodic acid-Schiff, Ziehl-Neelsen, and Fite-Faraco staining, and immunohistochemistry were performed in selected cases. The dermatological diagnosis, gender, and age were recorded for each patient. We excluded all the records that did not include any of the above variables. As the main aim of the study was to address the basic demographic and histopathological information, and no comparison was indicated between the parameters, hence no statistical analysis was performed and the findings were tabulated in Microsoft Excel sheet and classified based on histopathological diagnosis, male to female ratio and age distribution. The histopathological diagnoses were further subclassified according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10).[8]

Results. During the study period, 1,125 patients with skin pathologies were identified. More than one half (n=579; 51.5%) of the patients were males, and 546 (48.5%) of the patients were females, with a male to female ratio of 1.1:1. The ages ranged from 1 to 101 years, with a mean age of 36.9±9.8 years. The majority of the skin diseases (n=639, 57%) were seen in the 20 to 49-years age group. The young age group (<10 years) contained 4.6% and the elderly age group (≥70 years) contained 5.2%.

The frequencies, percentage and the ICD-10 code of the total 1,125 benign skin diseases samples are summarized in the **Table 1**.

Tables 2 - 6 show the numbers, percentages, gender distributions, and mean ages of the patients with regard to the specific skin disease groups. In the skin appendage disorder group, epidermal inclusion cysts were the most common disease entity, representing 20.4% of the cases, followed by trichilemmal cysts. The mean ages of these patients were presented in **Table 2**.

Seborrheic keratosis, fibroepithelial polyps, and dermatomyofibromas were the most commonly seen benign tumors. The mean ages of these patients were presented in **Table 3**. Melanocytic nevi constituted the majority of the pigmentary disorders, accounting for 11.8% of the cases, with a mean age of 32.6±8 years. Psoriasis and lichen planus were the most commonly seen papulosquamous diseases. In the dermatitis/eczema group, atopic dermatitis was seen most commonly, at a rate of 4.7% and a mean age of 26±6.3 years.

Seborrhoeic dermatitis, nummular dermatitis, and lichen simplex chronicus were less common (**Table 4**). In the infectious disease group, viral infections were most common (4.4%), followed by bacterial (0.6%), parasitic (1%), and fungal (0.08%) infections. Viral warts were the most commonly seen infectious disease, making up 4.1% of the total cases, with a mean patient age of 33.9±8.7 years (**Table 5**). Dermatoses due to discoid lupus erythematosus, leukocytoclastic vasculitis, and bullous pemphigoid were presented in **Tables 4 & 6**.

Discussion. The histopathologically-based literature on benign skin diseases in Saudi Arabia is scant. Rather, most of the associated articles published in the recent literature were written by dermatologists, and they were predominantly related to the clinical practices and differential diagnoses.

Histopathological studies are gold standard for the diagnosis of both benign and malignant skin diseases and considered a very crucial method in assisting the dermatologist in the understanding the general pattern of skin diseases, management and allows a proper clinicopathological correlation.[9,10] As mentioned earlier, there is a lack of histopathology based studies on the spectrum of benign skin diseases from our region. Hence, in this retrospective hospital-based study, we tried to highlight the histopathological pattern of benign skin diseases in the Madinah region, which is one of the largest regions of Saudi Arabia, with an area of 151,990 km^2 and an estimated population of 2.13 million. The most reliable way to calculate the incidence and prevalence rates of any disease in a region is to implement a community-based study; however, one of the most crucial factors hindering a population-based study on dermatological disorders is the associated stigma.[11] Although the present research study was retrospective, histopathology laboratory-based, and limited to a single hospital, we believe that our results represent a rough estimate of the benign skin diseases in the Madinah region. Moreover, it was limited by its dependence on the data collection efficacy and the lack of statistical analyses. However, it served the purpose of providing the basic demographic and clinicopathological data, which can be compared with

Table 1 - ICD code groups, frequencies and percentages of 1,125 benign skin diseases.

ICD Codes	Official name of ICD Group	n	(%)
L00-L08	Infections of the skin and subcutaneous tissue	68	(6.1)
L10-L14	Bullous disorders	28	(2.5)
L20-L30	Dermatitis and eczema	114	(10.0)
L40-L45	Papulosquamous disorders	128	(11.4)
L50-L54	Urticaria and erythema	19	(1.6)
L60-L75	Disorders of skin appendages	334	(29.6)
L80-L99	Other disorders of the skin and subcutaneous tissue	62	(5.5)
M35.1, M35.9	Connective tissue diseases	32	(2.8)
L81.1, D22	Disorders of pigmentation	134	(11.9)
D10-D36	Benign tumors	206	(18.3)

Table 2 - Details of numbers, percentages, mean age and sex ratios of disorders of skin appendages.

Disorders of skin appendages	n	(%)	Mean age (years)	M/F
Epidermal inclusion cyst	230	(20.4)	35.0	152/78
Trichilemmal cyst	104	(9.2)	36.7	48/56
Total	**334**	**(100)**		

Table 3 - Details of numbers, percentages, mean age and gender ratios of benign tumors.

Tumors	n	(%)	Mean age (years)	M/F
Adnexal tumors				
Chondroidsyringoma	2	(0.16)	58.5	2/0
Eccrineporoma	2	(0.16)	62.5	2/0
Eccrinespiradenoma	2	(0.16)	71	2/0
Hidradenoma	2	(0.16)	43	1/1
Syringocystadenomapapilliferum	2	(0.16)	42	1/1
Keratoacanthoma	5	(0.4)	49.5	2/3
Pilomatrixoma	5	(0.4)	18.5	5/0
Eccrinecylindroma	3	(0.2)	37.7	3/0
Trichoepithelioma	4	(0.3)	57.3	2/2
Trichofolliculoma	2	(0.16)	33.5	1/1
Sebaceous adenoma	1	(0.08)	70	1/0
Nevus sebaceous	4	(0.3)	15.3	2/2
Total	**34**			
Epidermal tumors				
Fibroepithelial polyp	57	(5.1)	46	32/25
Seborrheic keratosis	67	(5.9)	47.7	42/25
Dermoid cyst	17	(1.5)	9.6	9/8
Total	**141**			
Dermal tumors				
Dermatomyofibroma	31	(2.8)	32.5	15/16

Table 4 - Details of dermatoses due to bullous disorders, dermatitis and eczema, papulosquamous lesions, urticaria and erythema, connective tissue diseases and disorders of pigmentation.

Variables	n	(%)	Mean age (years)	M/F
Bullous disorders				
Bullous pemphigoid	17	(1.5)	54.7	7/10
Pemphigus vulgaris	10	(0.9)	45.2	3/7
Pemphigus foliaceus	1	(0.1)	32	1/0
Total	**28**			
Dermatitis and eczema				
Atopic dermatitis	53	(4.7)	26	30/23
Seborrhoeic dermatitis	20	(1.8)	41.6	5/15
Nummular dermatitis	17	(1.5)	35	8/9
Lichen simplex chronicus	14	(1.2)	29	3/11
Allergic contact dermatitis	7	(0.6)	34	4/3
Prurigonodularis	3	(0.2)	42	0/3
Total	**104**			
Papulosquamous lesions				
Psoriasis	57	(5.1)	36	24/33
Pityriasislichenoides et varioliformisacuta	1	(0.1)	12	1/0
Pityriasislichenoideschronica	5	(0.4)	38.6	4/1
Pityriasisrosea	12	(1.1)	29	8/4
Pityriasisrubrapilaris	8	(0.7)	44	7/1
Lichen planus	41	(3.7)	41.2	20/21
Lichen nitidus	2	(0.2)	22	1/1
Lichen striatus	2	(0.2)	21	1/1
Total	**128**			
Urticaria and erythema				
Urticaria	11	(1.0)	36.2	4/7
Erythema multiforme	4	(0.3)	45.3	3/1
Erythema annularecentrifugum	4	(0.1)	32	1/3
Total	**19**			
Connective tissue diseases				
Discoid lupus erythematosus	25	(2.2)	43.6	10/15
Morphea	6	(0.5)	15	3/3
Dermatomyositis	1	(0.1)	23.4	0/1
Total	**32**			
Disorders of pigmentation				
Melanocytic nevus	133	(11.8)	32.6	45/88
Melasma	1	(0.1)	25	0/1
Total	**134**			

Table 5 - Details of numbers, percentages, mean age and gender ratios of infections of the skin and subcutaneous tissue.

Infections of skin and subcutaneous tissue	n (%)	Mean age (years)	M/F
Bacterial			
Lupus vulgaris	2 (0.2)	14.5	2/0
Folliculitis	2 (0.2)	19.5	2/0
Leprosy	1 (0.1)	20	1/0
Impetigo	1 (0.1)	23	1/0
Erysipelas	1 (0.1)	54	1/0
Viral			
Warts (including condyloma)	45 (4.1)	33.9	24/21
Molluscumcontagiosum	4 (0.3)	20	2/2
Fungal			
Tineacorporis	1 (0.1)	27	0/1
Parasitic			
Leishmaniasis	11 (1.0)	45	7/4

Table 6 - Details of numbers, percentages, mean age and gender ratios of miscellaneous disorders of the skin and subcutaneous tissue.

Miscellaneous disorders	n	(%)	Mean age (years)	M/F
Leukocytoclastic vasculitis	19	(1.7)	37.5	9/10
Keloid scar	14	(1.2)	26.7	3/11
Pyogenic granuloma	10	(0.8)	35.6	5/5
Drug eruption	7	(0.6)	32	3/4
Sweet's Syndrome	4	(0.3)	41	1/3
Stasis dermatitis	3	(0.2)	43.5	1/2
Lichen sclerosus et atrophicus	2	(0.2)	18	0/2
Alopecia	1	(0.1)	26	0/1
Miliaria	1	(0.1)	49.3	0/1
Darier's disease	1	(0.1)	51	1/0

the available studies in the national and international literature.

In this study, a total of 1,125 patients were diagnosed with various benign skin diseases. Of these, 579 (51.5%) of the patients were males, 546 (48.5%) of the patients were females, and the male to female ratio was 1.1:1. This finding indicates a slight preponderance of males when compared to females in our sample of benign skin disease patients. This gender distribution corresponds to those of previous studies conducted in Saudi Arabia by Al Shobaili[5] (58.5% in males and 41.5% in females), Hofny et al[12] from Egypt (58.9% in malesand 41.1% in females) and from India by Celine et al,[1] Singh et al[13] and Rao et al[14] (58.8% in males and 41.12% in females, 60.8% in males, 39.2% in females and 63.41% in males and 36.59% in females respectively). Contrary to our observation of male preponderance, there are many previous data from Saudi Arabia by Alghanmi et al[7] from King Abdulaziz University Hospital, Jeddah, Al-Zoman and Al-Asmari[15] from Riyadh Military Hospital, and Alshammrie et al[16] from King Khalid Hospital, Hail reported a female preponderance. Studies from other parts of the world also reported higher skin disease incidences in females. For example, Symvoulakis et al[17] from a Mediterranean island, El-Khateeb et al[18] from Egypt, Bilgili et al[19] from Turkey, and Sevensson et al[20] from Europe all reported higher female skin disease rates. They claimed that the female predominance was mainly attributed to the higher awareness of women with regard to skin problems for the obvious cosmetic reasons, as well as a greater sensitivity that women have in general regarding health-related issues.

In our study, the maximum number of cases (n=639, 57%) was seen in the 20 to 49-year-old age group, with a mean age of 36.9 years old. Similar observations were made by Symvoulakis et al[16] from a Mediterranean

Table 7 - Comparison of our findings with the previous published literature from various national and international published data.

Study	Place	Type of study	Male (%)	Female (%)	Most common age	Most common benign skin diseases (%)
Heartshorne[26] (2003)	Johannesburg, South Africa	Hospital Based	42.1	57.9	28 - 96	Eczema and dermatitis (31.2)
Al-Zoman et al[15] (2008)	Riyadh, Saudi Arabia	Hospital Based	41.6	58.4	41 - 50	Eczema and dermatitis (21.2)
Al Shobaili[5] (2010)	Qassim, Saudi Arabia	Hospital Based	58.5	41.5	5 - 34	Eczema and dermatitis (19.59)
Gutierrez et al[27] (2010)	Peru	Hospital Based	52.9	47.1	0 - 15	Infection of skin and subcutaneous tissue (31.5)
Furue et al[28] (2011)	Japan	Hospital Based	46.1	53.9	16 - 60	Eczema and dermatitis (>1/3rd)
Bilgili et al[19] (2013)	Eskiseher, Turkey	Hospital Based	44.3	55.7	20 - 29	Eczema and dermatitis (21.8)
Alghanmi et al[7] (2013)	Jeddah, Saudi Arabia	Pathology Based	F>M	F>M	>46	Vesiculobullous disorders (22.2)
Celine et al[1] (2014)	Kerala, India	Hospital Based	58.9	41.1	0 - 15	Infection of skin and subcutaneous tissue (63.2)
Hofny et al[12] (2015)	Assiut, Egypt	Hospital Based	54.0	46.0	18 - 39	Infection of skin and subcutaneous tissue (38)
Singh et al[13] (2016)	Assam, India	Pathology Based	60.8	39.2	>50	Infection of skin and subcutaneous tissue (28.57)
Okoh et al[29] (2018)	Ebonyi, Nigeria	Hospital Based	58.7	41.3	16 - 30	Infection of skin and subcutaneous tissue (30.8)
Sevensson et al[20] (2018)	Europe	Population Based	53.9	46.1	18 - 50	Viral Warts (41.3)
Bezbaruah et al[2] (2018)	Assam, India	Pathology Based	48.7	51.3	21 - 50	Benign Skin and adnexal tumors (61.06)
Present study (2019)	Madinah, Saudi Arabia	Pathology Based	51.5	48.5	20 - 49	Disorders of skin appendages (29.6)

island, Hofny et al[11] from Egypt, Narang et al[20] from India, Alshobaili et al[5] from Saudi Arabia, and Bilgili et al[18] from Turkey, who reported the maximum number of cases in adult patients (21-40 years old, 18-39 years old, 21-30 years old, 15-34 years old, and 20-29 years old, respectively). In the present study, the rate of skin diseases in children was 4.6%; however, Celine et al[1] from India and Memon et al[22] from Pakistan have documented the maximum number of cases in populations that were less than 15 years old. In the present study, only 5.2% of the cases were in the elderly age group; however, Alghnami et al[7] from Saudi Arabia and Singh et al[13] from India reported the maximum number of cases in elderly patients.

In this study, we encountered a large variety of benign skin diseases, and for ease of discussion, we classified them based on internationally recognized criteria, grouping them into 10 categories according to the ICD-10. The most frequently occurring benign skin diseases in our study were skin appendage disorders (29.6%), benign skin and adnexal tumors (18.3%), pigmentation disorders (11.9%), papulosquamous lesions (11.4%), and dermatitis/eczema (10%). Skin infections and nonspecific disorders of the skin (6.1%) and subcutaneous tissue occurred less frequently (5.5%), while connective tissue disorders affecting the skin (2.8%), bullous disorders (2.5%), and urticaria and erythema (1.6%) were the least frequently encountered diseases. We compared our findings with those of previous studies of a similar nature from other regions in Saudi Arabia and other parts of the world. As mentioned earlier, little histopathologically-based data is available on benign skin diseases; therefore, our comparison included both clinical and pathologically-based studies.

In our study, skin appendage disorders were the most commonly encountered diseases, and this group included epidermal inclusion cysts and trichilemmal cysts. Our results were similar to the results of studies conducted in Turkey[19] and Iran.[23] Benign skin and adnexal tumors were the next frequently encountered skin diseases in our study. According to a recent study conducted in India by Bezbaruah et al,[2] benign skin and adnexal tumors were the most common lesions encountered in their cohort, at a rate of 61.1%. The melanocytic lesions were seen in 11.9% of the cases,

and these consisted mainly of benign melanocytic nevi. Alghanmi et al[7] from western Saudi Arabia observed benign melanocytic neoplasms in 19% of the cases, which was higher than our observed rate of 11.9%. The papulosquamous lesions were the fourth most commonly occurring lesions in our study, and this included psoriasis,pityriasis lichenoides et varioliformis acuta, and pityriasis rosea. Biligili et al[19] from Turkey also observed these lesions as the fourth most commonly seen lesions in 9.2% of the cases; psoriasis was the most common diagnosis, followed by lichen planus, and pityriasis rosea. Gulia et al[24] from India and Ogun et al[25] from Nigeria reported papulosquamous lesions as some of the most common benign skin lesions in their study. In this study, eczema and dermatitis were the fifth most commonly seen benign skin diseases, making up 10% of the total cases. Contrary to our observation, eczema and dermatitis were the most frequently encountered benign skin diseases in previous studies from the other regions of Saudi Arabia and other nations, this could be attributed to the diagnosis of eczema and dermatitis is mainly done on history and clinical examinations and biopsy is rarely perform for the diagnostic purpose. Histopathological examinations are usually indicated in doubtful cases of eczema and dermatitis.

A detailed comparison of our findings with the previously published literature from Saudi Arabia and other parts of the world is depicted in **Table** 7. The comparison of our observations revealed that most of the benign skin diseases seen in the previous literature were eczema and dermatitis, infections and infestations, and benign skin and adnexal tumors. As highlighted previously, limited histopathologically-based data is available in the recent literature on the benign skin disease pattern, and the majority of the studies that we compared were dermatology clinic-based studies. Therefore, the clinical diagnoses of eczema and dermatitis were the most common benign skin diseases observed in most of the literature. However, it has also been observed that the geographical and racial distributions and environmental and socioeconomic factors of the affected population also affect the skin disease occurrence rates. Thus, eczema and dermatitis were the more prevalent benign skin diseases documented in developed and industrialized countries, whereas infections and infestations were the most frequently encountered diseases from the nations with poorer socioeconomic indices.

Study limitations. This study has a few limitations, First the sample was restricted to one tertiary care government hospital, which might limit the extension of results to the general population and provide a rough estimate of benign skin disease in the Madinah region. Second, the data were obtained from the histopathology department and not from the dermatology clinic, hence the chances of underreporting cannot be ruled out as most of the benign skin diseases are diagnosed and treated based on history and clinical examination, biopsy is done only in doubtful cases. Last, the occupational history, type of residence, exposure to sun and irritants are not included in the patients history.

In conclusion, a variety of benign skin lesions were seen in the present study in a wide age distribution range. The most common skin diseases observed in this study were skin appendage disorders, benign skin and adnexal tumors, pigmentation disorders, and papulosquamous lesions. Various regional factors, including the geographic distribution, genetic influence, socioeconomic status, cultural differences, and personal hygiene, affect the skin disease prevalence. However, there is a significant lack of histopathologically-based studies on benign skin lesions in the world, and no such studies from the Madinah region of Saudi Arabia were found. Our histopathologically-based retrospective study provides a baseline tool for future population-targeted studies on benign skin diseases. We strongly recommend further histopathology-based studies of the larger cohort at national and international levels.

References

1. Antony J, Celine TM. A study on pattern of diseases of skin and subcutaneous tissue. ***Afr J Med Health Sci*** 2014; 13: 34-38.
2. Bezbaruah Rukmini, Baruah Mausoomi. Histopathological spectrum of skin lesions- a hospital based study. ***Indian Journal of Applied Research*** 2018; 8: 51-52.
3. Shelleh HH, Al-Hatiti HS. Pattern of skin diseases in a hospital in southwestern Saudi Arabia. ***Saudi Med J*** 2004; 25: 507-510.
4. Johnson ML. Defining the Burden of Skin Disease in the United States-A Historical Perspective. ***J Investig Dermatol Symp*** 2004; 9: 108-110.
5. Al Shobaili HA. The pattern of skin diseases in the Qassim region of Saudi Arabia: What the primary care physician should know. ***Ann Saudi Med*** 2010; 30: 448-453.
6. Kar C, Das S, Roy AK. Pattern of skin diseases in a tertiary institution in Kolkata. ***Indian J Dermatol*** 2014; 59: 209-221.
7. Alghanmi NM, Abdullah LS. Pathology of skin diseases. A study from Western Saudi Arabia. ***Saudi Med J*** 2012; 34: 74-79.
8. World Health Organization. International statistical classification of diseases and related health problems, 10th Revision; Fifth Edition. Geneva. [Updated 2016; Accessed 2019 May 2]. Available from: https://icd.who.int/browse10/Content/statichtml/ICD10Volume2_en_2010.pdf
9. Werner B. Skin biopsy with histopathologic analysis. Why? What for? How? Part I. ***An Bras Dermatol*** 2009; 84: 1-3.

10. Werner B. Skin biopsy with histopathologic analysis. Why? What for? How? Part II. ***An Bras Dermatol*** 2009; 84: 1-4.
11. Alghamdi KM, Alshammari SA. Arabic version of Skindex-16: translation and cultural adaptation, with assessment of reliability and validity. ***Int J Dermatol*** 2007; 46: 247-252.
12. Hofny ER, Monaza EM, Gaber HD, Mostafa MA. Trends in the pattern of skin diseases in the last four decades at Assiut University Hospital - Upper Egypt. ***Clinical Dermatology*** 2015; 3: 69-74.
13. Singh S, Debnath A, Datta D, Chakravarty S, Chaubey RN. Histopathological Evaluation of Skin Lesions with Special Reference to Skin Adnexal Tumors in a Tertiary Centre of North-Eastern India-A Three Year Study. ***IOSR Journal of Dental and Medical Sciences*** 2016; 15: 34-39.
14. Rao GS, Kumar SS, Sandhya. Pattern of skin diseases in an Indian village. ***Indian J Med Sci*** 2003; 57: 108-110.
15. Al-Zoman AY, Facharizt, Al-Asmari AK. Pattern of skin diseases at Riyadh Military Hospital. ***Egyptian Dermatology Online Journal*** 2008; 4: 1-10.
16. Al Shammrie F, Al Shammrie A. Pattern of skin disease in Hail region of Saudi Arabia. ***Journal of Dermatology & Dermatologic Surgery*** 2017; 21: 62-65.
17. Symvoulakis EK, Krasagakis K, Komninos ID, Kastrinakis I, Lyronis I, Philalithis A, Tosca AD. Primary care and pattern of skin diseases in a Mediterranean Island. ***BMC Family Practice*** 2006; 7: 1-6.
18. El-Khateeb EA, Imam AA, Sallam MA. Pattern of skin diseases in Cairo, Egypt. ***Int J Dermatol*** 2011; 50: 844-853.
19. Bilgili ME, Yildiz H, Sarici G. Prevalence of skin diseases in a dermatology outpatient clinic in Turkey. A cross-sectional, retrospective study. ***J Dermatol Case Rep*** 2013; 7: 108.
20. Svensson A, Ofenloch RF, Bruze M, Naldi L, Cazzaniga S, Elsner P, et al. Prevalence of skin disease in a population-based sample of adults from five European countries. ***Br J Dermatol*** 2018; 178: 1111-1118.
21. Narang S, Jain R. An evaluation of histopathological findings of skin biopsies in various skin disorders. ***Annals of Pathology and Laboratory Medicine*** 2015; 2: A42-A46.
22. Memon KN, Soomro RA, Ansari MS. Pattern of skin diseases in patients visiting a tertiary care health facility at Hyderabad, Pakistan. ***J Ayub Med Coll Abbottabad*** 2011; 23: 37-39.
23. Baghestani S, Zare S, Mahboobi AA. Skin diseases patterns in Hormozgan, Iran. ***Int J Dermatol*** 2005; 44: 641-645.
24. Gulia SP, Wadhai SA, Lavanya M, Menon R, Chaudhary M, Kumar SP. Histopathological pattern of skin diseases in a teaching hospital Puducherry. ***Int J Recent Trend Sci Technol*** 2014; 11: 45-50.
25. Ogun GO, Okoro OE. The spectrum of non-neoplastic skin lesions in Ibadan, Nigeria: a histopathologic study. ***Pan African Medical Journal*** 2016; 23: 221.
26. Hartshorne ST. Dermatological disorders in Johannesburg, South Africa. ***Clin Exp Dermatol*** 2003; 28: 661-665.
27. Gutierrez EL, Galarza C, Ramos W, Tello M, Jimenez G, Ronceros G, et al. Skin diseases in the Peruvian Amazonia. ***Int J Dermatol*** 2010; 49: 794-800.
28. Furue M, Yamazaki S, Jimbow K, Tsuchida T, Amagai M, Tanaka T, et al. Prevalence of dermatological disorders in Japan: a nationwide, cross-sectional, seasonal, multicenter, hospital-based study. ***J Dermatol*** 2011; 38: 310-320.
29. Okoh NU, Nnaji TO, Okoro AN. Pattern of Skin Diseases in Ebonyi State University Teaching Hospital. ***Epidemol Int J*** 2018: 2: 000106.

Ethical Consent

All manuscripts reporting the results of experimental investigations involving human subjects should include a statement confirming that informed consent was obtained from each subject or subject's guardian, after receiving approval of the experimental protocol by a local human ethics committee, or institutional review board. When reporting experiments on animals, authors should indicate whether the institutional and national guide for the care and use of laboratory animals was followed.