MEDICAL SCIENCE

Incidence of cutaneous warts: A retrospective study in King Abdulaziz University Hospital, Saudi Arabia

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To Cite:
Salaam S, Bakhsh R, Obaid H, Abduljabbar MH, Hariri J. Incidence of cutaneous warts: A retrospective study in King Abdulaziz University Hospital, Saudi Arabia. *Medical Science* 2023; 27: e329ms3093.
doi: https://doi.org/10.54905/disssi/v27i138/e329ms3093

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Peer-Review History
Received: 06 June 2023
Reviewed & Revised: 10/June/2023 to 28/July/2023
Accepted: 01 August 2023
Published: 09 August 2023

Peer-review Method
External peer-review was done through double-blind method.

Medical Science
pISSN 2321–7359; eISSN 2321–7367

ABSTRACT

Human papilloma virus (HPV) causes cutaneous warts, a common and benign skin condition. Despite the extensive research on HPV, few studies have explicitly examined cutaneous warts, especially in Saudi Arabia. This study aimed to evaluate the incidence, demographic and clinical characteristics of patients with cutaneous warts in Jeddah, Saudi Arabia. Data was collected from medical records of patients who attended dermatology clinics at King Abdulaziz University Hospital (KAUH), from 2011 to 2022. It included sociodemographic variables, including age, nationality, and sex, comorbidities, and diagnosis date. Additionally, wart location and treatment methods were collected. 160 patients were diagnosed with various types of warts. Most of which were between 15-29 years of age. The majorities of participants were female, and most were Saudi nationals. In those participants, diabetes was the most common comorbidity and the highest percentage of cases diagnosed with warts was in 2018. The palmer region was the most common location for warts. Warts in the genital area were significantly associated with those between 33 and 44 years of age. The remaining age groups had a significant higher percent of palmar warts.

Keywords: Warts, incidence, cutaneous warts, HPV

1. INTRODUCTION

Human papilloma virus (HPV) infection causes the growth of cutaneous warts, a common, benign, and self-limiting skin condition. Epidermal cell infection leads to cellular perforation, thickening, and warty papules on the skin (Witchey et al., 2018). HPV-associated warts can be classified into four types: Common, plantar, genital, and flat or planar warts, whereas sequencing of viral DNA can be used to distinguish between over 150 HPV strains (Sterling et al., 2014; Doorbar et al., 2015). The outcome of an infection can be either treatment, especially in people whose immune systems are functioning well; latent response; or clinical manifestations, namely, warts (Cardoso and Calonje, 2011; Al-Aboud and Nigam, 2017). However, warts

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generally resolve without treatment, although they may become more resistant to treatment over time (Zachariae et al., 2012).

Although skin diseases are rarely lethal, rare instances of malignant alterations, including verrucous carcinoma, have been documented (Doorbar et al., 2015; Cardoso and Calonje, 2011; Arican et al., 2013). Moreover, considering the psychological aspects of warts is crucial, as some individuals may suffer from psychological anguish and physical effects of warts (Bruggink et al., 2012). Extensive research has been conducted on HPV; however, few studies have explicitly examined the incidence of cutaneous warts, especially in Saudi Arabia. In previous studies evaluating viral infections in dermatology clinic warts, 72.5% of the total visits were performed in Al-Khobar (Al-Thukair et al., 2017), whereas in Al-Baha, viral warts constituted about two-thirds (62.6%) of their attendants (Al-Ghamdi et al., 2020).

According to a study conducted in Madinah and Jeddah among primary school children, the prevalence of warts was 9.04%. This study was conducted to evaluate the demographic and clinical characteristics of patients with cutaneous warts by retrospectively assessing the incidence of cutaneous warts among patients in the dermatology department of King Abdulaziz University Hospital in Jeddah, Saudi Arabia, from 2011 to 2022 (Allayali et al., 2017).

2. MATERIALS AND METHODS

Subjects

This cross-sectional study was conducted at King Abdulaziz University Hospital (KAUH), a tertiary center in Jeddah, Saudi Arabia, from August 2022 to November 2022. All patients who attended the Department of Dermatology at King Abdulaziz University Hospital (KAUH) between 2011 and 2022 were enrolled. This study was approved by the Institutional Review Board (IRB) of the Research Ethics Committee of KAUH (reference no. 149-22). All patients in KAUH have previously agreed to use their medical information for educational purposes.

Data Collection

Data were retrieved from the patient's medical records; collected variables included sociodemographic data, such as age, nationality, sex, comorbidities, and date of diagnosis. Additionally, data regarding the warts' location and treatment methods were obtained. All study participants waivered their consent.

Statistical analysis

Data were statistically analyzed using the Statistical Package for Social Sciences (SPSS) program version 26. Qualitative data were expressed as numbers and percentages. Quantitative data were expressed as mean ± standard deviation (SD).

3. RESULTS

A total of 381 patients participated in our study, of whom 160 (41.9%) were diagnosed with warts of various types. Participants who reported having warts were most commonly between the ages of 15 and 29 years (33.1%), while the remaining age groups ≤14, 30–44, and >45 years accounted for 13.8%, 23.1%, and 30%, respectively. Moreover, 113 (70.6%) were of Saudi nationality and females represented 84 (57.5%) of the participants. Furthermore, nearly half of the participants had coexisting comorbidity (48.1%), with diabetes mellitus being the most commonly reported comorbidity among patients with warts (21 (13.1%)) (Table 1).

Table 1 Distribution of studied patients according to comorbidity (no. 160)

Variable	No. (%)
Comorbidities	
Yes	77 (48.1)
No	83 (51.9)
DM	21 (13.1)
Immunodeficiency disorders	4 (2.5)
Organ transplant	3 (1.9)
Other	65 (40.6)
If others, specify	
Neurotological disorders	3 (1.9)
Respiratory disorders	4 (5.6)

Allergy	1 (0.6)
CVS disorders	14 (8.8)
Dyslipidemia	2 (1.3)
Other endocrine disorders	17 (10.6)
Hematological disorders	9 (5.6)
Renal disorders	1 (0.6)
Other Autoimmune disease	11 (6.9)
MSK disorders	1 (0.6)
Cancer	8 (5)
Other skin disorders	12 (7.5)

DM: Diabetes mellitus; CVS: Cardiovascular; MSK: Musculoskeletal

The highest percentage of diagnosed wart cases was found in 2018 (50 cases, 31.3%), followed by 2019 (27 cases, 16.9%), whereas the lowest was in 2015 and 2022, with 2 (1.3%) and 5 (3.1%) cases, respectively. The relationship between the year of diagnosis and patient demographics, comorbidity, and wart location is in (Table 2).

Table 2 Relationship between year of diagnosis and patient demographics, comorbidities, and wart location (no. 160)

Variable	Year								p-value
	2015	2016	2017	2018	2019	2020	2021	2022	
Age (years)									
≤14	0 (0.0)	0 (0.0)	6 (17.6)	5 (10)	8 (29.6)	1 (7.70)	1 (5.9)	1 (20)	
15-29	1 (50)	5 (41.7)	13 (38.2)	10 (20)	11 (40.7)	7 (53.8)	5 (29.4)	1 (20)	0.096
30-44	1 (50)	2 (16.7)	4 (11.8)	15 (30)	7 (25.9)	2 (15.4)	4 (23.5)	2 (40)	
>45	0 (0.0)	5 (41.7)	11 (32.4)	20 (40)	1 (3.7)	3 (23.1)	7 (41.2)	1 (20)	
(Mean ± SD)	30 ± 15.55	40.42 ± 19.71	34.12 ± 20.06	39.08 ± 17.05	23.15 ± 12.88	32.54 ± 15.49	41.95 ± 17.17	33 ± 22	0.011*
Gender									
Female	2 (100)	6 (50)	19 (55.9)	23 (46)	10 (37)	8 (61.5)	12 (70.6)	4 (80)	
Male	0 (0.0)	6 (50)	15 (44.1)	27 (54)	17 (63)	5 (38.5)	5 (29.4)	1 (20)	0.212**
Comorbidities									
Yes	0 (0.0)	8 (66.7)	10 (29.4)	24 (48)	17 (63)	7 (53.8)	9 (52.9)	2 (40)	
No	2 (100)	4 (33.3)	24 (70.6)	26 (52)	10 (37)	6 (46.2)	8 (47.1)	3 (60)	0.134
If yes, specify									
DM	0 (0.0)	4 (33.3)	3 (8.8)	8 (16)	2 (7.4)	1 (7.7)	3 (17.6)	0 (0.0)	0.361**
Immunodeficiency disorders	0 (0.0)	0 (0.0)	3 (8.8)	0 (0.0)	0 (0.0)	1 (7.7)	0 (0.0)	0 (0.0)	0.194**
Organ transplant	0 (0.0)	1 (8.3)	2 (5.9)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0.345**
Other	2 (100)	5 (41.7)	16 (47.1)	26 (52)	9 (33.3)	1 (7.7)	4 (23.5)	2 (40)	0.04**
If others, specify									
MSK disorders	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25)	0 (0.0)	0.019**
Other skin disorders	0 (0.0)	1 (16.7)	0 (0.0)	5 (20)	5 (55.6)	1 (33.3)	0 (0.0)	0 (0.0)	0.029**
Location									
Facial	0 (0.0)	1 (8.3)	0 (0.0)	2 (4)	3 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	
Genital	0 (0.0)	0 (0.0)	0 (0.0)	6 (12)	4 (14.8)	1 (5.9)	1 (5.9)	1 (20)	0.005
Other	0 (0.0)	0 (0.0)	1 (2.9)	6 (12)	4 (14.8)	1 (5.9)	1 (5.9)	0 (0.0)	
Palmar	1 (50)	2 (16.7)	6 (17.6)	5 (10)	5 (18.5)	7 (41.2)	7 (41.2)	0 (0.0)	
Palmar - Facial	0 (0.0)	1 (8.3)	1 (2.9)	0 (0.0)	1 (3.7)	1 (5.9)	1 (5.9)	0 (0.0)	
Palmar - Plantar	1 (50)	1 (8.3)	0 (0.0)	1 (2)	5 (18.5)	2 (11.8)	2 (11.8)	1 (20)	

Plantar	0 (0.0)	2 (16.7)	7 (20.6)	4 (8)	4 (14.8)	5 (29.4)	5 (29.4)	1 (20)	

N.B.: * = Kruskal–Wallis test ** = $\chi 2$ test

DM: Diabetes mellitus; CVS: Cardiovascular; MSK: Musculoskeletal

Approximately 29.4% of the warts were palmar warts, 18.8% were single, and the remaining 10.6% had mixed locations. Furthermore, there were 15.6% cases of planter warts and 8.8% of genital warts. Patients aged ≤14, 15–29, or >45 years had a significantly higher percentage of palmar warts, whereas patients aged 30–44 years had a higher percentage of genital warts ($p<0.05$). While wart location was not significantly correlated with sex, palmar warts were more common among female participants (22.6%) than among male participants, who had more plantar warts (17.1). Cryotherapy (50.6%) and cautery (14.4%) were the most common methods of therapy for the treatment of warts (Figure 1).

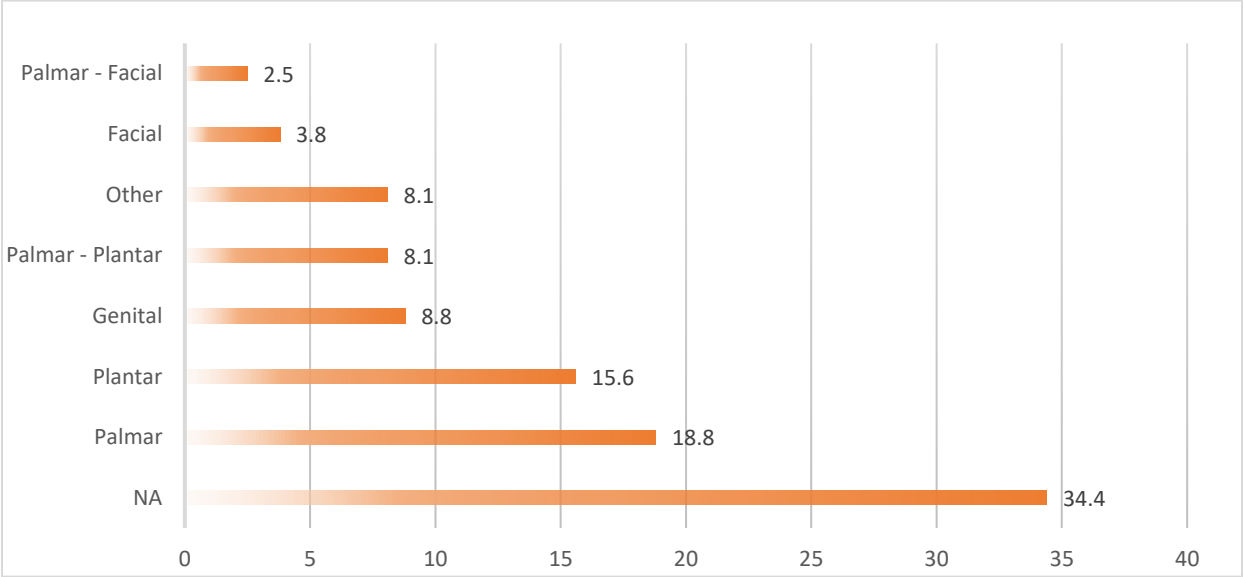

Figure 1 Percentage distribution of patients according to wart location (n=160)

4. DISCUSSION

This study aimed to measure the incidence of cutaneous warts in a dermatology clinic in Saudi Arabia where 160 out of 381 patients were diagnosed with warts. In our study cohort, the incidence of warts was 41.9%. In contrast, Witchey et al., (2018) study in Sweden reported a 14% annual incidence of plantar warts. Moreover, 52% of participants in Zachariae et al., (2012) study conducted in Copenhagen reported having warts. It was found that the most frequent age group for wart presentation was 15–29 years, which is similar to the findings of Beliaeva, (1990), who found that those between the ages of 20 and 29 years had a higher incidence than others. Moreover, other studies have stated that the prevalence of warts was highest in children and young adults (Sudhakar et al., 2013; Beliaeva, 1990).

In our study, 57.5% of the patients were females. The results indicated that the most common wart type among female participants was palmar warts 19 (22.6%), whereas 13 (17.1%) males reported developing plantar warts more than other types. Contrary to our study, Witchey et al., (2018) demonstrated that females are generally more susceptible to developing plantar warts than males. However, the prevalence rates according to sex may change with age. Females experienced a higher prevalence at age 13 years and males at 14.5 years. Plantar warts were more frequent in females during childhood, whereas they were more frequent among males in adulthood (Witchey et al., 2018).

Diabetes mellitus was the most commonly reported comorbidity among patients with warts in our sample 21 (13.1%). Other studies have reported similar results, which may further validate the correlation between diabetes mellitus and warts. In a study by Reinholdt et al., (2022), genital warts were found to be more prevalent in patients with type 1 diabetes than in those without the disease in all sexes and age groups. Furthermore, another study conducted by Shannoon, (2022) concluded that there is a positive correlation between DM type 2 and the development of plantar warts. DM, which compromises the immune system of the human body, can increase susceptibility to HPV infection and, thus the increase in warts (Shannoon, 2022).

Moreover, only 1.9% of the patients had undergone organ transplantation. These results differ from those of a study by Krüger-Corcoran et al., (2010), who reported that organ transplant patients who underwent transplantation at an older age and were

administered immunosuppressive drugs were more prone to develop warts. Regarding location, palmar warts were the most common among the majority of age groups (29.4%); these results seem to be consistent with those observed in earlier studies (Al-Ghamdi et al., 2020; Jablonska et al., 1997; Androphy and Lowy, 2008). Several studies support our findings in children and young adults, with warts mostly located on the hands (Allayali et al., 2017; Essa et al., 2019; Al-Mutairi and Al-Khalaf, 2012).

Surprisingly, genital warts were found to be significantly related to those between the ages of 33 and 44 years, as they were most frequent in this age group. Similarly, a study in Saudi Arabia has stated that in nearly 50% of genital warts cases, the patients were under 40 years old, with a significant decline in those over 50 years, almost half of whom had experienced sexual intercourse by the age of 20 years. Another study has found the maximum burden of the disease to be in patients in the 25–35-year age group, most of whom were sexually active (Chhachhi et al., 2016). Therefore, it is possible to assume that the difference in presentation could be due to the increase in sexual activity among those under the age of 40, making them more susceptible to genital warts compared to other age groups.

Limitations

The limitations of our study include its cross-sectional nature, which made it difficult to describe the course of the infection. It is further critical to note this study's lack of genotype identification. Further research should be undertaken to investigate the prevalence of specific HPV genotypes encountered in dermatology clinics. Finally, this study was limited by insufficient data on patients outside of King Abdulaziz University Hospital; therefore, future multicenter studies on the prevalence of non-genital warts are recommended.

5. CONCLUSIONS

Overall, the prevalence of warts was 41.9% in the sample, with warts presenting most commonly in patients aged 15–29 years, with the majority being females and of Saudi nationality. Furthermore, 48.1% of the sample had coexisting comorbidities, with DM being the most commonly reported comorbidity. The hand was the most affected site with a single lesion and was associated more with females, whereas male participants had more plantar warts. A significant association was found between those between 33-44 years of age and warts in the genital area. Palmar warts were significantly associated with the remaining age groups. Finally, cryotherapy was the most frequent treatment method.

Author's declaration

This manuscript has not been published or presented elsewhere in part or in entirety and is not under consideration by another journal. All study participants waivered their consent, and the study design was approved by the appropriate ethics review board. We have read and understood your journal's policies and believe that neither the manuscript nor the study violates any of these. There are no conflicts of interest to declare.

Informed consent

Written & Oral informed consent was obtained from all participants in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Acknowledgement

We thank all participants, including Dr. Rahaf Almuhanna and Dr. Bushra Almusally, who were all contributed samples to the study.

Author contributions

We certify, as authors, that we have participated sufficiently in the data collection, intellectual content, conception and design of this work, as well as the writing of the manuscript, to take public responsibility for it and have agreed to have our name listed as a contributor. All persons who have contributed substantially to the work reported in the manuscript.

Ethical approval

The study was approved by the Institutional Review Board (IRB) of the Research Ethics Committee of KAUH (reference no. 149-22) on 17/03/2022.

Funding

This study has not received any external funding.

Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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