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Profile of Patients with Viral Infection at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, in 2016-2018

Melati Adinda Putri[1], Linda Astari[2*], Bramantono Bramantono[3], Sylvia Anggraeni[2]

[1]Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.
[2]The Indonesian Society of Dermatology and Venerology, Surabaya, Indonesia.
[3]The Indonesian Society of Internal Medicine, Surabaya, Indonesia.

* Correspondence: linda-a@fk.unair.ac.id

ABSTRACT

Introduction: The high incidence of viral skin infections in Indonesia, combined with a lack of understanding of risk factors and prevention measures, poses a significant problem. Few studies have examined the epidemiological profile of viral skin infections in Indonesia. This study aimed to evaluate the profile of patients with viral infections at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, from 2016 to 2018.

Methods: This was a descriptive, retrospective study based on the medical records of 560 patients collected between January 2016 and December 2018 (n=560). All data calculations were performed using the International Business Machines Corporation (IBM) Statistical Package for Social Sciences (SPSS) version 26.

Results: The prevalence of the five viral infections was 71.8% among all patients with viral infections. The most common diagnosis was shingles (47.5%), the most affected age group was late teens (17-25 years old) (21.3%), the most common gender was female (52,9%), the most frequent clinical manifestation was vesicles (52.1%), and the most commonly used therapy type was topical (73.4%).

Conclusion: The number of patients with viral infections at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, has increased annually, requiring more comprehensive management to reduce morbidity and mortality.

Highlights:

1. The most common viral skin infections at the Dermatology and Venerology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, in 2016-2018 were shingles, verruca vulgaris, varicella, molluscum contagiosum, and measles.
2. Viral skin infections predominantly affected late teens (17-25 years old), females, and each disease presented different clinical manifestations and treatments.

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Introduction

The first and most significant line of defense for humans against the external environment is the skin, which also serves as an active immune organ.[1] Viral infection occurs when a virus penetrates the host's body through lysis and lysogenic cycles, ultimately leading to the onset of symptoms of illness. Viral skin infections are often ignored, despite their potential to cause disabilities and their ranking as the fourth leading cause of non-fatal disease cases in the world. This condition underscores the need for more rigorous attention and data-driven strategies in dermatology. A study conducted at Panti Siwi Primary Clinic, Jember, found that viral skin infections were the most common type of infection, followed by bacterial, parasitic, and fungal infections.[2] This supports global epidemiological data that highlight the burden of skin-related viral illness in both clinical and public health settings. The most common viral skin infections are verruca vulgaris, molluscum contagiosum, varicella, shingles, and measles.[3]

Verruca vulgaris is distributed worldwide, with a prevalence of 3-33%.[4] On the other hand, the prevalence of molluscum contagiosum accounts for up to 62% of viral skin diseases in the United States (US).[5] Varicella has also reached 3 million cases per year in the US.[6] Meanwhile, from 2011 to 2013, the Indonesian Herpes Study Group recorded 2,232 cases of shingles in 13 hospitals across Indonesia.[7] Indonesia experienced a measles outbreak in 2019.[8] Measles cases in Indonesia increased from 27 provinces to 30 provinces between 2015 and 2017. The previously mentioned data provide an overview of the prevalence of viral skin infections, both nationally and globally. The risk of viral infection increases in immunocompromised populations, such as patients with human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), diabetes, cancer, autoimmune diseases, cardiovascular diseases, respiratory diseases, kidney diseases, liver diseases, and blood disorders that people around the world widely suffer.[9] Treatment costs are also high due to the loss of skin integrity and the complex systemic effects caused by viral skin infections.[10]

Some people lack understanding of the risk factors, transmission, and prevention of viral infections due to a lack of references. Therefore, this study aimed to evaluate the profile of patients with viral infections in the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, from 2016 to 2018, in terms of prevalence, age, gender, clinical manifestations, and therapy, to reduce morbidity and mortality rates. This study is expected to contribute to the scientific literature on skin virus infections, serving as a reference for the public and informing further research.[11]

Methods

This study was conducted in the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, from November 2022 to May 2023. This study was approved by the Ethics Committee of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia (No.1086/LOE/301.4.2/X/2022). All data calculations were performed using the International Business Machines Corporation (IBM) Statistical Package for Social Sciences (SPSS) version 26.[12] This descriptive, retrospective study was based on 560 secondary data from medical records of patients with viral infections in the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, from 2016 to 2018. The data were collected through consecutive sampling based on the inclusion criteria.[13] Retrospective descriptive research is a type of study that aims to describe a situation by analyzing past data.[14]

Results

The sample of this study consists of 560 patients (71.8%) of all patients with viral infections in the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. These patients include 162 visits (28.9%) from 2016, 193 visits (34.5%) from 2017, and 205 visits (36.6%) from 2018. As shown in Table 1, the most common diagnosis was shingles, affecting 266 patients (47.5%). On the other hand, the least common diagnosis was measles, with only two patients (0.4%).

Table 1. Prevalence of viral infections

Diagnosis	Year			n (%)
	2016 (%)	2017 (%)	2018 (%)	
Verruca vulgaris	45 (27.8)	39 (20.2)	50 (24.4)	134 (23.9)
Molluscum contagiosum	13 (8.0)	22 (11.4)	16 (7.8)	51 (9.1)
Varicella	26 (16.0)	34 (17.6)	47 (22.9)	107 (19.1)
Shingles	77 (47.5)	97 (50.3)	92 (44.9)	266 (47.5)
Measles	1 (0.6)	1 (0.5)	0	2 (0.4)
n (%)	162 (28.9)	193 (34.5)	205 (36.6)	560 (100)

Source: Research data, processed

Shingles is caused by the reactivation of the varicella-zoster virus that is dormant within the cranial nerves or dorsal root ganglia.[15] On the other hand, the measles virus can be transmitted between humans through droplets and has an incubation period of 10 to 14 days.[8]

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Table 2. Distribution of viral infection patients by age

Diagnosis	Age Group (Years Old)											n (%)
	Toddler (0-5) (%)	Children (6-11) (%)	Early Teens (12-16) (%)	Late Teens (17-25) (%)	Early Adult (26-35) (%)	Late Adult (36-44) (%)	Middle Age (45-54) (%)	Elderly (55-65) (%)	Young Elderly (66-74) (%)	Old Elderly (75-90) (%)	Very Old Elderly (>90) (%)	
Verruca vulgaris	3 (2.2)	12 (9.0)	16 (11.9)	39 (29.1)	27 (20.1)	15 (11.2)	9 (6.7)	8 (6.0)	3 (2.2)	2 (1.5)	0	134 (100)
Molluscum contagiosum	15 (29.4)	15 (29.4)	0	11 (21.6)	3 (5.9)	1 (2.0)	6 (11.8)	0	0	0	0	51 (100)
Varicella	21 (19.6)	10 (9.3)	8 (7.5)	35 (32.7)	13 (12.1)	8 (7.5)	10 (9.3)	1 (0.9)	1 (0.9)	0	0	107 (100)
Shingles	1 (0.4)	8 (3.0)	7 (2.6)	33 (12.4)	30 (11.3)	30 (11.3)	42 (15.8)	73 (27.4)	28 (10.5)	13 (4.9)	1 (0.4)	266 (100)
Measles	0	0	0	1 (50.0)	1 (50.0)	0	0	0	0	0	0	2 (100)
n (%)	40 (7.1)	45 (8.0)	31 (5.5)	119 (21.3)	74 (13.2)	54 (9.6)	67 (12.0)	82 (14.6)	32 (5.7)	15 (2.7)	1 (0.2)	560 (100)

Source: Research data, processed

The most represented age group was late teens (17-25 years old), comprising 119 patients (21.3%), whilst the least represented age group was the very old elderly (>90 years old), with only one patient (0.2%), recorded in one case of shingles (Table 2). Table 3 presents the distribution of patients with viral infections by gender. Females comprised the majority of patients, with 296 (52.9%), while males accounted for 264 (47.1%).

Table 3. Distribution of viral infection patients by gender

Diagnosis	Gender		n (%)
	Female (%)	Male (%)	
Verruca vulgaris	61 (45.5)	73 (54.5)	134 (100)
Molluscum contagiosum	26 (51.0)	25 (49.0)	51 (100)
Varicella	67 (62.6)	40 (37.4)	107 (100)
Shingles	141 (53.0)	125 (47.0)	266 (100)
Measles	1 (50.0)	1 (50.0)	2 (100)
n (%)	296 (52.9)	264 (47.1)	560 (100)

Source: Research data, processed

Table 4 shows that the most common clinical manifestation in this study was vesicles, occurring in 292 cases (52.1%), and the least common manifestation was plaques, observed in only three patients (0.5%). The majority of patients received topical therapy, with 411 patients (73.4%).

Table 4. Distribution of viral infection patients based on clinical manifestation

Diagnosis	Clinical Manifestation									
	Macular Erythematous (%)	Papule (%)	Nodule (%)	Plaque (%)	Vesicle (%)	Bulla (%)	Pustule (%)	Scuama (%)	Crust (%)	Erosion (%)
Verruca vulgaris (n=134)	12 (9.0)	113 (84.3)	20 (14.9)	2 (1.5)	0	0	0	2 (1.5)	1 (0.7)	2 (1.5)
Molluscum contagiosum (n=51)	2 (3.9)	50 (98.0)	0	0	1 (2.0)	0	0	2 (3.9)	0	0
Varicella (n=107)	51 (47.7)	12 (11.2)	0	0	87 (81.3)	1 (0.9)	24 (22.4)	1 (0.9)	37 (34.6)	31 (29.0)
Shingles (n=266)	195 (73.3)	18 (6.8)	0	1 (0.4)	204 (76.7)	18 (6.8)	36 (13.5)	7 (2.6)	63 (23.7)	43 (16.2)
Measles (n=2)	2 (100)	0	0	0	0	0	0	0	0	0
n (%) (n=560)	262 (46.8)	193 (34.5)	20 (3.6)	3 (0.5)	292 (52.1)	19 (3.4)	60 (10.7)	12 (2.1)	101 (18.0)	76 (13.6)

Note: One patient could have more than one clinical manifestation
Source: Research data, processed

These topical therapies included salicylic powder (2%), antibiotics, antivirals, and antibiotic-antiviral combinations. However, 15 patients (2.7%) had no data on the treatment they received (Table 5).

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Table 5. Distribution of viral infection patients based on clinical manifestation

Diagnosis	Therapy										
	Topical			Systemic			Physical			Symptomatic	No Data
	Salicylic Powder (2%) (%)	Antibiotic (%)	Combination (%)	Antiviral (%)	Antibiotic (%)	Combination (%)	Excision (%)	Cautery (%)	Exfoliation (%)		
Verruca vulgaris (n=134)	0	92 (68.7)	0	0	19 (14.2)	0	55 (41.0)	49 (36.6)	2 (1.5)	29 (21.6)	7 (5.2)
Molluscum contagiosum (n=51)	0	38 (74.5)	0	0	5 (9.8)	0	6 (11.8)	17 (33.3)	8 (15.7)	7 (13.7)	6 (11.8)
Varicella (n=107)	47 (43.9)	20 (18.7)	17 (15.9)	76 (71.0)	5 (4.7)	12 (11.2)	0	0	0	77 (72.0)	0
Shingles (n=266)	134 (50.4)	30 (11.3)	32 (12.0)	100 (37.6)	43 (16.2)	93 (35.0)	0	0	0	235 (88.3)	2 (0.8)
Measles (n=2)	1 (50.0)	0	0	0	0	0	0	0	0	2 (100)	0
n (%) (n=560)	182 (32.5)	180 (32.1)	49 (8.8)	176 (31.4)	72 (12.9)	105 (18.7)	61 (10.9)	66 (11.8)	10 (1.8)	350 (62.5)	15 (2.7)
	411 (73.4)			353 (63.0)			137 (24.5)				

Note: One patient could get more than one therapy
Source: Research data, processed

Discussion

The five diseases discussed in this study are the five most common diagnoses of viral infections in the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, from 2016 to 2018. The most common diagnosis was shingles, with 266 patients (47.5%). A study conducted at Panti Siwi Primary Clinic, Jember, also reported shingles (31.7%) as the most common diagnosis of viral skin infections from 2018 to 2020.[2] The high number of shingles cases is attributed to the fact that 10-20% of varicella patients can experience reactivation several years later, especially those who are immunocompromised. Reactivation of varicella-zoster virus in the latent phase can occur spontaneously or be induced by stress, fever, radiation therapy, local trauma, or immunosuppressant agents.[16] The shingles vaccine is contraindicated for immunocompromised patients, which may contribute to the increasing incidence of shingles.[17]

The most common age group in this study was late teens (17-25 years old), with 119 patients (21.3%). These results align with a study in Ponorogo, which found that the most viral infections occurred in patients over 12 years old (48.6%).[3] Verruca vulgaris (29.1%) and varicella (32.7%) were most prevalent among individuals in their late teens (17-25 years old). Measles patients consisted of one patient (50%) in the late teens age group (17-25 years old) and one patient (50%) in the adult age group (26-35 years old). The high incidence rate in late teens and early adult age groups is due to increased outdoor activities, which facilitate transmission and the possibility of not receiving vaccines during childhood. Molluscum contagiosum patients were predominantly toddlers (0-5 years old) (29.4%) and children (6-11 years old) (29.4%), likely due to low child immunity, difficulties in adopting clean and healthy living habits, and children's tendency to play outside. Shingles patients were dominated by the elderly (45-65 years old) (36%) because the elderly often have comorbidities, and increasing age causes a decrease in cellular immunity, which is a significant factor in viral reactivation.[18]

The patients in this study with viral infections were predominantly female, comprising 296 patients (52.9%), while the remaining 264 patients (47.1%) were male. A study in Ethiopia also found that females were more prevalent among patients with viral infections.[19] In general, the higher prevalence of viral infections among females is caused by increased contact with children or the elderly who have lower immunity, psychological factors, emotional stress, and females are more concerned about skin complaints, leading them to immediately go to health facilities to seek treatment, which often leads to earlier presentation at healthcare facilities.[18] Another study also explained that women's skin is thinner than men's, making it more susceptible to lesions and easier for viruses to enter.[20]

Several signs and symptoms are associated with viral skin infections in patients. Patients in this study could have one or more clinical manifestations. Most patients in this study exhibited clinical manifestations of vesicles in 292 patients (52.1%). There were 87 patients (81.3%) with varicella and 204 patients (76.7%) with shingles who had a clinical picture of vesicles. According to the reference, the initial lesion in varicella is an erythematous macule, which then turns into papules, vesicles (filled with clear liquid, thin-walled, on an erythematous base), pustules, and dries into crusts.[21] The early symptoms of varicella include prodromal symptoms, such as muscle pain, nausea, decreased appetite, headache, and fever, which typically appear before the rash develops.[6] The characteristic feature of shingles is the presence of unilateral lesions and radicular pain confined to one single dermatome. The most commonly affected dermatome is the thoracic.[22]

Verruca vulgaris is a skin infection primarily caused by human papillomavirus (HPV) type 1, 2, and 4.[23] The most common clinical manifestation of verruca vulgaris is papules (84.3%). According to a previous study, verruca vulgaris lesions typically present as single or multiple verrucous papules, ranging in size from 1 mm to 1 cm.[4] The most common clinical manifestation of molluscum contagiosum was papules in 50 patients (98%). Molluscum contagiosum lesions are round, dome-shaped papules, 1 mm to 1 cm in size, with a delle in the center, according to

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another previous study.[24] It can appear on the extremities or the genital area.[25]

All measles patients (100%) exhibited clinical manifestations of erythematous macules. According to a previous study, the measles lesion is characterized by a pink, well-demarcated maculopapular rash that typically begins behind the ears and extends to the body and extremities.[26] Measles typically starts with a prodromal stage, characterized by symptoms such as fever above 38°C, conjunctivitis, coryza, and cough, which last for approximately 3 days.[27]

Patients in this study could receive one or more types of therapy. The majority of 411 patients (73.4%) in this study received topical therapy, with the most common type used being salicylic powder (2%) (32.5%). Most patients with verruca vulgaris received physical therapy (79.1%), primarily in the form of excision (41%). Another therapy administered was topical antibiotics, such as sodium fusidate ointments, which were used as a treatment after physical therapy, primarily if secondary infections were detected. Some patients also received symptomatic therapy, such as mefenamic acid to reduce pain and systemic oral antibiotics. For example, amoxicillin was used because secondary infections were found.[28]

Although the physical therapy performed is appropriate, it is also important to consider applying topical therapy with trichloroacetic acid (100%), salicylic acid (10-60%), or imiquimod (5%), as recommended by the Clinical Practice Guidelines of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. These guidelines recommend physical therapy for verruca vulgaris, such as excision, cautery, cryotherapy, and carbon dioxide (CO_2) laser. Recommended topical therapies are trichloroacetic acid (100%), salicylic acid (10-60%), and imiquimod.[29]

The most common therapy received by patients with molluscum contagiosum in this study was topical therapy, such as topical antibiotics, used by 38 patients (74.5%), with sodium fusidate ointments being the most common example. Other therapies administered included physical therapy, cautery, symptomatic therapy with cetirizine to reduce itching, and systemic therapy with oral antibiotics. In this case, amoxicillin was used because a secondary infection was present.[28]

Based on the Clinical Practice Guidelines of the Indonesian Society of Dermatology and Venereology (PERDOSKI), the recommended therapy for molluscum contagiosum is physical treatment such as excision, cauterization, and cryotherapy. Topical therapy such as potassium hydroxide (KOH) (10%), podophyllotoxin (0.5%), and imiquimod (5%) can be given after physical therapy. The physical treatment performed is appropriate. However, it is also necessary to consider administering topical therapy with KOH (10%), podophyllotoxin (0.5%), and imiquimod (5%) according to recommendations to achieve optimal results.[28]

The most common therapy administered to varicella patients in this study was systemic therapy, used in 93 patients (86.9%), with oral antivirals being the most common type (71%), such as acyclovir. Other therapies that were given were topical therapies, such as salicylic powder (2%), for vesicular lesions, and topical antibiotics, such as sodium fusidate ointment, for erosive lesions. Some patients also receive symptomatic therapy, such as paracetamol to reduce fever, and cetirizine to relieve itching. Based on the Clinical Practice Guidelines of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, the recommended therapy for varicella is systemic oral antivirals (acyclovir), oral antibiotics (erythromycin and dicloxacillin) if there are secondary infections, topical therapy such as salicylic powder (2%) for vesicular lesions, and sodium fusidate antibiotic ointment for erosive lesions, as well as symptomatic therapy, such as paracetamol, if fever was found.[29]

The most common therapy received by shingles patients in this study was systemic therapy in 236 patients (88.7%), with the most common types of systemic therapy used being oral antivirals (37.6%) such as acyclovir. Acyclovir can reduce the formation of vesicles, crusts, and pain (acute neuritis), as well as complications, if administered within 72 hours after the onset of exanthema.[30] Untreated shingles can cause several complications, such as post-herpetic neuralgia, Ramsay-Hunt syndrome, herpes zoster (HZ) ophthalmicus, HZ oticus, and meningoencephalitis.[31] Other therapies may also be provided, including symptomatic treatment with mefenamic acid, to reduce pain and alleviate itching. Some patients also received topical therapies, such as salicylic powder (2%) for dry lesions, topical antibiotics like sodium fusidate ointments for erosive lesions, or a combination of both. Based on the Clinical Practice Guidelines of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, the recommended therapy for shingles is systemic therapy using oral antivirals (acyclovir) for 7-10 days, oral antibiotics (erythromycin and dicloxacillin) if secondary infection occurs, topical therapy like saline compresses for wet lesions, salicylic powder (2%) for dry lesions, sodium fusidate ointment for erosive lesions, and symptomatic therapy such as paracetamol or non-steroidal anti-inflammatory drugs (NSAIDs) for pain relief.[29]

All patients with measles (100%) in this study received symptomatic therapy. The symptomatic therapies include vitamin A at age-appropriate doses, paracetamol to reduce fever, and loratadine to alleviate itching. A total of one patient (50%) also received topical therapy such as salicylic powder (2%). Based on a previous study, there was no antiviral or specific therapy for measles.[26] Hence, the treatment given was supportive or symptomatic. The recommended therapy was rest, vitamin A at age-appropriate doses, antipyretics, hydration, adequate nutrition, and oral antibiotics if a secondary infection was present.[26] Measles can also be prevented through immunization, which should be started at 9 months of age in countries where incidence and mortality rates are high. However, it can be postponed until 12-15 months of age in countries where the disease typically occurs later in life.[32] These findings not only reinforce the importance of following clinical guidelines but also highlight opportunities to explore more personalized and timely antiviral interventions, especially in shingles and varicella cases. Furthermore, the role of early diagnosis and the impact of

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combined therapies on reducing complications could be considered in future studies as a new aspect to improve outcomes.

Strengths and Limitations

This study examines the prevalence, demographic data (including age and gender), clinical manifestations, and treatment of patients with viral skin infections that have not been previously reported by other studies in the exact location or period.

The limitation of this study was the incomplete medical record data, which resulted from some patients not having data on the therapy they received at each visit. In some cases, the patient's clinical manifestations remain unchanged until the final visit, which may result from a lack of therapeutic improvement or errors in the medical record documentation.

Conclusion

Patients with viral infections at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, have increased annually and require more comprehensive management.

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Conflict of Interest

The authors declared there is no conflict of interest.

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Ethical Clearance

This study had received ethical clearance from the Ethics Committee at Dr. Soetomo General Academic Hospital Surabaya (No.1086/ LOE/301.4.2/X/2022) on 13-10-2022.

Authors' Contributions

Designed the study and drafted the manuscript: MAP. Collected data and performed background literature review: MAP. Performed statistical analysis: MAP. Supervised results and discussion: MAP, LA, BB, and SA. All authors reviewed and approved the final version of the manuscript.

Data Availability

Available.

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