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Title

A cross-sectional study of dermatological conditions in rural and urban Timor-Leste

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ABSTRACT

Background

There is limited information about the type of skin disease in Timor-Leste. Surveys can assist in estimating the magnitude and burden of disease, which can inform both population-based health policy and resource allocation. In order to determine the type and magnitude of skin disease in Timor-Leste, we conducted a cross-sectional point prevalence study of 271 patients from rural and urban Timor-Leste. The aim of the study was to estimate the magnitude and burden of dermatological disease.

Methods

Two Australian trained dermatologists conducted clinics in the city of Dili (urban) and village of Manusae (rural) in Timor-Leste between the period of June and July 2016. They independently recorded all patient presentations and diagnoses.

Results

A total of 271 patients were reviewed over two months, of whom 37% were seen in an urban setting and 63% in a rural setting. Scabies accounted for 96% of all presentations in the rural setting, which was significantly higher than its presentation in the urban setting (8%), $P < 0.001$. Scabies also accounted for the majority of presentations in the pediatric population aged 10 years or younger. Fungal and bacterial skin and soft tissue infections were both more common in urban areas ($P < 0.001$).

Conclusions

Scabies infection remains the most prevalent dermatological condition encountered in the Timor-Leste rural population, and has hopefully been addressed by a recent mass drug administration. It is important to raise awareness of the systemic problems which can arise from untreated skin infections.

Introduction

There is limited information about the type of skin disease in Timor-Leste, a resource limited developing country in Southeast Asia. The climate is tropical, and the population experiences poverty, low levels of hygiene, poor infrastructure and inadequate access to healthcare. These are factors that are not only known to exacerbate communicable skin disease, but are implicated as contributing to their prevalence¹. Timor-Leste ranked in the lowest 25% (159/211) of countries by annual GDP in 2016².

Surveys of disease assist in estimating the magnitude and burden of disease, which help to inform population-based health policy and resource allocation. However, to date, there are only five studies that have evaluated dermatological conditions in Timor-Leste.

The most recent, published in 2010, was a comprehensive survey of dermatological conditions in four districts of Timor-Leste. Patients were examined for five conditions (scabies, pyoderma, dermatophyte infection, leprosy and yaws), and high rates of dermatophyte infection, scabies and pyoderma were reported³.

The other published studies are less relevant in informing epidemiology in the region. For example, a 2005 study reported the dermatological conditions affecting Australian peacekeeping forces deployed to Timor-Leste¹, which is less applicable to the local population.

Despite the burden of skin disease, a recent paper outlining health research priorities in Timor-Leste did not specify skin disease as a priority⁴. Yet scabies and pyoderma in other settings has been associated with high rates of morbidity and mortality due to the association with group A streptococcal infection leading to IgA glomerulonephritis and rheumatic heart disease^{5,6} and indeed there is a high prevalence of pyoderma⁷ and rheumatic heart disease in Timor-Leste⁸. Skin disease

in Timor-Leste may be an under-reported public health issue that causes a significant burden of disease, and one that should be brought to the attention of their public health authorities.

In order to determine the type and magnitude of skin disease in Timor-Leste, we conducted a cross-sectional point prevalence study of 271 patients from rural and urban Timor-Leste.

Materials and Methods

Two Australian-trained dermatologists, RS and JR, visited Timor-Leste and practiced in public health clinics in the capital city of Dili and the rural village of Manusae. They independently recorded all cases seen at the clinics between June and July 2016. Patients provided verbal consent for their data to be used in the analysis during the time of examination.

The two dermatologists independently reached a clinical diagnosis, and in cases of diagnostic uncertainty, the two researchers would deliberate until a consensus was reached. If there was further uncertainty, a skin biopsy would be taken.

Age, gender, diagnoses (primary and secondary), date seen, treatment (primary and secondary) and location of clinic (urban versus rural) were recorded. Statistical analysis was performed using SPSS statistical software v24.0¹⁸ to determine if there was a significant difference between the prevalence of dermatological conditions between urban and rural Timor-Leste.

Results

Dermatological presentations based on area

A total of 271 patients were examined, of which 100 (36.9%) were seen in Dili (urban) and 171 (63.1%) in Manusae (rural). The mean age of all patients was 24.3 years, with a range of 0.08 to 90 years. The age distribution was similar across both

urban (mean age 25.5) and rural areas (23.5 years). Males accounted for 39.9% of all cases seen, 41% in urban and 39.2% in rural areas.

Scabies infection was the most commonly diagnosed condition, accounting for 63.5% of all presentations. This was especially prevalent in the rural population and accounted for 95.9% of all patient presentations. Comparatively, the prevalence was much lower in the urban population and accounted for 8% of cases. The lower prevalence of scabies in urban versus rural areas was statistically significant ($P < 0.001$).

Fungal infections were more prominent in the urban community ($P < 0.001$), accounting for a total of 29% of urban presentations. The most prevalent of these were pityriasis versicolor (11%) and tinea corporis (11%). Other fungal infections encountered were deep fungal infections, tinea capitis and tinea cruris. Fungal infections only accounted for 5.9% of patient presentations in the rural clinic, with the most common diagnosis being tinea capitis (2.3%). Other diagnoses included pityriasis versicolor, tinea corporis and tinea faciei.

Bacterial infections of the skin and soft tissue accounted for 15% of presentations in the urban setting and 2.9% in the rural setting. This difference was also statistically significant ($P < 0.001$).

Atopic dermatitis and acne vulgaris were significantly more prevalent in urban areas. Atopic dermatitis accounted for 11% of all urban presentations ($p < 0.001$) and acne vulgaris 6% of urban presentations ($p < 0.002$), Table 1.

Dermatological presentations based on age

The prevalence of scabies was noted to be highest in young children, with 45.9% of all scabies presentations in the 0 to 10 age group. Co-infection was also more prevalent amongst patients in this group. There were 4/79 (5.1%) young children with concurrent fungal infections and 5/79 (6.3%) with concurrent pyoderma. Table 2.

Discussion

Scabies accounted for an extremely high proportion of rural skin presentations, a finding supported by a previous study in Timor-Leste school aged children⁷. It is also a condition that has the greatest burden of disease in children^{3,9}. Scabies typically has a high prevalence in tropical, low income communities such as those in Timor-Leste, Northern Australia, Papua New Guinea, Fiji and Panama¹⁰.

The other prevalent conditions identified in the study were fungal infections. These were the most common presentation in urban areas. Fungal infections have previously been noted to have the highest prevalence across all age groups in Timor-Leste³. Researchers have observed that the higher prevalence of fungal skin infections in urban areas may be correlated with the increased prevalence of domestic animals in these areas¹¹.

Secondary infection of scabies, most commonly seen in children, has been previously reported³. Co-infection may be due to the high recorded prevalence of impetigo in East-Timorese children⁷. Previous studies have shown that the treatment of scabies has also resulted in a decreased prevalence of pyoderma and scabies with superimposed pyoderma¹². This is clinically significant as the eradication of scabies could prevent more serious sequelae of pyoderma and impetigo such as septicaemia¹³, post-streptococcal glomerulonephritis⁵ and rheumatic heart disease⁶.

The use of mass drug administration (MDA), a community-based control of scabies whereby both health and unhealthy individuals are treated, has been successful in several communities with high scabies prevalence^{14,15}. We are pleased to report that ivermectin was given to all healthy adults and children over two years in a MDA in 2019 in Timor Leste. In one study, a single oral dose of ivermectin and topical permethrin was effective, with ivermectin found to be more effective than permethrin in reducing scabies prevalence¹⁵. However another study has shown no difference between the efficacy of topical benzyl benzoate versus ivermectin¹⁶. Benzyl

benzoate is inexpensive, with a buyer median price of around 0.4 USD for 100mL in developing countries¹⁹. However more than one application is needed in severe cases, and it can irritate broken skin. Permethrin is a slightly more expensive alternative, with a median buyer price of 3.55 USD for 100g¹⁹. MDA with Moxidectin is under evaluation¹⁷.

According to the World Health Organization (WHO), scabies is part of a group known as skin neglected tropical diseases (NTDs)²¹. As their name suggests, negligible resources are allocated to treating these diseases, which are more prevalent in developing countries²⁰. In regards to treating skin NTDs, the WHO has outlined several measures 'in order to optimize the use of limited resources', including but not limited to: providing stronger health systems by training more health workers, horizontal health approaches for improved co-ordination of community activities and village-based surveillance, integration of skin NTDs into the primary healthcare system with other public health problems such as TB, HIV/AIDS or diabetes²¹.

There is past evidence to show that the approach to the control and elimination of NTDs should focus on a "comprehensive, multi-faceted, and coordinated community-based programs", as drug therapy may only be a short-term strategy to the eradication of the disease in an endemic community²². Surveillance schemes to monitor progress and maintenance of therapy are also emphasized as an important strategy^{22,23}. The control and eradication of scabies must therefore be tackled through a combined approach by improving the social determinants of health within a community, namely improved education, living and working conditions, water and sanitation, and increased provision of healthcare services. This will have a lasting impact not only in terms of scabies control, but the eradication and control of other NTDs and communicable diseases.

Limitations

This cross-sectional analytical study provided information about dermatological conditions in a rural and an urban setting in Timor-Leste.

The true prevalence of skin conditions may be underestimated within the population in general, as only those who sought treatment at the clinic were included in the

study. However, this study provides a clear baseline for the allocation of resources and provision of education to rural clinics and schools, where the majority of sufferers are located. The clinic was also conducted in the dry season, which may not accurately reflect the total burden of scabies infections in the community, especially as the scabies mite tends to thrive in different conditions.

Conclusion

Skin conditions and their management remain an underreported and neglected area of public health in Timor-Leste⁴. There is currently no policy in place for the management of communicable skin infections, though scabies and impetigo were found to be at epidemic proportions especially among children in this small snapshot taken in 2016. However, with the recent mass drug administration of ivermectin in Timor-Leste, we would anticipate improvement in the scabies situation. Nevertheless, it is always important to highlight the importance of treating skin infections, which can lead to septicaemia¹³, post-streptococcal glomerulonephritis⁵ and rheumatic heart disease⁶ in a resource-limited, developing country.

Conflicts of Interest: None.

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Table 1: Prevalence of dermatological conditions among 271 patients seen in both an urban and rural settings in Timor-Leste between June-July 2016

Characteristic	All patients (%)	Dili/Urban (%)	Manusae/Rural (%)	P-value
Scabies infection	172 (63.5)	8 (8)	164 (95.9)	< 0.001
Fungal infection	39 (14.4)	29 (29)	10 (5.9)	< 0.001
Pityriasis versicolor	12 (4.4)	11 (11)	1 (0.6)	
Subcutaneous	3 (1.1)	3 (3)	-	
Tinea capitis	5 (1.9)	1 (1)	4 (2.3)	
Tinea corporis	14 (5.2)	11 (11)	3 (1.8)	
Tinea cruris	3 (1.1)	3 (3)	-	
Tinea faciei	2 (0.7)	-	2 (1.2)	
Skin and soft tissue infection (bacterial)	20 (7.4)	15 (15)	5 (2.9)	< 0.001
Dermatitis	13 (4.8)	11 (11)	2 (1.2)	< 0.001
Acne vulgaris	6 (2.2)	6 (6)	0	< 0.002
Other*	46 (17)	43 (43)	3 (1.8)	
Total	271 (100)	100 (100)	171 (100)	

*Allergic rhinitis, yaws, melasma, bullous impetigo, keloids, naevi, genital herpes, prurigo, squamous cell carcinoma, basal cell carcinoma, exanthema, greying hair, lichen amyloidosis, palmoplantar keratoderma, subacute cutaneous lupus erythematosus, lipoma

Table 2: Prevalence of scabies and co-existing dermatological infections by age group in two clinics in Timor-Leste between June-July 2016

Age group	Scabies (%)	Scabies and fungal infections	Scabies and pyoderma

0-10	79 (45.9)	4	5
11-20	18 (10.5)		
21-30	20 (11.6)		
31-40	17 (9.9)		
41-50	12 (7.0)	1	
51-60	14 (8.1)		
60+	12 (7.0)		
Total	172	5	5

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