

## Original Research Article

# Awareness of Risk Factors for Skin Infections and its Impact on Quality of Life among Adults in a Malaysian City: A Cross-Sectional Study

Ghaneshwari Ramamuthie<sup>1</sup>, Rohit Kumar Verma<sup>1</sup>, Jamunarani Appalasamy<sup>1\*</sup> and Ankur Barua<sup>2</sup>

<sup>1</sup>Department of Pharmacy Practice School of Pharmacy, <sup>2</sup>Department of Community Medicine, School of Medicine, International Medical University, Bukit Jalil, Kuala Lumpur, Malaysia-57000

\*For correspondence: **Email:** [jhamunaa2@gmail.com](mailto:jhamunaa2@gmail.com)

Received: 13 May 2015

Revised accepted: 10 September 2015

### Abstract

**Purpose:** To explore the level of awareness of risk factors related to skin infection and its impact on quality of life (QoL) in Klang, Malaysia.

**Methods:** A cross-sectional study was conducted among adults in Klang, Malaysia using a validated questionnaire and Dermatology Quality of Life Index (DLQI). A stratified and convenient sampling technique was executed. Multivariate analysis was employed to summarize significant relationships between variables.

**Results:** The prevalence of skin infection was 59 %. A majority (51.9 %) of the participants had experienced or claimed to have bacterial infections of the skin. More than 50 % of them were aware of the risk factors for skin infection. Several significant associations ( $p < 0.05$ ) between variables of awareness of risk factors associated with skin infection and QoL were documented.

**Conclusion:** Awareness of the risk factors contributing to skin infection do play a major role in improving basic understanding of skin infections and quality of life among Malaysians in Klang.

**Keywords:** Skin infection, Awareness, Risk factors, Quality of Life

Tropical Journal of Pharmaceutical Research is indexed by Science Citation Index (SciSearch), Scopus, International Pharmaceutical Abstract, Chemical Abstracts, Embase, Index Copernicus, EBSCO, African Index Medicus, JournalSeek, Journal Citation Reports/Science Edition, Directory of Open Access Journals (DOAJ), African Journal Online, Bioline International, Open-J-Gate and Pharmacy Abstracts

## INTRODUCTION

Globally, skin infection is ranked fourth among the top ten most prevalent skin diseases [1]. Skin infection has a prevalence rate of 20 – 80 % in developing countries [2]. Lack of awareness of risk factors is a major contributor to the development of skin infections [3]. Studies have reported that generally, people are aware of potential side-effects of medication used to treat skin infection [4]. However, the level of understanding of the risk factors for skin infection is poor, leading to late detection of symptoms by doctors or pharmacists. This level of

understanding may have special relevance where awareness is of concern [4]. In Malaysia, people purchase medications based on their own knowledge or experience of their effectiveness on their skin condition. A doctor or a pharmacist is only consulted if their skin condition worsens [4].

In this past few years, measuring quality of life (QoL) had become an important aspect of medical research into skin disorders, as with other chronic illnesses [5]. Although skin infection has lower impact on mortality than other diseases, the morbidity associated with it has a

great impact on QoL, especially when it involves disability, disfigurement and symptoms such as pain, stinging and itchiness [6]. Awareness of risk factors associated with skin infection is an understudied area in Malaysia. This study therefore aims to explore the level of awareness of risk factors related to skin infection among adults, and how it affects their QoL. These findings are essential to trigger further development of health education among general practitioners and pharmacists in Malaysia. Ethics approval for the study was obtained from The International Medical University Joint-Committee of the Research and Ethics Committee, International Medical University, Kuala Lumpur Malaysia (Reference Number: BP I-01/11(48)2014).

## EXPERIMENTAL

We performed a cross-sectional study from July to November 2014, focused on Klang, Malaysia. Klang was selected as our study location as it is one of the districts in Malaysia with a high population, represents Malaysia's mixed races, and has moderate internal migration as an economic and cultural hub [7]. A stratified and convenient sampling technique was used to explore responses from the public, which comprises three main racial groups. Consenting participants were aged 18 years and above, and were able to read and understand English.

A self-administered questionnaire was adapted and adjusted based on local context [8]. The developed questionnaire comprised three sections: Part A, which included socio-demographic details; Part B, which explored participants' level of awareness of skin infection risk factors; and Part C, which assessed the effect of skin infection on the QoL of the participant using a modified version of the Dermatology Quality of Life Index [9]. The

questionnaire was then validated via a pilot study undertaken among 60 participants from the public. The questionnaire had satisfactory internal consistency with a Cronbach alpha value of more than 0.7. This data was not included in the actual study. Face and content validity was confirmed by three healthcare professionals, whose remarks and explanations were implemented in the questionnaire. Participants were randomly selected from various public facilities such as shopping centers, schools and hospitals. Participants were given brief information about the study and their consent was obtained. Confidentiality and anonymity were ensured. All 384 participants who consented to take part in the survey completed the self-administered questionnaire.

## Data analysis

Data were analyzed using Statistical Package of Social Sciences (SPSS) Version 17. Non-parametric descriptive analysis was performed to identify the baseline characteristics of the study population whereas chi-squared tests were employed for evaluation of association between level of awareness and its impact on QoL.

## RESULTS

The demographic details of the study participants are presented in Table 1. Out of the 384 participants, 140 (36.5 %) were male and 244 (63.5 %) were female. Approximately half of the population (46.4 %) were between 18 to 25 years of age, reflecting the fact that almost half the participants were students; the other half were mostly from the middle income group. Out of the total number of participants, 227 claimed to have experienced skin infection, which amounts to a prevalence of 59 %.

**Table 1:** Socio-demographical characteristics of the participants (n = 384)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	140	36.5
	Female	244	63.5
Age	18-25years	178	46.4
	26-40years	152	39.6
	41-60years	46	12.0
	>60years	8	2.1
Annual income	<RM10,000	128	33.3
	RM10,000-RM50,000	232	60.4
	>RM50,000	24	6.3
Highest level of education	Primary	15	3.9
	Secondary	128	33.3
	Tertiary	198	51.6

A majority (51.9 %) of the participants had experienced or claimed to have bacterial infections such as acne, while 38.3 % had experienced a fungal infection such as athlete's foot or candida. Only 8.8 % had a viral infection such as warts, and a small number of participants (1.7 %) suffered from a parasitic infection such as scabies.

More than 50 % of participants were aware of the risk factors associated with skin infection. A huge number of participants (71.9 %) knew that sharing their belongings could contribute to chances of contracting skin infection, whereas 69.5 % of them were aware of heavy perspiration as a risk factor of skin infection. Only 45.6 % showed awareness of the risk of wearing tight-fitting and non-cotton clothes as a trigger to skin infection (Table 2).

The QoL of 227 participants with skin infection was mostly affected by uncomfortable physical symptoms such as itchiness, soreness, pain and stinging. Embarrassment and self-consciousness about the appearance of the skin condition were found to be a second major factor affecting QoL (77.1 %), as shown in Table 3. The other types of impact on QoL such as the effect on relationships, interference with social or leisure activities, and treatment problems scored < 50 %.

There were significant associations ( $p < 0.05$ , 95 % CI) between awareness of the risk of skin infection from tattooing and piercing and QoL, in which the former caused problems with work or studies ( $p = 0.025$ ) and relationships ( $p = 0.041$ ). Awareness of the risk of skin infection caused by heavy perspiration was also significantly

associated with problems in social relationships ( $p = 0.026$ ). Subsequently, two values were also detected ( $p = 0.021$  and  $p = 0.044$ ); these represented significant associations between awareness of the risk of skin infection due to tight fitting and non-cotton clothes and interference to social or leisure activity and work or studies, respectively.

## DISCUSSION

This is the first study in Malaysia focused on awareness of risk factors for skin infections in a community. The prevalence of skin infection among adults was found to be 59 %, with bacterial and fungal infections the most common. These findings correlate with studies performed in tropical countries such as Mauritius, tropical Africa, and the region of Timor Leste, which has a similar climate to Malaysia [10-12]. A change in climate with greater heat and humidity was reported as a cause of an increase in bacterial and fungal proliferation [13-15]. The most prevalent sub-type of skin infection in this study, acne, was partly due to the excessive production of sebum in a hot climate leading to entrapment and uncontrolled proliferation of *Propionibacterium acne* within the blocked skin pores, causing infection and inflammation [16,17]. Thus, type of clothing and heavy perspiration could be one of the main risk factors involved in the development of skin infection in tropical countries.

A majority of the participants were aware of risk factors associated with skin infection regardless of age and education level.

**Table 2:** Awareness of risk factors associated with skin infection among participants

Awareness of physical risk factors	Participants (%)
Sharing personal belongings	71.9
Wearing tight fitting and non-cotton clothes	45.6
Sharing cosmetics	60.9
Tattoo and piercing	54.4
Heavy perspiration	69.5

**Table 3:** Impact of skin infection on QoL of participants

Impact on QoL	Affected (%)	Not affected (%)
Infection symptoms (itch, pain, soreness, stinging)	85.8	14.2
Embarrassment	77.1	22.9
Interference with social and leisure activity	48.5	51.5
Influence on and interference with choice of clothing	43.6	56.4
Problems at work or study	44.9	55.1
Relationships	34.8	65.2
Problems associated with the skin infection treatment	47.5	52.5

The findings are in line with those of Kotowaroo and Rajesh, who reported that 85 % of their respondents had good knowledge and awareness of skin infection as a result of their tertiary education and middle socioeconomic status [18]. This statement also correlates with statistics from Malaysia, which indicate that Klang is one of the highly urbanized districts with adequate provision of health, education and sanitary facilities within each socio-economic class [19,20]. Furthermore, the participants from the Klang district have good health-seeking behaviors [21]. Nevertheless, we were concerned about a lack of awareness among the minority group, which had to be explored.

Skin infection has great negative effects on QoL [22]. Our study detected that skin infections caused physical symptoms such as itchiness, soreness, and painful or stinging wounds among the participants. These findings are similar to those of previous studies undertaken in other countries using various setups and sample sizes [23-25]. The effect on QoL of embarrassment and self-consciousness resulting from skin infection was also in line with other studies performed in central Saudi Arabia, in which the location of lesions caused by skin infection created a major psychological impairment in individual identity development [26,27]. Furthermore, the messiness and time-constraints imposed by the topical application of treatments for skin infection caused discomfort and annoyance [28].

Significant associations between awareness of risk factors of skin infection and QoL prove that a better understanding of the risk factors does improve individual QoL. A study of emotionally affected acne patients has shown that when they adhere to treatment as they became more aware of the condition, both their outcomes and quality of life improve [29]. Furthermore, social and family support is an essential predictor of increased awareness about skin infection, which in turn improves the functionality aspect of QoL [30].

### Limitations of the study

A few limitations arose in this study, one of which is a possible bias due to the use of a self-administered questionnaire. In addition, it only surveyed awareness of major physical or environmental risk factors associated with skin infection. Due to time constraints and lack of medical records, participants' medical or medication histories and detailed statistics on

their socioeconomic background were not explored.

## CONCLUSION

Skin infection is widely prevalent among the population of the Malaysian city of Klang. Despite an average awareness of risk factors contributing to skin infection, this study revealed that Malaysians still lack some basic knowledge and understanding of skin infections that indirectly affect their QoL. Awareness of skin infections is under-researched in Malaysia, and a deep understanding remains to be achieved. Thus, there is a need for further studies on community health education and treatment individualization for skin infections in Malaysia.

## ACKNOWLEDGEMENT

The authors would like to thank Kotowaroo Goonmate and Rajesh Jeewon from Department of Health Sciences, Faculty of Science, Reduit, University of Mauritius for their contribution of the validated questionnaire. They also wish to thank the Department of Pharmacy Practice, International Medical University, Malaysia for consistent encouragement as well as the provision of facilities.

## REFERENCES

1. Hay R., Johns NE, Williams HC, Bolliger IW, Dellavalle RP, Margolis DJ, Marks R, Naldi L, Weinstock MA, Wulf SK, Michaud C, et al. *The global burden of skin disease in 2010: An analysis of the prevalence and impact of skin conditions. J Invest Dermatol* 2013; 134(6): 1523-1747.
2. Hay R, Bendeck SE, Chen S, Estrada R, Haddix A, McLeod T, Mahé A. *Skin diseases 2006 [cited 2015 May 11]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK11733/>.*
3. Kotowaroo G, Rajesh J. *What factors contribute to a higher frequency of skin infection among adults in Mauritius J Dermatol* 2013; 4(3):297-302.
4. Jamunarani A, Azmi S. *A survey of drug-related-problems among patients treated for allergy symptoms in community pharmacies at Negeri Sembilan, Malaysia. Int J Pharm Pharm Sci* 2014; 6(10):313-316.
5. Beattie PE, Lewis J. *A comparative study of impairment of quality of life in children with skin disease and children with other chronic diseases. Brit J Dermatol* 2006; 155(1):145-51.
6. Hay R, Bendeck SE, Chen S, Estrada R, Haddix A, McLeod T, Mahé A. *Skin diseases 2006 [cited 2015 May 11]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK11733/>.*

7. KCCCI. Klang introduction 2014. [cited 2015 May 11]. Available from: <http://www.klangyiwu.org/en/info-en/klang-intro-en-2>
8. Kotowaroo G, Rajesh J. What factors contribute to a higher frequency of skin infection among adults in Mauritius? *J Dermatol* 2013; 4(3):297-302.
9. Finlay AY, Hayes J. Dermatology Quality of Life Index 2014. [cited 2014 Jun 10]. Available from :<http://www.dermatology.org.uk/quality/dlqi/quality-dlqi.html>
10. Kotowaroo G, Rajesh J. What factors contribute to a higher frequency of skin infection among adults in Mauritius? *J Dermatol* 2013; 4(3):297-302.
11. Milena ML, Amaral S, Harmen SP, Joseph HM, Fernandes JL, Counahan ML. The prevalence of common skin infections in four districts in Timor Leste: a cross sectional survey. *J BMC Infectious Diseases* 2010; 10:61.
12. Hogewoning, Arjan. The most common skin diseases among children in Anambra state of Africa. *Mycoses* 2008; 51: 536-541
13. Hay R, Johns NE, Williams HC, Bolliger IW, Dellavalle RP, Margolis DJ, Marks R, Naldi L, Weinstock MA, Wulf SK, Michaud C, et al. The global burden of skin disease in 2010: An analysis of the prevalence and impact of skin conditions. *J Invest Dermatol* 2013; 134(6): 1523-1747.
14. Hussein AS, El-Mofty, Hassanien MA. Climate change and predicted trend of fungal keratitis in Egypt. *J EMH, WHO* 2011; 17(6): 468-473.
15. Havlickova B, Czaika VA, Friedrich M. Epidemiological trends in skin mycoses worldwide. *Journal compilation* 2008; 51(4): 2-15.
16. El-Akawi Z, Abdel LN, Abdul RK, Al-Aboosi M. Factors believed by Jordanian acne patients to affect their acne condition. *J EMH* 2006; 12(6): 840-846.
17. Acne. *Derma Medics Professional* 2009. [cited 2015 May 11]. Available from: [http://www.dermamedics.com/acne\\_id61.html](http://www.dermamedics.com/acne_id61.html).
18. Kotowaroo G, Rajesh J. What factors contribute to a higher frequency of skin infection among adults in Mauritius? *J Dermatol* 2013; 4(3): 297-302.
19. Jamaliah J. Emerging trends of urbanisation in Malaysia. *J Dept of Stats Malaysia* 2004; 1(6): 43-54.
20. Country Health Plan. Ministry of Health Malaysia 2011. [cited 2015 May 11]. Available from :[http://www.moh.gov.my/images/gallery/Report/County\\_health.pdf](http://www.moh.gov.my/images/gallery/Report/County_health.pdf)
21. Liew CK, Khor MN, Jason A. A New Health Information Platform: Youth Consumer Behaviour Towards Healthcare Website. *IPEDR* 2014; 74(6): 43-54.
22. Schofield J, Grindlay D, Williams H. Skin Conditions in the UK: A Health Care Needs Assessment. UK: Centre of Evidence Based Dermatology 2009. University of Nottingham.
23. Kotowaroo G, Rajesh J. What factors contribute to a higher frequency of skin infection among adults in Mauritius? *J Dermatol* 2013; 4(3): 297-302.
24. Country Health Plan. Ministry of Health Malaysia 2011 [cited 2015 May 11]. Available from :[http://www.moh.gov.my/images/gallery/Report/County\\_health.pdf](http://www.moh.gov.my/images/gallery/Report/County_health.pdf)
25. Liew CK, Khor MN, Jason A. A New Health Information Platform: Youth Consumer Behaviour Towards Healthcare website. *International Proc Econ Dev Res* 2014; 74(6): 43-54.
26. Abolfotouh MA, Al-Khowailed MS, Suliman WE, Al-Turaif DA, Al-Bluwi E, Al-Kahtani HS. Quality of life in patient with skin disorders in central Saudi Arabia. *Int J Gen Med* 2012; 5(1): 633-642.
27. Bilgiç O, Bilgiç A, Akiş HK, Eskioğlu F, Kiliç EZ. Depression, anxiety and health-related quality of life in children and adolescents with vitiligo. *J Clin Exp Dermatol* 2011; 36: 360-365.
28. Tasoula E, Gregoriou S, Chalikias J, Lazarou D, Danopoulou I, Katsambas A, Rigopoulos D. The impact of acne vulgaris on quality of life and psychic health in young adolescents in Greece: Results of a population survey. *An Bras Dermatol* 2012; 87(6):862-869
29. Jonas CM, Pedrosa E, Penas PF. Self-reported adherence to treatment and quality of life in mild to moderate acne. *Dermatology* 2008. 217(4): 309-314.
30. Abolfotouh MA, Al-Khowailed MS, Suliman WE, Al-Turaif DA, Al-Bluwi E, Al-Kahtani HS. Quality of life in patient with skin disorders in central Saudi Arabia. *Int J Gen Med* 2012; 5(1): 633-642.