

SOCIODEMOGRAPHIC FACTORS AND THEIR ASSOCIATION TO PREVALENCE OF SKIN DISEASES AMONG ADOLESCENTS

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Abstract

Introduction: The pattern of skin diseases in any community is influenced by genetic constitution, climate, socioeconomic status, occupation, education, hygienic standards, customs and quality of medical care. The burden of skin disease also has an impact on the Quality of Life of adolescents. This study aims to investigate the level of awareness and assess the prevalence of different types of skin diseases among adolescents in Mauritius.

Material and Methods: 500 adolescents and young adults of both sexes and aged between 11-23 years were recruited. A questionnaire was used to elicit information and to assess the knowledge status of skin diseases and to determine possible risk factors. In addition, a validated questionnaire based on Quality of Life Index was used to determine the psychosocial effect of adolescents suffering from skin diseases. Data was analysed using IBM Statistics SPSS version 20 and Microsoft Excel 2007.

Results: Incidence of skin diseases was 22.9% in males and 24.7% females respectively. Acne was the most common skin problems in both gender followed by fungal infection (2.9%) in males and eczema (2.4%) in females. Climatic conditions (e.g summer), consumption of oily and spicy foods, sports practice and familial history were correlated positively with prevalence of skin diseases.

Conclusion: Acne, eczema and fungal infection were the most common skin diseases identified. The findings also indicate that more respondents between 15-19 years old were more prone to skin diseases.

Key words: prevalence; awareness; adolescents; skin diseases

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Introduction

Skin diseases are very common in many tropical countries among adolescents [1,2]. The pattern of skin diseases in any community is influenced by genetic constitution, climate, socioeconomic status, occupation, education, hygiene, standards, customs and quality of medical care. The aim of the study was to assess adolescents and young adult's knowledge about skin diseases and its risk factors [1]. Surprisingly not much has been published on interaction with and the role of dermatology in such a setting although skin diseases are quite common in the general population [2]. These factors give each community its unique pattern and account for the wide variation reported from different regions of the world and even in the same country [3]. Adolescents' skin problems can be studied at the population level. A study revealed that out of 260 adolescents aged between 18-20 years in Oslo, Norway, 74% had pimples/signs of acne, 40% dry skin, 81% dermatitis/rashes and 83% other skin problems and the prevalence of the adolescents' self-reported complaints were higher than those found during clinical examination by a dermatologist [4].

Skin diseases account for 6-7% of all outpatient visits to primary

care clinics and, although dermatologic diagnoses of adolescents overlap with general adult dermatology, data on the former as a distinct entity are rare [5]. In Mauritius, apart from some of the skin cancers, skin diseases are not recorded in any official registry and they vary enormously from mild conditions which may affect only the appearance of the skin to severe diseases which are totally incapacitating. The degree of treatment required, varies accordingly. In Netherlands, adolescents aged 12-18 years attending secondary school participated in a survey and revealed that those with chronic skin diseases are both likely to have emotional and behavioral problems [6].

Nonetheless, every medical practitioner knows that there are plenty people suffering with these conditions [7]. A comprehensive survey of general practitioners' workloads in Australia discovered that skin problems were the primary reason for at least 15% of consultations whereas, a community-based data collections show that physicians are consulted about skin conditions by less than 50% of those who have them. People frequently seek advice from pharmacists, family or friends and naturopaths or they simply prescribe for themselves based on information from elsewhere [5].

A cross-sectional, community-based study in Tehran, Iran by Ghodsi et al. [8] performed to determine the prevalence and severity of acne vulgaris in adolescents reported factors influencing acne severity risk and showed that the secondary outcome measures of family history, relation to nutrition habits, emotional stress, menstruation and smoking were associated with acne. They also stated that personal hygiene is important to inhibit skin diseases such as ringworm, scabies.

According to World Health Organisation 2001 report, the global burden of disease indicated that skin diseases were associated with mortality rates of 20,000 in Sub-Saharan Africa in 2001 [9]. An additional point, often overlooked, is that skin problems in the developing world are often transmissible and contagious but are readily treatable [10,11].

Bacterial skin infections or pyoderma are common in most developing countries arising as primary infections of the skin (impetigo) or secondary infections among adolescents [12,13]. Lewis Jones and Walker [14] conducted a research among Scottish schoolchildren aged 15-18 years and revealed an 83% high prevalence of acne in teenagers. 11% adolescents perceived their lives to be significantly affected by their acne (8% moderately to severe, 3% severe).

Aim

To assess the prevalence of skin diseases and their awareness among adolescents.

Objectives:

- To investigate which skin disease is more prevalent among adolescents.
- To assess the level of awareness and hygienic practices among teenagers.
- To assess the Quality of Life Index of adolescents suffering from skin diseases.

Material and Methods

Sample Population

A total of 500 random participants including male and female school adolescents and young adults were recruited from different districts of Mauritius. Inclusion criteria for selection were as follows:

- 1) Age: 11-23 years.
- 2) Male and Female healthy school adolescents and young adults from secondary schools and universities.

However adolescents and young adults with type 1 and type 2 diabetes were excluded in this study. Following selection the participants were required to fill a designed questionnaire.

Questionnaire design

A questionnaire consisting of both open ended and closed ended questions was designed for the purpose of this study. It included the demographic details (for example age, gender, district etc), the current lifestyle practices with regards to skin disease (for example treatment, face wash), the current awareness of the participants about skin diseases and hygienic practices. Questions on genetic predisposition, possession of tattoos/piercing, sharing of cosmetics, sports practice, nutrition were also included in an attempt to identify potential risk factors for particular skin diseases.

The last part of the questionnaire dealt with the impact of having skin disease on the social life of the participants and their resulting change in their behaviour. A validated questionnaire based on DLQI (Dermatology Life Quality Index) was used. Prior permission from authors was obtained beforehand.

Data collection

The corrected questionnaires were distributed randomly amongst school adolescents and young university students. Appropriate informed consent was obtained from parents and all participants. Research was approved by UoM Ethic Committee. Information sheet in which all details about the project, the participant's rights and the researcher's statement were enclosed, accompanied the questionnaire. All information collected during the course of this survey was kept confidential and that the data was strictly used for research only.

Data Analysis

Data generated from the questionnaires was analysed both using Excel 2007 (Microsoft corporation) and IBM Statistics SPSS version 20 (IBM corporation). Descriptive frequency tables and Pearson's bivariate correlation in SPSS were used to analyse the information collected during the course of the study.

Analysis carried out also compared the incidence of disease amongst males and females and their current knowledge of skin disease. Potential risk factors for skin disease and the impact of skin disease on the social life of the participants, who had skin disease, were also investigated by performing statistical analysis in SPSS.

Results

The mean age of the sample population was 17.78. The highest levels of education were from tertiary education (27.6%) followed by secondary school (23.8%). Moreover, 63.4% males and 66.1% females were aware about skin diseases and a Pearson correlation revealed a positive correlation between presence of skin diseases and level of knowledge.

Fifteen skin diseases were identified during this survey but acne (13%), fungal infection (2%) and eczema (2%) were the most prevalent and significant among the adolescents and young adults in the general population. 22.9% males and 24.7% females had acne problem. Furthermore participants aged between 15-19 years were more prone to skin diseases such as acne (60%), wart (50%), dermatitis (57.1%), eczema (70%), pimples (55.6%) and those who were between 20-24 years were more affected by fungal infection (50%). Among those who were suffering from skin diseases, the face (62%) was the most affected region in the body followed by the back (11%) (Tabl. I).

Also, it was noted that climatic conditions influenced in the severity of skin diseases and almost everyone (93%) complained to be more prone to get any skin diseases during summer. Moreover, 35.5% respondents grade their skin diseases as 'a little severe' while 5% had 'severe' skin diseases and 39% complained having their skin diseases appeared every month and 12% was every 6 months. An interesting aspect was found that 25.5% of the adolescents came to know about skin diseases via other sources such as parents, friends and teachers and 8.6% from the internet and 19.7% from physician. According to the participants, 27% thought skin diseases were caused by parasites followed by virus (23%). Only 17% thought hormone imbalance and fungi may be the cause.

Moreover, 56% of the adolescents thought nutrition could be a leading cause of skin diseases such as acne (39.6%), eczema (1.8%) and wart (0.6%). A Pearson correlation indicated that presence of skin diseases correlated positively and significantly with spicy and oily foods but 33.3% of the sample population consumed oily and spicy foods (25.5%) and fast foods (22.5%) more than three times a week.

Diseases	Age Group n (%)			Male (%)	Female (%)
	10-14	15-19	20-24		
Acne	8 (12.3)	39 (60.0)	18 (27.7)	35.4	64.6
Wart	-	1 (50.0)	1 (50.0)	50	50
Dart	1 (14.3)	4 (57.1)	2 (28.6)	57.1	42.9
Eczema	-	7 (70.0)	3 (30.0)	30	70
Pimples	1 (11.1)	5 (55.6)	3 (33.3)	44.4	55.6
Fungal Infection	3 (30.0)	2 (20.0)	5 (50.0)	60	40
Scabies	-	2 (33.3)	4 (66.7)	33.3	66.7
Athlete's Foot	-	1 (100.0)	-	100	-
Psoriasis	-	3 (60.0)	2 (40.0)	60	40
Allergies	-	1 (100.0)	-	-	100
Pigmentation	-	-	2 (100.0)	-	100
Furunculosis	-	1 (100.0)	-	-	100
Rashes	-	-	1 (100.0)	100	-
Folliculitis	-	-	1 (100.0)	100	-
Scars	-	1 (100.0)	-	100	-

Table I. Different frequencies and percentage of the different skin diseases in different age group

Discussion

Skin disease is a major health problem [15]. Given the rise in the prevalence of skin infections in many countries and the lack of published data pertaining to the prevalence and awareness of skin disease in Mauritius, this survey was done to assess the level of awareness of skin disease and the prevalence of skin infections among the Mauritian adolescents and young adult's population and found a prevalence of 1:15 among males and females suffering from skin diseases.

Out of 500 participants, it was found that the overall incidence of disease was 24% (n=120). Acne (n=65) was most prevalent among the youngsters followed by eczema and fungal infection in both gender. This finding is in line with the study done by Mancini [16] who revealed that acne vulgaris was the most common skin diseases treated by physicians accounting for more than 14 million visits per year and that generally, acne appeared for the first time in approximately 85% of individuals between the ages of 15 and 17 years. Among the participants who had skin diseases, the majorities (60%) had acne and are within 15-19 years. According to Mancini [16], the first acne lesions among adolescents and young adults were one of the earliest signs of approaching puberty and generally occurred at time of heightened emotional sensitivity.

The incidence of skin diseases in males was 22.9% (n=47) and in females 24.7% (n=73). Further analysis revealed that of the total number of males with or without disease, 11.2% had acne and 14.2% of females also had acne. Eczema and fungal infections were present in 1.5% and 2.9% of males respectively while 2.4% and 1.4% of females who had a skin disease had eczema and fungal infection respectively. An interesting finding is that two males and four females had scabies. Diseases such as wart, dart pimples, scabies, athletes' foot, allergies, psoriasis, pigmentation, furunculosis, rashes, folliculitis and scars though in small amounts, were reported by the participants but in low frequency.

Relationship of age and affected body parts with skin disease

Skin problems were found in all age categories. However, age and presence of disease among youngsters did not correlate ($p>0.05$). Indeed age was not linked to the presence of disease as acne, dart, fungal infections and other skin diseases were present across all age group implying that a particular disease did not occur at a particular age (Tabl. I). El-Khateeb et al [3] conducted a study in Cairo, Egypt and discovered that only certain skin diseases were related to age. Bacterial infections subgroup was the most common in infants and preschool children, and impetigo was the leading disease [1]. In school and young adult stages, scabies and contact dermatitis were the most common and in old adult and geriatric stages, scabies was the most common. However, this study found that acne, dart, eczema was more prominent between the age of 15-19 years and fungal infections in 20-24 years.

Analysis of impact of skin disease on body parts revealed that face was the most affected. The majority (90.8%) of population who had acne, had their face most affected followed by the back (6.2%). Palmar [17] stated that generally acne began on the face and as it progressed and became more severe, it began to affect other areas of the body as well. Back acne was fairly common among acne sufferers affecting males, females, teens and adult. However, not everyone with acne would experience an outbreak on the body, but those with body acne nearly always have acne on the face too and their causes were the same that is, overactive oil glands, excess dead skin cells, and proliferation of acne-causing bacteria. Moreover body acne was more common and more severe among males [17]. Dart and pimples also affected the face of the participants (57.1% and 66.7% respectively). However, results here showed that as eczema and scabies mostly affected the feet. Of those who specified other places, it was seen that the belly, butt, head, neck and breast were also body parts which were affected by skin disease but there was a minimal percentage.

Analyses also revealed that there are differences in the Frequency and Severity of skin diseases among the participants. Furthermore, this study demonstrated that skin diseases appeared roughly every day to every month. Acne and eczema appeared daily to every month while fungal infections appeared mostly every 4 months and most of participants with dermatitis had the disease every 3 months. The fact of having a skin disease was not considered as a severe problem by a large cohort (35.5%) while a minority (5%) stated that their skin disease was 'very severe'. Acne, dermatitis and fungal infections was considered as a 'very little severe' by the respondents, while those having psoriasis and eczema, the response to the severity of the corresponding disease varied from 'not at all severe' to 'very severe'. This can be explained by the fact that, as a disease progresses, body parts get affected and in the case of psoriasis and eczema, many body parts are affected which the youngsters considered as severe [17].

The attitude of the general study population (n=500) in relation to treatment of skin disease yielded interesting findings. A large percentage (59.4%) of adolescents and young adults seek for advice from dermatologist for treatment following skin disease. Herbal treatment was also an ailment for skin disease while self-medication was in a small percentage (15.2%). A visit to the dermatologist is the best treatment for skin disease depending on the severity of the disease rather than self-medication. A research on retinoids revealed that it has been used widely in the topical and systemic treatments of various dermatoses: psoriasis, disorders of keratinization (DOK), keratotic genodermatosis, and severe acne [18]. The majority of respondents (58.3%) stated that they sought for dermatological consultation at least 1-5 times over the preceding year and they are also of the opinion that a visit to the dermatologist is the best treatment. However, the frequency of dermatologist visits for acne was quite low. The majority of those having scabies (66.7%) did not visit a dermatologist. Nevertheless 2.5% of diseased population specified that they visited pharmacist and 2.5% stated they did nothing to treat their skin disease.

Risk factors and its relationships to prevalence of skin diseases

In the current study one of the objectives was to assess the current awareness of skin diseases of young adults. Various variables pertaining to knowledge of skin diseases were assessed. The majority of males and females were aware of skin diseases. Further analyses between presence of skin diseases and awareness of skin diseases revealed a strong positive association between these two variables ($p=0.00$, $r=0.372$). This can be explained by the fact that due to the frequent occurrence of skin diseases, the youngsters were more aware. A community-based study of skin diseases especially acne amongst adolescents in Singapore revealed that half of the respondents felt that the following factors in order of priority were important in acne: fried foods, cosmetics, stress, lack of sleep and hormonal changes and in addition two factors, poor skin hygiene (71%) and dirt (75.8%) were identified as most important [19]. In this study, acne was the most predominating skin disorder the sample population was aware of, followed by eczema, pimples, skin cancer, dermatitis and psoriasis. In addition, a case of acne stage II was presented with a long history of firm nodules, large abscesses and sinus tracts, small scars, distributed in the axillary, groin, perianal and infraumbilical areas, associated with lesions on the face [15].

Nutrition is one of the most important parameters that are involved in modulating skin health and condition [20]. The knowledge about main etiological agents of skin diseases was assessed, and the opinions of the participants diverged. Some adolescents were not aware that bacteria, fungi and hormone imbalance could be a possible cause of skin disease. On the other hand, analysis of nutrition and skin disease relationship revealed that, a large cohort (56%) was aware that nutrition is a risk factor for skin disease and most of them, stated that acne was the leading skin disorder caused by nutrition followed by pimple. The role of food in the aetiopathogenesis of skin diseases remains controversial. However, a study done on participants aged between 6-17 years in a paediatric dermatology clinic and found that in a total of 75% (75 of 100) had tried some form of food exclusion. Of these 48% had avoided dairy products, 27% avoided eggs, 20% food additives and colouring, 13% avoided chocolates, sweets (candy), soft or fizzy drinks and nuts. 30% of those restricting foods felt that this had brought about an improvement in their skin diseases such as atopic dermatitis and acne but 51% said they had done so after consultation with a doctor or dietician [21]. Indeed, in the present study presence of skin disease correlated both positively and strongly with spicy and oily foods ($r=+ve$, $p=0.000$; $r=+ve$, $p=0.001$ respectively). A community based study in Iran showed that sweet and oily foods were recognised as risk factors for moderate to severe acne. However, this relationship does not always stand good as spicy foods were not associated with acne severity [8].

The knowledge about sharing of cosmetics as an agent for skin disease was analysed and it was found that the majority of males and females know that cosmetics could cause skin disease irrespective of age group. Foundation was the cosmetic which was mostly used by males and females and a majority did not share their cosmetics. Many of the participants (91.2%) noticed a positive change in their skin after use of cosmetics while 8.8% had a negative change. Among those who experienced negative changes, acne, pimples, skin rashes, dermatitis and irritations were observed.

In Sweden, Berne et al [22] revealed that the use of cosmetics is rising and adverse reactions to these products are increasing. Among people with self-reported sensitive skin, as many as 57% of women and 31.4% of men reported side effects from using cosmetics or skin care products at some stage in their lives. Their study suggests that 176 patients who visited a dermatologist with specific complaints of reactions to cosmetic products, 45% had dermatoses. Contact dermatitis is the most commonly reported adverse reaction to cosmetics and others such as itching, burning, papules and various others [23]. Moreover, in a recent epidemiological study in UK, 23% of women and 13.8% of men had experienced some sort of negative reaction to a personal care product over the course of 1 year [22]. Findings indicate no correlation between knowledge status and knowledge of cosmetics as a cause of disease and suggest that people are not aware that cosmetics can lead to skin diseases.

In addition all respondents were very aware that tattoo or piercing could be a risk factor for skin disease and this explains why the majority of them were unwilling to have a tattoo or piercing. Tattoos and piercing are increasingly popular in today's society, but it could also give rise to skin diseases.

An investigation was conducted among adolescents of the University of Bari in the region of Apulia, Italy about the knowledge of the risk and practices related to tattoo and piercing.

Of the 1598 students, 78.3% believe it is risky to undergo piercing/tattoo practices, 29% of the sample had at least one piercing or tattoo (excluding earlobe piercing in women). The average age for first piercing was 15.3 years and tattoo 17.5 years. 13.2% of the interviewees who underwent tattoos had skin complication after and 13.1% declared they had had several symptoms [24].

Another major factor contributing positively to a higher incidence of skin diseases is climatic conditions. Hand-foot-mouth disease (HFMD) is an acute viral infection that occurs usually among children in summer [25]. In this study, attempts were made to find possible risk factors for the skin disorders which the youngsters faced. The majority of the study population (92.5%) was more prone to diseases in summer. An association between season and a higher incidence of skin diseases do exist. It has also been found that 8.8% males and 13.6% females were more prone to skin diseases during summer season. For instance, El-Khateeb et al [3] found that there is significant variation in skin diseases mainly in summer (40.7%) and the main skin diseases included dermatitis (58.7%) as most common followed by fungal infection (34.87%), scabies (9.26%), warts (5.51%), and pigmentary disorders (4.24%).

Other factors linked to prevalence of Skin Diseases

Skin hygiene, particularly hands, is considered to be one of the primary mechanisms to reduce risk of infection [26]. Majority of respondents (89%) were fully aware of the impact of humidity can be a prevalence of skin diseases and therefore they did not keep their clothes in a humid environment. A study done in Lebanon among Polish soldiers whose skin diseases pose an epidemiological problem in hot, dry as well as humid climate. High temperature and humidity of air, inappropriate clothing and low level of personal hygiene influence the incidence of skin disease among them. 13.2% of them suffered from dermatoses, 16.2% mycoses, 11.9% from viral diseases and 10% from pyoderma [27].

Most of the youngsters (81.7%) practiced sports. Acne was predominant among those suffering from skin disease and practicing sports, followed by eczema. The correlation between frequency of sports practice and presence of skin disease was not statistically significant. The role of sport in the pathogenesis of acne or skin disease remains to be determined as our data is insufficient enough to relate sports as being a direct risk factor. During the survey only 1 out of 120 participants suffering from skin diseases got furunculosis, which is quite frequent among athletes, was observed. For instance, one study done by [28] revealed that furunculosis in 28% of high school football players and 14% of basketball players.

It is commonly known that the occurrences of some skin diseases are known to be associated with family history. For examples, Tan et al [19] reported a high prevalence of young adolescents in Singapore suffering from acne (88%) when their parents suffered from similar conditions. The hygienic practices of the participants with skin diseases were found to be very good. For instance, the majority did not share their cosmetics (67%), washed their face more than once (49.8%) and most of them bathed twice or more daily. Results also show that many youngsters changed their clothes after heavy perspiration. A study carried out on prevalence of Tinea cruris showed that excessive perspiration is the most common predisposing factor and hence patient education on proper hygiene makes intuitive sense for successful treatment [29].

Dermatology Life Quality Index (DLQI)

Finally, the psychological aspect of skin diseases and its impact on social life of the participants who had skin disease were also investigated. Many of them had a little itching of the skin while very few find their skin itching very much. This finding suggests that depending on the skin disease present, the degree of embarrassment varies. Coincidentally, the impact of having skin disease did not interfere very much with the quality of life of youngsters. This is further supported from evidence that way of dressing, social and leisure activities, family relationships, studies were not affected.

Social, psychological and occupational factors may all contribute to an impaired quality of life. Simmons and Massey [30] found that life choices and employment opportunities are influenced by skin diseases as they may impinge on social life leading to embarrassment, decreased confidence, feelings of rejection and social withdrawal. In addition, domestic life may be affected on many levels.

100 patients with psoriasis had poor quality of life and significant correlation was found between Dermatology Life Quality Index and Beck Depression Inventory [31].

Conclusion

This project has given an account on the prevalence and awareness of skin diseases among school adolescents and young adults in Mauritius. The findings in this study demonstrated that people between the ages of 15-19 years were more prone to skin diseases. Moreover, more females were more affected to skin diseases rather than males.

Acne, eczema and fungal infection were the most common diseases affecting this particular group of people and amongst the different body parts; the face, back and feet were the most affected in particular during summer season. Most respondents view their skin diseases as 'little severe' and the majority preferred to seek dermatologists' advice to avoid worsening skin diseases.

Even if a greater number were aware the fact that cosmetics can be a cause of skin diseases, still most of the respondents made use of them, in particular females. Complaints related to cosmetics include acne, rash, rashes and irritations were the most dominant. The majority were unwilling to have a tattoo/piercing due to the fact that they were aware of its related risk factors.

A large number of adolescents practiced sports. Amongst those who exercised, they suffered from mostly acne. Three quarter of the sample population were aware that perspiration could be a risk factor, hence, after heaving sweating the adolescents did change their clothes and maintain good hygienic practices.

Besides, acne and eczema were found to coincide with family history, that is, some participants said having parents or siblings suffering from acne and eczema and in turns they were affected too.

Also, the psychosocial effect was investigated among adolescents suffering from skin diseases. It was found that some people were a little embarrassed and had an influence in their life, especially problems with their family members, close friends or partners.

Awareness campaigns should be organised in schools regarding on preventive measures of skin diseases and advice concerning treatment and regular medical check up in schools as some adolescents might get some skin problems but are unaware. Having a balanced diet and minimum use of cosmetics followed by proper hygiene can also help in preventing skin diseases.

Most importantly providing professional psychological advice and help for adolescents suffering from skin diseases.

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