

ORIGINAL ARTICLE

**Epidemiological Study of Common Dermatological Disorders in Western Nepal:
A Cross-Sectional Comparative Study**

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Abstract:

Background: Skin diseases and their complications are a major burden on the health system of many nations. Since there is a paucity of data regarding the epidemiological status among the local population at the different parts of Nepal which are geographically distinct from each other, the present study was conducted to meet the need of an hour. *Aim and Objectives:* To identify and compare the pattern of dermatological diseases in the outpatients reporting to a medical camp that was organized at three distinct part of Nepal. *Material and Methods:* All cases with dermatological complaints attending the medical camp were included in the study after thorough examination. Data were collected, tabulated and analyzed statistically. *Results:* Out of 1,045 dermatological cases, who reported to the camp, 45.3% (mean age 26.3±30.3) were males and 54.7% (mean age 31.8±45.5) were females with the maximum number of disorders present in patients under the age group 16 to 30 years (33.6%) for all the study groups. Non-infective conditions (55.8%) outweighed infective conditions (36.8%). *Conclusion:* The identification of these diseases which are usually neglected by the community is important for proper diagnosis, treatment and for dermatologic education and research as well.

Keywords: Himalayas, Infections, Rural, Skin diseases.

Introduction:

The importance of intact healthy skin is beyond argument in the optimal physical functioning of the human body [1]. Due to its exposure to the external world and involvement in almost all of the systemic diseases, skin diseases account for a significant public health issue in developing countries affecting 20-30% of the general population at any given time [2]. The development of skin disease is influenced by various factors like genetic, race, religion, socioeconomic status, nutrition, personal habits, age etc [3]. Geographical factors such as season and climate also contribute to the increased prevalence of certain type of skin disorder in a particular area [4]. The pattern of skin diseases differs between countries and even within regions as a result of these factors [5].

Nepal is a mountainous country on the southern slopes of the Himalayas in the Indian sub-continent and is divided into three eco-climatic regions. The country comprises of the mountains in the north, the central hills, and the southern terai plains, with climate varying from arctic type in the north to tropical type in the south. It is densely populated, with a population of 26.6 million, the majority of whom live in rural areas often in remote and difficult terrain. In Nepal, ethnical, religious, and geographical diversities are quite

prevalent in different parts of the country [6]. The annual report of the Department of Health Sciences in 2067/2068 B.S. (2010/2011 A.D) ranks skin diseases as the fourth most common problem in patients attending outpatient clinics in the country, and comprises 1.4% of health care to all inhabitants, Nepal current total in-patient morbidity [7]. Low socioeconomic status, malnutrition, overcrowding, and poor standards of hygiene are important factors accounting for the distribution of skin diseases in developing countries such as Nepal [8]. Hence identifying the pattern of these diseases can help to educate the patients and reduce disease morbidity as most patients with skin problems, especially in rural areas, do not report for treatment unless compelled by the severity of the symptoms. Since there is a paucity of data regarding the epidemiological status among the local population at the different parts of Nepal which are geographically distinct from each other, the present study was carried out at three remote districts of Nepal i.e. Rolpa (Hilly region), Humla (Himalayan region) and Bardiya (Terai region) in association with Ministry of Health of Nepal at dermatologic camp organized in the month of March 2014. To the best of our knowledge, this is the first community-based study which has determined the prevalence skin disorders in three rural communities in western Nepal. The study was aimed to assess and compare the disease pattern among different age and gender groups, to assess the variation of skin diseases among different ethnic groups, to determine the pattern of skin diseases, and to compare the pattern of skin diseases among different groups.

Material and Methods:

Study Design and Setting

The study was carried out at three districts of western region of Nepal i.e. Rolpa, Humla and

Bardiya at the dermatologic camp organized by the department of dermatology, Nepalgunj Medical College and Hospital (NGMCTH), Nepal in association with Ministry of Health of Nepal in the month of March 2014. The patients were categorized into the following groups-

Group A: Patients reporting at Rolpa, Group B: Patients reporting at Humla and Group C: Patients reporting at Bardiya.

All newly diagnosed cases presenting with skin diseases, all ages and both sexes, with parent/guardian giving verbal consent for the study were included in the study. Cases of sexually transmitted diseases and with doubtful diagnosis were excluded from the study.

All the patients with dermatological complaints were thoroughly examined for cutaneous diseases. The demographic and clinical data were documented on patient record forms prepared for the study. The majority of diagnoses were based on the patient's history and clinical signs and others who required biopsies to verify the diagnosis were referred to the NGMCTH, Nepal for treatment. The diagnoses of skin diseases were classified according to Wilkinson *et al* [9].

Statistical Analysis:

The data were entered in the SPSS 19 program and analyzed. Statistical significance was determined by the One-way ANOVA test. A p-value of <0.05 was considered significant.

Results:

A total of 1,045 patients attended the camp, 99 patients of group A, 166 patients of group B and 780 of group C. Out of total 1,045, 572 (54.7%) were females and 473 (45.3%) males with the significant difference in the gender distribution between group A and C and group B and C (p=0.009) (Table 1).

Table 1: Distribution of Patients According to Gender

Gender	Group A n (%)	Group B n (%)	Group C n (%)	Total	χ^2	p-value
Males	46 (46.5)	93 (56)	334 (42.8)	473 (45.3)	3.5	0.18
Females	53 (53.5)	73 (44)	446 (57.2)	572 (54.7)	2.9	0.22
Sub total	99	166	780	1,045	-	-
Male: Female ratio	0.9:1	1.3:1	01:01.4	01:01.2	-	-
Mean±SD	49.5±4.9	83±14.1	390±79.2	174.1±171.7	-	-

The patients were divided into different age groups; <15, 16-30, 31-45, 46-60, 61-75 and 76 years and above. A highest proportion of the patients were from 16 to 30 years of age (33.6%) among all age groups. Females' outnumbered males in all age groups except those under 15 years and between 16 to 30 years of age in group A, between 61 to 75 years of age in group C whereas in group B males outnumbered females in all age groups except those between 16 to 30 years and 61 to 75 years of age (Table 2).

All disorders were broadly classified into

infective (36.8%), non-infective (55.8%), and miscellaneous disorders (7.4%). Of all the infective disorders related to dermatological conditions, fungal infections (25.9%) were most commonly seen in both sexes of group A and C whereas in group B, parasitic infections (4.9%) were the most dominating. Similarly eczema (32.2%) was the most common non-infectious disorder found in both males and females of all the 3 study groups whereas disorders of sweat glands like hyperhidrosis (0.6%) were the least in all the groups (Table 3).

Table 2: Distribution of Patients According to Age Group and Gender

Age group (in years)	Group A		Group B		Group C		Total		p-value	
	Males n (%)	Females n (%)	Males n (%)	Females n (%)	Males n (%)	Females n (%)	Males n (%)	Females n (%)	Males	Females
< 15	12 -26	10 (18.9)	24 (25.8)	16 -21.9	67 -20.1	80 -17.9	103 (21.8)	106 (18.5)	0.005	0.009
16-30	17 -37	14 (26.4)	33 (35.5)	41 -56.2	86 -25.6	160 (35.9)	136 (28.8)	215 (37.6)		
31-45	07 (15.2)	12 (22.6)	21 (22.6)	9 -12.3	81 -24.3	119 (26.7)	109 -23	140 -24.5		
46-60	5 -10.9	11 (20.8)	12 -12.9	3 -4.1	52 -15.6	65 -14.6	69 -14.5	79 -13.8		
61-75	5 -10.9	5 -9.4	3 -3.2	4 -5.5	33 -9.9	19 -4.3	41 -8.7	28 -4.9		
> 76	0	1 -1.9	0	0	15 -4.5	3 -0.6	15 -3.2	4 -0.7		
Sub total	46	53	93	73	334	446	473	572		
Mean±SD	7.7±5.4	8.8±4.9	15.5±14	12.2±15.2	55.7±36.1	74.3±59.3	26.3±30.3	31.8±45.5		

Table 3: Distribution of Skin Dermatoses According to Gender

Type of dermatoses	Group A		Group B		Group C		Total	
	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)
Infectious disorders								
Bacterial Infections	05 (17.9)	02 (12.4)	06 (15)	1 -4.2	13 (9.7)	17 -11.9	24 (11.8)	20 (10.9)
Fungal infections	18 (64.3)	12 -75	11 (27.5)	04 (16.6)	110 (82.1)	115 (80.4)	139 (68.9)	131 (71.6)
Viral infections	04 (14.3)	1 -6.3	09 (22.5)	1 -4.2	01 (0.7)	3 -2.1	14 (6.9)	05 (2.7)
Parasitic infections	01 (3.5)	1 -6.3	14 (35)	18 -75	10 (7.5)	8 -5.6	25 (12.4)	27 (14.8)
Sub total	28	16	40	24	134	143	202	183
Non-infectious disorders								
Eczema, lichenification, prurigo and erythroderma	9 -50	16 (43.2)	20 (37.8)	15 (30.7)	132 (66)	145 (47.9)	161 -59.4	176 (45.2)
Urticaria and mastocytosis	03 (16.6)	08 (21.7)	12 (22.6)	08 (16.3)	8 -4	22 -7.2	23 -8.4	38 -9.8
Papulo -squamous disorders	01 (5.6)	2 -5.4	01 (1.9)	2 -4.1	05 (2.5)	24 -7.9	7 -2.6	28 -7.2
Naevi and other developmental defects	01 (5.6)	–	02 (3.7)	2 -4.1	2 -1	2 -0.8	4 -1.6	4 -1
Disorders of the sebaceous glands	01 (5.6)	06 (16.2)	13 (24.6)	09 (18.3)	05 (2.5)	11 -3.6	19 -7	26 -6.6
Disorders of skin colour	03 (16.6)	05 (13.5)	03 (5.6)	12 (24.5)	11 (5.5)	44 -14.5	19 -7	61 (15.7)
Disorders of keratinization	–	–	1 -1.9	–	6 -3	5 -1.6	6 -2.2	5 -1.3
Disorders of sweat glands	–	–	–	1 -2	–	5 -1.6	–	6 -1.6
Others	–	–	01 (1.9)	–	31 (15.5)	45 -14.9	32 -11.8	45 (11.6)
Subtotal	18	37	53	49	200	303	271	389

The pattern and the relative frequency of skin diseases among all patients based up on age groups are shown in Table 4. Fungal infections were the most common among all the age groups in groups A and C except the age group <15 years

in group B where parasitic infections were the most prevalent. Among non-infectious disorders, all the age groups presented dominance of eczema in group B and C except the age group 16-30 years in group A where urticaria were the commonest.

Table 4: Distribution of Skin Dermatoses in According to Age Group

Type of dermatoses	Group A						Group B						Group C						Total No.
	<15	16-30	31-45	46-60	61-75	>76	<15	16-30	31-45	46-60	61-75	>76	<15	16-30	31-45	46-60	61-75	>	
Infectious disorders																			
Bacterial infections	02 (16.7)	--	--	--	1 -20	--	2 -8	03 (12.5)	01 (11.1)	--	01 (33.3)	--	15 -19	9 -9.7	5 -8.5	04 (13.8)	01 (7.7)	--	44 (11.4)
Fungal infections	10 (83.3)	11 (91.7)	08 (88.9)	5 -100	3 -60	--	07 (28)	10 (41.7)	02 (22.2)	2 -66.7	02 (66.7)	--	50 (63.3)	69 (74.2)	52 (88.1)	24 (82.7)	11 (84.6)	04 (100)	270 (70.2)
Viral infections	--	1 -8.3	01 (11.1)	--	--	01 (100)	--	1 -4.1	04 (44.5)	01 (33.3)	--	--	5 -6.3	5 -5.3	--	--	--	--	19 (4.9)
Parasitic infections	--	--	--	--	1 -20	--	16 (64)	10 (41.7)	02 (22.2)	--	--	--	09 (11.4)	10 (10.8)	2 -3.4	01 (3.5)	01 (7.7)	--	52 (13.5)
Sub total	12	12	9	5	5	1	25	24	9	3	3	--	79	93	59	29	13	4	385
Non-infectious disorders																			
Eczema, lichenification, prurigo and erythroderma	05 (50)	05 (26.4)	5 -10	6 -54.5	4 -80	--	04 (26.6)	11 (22)	11 (52.5)	07 (58.4)	2 -50	--	45 (66.1)	80 (52.3)	72 (51.1)	51 (57.9)	26 (66.7)	03 (21.4)	337 (51.2)
Urticaria and mastocytosis	01 (10)	06 (31.6)	2 -20	2 -18.2	--	--	02 (13.3)	07 (14)	07 (33.4)	02 (16.7)	2 -50	--	5 -7.4	8 -5.2	10 -7.1	07 (7.9)	--	--	61 (9.2)
Papulo-squamous disorders	01 (10)	--	1 -10	1 -9.1	--	--	--	2 -4	1 -4.7	--	--	--	1 -1.4	13 -8.6	2 -1.5	10 (11.4)	03 (7.7)	--	35 (5.3)
Naevi and other developmental defects	01 (10)	--	--	--	--	--	01 (6.7)	1 -2	1 -4.7	1 -8.3	--	--	1 -1.4	1 -0.6	1 -0.7	--	--	--	08 (1.2)
Disorders of the sebaceous glands	01 (10)	4 -21	1 -10	--	1 -20	--	04 (26.7)	16 (32)	1 -4.7	1 -8.3	--	--	3 -4.5	10 -6.5	1 -0.7	--	--	02 (14.4)	45 (6.8)
Disorders of skin colour	01 (10)	4 -21	1 -10	2 -18.2	--	--	02 (13.3)	12 (24)	--	1 -8.3	--	--	10 (14.7)	24 (15.7)	19 (13.5)	04 (4.5)	--	--	80 (12.1)
Disorders of keratinization	--	--	--	--	--	--	--	1 -2	--	--	--	--	3 -4.5	3 -1.9	4 -2.8	--	--	--	11 (1.7)
Disorders of sweat glands	--	--	--	--	--	--	01 (6.7)	--	--	--	--	--	--	2 -1.4	1 -0.7	01 (1.2)	01 (2.5)	--	06 (0.9)
Others	--	--	--	--	--	--	01 (6.7)	--	--	--	--	--	--	12 -7.8	31 (21.9)	15 (17.1)	09 (23.1)	09 (64.2)	77 (11.6)
Subtotal	10	19	10	11	5	--	15	50	21	12	4	--	68	153	141	88	39	14	660

Discussion:

Skin diseases are widespread and pose a major burden to health resources in many developing countries. In Nepal, skin problems are one of the most common causes of medical consultations [7].

In the present study, females were found to be most commonly affected (M: F= 54.7:45.3). This finding is consistent with the findings of the study carried out by Gupta [4], Jha *et al* [6], I.A. Al-Hoqail [10], Shrestha *et al* [11], Joel *et al* [12] and Bilgili *et al* [13] whereas Karn *et al* [1], Bindu *et al* [14], Dayal *et al* [15] and Rao *et al* [16] have reported male preponderance in their studies.

Maximum numbers of disorders were present in patients under the age group 16-30 years for all the study groups in our study. Similar finding was reported by Al-Hoqail [10] where the maximum number of disorders was present in patients under the age group 21–30 years. Karn *et al* [1], Shrestha *et al* [11], Joel *et al* [12], Bilgili *et al* [13], Grover *et al* [17] and Kuruvilla *et al* [18] have also reported maximum numbers of skin disorders in the second and third decade of life whereas Gupta [4], Mishra *et al* [19] and Symvoulakis *et al* [20] have shown age group between 30-44 years to carry the maximum incidence.

In this study, females outnumbered males in all age groups except those under 15 years and between 16-30 years of age in group A, between 61-75 years of age in group C whereas in group B males outnumbered females in all age groups except those between 16-30 years and 61-75 years of age. We have found only one study carried out by Bilgili *et al* [13] where distribution of skin disorders was made according to gender and age group and their findings were similar to the present study.

In our study, all disorders were broadly classified into infective (36.8%), non-infective (55.8%), and miscellaneous disorders (7.4%). Of all the infectious disorders related to dermatological conditions, fungal infections (25.8%) were most commonly seen in both sexes of group A and C whereas in group B, parasitic infections (5%) were the most dominating. Similarly eczema was the most common non-infectious disorder found in both males and females among all the 3 study groups. This finding is in consistent with the studies carried out by Karn *et al* [1], Gupta [4], Shrestha *et al* [11], Bilgili *et al* [13], Rao *et al* [16], Shrestha *et al* [21], Devi *et al* [22], Gangadharan *et al* [23] and Das [24]. The high incidence of eczema in this population might be explained by the fact that most of them were either farmers or housewives who also worked in the fields. They all walked barefoot and worked with bare hands and used no sun protection during outdoor work. Binamra *et al* [2] and Souissi *et al* [25] also reported fungal infections as the most frequently seen skin conditions. Geographical factors such as season and climate contribute to the high incidence of fungal infection in this population. High incidence of bacterial infections and parasitic infestation can be explained due to the overcrowding, poverty, poor resistance and also poor living standards of these patients.

Although majority of the studies have found non-infectious skin disorders to dominant over the infectious disorders but the studies done by Dayal *et al* [15] and Kuruvilla *et al* [18] have reported infective dermatoses to carry higher incidence than non-infective dermatoses.

In our study, fungal infections outnumbered all other infective skin disorders and were the

commonest among all the age groups in group A and C except the age group <15 in group B where parasitic infections were the most prevalent infections. Among non-infectious disorders, all the age groups presented dominance of eczema in group B and C except the age group 16-30 in group A where urticaria were the commonest. I.A. Al-Hoqail [10] in his study found that in age group 21–30 years, eczema, dermatitis and psoriasis were prevalent among the non-infectious dermatological disorders. The infectious dermatological disorders showed the prevalence of viral infection significantly higher than bacterial infection and fungal infection unlike the findings of our study.

This difference in disease pattern in three different districts of west Nepal highlights on the diversity of disease prevalence in different geographical location of the country. A seasonal variation in certain skin disorders is a well known fact that has been observed for centuries. Low temperature and humidity can have a detrimental effect on the epidermal barrier. When comparing the climate in our study setting, we observed that Rolpa and Humla were similar, while the Bardiya region had a moderate climate and was rainy at most times of the year and had higher humidity levels than the other two.

Limitations of the study:

1. Epidemiologic studies with longer periods are recommended as the present study was carried out for the short period.
2. The seasonal variation of skin diseases; where this study was conducted may not reflect the pattern in different seasons throughout the whole year.
3. Further studies including treatment, follow-up of patients has to be carried out to provide a better understanding of the epidemiology of skin disorders in order to improve future patient care and cost reduction through physician education.

Conclusion:

This study depicts various skin diseases in three rural districts of western region of Nepal and demonstrates that skin diseases are one of the most prevalent disease conditions among the general population, representing a major public health problem. Hence, this study can be taken as an eye-opener for all the health care professionals towards the skin disorders that are highly neglected by the community and calls for health education that is utmost necessary to control their spread, reduce the associated morbidity, and improve the health status of the population.

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