

Spectrum of Skin Changes in the Elderly Population at a Rural Tertiary Care Hospital in Northern India: A Cross-sectional Study

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ABSTRACT

Introduction: Ageing is a complex, natural process. Due to structural and physiological changes that occur as a consequence of intrinsic and extrinsic aging, the elderly population is highly susceptible to dermatological disorders. These changes are associated with significant morbidity and stress. Hence, it is important to have a better understanding of the dermatological needs of elderly patients.

Aim: The aim of this study was to investigate the pattern and frequency of geriatric dermatoses in patients attending the Skin Outpatient Department (OPD) at a tertiary care centre.

Materials and Methods: This cross-sectional observational study was conducted at the Department of Dermatology, Venereology, and Leprosy at BPS Government Medical College for Women, Khanpur Kalan (Sonepat), Haryana, India, from September 2022 to February 2023. A total of 300 patients aged 60 years and above, of either sex, who consented to participate were enrolled. Detailed history taking and dermatological examinations were performed, and relevant investigations were

carried out. Data was collected, entered into a Microsoft Excel sheet, and analysed for frequency, percentage, and mean of variables.

Results: Out of the total 300 patients, 155 (51.66%) were males and 145 (48.33%) were females. The majority of patients belonged to the age group of 60-69 years (n=171, 57%). Wrinkling (n=287, 95.66%) was the most common physiological skin finding, followed by dry skin (n=157, 52.33%). Among pathological dermatoses, infectious dermatoses were present in (n=134, 44.66%) patients, followed by eczemas (n=92, 30.66%). Papulosquamous disorders were seen in (n=17, 5.66%) patients. Hypertension was the most common systemic illness present in (n=53, 17.66%) patients.

Conclusion: Physiological and pathological skin changes in the elderly are a common cause of consultation in dermatology OPD. Physiological changes were seen in all patients. Among pathological changes, infections were the leading dermatoses, followed by eczemas and papulosquamous disorders.

Keywords: Dermatological disorders, Geriatric, Haryana, Infectious dermatoses

INTRODUCTION

Aging is an inevitable biological reality. India is a developing nation and in 2001 entered the group of aging countries, with the population of people aged 60 years and above exceeding 7% [1]. By 2026, the geriatric population is expected to double due to an increase in life expectancy as well as a decline in birth rates [1]. According to World Health Organisation predictions, the global population of people aged over 60 years will reach two billion in 2050 [2]. This hike in the elderly population can also be seen in hospital outpatient departments. As age progresses, various intrinsic and extrinsic changes occur in the skin, making it more prone to cutaneous diseases [3]. Geriatric dermatoses account for a significant proportion of morbidity seen in the elderly and are one of the commonest causes for everyday consultation in the elderly [4]. These dermatoses are rarely fatal but can lead to significant morbidity and affect the quality of life [5].

There are only a few studies about the skin dermatoses of the elderly in India [3-7]. A thorough knowledge of the pattern of prevalent dermatoses in this geographic region will help healthcare providers make better healthcare policies. There is limited regional data addressing geriatric dermatological issues in this area. Hence, the present study was conducted with the aim to study the pattern and frequency of dermatological conditions in geriatric patients attending the outpatient department in the tertiary care centre.

MATERIALS AND METHODS

This cross-sectional observational study was conducted at the Department of Dermatology, Venereology, and Leprosy at BPS

Government Medical College for Women, Khanpur Kalan (Sonepat), Haryana, India, from September 2022 to February 2023. Institutional Ethics Committee vide letter no. BPSGMCW/RC758/IEC/22 was obtained.

Inclusion criteria: Patients aged 60 years and above, of either sex, presenting with skin problems in the skin OPD or those referred from other departments for dermatological complaints, and who provided a detailed history, allowed the conduct of necessary investigations if required, and gave consent for participation in the study, were included.

Exclusion criteria: Patients who refused to give consent and those with genodermatoses, albinism, or disorders of Deoxyribonucleic Acid (DNA) stability that are likely to interfere with changes of aging in the skin were excluded.

Sample size: The sample size was calculated based on the proportion formula, assuming an unknown prevalence of cutaneous conditions in the geriatric population (estimated as 50%) with a 95% confidence interval and a relative error of 7%. The required sample size was 196, approximately 200.

Procedure

A total of 300 patients were enrolled in the study. Informed consent was obtained from patients after explaining in the local language. After taking a history, a detailed dermatological examination was done, and all findings were noted in a pre-designed proforma. Routine blood investigations, like haemoglobin, complete blood counts, urine routine, blood sugar estimation, etc., were carried out whenever necessary. Necessary skin investigation like skin

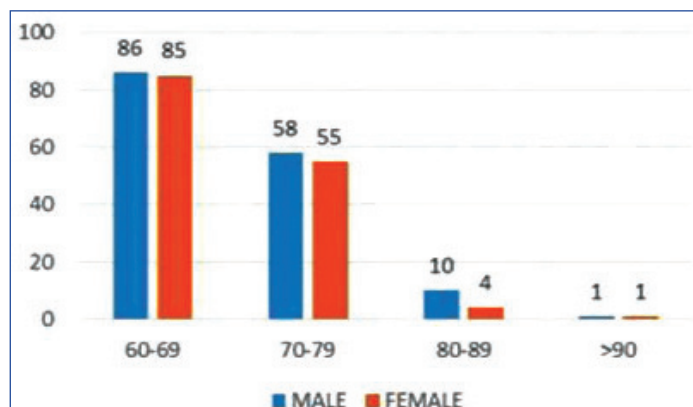
scrapings, nail clippings for fungus, Tzanck smears, and skin biopsies, were performed wherever indicated to support clinical findings. Co-morbidities and physiological skin changes were also noted. Clinical images of the dermatoses were taken and recorded with the consent of the patient.

STATISTICAL ANALYSIS

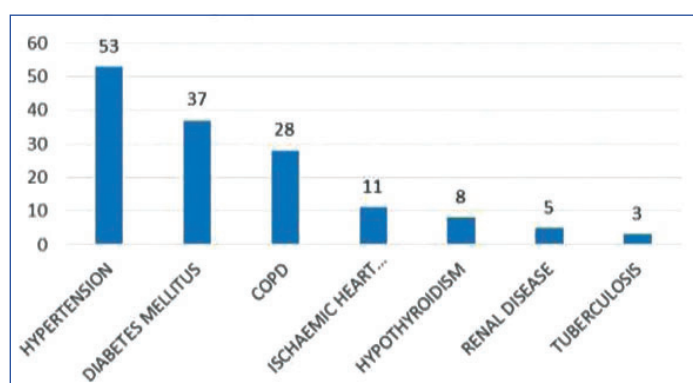
The data was collected in a Microsoft Excel sheet and entered into the Statistical Package for Social Sciences (SPSS) software version 22.0. Frequencies, percentages, and means of the variables were calculated.

RESULTS

A total of 300 patients were recruited for the study: 155 (51.66%) were males, and 145 (48.33%) were females. The male-to-female ratio was 1.07. Out of the total, 215 (71.66%) patients belonged to rural regions. The age distribution of patients was as follows: the largest group was in the age range of 60-69 years with 171 patients (57%), followed by the age range of 70-79 years with 113 patients (37.66%), and the age range of 80-89 years with 14 patients (4.66%) [Table/Fig-1]. The oldest patient was 92 years old. The mean age of the study population was 69.05±6.23 years. Regarding systemic diseases, hypertension was the most common, affecting 53 patients (17.66%), followed by diabetes mellitus in 37 patients (12.33%). The associated systemic illness is tabulated in [Table/Fig-2].



[Table/Fig-1]: Age and Sex distribution. Total N=300 patients



[Table/Fig-2]: Associated systemic illness. co-morbidities; COPD: Chronic obstructive pulmonary disease

The most common physiological skin condition was wrinkling, observed in 287 patients (95.66%). This was followed by xerosis/dry skin in 157 patients (52.33%) as shown in [Table/Fig-3,4].

Among viral infections, herpes zoster [Table/Fig-5] was the most common, with 15 cases (5%), followed by post-herpetic neuralgia with 10 cases (3.33%). Pyoderma was the most common bacterial infection, affecting 10 patients (3.33%). One case of BT Hansen's was also noted. Infection and infestations were the largest group of dermatoses, present in 134 patients (44.66%), followed by eczemas in 92 patients (30.66%) as shown in [Table/Fig-6].



[Table/Fig-3]: Xerosis/dry skin.

Physiological changes	No. of cases	Percentage
Wrinkling	287	95.66%
Dry skin	157	52.33%
Cherry angiomas	122	40.66%
Seborrheic keratoses	91	30.33%
Senile comedones	41	13.66%
Senile lentigines	67	22.33%
Colloid milium	32	10.66%
Senile purpura	28	9.33%
Idiopathic Guttate Hypomelanosis (IGH)	79	26.33%
Dermatosis papulosis nigra	37	12.33%
Callosity	14	4.66%
Fissuring of soles	89	29.67%

[Table/Fig-4]: Physiological skin changes in geriatric patients.



[Table/Fig-5]: Herpes zoster.

Infections and infestations	n	(%)
Scabies	42	14%
Fungal	50	16.67%
Dermatophytic infections	38	12.66%
Onychomycosis	4	1.33%
Pityriasis versicolor	1	0.33%
Candidiasis	7	2.33%
Viral	26	8.66%
Herpes zoster	15	5%
PHN	10	3.33%
Warts	1	0.33%
Bacterial	16	5.33%
Pyoderma	10	3.33%
Folliculitis	4	1.33%
Furunculosis	1	0.33%
Hansens disease	1	0.33%
Total	134	44.66%

[Table/Fig-6]: Frequency of infectious geriatric dermatoses.

There were a total of 17 cases (5.66%) with papulosquamous disorders. Among them, 11 cases (3.66%) were diagnosed with psoriasis, including eight cases of psoriasis vulgaris, two cases of erythroderma [Table/Fig-7], and one case of pustular psoriasis.



[Table/Fig-7]: Erythrodermic psoriasis.

Generalised pruritus not attributable to any skin lesions was observed in 28 cases (9.33%). Among them, three patients had diabetes, two had hypothyroidism, and one had chronic kidney disease. The rest were diagnosed with senile pruritus. Photodermatitis was seen in 11 patients (3.66%) [Table/Fig-8]. Connective tissue disease was present in four cases, including two cases of discoid lupus erythematosus and one case each of extragenital and genital lichen sclerosus et atrophicus [Table/Fig-9]. Only one patient presented with bullous pemphigoid among immuno-bullous disorders [Table/Fig-10]. Miscellaneous conditions included three cases each of corn and keloid, two cases of vasculitis, and one case each of traumatic ulcer, diabetic ulcer, and aphthous ulcer. Additionally, one case each of sebaceous hyperplasia, alopecia areata, lichen amyloidosis, delusion of parasitosis, fixed drug eruption, erythema ab igne, and angina bullosa hemorrhagica [Table/Fig-11] were recorded. No cases of skin malignancy were observed. The frequency of various non-infectious pathological dermatoses is shown in [Table/Fig-12].



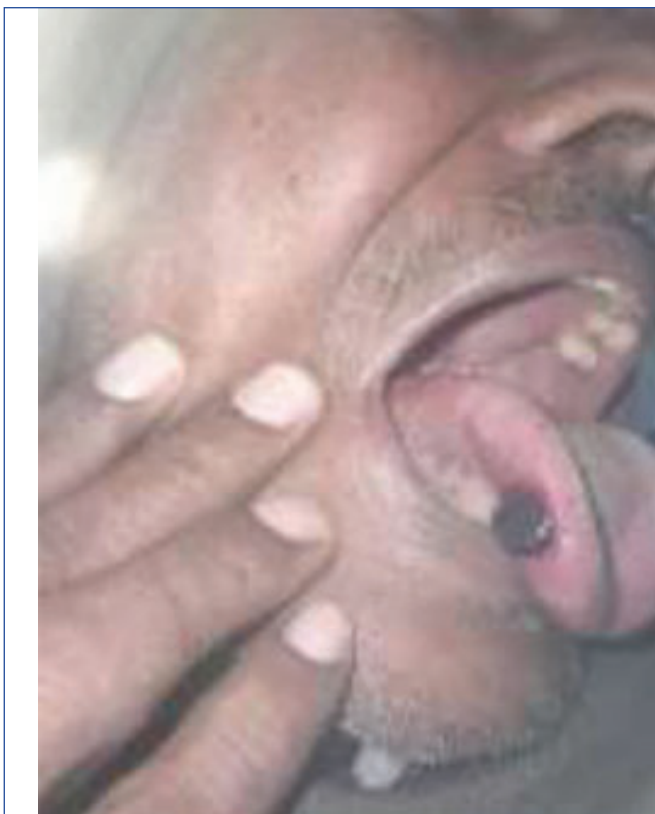
[Table/Fig-8]: Photodermatitis.



[Table/Fig-9]: Lichen sclerosus atrophicus.



[Table/Fig-10]: Bullous pemphigoid.



[Table/Fig-11]: Angina Bullosa Haemorrhagica.

Non infectious dermatoses	n	(%)
Eczemas	92	30.66%
Allergic contact dermatitis	17	5.66%
Irritant contact dermatitis	4	1.33%
Hand and foot eczema	8	2.66%
Seborrhoeic dermatitis	12	4%
Atopic dermatitis	4	1.33%
Lichen simplex chronicus	9	3%
Stasis eczema	3	1%
Airborne contact dermatitis	2	0.66%
Pompholyx	4	1.33%
Infected eczema	5	1.66%
Prurigo nodularis	4	1.33%
Asteatotic eczema	11	3.67%
Non specific eczemas	9	3.00%
Papulosquamous diseases	17	5.66%
Psoriasis	11	3.66%
Lichen planus	6	2%
Photodermatitis	11	3.66%
Vitiligo	3	1%
Urticaria/angioedema	8	2.66%
Miliaria	8	2.66%
Connective tissue disease	4	1.33%
Immunobullous	1	0.33%
Pruritus	28	9.33%
Other	18	6.00%

[Table/Fig-12]: Frequency of non-infectious pathological dermatoses.

DISCUSSION

Ageing is a natural process with many physiological and pathological changes. These changes are a result of intrinsic aging along with cumulative extrinsic environmental insults, like sun exposure. Although these changes are mostly harmless, they can lead to high morbidity and decreased quality of life in the elderly.

Hence, aged skin requires special attention and care to prevent complications secondary to cutaneous changes [3,4]. In this study, a geriatric population aged 60 years and above was enrolled, similar to studies done by Agarwal R et al., and Simin MK et al., [3,4]. The majority of patients were in the age group of 60-69 years, which is comparable to studies done by Agarwal R et al., and Raveendra L [3,6]. This can be explained by the fact that as age increases, it becomes very difficult to access health services due to poor health conditions.

In this study, 300 patients were enrolled, of which 155 (51.66%) were males and 145 (48.33%) were females. This male preponderance was consistent with studies done by Raveendra L, Patange VS, Fernandez RJ, and Jha HK et al., [6-8]. In a study done by Simin MK et al., female predominance was seen, which can be attributed to a higher literacy rate in females and good healthcare facilities in that region [4]. The most common co-morbid condition was hypertension, present in 53 (17.66%) of patients, followed by diabetes mellitus in 37 (12.33%). This is consistent with the studies done by Raveendra L and Kumar D et al., [6,9].

The most common presenting complaint was itching in 230 (76.67%) patients. A similar incidence of pruritus (78.5%) as a presenting complaint was seen in a study done by Patange VS and Fernandez RJ [7]. Raveendra L noted pruritus in 44% of patients [6]. In most cases, itching was attributable to cutaneous dermatoses. Patients presenting with complaints of chronic generalised pruritus (9.33%) without any lesions suggestive of specific dermatoses were further investigated to rule out underlying causes. Senile pruritus was a diagnosis of exclusion. Out of these, three patients had diabetes, two patients had hypothyroidism, and one had chronic kidney disease, and (7.3%) were diagnosed with senile pruritus. Patange VS and Fernandez RJ noticed senile pruritus in 3.8% of cases [7].

All patients showed signs of aging, with wrinkling being the most common physiological skin change seen in (95.66%) of cases. Simin MK et al., and Raveendra L reported wrinkling in 98.5% and 88% of cases, respectively [4,6]. With increasing age, the skin becomes less elastic, there is a reduction in the secretion of natural oils leading to decreased moisture. This, along with chronic sun exposure and personal habits like smoking, leads to decreased collagen production, leading to skin wrinkling [4]. Agriculture, which leads to chronic sun exposure, is the main occupation in this area, and hookah smoking is also quite common. These factors also accelerate photoaging. Xerosis was observed in 157 (52.33%) cases in the present study, similar to Paliwal G et al., (55.9%) and Chopra A et al., (50.8%) [10,11]. A higher incidence of xerosis was noted in Beauregard S and Gilchrist BA (85%) and Tindall JP and Smith JG (77%) [12,13]. This can be explained by differences in geographical conditions and climatic factors. Cherry angiomas were seen in 122 (40.66%) patients in the present study, while Agarwal R et al., noted cherry angiomas in 91.8% [3]. Seborrheic keratoses were seen in (30.33%) of cases in the present study, comparable to Patange VS and Fernandez RJ (37.5%) [7]. In the study done by Simin MK et al., the incidence of seborrheic keratoses was 54.5% [4]. The incidence of senile lentigines in the present study was 22.33%, comparable to Simin MK et al., [4]. A higher incidence was reported by Beauregard S and Gilchrist BA (70.6%) [12]. This may be due to differences in Fitzpatrick skin type and racial factors. Fissuring of the soles was observed in 29.67% of cases in the present study. A higher incidence of sole fissuring was seen in a study conducted in Libya by Alramaity Omer N et al., [14]. Idiopathic Guttate Hypomelanosis (IGH) was recorded in 26.33% of cases. A study by Grover S and Narsimhalu C reported a higher incidence of IGH (76.5%) [15]. Senile comedones were observed in (13.66%) cases, similar to Agarwal R et al., (13.2%) [3]. 9.3% of

the participants had senile purpura. Almost a similar incidence was reported by Patange VS and Fernandez RJ (9%) and Raghvendra BN and Rajesh G (9.67%) [7,16].

Among pathological dermatoses, infections and infestations were the most frequent (44.66%), followed by eczema (30.66%). Scabies was the only infestation observed, seen in (14%) of patients. A lower incidence of scabies was observed in the study done by Simin MK et al., (1.5%) and Darjani A et al., (4.3%) [4,17]. The higher number of scabies cases in the present study may be due to overcrowding, poor living conditions, and poor hygiene. Fungal infections accounted for the highest proportion of infections, with (16.67%) of cases. Dermatophytic infections were the most common fungal infections. This is comparable to the study done by Jindal R et al., (18%) [18].

The high prevalence of fungal infections may be due to age-related changes in immunity and other predisposing factors like humidity, use of topical corticosteroids, and poor skin care. The incidence of viral infections in the present study was 8.66%, which is similar to the study done by Jindal R et al., (7.6%) [18]. Herpes zoster was the most common viral infection observed. One case presented with disseminated herpes zoster. The higher incidence of herpes zoster in old age is due to a decrease in cell-mediated immunity with advancing age, which can reactivate the varicella-zoster virus. A total of 5.33% of cases were diagnosed with bacterial infections, which is similar to the study done by Patange VS and Fernandez RJ (8.5%) [7]. A higher incidence of bacterial infections was seen in Agarwal R et al., (29.2%) and Simin MK et al., (24.5%) [3,4]. One case (0.33%) of Hansen's disease (Borderline lepromatous) was noted. The incidence of Hansen's disease was 6% in the study done by Raveendra L [6]. No cases of cutaneous tuberculosis were recorded.

The increased susceptibility of older individuals to infections, including dermatological infections, probably arises from functional changes driven by the aging process of the immune system, known as immunosenescence, as well as poor personal care due to declining health [19]. Immunosenescence is an umbrella term that describes the failing of the immune system with age. With advancing age, the adaptive immunity weakens due to a low number of CD8+ naïve T cells and an increased number of memory cells, resulting in

a correspondingly reduced diversity of the T Cell Antigen Receptor (TCR) repertoire. Additionally, an increased pro-inflammatory status contributes to the morbidity and mortality seen in the elderly [19].

Among the non-infectious dermatoses, eczema formed the major group (30.66%). The incidence of eczema was comparable to studies done by Agarwal R et al., (30.6%), Raveendra L (31%), and Thapa DP et al., (35.8%) [3,6,20]. Allergic contact dermatitis (5.66%) was the most common. The higher incidence of eczema is due to agricultural practices in this region, like long hours of work in heat and sun, the use of chemical sprays, which is further worsened by the use of self-medications with various over-the-counter products containing different allergens, as well as the use of soaps and detergents. Xerosis, along with age-related barrier dysfunction, also predispose the elderly to eczemas. The prevalence and pattern of eczema in different regions also differ due to genetic predisposition and environmental allergens in the locality [21].

Psoriasis was present in (3.66%) of patients. Two cases of psoriasis presented as erythroderma. The higher incidence of psoriasis was seen in studies by Simin MK et al., (8.5%) and Sanyogita S et al., (15%) [4,22]. A 2% of cases of lichen planus were noted, which is similar to Sahoo A et al., (2.4%) [23]. Among vesicobullous disorders, a single case (0.33%) of bullous pemphigoid was recorded, which is similar to the study done by Sanyogita S et al., (0.33%) [22]. The incidence of bullous pemphigoid was higher in the study done by Agarwal R et al., (2%) [3]. No cases of pemphigus and dermatitis herpetiformis were seen. The incidence of vesicobullous disorders in studies done by Sharma A et al., and Mehra M et al., were 5.71% and 3.2%, respectively [24,25].

In connective tissue diseases, two cases of lichen sclerosus atrophicus and two cases of discoid lupus erythematosus were reported. Raghavendra BN et al., reported 0.33% of cases of discoid lupus erythematosus in his study [16]. No cases of cutaneous malignancy were observed. Due to Fitzpatrick skin types 3 and 4, the incidence of skin cancer is low in the Indian population compared to Caucasians [26].

Among other conditions, the incidence of vitiligo is 1%. The incidence of vitiligo was higher in Agarwal R et al., (6.6%) [3]. A comparison of observations in geriatric studies from different regions is shown in [Table/Fig-13] [3,4,6,8,9,16,18,23-25].

S. No.	Name of author and publication year	Place of study	Year of study	Total no. of subjects	Age in years	Observation
1	Agarwal R et al., 2019 [3]	Northern India	Not mentioned in the study	500	>60	Bacterial infection- 29.2%, Scabies-9% c, Allergic contact dermatitis-30.6%
2	Simin MK et al., 2021 [4]	North Kerala	Not mentioned in the study	200	>60	Xerosis-56.5%, eczema-32.5%, Fungal infections-30.5%, Bacterial infections-24.5%, scabies-1.5%
3	Raveendra L et al., 2014 [6]	Bangalore	Not mentioned in the study	200	>65	Pruritus-44%, Xerosis-93%, Wrinkle-88%, Hansens disease-6%
4	Jha HK 2020 [8]	Nepal	May 2014 to April 2015	235	>60	Infections and Infestations-38.61%, Eczema-18.69%, Papulosquamous-11.78%
5	Kumar D et al., 2021 [9]	Eastern India	Not mentioned in the study	250	>60	Infections-30%, dermatitis-29.6%, papulosquamous-18.4%, immunobullous-6.4%
6	Raghavendra BN and Rajesh G 2020 [16]	Kolar, Karnataka	Not mentioned in the study	300	>60	Wrinkling-94%, Eczematous dermatitis-44.3%, Infections and infestations-40.6%
7	Jindal R et al., 2016 [18]	Uttarakhand	August 2012 to August 2014	1380	>60	Erythematous squamous disorder-38.9%, Infections-29.9%, Senile pruritus-9%
8	Sahoo A et al., 2000 [23]	Orrisa	October 1997 to September 1998	200	>55	Pruritus-54%, Psoriasis-9%, Vitiligo-3.5%
9	Sharma A et al., 2022 [24]	South eastern Rajasthan	May 2018 to May 2020	210	>60	Generalised pruritus-28.57%, Eczema-39.04%, Infections-38.57%, Vesiculobullous-5.71%
10	Mehra M et al., 2021 [25]	Northern India	November 2017 to November 2018	440	>60	Infections and Infestations-51.3%, Papulosquamous-12.7%, Neoplasia-27.3%, immunobullous-3.2%
11	Present study	Haryana	September 2022 to February 2023	300	>60	Infections and infestation-44.66%, Eczemas-30.66%, Psoriasis-3.66%

[Table/Fig-13]: Comparison of observation in geriatric studies from different regions [3,4,6,8,9,16,18,23-25].

Limitation(s)

This was a single-centre hospital-based study, so the results may not be representative of the general population. Due to the limited duration of the study, seasonal variations were not studied. More studies with a better sample size need to be done to study the effects of co-morbidities, socio-economic status, the effect of exposure to the sun, etc.

CONCLUSION(S)

This study provides us with information about the patterns of physiological and pathological changes in aging skin. In the present study, infectious diseases and eczema formed a major group. These conditions are manageable with proper skincare practices. A comprehensive understanding of these dermatoses helps in early diagnosis and treatment, thereby reducing morbidity and improving quality of life.

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