

Article

A Retrospective, Cross-sectional Hospital-based Study to Determine the Epidemiological, Clinical and Comorbidity Characteristics in Older Adults with Psoriasis

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Abstract: Background: Psoriasis is extensively studied among middle-aged adults, but not many have studied psoriasis in older adults (geriatrics). **Objectives:** To analyze epidemiological, clinical, comorbidities and therapeutic profile of geriatric psoriasis (GP). **Methods:** All consenting clinically diagnosed psoriatic patients ≥ 60 years were divided into two groups: Elderly psoriatic (EP) (60-75 years) and Ultra elderly psoriatic (UP) (>75 years). The dermatologist filled their clinical characteristics' standardised questionnaire to determine comorbidities, drug interactions profile and compared with age-matched controls using Chi square test. **Results:** Prevalence of GP is 14.5% (Average age: 68 years; Sex ratio=2.5:1) among geriatrics attending dermatology OPD. Most common (49.9%) as well as initial site affected (39.3%) were Palms±Soles. Nummular plaque (90.2%) was most common type. Superficial fungal infection (26.9%) and pruritus (90.8%) were commonly associated cutaneous disease and symptom ($p < 0.05$) respectively. Hypertension (49.7%), Diabetes Mellitus (22.8%), dyslipidemia (25.8%) and Metabolic syndrome (MS) (17.8%) were associated systemic comorbidities. Dyslipidemia and MS ($p < 0.0001$) were more common among GP (163) than controls (963). Drug aggravated psoriasis could not be linked to polypharmacy. Although, topicals were mainstay, oral Methotrexate was most efficacious systemically. **Conclusion:** Our findings suggest a trimodal age of psoriasis onset at 68 years. As age advances, psoriasis severity decreases, unstable guttate lesions decrease; palms±soles commonly involved; infrequent familial occurrence with Polypharmacy not aggravating psoriasis. Active screening for cardiovascular comorbidities in all geriatric psoriasis patients is highly recommended.

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1. Introduction

Indian Government's 'National Policy on Older Persons' defines 'senior citizen/geriatric/ elderly' as a person ≥ 60 years [1]. Geriatric population (104 million) is expected to rise from 8% (2015) to 19% (2050) [2]. About 4.9% of patients had psoriatic onset after 60 years of age and the proportion might increase in aging society [3]. Many Indian studies describe psoriasis epidemiology [4-11] in adults, but none have outlined specific epidemiological trends of psoriasis in geriatric Indian population. This contributes to the underestimation of age-related psoriatic problems.

Our study aimed to analyze the prevalence of Geriatric Psoriasis (GP) and to identify its specific epidemiological, clinical, comorbidity and therapeutic trends.

2. Material and Methods

A retrospective, outpatient, tertiary hospital-based, cross-sectional study was conducted to include patients ≥ 60 years (geriatrics) with self-reported dermatosis between 1st June 2020 to 31st May 2021. They were arbitrarily divided into groups of ‘Elderly:60-75 years’ and ‘Ultra elderly:>75 years’, as no such division is defined in Indian population [1]. (Figure 1) Inclusion criteria involved the subject to be of an appropriate age, maintain verbal contact for medical history and allow examination. Psoriasis being easily diagnosed clinically, diagnostic tests were performed only when necessary [12]. Cases with doubtful diagnosis, refusing biopsy and denying informed written consent were excluded.

Psoriasis	Elderly(60-75 years)	Ultraelderly(≥ 75 years)	Total
Present	141(16.6%)	22(7.9%)	163(14.5%)(Cases)
Absent	707(83.4%)	256(92.1%)	963(85.5%)(Controls)
Total	848(75.3%)	278(24.7%)	1126(100%)

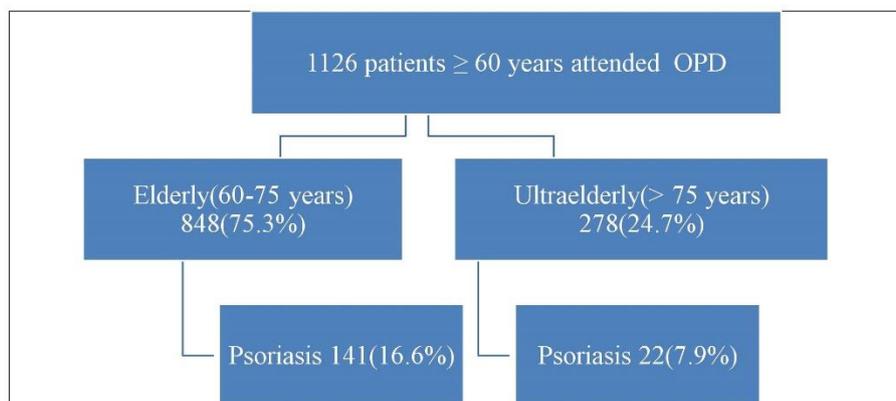


Figure 1. Prevalence of Psoriasis in patients > 60 years with self-reported dermatosis.

2.1. Study design

All demographic and medical information was recorded using a psoriasis questionnaire, evaluated and filled by an independent dermatologist to record patients’ demographics; habits; triggers, pruritus, detailed Psoriasis onset, duration, site, disease course, severity, Psoriasis Area Severity Index(PASI), triggers, and/or previous/current systemic treatment with PASI 75 response, side effects, drug interactions or any other concomitant skin or systemic comorbidity and management for patients attending our Psoriasis clinic.

Systemic comorbidities were compared with geriatrics having other self-reported dermatosis(except psoriasis) as controls. The relationship between these comorbidities and clinical characteristics of psoriasis were investigated.

2.2. Statistical analyses

Categorical variables were presented as numbers, percentages; Odd’s ratio and Chi square tests used for comparison of proportions with $p < 0.05$ as test of significance on MedCalc for Windows, version 19.4.1(Med Calc Software, Ostend, Belgium) using two-tailed tests.

3. Results

3.1. Demographic data

A total of 1126 patients ≥ 60 years with self-reported dermatosis(60-88 years) attended our department; of which 163(14.5%) had psoriasis; average: 67 ± 5.94 years with confidence

interval(CI 95%) 66-68. They were divided into 'Elderly Psoriatics(EP)' and 'Ultraelderly Psoriatics(UP)' with a median age of 65 and 78 years respectively.(Figure 1) Both groups were comparable for their baseline characteristics. (Table 1)

Table 1. Demographic profile of Geriatric Psoriatic patients.

Sr. No.	Characteristics		Elderly (60-75 years)		Ultraelderly (> 75 years)		P value (p < 0.05)	χ^2	Grand total	
			Freq	%	Freq	%			Freq	%
1	Gender	Males	102	72.3	14	63.6	0.4	0.7	116	71.2
		Females	39	27.3	8	36.4			47	28.8
		Total	141	86.5	22	13.5			163	100
2	Body Mass Index(BMI) ⁴³	Underweight (<18.5 kg/m ²)	2	1.4	3	13.6	0.00055	17.52	5	3.1
		Normal or lean(18.5–22.9 kg/m ²)	17	12.1	5	22.7			22	13.5
		Overweight(23.0 –24.9 kg/m ²)	78	55.3	10	45.5			88	54.0
		Obese(≥25 kg/m ²)	44	31.2	4	18.2			48	29.4
3	Duration since Psoriasis onset	< 10 years	112	79.43	15	68.2	0.07	3.2	127	77.9
		≥ 10 years	29	20.57	7	31.8			36	22.1
4	First Visit to the Dermatologist for management after Psoriasis onset within	< 6 months	126	89.36	22	100	0.28	2.58	148	90.8
		6 months-2 years	9	6.38	0	0			9	
		> 2 years	6	4.26	0	0			6	
5	Associated skin disorder	Yes	47	33.3	7	31.8	0.88	0.02	54	33.1
		No	94	66.7	15	69.2			109	67.9
6	Habits	Smoking	29	20.6	4	18.2	0.125	4.15	33	20.3
		Alcoholism	17	12.1	1	4.5			18	11
		Tobacco	30	21.3	6	27.3			36	22.1
		Others	0	0	0	0			0	0

Inspite of a significant difference($p < 0.05$) between body weights of both groups, no significant relationship could be established between Body Mass Index, psoriasis duration and severity(PASI). Tobacco and alcoholism were most prevalent.

About one third of GP had concomitant other skin disorders. Superficial fungal infections(26.9%),eczema(5.52%), nail(4.29%) and hyperpigmentary disorders(3.68%) were most common.

3.2. Clinical Characteristics

Nummular Plaque Psoriasis(NPP)(90.18%) was most common GP phenotype. Seven(5%) EP presented with guttate lesions while none in UP($p < 0.05$). (Table 2)

Table 2. Clinical characteristics of geriatric psoriasis.

Sr. No.		Characteristics		Elderly (60-75 years)		Ultraelderly (> 75 years)		P value ($p < 0.05$)	χ^2	Grand total	
				Freq	%	Freq	%			Freq	%
1	Morphological type of psoriasis	Chronic plaque psoriasis	Nummular plaque (1-5 cm)	127	90.1	20	90.9	0.95	0.003	147	90.2
			Large plaque (> 5 cm)	9	6.4	2	9.1			0.48	0.48
		Guttate (<1 cm)		7	5	0	0	0.02	4.96	7	4.3
		Pustular		2	1.4	0	0	0.23	1.42	2	1.2
		Erythrodermic		1	0.7	0	0	0.39	0.71	1	0.6
		Others		4	2.8	0	0	0.09	2.84	4	2.45
2	Nails involved	Yes		53	37.6	11	50	0.07	3.12	64	39.3
		No		88	62.4	11	50			99	60.7
3	Psoriatic arthritis			0	0	0	0			0	0

Palms±Soles were most common initial site of GP onset(43.6%) along with most common site affected overall(49.9%). There was a significant difference amongst back and palms±soles affection in both groups($p = 0.0001, p < 0.05$). (Figure 2)

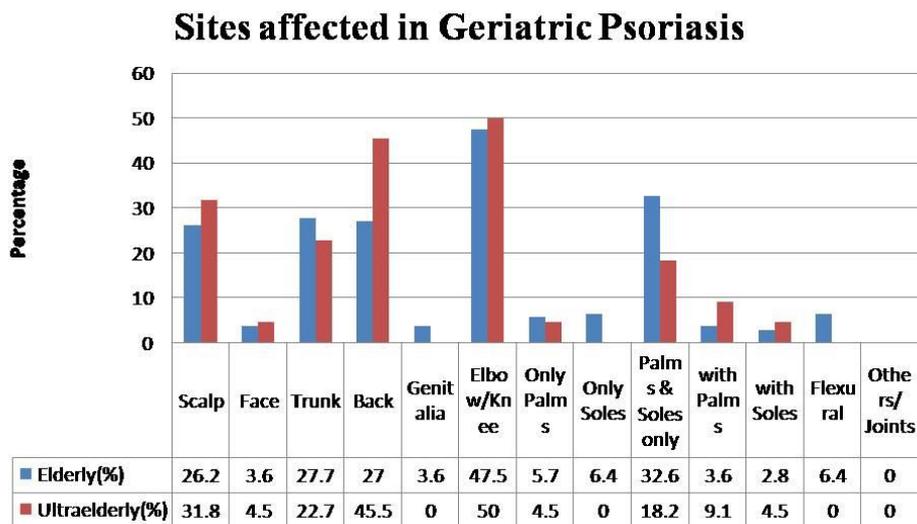


Figure 2. Sites affected in Geriatric Psoriasis.

Nails were involved in 26(49.1%)EP and 7(63.6%)UP with >1 psoriatic nail changes being present in 33(51.6%). Pitting(98.4%), Onycholysis(23.4%) and Subungual hyperkeratosis(17.2%) were most common nail changes.

Common GP triggers, subjective pruritus and improvement over 6 months are described in [Table 3](#).

Table 3. Geriatric psoriasis and its relation to common triggers, pruritus and subjective improvement.

Sr. No.	Characteristics		Elderly (60-75 years)		Ultraelderly (> 75 years)		P value (p < 0.05)	χ ²	Grand total	
			Freq	%	Freq	%			Freq	%
1.	Triggers									
a.	Family history of Psoriasis(1 st degree)	Yes	10	7.1	0	0	0.007	7.1	10	6.13
b.	Mental Stress	Yes	59	41.8	4	18.2	0.002	9.28	63	38.65
c.	Seasonal exacerbation	Yes	66	46.8	11	50	0.74	0.105	77	47.24
d.	Psoroatopic(presence of atopy)	Yes	15	10.6	3	13.64	0.53	0.381	18	11.04
e.	Seboatopic(predominant seborrhoeic involvement)	Yes	15	10.6	3	13.64	0.53	0.381	18	11.04
f.	Drug exacerbation	Yes	0	0	0	0			0	0
g.	Non-compliant exacerbation	Yes	38	27	4	18.2	0.19	1.71	42	25.8
2	Associated pruritus	None	11	7.8	4	18.2	0.04	4.16	15	9.2

		Mild	91	64.5	14	63.6	0.93	0.006	105	64.4
		Moderate	38	27	3	13.6	0.04	4.42	41	25.2
		Severe	1	0.7	1	4.6	0.09	2.86	2	1.2
3	Subjective sensation in last 6 months	Improved	82	58.2	8	36.4	0.02	5.02	90	55.2
		Stationary	7	5	1	4.6	0.89	0.016	8	5
		Wax and Wane	32	22.7	6	27.3	0.5	0.42	38	23.3
		Aggravated	20	14.1	3	13.6	0.9	0.009	23	14.1

Mild psoriasis(92.6%) was most common among both groups while moderate/severe psoriasis was seen in 12(7.4%) according to PASI.

Although GP severity was mild, systemic therapy was required in 66(46.8%) EP vs 3(13.6%) UP (p=0.0003). As monotherapy, 52.2%, 56.5%, 50%, 61.9% and 66.7% of EP started on Apremilast, oral Methotrexate, injectable Methotrexate, Acitretin and Cyclosporine respectively attained PASI 75. Apremilast, injectable Methotrexate and Cyclosporine were not used in UP. (Figure 3)

Efficacy of systemic therapy in Geriatric psoriasis

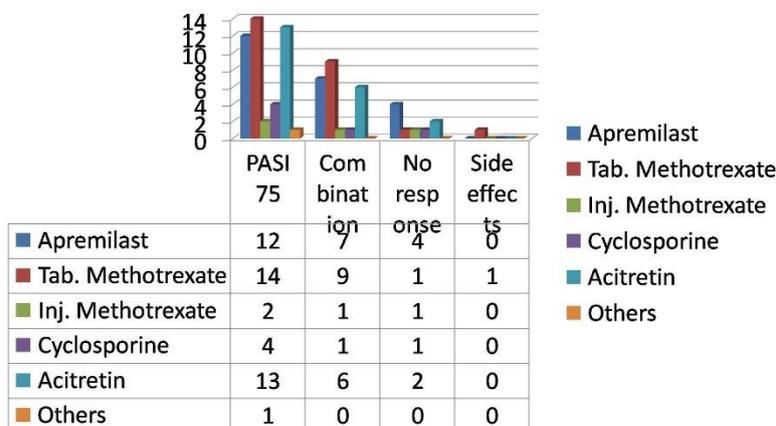


Figure 3. Efficacy of systemic therapy in Geriatric Psoriasis.

3.3. Systemic Comorbidity and Geriatric Psoriasis(GP)

The associated systemic comorbidities with duration and management were recorded in GP patients. (Table 4) Patients with longer duration of psoriasis(≥10 years) had higher prevalence of Diabetes mellitus(DM)(25%),Hypertension(HTN)(52.8%), Dyslipidemia(DL)(13.9%) and Metabolic syndrome(MS)(13.9%) which was statistically significant(p<0.01) for HTN and DM only. No significant difference was observed between the prevalence of comorbidities and psoriasis PASI severity.

Table 4. Systemic comorbidity profile in Elderly and Ultra elderly psoriatic groups.

Characteristics	Elderly	Ultraelderly			
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		Freq	%	Freq	%	Grand Total	%	P value
Associated Comorbidity	No	56	39.7	7	31.8	63	38.7	0.24
	Yes	85	60.3	15	68.2	100	61.3	
Arterial Hypertension(HTN)		67	47.5	14	63.6	81	49.7	0.12
	< 5 years	13	19.4	3	21.4	16	19.8	
	5-10 years	24	35.8	2	9.09	26	32.1	
	> 10 years	30	44.8	9	40.9	39	48.2	
Anti HTN Drugs								
Calcium Channel Blockers		52	77.6	13	92.9	65	80.3	
Diuretics		9	13.4	1	4.6	10	12.4	
Angiotensin Converting Enzyme Inhibitors		15	22.4	5	22.7	20	24.7	
Angiotensin Receptor Blockers		39	58.2	7	31.8	46	56.8	
Diabetes Mellitus type II(DM)		29	20.6	7	31.8	36	22.1	
	< 5 years	6	20.7	0	0	6	16.7	
	5-10 years	15	51.7	0	0	15	9.2	
	> 10 years	8	27.6	7	31.82	15	9.2	
Hypoglycaemic Drugs								
Metformin		25	86.2	7	31.8	32	88.9	
Sulfonylureas		21	72.4	7	31.8	28	77.8	
Thiozolididiones		7	24.1	3	13.6	10	27.8	
Acarbose		1	3.5	0	0	1	2.8	
Meglitides		6	20.7	2	9.1	8	22.2	
Insulin		1	3.5	0	0	1	2.8	
Dyslipidemia		33	23.4	9	41	42	25.8	
	< 5 years	5	15.2	1	1.1	6	14.3	
	5-10 years	16	48.5	1	1.1	17	40.5	
	> 10 years	12	36.4	7	77.8	19	45.2	
Ischaemic Heart Disease		11	7.8	6	27.3	17	10.43	
	< 5 years	3	27.3	3	50	6	35.3	
	5-10 years	4	36.4	0	0	4	23.5	
	> 10 years	4	36.4	3	50	7	41.2	
Metabolic syndrome		22	15.6	7	31.8	29	17.8	
Hypothyroidism		4	2.8	1	4.55	5	3.1	
	< 5 years	0		0	0	0	0	
	5-10 years	3	75	0	0	3	60	
	> 10 years	1	25	1	100	2	40	
Thyroxine		3	75	1	4.55	4	80	
Benign Prostatic Hyperplasia		5	3.6	1	4.55	6	5.2	

	< 5 years	2	40	1	100	3	50
	5-10 years	1	20	0	0	1	16.7
	> 10 years	2	40	0	0	2	33.3
Athritis except Psoriatic arthritis		4	2.8	0	0	4	2.4
	< 5 years	1	25	0	0	1	25
	5-10 years	1	25	0	0	1	25
	> 10 years	2	50	0	0	2	50
Renal disease		2	1.4	0	0	2	1.2
	< 5 years	0	0	0	0	0	0
	5-10 years	1	50	0	0	1	50
	> 10 years	1	50	0	0	1	50
Others		8	5.7	2	9.1	10	6.1
	< 5 years	3	37.5	1	50	4	40
	5-10 years	3	37.5	0	0	3	30
	> 10 years	2	25	1	50	3	30

On comparing systemic comorbidities with remaining 963 controls (patients with skin disorders other than psoriasis), it was found that DL and MS was significantly ($p < 0.0001$) more common in GP while DM more in controls ($p < 0.0001$). (Figure 4)

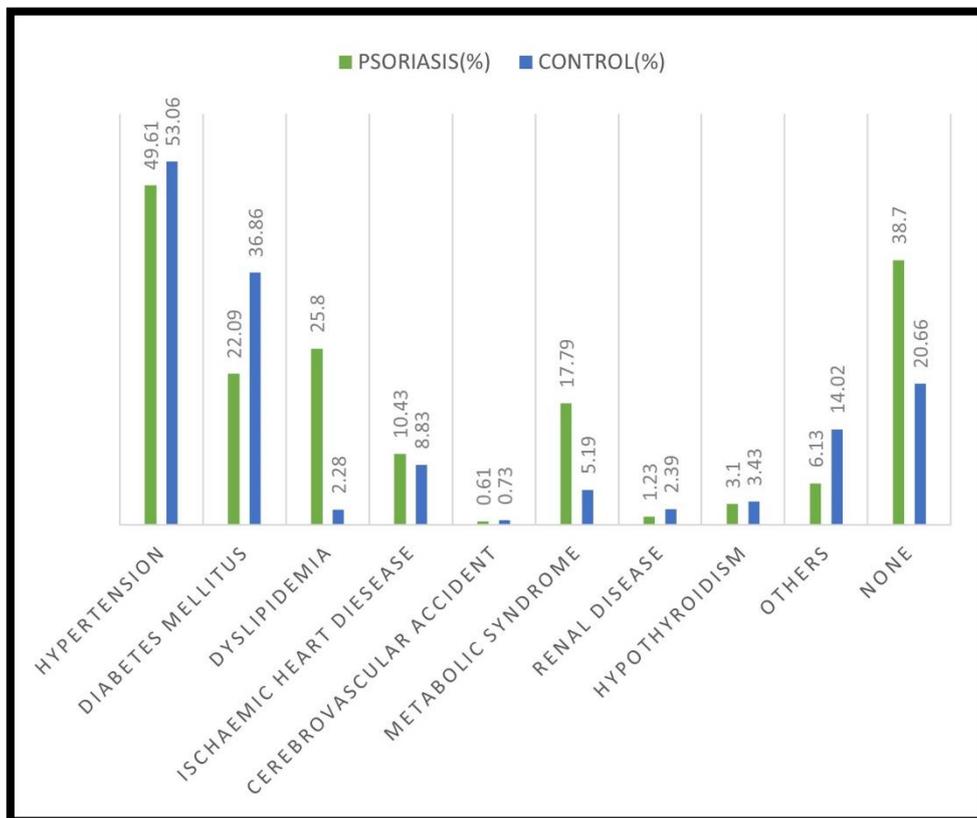


Figure 4. Systemic Comorbidities in Geriatric Psoriasis and Controls.

4. Discussion

Worldwide studies have reported an increasing trend in GP prevalence(3.1-18.9%) over the past 30 years [6,13-18] with few demonstrating decreasing prevalence in individuals >70 years [17,19]. In our study, a higher psoriasis prevalence(14.5%) was seen among the geriatrics ≥ 60 years with eldest being 88 years. While most Western studies [13,17,19,20] have used a cut off 'elderly age' at 65 years, we chose the cut off at 60 years as it's the retirement age as well as the 'Elderly age' adopted by the Indian Government [1]. Hence, GP prevalence has increased with rise in geriatric population.

In our study, GP prevalence was almost half(8.3%) in UP as compared to EP(16.4%)which could be attributed to the progressive impairment of the immune system with age -'Immunosenescence' [16]. (Figure 1)

North Indian studies report adult psoriasis prevalence as 0.8-2.3%; peak onset between third and fourth decades and a male:female ratio of 2.4:1 [4]. This ratio remained constant in our GP study(2.5:1) while Spanish GP study reported a lower 1.8:1 ratio [17].

Psoriasis has bimodal onset:early(20-30 years) and late(>40 years) [21] with a peak at 55 years [22]. Piaserico et al. [23] and Bedi et al. [24] reported psoriasis onset at 71 and 72 years respectively. In our study, 79.43% EP and 77.91% UP had psoriasis onset within 10 years; that is around 55 years corresponding to late-onset among EP and around 68 years for UP. Kwon et al. [25] identified 'Elderly onset group' with onset age >60 years. Takeshita et al. also reported average age of GP onset at 68 years [26]. Probably psoriasis is 'Trimodal in onset' with a third peak around 68 years which needs further observation. The oldest reported age of psoriasis onset is 108 years [22] while it is 82 years from India [6].

According to BMI, 31.2% EP were obese vs 18.2% UP in our study. In United States(US), only 9.3% were obese, [26] while Spanish GP study reported normal, overweight and obese BMI in 24.3%,31.4% and 44.3% respectively [17] accounting for regional constitutional genetic disparity [17].

A Multinational Assessment of Psoriasis and Psoriatic Arthritis survey from US reported a 2 year median delay from symptom onset to time of diagnosis and delayed dermatologist visit until a year [27]. Contrarily, 90.8% GP patients had visited Dermatologist within 6 months of psoriasis onset with 89.4% EP and 100% UP emphasizing easier Dermatologist access in India.

NPP accounts for 76-90% psoriatic cases [17,25,28] as in our study(90.2%), followed by LPP(6.7%) and guttate(5%). Interestingly, UP did not present with unstable guttate, erythrodermic or pustular lesions. This difference was statistically significant suggesting stability of psoriatic plaques with Immunosenescence. (Table 2) Interestingly, inverse psoriasis was not reported in our study in spite obesity being common and implicated to increase its prevalence [22].

Nail involvement varies from 13-50% with cumulative lifetime increase to 80%-90% [11]. Kwon et al. reported higher nail involvement in elderly onset psoriasis(27.9%) [25]. In our cohort, Nail involvement was seen in 37.6% EP and 50% UP in while Ferrandiz et al. reported a lower prevalence at 1.4% [11].

Scalp(36.8%) was the most frequent site of psoriasis origin, followed by extremity(19.3%),hand/foot(16.8%),knee/elbow(14.3%),face(9.2%) and trunk(4%) by Korean study [25]. Whereas we reported 43.6% palms/soles or both as initial site of involvement. Kumar et al. reported palms/soles were the first site of onset in 21% of adult Palmoplantar psoriasis [28]. The relation between age of onset and initially affected body part has rarely been reported and further supporting studies could provide useful information for clinicians.

Psoriatic plaques are most frequently found on the extensor surfaces(elbow/knees) of adults [29] but palms±soles were most commonly affected in our study.

In our study, PASI <10 was seen in 92.2% EP and 95.5% UP reiterating the observations by Kwon et al. [25] and Fernandes et al. [17] of psoriasis severity declining as age advanced [25].

Positive affection of first degree family relatives were observed in 28.6% in Spanish GP as opposed to a lower prevalence of 7.1% in EP and none in UP in our study ($p < 0.05$). Lower incidence of family history in the elderly-onset group corresponded well with previous reports [11,25] highlighting close association between earlier onset psoriasis, unstable lesions and higher incidence of family history [11]. This difference could be due to poor recall by UP or since late onset psoriasis is more stable due to Immunosenescence. Interestingly trauma/kobnerisation or infections exacerbating psoriasis was not seen in both groups as opposed to routinely seen in childhood or early onset psoriasis reiterating stability of GP [21,25].

Smoking and alcoholism were seen in 55.7% each >65 years [17] while in our study, there were 20.25% smokers, 11.04% alcoholics and 22.09% tobacco chewers. This difference could be attributed to the cultural differences in study populations.

Concomitant skin disorder was observed in 31.8% GP cases. Superficial fungal infections (Dermatophytosis-50%) was the most common reiterating the menace of dermatophytosis in India leaving no age group unaffected.

Mild Molin's extent [30,31] was outlined by Kwon et al. [25] along with Mild Haftek's activity [32] by Pott's et al. [7], Kwon et al. [25] and our study. (Figure 5)

Kwon et al. [25] described 32(25.4%), 50(39.7%), 25(19.8%) and 19(15.1%) vs 15(9.2%), 105(64.4%), 41(25.2%) and 2(1.23%) in our study to have none mild, moderate and severe symptoms respectively. We reported higher 'Improved'(55.2% vs 30%) and Wax and Waning'(23.3% vs 7.4%) subjective states as compared to Kwon et al. [25].

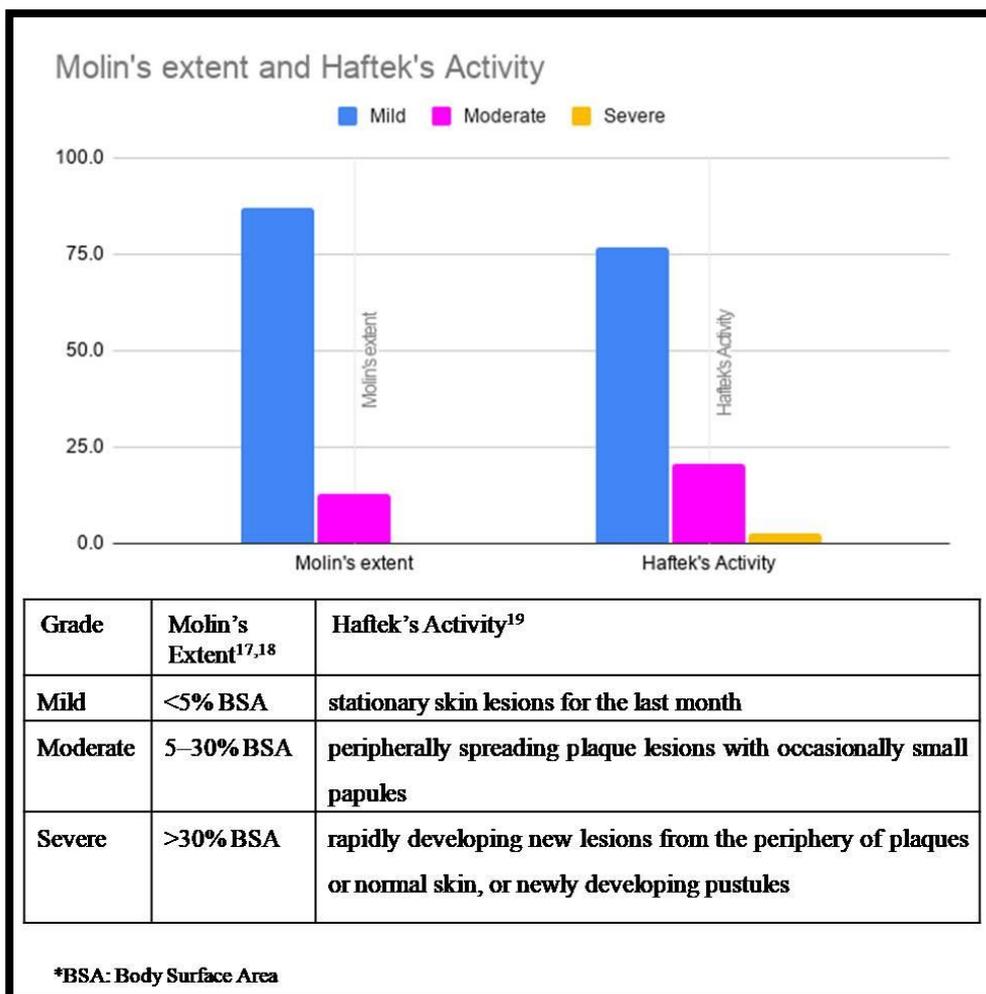


Figure 5. Psoriatic Activity

Although Psoriasis affects skin and joints primarily, [33] concurrent systemic illnesses with Psoriasis are termed as 'Comorbidity'. Genetic and environmental differences could account for 75% GP having at least one comorbid condition by Lebwohl et al. [27] vs only 38.7% in our study.

Takeshita et al. reported HTN(67.6%); DL(59.9%); DM(32.4%) of which 23.5% had atherosclerotic outcomes [26]. In Spanish GP, HTN, DM and DL were observed in 55.7%, 25.7% and 29% respectively similar to our study [17]. (Table 5)

Kim et al. in their analysis according to sex and age; found causal association between HTN and psoriasis risk, but HTN in ≥ 65 years was not associated with psoriasis incidence. They concluded that increased prevalence of obesity, DM, or DL related to inflammation and oxidative stress increase the risk of HTN in young adults which are similar to psoriatic pathogenesis, whereas the pathophysiology of HTN in the elderly include age-related elastic tissue degradation and arterial calcium deposition [34].

Early onset psoriasis is an independent risk factor for cardiovascular disease, this risk is highest with severe psoriasis [29,35]. The relationship between psoriasis severity and comorbidities varies in different studies. In a Malaysian study, HTN, DM, DL and obesity were more frequent in patients presenting late-onset psoriasis with significantly fewer instances of familial psoriasis with no significant difference in the prevalence of comorbidities and psoriatic severity [36]. A large study involving 131,560 patients reported increased prevalence of obesity and DM in patients with severe psoriasis [37].

Increased age-adjusted relative risk for myocardial infarction was reported in a population-based cohort study involving 130,976 patients [37] as well as Gelfand et al. [35], Xiao et al. [38] and Sommer et al. [39]. However, Gisondi et al. [40] found no correlation between psoriasis severity and prevalence of MS consistent with our findings. Of note for these studies is the fact that none of these were studied predominantly in the elderly age group and the definitions adopted for psoriasis severity were varied and inconsistent. Other psoriasis associated comorbidities [7] like Irritable bowel disease, psoriatic arthritis, depression, hepatorenal diseases and malignancies are associated were not observed in our study.

On comparing systemic comorbidities with remaining 963 controls, it was found that DL and MS were significantly($p < 0.0001$) more common among GP consistent with other studies [35,37,41] while interestingly DM was more common in controls($p < 0.0001$). (Table 5)

Table 5. Studies describing systemic comorbidities and Psoriasis.

Year	Author	Country	Age grp(years)	Hypertension		Diabetes Mellitus type II		Dyslipidemia		Ischemic Heart Disease		Metabolic syndrome	
				Psoriasis	Control	Psoriasis	Control	Psoriasis	Control	Psoriasis	Control	Psoriasis	Control
1985	Henseler et al. ⁴⁴	Germany	N/A	1.9	0.8	2.1	1.1	-	-	-	-	-	-
2002	Niemann et al. ³⁷	USA	20-90	34.7	11.9	11.5	3.3	10.7	3.3	-	-	-	-
2006	Gelfand et al. ³⁵	USA	31-63	14.7	11.9	4.4	3.3	4.6	3.3	1.8	1.4	-	-
2012	Mazlin et al. ³⁶	Malaysia	> 18	33.2	-	17.7	-	17.8	-	5.8	-	-	-
2012	Fernandez-Torres et al. ¹⁷	Spain	> 65	55.7	-	25.7	-	29	-	-	-	-	-
2015	Takshita et al. ²⁶	USA		67.6	-	32.4	-	59.9	-	23.5	-	-	-
2016	Phan C et al. ⁴¹	France	48.7 avg	26.1	-	11	-	27.5	-	-	-	-	-
2018	Feldman et al. ⁴⁵	USA	>20	39.7	33.7	15.5	13	38.7	33	10.7	8.7	-	-
2018	Kim et al. ³⁴	South Korea	> 20	5	3.3	-	-	-	-	-	-	-	-
2020	Yildizhan et al. ¹⁶	Turkey	≥65	57.3	-	33.7	-	22.5	-	22.5	-	-	-
2020	Our study	India	> 60	49.6	53.1	22.8	37	25.8	2.3	10.4	8.8	17.8	5.2

We observed increased prevalence of HTN, DM and DL if psoriasis duration was >10 years reinterating psoriatic march triggering systemic inflammation and atherosclerosis; or may be age-associated coincidence.

Angiotensin-converting enzyme inhibitors(ACEI),angiotensin-converting enzyme blockers(ARB),Calcium Channel Blockers(CCB),Thiazides, antimalarials, lithium and nonsteroidal anti inflammatory drugs are known to induce and exacerbate psoriasis [29]. Interestingly, in our study, none were on β blockers known to exacerbate GP [34]. Although theoretically, drug induced psoriasis is common [37] in geriatrics owing to polypharmacy, no such causal attribution could be established in our study despite CCB instead of β blockers being widely used to treat HTN in our institute.

Systemic therapy must take into consideration the patients' comorbidities (to identify contraindications) and co-medications (to avoid drug interactions). Comorbidities not only reduce therapeutic options, but can potentially be aggravated by anti-psoriatic treatment. Acitretin and Cyclosporine can increase serum triglycerides and cholesterol, negatively influencing DL linked to MS [33]. In our study, acitretin (31.8%) and cyclosporine (9.1%) was used in EP and PASI75 was achieved in 61.8% and 66.7% respectively in absence of any side-effects.

In a Spanish study, 54.3% GP were relieved with topicals alone, while conventional systemic therapy and biologics were required by 31.4% and 14.3% respectively [17]. Takeshita et al. [26] found oral methotrexate to be used most commonly for moderate-severe psoriasis, followed by biologics [25]. In our study, 63.8% were controlled with topicals alone while 36.2% required conventional agents to attain PASI75, while none required biologics. Phototherapy was received by only one EP indicating that although efficacious and safe, repeated weekly multi-hospital visits by a relatively morbid geriatric group was not preferred.

Our findings suggest a trimodal age of psoriatic onset at 68 years. Mental stress (41.8%) and Seasonal exacerbation (50%) are common psoriatic triggers in EP and UP respectively ($p < 0.05$). As age advances, GP prevalence increases; psoriasis severity decreases, unstable (guttate, erythrodermic, pustular) lesions decrease, soles more frequently involved and less familial occurrence. HTN (49.7%) and DL (25.8%) are the most common associated comorbidities and its prevalence increases if psoriasis duration > 10 years. In spite of polypharmacy, drug aggravated psoriasis could not be linked in either groups and with psoriasis severity. Topicals form the mainstay of GP management. Oral Methotrexate is most efficacious for systemic therapy. This is the first Indian study to describe the association between systemic comorbidities and their medication use, and risk of psoriasis incidence in elderly Indian population.

Limitations of this study include its observational nature, heterogeneous duration of treatment, non-representation of community GP prevalence being a hospital-based study. The findings are solely based on patient's history and available medical records. Selection bias could occur as comorbid patients more likely visit hospital. A large, multi-centre, prospective case-control study would help determine the relative risk for comorbidities among GP and various epidemiological and genetic trends.

The perception of psoriasis being merely 'skin deep' has to change among dermatologists and non-dermatologists alike. Active long-term screening for cardiovascular comorbidities along with proactive management of modifiable risk factors with appropriate subspecialty referrals in all adult psoriasis is highly recommended. Thus, physicians must be familiar with GP and provide patient-centered, cost-effective and practical management.

Data Privacy Statement

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

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