Brief Report

The Association of Alcohol Use Disorder and Chronic Plaque Psoriasis: Results of a Pilot Study

Abstract

Background: Association between alcohol consumption, alcohol use disorder, and clinical features of psoriasis patients has not been adequately studied in the Indian context. **Objectives:** To study the frequency of alcohol consumption, alcohol use disorder, and its association with age, gender, duration, and severity of psoriasis. **Materials and Methods:** One hundred and forty-six (M: F 6.3:1) patients completed the Alcohol Use Disorder Identification Test (AUDIT) questionnaire by World Health Organization (WHO). Excessive drinkers, occasional drinkers, and abstainers were defined. AUDIT provided a measure of alcohol consumption, its dependence, and its impact on daily life. The severity of psoriasis was graded as mild, moderate, and severe. **Results:** Seventy-four (50.7%) patients were aged ≤40 years and 51.4% of patients had the disease for <5 years. Psoriasis was mild in 48.6% and moderate to severe in 51.4% of patients, respectively. Only males (32.9%) were consuming alcohol in varying amounts; 19.9% were occasional drinkers (AUDIT score <8). Other 67.1% of patients completely abstained from alcohol consumption (AUDIT score 0). The remaining 13% were regular drinkers (AUDIT score >8) and had more severe psoriasis compared to patients having AUDIT score <8 ($P < 0.05$). A high level of alcohol use disorder and alcohol dependence was present in one patient each. **Limitations:** Few patients, particularly females may not have disclosed their alcohol consumption due to fear of stigmatization. Small number of patients, hospital-based cross-sectional study design, and no follow-up for clinical improvement after cessation of alcohol are other limitations. **Conclusions:** Alcohol consumption was associated with alcohol use disorder in 32.9% of patients (AUDIT score >8) and significantly severe psoriasis compared to 67.1% abstainers. Whether increased alcohol consumption is a consequence or a risk factor for chronicity of psoriasis needs large linear studies for confirmation.

Keywords: *Alcohol use disorders, alcoholism, AUDIT score, PASI score, plaque psoriasis*

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Introduction

The etiopathogenesis of psoriasis is considered a complex interplay of genetic, immunologic, and metabolic mechanisms with keratinocytes, Langerhans cells, mast cells, and T-cells playing a predominant role in the regeneration-like reaction of keratinocytes triggering psoriasis and its severity.[1-3] However, the role of infections (streptococcal), drugs (beta-blockers, lithium, interferon-α), and substance abuse (smoking, alcohol consumption), which apparently trigger, exacerbate, and influence the disease progression remains poorly understood.[4-9] How alcohol consumption affects psoriasis severity remains complex, and increased susceptibility for infections due to immune dysfunction/immunosuppression, stimulation of lymphocytes, proliferation of keratinocytes by keratinocyte growth factors and cycle activators such as cyclin D1, and excessive production of inflammatory cytokines have been implicated often.[10-13]

Studies have shown that psoriasis patients consumed alcohol more often and developed significant alcohol dependence among a variety of addictions as compared to the general population.[5,14,15] The type of alcohol and amount consumed also seems to trigger plaque psoriasis and/or its exacerbation.[6,7,15] There was also a definite correlation between high PASI score and level of alcohol consumption in a multicenter study of 1203 patients particularly in women with different subtypes of psoriasis.[16] These patients also tend to have severe inflammatory lesions

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with minimal scaling mainly involving the face and flexures while acral lesions are frequently hyperkeratotic.[17] The psoriasis patients also have an increased risk of premature mortality compared to the general population imputed to concurrent comorbidities, and the risk is 60% more for alcohol-related causes (alcoholic liver disease, fibrosis and cirrhosis, alcohol dependence, psychological and behavioral disorders, psychosis).[18-20]

Psoriasis is well known to significantly impair quality of life due to occupational, personal, or severe psychosocial morbidity. A survey by the National Psoriasis Foundation reported nearly 79% of patients having a negative impact on their lives and almost 5% contemplated suicide due to severe psoriasis.[20] This high prevalence of anxiety and depression may, in turn, encourage excessive alcohol consumption in 17–30% of patients leading to the development of alcohol-related problems and vice versa.[21] The patients who had alcohol problems also had higher anxiety and depression and more severe psoriasis compared to abstainers in the same study. Furthermore, alcohol abuse in psoriasis patients will have implications for decreased response and interaction with antipsoriatic medications.[15,22] Thus, it will be useful to delineate alcohol consumption behavior and alcohol use disorder in patients with psoriasis for holistic management. Although many researchers in the West have explored the alcohol-consuming behavior among psoriasis patients, this aspect remains largely understudied in Indian patients having socioeconomic status and alcohol consumption behavior different from that in the western countries. We studied the frequency of alcohol consumption and alcohol use disorder in Indian patients with psoriasis and also examined its associations with clinical features including age, gender, disease duration, and severity of psoriasis.

Materials and Methods

Two hundred consecutive adults having chronic plaque psoriasis were enrolled for this study between September 2015 and August 2016 after receiving informed written consent. The study was approved by the Institutional Ethics Committee. Pregnant and lactating women and patients with preexisting diabetes mellitus, hypertension, hepatorenal disease, collagen vascular disorders, morbid obesity [body mass index (BMI) >30 kg/m^2], and malignancy were excluded. The demographic profile, duration of psoriasis, personal history, and detailed medical history were recorded. The severity of psoriasis was assessed by the psoriasis area severity index (PASI) score and body surface area (BSA) measured by the Wallace rule of nines.[23] The severity of psoriasis was graded as mild (PASI <6 or BSA ≤10%), moderate (PASI = 6-12 or BSA 11-20%), and severe (PASI >12 or BSA >20).[23,24] Psoriatic arthritis when present was classified by Moll and Wright criteria.[25]

The individuals consuming alcohol >60ml daily were defined as excessive drinkers, those taking ≤60ml once in a while and not regularly were occasional drinkers, and abstainers were those who did not drink at all. The Alcohol Use Disorders Identification Test (AUDIT), a questionnaire developed and validated extensively by the World Health Organization (WHO), was used both in English and Hindi as per the respondent's preference.[26,27] AUDIT comprises 10 questions for current alcohol use and the frequency of personal drinking behaviors during the last 12 months and provides a measure of alcohol consumption and its dependence and impact on the patient's day to day life.[26,28] After explaining the purpose and procedure, the participants were asked to complete the questionnaire. Questions were explained only when not understood by the respondent. The responses for alcohol drinking were scored from 0 (never consumed) to 4 (consumed daily). A sum of 8 or more scores from the 10 items using cut-offs as defined by WHO was considered indicative of hazardous and harmful alcohol use and possible alcohol dependence.[26,28] In accordance with AUDIT protocol, for a score above 8, alcohol use disorder was considered very likely that needed management by appropriate interventions (vide infra). Patients with scores between 8 and 15 were considered to have a medium level alcohol problem requiring advice emphasizing reduction of hazardous drinking. Scores between 16 and 19 indicative of a high level of alcohol problem were considered appropriate for continued counseling and monitoring for the avoidance of alcohol consumption. Patients with scores of 20 or above were advised for further evaluation for alcohol dependence. A score of 0 was allocated to patients who did not consume alcohol. All patients were provided with standard treatment and counseling.

Data analysis

Two of the 148 (74%) questionnaires received back were incomplete and were excluded from the final analysis. MS Word Excel software was used to tabulate and analyze the data. The continuous data are presented as mean and standard deviation (SD), and categorical variables are presented as frequencies and percentages. The χ^2 test and student *t*-test were used for the statistical analysis of the categorical and parametric data, respectively. A $P < 0.05$ calculated at 5% level (95% confidence limit) was considered statistically significant.

Results

Table 1 shows baseline features of 146 patients comprising 126 males and 20 females (M: F = 6.3:1) aged between 21 and 75 years (mean ± SD 42.69 ± 13.28 years). Forty-three (29.4%) patients had moderate to severe psoriasis and the disease was mild in 103 (70.5%) patients. No patient had psoriatic arthritis.

None of the women had a history of alcohol consumption and only 48 (32.9%) male patients were taking alcohol.

Table 1: Baseline characteristics of patients with psoriasis

Baseline characteristics		Number of patients (%) *n*=146
Gender	Males	126 (86.3)
	Females	20 (13.7)
	M:F	6.3:1
Age in years	Range	21-75
	Mean±SD	42.69±13.28
	21-30	31 (21.2)
	31-40	43 (29.5)
	41-50	33 (22.6)
	51-60	23 (15.7)
	>60	16 (11.0)
Duration of psoriasis	Range	1mo-40 y
	Mean±SD	7.17±8.11 y
	<5 y	75 (51.4)
	5-10 y	35 (24.0)
	>10 y	36 (24.6)
PASI score (severity)	<6 (mild)	103 (70.5)
	6-12 (moderate)	37 (25.3)
	>12 (severe)	06 (4.1)
BSA (severity)	<10% (mild)	71 (48.6)
	10-20% (moderate)	41 (28.1)
	>20% (severe)	34 (23.3)
Alcohol consumption	No	98 (67.1)
	Yes	48 (32.9)
AUDIT score (Alcohol use disorder)	<8 (No)	29 (19.9)
	≥8 (Yes)	
	8-15=17	19 (13.0)
	16-19=1	
	≥20=1	

AUDIT, Alcohol use disorder identification test; BSA, body surface area; PASI, psoriasis area severity index; mo, month; y, years. Notes: The Alcohol Use Disorders Identification Test (AUDIT) questionnaire by WHO assesses hazardous level drinking (questions 1to3 for frequency of drinking, typical quantity, and frequency of heavy drinking), dependence symptoms (questions 4 to 6 for an impaired control over drinking, an increased salience of drinking, and morning drinking), and harmful alcohol use (questions 7 to 10 for guilt after drinking, blackouts, alcohol-related injuries, and others concerned about drinking)

Twenty-nine (19.9%) patients consumed alcohol once in a while and on social occasions and their AUDIT score was less than 8 and comprised the majority. Other 19 (13%) patients had been taking alcohol daily in varying amounts, which they could not quantify. Seventeen of them had a medium level of alcohol problem (AUDIT score between 8 and 15), one patient had a high level of alcohol problem (AUDIT score between 16 and 19) and another patient had AUDIT score >20 requiring further psychiatric evaluation for alcohol dependence and de-addiction. Table 2 depicts comparative characteristics of patients consuming alcohol. Significantly more patients had moderate to severe disease both in terms of PASI score and BSA involvement having AUDIT score above 8 compared to patients having AUDIT score below 8 ($P < 0.05$). However, there was no statistically significant difference in their age, duration, and severity of psoriasis when compared with abstainers.

Discussion

Apparently, alcohol consumption prevalence of 32.9% in this study is in conformity with prevalence rates between 23% and 74% in population-based studies conducted in different parts of India where women constituted over 90% of the abstainers and reasonably high current alcohol use among older urban males as compared to their rural counterparts was noted.[29,30] Although corresponding to these trends, it remains distinctly possible that the less number of women in this study is perhaps due to their non-participation, as alcohol consumption for them is not accepted socially barring few tribal communities in the state.

Psoriasis patients are known to have significant dependence on alcohol consumption compared to the general population and our observations more or less conformed with earlier studies.[14,15,31] Although data on the relation of alcohol consumption and psoriasis remains less conclusive than that for smoking, a correlation between excessive alcohol consumption and new-onset psoriasis and psoriasis severity has been observed among both men and women across time and regions.[6,15,16,22,32-36] Poikolainen *et al*.[6] observed that alcohol is a risk factor for psoriasis severity in young and middle-aged men that may itself encourage them to continue drinking more. According to Qureshi *et al*.[7] consuming more than two alcoholic beverages weekly and nonlight beer, in particular, is an independent risk factor for new-onset psoriasis in females. A similar tendency for alcohol consumption at levels higher than 100 g/day (12.5 units in the UK) being associated with the development and exacerbation of psoriasis in men has been reported by other workers.[6,17,33] The odds ratio for the development of psoriasis at an alcohol intake of 100 g/day compared with no intake was 2.2 [95% confidence interval (CI) 1.3–3.9].[6] Although there is no comparative Indian data, a significant association between alcohol use disorders and severity of psoriasis both in terms of PASI score and BSA involvement was observed in this study.

There was a greater number of patients having moderate to severe disease and high AUDIT score compared to those with low AUDIT score. Unfortunately, we could not quantify alcohol intake or ascertain the type of alcoholic beverage consumed by our patients as most of them were consuming unbranded and/or locally brewed alcohol due to poor affordability. However, caution is advised in the interpretation of whether alcohol consumption is a consequence or a risk factor for chronicity of psoriasis in the absence of any statistically significant difference between the duration of psoriasis in patients with normal and abnormal AUDIT score. Nevertheless, psoriasis patients

Table 2: Comparative characteristics of patients with psoriasis and alcohol consumption

Baseline characteristics		Number of patients (%)					
		Alcohol consumption (*n*=146)			Alcohol consumption(*n*=48)		
		No *n*=98	Yes *n*=48	*P*	No alcohol use disorder *n*=29	Alcohol use disorder present *n*=19	*P*
Age	Range	21-75y	21-75y	-	21-75y	30-65y	-
	Mean±SD	42.01±13.8	44.08±11.9	0.37	42.68±13.01	46.21±9.7	0.31
	≥41 yr	46 (46.9)	27 (56.3)	0.28	16 (55.2)	11 (57.9)	0.70
	≤40 yr	52 (53.1)	21 (43.7)		13 (44.8)	08 (42.1)	
Duration of psoriasis	Range	1mo-40y	1mo-30y	-	2mo-30y	1mo-20y	-
	Mean±SD	6.85±7.07	5.84±6.88	0.41	5.94±7.76	5.68±5.26	0.89
	>5years	46 (46.9)	16 (33.3)	0.11	08 (27.6)	08 (42.1)	0.30
	≤5 years	52 (53.1)	32 (66.7)		21 (72.4)	11 (57.9)	
PASI score (severity)	>6 (moderate to severe)	29 (29.6)	13 (27.1)	0.75	04 (13.8)	09 (47.4)	**0.01**
	≤6 (mild)	69 (70.4)	35 (72.9)		25 (28.2)	10 (52.6)	
BSA	>10% (moderate to severe)	44 (44.9)	20 (41.7)	0.71	08 (27.6)	12 (63.2)	**0.01**
	≤10% (mild)	54 (55.1)	28 (58.3)		21 (72.4)	07 (36.8)	

BSA: Body surface area; PASI: Psoriasis area severity index; mo: Month; y: Year. *P*<0.05 calculated at 5% level (95% confidence limit) was considered statistically significant and is depicted in bold

need to be assessed carefully for alcohol consumption and alcohol use disorder before initiating systemic treatments with methotrexate, cyclosporine, or acitretin in view of their interaction with alcohol that may limit their efficacy and/or increase toxicity. Moreover, cessation of alcohol consumption may improve disease severity and overall outcome and must be emphasized. It may also improve therapeutic compliance as alcohol consumption is reportedly a major cause of treatment non-compliance.[37]

Limitations

Patients with plaque psoriasis only were included in the study and results may vary in other clinical forms. The patients were not evaluated for other confounders like smoking habits, anxiety, and depression for the increased severity of psoriasis. Small number of patients, no control group, and hospital-based cross-sectional study design might have identified associations but results do not necessarily imply causality. Few patients, women in particular, may not have disclosed their alcohol consumption habits for social reasons. Patients were not followed up for clinical improvement after cessation of alcohol.

Conclusions

Alcohol consumption was significantly associated with alcohol use disorder in 32.9% of patients, and increased psoriasis severity both in terms of PASI score and BSA involvement compared to abstainers in this study. All patients with psoriasis need to be assessed carefully for alcohol-use problem(s) before initiating systemic treatments and counseled for the necessity of cessation of alcohol consumption for improved therapeutic outcomes and health. However, whether increased alcohol consumption is a consequence or a risk factor for chronicity of psoriasis needs larger linear studies for confirmation.

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Declaration

All authors declare that they have no competing interest and therefore nothing else to declare, and have contributed significantly and take full responsibility for the manuscript. The authors of the paper are obliged to confirm that it has not been previously published. The study was not funded by any agency.

Contributors' Statement

VKM planned, obtained, compiled, analyzed, and interpreted the data, drafted, and critically evaluated the manuscript for important intellectual content. **ND, PSC, KSM, RS, AS, VKS, JS, and SH** helped in data obtaining and compiling, literature search, and preparing of the initial draft. All authors were involved in the revision of the draft manuscript and have agreed to the final content.

Statement of Ethics

The study was approved by the Institutional Ethics Committee (Rgn no ECR/490/Inst/HP/2013/RR-16). Informed consent was obtained from all patients for being enrolled in the study. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2013. All patients were provided with standard treatment and counseling.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

References

1. Ogawa E, Sato Y, Minagawa A, Okuyama R. Pathogenesis of psoriasis and development of treatment. J Dermatol 2018;45:264-72.
2. Zhang P, Su Y, Lu Q. Epigenetics and psoriasis. J Eur Acad Dermatol Venereol 2012;26:399-403.
3. Zhao M, Lu Q. The aberrant epigenetic modifications in the pathogenesis of psoriasis. J Investig Dermatol Symp Proc 2018;19:S81-2.
4. Zeng J, Luo S, Huang Y, Lu Q. Critical role of environmental factors in the pathogenesis of psoriasis. J Dermatol 2017;44:863-72.
5. Higgins E. Alcohol, smoking, and psoriasis. Clin Exp Dermatol 2000;25:107-10.
6. Poikolainen K, Reunala T, Karvonen J, Lauharanta J, Kärkkäinen P. Alcohol intake: A risk factor for psoriasis in young and middle aged men? BMJ 1990;300:780-3.
7. Qureshi AA, Dominguez PL, Choi HK, Han J, Curhan G. Alcohol intake and risk of incident psoriasis in US women: A prospective study. Arch Dermatol 2010;146:1364-9.
8. Wu S, Cho E, Li W-Q, Han J, Qureshi AA. Alcohol intake and risk of incident psoriatic arthritis in women. J Rheumatol 2015;42:835-40.
9. Zou L, Lonne-Rahm SB, Helander A, Stokkeland K, Franck J, Nordlind K. Alcohol intake measured by phosphatidylethanol in blood and the lifetime drinking history interview are correlated with the extent of psoriasis. Dermatology 2015;230:375-80.
10. Farkas A, Kemény L. Psoriasis and alcohol; is cutaneous ethanol one of the missing links. Br J Dermatol 2010;162:711-6.
11. Farkas A, Kemény L. Alcohol, liver, systemic inflammation and skin: A focus on patients with psoriasis. Skin Pharmacol Physiol 2013;26:119-26.
12. Farkas A, Kemény L, Széll M, Dobozy A, Bata-Csörgo Z. Ethanol and acetone stimulate the proliferation of HaCaT keratinocytes: The possible role of alcohol in exacerbating psoriasis. Arch Dermatol Res 2003;295:56-62.
13. Ockenfels HM, Keim-Maas C, Funk R, Nussbaum G, Goos M. Ethanol enhances the IFN-gamma, TGF-alpha and IL-6 secretion in psoriatic co-cultures. Br J Dermatol 1996;135:746-51.
14. Brenaut E, Horreau C, Pouplard C, Barnetche T, Paul C, Richard MA, *et al*. Alcohol consumption and psoriasis: A systematic literature review. J Eur Acad Dermatol Venereol 2013;27(Suppl 3):30-5.
15. Gupta MA, Schork NJ, Gupta AK, Ellis CN. Alcohol intake and treatment responsiveness of psoriasis: A prospective study. J Am Acad Dermatol 1993;28:730-2.
16. Gerdes S, Zahl VA, Weichenthal M, Mrowietz U. Smoking and alcohol intake in severely affected patients with psoriasis in Germany. Dermatology 2010;220:38-43.
17. Cassano N, Vesitita M, Apruzzi D, Vena GA. Alcohol, psoriasis, liver disease, and anti-psoriasis drugs. Int J Dermatol 2011;50:1323-31.
18. Parisi R, Webb RT, Carr MJ, Moriarty KJ, Kleyn CE, Griffiths CEM, *et al*. Alcohol-related mortality in patients with psoriasis: A population-based cohort study. JAMA Dermatol 2017;153:1256-62.
19. Tobin AM, Higgins EM, Norris S, Kirby B. Prevalence of psoriasis in patients with alcoholic liver disease. Clin Exp Dermatol 2009;34:698-701.
20. Krueger G, Koo J, Lebwohl M, Menter M, Stern RS, Rolstad T. The impact of psoriasis on quality of life: Results of a 1998 National Psoriasis Foundation patient-membership survey. Arch Dermatol 2001;137:280-4.
21. Kirby B, Richards HL, Mason DL, Fortune DG, Main CJ, Griffiths CE. Alcohol consumption and psychological distress in patients with psoriasis. Br J Dermatol 2008;158138-40.
22. Higgins EM, du Vivier AWP. Alcohol abuse and treatment resistance in skin disease. J Am Acad Dermatol 1994;30:1048.
23. Fredriksson T, Pettersson U. Severe psoriasis-oral therapy with a new retinoid. Dermatologica1978;157:238-44.
24. Feldman SR. A quantitative definition of severe psoriasis for use in clinical trials. J Dermatolog Treat 2004;15:27-9.
25. Griffith CEM, Barker JNWN. Psoriasis. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. Rook's Textbook of Dermatology. 8th ed. Oxford: Blackwell Publishing; 2010. p. 20.1-60.
26. Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro MG. AUDIT: The Alcohol Use Disorders Identification Test Guidelines for Use in Primary Care. 2nd ed. Geneva, Switzerland: World Health Organization; 2001.
27. Pal HR, Jena R, Yadav D. Validation of the Alcohol Use Disorders Identification Test (AUDIT) in urban community outreach and de-addiction center samples in north India. J Stud Alcohol 2004;65:794-800.
28. Kumar SG, KC P, L S, E S, Vinayagamoorthy, Kumar V. Prevalence and pattern of alcohol consumption using alcohol use disorders identification test (AUDIT) in rural Tamil Nadu, India. J Clin Diag Res 2013;7:1637-9.
29. Mohan D, Chopra A, Ray R, Sethi H. Alcohol consumption in India: A cross sectional study. In: Room R, Demers A, Bourgault C, editors, Surveys of Drinking Patterns and Problems in Seven Developing Countries. Geneva: World Health Organization; 2001.p. 103-14.
30. Nadkarni A, Murthy P, Crome IB, Rao R. Alcohol use and alcoholuse disorders among older adults in India: A literature review. Aging Ment Health 2013;17:979-91.
31. Svanström C, Lonne-Rahm S-B, Nordlind K. Psoriasis and alcohol. Psoriasis 2019;9:75-9.
32. Naldi L, Peli L, Parazzini F. Association of early-stage psoriasis with smoking and male alcohol consumption: Evidence from an Italian case-control study. Arch Dermatol 1999;135:1479-84.
33. Behnam SM, Behnam SE, Koo JY. Alcohol as a risk factor for plaque-type psoriasis. Cutis 2005;76:181-5.
34. Wolk K, Mallbris L, Larsson P, Rosenblad A, Vingård E,

Ståhle M. Excessive body weight and smoking associates with a high risk of onset of plaque psoriasis. Acta DermVenereol 2009;89:492-7.

35. Monk BE, Neill SM. Alcohol consumption and psoriasis. Dermatologica1986;173:57-60.
36. Poikolainen K, Reunala T, Karvonen J. Smoking, alcohol and life events related to psoriasis among women. Br J Dermatol 1994;130:473-7.
37. Zaghloul SS, Goodfield MJ. Objective assessment of compliance with psoriasis treatment. Arch Dermatol 2004;140:408-14.