

Prevalence and Pattern of Dermatological Manifestations Among Substance Users Across Kashmir Valley in North India

Abstract

Background: Substance use has turned out to be one of the growing social problems of the present society cutting across all sorts of boundaries of the world with Kashmir Valley being no exception to this growing pathological phenomenon. **Aims and Objectives:** To find the prevalence and pattern of dermatological manifestations among substance users across Kashmir Valley. **Materials and Methods:** Cross-sectional study where patients of all age-groups, irrespective of gender, were enrolled in the three largest districts of Kashmir Valley over a span of 18 months. **Results:** Sample size was 710 with a male/female ratio of 12.4:1. The mean age of the cases was 25.2 ± 7.05 years. Heroin, one of the opioids, was the most common substance used ($n = 515$), followed by cannabis ($n = 334$). Pruritus was found to be the most common dermatological manifestation overall and statistically significant among heroin users. Stigmata of injection drug use (IDU) with the presence of track marks and sooting tattoos (93.1%), atrophic scars secondary to skin popping (30.7%), active skin ulcers (18.8%), and puffy hand syndrome (8.7%) were specifically seen among injection drug users. Oral involvement was seen in 48.5%, including periodontal disease, oral thrush, and stomatitis nicotinic. Hyperhidrosis was present in 30%, and hesitation cuts over arms in 16.3% of all substance users. **Conclusion:** Dermatological manifestations are quite prevalent among substance users in the population of Kashmir. Pruritus with temporal relation to substance use, stigmata of injectable drug use including track marks and sooting tattoos, atrophic scars at injection sites, active skin ulcers, and skin and soft tissue infections, and hyperhidrosis are among important dermatological clues for detecting substance use. Recognition of such cutaneous signs is important in these cases for more effective diagnosis and treatment.

Keywords: Cannabis, heroin, pruritus, sooting tattoos, substance use, track marks

Introduction

Substance use has turned out to be one of the growing social problems of the present society cutting across all sorts of boundaries of the world. Like in other parts of the globe, substance use is highly prevalent in India with the society of the Kashmir Valley being no exception to this growing pathological phenomenon. It has been observed that there has been a surge in substance use in our society, especially the youth over the past few years.^[1]

From a dermatological point of view, skin eruptions induced by illicit drugs can be encountered in a variety of clinical settings. Dermatoses in this group of patients may range from pharmacological side effects of the drug to cutaneous complications of drug administration, or the lesions can be due to adulterants or infectious agents mixed with the drug.^[2] Owing to

the paucity of literature regarding the prevalence and pattern of dermatological manifestations among substance users, the present study was designed and is the first of its kind in Kashmir Valley, with an aim to offer a novel look into the trends in the pattern of dermatoses among substance users. All the studies that we came across, during an extensive review of literature, have focused on a single disorder and never on an entire group of disorders.^[3-10] In this one-of-a-kind study, we focused on dermatological manifestations among substance users as a comprehensive cluster and attempted to study these disorders as a group.

Aims and Objectives

To determine the prevalence and pattern of dermatological manifestations among substance users across Kashmir Valley.

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Materials and Methods

It was a cross sectional study for a period of 18 months (November 2018 to April 2020). Native Kashmiri population was recruited and samples were taken from patients of all age groups and gender, admitted at various drug de addiction centres (DDC) from multiple districts within Kashmir valley, after obtaining Institutional ethical clearance. Stratification of Kashmir Valley into three zones and distribution of drug de addiction facilities were done for convenience sampling [Figure A].

The frequency of visits to various drug de-addiction facilities across Kashmir Valley was determined by the inflow of patients at these centers on the basis of data given by the Department of Psychiatry, Government medical college (GMC), Srinagar, and various other drug de-addiction centers across the valley. Based on the past and present IPD and OPD records, the highest number of admissions was seen at drug de-addiction center, Institute of Mental Health and Neuroscience (IMHANS), Government Medical College, Srinagar, during the study period as this treatment facility catered to most of the population undergoing treatment for substance use and was also the referral center for the whole valley. Weekly visits were made over a span of 18 months at DDC IMHANS, GMC, Srinagar. Monthly visits were made to the drug de-addiction facilities under Jammu and Kashmir Police available at Police Control Room (PCR), Batamaloo, Srinagar, and Youth Development and Rehabilitation Centre, Eidgah, Srinagar, which had the second highest number of admissions in the valley during the period of this study. Three monthly visits were made to the rest of the drug de-addiction centers, i.e., GMC Anantnag and GMC Baramulla as well as drug de-addiction centers which were under Jammu and Kashmir police at district police lines Anantnag, and old hospital Baramulla.

A detailed history was elicited in each case regarding age, sex, occupation, and socioeconomic status with a particular reference to cutaneous complaints including lesion type, onset, duration, evolution, and progression. Past history

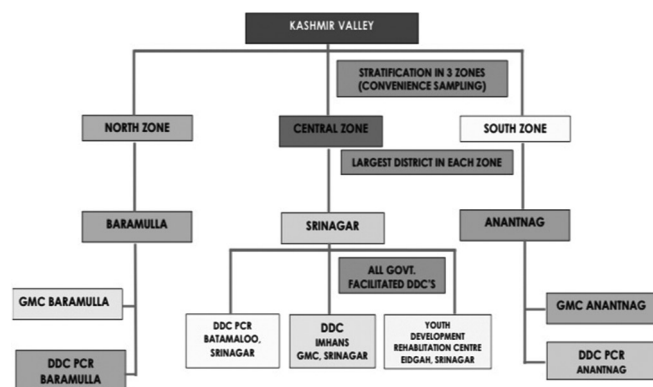


Figure A: Stratification of Kashmir Valley into three zones and distribution of drug de-addiction facilities for convenience sampling

and associated comorbidities were also recorded on a predesigned pro forma. General physical examination, systemic examination, and a detailed mucocutaneous examination of all patients was carried out after taking consent. Routine laboratory investigations including serology for hepatitis B, hepatitis C, and HIV were also conducted. Diascopy and dermatoscopy wherever needed were used as a means of examination. Skin biopsy was performed in cases of a diagnostic dilemma.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to the data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as mean \pm SD, and categorical variables were summarized as frequencies and percentages. Graphically, the data was presented by bar and pie diagrams. Chi-square test was employed for comparing the prevalence of various parameters. A *P* value of less than 0.05 was considered statistically significant. All *P* values were two-tailed.

Results

The study included a total of 710 cases with 657 males (92.5%) and 53 females (7.5%). The male/female ratio was 12.4:1. The mean age of patients was 25.2 ± 7.05 years.

Socio-demographic characteristics of study patients are given in Table 1.

Comorbidities and serology of study patients are given in Table 2.

49.4% patients were polysubstance users, while 50.6% patients used a single substance only. Opioids were the most common substance used among which heroin had the highest number of cases, while cannabis was found to be the second most common substance (47%). Tramadol (18.9%), codeine (3.7%), and tapentadol (1.8%) were the other opioids used [Table 3]. Among heroin users, 42.3% were injectable drug users (IDUs), while in the rest of the cases heroin was perpetuated via smoking (57.7%). Smoking was also the mode of substance abuse among all patients of cannabis use in this study (100%). Other substances abused in this study were taken orally except cocaine where snorting was carried out. The duration of substance use ranged between 1 month and 16 years with the mean duration being 2.8 ± 2.56 years [Figure 1].

The prevalence and pattern of dermatological manifestations among study patients are given in Table 4. Heroin was the most common substance used by cases in this study. Specific dermatological manifestations and their prevalence among heroin users are shown in [Figure 2].

Cannabis was found to be the second most common substance used by the cases in the current study (47%).

Table 1: Socio-demographic characteristics of study patients

Parameter	Number	Percentage (%)
Age (years)		
≤20	150	21.1
21-30	458	64.5
31-40	97	13.7
>40	5	0.7
Gender		
Male	657	92.5
Female	53	7.5
Residence		
Rural	296	41.7
Urban	414	58.3
Marital status		
Married	247	34.8
Unmarried	463	65.2
Family history		
Yes	35	4.9
No	675	95.1
Occupation		
Student	201	28.3
Business man	188	26.5
Unemployed	124	17.5
Skilled worker	59	8.3
Driver	45	6.3
Govt. employee	43	6.1
Labor	28	3.9
Others	22	3.1
Educational status		
Illiterate	28	3.9
Primary	24	3.4
Middle	107	15.1
Secondary	217	30.6
Higher secondary	186	26.2
Graduate	138	19.4
Postgraduate	10	1.4

Table 2: Comorbidities and serology of study patients

Parameter	Number	Percentage (%)
Comorbidities		
Bipolar-associated disorder	28	3.9
Hypertension	15	2.1
Hypothyroidism	13	1.8
Depression	12	1.7
Diabetes Mellitus	9	1.3
Insomnia	9	1.3
Seizure disorder	4	0.6
Serology		
Hepatitis B only	36	5.1
Hepatitis C only	13	1.8
Hepatitis B and C	100	14.1
Human immunodeficiency virus (HIV)	16	2.3

Specific dermatological manifestations and their prevalence in this group are shown in [Figure 3].

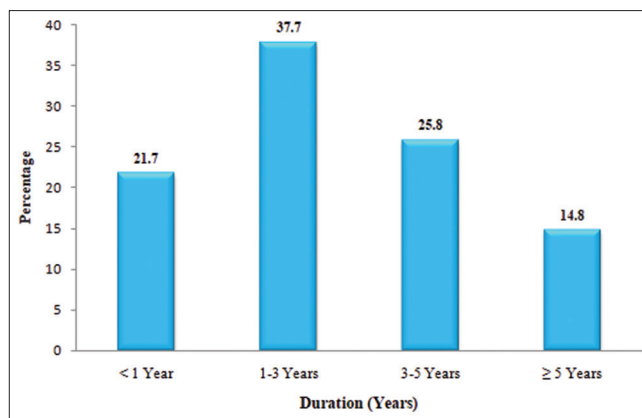


Figure 1: Distribution of substance use among study patients

Pruritus was found to be the most common dermatological manifestation overall and was statistically significant ($P < 0.001$) among heroin users. The presence of pruritus had a temporal relation with substance use and was seen most commonly during the first few months of heroin use with 53% having pruritus in the first 3 months of heroin use. There was a predilection for pruritus toward the nasal and facial area followed by genitals. This in turn led to the presence of prurigo [41 (8.5%)] in some of these cases where 26 such cases were biopsy-documented [Figure 4]. The mean age of patients presenting with pruritus was 24.1 ± 5.27 years, and the majority of patients were in the age-group of 21–30 years (64%) [Figure 5]. Among cases of pruritus, 36% had mild, 47% had moderate, while 17% had severe pruritus on the basis of 12-point pruritus severity scale (12 PSS).

Some lesions were specifically seen among injectable drug users (IDUs) [Figure 6]. Stigmata of injection drug use (IDU) with the presence of track marks and sooting tattoos were observed in 93.1% of injectable heroin users [Figure 7].

Deep circular punched-out looking atrophic scars secondary to skin popping were seen exclusively in injectable heroin users (30.7%) [Figure 8].

Active skin ulcers and skin and soft tissue infections (SSTI) at the injection site were present in injectable heroin users (18.8%) [Figure 9]. Such lesions had a predilection toward forearms and arms followed by legs. Most of the lesions were infective with *staphylococcus aureus* and anaerobes as the most common agents isolated on cultures.

Similarly, puffy hand syndrome developing post-chronic intravenous heroin use was exclusively seen (8.7%).

Hyperhidrosis localized to palms followed by generalized hyperhidrosis was seen in a few cases in the present study specifically in opioid users, where it was seen in 39.6% of heroin users.

Oral involvement was fairly common in heroin users where the mode of administration was smoking. Tooth decay and periodontal disease could be seen in many of these heroin users (19%). Some of the heroin users presented with soft creamy patches or pseudo-membranes in the oral mucosa consistent with the clinical picture of oral thrush. Culture on Sabouraud dextrose agar (SDA) medium revealed both *Candida albicans* and non-albicans species (6.2%), out of which 1.1% patients were positive for HIV serology. Stomatitis nicotinic, characterized by palatal erythema with papules secondary to heroin and cannabis smoking, was also present in 13.6% and 13.8%, respectively ($P = 0.941$). Similarly, black hairy tongue secondary to heavy heroin and cannabis smoking was observed in 4.8% heroin users and 3.2% cannabis users [Figure 10].

Staining over the fingers and nails present with hyperpigmentation due to smoking could be seen in both cannabis (64.4%) and heroin users (57.1%), however, statistically significant among cannabis users ($P < 0.002$) compared to heroin users [Figure 11].

Table 3: Distribution of study patients as per substance use

Substance use	Number	Percentage (%)
Opioids		
Heroin	515	72.5
Tramadol	134	18.9
Codeine	26	3.7
Tapentadol	13	1.8
Cannabis	334	47.0
Alcohol	40	5.6
Benzodiazepines	15	2.1
Others (Cocaine, shoe polish)	9	1.3

Periorbital hypermelanosis was seen in many of the cases of cannabis use in this study (13.7%). Frictional callosities of the hands, especially thumb (12.2%), developed secondary to hand rubbing of cannabis, and excessive lighter use was also seen in cannabis smokers. Acne vulgaris in cannabis users was less (9.2%) compared to total users and statistically significant ($P < 0.001$). Hesitation cuts were seen in 16.3% of substance users, among which 36% of the patients had associated psychological comorbidities, predominantly bipolar-associated disorder diagnosed, while dermatitis artefacta could be seen in 2.1% cases with 53% having associated psychological comorbidities, predominantly depression diagnosed by a psychiatrist in both groups of patients.

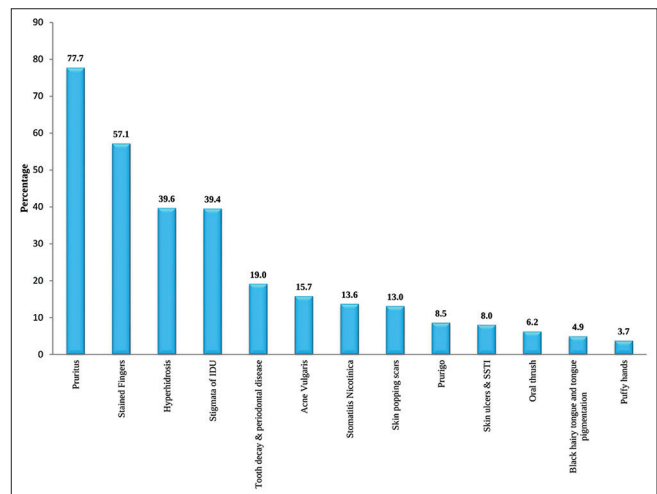


Figure 2: Prevalence and pattern of dermatological manifestations among heroin users

Table 4: Prevalence and pattern of dermatological manifestations among study patients [n=710]

Dermatological manifestations	Number	Percentage (%)
Pruritus	439	61.8
Stained fingers	360	50.7
Oral involvement (periodontal disease, thrush, stomatitis nicotinic, black hairy tongue).	344	48.5
Hyperhidrosis	213	30.0
Stigmata of injectable drug use (track marks and sooting tattoos)	203	28.6
Acne vulgaris	125	17.6
Hesitation cuts	116	16.3
Facial hypermelanosis with periorbital darkening	89	12.5
Skin popping scars	67	9.4
Prurigo	60	8.5
Frictional callosities	41	5.8
Skin ulcers and skin and soft tissue infections (SSTI)	41	5.8
Pityriasis capitis	26	3.7
Hand eczema	24	3.3
Puffy hands	19	2.7
Dermatophytosis	15	2.1
Dermatitis artefacta	15	2.1
Others (eczema, psoriasis, vitiligo)	14	2.0

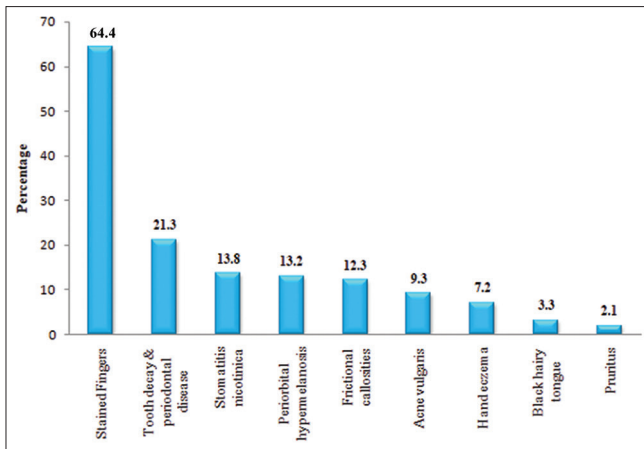


Figure 3: Prevalence and pattern of dermatological manifestations among cannabis users

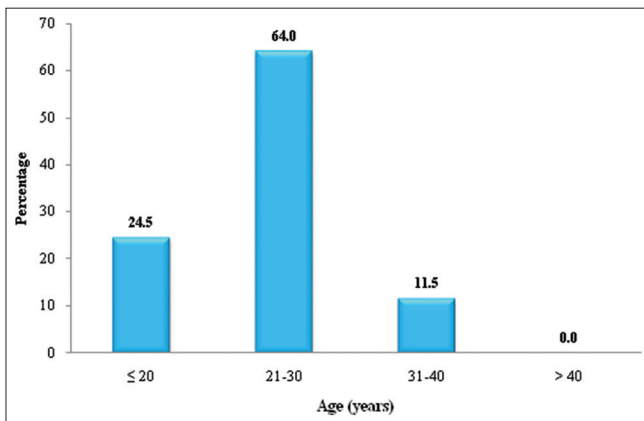


Figure 5: Age distribution of heroin users with pruritus

Dermatological disorders like pityriasis capitis (3.7%), dermatophytosis (2.1%), hand eczema (3.3%) and other disorders (psoriasis, vitiligo, and eczema) (2%) were also seen in the study.

Discussion

The pattern of substance use has seen a shift toward opioid use being highly prevalent in Kashmir Valley with heroin being most commonly abused among them compared to cannabis, being the most common substance used in the past. Similarly, in our study the most common substance used by study cases was heroin (n = 515) followed by cannabis (n = 334). In current times, clinicians often find it difficult to detect these dangerous practices of substance use among patients, thus making it important to recognize dermatological manifestations of substance use for more effective diagnosis and practices. All the studies that we came across, during an extensive review of literature, have focused on a single substance and its cutaneous signs and never on the entire group of substances abused with respect to their dermatological manifestations. In this one-of-a-kind study, we focused on dermatological manifestations among substance users as a comprehensive

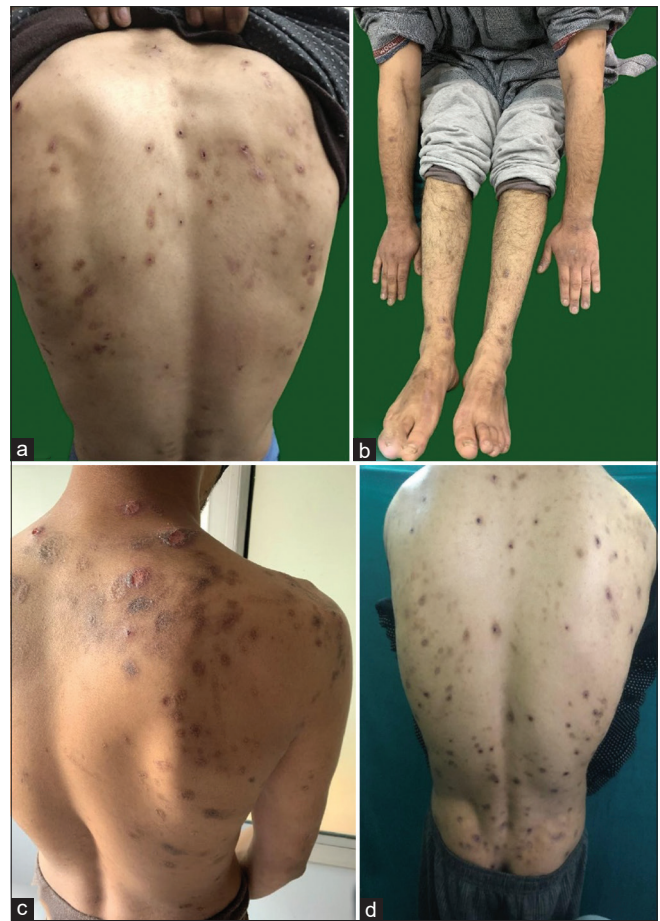


Figure 4: Prurigo and prurigo nodularis in patients secondary to pruritus among heroin users over back (a, c and d) and extremities (b)

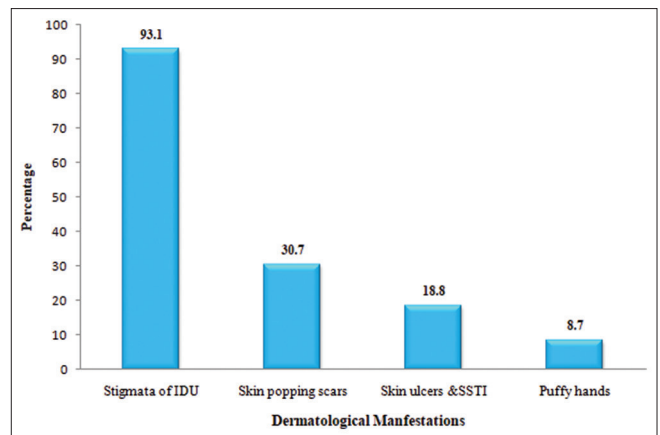


Figure 6: Prevalence and pattern of dermatological manifestations, specifically among injectable heroin users

cluster and attempted to study these manifestations as a group.

In the present study, pruritus was the most common dermatological symptom among substance users, which was statistically significant among heroin users ($P < 0.001$). Heroin and other opiates are known to induce pruritus. Many mechanisms have been put forward to explain itching

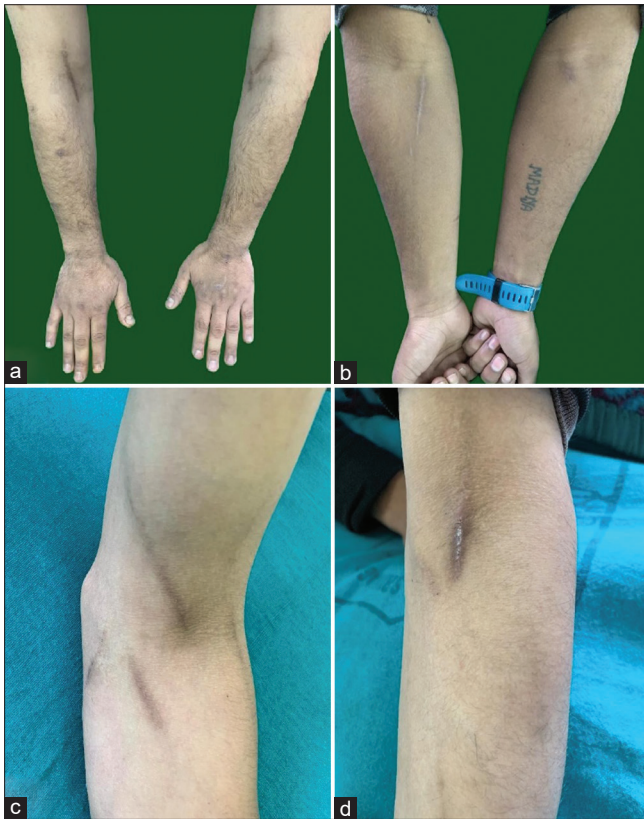


Figure 7: Track marks: Linear post-inflammatory hyperpigmentation at intravenous injection sites (a, b, c and d). Sooting tattoos formed due to injection of heroin with hot needles in cases of injectable heroin users (c and d)

post-heroin use. Opioid-induced itch has been suggested to be mediated primarily through the μ -opioid receptor (MOR), a key receptor for opiates. Xian-Yu Liu *et al.*^[11] demonstrated that this itch-specific receptor, known as MOR1D, appears to operate independently from receptors that relieve pain. Maurer *et al.*^[12] in their study found pruritus present in 55.4% of cases in a sample size of 78, all being heroin users. They also found higher levels of histamine in cases compared to controls in the study. Elevated histamine levels due to mast cell degranulation and histamine release might have been a consequence of immune activation due to regular heroin use.^[12] Our study found pruritus occurring immediately following heroin use with a duration lasting up to several days as found by Hennings *et al.*^[2] There was a predilection of itching towards the nasal and facial areas of the cases in our study, and such findings have not been reported so far in other studies.

Staining of the fingers and nails with resulting hyperpigmentation from pale yellow to intense brown color, most commonly of the middle finger, followed by the index finger and thumb of the dominant hand, was seen in the majority of cannabis smokers (64.4%) and heroin smokers (57.1%) in our study. The mechanism of development of such lesions is similar to the development of tobacco staining of fingers where such lesions are seen

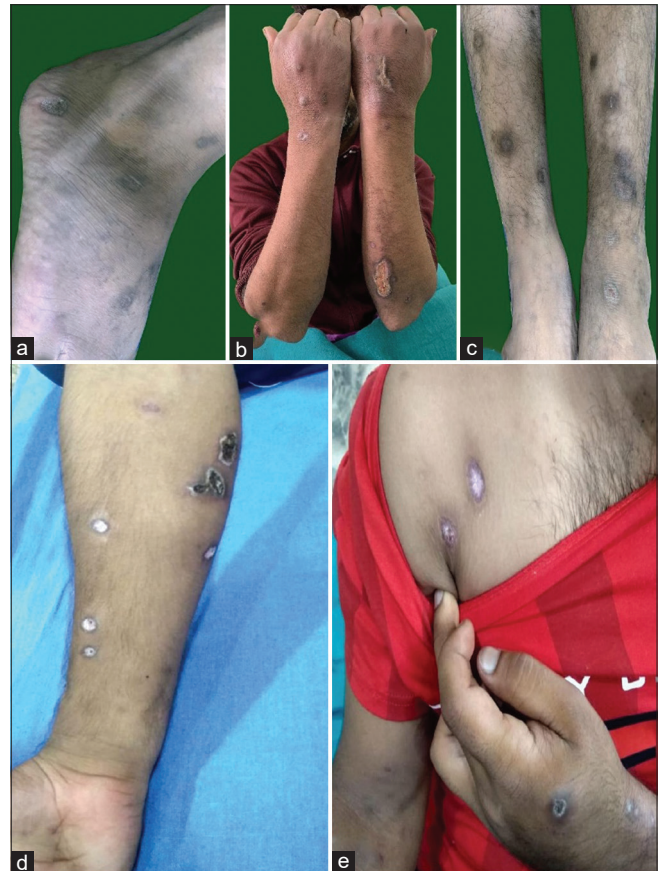


Figure 8: Deep circular punched-out looking atrophic scars formed due to heroin administration by intradermal, subcutaneous, or intramuscular routes (skin popping). (a-e)

due to repeated exposure to smoke and tar in smoke as mentioned by Chauhan *et al.*^[13] Kalman *et al.*^[14] in their study found two- to four-fold increase in the consumption of tobacco and thus staining of fingers in substance users compared to the general population.

Hyperhidrosis was seen in a few cases in the present study, specifically in opioid users, whereas it was seen in 39.6% of heroin users. Opioids are recognized as potent stimulators of mast cell degranulation, and this is thought to be the main mechanism for their diaphoretic action, resulting in excessive perspiration in heroin users. Cheshire *et al.*^[15] found hyperhidrosis associated with opioid use in their study.

Thomson *et al.*^[16] in their study found periodontal disease in cannabis users where they determined three cannabis exposure groups as “No exposure” (32.3%), “Some exposure” (47.4%), and “High exposure” (20.2%) and found periodontal disease in 6.5%, 11.2%, and 23.6%, respectively, concluding cannabis smoking as a risk factor for periodontal disease that is independent of the use of tobacco. Schulz-Katterbach *et al.*^[17] found cannabis use associated with significantly higher dental decays values ($P = 0.0001$) than the control group in their study. Similarly, Al Bush *et al.*^[18] in their study with a sample

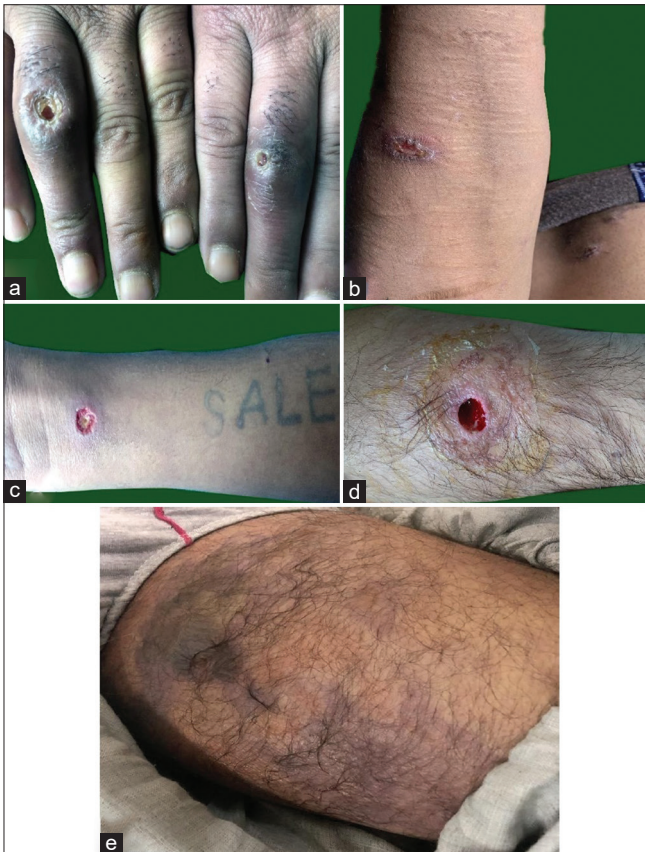


Figure 9: Active skin ulcers and skin and soft tissue infections at the injection site present in patients using injectable heroin (a-e)



Figure 10: Oral hairy tongue as brown to blackish thickened plaques over the tongue which are difficult to remove

size of 100 found cannabis and heroin use were associated with dental decay and periodontal disease. Likewise, in the present study, tooth decay and periodontal disease were seen in 21.2% of cannabis users as well as in 19% of heroin users, concluding that both cannabis and heroin use are associated with dental decay and periodontal disease and are risk factors for these oral conditions, though the difference between the two substances was not statistically significant ($P = 0.427$).

Some dermatological manifestations were specific to IDUs in the present study. The presence of linear post-inflammatory hyperpigmentation at intravenous injection sites (track marks) resulting from damage and consequent sclerosis of the underlying veins and sooting tattoos formed due to injection of heroin with hot needles was seen exclusively in injectable heroin users (93.1%) in our study. Coull *et al.*^[3] in their study with a sample size of 204 IDUs, where 60% of the cases had some skin manifestation, found a prevalence of 47% cases among them having track marks. The antecubital fossa of the non-dominant arm was the most commonly affected site in the present study similar to the description by Del Giudice.^[19] Such lesions have been described in the previous literature and are known as telltale signs or stigmata of injectable drug use.

In the present study, 30.7% of injectable heroin users ended up with the presence of skin popping scars. Once the veins become sclerotic and inaccessible, drug users often resort to intradermal, subcutaneous, and sometimes intramuscular drug administration, also known as “skin popping.” This method of drug administration usually results in deep, circular, punched-out looking atrophic scars known as skin popping scars. This can be considered as another telltale sign of injectable drug use as described by Grunebaum *et al.*^[20] Reports from European researchers show an apparent increase in skin popping among drug users.^[21,22]

Coull *et al.*^[3] in their study found abscesses in the past or currently present in 75% cases followed by lumps in 48%, and leg ulcers in 25% cases. Similarly, in our study, 18.8% of injectable drug users had active skin ulcerations and skin and soft tissue infections. Several independent risk factors are present among injection drug abusers for developing SSTIs, the most important being skin popping which causes tissue trauma and introduces bacteria into the skin. It may also introduce adulterant substances, which can concentrate locally and irritate the skin.^[23]

In the present study, 8.8% of injectable heroin users had the presence of puffy hands, which develops after long-term intravenous drug addiction. It was characterized by a non-pitting edema, affecting the dorsal side of fingers and

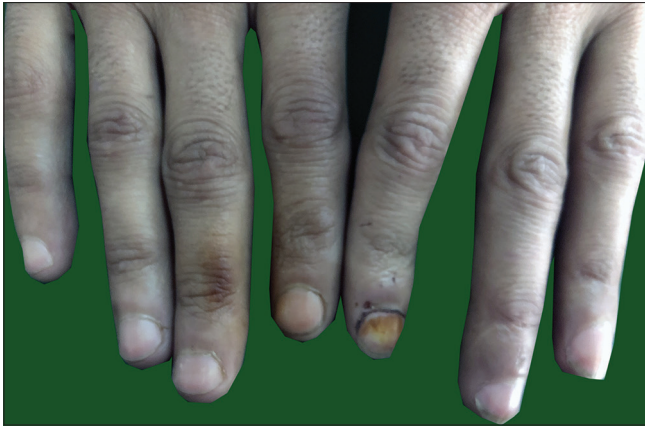


Figure 11: Staining of the fingers and nails with resulting hyperpigmentation seen in majority of cannabis smokers

hands, especially non-dominant hand with a puffy aspect similar to the description by Amode *et al.*^[24] Female gender, injections in the hands and in the feet, and the absence of tourniquet have been found to be significant risk factors for puffy hand syndrome in the past literature.^[25] In our study, male gender was predominant and the most common site was non-dominant hand followed by dominant hand, and in most of the cases history of tourniquet use while injecting heroin was lacking.

In our study, 13.7% of cannabis users had the presence of periorbital hyperpigmentation. Premature aging such as periorbital darkening, hair loss, and graying of hair has been associated with cannabis use in the literature.^[26] Maharaj *et al.*^[27] have described an increased cornification of the radial aspect of the thumb just distal to the pulp prominence on close inspection which is more easily palpated as a thickening of the corneal layer of the palmar skin of the thumb in 27 cases of heavy smoking which they have described to be due to the result of repeated friction of the thumb against the roller of cigarette lighters. Similarly, in our study, we could also find the presence of frictional callosities, especially over thumb and fingers (12.2%), developed secondary to hand rubbing of cannabis and excessive lighter use by cannabis smokers. In our study, the prevalence of acne vulgaris among substance users was 17.2%; however, the prevalence of acne vulgaris was significantly less among cannabis users (9.3%) ($P < 0.001$). The decreased prevalence of acne among these cases can be attributed to sebostatic effects of cannabis. Oláh *et al.*^[28] showed that cannabidiol (CBD) derived from *Cannabis sativa* might improve acne vulgaris through a sebostatic mechanism. CBD had antiproliferative effects on both keratinocytes and sebocytes, thus decreasing the formation of comedones and production of sebum as well as demonstrable antimicrobial activity.^[28,29]

Larkin *et al.*^[30] in a systemic review of hospital-based studies found thirteen studies reporting a positive association between hesitation cuts/repetition of self-harm

and drug abuse/dependence. In the current study as well, 16.3% cases had the presence of hesitation cuts, most commonly over forearms.

Limitations

This was a clinical study, and the sample size in our study was small to make any concrete inferences regarding the exact prevalence and pattern of these disorders.

Due to the cross-sectional design of the study, we could not infer the presence or absence of dermatological manifestations at other times.

Only patients motivated for treatment were examined because of the presence of bias of being registered in drug de-addiction centers.

The presence of psychological disorders and systemic comorbidities could also lead to a few dermatological manifestations present in the study. There was no comparative group.

Conclusion

Dermatological manifestations are quite prevalent among substance users in the population of Kashmir. Pruritus with temporal relation to substance use, stigmata of injectable drug use including track marks and sooting tattoos, atrophic scars at injection sites, active skin ulcers, and skin and soft tissue infections, and hyperhidrosis are among important dermatological clues for detecting substance use. Recognition of such cutaneous signs is important in these cases for more effective diagnosis and treatment. Creating awareness regarding such manifestations and their probable association with substance use is also imperative.

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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Nil.

Conflicts of interest

There are no conflicts of interest.

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