Dermatosis due to occupational exposure of steroid fumes either by inhalation or direct contact to the skin is an uncommon entity. To the best of our knowledge, adverse effects due to inhalation of corticosteroid fumes as an occupational hazard have never been described before.

The pharmaceutical factory workers are under a constant risk of exposure to various kinds of chemicals used in manufacturing of drugs. Inhaled corticosteroids result in high amount of oropharyngeal deposition of the drug that subsequently reaches the systemic circulation leading to systemic side effects.[1] The drug that is deposited on the skin in the form of powder or fumes gets absorbed through the skin into the systemic circulation leading to bizarre side effects. Moroni et al.[2] studied a factory in which corticosteroids were manufactured, and the adverse effects found included local effects such as acne, erythema, and systemic effects, including hypertension and features of Cushing’s syndrome. The evidence suggests that occupational steroid-related skin conditions may be induced by both systemic and local exposure, and in most cases the effects are reversible on cessation of exposure.

Case Report1

A 36-year-old male presented to skin outpatient department (OPD) with chief complaints of annular lesions and itching on buttocks for the past 1 year which had progressed to involve groins, thighs, and trunk. On examination, multiple well-defined, annular erythematous plaques with inflamatory advancing margin, scaling, and central clearing were present [Figure 1a]. Acneiform eruptions were present over face, trunk, and back with multiple flat topped, skin-colored plane warts over forearm [Figure 1b]. Striae were present over bilateral axilla and groin [Figure 1c]. Telangiectasia with erythema over face and petechial lesions over back and forearm were noticed. He also had moon face along with buffalo hump.

Case Report2

A 32-year-old male presented to the skin OPD with chief complaint of annular lesions all over body since 10 months. On examination, multiple, well-defined, erythematous, annular plaques with central clearing and elevated borders were present over face, chest, abdomen, back, groins, buttocks, and bilateral upper and lower limbs [Figure 2a]. On further examination, the patient was also found to have acneiform eruptions over chest and back [Figure 2b]. He had cushingoid face with seborrheic dermatitis-like lesions [Figure 2c].

In both the patients, there was no history of similar complaints reported in family members. Clinical diagnosis of extensive tinea corporis along with acneiform eruptions was made. KOH mount done from inflammatory margin revealed fungal hyphae. No other comorbidities were found in both the patients. The patients were previously treated with inadequate dosage and duration of multiple antifungal agents. Further history revealed that both the patients were working in halobetasol and clobetasol preparation manufacturing company for last 2.5 and 2 years, respectively. Few other workers working there were also having similar lesions. All the above features along with extensive fungal infection pointed toward chronic steroid exposure as one of the aggravating factors. Both of them were treated with tab itraconazole and topical amorolfine for 2 months. The patients were advised to wear protective mask, clothing covering the body parts, hand-gloves, and goggles.

Steroids act on the body through its anti-inflammatory and immunosuppressive effects predisposing patients on chronic steroids to several dermatosis especially infectious ones. Although local adverse effects of inhaled steroids are most common, there is increasing evidence of systemic adverse effects associated with inhaled steroid use, particularly at higher dosages (>1500 μg beclomethasone per day).[3]
Well-recognized cutaneous adverse effects include skin atrophy, acneiform eruption, pigment alteration, exacerbation of skin infections, and hypertrichosis. Skin atrophy leads to purpura, loss of subcutaneous tissue, and increased skin mobility with consequent fragility and traumatic tearing of the skin resulting in striae. The degree of cutaneous atrophy is dose- and molecule-related. There are reports of skin thinning and purpura in association with long-term inhaled steroids.\textsuperscript{[4]} Also, due to bypassing of first-pass metabolism due to inhalation of steroid fumes, relatively higher amount of drug is absorbed systematically leading to side effects such as adrenal suppression, cataract, glaucoma, and hyperglycemia. Side effects due to inhalation are reported when steroids are used as a therapy particularly in bronchial asthma, but reports of inhalation due to occupational exposure have been brought to light very rarely.

Health effects related to occupational exposure to active pharmaceutical ingredients has been described previously.\textsuperscript{[5]} A questionnaire-based study found easy bruising to be the most commonly reported symptom in a group of patients using inhaled steroids.\textsuperscript{[6]} There are reports of sudden-onset severe acne vulgaris in patients on inhaled steroids. The fungal infection caused due to decreased innate immunity of the body can be treated by changing the working environment along with the use of oral and topical antifungals. To the best of our knowledge, no such case has been reported in recent literature.

The protection of workers from the potential harmful effects of steroids poses a significant challenge for the pharmaceutical industry dealing with manufacturing of steroids. Preventive measures should be tried at different levels—at employer level by various technical means such as quality control, housekeeping, warning, education, and monitoring; at employee level by making them aware about personal protection, hygiene, and education. The government also should intervene by monitoring the quality, industry regulation, control, education, and awareness for the same.

The importance of enclosure and employee education should be noted as potential measures for reduction of future cases. We hereby emphasis the regular audit of safety measures in steroids manufacturing industries and employee education for reducing future cases.

**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.

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