Abstract

Background: “Holi” is a spring festival celebrated primarily in the Indian subcontinent and also abroad by expatriate Indians. It is a festival of colors, traditionally celebrated by mutual application of colors in different forms on a particular day of the year. These colors frequently comprise a range of synthetic dyes which have harmful effects on the skin and mucosae. Children take part in this colorful festival with much enthusiasm and vigor, making them prone to develop different “Holi”-related dermatoses. Our objective was to find out the different patterns of “Holi”-related dermatoses in a group of pediatric patients.

Methodology: This was a cross-sectional descriptive study carried out over a period of 6 years (2010–2015). Consecutive patients of pediatric age group who attended dermatology outpatient department (OPD) with different dermatoses following application of “Holi” color were included in this study. Results: A total of 63 patients (mean age 11 years; range 1–16 years) were evaluated with a female to male ratio of 1.3:1. Itching is the predominant presenting symptom followed by burning sensation, dryness, scaling, oozing, and loss of hair. Examination revealed that eczematous lesion was the most common (69.8%) reaction pattern followed by xerosis, desquamation, excoriation, erythema, morbilliform eruption, erosion, alopecia, ulceration, acute paronychia, and hyperpigmentation. The face was the most common (76.4%) site of affection. Conclusion: A sizable number of patients of pediatric age group may be affected by “Holi”-related dermatoses necessitating precautionary measures.

Key Words: Children, dermatoses, “Holi”

Introduction

The Hindu festival of “Holi” marks the start of spring. “Holi” is celebrated primarily in India, Nepal, Sri Lanka, and countries with a sizable emigrant ethnic Indian population.[1-3] Foreign tourists visiting India also take part in this colorful festival with a great zeal.[4] “Holi” is traditionally celebrated by mutual smearing and splashing of diverse powdered or water-based colors among the participants on a particular day of the year.[1-3] These colors often include various synthetic and industrial dyes which may have detrimental effects on the skin and mucosae.[1,2] Health hazards from “Holi” colors are a common annually recurring problem in the Indian subcontinent.[5-7] As a consequence of “Holi,” a large number of patients including children seek advice from dermatologists for various skin problems arising out of celebration with these colors.[5] Children participate enthusiastically in this colorful festival, making them prone to develop different “Holi”-related dermatoses. We report here a total of 63 patients of pediatric age group from the state of West Bengal in Eastern India, who developed different dermatoses following exposure to the colors of “Holi.” The objective of this study was to find out the different patterns of “Holi”-related dermatoses in a group of children since there is absence of data regarding the harmful mucocutaneous effects of the synthetic/industrial dyes used as “Holi” colors in the pediatric population.
**Methodology**
This was a cross-sectional descriptive clinical study. Consecutive patients [Figure 1] of both sexes aged 1–18 years who presented to us with different dermatoses following application of “Holi” color within 2 weeks of the festival of “Holi” between March 2010 and March 2015 comprised the study population. The study was conducted at a tertiary care hospital of Eastern India. It was approved by the Institutional Ethics Committee. After obtaining an informed written consent from the guardian of each patient, a detailed history was obtained with special emphasis on demographic data, types of colors used, and local and systemic symptoms. Subsequently, a thorough clinical examination was done with main focus on the types of lesions and sites of affection. Data were collected in a pretested, predesigned, and semi-structured schedule and were analyzed accordingly.

**Inclusion criteria**
It included patients aged <18 years presenting with “Holi”–related dermatoses at dermatology OPD within 2 weeks (the most probable time of presentation for “Holi”–related dermatoses) of the festival.

**Exclusion criteria**
Patients aged more than 18 years and patients presenting after 2 weeks of the festival of “Holi” were excluded from the study.

**Operational definition**
Any type of dermatoses occurring as a direct or indirect consequence of applying color during celebration of “Holi” was considered as “Holi” dermatoses. Exacerbation of any preexisting dermatosis was also considered to be a part of it.

Statistical analysis was performed with the help of GraphPad Prism version 5 (GraphPad software Inc., San Diego; 2007) software and Microsoft Excel.

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**Results**
Sixty-three patients (mean age 11 years; range 1–16 years) were evaluated. There were 36 (57.1%) girls and 27 (42.9%) boys with a female to male ratio of 1.3:1. Most of the patients came from urban (34, 54%) areas.

Itching, the predominant presenting symptom, was present in 38 (60.3%) patients. This was followed by burning sensation (25, 39.7%), dryness (17, 27%), scaling (5, 7.9%), oozing (2, 3.2%), and loss of hair (2, 3.2%).

No systemic symptom was present. History of atopy was found in three children. Mucocutaneous examination [Figures 2-6] revealed that eczematous lesion (44, 69.8%) was the most common reaction pattern. This was followed by xerosis (14, 22.2%), desquamation (6, 9.5%), excoriation (5, 7.9%), erythema (5, 7.9%), morbilliform eruption (4, 6.3%), erosion (3, 4.8%), alopecia (2, 3.1%), ulceration (2, 3.1%), acute paronychia (1, 1.6%), and hyperpigmentation (1, 1.6%). Exacerbation of acne was noted in five (7.9%) patients and seborrheic dermatitis in two (3.2%) patients.

The face was the most common (49, 76.4%) site of affection, followed by palms (6, 11.7%), forearm (4, 5.9%), scalp (2, 3.9%), dorsum of hands (2, 3.9%), axilla (2, 1.9%), scalp (2, 3.9%), back (2, 3.9%), arm (1, 1.6%), neck (1, 1.6%), nail folds (1, 1.6%), and thigh (1, 1.6%). The most common color used was red (53, 77.7%) followed by green (16, 25.4%), black (8, 12.7%) pink (8, 12.7%), purple (5, 7.9%), yellow (5, 7.9%), golden (4, 6.3%), silver (3, 4.8%), and blue (2, 3.2%). Thirty (47.6%) patients were exposed to more than one color.

Traces of varying shades of exogenous pigmentation were still discernible on various body parts in most of the patients. The precise nature of the colorants used could not be ascertained as these were not available with the patients. However, on surveying the market, we could find that one of the containers was labeled as rhodamine meant for industrial use only. Systemic examination was noncontributory.

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Figure 1: Flowchart showing the method of recruitment of children with dermatosis from celebration of “Holi”

Figure 2: (a and b) Eczematous lesions and erosions on the face
Discussion

Globally, physicians are encountering an increasing number of patients belonging to diverse cultural and ethnic backgrounds. In view of this fact, it is important to appreciate that cultural practices may give rise to various health hazards. “Holi” is one such cultural practice that may lead to various cutaneous disorders that make the sufferers seek dermatological consultation.

During “Holi,” water guns or balloons filled with watercolors are commonly used to throw colors on people. Powdered colors are also smeared on the face. The dry colors are commonly known as “gulal” or “abir.”

Originally, the blissful festival of “Holi” was meant to rejoice the arrival of spring while the colors were used to represent the various hues of the spring season.

However, with the passage of time, as with various other festivals, “Holi” too has been commercialized, and hence it has become yet another source of environmental degradation. In earlier times, “Holi” colors used to be prepared from the flowers that blossomed during spring. Over the years, with the advent of urbanization and industrialization, these natural colors have been substituted by synthetic and industrial dyes. The colors commonly used are black (lead oxide), green (copper sulfate and malachite green), silver (aluminum bromide), blue (Prussian blue, cobalt nitrate, indigo, and zinc salts), and red (mercury sulfate). Most of these chemicals are phototoxic and provoke skin allergies. Mica dust often incorporated in the dry colors as a sparkling agent can cause microabrasions of skin leading to the secondary infections.

The “Holi” colors are usually sold loose by the streetside, without any printed information about the specific composition. There are a few reports of cutaneous, ocular, and systemic (methemoglobinemia) affection from “Holi” colors.

A large number of cutaneous and extracutaneous health hazards have been noticed following “Holi” [Table 1]. However, there is absence of data regarding the harmful effects of the colors on the pediatric population.

The present study showed slightly higher occurrence of eczematous lesion and xerosis and desquamation...
but lower rate of cutaneous erosion in comparison to the general population.\cite{5} The face was more commonly affected in our study sample. However, involvement of the hands and nail folds was less commonly seen in comparison to a former study involving patients from all age groups.\cite{5} Focal hair loss and erosion over scalp in two children were an interesting finding in this present series, not described previously. We speculate that the alopecia might be the result of corrosive effect of the dyes. On the other hand, there was no history of ingestion of “Holi” dyes in our study. We think the morbilliform eruption in our patients might be due to contact sensitization. No definite impact of atopy upon the skin rash could be determined in the present study.

**Conclusion**

In the present study, we sought to draw attention of clinicians about this common yet under-reported issue in pediatric population. At the same time, we would like to emphasize on parental counseling about the usage of safe colors (instead of industrial colors) by the children during such festival. Children should be instructed by the parents and also in schools about preparation of their own “Holi” colors from natural and safe ingredients such as beetroot, rose petals, flowers (e.g. marigold), spinach, henna leaves, and turmeric among others.\cite{1} Furthermore, they should be educated that by observing “Holi” using safe, natural colors, we not only save our body but also help protect our environment and conserve our biodiversity. However, the growing demand for organic colors at “Holi” has spawned an industry of so-called “herbal colors,” which though commands a place in the market but fails to pledge consumers of quality.\cite{8}

**Limitations**

One of the limitations of the present study was our inability to perform patch test in our patients. This is due to the fact that in most of the cases colors were not available with the patients, and the nature of synthetic and industrial dyes remained unknown.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**What is new?**

There is no formal study regarding the harmful effects of the “Holi” colors on the pediatric population. In the present study, we sought to draw attention of clinicians about this common yet under-reported issue in pediatric population.

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**Table 1: Clinical manifestations of “Holi” color-induced disorders**

| Cutaneous                        | Direct effect                  |
|----------------------------------|-------------------------------|
|                                  | Pruritus                       |
|                                  | Burning sensation              |
|                                  | Pain                           |
|                                  | Xerosis and scaling            |
|                                  | Eczematous lesions             |
|                                  | Erosions                       |
|                                  | Photosensitivity               |
|                                  | Erythema                       |
|                                  | Acute nail fold inflammation   |
|                                  | Urticaria                      |
| Exacerbation of preexisting dermatoses | Acne                           |
|                                  | Eczema                         |
|                                  | Paronychia                     |
| Secondary complication           | Pyodermas                      |
|                                  | Abrasion due to vigorous scrubbing |
| Extracutaneous involvement       | Ocular                         |
|                                  | Redness                        |
|                                  | Watering                       |
|                                  | Grittiness                     |
|                                  | Conjunctivitis                 |
|                                  | Corneal abrasions              |
|                                  | Periorbital necrotizing fasciitis |
|                                  | Other                          |
|                                  | Methemoglobinemia              |

During such festival. Children should be instructed by the parents and also in schools about preparation of their own “Holi” colors from natural and safe ingredients such as beetroot, rose petals, flowers (e.g. marigold), spinach, henna leaves, and turmeric among others.\cite{1} Furthermore, they should be educated that by observing “Holi” using safe, natural colors, we not only save our body but also help protect our environment and conserve our biodiversity. However, the growing demand for organic colors at “Holi” has spawned an industry of so-called “herbal colors,” which though commands a place in the market but fails to pledge consumers of quality.\cite{8}