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# Allergic dermatitis

## Black henna (para-phenylenediamine) use among the East African patient population in a general practice setting

### Keywords

lawsone; henna dye; tattooing; body modification, non-therapeutic; hypersensitivity; dermatitis, contact

The use of henna has become a global phenomenon for skin adornment in arms and legs. The practice is old and common among communities of East African origin. Traditionally, natural henna is used during Eid celebrations, marriage ceremonies and other social occasions. However, black henna type with para-phenylenediamine (PPD) additive is gaining favour over the natural one due to its effect and ease in achieving the desired intensity, longevity and ease of drying.<sup>1,2</sup> The natural henna stains the skin orange to brown and takes an hour to dry while black henna is intensely black and dries in minutes. This article describes a case of allergic dermatitis due to a black henna use seen in a general practice clinic setting and highlights the role of education and counselling of a particular community.

### Case study

A 42-year-old, HIV-positive woman presented with an itchy, erythematous swelling of her forearms and hands 1 day after black henna application. On physical examination, there was erythema and blistering of about 3-cm length following the intricate details and patterns of henna drawings on the forearms and hands. The erythema and

blisters were raised about 2 mm high and were excoriated.

The patient was treated with topical corticosteroid for 1 week and was referred to dermatologists for allergy testing to PPD chemical compound in hair dye and black henna. The patch testing result was positive to hair dye PPD and to chrome. The patient claimed the person who colours her skin added hair dye to the natural henna. The patient had uneventfully used black henna for a celebratory occasion 3 months prior to this incident and this may have primed the body for the subsequent allergic reaction that resulted in severe acute allergic dermatitis and skin blistering. Due to implications of PPD reaction on the immune system and possible renal complication, the patient was investigated for complete blood count, creatinine level, eGFR and electrolytes. The results were all reported as normal.

### Discussion

Ethno-cultural diversity has increased in North America, Australia and the European continent due to global migration and population shift. There is a growing community of East African people in these regions. As a result of this migration and settlement, healthcare policy and practice that are prevalent among this community should be addressed.<sup>3</sup> Caroll J et al., in their work with a Somali community, asserts that healthcare providers must be able to understand specific cultural health beliefs to tailor health prevention efforts to targeted group.<sup>4</sup> The use of black henna (PPD) among East African community members is increasingly seen in general practice. The healthcare practitioner should educate patients whenever opportunity

lends itself and partner with community leaders to highlight the issue and to educate en masse.

The compound PPD in hair dye is implicated as the main culprit for allergic dermatitis. The other sources of exposure include black henna tattoos, leather, fur, textiles and rubber products.<sup>5</sup> The majority of positive patch testing is due to reaction to PPD while natural henna does not show any positive reactivity.<sup>6,7</sup> PPD can cross-react with para-amino compounds (benzocaine, sulfa drugs, aminoazobenzene, IPPD, PABA) and hairdressing allergens (2,5-diaminotoluene sulfate, 2-Nitro-4-phenylenediamine, 4-aminophenol, 3-aminophenol). The incidence of positive patch testing could be high among the community, which warrants further studies to help in the management of allergic dermatitis. The Bilcha KD et al. study on patch testing reaction in Ethiopian subjects with previous eczema reveals that more than 60% of subjects were positive to many allergens.<sup>8</sup> The use of temporary tattoos in Copenhagen, Denmark, among trained hairdressers and the general population is 39.4% and 33.3% respectively and the incidence of allergic reaction could be as high as 2.3% among people who had a tattoo.<sup>9</sup>

The dermatological manifestation of allergic dermatitis to PPD varies in severity from an intensely itchy erythematous, blistering eruption to painful, itchy exudative bullous eruptions, face and scalp swelling, or renal collapse and failure;<sup>10–13</sup> Black henna allergic dermatitis is an ongoing problem with an extensive surge of cases, which pinpoint the culprit to a history of hair dye exposure. There have been more than 140 reported cases in English language literature and this illustrates the burden of allergic dermatitis due to PPD.<sup>14</sup> There have been reports of tattoo-induced chronic psoriasis on the tattoo sites despite treatment.<sup>15</sup>

A detailed history and thorough physical examination will point to the culprit being black henna and hair dye use. The next approach in the management would be to do a patch testing to identify the specific allergen (PPD). Open patch testing on the forearm without occlusion can be done to assess the potential irritant or sensitiser, which in this case is black henna or hair dye. The site is assessed at regular intervals for the first 30–60 minutes and later reading is done after 3–4 days. The acute measures would

include treating the inflammation with a topical corticosteroid once or twice daily only for 1–2 weeks.<sup>16,17</sup> The choice of corticosteroid potency depends on the site of the inflammation. High potency corticosteroid is used for all body parts not exceeding 20% of the body surface except for the face and flexural areas, which require a low-potency corticosteroid. Lubricant emollient is used once daily to maintain skin hydration and to treat itchiness and irritation. Oral or topical antibiotics can be used for secondary infection and a case of allergic dermatitis with staphylococcal super-infection has been reported.<sup>18</sup> Benefits from the use of prophylactic anti-staphylococcal antibiotic has not shown any clear evidence.<sup>19</sup> Post-inflammatory hyperpigmentation tends to occur in greater frequency among darker skin groups and can cause a psychological, emotional distress and is associated with a negative impact on the quality of life.<sup>20</sup> The treatment of post-inflammatory hyperpigmentation should then begin early on to help in its resolution. Hydroquinone (topical tyrosinase inhibitor) is the mainstay depigmenting agent used to lighten the area of pigmentation and broad-spectrum sunscreen and sun protective measures are recommended. The long-term management goal is to identify and eliminate the offending agents, educate the patient to read the packaging of dyes and avoidance of those containing any PPD chemicals such as black henna and hair dyes.

In our clinical setting in Toronto, an average of 2–3 cases of allergic dermatitis as a result of black henna use are seen among the patient population of East African origin during the Muslim Eid holiday celebration. Henna is used by this population for adornment of visible parts of extremities, mainly forearms and lower extremities below the knees. The case presented is captured and documented in a digital image and it shares comparable characterisation of other reported cases in terms of dermatological manifestation, progression of PPD-positive reactivity and response to treatment. However most of the patients seen are from a particular community and present following certain festive occasions. The patients' demography is East African and the majority had henna applied from early childhood and throughout their lifespan. It is not uncommon for a male member of this

community to apply henna on their hair, scalp, mustache and beard to mask the gray hair associated with old age.

## Conclusion

The practice of the ecstatic beautification will not vanish overnight and the aim should not be to eliminate all henna use. General practitioners (GPs) should educate potential users to avoid using henna products with PPD additives and to instead use natural henna. The potential users in our case are from East African communities (Somalis, Eritreans, Ethiopians, Sudanese) who use it occasionally during celebratory occasions such as Eid celebrations, marriage and parturient festivities. We can educate and counsel this community during a brief clinical visit and in new comers centres in Canada. Of particular interesting social behavior among certain communities is that of a herding phenomenon. An individual's encounter or experience will have a domino and contagious effect to other members in a community.<sup>21</sup> It is an effective strategy of engagement between the GP and members of the community.

The role of the GP is important in acute management with the use of high-potency corticosteroid and long-term counseling and education of patients regarding the type of henna to avoid.<sup>22</sup> One way to educate is through brochures and booklets in a language easy to understand explaining the possible impact of black henna on a person. The henna website publishes a warning about use of PPD black henna in various languages.<sup>23</sup> It is also necessary to counsel holiday goers regarding use of henna in a foreign region to avoid a painful experience.<sup>24</sup>

Many regulatory agencies around the globe, including Health Canada, have issued a safety warning about PPD in black henna and users should be cautious when inspecting labels for PPD content.<sup>25</sup> However, a much stricter ban on the use of PPD for hair dye and any body decoration use should be mandated. Health Canada and other global regulatory agencies should further their oversight on marketing and distribution. Finally, we suggest that future patch testing could be carried out among East African community members. Such a study would provide baseline data that could be used to determine the prevalence of allergic dermatitis due to PPD use among the community.

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