‘Black Henna’ and the Epidemic of para-Phenylenediamine Sensitization: Awareness, Education and Policy

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Having studied many countries’ approaches to the ‘black henna’ health problem, and having been a consultant for national and local health boards, I believe I can propose a workable solution to the problem. The solution requires expanding access to safe henna products and limiting access to high PPD content powders. The USA is the only nation I know of that presently prohibits the use of henna as body art and that prohibition has contributed to the rise of ‘black henna’ and para-phenylenediamine sensitization. ‘Black henna’ is formulated with materials that can be freely purchased by any person who wishes to do so. People are prohibited from purchasing a safe alternative. There are solutions to this problem, they are within the purview of the US FDA, and mostly require enforcement of regulations already in place, with some adjustments to insure a safe and culturally sensitive access to henna for the seven million Hindu and Muslim citizens in the USA, as well as innumerable enthusiasts.

Based on my doctoral research (1) I estimate that as of 2013, there have been 140,625,000 people severely sensitized to para-phenylenediamine in areas of tourism by 2013, and that the number continues to increase by 9,375,000 each year. Many of these were children sensitized between 1997 and 2015, who will be a rising demographic of sensitized adults seeking to mask gray hair from 2010 to 2040. A far larger number of women are sensitized to para-phenylenediamine through cultural use where safe, traditional henna was formerly used to celebrate marriage and religious holidays, and is now replaced by para-phenylenediamine, as black stains considered more modern and fashionable. Attempts by governments to ban ‘black henna’ have largely been ineffective as the desire for fast, black temporary tattoos continues, and the patrons either do not know the risk, don’t believe they will be affected, or don’t consider the risk of injury to be significant. Enforcement of ‘black henna’ bans have rarely succeeded because of the availability of para-phenylenediamine and the seasonal, informal economies of the practitioners.

Any person who has a ‘black henna’, the popular temporary tattoo created by ornamenting skin with paste containing 15% to 80% para-phenylenediamine, is at risk of a severe allergic reaction to oxidative hair dye. The number and severity of these reactions is increasing, and have included hospitalization and death. Many of the extreme reactions are caused by sensitization from unusual levels of para-phenylenediamine in ‘black henna’ temporary tattoos, the time the ‘black henna’ paste is left on the skin, the large size of the area painted with ‘black henna’. These factors may be complicated by the young age of the client at first exposure (2). The para-phenylenediamine sensitization rate in children has risen to 8% in 2004, and 16% in 2015 according to a broad study presented to the British Association of Dermatologists’ Annual Conference in 2015 (3).

In the Kligman (4) sensitization assay, a patch of 10% para-phenylenediamine sensitized 100% of subjects in five applications or fewer. Tests of ‘black henna’ paste in areas of

tourism have been found to be from 15% to 80% para-phenylenediamine (5) (6). These high concentrations of para-phenylenediamine 'black henna' are left on the skin a minimum of twenty minutes, and the applications are frequently very large, imitating large permanent ink tattoos. This increases the dose-time sensitization curve, resulting in extreme levels of subsequent allergic reactions. In some instances where there have been a number of people exposed at the same time to the same 'black henna', then examined by a health department, 50% of subjects were sensitized by the first application of 'black henna' (7).

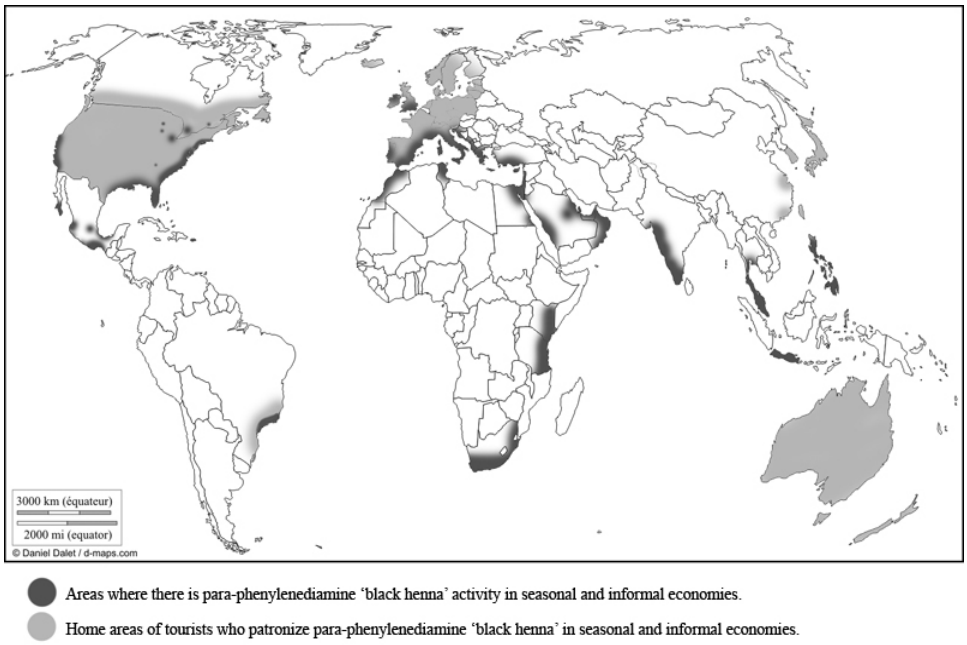

Figure 1: Areas where para-phenylenediamine skin painting is common in informal economies of tourism, and the areas to which their patrons return

Beaches and resorts facilitate seasonal and informal economies where ornamenting skin with para-phenylenediamine 'black henna' is done to emulate 'tribal' tattooing styles as well as traditional henna body art patterns. These tourists return home, often unaware of or misidentifying their sensitizations. Many of the 'black henna' clients are children who want the appearance of having an 'adult' tattoo; there may be more young males than females sensitized by these applications, as more extensive skin decorations are intended to emulate permanent, masculine tattoos.

Cultural groups have been sensitized through 'black henna' replacing or augmenting traditional henna in social and religious celebrations. Para-phenylenediamine has been used to decorate skin in cultural celebrations for twenty to forty years in areas of East Africa, the Arabian Peninsula and South Asia, and more recently in diaspora. This sensitized population is largely female, with multiple exposures of 20% to 60% para-phenylenediamine skin painting, each being applied with paste in contact with skin for a duration of twenty or thirty minutes. The awareness of the risk of skin reaction is not absent, but women's preference for fast, convenient, fashionable black skin art prevails over the estimation of risk. This practice, though not done before the 1970's, has been

embedded in many communities for long enough that ‘black henna’ is considered part of the culture.

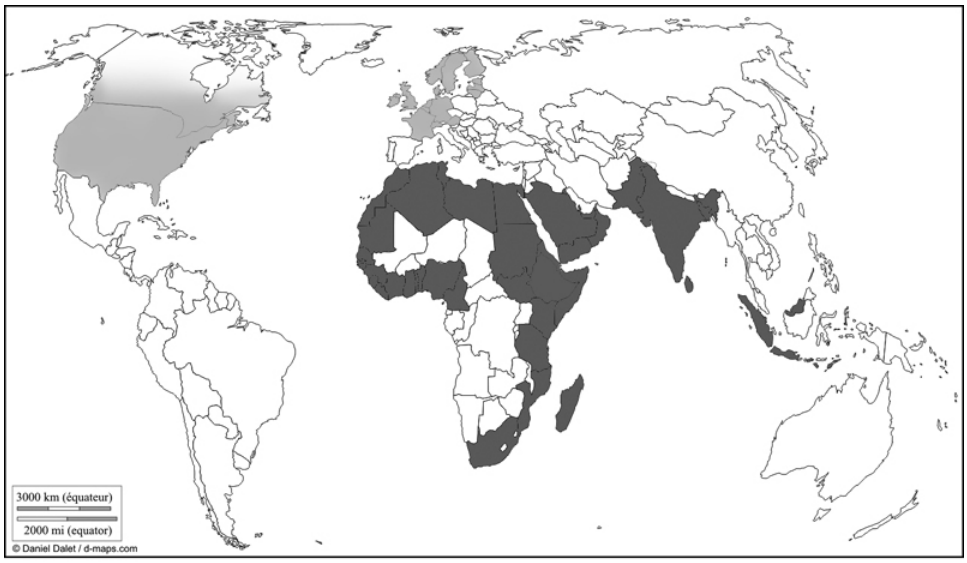

Figure 2: Areas where women use para-phenylenediamine ‘black henna’ to ornament skin for weddings, Eids, and other religious and cultural celebrations, and areas of diasporic communities where the practice is continued.

My suggestions to curb the number of injuries from ‘black henna’ involve removing the high PPD content components of ‘black henna’ from the public marketplace, and allowing a safe alternative to become available.

1. Identify products responsible for injuries and outlaw or confiscate them whenever possible. I have the list of the products most dangerous and most frequently used. Henna is not used in the formulation of ‘black henna. The products used to make ‘black henna’ are black hair dyes produced in China, Japan, India, and Pakistan; the PPD content of these dyes ranges from 15% to 40% far in excess of the US legal limit for PPD in hair dye, though these are readily available in beauty supply shops and ethnic groceries.
2. Ban all import of henna paste. Henna paste cannot hold quality for more than a few days without the addition of unacceptably hazardous dyes and preservatives.
3. Education: schools all over USA already teach henna body art as part of their multi-cultural curriculum segments. The population already has knowledge of, and desire for henna body art; facilitate safe practice through limitation of dangerous products and availability of safe products. Cultural sensitivity: the seven million Hindus and Muslims currently living in the USA hold dear their cultural practices of henna. Legalize safe a henna supply rather than prohibiting it, so that people will not resort to dangerous but legal PPD products used to formulate ‘black henna’.

4. Create a new grade for henna of a higher standard than is presently defined by the FDA as the legal standard as henna for hair. Define this henna at the standards and testing required by the FDA for the Northwest University Medical School studies on the therapeutic use of henna; that is to say the henna must be independently proven to be 100% pure henna, lawsone content 1.5% or above, free of adulterants, additives, pesticides, heavy metals, contaminants, and sifted to a particle size of no larger than 150 µm. Make the responsibility of meeting the standards of this new grade that of the importer; that is that the henna and must be submitted to an independent certified laboratory before being offered for sale and proven to meet the above mentioned standards before being offered for sale. Allow this grade of henna to be sold OTC in shops and pharmacies for topical use, without any claims for diagnosis or cure, with warnings for known risks and instructions use. This will also create a baseline for further testing of henna in the field of medicine; present studies are hampered by unquantified supplies of the raw material.(8)
5. Require the % listing of PPD in hair dye as a dry weight content rather than '% in dilution'. High PPD content hair dye products which are used to formulate 'black henna' are not truthful about their PPD content.
6. Limit OTC availability of any product that has a PPD dry powder content of 1% or over to licensed cosmetologists only, or require a warning on the exterior of the package, "applying this product to skin may result in severe allergic reaction." 1% PPD is ineffective as a 'black henna' temporary tattoo, so limiting that availability will reduce the means by which people acquire their materials for injury-causing body art.
7. Consider banning the import of ANY henna hair dye product that contains PPD. There is now a rapid scanning test to establish presence of PPD. (9)

This multi-part solution should satisfy a number of problems including the cultural conflicts created with present FDA prohibition of henna by making a safe alternative to 'black henna' products more widely available, reliable, and therefore the preferred choice in the marketplace.

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