Academic Sciences International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 5, Suppl 2, 2013

Research Article

FREQUENCY AND ATTITUDES OF USING HAIR DYES AMONG PALESTINIAN WOMEN

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Received: 18 Mar 2013, Revised and Accepted: 26 Apr 2013

ABSTRACT

Objective: The objectives of the study were to identify the rate of using hair dyes among Palestinian women, preferences, motivations and attitudes towards their use.

Methods: A cross-sectional study was conducted between May and July 2011. A self-administered questionnaire was used.

Results: Among 200 females interviewed, 149 (74.5%) said that they used hair dyes. Their reasons were to hide gray hair in 35 (23.5%), to improve the outlook in 36 (24.2%), and to change and to follow the new trends in 78 (52.3%). Natural dyes (henna) were the choice for 38.9%. The main reason behind the preference of natural dyes was the belief they are safer than chemical dyes. A small percentage used hair dyes during pregnancy, and 21.5% thought that hair dyes may cause cancer.

Conclusion: Use of hair dye is very common among females. The public should be informed about the risks associated with excessive hair dye use. Women should understand that natural dyes such as henna are not completely free from side effects. It is important to include information on the ingredients on hair coloring packs and mention possible side effects of both chemical and natural hair dyes.

Keywords: Cosmetics, Hair dyes, Henna, Palestine.

INTRODUCTION

The art of hair dyeing was known as early as 5000 years BC among the Egyptians. Vegetable hair dyes were used at that time. The first artificial dye was synthesized in the laboratory in 1856, and permanent hair colorants have been in commercial use for over 100 years [1]. Hair dyes can be divided into five categories, each with a specific composition and action mechanism: gradual hair coloring, vegetable hair dyes (such as henna), temporary dyes, semi-permanent dyes and permanent hair colors [2]. Recently, wider debate on the safety and composition of hair dyes is overdue among medical and scientific communities, the public, and legislators. Cultural and commercial pressures to dye hair are putting people at risk and increasing the burden on health services [3]. As the increase of scientific studies on beauty products continue to rise, so have public health concerns. The most common chemicals used in permanent hair colors are phenylenediamine, 3- aminophenol, resorcinol, toluene-2,5-diamine sulphate, sodium sulfite, oleic acid, sodium hydroxide, ammonium hydroxide, propylene glycol and isopropyl alcohol. The Chemicals p-phenylenediamine and aminophenyl have been suggested as possible carcinogens or mutagens in experimental studies and many have been eliminated from oxidative dye products since the early 1980's [4]. The scientific community has been interested in this potential public health impact.

Many non-toxic and natural hair color products are now available on the market. These products rival the effects of synthetic hair dyes without the use of harmful additives. Henna is a naturally occurring brown dye made from the leaves of the tree Lawsonia inermis. The active ingredient of henna is lawsone (2-hydroxy-1, 4-naphthoquinone). Henna has been used to adorn women's bodies during marriage ceremonies and other social celebrations since the Bronze Age. It is traditionally used in Islamic and Hindu cultures as a hair coloring and as a dye for decorating the nails or making temporary skin tattoos [5,6]. In Palestine, use of hair dyes either natural or chemical is common among women. The use of henna is part of the tradition and culture. Women of all ages use henna for skin decoration and hair dyeing, and it is considered an essential part of the wedding ceremonies and other social celebrations. Little is known about the use of hair dyes among women in Palestine because there are no previous studies in this field. Thus the objectives of the study were to identify the rate of using hair dyes among women, preferences, motivations and attitudes towards their use to help policy makers and healthcare professionals in implementing suitable regulations and education to protect women and ensure safe use. Generally, Henna is believed to be a safer natural alternative to chemical dyes in our part of the world.

MATERIALS AND METHODS

A cross-sectional study was conducted between May and July 2011. A self-administered questionnaire was used. The questionnaire included questions to assess women's attitudes towards hair dyes, the rate of their use, the types of hair dyes preferred and the reasons behind their choices. The questionnaires were handed out randomly in various cities, villages and camps of the West Bank. The information was collected by trained interviewers from pharmacy students. A convenient sample of 200 women was collected. The data was entered and descriptively analyzed using the Statistical Package for the Social Sciences (SPSS) software program version 16.0.

RESULTS

Rate and motivation for hair coloring

The sample consisted of 200 females, 149 (74.5%) of them said that they used hair dyes. When they were asked about their motivation, 35 (23.5%) said that was to hide gray hair, 36 (24.2%) used hair dyes to improve the outlook, while for 78 (52.3%) of them they used hair dyes just to change and to follow the new trends.

Natural dyes and motivation for consumer preference

Concerning the type of hair dyes preferred by consumers, natural dyes (henna) were the choice for 58 out of the 149 whom used hair dyes, while chemical dyes were the choice for 91 as shown in Figure 1.

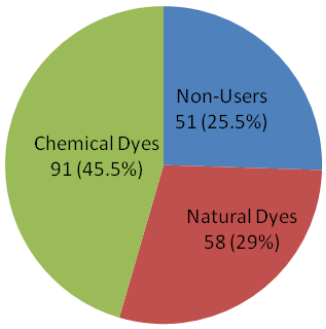

Fig. 1: It Shows Use of hair dyes among Palestinian women (N = 200)

Among those who prefer natural dyes, 41 (70.1%) of them told that they add other natural materials to henna; the main natural materials were hibiscus, tea and chamomile. Twenty five declared that the motivation behind the addition of these natural materials was to reach the required degree of color, while 10 of them added natural materials to increase the adherence and permanence of color on hair and only a minority of the interviewed females (6) had this practice due to their beneficial effects on the hair. When the consumers were asked to give the reasons behind the preference of natural dyes, 23 out of the 58 said that was because they are safer than chemical dyes, 15 said that natural dyes give them the best natural color results, and 20 used natural dyes because they think they are useful to the scalp (Table 1).

Table 1: It shows the reasons behind the preference of natural dyes

Reason	Frequency (%) (N = 58)
They are safer than chemical dyes	23 (39.7%)
They give the best natural color	15 (25.9%)
They are useful to the scalp	20 (34.4%)

Regarding any experience of side effects after using henna 8 out of 58 (13.8%) reported that they have experienced side effects due to the use of natural dyes as headache, contact allergic dermatitis, and chemical burns.

Synthetic dyes & motivation of consumer preference

Among the consumers who declared that they preferred chemical dyes, 40 out of 91 (44%) said that the reason behind their preference of chemical dyes was that they are easier to use (require shorter time on hair and can be washed easily). Twenty four of the females preferred chemical dyes to obtain the required degree of color, and 27 of them chose chemical dyes because they give wider options when choosing color (Table 2).

Table 2: It shows the reasons behind the preference of chemical dyes

Reason	Frequency (%) (N = 91)
They are easier than natural dyes	40 (44%)
They give the required degree of color	24 (26.4%)
They give wider options of colors	27 (29.6%)

The consumers were asked if they have suffered from any of the side effects that could be related to chemical hair dyes, the reported side effects were trichorrhexis (40.7%), itching and redness of the scalp (20.4%), and hair loss (29.6%).

Preferred place to get chemical hair dyes

Concerning the ideal place to get the desired hair dyes, stores or supermarkets were chosen by 15 out of 91 (16.5%) of the females, 28 (30.8%) of the females depended on community pharmacies to achieve their hair dyes, while more than half of them 48 (52.7%) declared that the beauty salon was their preferred place to get hair dyes.

Safety of hair dyes and use during pregnancy and lactation

When women were asked if they have ever used any type of hair dyes during pregnancy or breast-feeding, only 11 out of 149 (7.4%) said yes. When consumers were asked if they think that hair dyes may cause cancer 32 (21.5%) of the females answered with yes with only 9.3% of them opted to consult a doctor or a pharmacist.

DISCUSSION

In this study, 149 (74.5%) of the females said that they have used hair dyes. These results are similar to other countries where a high percentage of women use hair dyes. In a survey from Saudi Arabia, 82.6% of the participating females had dyed their hair at some point in their lives [7]. In Denmark 74.9% of women and 18.4% of men had at some point dyed their hair, and the median age for first use of hair dye for both men and women was during the teenage years [8]. About one third of women in Europe and North America, along with 10% of men older than 40 years, use some type of hair dye [9]. Hair coloring is a dye that is used to color human hair. It is used for a variety of purposes; most commonly to return gray hair to its previous color, to change hair color to a more desirable shade, or to return hair to its original color after chemicals (e.g. hair dye) have discolored it [7]. The major motivation for hair dyeing in this study was to simply have a change of color and follow new trends (52.3%); other reasons were to improve the outlook by 24.2% and to hide gray hair by 23.5%. Concerning the type of hair dyes preferred by consumers, natural dyes (henna) were the choice for 58 (38.9%) of the females. This shows that henna is widely used in our community. This can be expected as the use of henna dye is traditional in Islamic countries. It has a religious and social significance and it thought to be safe. In fact, when the consumers were asked to give the reasons behind the preference of natural dyes, 39.7% of them said that was because they are safer than chemical dyes, 25.9% of them said that natural dyes give them the best normal results. An interesting number of interviewed females (34.4%) declared that henna is beneficial to the scalp which may be investigated in a future research. Eight out of 58 (13.8%) reported that they have experienced side effects due to the use of natural dyes as headache, contact allergic dermatitis, and chemical burns.

Regarding the safety, despite the wide spread use of natural henna, especially, in countries where henna art is traditionally practiced; reports of allergic contact dermatitis to natural henna are very rare in the literature. It can therefore be assumed that natural henna is a very weak skin allergen [6,10], and these allergic observations may be due to the addition of other components to henna in order to improve the quality of this product in terms of final color, time required to achieve the desired color and its lasting effect. In fact, these properties were reported by the consumers when they were asked about the motivations behind the addition of other home additives to henna. Indeed, this was confirmed by consumers who preferred the chemical dyes. Therefore, this may encourage some manufacturers to mix henna with other chemical dyes such as para-phenylenediamine (PPD), without mentioning these additives on the label of henna packages and this may be dangerous due to possible toxic effects of these added chemicals. In fact, PPD has been mixed with natural henna to give an ebony color (black henna) instead of the orange/reddish color given by natural henna. The other reason for adding PPD to the natural henna is to speed up (shorten the time) of the tattooing and dyeing process, while natural henna staining takes 4 to 12 hours, addition of PPD can reduce this time to an hour or two and also there will be a longer lasting effect as well [5]. Thus, a new pattern of exposure to PPD has been recognized through henna which increases the risk of developing adverse health effects related to PPD. Acute allergic contact dermatitis, eczema, chemical burn, acute renal failure, acute and severe angioneurotic edema, abdominal pain and vomiting as adverse health effects associated with the use of henna containing PPD (black henna) are well documented in the literature [5]. It is also documented that PPD can bring about rhabdomyolysis which is the main cause of acute renal failure [11].

It is good to mention that many other herbs like Kikar (*Acacia arabica*), bihi (*Cydonia oblonga*), bhringraj (*Eclipta alba*), patnag (*Haematoxylon campechianum*), akhrot (*Juglans regia*), narra (*Petrocarpus inducus*) and jaborandi (*Pilocarpus jaborandi*) can be used as a main ingredients in hair care preparations mainly for dyeing hair [12], Some other herbs as *Emblica officinalis*, *Centella asiatica*, *Aloe vera*, *Ocimum sanctum* and *Eclipta* can be used to improve hair growth [13]. So in summary, we can say that natural products might be safer than chemical products but they are not completely free from possible side effects and women need to know this in order to protect their health, and thus more public health awareness efforts must be conducted within communities using them.

Henna producers should not mix it with these chemicals or at least should provide henna packs with a label that contain complete information about the ingredients present in the provided henna formulation, since most consumers use it due to its claimed safety when compared with chemical dyes. Also, regulatory bodies should analyze and check on the quality of the henna packs arriving from various sources to check for presence of harmful ingredients or undisclosed ingredients and assure its freedom from the presence of such chemicals. It is also a good idea to pose restrictions on points of

sale for henna products so that consumers buy the packs from pharmacies where he will be well informed and get the advice he needs. It is reported in the literature that henna has been known to cause haemolytic crisis in glucose-6-phosphate dehydrogenase (G6PD) deficient infants and others. In the UAE, Raupp and his colleagues have reported the occurrence of haemolytic crisis in four G6PD-deficient children following topical application of henna; of these a female neonate recovered after exchange transfusion, and a male infant died despite receiving a transfusion [14]. In particular people who have (G6PD) deficiency should be informed about the potentially serious adverse health effects of topical application of henna. In addition, an awareness program should be established to inform the public about the risk of using henna mixed with PPD (black henna). Palestine is an Islamic country where many people traditionally use henna for different purposes such as hand and nail decoration and the dyeing of hair; it is also used to relieve pain and pruritus and to treat infections. Hence, people should be aware of the potential side effects of henna and warnings about the risk of using henna are warranted. When the labels of henna products in our market were reviewed, it was found that some of them included information about ingredients, use, precautions, and expiry date while others did not.

Side effects that could be related to chemical hair dyes were highly reported. Itching and redness of the scalp was reported with among 20.4% of the women, this is a very high percentage. For more than 100 years aromatic amine family have been the main agents used in permanent hair dyes, and more than two thirds of hair dyes currently contain PPD. This compound is an effective hair dye owing to its low molecular weight, its ability to penetrate the hair shaft and follicle, its strong protein binding capacity, and its rapid polymerization in the presence of a coupler (a kind of catalyst) and an oxidizing agent. However these properties also make PPD an ideal contact allergen and, indeed, it is among the most potent [3,15]. To prevent contact dermatitis to oxidative hair coloring products, a consumer test (skin allergy test, SAT) consisting of the open application of the colorant base prior to mixing with the developer is recommended 48 hours before hair coloring. The test is a suitable tool for the secondary prevention of contact allergic reactions to hair coloring products [16], but this practice is not common in our country. It is good to encourage this practice among women with a history of possible side effects due to hair dyes to improve safety and try to avoid these effects in the future. Chemicals in hair dyes can also cause rhabdomyolysis, laryngeal edema, severe metabolic acidosis and acute renal failure [1].

When women were asked if they have ever used hair dyes during pregnancy or breast-feeding, only 11 out of 149 (7.4%) said yes. This shows a high awareness and concern of fetus safety among pregnant women. Studies regarding teratogenic effects of chemical hair dyes are not conclusive. Few studies have examined women's use of hair dye before and during pregnancy. A 2005 study suggested an association between hair dye in pregnancy and the childhood cancer neuroblastoma [17], but other studies haven't reached the same conclusion [18]. Hair dyes are probably safe to use during pregnancy because so little dye is absorbed through the skin. However, it is still important to be cautious [4,7], therefore many health care providers recommend that pregnant women not use permanent hair dyes during the first three months. While the absorption through the skin is minimal, the concern is that breathing fumes during the process could be harmful to the developing baby. Permanent hair dyes contain ammonia which has a strong chemical fume. The recommendation is to avoid hair dyes that contain ammonia.

When consumers were asked if they think that hair dyes may cause cancer, 21.5% of the females answered with yes. In a study from Saudi Arabia, 36.0% believed that hair dyes could cause cancer [7]. An association between hair dyes and cancer is an important public health concerns since a high percentage of people use them. Regarding this risk, the results are inconsistent [4,10]. Non-Hodgkin's lymphoma has been associated with use of hair coloring products, particularly long-term use of dark permanent dyes or use before 1980s, in several epidemiologic studies [19,21]. However, other investigators have not reported positive associations between ever use of permanent hair dye and lymphoma [22,23]. Several studies have suggested an increased risk of bladder cancer among hairdressers, who are occupationally exposed to hair dyes. There has also been concern about a possible increased risk of bladder cancer among users of hair dyes. However, the association between personal hair dye use and bladder cancer risk remains inconclusive [24]. Women need to understand that hair dyes might not be completely safe, so they should not be overused. Many natural health care experts recommend using natural dyes and doing hair dyeing as infrequently as possible. Unfortunately, this study showed that henna which is the most widely used hair dye among women in this study was found to cause some side effects and is not completely safe. This finding was associated with presence of hazardous chemicals in henna packages. As reported in many studies, the dangers of these chemicals is associated with long term use of henna and thus, the carcinogenic hazards of these chemicals may be more frequent. Hair color professionals should consider wearing heavy plastic gloves and a mask to protect against fumes and try to schedule color work so that they have a break in between applications. Consumers, when possible, should look at less toxic options such as all natural coloring agents.

Regarding the preferred place to get the desired dyes, it was interesting to see that only 30.8% of female prefer the community pharmacies where may receive better information about the direction and safety of these products. Therefore, it would be important to encourage consumers to get their hair dyes from pharmacy since pharmacists should aware about potential side effects and the quality of these products and accordingly they can advise the consumers especially in case of pregnancy or lactation.

CONCLUSIONS

It is concluded that a high percentage of women use hair dyes in our country and henna is widely used. The public should be informed about the risks associated with excessive hair dye use. Women should understand that natural dyes are not completely free from side effects. It is important that there is labeling of the ingredients of hair dye packs with date of manufacture and expiry. In addition, instructions on use should be included so that sensitive individuals are aware of any possible allergenic ingredients prior to purchase and use. Ministry of Health should oblige importers to report important relevant information on ingredients, use, precautions, possible side effects and expiry date on products. It should also conduct analysis on coloring products for hazardous chemicals such as PPD and restrict sale to pharmacies where proper advice can be provided to consumers.

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