

A CLINICAL STUDY OF HYDROQUINONE REACTION IN SKIN BLEACHING IN GHANA

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SUMMARY

A clinical study was conducted among 35 subjects who were seen at the Dermatology Out-patient Clinic at Korle-Bu Teaching Hospital, Accra, with adverse skin reactions following the use of topical bleaching agents. Hydroquinone-containing preparations were found to be the most commonly used agents. Ochronosis and colloid millia were the main clinical findings and their distribution suggested a photocontact reaction.

INTRODUCTION

The use of skin bleaching agents or lighteners has been reported in many parts of the world, such as Kenya,¹ South Africa,^{2,3} Zimbabwe,⁴ USA,^{5,6} Great Britain⁷ and Saudi-Arabia.⁸ Various chemicals have been used with consequent undesirable side effects. While phenols were reported to have been associated with ochronosis,⁹ the mercurials were implicated in nephropathy.^{1,8}

Hydroquinone (1,4-benzenediol) was first reported in association with ochronosis (black pigmentation) and colloid millia (subepidermal keratin cyst) by

Findlay *et al* in 1975.² A later report,³ also confirmed these findings with hydroquinone concentrations of less than 2%, even when combined with sunscreens agents.

Hydroquinone causes melanocyte damage by interfering with the formation and melanisation of melanosomes as well as the destruction of the membranous organelles with resultant cellular necrosis which ultimately causes depigmentation.¹⁰

As a result of the increasing use of bleaching agents and the observation of the associated disfiguring skin reactions in the Ghanaian population, a clinical study of the affected subjects was carried out at the Dermatology Outpatient Clinic of Korle-Bu Teaching Hospital, Accra, from 1988 to 1990 and the report is presented here.

MATERIALS AND METHOD

Subjects were referred from either the general practices or polyclinics in Accra while a few others were seen on their own initiatives. A standard questionnaire was designed for all subjects to obtain information on age, sex, educational background, occu-

pation, types of bleaching agents used, use of other topical agents and systemic drugs, age of onset of skin reactions, as well as intervals between the start of the use of the bleaching agents and the onset of the skin reactions and any associated symptoms. Detailed clinical skin examination then followed in all subjects.

RESULTS

A total of 35 subjects, all females, were seen over the period of the study. Their ages ranged from 30 to 62 years with an average of 49.7 ± 7.0 years. Among these were 22 traders, 4 bank clerks, 5 housewives, a civil servant, a teacher, a laundry assistant and a beautician. Of the total number of subjects only 6 (17%) had completed secondary school education. In all cases the reason for the use of the bleaching agents was purely as a cosmetic as subjects felt it was fashionable and made them more attractive, particularly to the male sex.

The ages of onset of the skin reactions ranged from 20 to 54 years with an average of 45.7 ± 8.3 years. Information on the interval between the time of starting the use of the bleaching agents and the onset of the skin reactions was obtained from 19 subjects. This varied widely, ranging from a minimum of 2 years to a maximum of 24 years with an average of 8.8 ± 5.9 years.

The bleaching agents used were either soaps and/or creams (Table 1). Among the former were "Asepso", "Crusader" and "Roberts", all mercurials and "Neko", a carbanilide. Another soap used was "Anago Soap", a local preparation, the active ingredient of which is not known. On the whole, 21 subjects used either one or more of these soaps in combination with a cream.

Various brand names of hydroquinone-containing

Table 1: Types of Bleaching Agents Used

<u>Soap</u> —	Carbanilide	—	Neko
	Mercurials		Asepso Crusader Roberts
	Anago		? Active Ingredient
<u>Creams</u> —	Hydroquinones	—	Atra, Ambi, Paulina Shirley, Cleartone
	Steroids	—	Dermovate, Topsyne, Topgel
	Cocoa Butter		
	Pepsodent Toothpaste		

creams were used by all subjects. These included Atra, Ambi, Venos, Paulina, Shirley and Cleartone. In all, application of these creams was only to the exposed skin areas of the face, neck, arms, hands and legs but in 3 subjects this was applied to the whole body skin surface. Topical steroids were used briefly at various times by 15 subjects (43%) mainly for the treatment of early itchy reactions produced by the use of the soaps and or creams. However, in 2 (5.7%) subjects topical steroids were used as primary bleaching agents. One subject used Pepsodent toothpaste and 2 used cocoa butter at certain times.

Information on the use of drugs with photosensitizing potential was also obtained. 5 subjects were on thiazide diuretics, one on indomethacin and another on chlorpropamide. Intake of these drugs, however, did not precede the onset of the skin reactions.

Symptoms associated with the use of the various creams were sometimes observed. These were pruritus in 9 precipitated by sunlight exposure in 6; burning sensation in 9 precipitated by sunlight exposure

in 8 and papulo-vesicular reaction of dermatitis in only one subject.

The main clinical lesions seen were colloid milia and nodules as well as ochronosis (Table 2). In two subjects tumors were observed but requests for biopsies were refused. The distribution of the skin lesions was confined, in all cases, to the light-exposed areas of the face (forehead, cheekbones, nose and lips), neck (back, sides and "V" with sparing of the submental area of the neck) and anterolateral parts of the shoulders and arms (Table 3 and Figs. 1,2,3). In 3 subjects the upper exposed trunk was also affected.

Table 2: Morphological Changes in Subjects with Bleached Skin

Morphological Changes	Incidence
Colloid Milia	88.6% (31/35)
Ochronosis	100% (35/35)
Atrophy	25.7% (9/35)
Telangiectasia	5.7% (2/35)
Nodules and Tumors	8.6% (3/35)

Fig. 1: Ochronosis and colloid milia on the light-exposed skin of the face, side and V of the neck.



Fig. 2: - Ochronosis and colloid milia of the neck, shoulders and upper back.



Table 3: Distribution of Skin Lesions in Subjects with Bleached Skin

Skin Sites	Incidence
Face	91.4% (32/35)
Neck (V, Sides, & Back)	60% (21/35)
Arms and Hands	37.12% (13/35)
Trunk (Upper)	8.6% (3/35)

Fig. 3: Ochronosis and colloid milia on the antero-lateral part of the arm.



DISCUSSION

This study has demonstrated that skin bleaching is a cosmetic practice present in Ghana with delayed disfiguring skin reactions. Although all the subjects studied were females, with the recent observation by

the author that males are also now indulging in this practice it may not be too long before they also start developing similar side effects. It is interesting to note that while bleaching agents may be used therapeutically,¹¹ the reason for their use in this study was purely cosmetic. The observation that only 17% of the subjects had completed secondary school education supports the findings of Hardwick *et al*³ that this practice is more common among those with lower educational achievement. This may reflect differences in the concept of beauty among the different educational levels in the population.

The time interval between the start of the use of the bleaching agents and the onset of the adverse skin reactions varied widely, with an average of 8.8 ± 5.9 years. This would appear to be longer than the one year interval reported by Hardwick *et al*.³

Even though the types of soaps and creams used varied considerably, on the whole hydroquinone-containing creams were the most commonly used agents by all subjects. Mercurials and carbanilide soaps were only occasionally used. The roles of such preparations as "Pepsodent", Cocoa Butter and "Anago" soap in skin bleaching were not clear. Although topical steroids were used by 43% of the subjects at one time or the other only 3% used these as primary bleaching agents.

Early contact dermatitis may occur with the use of hydroquinone-containing preparations and such a reaction may be seen on any area of direct contact. However, with the delayed reactions of ochronosis, colloid milia formation, the occasional atrophy and nodules, it was significant to note that their distribution was confined only to the light-exposed areas of the face, neck, shoulders and arms. The pattern of distribution would, therefore, suggest that this latter form of reaction is of a photocontact type, probably that of phytotoxicity as seen in Civatte's poikiloderma. Symptoms of burning and pruritus in relation

to sunlight exposure also occurred in 8 and 6 subjects respectively. It might be suggested that the use of potentially photo-sensitising drugs such as thiazide and indomethacin might have been responsible for the types of reaction seen. This is most unlikely since other light-exposed areas such as the rims of the ears, backs of the hands and tops of the feet would have been affected as well. Moreover, the use of these drugs followed the onset of the skin reactions.

It may be suggested that the incorporation of sunscreens within the hydroquinone preparations would prevent the occurrence of such reactions but a recent report revealed that use of such a preparation failed to prevent the reactions.³ Although the absorption spectrum of hydroquinone has a peak of 293nm,³ suggesting the need for using ultraviolet-B (UVB) sunscreens, its action spectrum in the skin may be different. Moreover, the required protective factor may be higher than that used, hence the need for both in-vitro and in-vivo photosensitivity studies to determine the appropriate sunscreens agents required.

Cutaneous neoplasms such as basal cell and squamous cell carcinomas are rare in the black skin.¹² Would the frequent use of these bleaching agents eventually lead to the development of such sunlight-exposure related problems in the Ghanaian population? A long term follow up of these subjects is required to provide the answer.

CONCLUSION

Skin bleaching or lightening is a social practice with related delayed dermatological problems in the Ghanaian society. Hydroquinone preparations are the most commonly used agents and the distribution of the skin lesions is highly suggestive of a photo-contact reaction. The appropriate measures required

to deal with this problem relate to the adoption of preventive measures in the form of education of the public on the correct use of cosmetics, cultural acceptance of "black being beautiful" and the incorporation of the appropriate sunscreens agents in the hydroquinone-containing preparations.

ACKNOWLEDGEMENT

I wish to thank Mr. John Appiah of the Department of Medicine and Therapeutics for typing the manuscript.

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