Multicultural Perceptions of Facial Skin Color Abnormalities

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A appearance is a key determining factor in possessing self-esteem.[1] Self-esteem is important for mental well-being in persons of all ages and races, beginning in childhood and assuming paramount importance during adolescence.[2] Appearance continues to be important in adulthood despite the onset of outward signs of aging.[3] This need for attractiveness is observed in Hollywood starlets, models who grace magazine covers, and even in pop culture anthems. Janis Ian, a modern songstress, best summarized the importance of attractiveness in her lyrics "I learned the truth at 17, that love was meant for beauty queens and high school girls with clear skinned smiles..."

Perhaps one of the biggest emotional handicaps is facial disfigurement, which can take many forms.[4] Most adolescents are aware of the social issues that accompany facial scars resulting from a car accident, a four-wheeler mishap, or a gang-related knife fight. Yet, physical injury is not the most common cause of facial abnormalities. The most common cause of facial disfigurement in persons of all skin colors and ages is dyspigmentation.[5] Dyspigmentation can result from inflammatory acne, hormonal alterations, benign growths, and sun exposure. Little research has been done to date to characterize the effects of dyspigmentation on perceptions of self in various skin colors. This is an important dermatologic issue, since an abnormal facial appearance can lead to depression, encourage criminal activity, decrease quality of life, and promote discrimination.[6] The research presented in this article examines the effects of facial dyspigmentation on multicultural perceptions.

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Methods

This was an 8-week, single-center study involving 80 participants. All participants signed an institutional review board–approved consent form and Health Insurance Portability and Accountability Act statement. Male and female participants representing all Fitzpatrick skin types with moderate facial dyspigmentation were selected from a suburban dermatology practice in High Point, North Carolina.

All successfully enrolled participants were dispensed a 30-g tube of a generic hydroquinone (HQ) 4% cream (Melquin HP). Participants were instructed at the research facility on proper application technique of the HQ 4% cream twice daily to the entire face and completion of a compliance diary. Participants were asked to complete a questionnaire indicating their perception of their facial skin dyspigmentation and self-esteem at baseline. Participants returned to the research center at weeks 4 and 8 to complete the questionnaire again, which was validated by a previous pilot study. Participants were asked to self assess their facial dyspigmentation at baseline and at weeks 4 and 8 on a 5-point ordinal scale, where 0=none, 1=minimal, 2=mild, 3=moderate, and 4=severe. The ordinal data was analyzed longitudinally as a difference from baseline, utilizing the paired 2-tailed Mann-Whitney test. A Spearman rank correlation test was used to analyze the relationship between perceived change in skin age and self-esteem, and a chi-square test for independence was used to analyze the relationship between self-esteem and perceived change in skin age. Significance was defined as $P<.05$.

Results

Seventy-eight of 80 participants successfully completed the study with 2 lost to follow-up after the baseline visit. The average age of enrolled participants was 48 years. No compliance issues were noted based on analysis of participants' diaries. Thus, all 78 participants completed the study per protocol and were included in the final data analysis. No adverse events or adverse experiences occurred during the administration of the study. Fifty-one participants possessed light skin color, 20 participants possessed medium skin color, and 9 participants

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possessed dark skin color in the final analysis. This skin type distribution is consistent with the population mix surrounding the research center.

The longitudinal analysis of the light, medium, and dark skinned participants showed a statistically significant perceived improvement in discoloration in dark skinned participants at weeks 4 ($P=.030$) and 8 ($P=.022$) as compared with baseline and for the light skinned participants at weeks 4 ($P<.001$) and 8 ($P<.001$) as compared with baseline (Table 1). Only a positive trend was observed for the medium skinned participants at weeks 4 ($P=.080$) and 8 ($P=.069$). No statistically significant intergroup perceptions were noted in the difference from baseline analysis.

Participants were also asked to determine how much younger they felt following treatment with HQ 4% after 4 and 8 weeks of use. Change from baseline analysis was performed using the paired 2-tailed Student *t*-test (Table 2). The participants with medium skin color demonstrated a statistically significant perceived younger appearance after 8 weeks of HQ 4% ($P=.022$) as compared with the participants with light skin color. No statistically significant differences were seen when comparing the participants with dark and light skin or dark and medium skin color. Furthermore, no difference was noted in absolute change in perceived skin age between all groups either at 4 or 8 weeks.

The data were also analyzed for a correlation between the degree of perceived improvement in skin appearance and perceived younger appearance following 8 weeks of HQ 4% application. Using the Spearman rank correlation, a highly statistically significant correlation was found between perceived dyspigmentation improvement and perceived younger appearance in participants with light skin (Spearman $r=0.585$, 95% confidence interval 0.1768 to 0.8209, $P=.0067$) (Figure 1). No correlation was observed between improvement in skin color appearance

and perceived younger appearance for medium and dark skin colors.

Further, data on improvement in participants' self-esteem was collected to evaluate an association with perceptions of younger appearance in all skin types. A chi-square test was utilized for this analysis, evaluating the subgroups of light, medium, and dark skinned participants (Table 3). The light skinned participants demonstrated a positive correlation between self-esteem and perceived younger appearance at 8 weeks

TABLE 3

Self-esteem and Perceived Change in Skin Age at Week 8 in Participants With Light Skin by Chi-Square Analysis[a]

	Self-esteem Improved	Self-esteem Not Improved
Skin age perceived as younger	17	5
Skin age perceived as not younger	20	9
	P=.002	

[a]P value indicates that participants perceiving a decrease in skin age were more likely to report improved self-esteem by chi-square test for independence.

(P=.002), whereas no statistically significant association existed between self-esteem and perceived younger appearance at 8 weeks in participants with medium skin.

Discussion

Appearance assessment is the first innate visual evaluation made by humans upon meeting.[7] This assessment was important evolutionarily to determine whether the other human was friendly or an aggressor for purposes of self-protection. Yet, appearance assessment goes beyond personal safety to include human attraction to the opposite sex.[8] Women with high cheekbones are felt to be universally beautiful regardless of age, skin color, or ethnicity. Social anthropologists have linked high cheekbones in females to a well-estrogenized state necessary for procreation. Conversely, males with a square jawline are identified as universally handsome and this feature has been linked to the presence of testosterone, again necessary for procreation. Thus, humans are mentally preprogrammed to use appearance as a means of judging others.

This means that an attractive appearance can yield a positive judgment, whereas a disfigured appearance can yield a negative judgment.[9] Many cultural adages encourage behaviors that ignore appearance, such as "you can't judge a book by its cover," yet appearance is a common issue used by children to tease and berate one another. Elementary school children frequently use the term *ugly* to insult others. Much verbal and electronic bullying of adolescents also revolves around appearance.[10] Adolescents with facial disfigurement may be ostracized by peers based on appearance.[11] The focus on an attractive appearance does not stop with adolescence, however. Even adults resort to social isolation when a large acne lesion appears in a very visible area such as the nose.[12]

This study utilized changes in facial pigmentation resulting from treatment with HQ 4% as a means to assess the impact on psychological factors associated with skin perception (eg, self-esteem and youthful skin appearance). The model of dyspigmentation as an evaluable form of facial disfigurement is important because dyspigmentation can be improved after 8 weeks of treatment, providing an intervention that can be perceived and quantitated by the participant. This intervention provides the background change necessary for the subsequent research providing insight into self-esteem as it relates to facial disfigurement. Further, this research model respects the safety and rights of human participants by selecting a form of facial disfigurement with an easy topical intervention.

Moreover, this research evaluated multicultural perceptions of facial skin color abnormalities. All Fitzpatrick skin types showed self-perceived improvement in skin dyspigmentation as compared with baseline, demonstrating the efficacy of HQ 4%. While this improvement was statistically significant in light and dark skin, only a positive trend was seen in medium skin. This could be due to the small number of participants in the medium skin group, however participants with dark skin were also few in number. Alternatively, this may highlight differing multicultural perceptions that require further investigation.

Once improvement in skin dyspigmentation was validated, it was possible to evaluate how improvement in facial appearance affected the study population. Assessments were made by asking the participants if their perceived age had decreased following twice-daily application of HQ 4%, evaluating the psychological premise that decreased age is an indication of improved self-perception. Further data were collected by asking the participants if they experienced an improvement in

self-esteem. It is interesting to note that only the participants with medium skin color demonstrated a statistically significant perceived younger appearance between 4 and 8 weeks of HQ 4% (*P*=.022) as compared with the participants with light skin color. No statistically significant differences were seen when comparing the dark and light skinned participants and the dark and medium skinned participants. Since this difference represents the change during the final 4 weeks of the study, this analysis suggests that the medium skinned participants improved more slowly than the light skinned participants (eg, reported a greater difference during the last 4 weeks, as all participants regardless of complexion reported a similar absolute decrease in perceived skin age at 8 weeks).

Self-esteem perceptions demonstrated a correlation between feeling younger and higher self-esteem in the participants with light skin. This may be due to the greater ease with which dyspigmentation can be improved in fair skinned persons. Since there is less pigment production to suppress, light skin is much easier to improve than dark skin with HQ 4%. Facial pigment abnormalities are also more superficial in light skin, allowing increased access of the HQ 4% to its active target. Decreased efficacy of the HQ 4% in medium and dark skin types might have provided fewer perceived results by participants. Alternatively, the relationship between self-esteem and facial pigmentation abnormalities may differ among various Fitzpatrick skin types, suggesting a multicultural difference in the perception of skin age and self-esteem.

Facial disfigurement due to pigmentary abnormalities in persons of all skin colors provided an interesting model for the evaluation of the relationship between skin color improvement, perceived age, and self-esteem. While it has been assumed that improved facial appearance is positively correlated with a perceived younger age, a Medline search did not reveal any studies to support this contention. Furthermore, it is also assumed that a perceived younger age is associated with higher self-esteem. Again, a Medline search did not uncover studies that used a facial dyspigmentation model to assess perceived age and self-esteem. This study evaluated the perceptions of facial disfigurement due to facial skin color abnormalities in relation to perceived age and self-esteem in persons of all Fitzpatrick skin types. The study was limited by the small sample size, leading to greater type II error, which is the error of not detecting a significant finding when one truly exists due to a small, or underpowered, sample size. Another bias could have been introduced by the preponderance of light skinned participants enrolled and the paucity of medium and dark skinned participants. This occurred because of the population demographics of the research center and the increased prevalence of facial skin dyspigmentation in lighter skin.

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