Phototype comparison between caucasian and asian skin types

Comparação do fototipo entre caucasianos e orientais

Original Article

ABSTRACT

Introduction: Evaluating the response of various skin types to ultraviolet radiation exposure is very important in dermatology. The Fitzpatrick system is the most frequently used classification technique. It is straightforward and practical, assesses photodamage and skin cancer risks, and helps in defining light-based treatments. Nevertheless, there seem to be limitations to its use in non-Caucasians.

Objective: To compare the subjective phototype evaluation method to the Fitzpatrick classification in Caucasian and Asian (East and Southeast Asian, in particular) skin types.

Methods: Caucasian and Asian women (n = 42) were classified using 3 evaluation methods (clinical, Fitzpatrick and Modified Fitzpatrick). The data were collected through questionnaires and analyzed using non-parametric methods. A 5% significance level was adopted.

Results: There were no statistically significant differences within each group between the clinical evaluation, Fitzpatrick classification and the Modified Fitzpatrick classification (Caucasian cr2 = 0.375, p = 0.93 and Asians cr2 = 3.5, p = 0.182).

Conclusion: The three methods evaluate phototypes equally, yet studies with larger population samples are still necessary.

Keywords: skin; skin pigmentation; photobiology.

RESUMO

Introdução: *A avaliação da resposta cutânea à exposição à radiação ultravioleta tem grande importância na prática dermatológica. De uma variedade de métodos, a classificação dos fototipos de pele de Fitzpatrick é a mais utilizada. Simples e prática, permite avaliar o risco de fotodano e câncer de pele, além de auxiliar na definição dos tratamentos com luz. Apesar disso, parece haver considerações em relação aos não caucasianos.*

Objetivo: *Comparar a avaliação subjetiva do fototipo com a classificação de Fitzpatrick em pacientes caucasianas e orientais.*

Métodos: *Quarenta e duas mulheres caucasianas e orientais foram classificadas de acordo com três métodos de avaliação (clínico, Fitzpatrick e Fitzpatrick modificado). Os dados foram coletados através de questionário e analisados por métodos não paramétricos.*

Resultados: *Na comparação entre a avaliação médica, e as classificações de Fitzpatrick e Fitzpatrick modificada não houve diferença estatisticamente significativa dentro de cada grupo.*

Conclusões: *Com base nesses resultados, pode-se concluir que os três métodos são equivalentes na avaliação do fototipo. Estudos com amostra populacional maior ainda serão necessários.*

Palavras-chave: *pele; pigmentação da pele; fotobiologia.*

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INTRODUCTION

Many patients of Asian descent seek dermatological care. Knowledge about the skin type, anatomy, physiology and unique aspects of Asian ethnicities allows for better decision making and treatment planning for these patients.

The Fitzpatrick classification is widely used to determine a patient's skin type. While Asian patients are usually considered to be phototypes IV and V, that classification has been questioned by some authors.[1,2] Therefore this study compares the subjective assessment of phototypes using the Fitzpatrick classification in Caucasian and Asian patients.

Table 1 - Fitzpatrick phototype scale

Phototype	Characteristics	Sensitivity to the sun
I – White	Always burns, never tans	Very sensitive
II – White	Easily burns, tans poorly	Sensitive
III – Light brown	Burns moderately, tans moderately	Normal
IV – Moderate brown	Burns somewhat, tans easily	Normal
V – Dark brown	Rarely burns, tans considerably	Somewhat sensitive
VI – Black	Never burns, totally pigmented	Insensitive

METHODS

This study consisted of a transversal analysis carried out through data collection and interviews. All methodological criteria complied with the current terms and rules for research in human beings – Resolution 196/96 of the Brazilian National Health Council and the most recent version of the Declaration of Helsinki. The study was also approved by the Research in Human Beings Ethics Committee of the hospital where it was carried out.

Caucasian women were recruited at the dermatology outpatient clinic of the hospital where the study took place, and Asian women (of Japanese, Chinese or Korean descent) were randomly recruited at an Asian community event in Curitiba (SP, Brazil). All study participants were classified using three assessment methods (clinical, Fitzpatrick classification and Modified Fitzpatrick classification).

All participants answered a questionnaire about maternal descent, paternal descent, their personal features (eye color, natural hair color, color of the skin in areas without exposure to the sun, presence of freckles in exposed areas, skin sensitivity to the sun and degree of tan grade). A dermatologist physician from the study hospital and a medical scholar evaluated patients' phototypes using the subjective classification method. The phototypes were also classified according to the Fitzpatrick (Table 1) and Modified Fitzpatrick (Table 2) classifications based on the data supplied in the questionnaires, which were answered without the researchers' involvement.

The data collected from the questionnaires were input into an Excel spreadsheet and analyzed using the Friedman test. A 5% significance level was adopted.

Table 2 - Modified Fitzpatrick phototype scale

PHOTOTYPE SUM OF THE POINTS FROM THE TABLE BELOW	I 0-7	II 8-16	III 17-25	IV 26-30	V or VI >30
Points	**0**	**1**	**2**	**3**	**4**
Eye color	Light blue or gray	Blue or green	Amber, light chestnut brown	Dark chestnut brown	Dark brown
Natural hair color	Red, reddish	Blond	Dark blond, chestnut brown	Light brown, dark brown	Black
Skin color (areas without exposure to the sun)	Reddish	Very pale	Pale, beige	Light brown	Dark brown
Prolonged exposure to the sun	Redness, painful blisters and desquamation	Blisters followed by desquamation	Burns, sometimes desquamates	Sometimes burns intensively	Never burns
Tanning degree	None or almost none	Light tan	Reasonably tan	Tans very easily	Darkens quickly
Tan after several hours of exposure to the sun	Never	Rarely	Sometimes	Usually	Always
Sensitivity of the face to the sun	Very sensitive	Sensitive	Normal	Very resistant	Never had problems
Last exposure (sun, tanning equipment or tanning creams)	More than 3 months ago	From 2 to 3 months ago	From 1 to 2 months ago	Less than 1 month ago	Less than 2 weeks ago
Frequency of exposure to the sun in the treated area	Never	Rarely	Sometimes	Usually	Always

RESULTS

Female patients (n = 48, 18 Asian and 30 non-Asian) were analyzed. Of the Asian patients, 15 had both maternal and paternal Japanese ancestry, and three had paternal Japanese ancestry only. The average age was 29 (range 22-38). In the non-Asian group, patients' ancestry varied between French, German, Italian, Brazilian native Indians, Polish and Portuguese, with an average age of 36 (range 22-63).

There was no significant statistical difference within each group between the medical evaluation and the Fitzpatrick and Modified Fitzpatrick classifications when analyzed using the Friedman test. Caucasian cr 2 = 0.375, p = 0.93 (Table 3 and Figure 1) and Asian cr 2 = 3.5, p = 0.182 (Table 4 and Figure 2).

DISCUSSION

Few studies on the dermatological implications of ethnic differences have been published in the indexed literature. Most published papers compare Caucasian and black populations. Although Asians constitute a huge portion of the world's population, studies about Asian individuals are rare except in medical journals published in Asia.

Since Brazil has one of the largest Asian-descended populations in the world, there is a significant number of medical consultations with that population. Moreover, with migration and intermarriage, it is increasingly common to find traces of several races in the same individual. For that reason – not only in dermatology but also in other medical specialties – a broad understanding of each ethnic group's unique aspects is important to improve patient treatment.

Evaluating the skin's response to ultraviolet radiation exposure is very important in dermatology, especially in photodermatosis, phototherapy, photoaging, photocarcinogenesis and photoprotection. It is also very useful when planning procedures such as surgery, laser therapy, peelings and dermabrasion.

Table 3 - Classification of Caucasian prototypes

Classification	Phototype evaluation		Fitzpatrick		Modified Fitspatriick	
	#	%	#	%	#	%
II	11	36,7	10	33,3	9	30
III	12	40	15	50	13	43,3
IV	6	20	5	16,7	8	26,7
V	1	3,3	0	0	0	0
Total	**30**	**100**	**30**	**100**	**30**	**100**

Table 4 - Classification of Asian phototypes

Classification	Phototype evaluation		Fitzpatrick		Modified Fitzpatrick	
	#	%	#	%	#	%
I	0	0	0	0	1	5,56
II	5	27,8	0	0	3	16,7
III	8	44,4	9	50	4	22,2
IV	4	22,2	7	38,9	6	33,3
V	1	5,6	2	11,1	4	22,22
Total	**18**	**100**	**18**	**100**	**18**	**100**

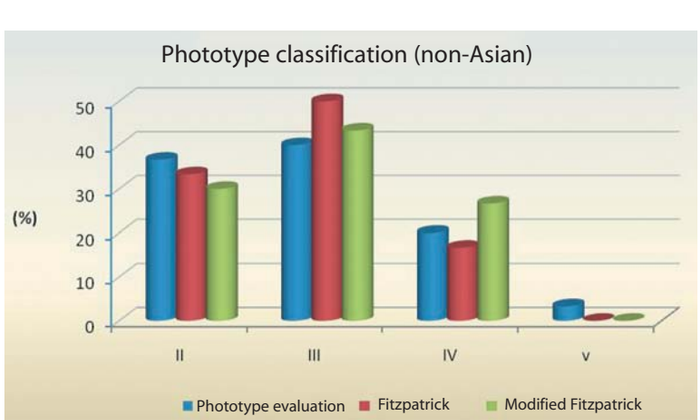

Figure 1 - Distribution of phototype proportions among Caucasians

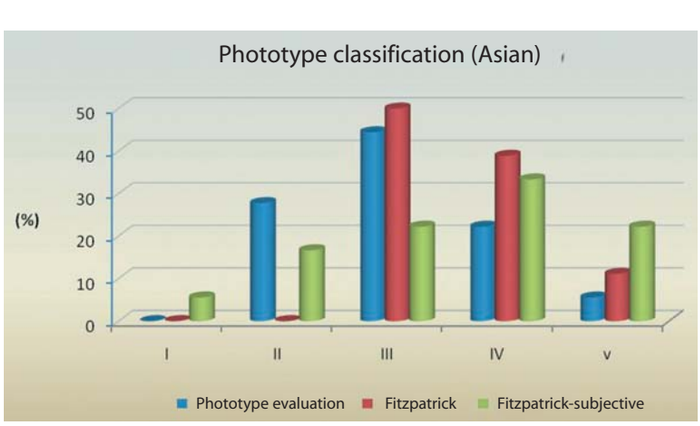

Figure 2 - Distribution of phototype proportions among Asians

Classifying the skin by phototype is the most frequently used method because it is simple, straightforward and practical.

The classification of skin phototypes developed by Fitzpatrick in 1975 assesses the skin's sensitivity to ultraviolet radiation, in the context of an individual's tendency to burn or tan. It is a subjective evaluation based on answers to patient-administered questionnaires. Classifying the skin into six types allows an assessment of the risks of photodamage and skin cancer, and helps plan phototherapy treatments by estimating the correct UV dose to minimize erythema and define the parameters of light-based treatments.[2-4]

The phototype category might not be the most effective evaluation of photosensitivity; this can be better estimated by determining the minimum dose of UV radiation that causes erythema, according to Wee and colleagues [2], who also suggest that genetics and environmental influence can affect that determination. Studies by Satoh and Kawada showed different responses from Japanese and Caucasian skin to ultraviolet radiation, and proposed the Japanese Skin Type assessment method.[1,4,5] Other authors demonstrated that UVB radiation is more erythemogenic than melanogenic in mongoloids.[6]

Although no statistical difference was observed among the three methods, the phototypes of Asian patients ranged from II to V, according to the assessment method used in this study. It was also verified that the physician's subjective evaluation can diverge from the questionnaires on the skin's reaction to sun exposure. In the Caucasian population, the medical evaluations correlated more closely with the other methods.

CONCLUSION

In light of these results, a more detailed individual analysis should be made of Asian skin characteristics and reaction to ultraviolet exposure, when in preparation for aesthetic procedures and phototherapy. More studies and a larger sample population are necessary to more broadly confirm those results. ●

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