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RESEARCH ARTICLE

SKIN AGING IN PEOPLE OF BLACK RACE LIVING IN TROPICAL ZONE

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ABSTRACT

Background: Solar radiation induces a deleterious effect on the skin, expressed by visible clinical changes. One of the consequences of frequent skin exposure to solar radiation is induced skin aging.
Objective: The objective of our study was to investigate the clinical signs of skin aging, in people of black race living in tropical zone and their possible correlation with lipoperoxidation.
Methods: The sampling consisted of 60 people divided into two groups of 30 people each. Group A consisted of 30 fishermen located in the area where sunlight is intense. Group B consisted of 30 farmers located in the area where sunlight is moderate. These populations were subjected to clinical examination to investigate signs of skin aging and determine the index of lipid peroxidation (TBARS) and glutathione peroxidase from the blood sample.
Results: The results showed a predominance of the major signs of discoloration and wrinkles (46.63%; 70%) and (10%; 60%), for groups A and B respectively. The results for skin aging mid face depigmentation assimilable to solar skin elastosis is greater in group A (60%) than group B (3.3%). A significant increase in Thiobarbituric Acid reactant substances (TBARS) was observed in group A (3.66 µmol/l) against 1.97 µmol/l in group B.
Conclusion: Our study has been able to highlight the characteristic of skin aging among in people of black race living in tropical zone. Further studies would be required to contribute to a classification of skin aging suitable for in people of black race living in tropical zone.

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INTRODUCTION

Skin aging is one of the most visible changes of all the changes that characterize aging (Polefka *et al*., 2011; Alexis and Rossi, 2011). Aging is the consequence of various extrinsic and intrinsic factors. Among these factors the sun, which induces free radicals, is a prime factor in skin aging (Alexis and Rossi, 2011). Human skin has chromophores which are capable of absorbing ultra-violet (UV) radiation (Wright *et al*., 2013). Solar radiation induces a deleterious effect on the skin, expressed by visible clinical changes that lead to histological and biochemical alterations (Kingman, 1969).

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One of the consequences of frequent skin exposure to solar radiation is induced skin aging or photodamage (Kingman, 1969; Del Bino and Bernerd, 2012). Among the changes induced by skin aging include those derived from free radicals produced by the mitochondria. Lipoperoxidation is the mechanism by which the UV induced tissue damage resulting from the production of free radicals (Harman, 1956; Dupont *et al*., 2013). The objective of our study was to investigate the clinical signs of skin aging, in people of black race living in tropical zone and their possible correlation with lipoperoxidation.

MATERIALS AND METHODS

Place of study

The study was initiated by the biochemistry laboratory of the UFR Medical Sciences of Abidjan (Côte d'Ivoire) in

collaboration with the Department of Dermatology of the University Hospital of Treichville (Abidjan, Côte d'Ivoire) for clinical examinations. Also biochemistry laboratory of Peyronie at the Montpellier Teaching Hospital (France) for biological analyzes.

Type of study

A cross-sectional study, descriptive meant for comparing, involved adult volunteers, aged minimum 30 years, residing and working in the tropical areas for at least 10 years and who signed an informed consent for their participation.

Study Populations

The study population was made up of selected residents of two villages, due to their exposure to sunshine or not. Sampling population consisted of (60) people divided into two groups of 30 people each, including 17 women and 13 men. Group A consisted of 30 deep sea fishermen selected from Azurretti village, seaside resort located 30 km east of Abidjan where the sunlight is very intense. Another group of 30 farmers from the village of Yassap B semi forest area located 50 km west of Abidjan where the sunlight is moderate.

Clinical Examination

Clinical tests started with a general examination which assessed the age, weight and height for the determination of the Body Mass Index (BMI) and a dermatological examination for signs of skin aging.

Biochemical investigations

Blood sample were collected from the study populations using venipuncture procedure at the elbow bend after fasting for ten hours. The collected sera and plasmas were divided into aliquots and stored at 20°C. The assays were carried out to determine the skin aging following:

- Determination of Thiobarbituric Acid reactant substances / plasma malondialdehyde (TBARS / MDA) by spectrofluorimetry using the method of Yagi (Yagi, 1976).
- Determination of the activity of glutathione peroxidase (GSH-Px) by the method of Paglia and Valentine (Lefevre *et al*., 1998).
- Determination of triglyceridemia, total cholesterol, HDL serum cholesterol using an automatic Pentra PLC 400 (PFU_ABX PENTRA 400 / UF 1110) LTD Randox Laboratories (France)
- Determination of LDL cholesterol by conventional enzymatic methods of UV / VIS Spectrometer (UNICAM 8625 Labover of Assistance, France).

Statistical analysis

The data obtained from the interogations and examinations were subjected to statistical analysis with EPIINFO 6.0 fr. For the analysis we used: Pearson X^2 test for analysis of qualitative variables and the Student "t" test for the analysis of quantitative variables. Significance thresholds were set at 0.05.

RESULTS

Anthropometric characteristics of the study populations

The study population consisted of two groups (A and B) with a mean age and body mass index of (48,1 years; 26,59 kg / m^2) and (57; 22,68 kg /m^2) for groups A and B respectively (Table 1).

Table 1. Anthropometric characteristic of the study populations

Parameters	Group A n = 30	Group B n = 30	p
Age (year)	48,1± 9,48	57 ± 10,68	0,001*
BMI (kg/m^2)	26,59 ± 7,32	22,68 ± 3,13	0,009 *

BMI: Body Mass Index

Table 2. Description of biochemical parameters of the study populations

Parameters	Group A n = 30	Group B n = 30	p
GPx (UI/l)	580,54 ± 153,47	541,20 ± 87,80	0,42
TBARS (µmol/l)	3,66 ± 0,86	1,97 ± 0,69	0,00*
Triglycerides (mmol/l)	1,17 ± 0,42	1,60 ± 0,70	0,04*
Total Cholesterol (mmol/l)	4,87 ± 1,05	4,74 ± 0,43	0,65
HDL Cholestérol (mmol/l)	1,40 ± 0,34	1,39 ± 0,29	0,93
LDL Cholestérol (mmol/l)	2,94 ± 0,85	2,64 ± 0,45	0,24

Table 3. Distribution of signs of skin aging according to Glogau classification

Clinical signs	Groupe A (%)	Groupe B (%)	P
Dry skin	93,3	90	1
Fine lines	36,7	43,3	0,59
Hypochromia	23,3	6,7	0,14
Hyperchromia	13,33	3,3	0,6
Telangiectasies	43,3	46,7	0,79
Wrinkles	70	60	0,4
Mid -facial skin depigmented	60	3,3	0,00*
Wroughness	16,7	10	0,7
Sagging skin	6,7	6,7	0,6

Biochemical parameters of the study populations

Table 2 gives a description of the biochemical parameters of the study populations distributed in the two groups (A and B).

Distribution of signs of skin aging according to Glogau classification

Table 3 shows the distribution of signs of skin aging according to the classification made by Glogau in 2011. Group A, which consists of people who are exposed to intense solar radiation compared to Group B, have more marked signs of heliodermia.

DISCUSSION

This study has allowed us to obtain results that have enabled us, after analysis to contribute to the understanding of skin photo damage associated with lipid peroxidation in people of black race living in tropical zone. The mean age of subjects in group A (48.1 years) was lower than that of group B subjects (57 years). This difference could be explained due to the nature of their job. Fishing activities, major occupation of subjects in

group A requires dynamism and physical strength in the high seas due to sustained physical effort that must be supplied. These activities are most often reserved for young people. Going by the classification of GLOCAU (Paglia and Valentine, 1967; Bonnefont-Rousselot, 2014). The signs of skin aging should be more pronounced in people over 50 years. This character is not found in our study, in that the more exposed populations (group A) had more pronounced clinical signs despite a significant age difference compared to the less exposed population (group B) (Del Bino and Bernerd, 2012; Sess *et al*., 1992). The Body Mass Index (BMI) showed a significant difference in group A (26,59 kg / m^2) against 22,68 kg / m^2 in group B. According to WHO classification Group A population is classified overweight, therefore present a risk of obesity, the individual risk factor of oxidative stress (Hwang *et al*., 2011). The biochemical characteristics showed that Thiobarbituric Acid reactant substances (TBARS) were significantly higher in group A (3,66µmol / l) against 1,97µmol / l in group B. Group A subjects are more exposed to sunlight therefore, would be subjected to increased lipid peroxidation. These values remained greater than the values in the classification giving by Sess (Lee and Moon, 2012). Increased concentrations level of TBARS could not be age-related. It could be correlated to the sun exposure (Wright *et al*., 2013; Lohoues *et al*., 2007; Philips *et al*., 2010). Populations in Group A showed lower values of triglycerides compared to Group B 1,17 and 1,60 mmol /L respectively. This could be correlated to the increased level of TBARS which induces lipoperoxidation (Hwang *et al*., 2011). The Lipid peroxidation induced by attack and denaturation of membrane phospholipids involved a greater mobilization of phospholipids to compensate for denaturation (Maclay *et al*., 2012). Skin damage signs reflecting a photo-induced aging are listed in Table III in their order of occurrence according to Glogau's classification (Bonnefont-Rousselot, 2014).

The midface depigmentation observed and can cover the orbital regions, nose, cheekbones and cheeks, could be attributed to the yellowish color corresponding to the clinical condition of solar skin elastosis. The solar elastosis is due to metalloproteins (MMP) enzymes involved in the degradation and renewal of certain proteins of the dermis and epidermis (Lohoues *et al*., 2007; Maclay *et al*., 2012; Nkenge and Bertin, 2013). There exists a correlation between the level of UV exposure and induction of MMPs (Philips *et al*., 2010). This exclusive facial skin damage is largely found in group A with 60% against 3.33% in group B. This result corroborates to the observations of Nkenge, who reported that 80 % of facial aging is caused by sun exposure (Nkenge and Bertin, 2013). Dry skin or xerosis was the most common clinical signs in both groups (93,3 % in group A and 90 % in group B). This observation is more pronounced in subjects of group A in all age groups. According to some authors, though genetically programmed, this skin dryness could be aggravated by extrinsic factors like prolonged exposure to sunlight (Polefka *et al*., 2011; Kingman, 1969).

Conclusion

Our study highlights characteristic signs of skin aging among black populations living in the tropics. The results showed that these signs were associated to the lipid peroxidation. Further studies would be required to contribute to a classification of skin aging suitable the people of black race living in tropical zone.

Competing Interests

The authors wish to declare that there is no conflict of interest.

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