ANALYSIS OF EXPOSURE TO RISK FACTORS ASSOCIATED WITH SKIN AGING IN UNIVERSITY STUDENTS

ANÁLISE DA EXPOSIÇÃO A FATORES DE RISCO EXTRÍNSECOS ASSOCIADOS AO ENVELHECIMENTO DA PELE EM UNIVERSITÁRIOS

ANÁLISIS DE LA EXPOSICIÓN A FACTORES DE RIESGO EXTRÍNSECOS ASOCIADOS AL ENVEJECIMIENTO CUTÁNICO EN ESTUDIANTES UNIVERSITARIOS

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ABSTRACT: Aging is inevitable, among the several organs that suffer with aging, the skin is an organ that suffers considerably with external factors, which potentially interferes on the precocious aging of the organ. Such aging is associated with a higher probability of developing dermatological diseases as well as substantially interferes with aesthetic issues. Based on this assumption, the objective of this study was to analyze the frequency of exposure of university students to risk factors involving skin aging. Were invited to participate in the study students of several university courses in the area of health. Each volunteer answered a structured questionnaire containing questions related to exposure to risk factors related to skin aging, such as smoking, alcoholism, prolonged sun exposure, absence of photo protection and few hours of sleep per day. In all, 298 volunteers from various health courses were interviewed, most of whom declared themselves white. We found a low frequency of smokers (11%), but higher frequency of individuals who ingested alcohol (42%), and additionally about 33% of individuals reported sun exposure, and about 56% of respondents did not use photo protection. Regarding sleep, about 56% of the individuals described having less than 6 hours of sleep per day. The studied population is frequently exposed to the main intrinsic and extrinsic factors involved with skin aging.

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KEYWORDS: Cutaneous aging. College students. Sleep. Cigarette. Alcohol.

RESUMO: *O envelhecimento é inevitável, dentre os diversos órgãos que sofrem com o envelhecimento, a pele é um órgão que sofre consideravelmente com fatores externos, o que potencialmente interfere no envelhecimento precoce do órgão. Tal envelhecimento está associado a uma maior probabilidade de desenvolvimento de doenças dermatológicas bem como interfere substancialmente em questões estéticas. Com base no suposto, o objetivo desse estudo foi o de analisar a frequência de exposição de universitários a fatores de risco envolvidos com o envelhecimento da pele. Foram convidados a participar do estudo universitários de diversos cursos da área da saúde. Cada voluntário respondeu a um questionário estruturado contendo perguntas relacionadas a exposição a fatores de risco relacionados ao envelhecimento cutâneo, como tabagismo, etilismo, exposição prolongada ao sol, ausência de foto proteção e poucas horas de sono por dia. Ao todo foram entrevistados 298 voluntários de diversos cursos da área da saúde, sendo que a maioria se declarou da etnia branca. Encontramos uma baixa frequência do uso do cigarro (11%), porém frequência mais elevada de indivíduos que ingeriam álcool (42%), e adicionalmente cerca de 33% dos indivíduos relataram exposição ao sol, e cerca de 56% dos entrevistados não faziam uso de foto proteção. Em relação ao sono, cerca de 56% dos indivíduos descreveram ter menos do que 6 horas de sono diárias. A população estudada está frequentemente exposta aos principais fatores intrínsecos e extrínsecos envolvidos com o envelhecimento cutâneo.*

PALAVRAS-CHAVE: *Envelhecimento cutâneo. Universitários. Sono. Cigarro. Álcool.*

RESUMEN: *El envejecimiento es inevitable, entre los diversos órganos que sufren el envejecimiento, la piel es un órgano que sufre considerablemente por factores externos, lo que potencialmente interfiere con el envejecimiento prematuro del órgano. Dicho envejecimiento está asociado con una mayor probabilidad de desarrollar enfermedades dermatológicas, además de interferir sustancialmente con los problemas estéticos. Partiendo del supuesto, el objetivo de este estudio fue analizar la frecuencia de exposición de los estudiantes universitarios a los factores de riesgo relacionados con el envejecimiento cutáneo. Se invitó a participar del estudio a estudiantes universitarios de diferentes cursos de salud. Cada voluntario respondió a un cuestionario estructurado que contenía preguntas relacionadas con la exposición a factores de riesgo relacionados con el envejecimiento cutáneo, como fumar, beber, exposición prolongada al sol, ausencia de fotoprotección y pocas horas de sueño al día. En total, se entrevistaron 298 voluntarios de diferentes cursos de salud, la mayoría de los cuales se declararon blancos. Encontramos una baja frecuencia de consumo de cigarrillos (11%), pero una mayor frecuencia de personas que bebían alcohol (42%) y, además, alrededor del 33% de las personas informaron haber estado expuestas al sol y aproximadamente el 56% de los encuestados no consumieron fotoprotección. Con respecto al sueño, alrededor del 56% de las personas informaron tener menos de 6 horas de sueño al día. La población estudiada está frecuentemente expuesta a los principales factores intrínsecos y extrínsecos implicados en el envejecimiento cutáneo.*

PALABRAS CLAVE: *Envejecimiento cutáneo. Estudiantes universitarios. Dormir. Cigarrillo. Alcohol.*

Introduction

The skin is the largest organ in the human body, composed of considerable cellular diversity and plays a fundamental role in protecting the body against dehydration, cancer, friction, infectious agents, as well as playing a fundamental role in the body's homeostasis. Unfortunately, the skin aging process is inevitable and considerable changes occur in the structural and functional characteristics of the skin (BONTÉ *et al*., 2019). This aging can be accelerated by intrinsic factors, such as metabolic disorders, for example diabetes (TOBIN, 2017), and extrinsic factors, such as prolonged and unprotected exposure to the sun, smoking, alcoholism, pollution, in addition to factors related to a better quality of life such as a good diet and an ideal sleep period (YOUNG, 2006; YIN *et al*., 2001; KRUTMANN *et al*., 2017).

From the pathophysiological point of view, the main structural changes that occur in the skin are the result of oxidative effects that induce structural changes in collagen and elastin, which consequently affects the composition of the extracellular matrix of connective tissue, or even changes at the DNA level, as well as it affects the cell membrane transport function (KAMMEYER; LUITEN, 2015). Such changes lead to important loss of the physiological function of the skin, as well as structural changes typical of aging. It is known that this premature skin aging can have considerable impacts on people's self-esteem, as well as on their quality of life, in addition to presenting risks for the development of skin cancers, such as melanoma. Therefore, the objective of this study was to analyze the frequency of exposure to the main risk factors extrinsic to skin aging.

Methods

The design of this work had an observational character without interventions and with the application of a structured questionnaire with 7 questions to ascertain the frequency of exposure to the main extrinsic risk factors linked to skin aging. The study was conducted at a private university located in the south of the city of São Paulo. Students from health courses from 18 to 40 years old of both genders were invited to participate in the study. The volunteers answered the questionnaire after reading and signing the Informed Consent Form (ICF). This study was approved by the Ethics and Research Committee of Santo Amaro University, with CAAE #19033019.6.0000.0081.

The different variables were tabulated and analyzed with respect to their significance before the main risk factors, in order to obtain those factors most prevalent in university

students. Thus, the data were analyzed based on the Wilcox test and the continuous variables used the anova test.

Results

In all, 298 academics from Physiotherapy, Aesthetics and Cosmetics, Biological Sciences, Physical Education and Dentistry courses were interviewed. There was a predominance of female individuals (61.4%), participating in the study, in relation to male individuals (38.6%). The study population was predominantly young, with an average age ranging from 21.7 to 24.9 years between the courses evaluated, and a considerable portion of the patients included in the study declared themselves to be white, followed by browns and blacks. The demographic data of the volunteers participating in the study are shown in table 1.

**Table 1** – Demographic data of the volunteers included in the study

Variable(n)	Physiotherapy (49)	Biological Sciences (50)	Pharmacy (50)	Aesthetics (50)	Dentistry (50)	Physical Education (49)
Age (average)	17-56 (24)	17-44 (21,7)	17-65 (27,7)	17-45 (22,8)	17-62 (24,9)	17-36 (22,0)
Men (%)	37 (75,5)	16 (32)	21 (42)	1 (2)	8 (16)	32 (65,3)
Women (%)	12 (24,5)	34 (68)	29 (58)	49 (98)	42 (84)	17 (34,7)
Skin color*	B:20 P:14 N:15	B:29 P:16 N: 5	B:21 P:15 N:11	B:20 P:16 N:9	B:27 P:18 N:4	B:19 P:17 N:10

* self-declared; B = White; P = Brown; N = Black
Source: Devised by the authors

We assessed the frequency of people who declared themselves to be alcoholics or smokers, the interviews revealed that most people said they did not use tobacco. Regarding alcoholism, a greater proportion than smokers claimed to drink alcohol at least twice a week, as described in figure 1.

Figure1 – List of smokers and alcohol users
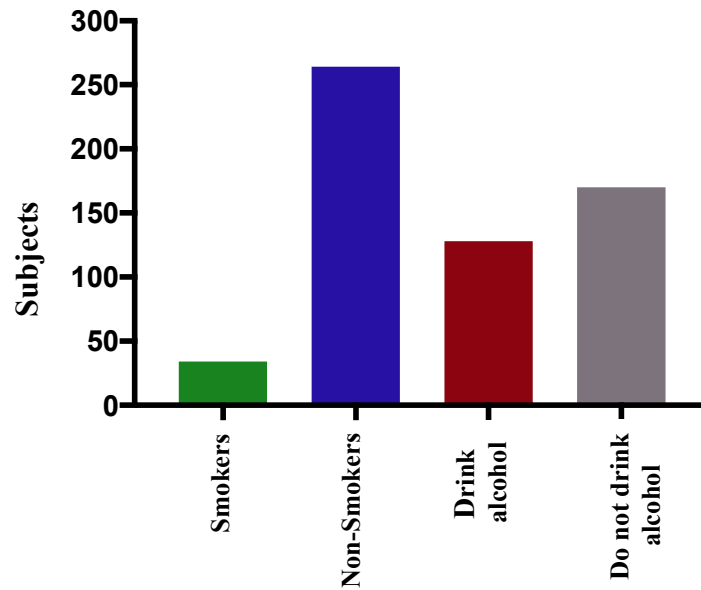
Source: Author's archive

Another factor analyzed by our group was the sleep duration of individuals in each course in general and what was observed, according to table 2, is that most students have 6 hours of sleep or less, which was statistically significant when compared to individuals who sleep at least 7 hours ($p < 0.01$).

**Table 2** – Individuals' hours of sleep for each of the courses

	Number of hours of sleep								
	3h	**4h**	**5h**	**6h**	**7h**	**8h**	**9h**	**10h**	**11h**
Biological Sciences	-	5	10	14	7	12	3	2	-
Physical education	-	1	9	15	12	7	1	2	-
Aesthetics and Cosmetics	1	-	9	14	3	15	5	2	-
Pharmacy	3	8	13	16	5	4	-	-	1
Physiotherapy	-	5	9	12	10	8	5	1	-
Dentistry	1	7	3	13	7	8	1	-	-
Total	5	26	53	83	45	54	15	7	1

Source: Devised by the authors

Additionally, we asked university students about exposure to sunlight and whether they use daily photo protection. According to figure 2, we could observe a worrying data, where about 33% of the individuals reported exposure to sunlight in periods of higher incidence of sunlight, while about 56% of all individuals do not use a photo protector. Of all the courses observed, only volunteers from the aesthetics course had a photo protector use rate of 66%,

followed by Dentistry (48%), Biological Sciences (39.5%), Physiotherapy (38%), Pharmacy (36%) and Physical Education (34%).

Figure 2 – List of individuals who report exposure to the sun and who use photo protection
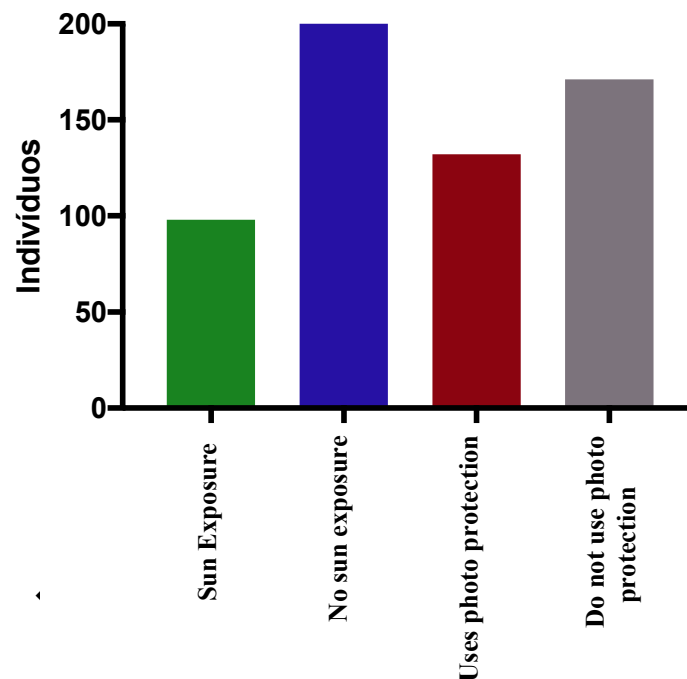
Source: Author's archive

Discussion

Our data demonstrated that there is a low adherence to the use of photo protection, as well as exposure to sunlight is frequent in the studied population. It is important to mention that 136 (45.6%) individuals studied declared themselves white, followed by 96 (32.2%) mixed race and 54 (18.1%) declared themselves black. Individuals with a lower concentration of melanin are known to be more susceptible to the development of cancers and skin tumors, especially melanoma (BOCZAR *et al.*, 2019; DE MELO *et al*., 2018; MAHENDRARAJ *et al*., 2017). The population of our study is predominantly young and it is important to mention that among the most frequent cancers in young adults, melanoma is the second most frequent (BARR *et al*., 2006).

An important data that was described in this study is that less than 11% are smokers, this finding is in accordance with the recent data described by the Ministry of Health, which during the period from 2006 to 2018 a considerable reduction in smoking in the territory national has been observed (BRASIL, 2012). The pathological mechanisms of cigarette use have a direct effect on aging and are well explored, thus we can highlight an alteration in the

collagen biosynthesis (KNUUTINEN *et al*., 2002), as well as an increase in the production of elastases by neutrophils and several metalloproteases due to the exacerbated production of reactive oxygen species (ROS) (GHOSH *et al*., 2019), which substantially interferes with the integrity of the extracellular matrix of connective tissue. In addition, the constant use of cigarettes contributes to an increase in blood viscosity, which potentially interferes with microcirculation and can result in nutritional and respiratory impacts of cells in histological aspects (ALKAN *et al*., 2014). Together, all of these have fundamental characteristics that contribute to the appearance of morphological characteristics linked to skin aging.

The frequent use of ethanol, in turn, was present in about 42% of the interviewed volunteers. The use of ethanol is linked to a series of characteristic changes, such as facial skin aging, loss of facial volume, loss of blood vessels and appearance of facial lines (GOODMAN *et al*., 2019). From a biological point of view, the use of ethanol can play an important role in aging in general, however, when we consider skin aging, ethanol can contribute to the production of ROS at the tissue level, which pathophysiologically would help in damaging the tissue and skin aging (RINNERTHALER *et al*., 2015).

Regarding aspects related to sleep, a large part of our population claims to sleep 6 hours or less. Several sleep quality indicators recommend at least 6 hours of sleep, such as the Pittsburgh Sleep Quality Index. A study that evaluated the skin's ability to recover after exposure to UV light, found that individuals with good hours of sleep had a better recovery than those who did not have a good quality of sleep (OYETAKIN-WHITE *et al*., 2015). Thus, the frequency of poor sleep quality may represent an important intrinsic factor for skin aging.

It is important to highlight that our data corroborate other data from other Brazilian regions, where many young people do not use photo protection and expose themselves excessively to the sun (BATISTA COSTA; BLESSMAN WEBER, 2004). Regarding alcohol consumption, our data show worrying values and higher than what was observed a few years ago (GARCIA; FREITAS, 2015).

In summary, our data revealed a great lack of adherence to some important measures for the deceleration of skin aging, which in addition to interfering in aesthetic aspects, interferes in morphological and physiological aspects of the skin, and can contribute to less tissue resistance, as well as the appearance of carcinogenic events. Thus, it is plausible to use socio-educational measures in order to encourage a more frequent use of sunscreen, as well as awareness of other aspects that contribute to skin aging, such as smoking, alcoholism and adhering to practices aimed at a better quality of life.

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