

Evaluation of sunscreen lotion usage patterns in vitiligo patients

Avaliação do padrão de uso de protetor solar em pacientes com vitiligo

ABSTRACT

Introduction: Since patients with vitiligo are believed to be more susceptible to developing malignant neoplasias due to the lack of melanin in the affected skin, the use of sunscreens is critically important.

Objective: To evaluate the pattern of sunscreen usage in vitiligo patients.

Methods: A transverse study of vitiligo patients was conducted from August 2009 to April 2010. The following variables were studied using a questionnaire and physical examination: demographic data (gender, age, education level, and phototype); clinical characteristics of the condition (age at diagnosis, affected areas of the body, and clinical type); sunscreen use (frequency, protection factor, and duration of use); and habits of sun exposure.

Results: Of the 121 study subjects, 43 used sunscreen – mainly with sun protection factor 30 – on a daily basis. The variables associated with daily use were female gender ($p = 0.001$, $OR = 4.76$, $95\% CI = 1.80-12.59$) and recommendation by a dermatologist in the first medical visit ($p = 0.047$, $OR = 2.28$, $95\% CI = 1.01-5.28$).

Conclusion: A pattern of sunscreen usage was determined for patients with vitiligo. In addition, it was verified that a dermatologist's recommendation to wear sunscreen had a statistically significant impact ($p = 0.047$, $OR = 2.28$, $95\% CI = 1.01-5.28$).

Keywords: vitiligo; evaluation; suncreening agents.

RESUMO

Fundamentos: Acredita-se que pacientes com vitiligo pertençam a um grupo mais susceptível para o desenvolvimento de neoplasias malignas da pele devido à ausência de melanina na pele afetada. Por isso, o uso de protetor solar é fundamental nesses pacientes.

Objetivo: Avaliar o padrão de uso de protetor solar em pacientes com vitiligo.

Métodos: Foi desenvolvido estudo transversal através de questionário e exame físico em pacientes com vitiligo, de agosto de 2009 a abril 2010, tendo sido analisadas as variáveis: dados demográficos; características clínicas do vitiligo; uso de protetor solar e hábitos de exposição solar.

Resultados: Participaram do estudo 121 pacientes, dos quais 43 usavam diariamente protetor solar, em sua maioria com FPS 30. As variáveis associadas ao uso diário foram sexo feminino ($P = 0.001$, $OR = 4,76$; $95\% IC = 1,80-12,59$) e recomendação pelo dermatologista na primeira consulta ($P = 0.047$, $OR = 2,28$; $95\% IC = 1,01-5,28$).

Conclusão: Foi determinado um padrão de uso de protetor solar em pacientes com vitiligo. Além disso, foi identificado que o aconselhamento do dermatologista teve significância estatística no uso de protetor solar por esses indivíduos ($P = 0.047$, $OR = 2,28$; $95\% IC = 1,01-5,28$).

Palavras-chave: vitiligo; avaliação; protetores de raios solares.

Original Article

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INTRODUCTION

Vitiligo is an acquired chronic systemic disorder of unforeseeable clinical evolution which is characterized by the emergence of achromic macules on the skin and mucous membranes due to an absence of melanin as a result of the melanocytes disappearing in the affected area. These macules may present with different sizes and shapes. Vitiligo has a prevalence of 0.1 to 1% in the world population.^{1,2} In general, this disorder first appears in Caucasians at around 24 years of age, however it can happen at any age.³ Both genders and all ethnic groups are affected equally. Approximately 20% of vitiligo patients have at least one immediate family member who is also affected by the disorder.⁴ Vitiligo can be clinically classified as vulgar (the most common, with 46.1% of cases), acrofacial, focal, universal and segmental.⁵

The disorder's pathogenesis is not fully understood; it may be caused by autoimmune dysfunction, oxidative and biochemical stress, neural mechanisms or adhesion defects of the melanocytes.⁶ Although vitiligo does not cause physical incapacity, its psychosocial impact can harm patients' quality of life in an important way.⁷

Ultraviolet radiation has a fundamental carcinogenic role, and can lead to the development of non-melanoma skin cancers.⁸ It can also cause cutaneous photoaging, even in low doses.⁹ The daily use of sunscreen lotions helps to prevent cutaneous alterations induced by ultraviolet radiation.¹⁰ Over the long term, sunscreen use reduces the incidence of actinic keratoses (11) and squamous cell carcinomas in immunocompetent patients.¹² In addition to the importance of regular use, other factors influence the effectiveness of sunscreen lotions, including the solar protection factor (SPF), which indicates the level of cutaneous protection against ultraviolet radiation-based sunburn;¹³ frequency of re-application;¹⁴ and the amount applied. There is an exponential correlation between the claimed SPF and the amount applied.¹⁵ The recommended dose is 2 mg/cm²,¹⁶ however in practice the protection factor is lower because the amount applied is usually much smaller. As most users of sunscreen lotion do not apply the appropriate amount, there may be a false perception that the skin is protected.¹⁷

The UVA or UVB-phototherapy is one of the main therapeutic modalities for vitiligo, especially in cases affecting extensive areas of the skin. In the UVA treatment, patients make associated use of Psoralen (PUVA). Due to the increased risk of sunburn and possible cutaneous damage caused by the UV radiation, patients should use sunscreen lotion and glasses with UV protection after the sessions, for the remainder of the day.

Although some studies suggest that vitiligo patients have protection mechanisms against the development of actinic damage, basocellular and squamous cell carcinomas,¹⁸⁻¹⁹ and there are limited reports of vitiligo patients developing these neoplasias,²⁰ these patients are believed to be more susceptible to the development of such neoplasias due to the absence of melanin in the affected skin. Therefore photoprotection – mainly the use of sunscreen lotion – is critical for these patients. Therefore this study was designed to evaluate the pattern of sunscreen usage in

vitiligo patients, with the goal of defining photoprotection strategies for this population.

MATERIAL AND METHODS

A transversal analysis was developed through the use of a questionnaire followed by physical examination in patients of the vitiligo outpatient clinic of the Hospital Irmandade da Santa Casa de Misericórdia of Curitiba City, from August 2009 to April 2010. The questionnaire, which contained multiple choice or open-ended questions, was administered by resident physicians (with the support of preceptors) during the patients' follow-up consultations in the outpatient clinic. The questions covered the following areas: demographic data (gender, age and education); clinical characteristics of the vitiligo (age at diagnosis and affected areas); sunscreen lotion use (frequency, SPF and duration of use); and habits of sun exposure (outdoor professional and leisure activities in direct exposure to sunlight, number of hours of exposure on weekdays and weekends) (Annex 1). After answering the questionnaire, patients had a physical examination to determine the clinical type of vitiligo and phototype, according to the Fitzpatrick classification. The face, neck, forearms and hands were considered exposed areas.

The data were analyzed with the aid of SPSS version 13.0 software. The correlation between the use of sunscreen lotions (response variable) and the qualitative variables was studied using Chi-square tests' bivariate analyses. T-student test was carried out to evaluate the correlation between response and quantitative variables. The level of statistical significance was set at $p < 0.05$.

The study complied with the ethical recommendations contained in the 2000 Helsinki Declaration. All recruited patients signed a term of free and informed consent and were told that the information generated by the study would be disclosed exclusively to researchers involved in the research, assuring the anonymity of the data.

RESULTS

121 patients (40 men and 81 women) were interviewed and examined. The mean age was 42 (range 6 to 79 years). The average time since developing vitiligo was 13.44 years (0.08 to 71 years). The average time of sunscreen lotion use was 3.49 years (0.16 to 10 years) (Table 1). The predominant Fitzpatrick phototypes were IV (42.14%) and III (33.88%), followed by II (14.87%), V (8.26%) and VI (0.82%).

According to the vitiligo clinical types, 96 patients (79.33%) presented the vulgar form, followed by 10.74% with acrofacial form, 4 (13%) with segmental type, 3.3% with focal type and 2.47% with universal type. Three-quarters of patients (75.21%) presented simultaneous lesions in exposed and unexposed areas, 17.36% had lesions in exposed areas only, and 7.44% presented vitiligo in unexposed areas only; there was no statistical significance in the daily use of sunscreen lotions ($p = 0.58$) (Table 2).

Roughly one-third (35.54%) of patients used sunscreen

Table 1 – Clinical features of the affected patients, photoexposure and sunscreen usage pattern

	Minimum	Maximum	Mean	Standard Deviation
Age	6	79	42	1.59
Vitiligo development (in years)	0.08	71	13,4	1.28
Use of sunscreen (in years)	0.16	10	3.49	0.47
Daily weekend exposure (in hours)	1	6	2.29	0.13
Daily weekday exposure (in hours)	1	6	2.41	0.14

Appendix 1: VITILIGO AND SUNSCREEN LOTION PROJECT

Name: _____ M F Age _____ Phototype _____ date ___/___/___

Telephone: _____

Vitiligo classification: Focal Vulgar Acrofacial Universal Segmental

Development: _____ months _____ years

Sites: head, neck, trunk, upper limbs, lower limbs, genitals, periorificial

Area: exposed unexposed both

Was the use of sunscreen recommended in the first consultation with the dermatologist? Yes No Does not remember

Use of sunscreen: Never Daily When exposed to sunlight

If daily in the previous question, answer the following: Factor: <30 30 >30

Applications per day: one two three or more For how many years: _____

Work environment: outdoors indoors

Leisure activities' environment (most of the time): outdoors indoors

Daily hours of exposure (during the week): <1 1 to 2 2 to 3 3 to 4
4 to 5 5 or more

Daily hours of exposure (during weekends): <1 1 to 2 2 to 3 3 to 4
4 to 5 5 or more

Education level: incomplete complete primary complete secondary complete higher
primary education education education education

Stamp/signature _____

lotion every day. These patients were also evaluated regarding the frequency of applications and SPF used; SPF 30 was the most common. The remaining patients were grouped and classified as “non-daily users” in order to improve the data analysis (Figure 1).

The majority of individuals (55.37%) reported to have been instructed to use sunscreen lotions in the first visit with the dermatologist. These patients protected themselves more frequently than those who were not instructed to do so at the first visit (p = 0.047, OR = 2.28; 95% IC = 1.01-5.28). Some patients (8.26%) could not remember whether they had received advice regarding sun protection in the first consultation

with the dermatologist, and were thus excluded from this analysis (Graph 1, Table 2).

Gender was one of the factors influencing the use of sunscreen lotions. Nearly half (45.67%) of the women and only 15% of the men used it daily (p = 0.001, OR = 4.76; 95% IC = 1.80-12.59) (Table 2).

Indoor working environments prevailed over outdoor (107 vs. 14); indoor workplaces did not influence sunscreen lotion use (p = 0.37) (Table 2). For 93 patients (76.85%), most time spent in leisure activities was indoors, while 28 (23.14%) spent most leisure time outside. The average hours of daily sunlight exposure from Monday to Friday was practically the same

Table 2 – Analysis of the correlation of studied variables and sunscreen use

	Daily use (n = 43)	“Non-daily” use (n = 78)	p value
Recommended by dermatologist			
Yes	43.28%	56.72%	0.047 ¹
No	25%	75%	
Gender			
Male	15%	85%	0.001 ¹
Female	45.67%	54.33%	
Work environment			
Indoors	21.42%	78.58%	0.37 ¹
Outdoors	37.38%	62.62%	
Areas affected by vitiligo			
Exposed	42.85%	57.15%	0.58 ²
Unexposed	44.45%	55.55%	
Both	32.96%	67.04%	
Education level			
Incomplete primary education	35.29%	64.71%	0.69 ³
Complete primary education	30.43%	69.57%	
Complete secondary education	39.39%	60.61%	
Complete higher education	50%	50%	

*Patients who used sunscreen when exposed to sunlight and patients who did not use.

** Patients who could not remember whether they had been instructed to use sunscreen by the dermatologist in their first consultation (8.26%) were excluded from this analysis.

¹ Fisher exact test

² Chi-square

³ Pearson Chi-square

as that for weekends (2.29 vs. 2.41 hours per day) (Table 1). The number of hours of exposure during such periods did not influence the use of sunscreen lotion ($p = 0.83$ and $p = 0.42$, respectively) (Table 2).

Regarding the education level of patients (higher education (6.6%), secondary education (27.3%), complete primary education (28.1%) and incomplete primary education (38%)), no statistical significance was verified in its correlation with the use of sunscreen ($p = 0.69$) (Table 2).

DISCUSSION

While no publications evaluating the use of sunscreen lotion in patients with vitiligo were found, according to data collected during the National Campaign for Skin Cancer Prevention in Brazil in 2009,²¹ about 30% of the total population reported using sunscreen lotion – compared with 35% in this study for vitiligo patients. However, in that campaign, results varied among federal regions, and frequency of use was not assessed as in the present study.

One of the motivating factors to evaluate patterns of sunscreen lotion use in patients with vitiligo is that vitiligo lesions do not contain melanocytes and, consequently melanin, which protects the skin against ultraviolet radiation. Therefore, a greater non-melanoma skin cancers and actinic keratoses inci-

dence would be expected in this population.

However, experimental data demonstrate the opposite,²²⁻²³ leading some authors to hypothesize that such a low skin cancer incidence results from a super expression of the protein p53, which exerts an anticarcinogenic effect.¹⁸ Moreover, the decreased expression of GD3 (which contributes to the apoptosis of keratinocytes) would induce a compensatory mechanism of epidermal thickening to protect the lesional skin from damage caused by the UV radiation.¹⁹ However, another study determined that despite the epidermal thickening, areas affected by vitiligo are not more protected than unaffected areas of the same patient. Notwithstanding, this study was not controlled for patients without vitiligo.²⁴ In addition, in another recent retrospective study, a statistically significant increase in non-melanoma skin cancer was not detected in patients with vitiligo compared with the general population.²⁵

In the present study, 55% of patients reported having been instructed to use sunscreen lotion in the first consultation with the dermatologist – which decisively influenced the daily use of the product. In this manner, 43% of patients who were instructed to use it did so, while among those who did not receive this advice, 25% used sunscreen ($p = 0.047$, OR = 2.28; 95% IC = 1.01-5.28). Although no additional factors influenc-

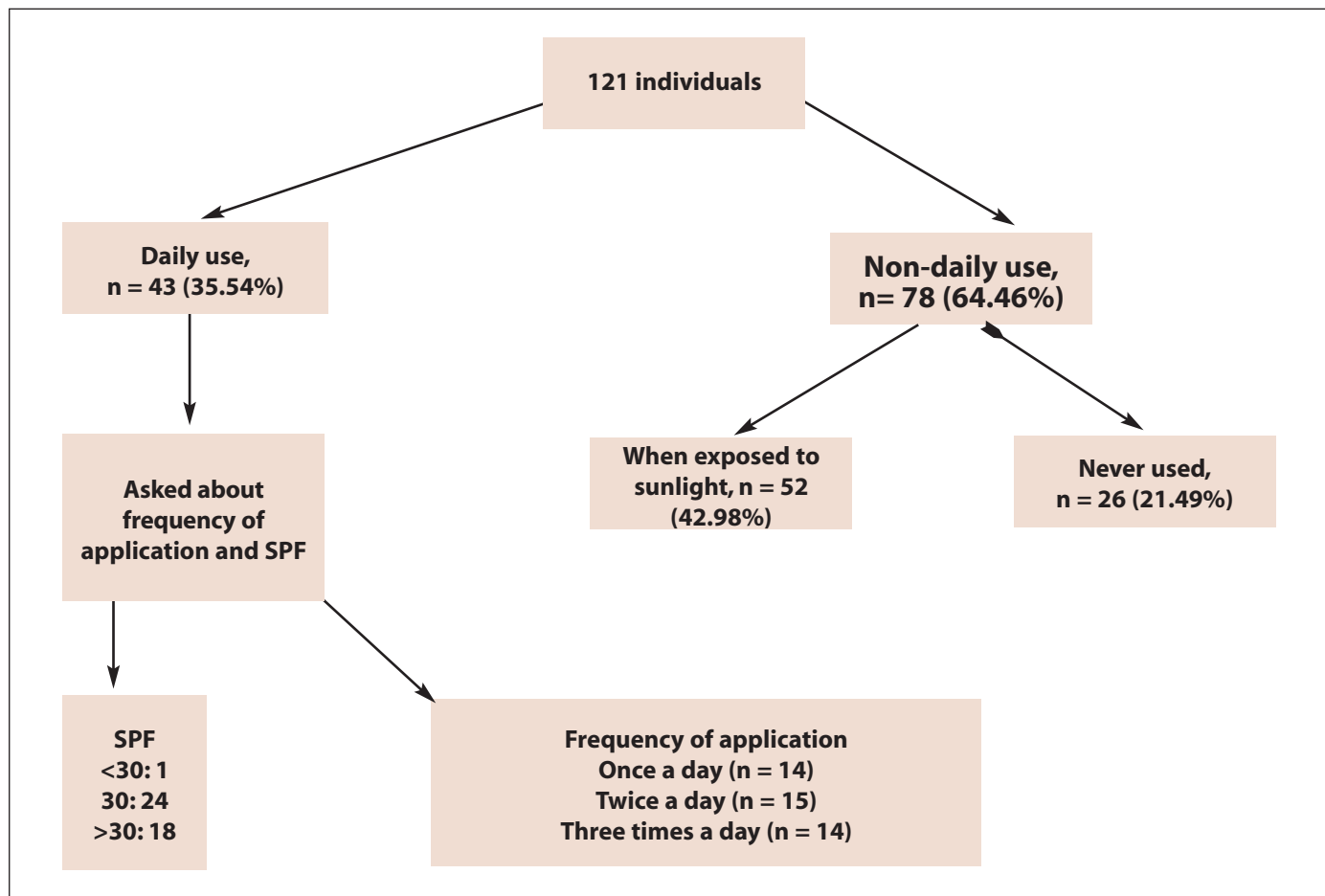
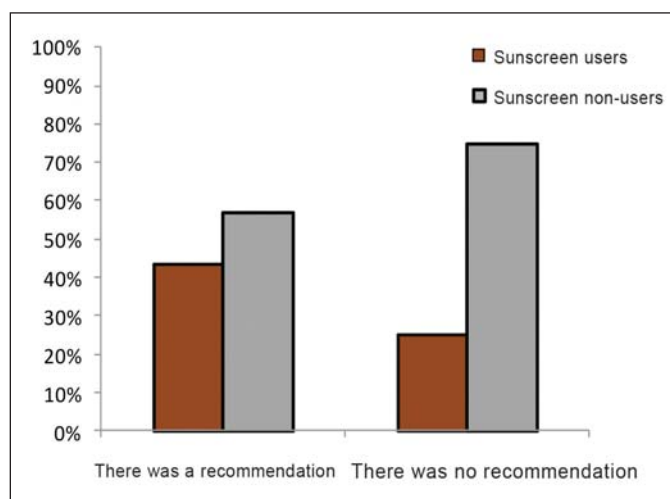


Figure 1- Patient distribution regarding sunscreen use

ing sunscreen use were evaluated, the importance of the dermatologists' recommendation to use sunscreen lotion was demonstrated.

The sample contained twice as many women as men (81 vs. 40), although there is a similar prevalence of vitiligo between genders in the general population.⁴ Gender was one of the factors that influenced the daily use of sunscreen lotion in patients with vitiligo, with 45% of women – compared with only 15% of men – using the product ($p = 0.001$, $OR = 4.76$; $95\% IC = 1.80-12.59$) (Table 2). This tendency has been demonstrated in other studies conducted within the general population.²⁶ In a study carried out in the South of Brazil, women were 347% more likely than men to use sunscreen lotion on normal working days – the same measure was 79% when on the beach and 145% when participating in outdoor sports.²⁷ Abroms and others investigated the factors that lead women to use sunscreen lotion more frequently than men: cutaneous aging prophylaxis and wrinkle and hyperpigmentation prevention were the main reasons. In contrast, men used sunscreen lotion less often for the following reasons: comparatively less interest in taking care of their skin, dislike of the texture and aroma of the products, and difficulty in applying the product – especially when in the presence



Graph 1 - Patient distribution regarding the recommendation to use sunscreen by the dermatologist in the first consultation

of other men. Moreover, because women use other skin care products, adherence to sunscreen application is easier. Another relevant factor is that, unlike men, women do not consider sunscreen lotion an expensive product.²⁸ These factors probably also

apply to vitiligo patients, as well as the fact that women tend to seek treatment more frequently due to the greater social impact of the disorder on their lives.^{7,29}

Duquia and colleagues evaluated the prevalence and factors associated with the use of sunscreen lotion. They observed that more than half of individuals studied used sunscreen at the beach, but few they used it in the days of study.²⁷ In our study, the sunscreen lotion use of individuals that worked predominantly exposed to sunlight was not higher than in those that worked inside ($p = 0.37$) (Table 1).

Another important factor for sunscreen efficacy is re-application.¹⁴ In the present study, among patients who used sunscreen every day, 14 did not re-apply, 15 re-applied once and 14 re-applied twice or more. In an Australian study that covered the general population, most of the participants (61%) reported that they re-applied sunscreen lotion when exposed to intense sunlight. The ones who re-applied more frequently were women, youths and those who were aware of the benefits of re-application. However, the authors did not specify whether the re-applications were made on a daily basis.³⁰

Duquia and colleagues²⁷ observed that one of the factors associated with the highest frequency of sunscreen lotion use in adults was education level. However, no significant statistical association between education level and sunscreen lotion use

was found in that study. Most of those individuals had an incomplete or complete primary education level (38 and 28.1%, respectively). Such a great proportion of individuals with low levels of education can be partly explained by the fact that the study was conducted in an outpatient clinic that cares for public health patients. We believe that the small amount of patients holding complete higher education degrees was one of the factors that hampered our evaluation regarding this possible association.

One limitation of the present study was the lack of analysis of the amount of sunscreen lotion applied. However, this was not the objective of the study, because we did not believe patients would use the recommended dose, given that studies evaluating the amount applied demonstrate that the recommendation is not followed.¹⁷

CONCLUSION

A standard of sunscreen lotion usage in individuals with vitiligo was determined. In addition, it was verified that a dermatologist's recommendation on sunscreen lotion use for vitiligo patients was statistically significant. This finding demonstrates the importance of the dermatologist's role in the prevention of skin cancer and photoaging in individuals with vitiligo. ●

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