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Evaluation of an educational intervention on skin cancer in the context of the covid-19 pandemic

Avaliação de uma intervenção educativa sobre câncer de pele realizada no contexto da pandemia da covid-19

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ABSTRACT

Introduction: Skin cancer is one of the most prevalent neoplasms, and melanoma is its most aggressive form. It is responsible for most deaths due to its high metastatic potential. The early diagnosis affects the patients' prognosis and can be encouraged by educating the population regarding self-examination of the skin and recognition of salient characteristics of the lesions.

Objectives: To evaluate the impact of an educational video intervention on skin cancer with the application of a questionnaire before and after the intervention.

Methods: Prospective quasi-experimental study that included patients assisted in the dermatology service of a public hospital in Belo Horizonte.

Results: 196 patients were included. Although most participants recognized the importance of monitoring with a dermatologist (81.1%), most were unaware of melanoma (70.9%). There was a significant change in knowledge about skin neoplasms, especially regarding the ABCDE mnemonic (P<0.01). **Conclusions:** The educational intervention contributed to increasing significantly the participants' knowledge about skin cancer. With the contact restrictions imposed by the COVID-19 pandemic, actions that disseminate information and encourage self-examination of the skin become even more essential for early diagnosis.

Keywords: Knowledge; Dermatology; Education; Melanoma; Skin neoplasms

RESUMO

Introdução: *o câncer de pele é uma das neoplasias prevalentes, e o melanoma consiste em sua forma mais agressiva por ser responsável pela maioria das mortes devido ao seu alto potencial metastático. O diagnóstico precoce afeta o prognóstico do paciente e pode ser estimulado educando-se a população quanto à realização do autoexame da pele e ao reconhecimento de características marcantes das lesões.*

Objetivos: *avaliar o impacto de uma intervenção educativa em vídeo sobre câncer de pele com a aplicação de questionário antes e após a intervenção.*

Métodos: *estudo prospectivo quase-experimental que incluiu os pacientes assistidos no Serviço de Dermatologia de um hospital público de Belo Horizonte.*

Resultados: *196 pacientes foram incluídos. Apesar de a maioria dos participantes reconhecer a importância do acompanhamento com o médico dermatologista (81,1%), a maior parte desconhecia o melanoma (70,9%). Houve significativa mudança no conhecimento sobre neoplasias de pele, principalmente no que diz respeito ao mnemônico do ABCDE (p<0,01).* ***Conclusões:*** *a intervenção educativa contribuiu para aumentar significativamente o conhecimento dos participantes acerca do câncer de pele. Com as restrições de contato impostas pela pandemia da COVID-19, ações que disseminem informações e estimulem o autoexame da pele se tornam ainda mais essenciais visando ao diagnóstico precoce.*

Palavras-chave: *Conhecimento; Dermatologia; Educação; Melanoma; Neoplasias cutâneas.*

Original Article

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INTRODUCTION

Skin cancer is one of the most prevalent neoplasms, and non-melanoma is the most frequent in both sexes. In Brazil, the National Cancer Institute José Alencar Gomes da Silva/Ministry of Health (INCA/MS) estimated 177,000 new cases for each year of the 2020-2022 triennium, with 83,770 cases in men and 93,160 in women. Regarding melanoma skin cancer, an estimated 4,200 new cases in men and 4,250 in women are estimated.[1]

Although less prevalent, the incidence of primary cutaneous melanoma is increasing. It is the most aggressive form of skin cancer, accounting for most deaths due to its high metastatic potential. Its treatment is usually curative if there is early detection of the disease. Thus, it is necessary to recognize a potentially malignant lesion to reduce the number of cases, increase the chances of cure, and lessen expenses with the various treatments the patient must undergo.[2]

Early diagnosis of melanoma is essential for treatment success. Thus, doctors and patients must be familiar with the disease. Knowledge of risk factors, including skin phototypes I and II, age over 40 years, positive family history of skin cancer, and prolonged sun exposure, especially in childhood and adolescence, is essential.[3,4]

Skin self-examination facilitates early detection of melanoma. It should be performed periodically and is represented by the ABCDE mnemonic, created to assist in the early diagnosis of the disease and stimulate the search for a dermatologist in case of clinical suspicion.

In this context, basic health education actions in places with a large circulation of the Public Healthcare System (Sistema Unico de Saúde - SUS) users are responsible to raise awareness and encourage attitudes and behaviors that favor health care. University extension programs show their importance in the relationship between institutions and society. This type of initiative makes it possible to bring together and exchange knowledge and experiences between teachers, students, and the population.[5,6]

Due to this demand, the Academic League of Dermatology of a teaching institution in Belo Horizonte developed the extension project "Look at your skin". The program brings the community dermatological information related to skin cancer and photoprotection, encouraging skin self-examination and, consequently, early detection of potentially malignant lesions.

This study aims to assess the population's knowledge and habits regarding skin cancer and sun exposure, promoting greater discussion and analysis on this subject, in addition to evaluating the effectiveness of an educational action promoted by the Academic League, adapted to the context of the COVID-19 pandemic.

METHODS

It is a prospective study with a quasi-experimental design, with analysis in two phases (before and after an educational intervention). We used convenience sampling based on the acceptance to participate in the research. Quasi-experimental research, before and after type, involves manipulating a variable (educational intervention), where the individual is the control. Thus, data are collected both before and after an intervention.

The study intended to answer the research question: "What is the effectiveness of an educational intervention on skin cancer in a population treated at a reference hospital in Brazil?". The research took place between March 2020 and January 2021. In total, 196 patients treated at a tertiary care center in Dermatology of a public hospital located in Belo Horizonte, Minas Gerais, participated in the investigation.

People over 18 years of age, literate, regardless of sex and race, and who had been or were patients at the institution were included in the research. Likewise, individuals under 18 years of age, illiterate, or who refused to respond to the questionnaire were excluded from the study.

Data were obtained through a questionnaire developed by the authors based on the scientific literature and adapted for the online format since the face-to-face approach became impossible due to the social isolation imposed by the COVID-19 pandemic. All participants were informed about the ethical aspects involved in the research by reading the Free and Informed Consent Form (ICF) present in the first part of the report and could only proceed with the online questionnaire after indicating that they agreed to participate.

The questionnaire presented two steps: the first step included questions about the characterization of the sample, comprising sociodemographic characteristics of the volunteers (age, sex, education), family income, skin phototypes (skin phototype I: very light skin, burns easily, never tans; II: fair skin, burns easily, tans very little; III: light brown skin, burns moderately and tans moderately; IV: moderate brown skin, burns little, tans easily; V: dark brown skin, burns rarely, tans a lot; VI: black skin, never burns, always tans), and skin cancer history in the family. The second step of the questionnaire included closed questions regarding the participants' knowledge on skin cancer, such as its prevalence and the main characteristics possibly found in potentially malignant lesions. In addition, to assess the participants' visual recognition of skin cancer, we included five images at the end of the questionnaire, three of potentially malignant lesions.

To assess the knowledge acquisition, the participants answered the questionnaire in two moments: at the beginning of the research (including stages one and two) and after the intervention, which consisted of a video prepared by the team containing the main information regarding skin cancer, when they answered again the step two. Then, the participants evaluated the importance of the information and, based on them, whether they would pay more attention and change their skincare.

Categorical variables were presented as absolute and relative frequencies and numerical variables as mean ± standard deviation and median (1st quartile – 3rd quartile). The comparison between paired categorical variables was performed using

the McNemar and Multinomial tests, when appropriate. The analyzes were performed using the R software version 4.0.3 and a significance level of 5% was considered. We assessed a total of 196 participants, of which 124 (63.3%) were women.

The Research Ethics Committee of the institutions involved approved this research under the numbers 25805319.6.0000.5134 and 25805319.6.3001.5138.

RESULTS

The sample consisted of 196 patients, 124 women (63.3%). The mean age found among the participants was 43.1 years (± 10.8). Concerning the level of education, the 196 subjects had some level of education, with 10.2% (n=20) with incomplete primary education and 11.2% (n=22) with complete higher education.

Regarding monthly family income, 5.6% (n=11) of the participants received up to 1 minimum wage; 27% (n=53) received between 1 and 3 minimum wages; 29.1% (n=57) received from 3 to 6 minimum wages; 20.9% (n=41) received from 6 to 9 minimum wages; 13.3% (n=26) received from 9 to 12 minimum wages; and 4.1% (n=8) received between 12 and 15 minimum wages.

Concerning the skin phototype, 9.7% of the individuals declared themselves as skin phototype I (n=19); 18.4% (n=36) as skin phototype II; 21.4% (n=42) as skin phototype III; 19.9% (n=39) as skin phototype IV; 20.4% (n=40) as skin phototype V; and 10.2% (n=20) as skin phototype VI.

When asked about their sun protection measures (Table 1), 29.1% (n=57) of participants declared they did not use any protection; 45.9% (n=90) wore clothes to cover more skin; 36.2% (n=71) avoided sunbathing between 10 am and 4 pm; 32.1% (n=63) wore hats or caps; 24% (n=47) used sunscreen; 3.6% (n=7) used parasols as sun protection. Adding the sun protection measures used, one subject used the five measures questioned; 19.9% of respondents (n=39) used one of the sun protection measures; 35.2% (n=69) used two measures; 12.2% (n=24) used three measures; and 3.1% (n=6) used four sun protection measures. As for the use of sunscreen, 76% (n=149) said they did not use it.

Regarding knowledge of skin cancers, 70.9% (n=139) had never heard about melanoma; 97.4% (n=191) had never heard about squamous cell carcinoma; and 94.4% (n=185) had never heard about basal cell carcinoma.

When comparing the rates of correct answers to the questions before and after the intervention, we observed that 30 participants (15.3% of the total) answered the question "What is the most common type of cancer among Brazilians?" correctly. After the intervention, 195 participants (99.5%) answered the same question correctly. When asked "Does family history (family members who had or have skin cancer) increase the chances of having skin cancer?", 117 subjects (59.7%) answered it correctly before the intervention and 193 participants (98.5%) answered it correctly after the intervention.

Table 1: Sun protection measures

	Statistic
What sun protection measures do you use?	
Don't use any measures	57 (29.1)
Clothes that cover the more skin	90 (45.9)
Avoid sunbathing between 10 am – 4 pm	71 (36.2)
Hats or caps	63 (32.1)
Sunscreen	47 (24.0)
Parasols	7 (3.6)
Number of sun protection measures used	
0	57 (29.1)
1	39 (19.9)
2	69 (35.2)
3	24 (12.2)
4	6 (3.1)
5	1 (0.5)
Do you use sunscreen?	
Yes	47 (24.0)
No	149 (76.0)
Have you ever heard of melanoma?	
Yes	57 (29.1)
No	139 (70.9)
Have you ever heard of squamous cell carcinoma (SCC)?	
Yes	5 (2.6)
No	191 (97.4)
Have you ever heard of basal cell carcinoma (BCC)?	
Yes	11 (5.6)
No	185 (94.4)

Regarding the statement: "It is extremely important that everyone follow up their 'spots' with dermatologists to avoid skin cancer", the correct answers went from 81.1% in the pre-intervention (n=159) up to 100% in the post-intervention.

Concerning the questions that requested participants to indicate the meaning of the mnemonic "ABCDE" (Table 2), in the pre-test, 15.3% (n=30) could indicate what A meant; 36.7% (n=72) could say the meaning of B; 37.8% (n=74) got the meaning of C right; 23% (n=45) answered the meaning of D correctly; and 23% (n=45) knew the meaning of E. After the intervention, no question was answered correctly by all participants. The question about A reached 73.5% (n=144) of correct answers; B, 93.9% (n=184); C, 89.8% (n=176); D, 65.3% (n=128); and E, 90.3% (n=77) of correct answers.

Table 2. Comparison between skin cancer answers before and after the intervention

	Pre-intervention	Post-intervention	P-Value
What is the most common type of cancer among Brazilians?			<0.001M
Colon and rectum	23 (11.7)	0 (0.0)	
Mama	45 (23.0)	1 (0.5)	
Skin	30 (15.3)	195 (99.5)	
Prostate	74 (37.8)	0 (0.0)	
Lung	24 (12.2)	0 (0.0)	
Does family history (family members who have had or have skin cancer) increase the chances of getting skin cancer?			<0.001N
Yes	117 (59.7)	193 (98.5)	
No	79 (40.3)	3 (1.5)	
Do you know the ABCDE of melanoma?			<0.001N
Yes	23 (11.7)	192 (98.0)	
No	173 (88.3)	4 (2.0)	
It is extremely important that everyone follow up their "spots" with dermatologists to avoid skin cancer. Is it true?			<0.001N
Yes	159 (81.1)	196 (100.0)	
No	37 (18.9)	0 (0.0)	
Considering that the ABCDE consists of 5 lesion characteristics, beginning with these letters (A – B – C – D – E) and that these indicate malignancy, indicate what you believe the letter A means			<0.001N
Altitude	61 (31.1)	6 (3.1)	
Area	74 (37.8)	32 (16.3)	
Arrangement	31 (15.8)	14 (7.1)	
Asymmetry	30 (15.3)	144 (73.5)	
Indicate what you believe the letter B means			<0.001M
Blister	54 (27.6)	9 (4.6)	
Borders	72 (36.7)	184 (93.9)	
Bleach	37 (18.9)	2 (1.0)	
Bright	33 (16.8)	1 (0.5)	
Indicate what you believe the letter C means			**<0.001N**
Cilium	21 (10.7)	1 (0.5)	
Color	74 (37.8)	176 (89.8)	
Consistency	57 (29.1)	8 (4.1)	
Crust	44 (22.4)	11 (5.6)	
Indicate what you believe the letter D means			<0.001N
Density	48 (24.5)	10 (5.1)	
Diameter	45 (23.0)	128 (65.3)	
Distension	65 (33.2)	39 (19.9)	
Distribution	38 (19.4)	19 (9.7)	
Indicate what you believe the letter E means			<0.001M
Elasticity	28 (14.3)	0 (0.0)	
Elevation	45 (23.0)	10 (5.1)	
Enlargement	56 (28.6)	9 (4.6)	

Evolving	67 (34.2)	177 (90.3)	
Please indicate below which lesions you believe are at greater risk of progressing to skin cancer, melanoma or non-melanoma			
1	125 (63.8)	196 (100.0)	<0.001N
2	74 (37.8)	159 (81.1)	<0.001N
3	**59 (30.1)**	**0 (0.0)**	**<0.001N**
4	**117 (59.7)**	**24 (12.2)**	**<0.001N**
5	**70 (35.7)**	**191 (97.4)**	**<0.001N**
1, 2 and 5	**6 (3.1)**	**139 (70.9)**	**<0.001N**

(M) Multinomial Test; (N) McNemar test

In the questions using images of skin lesions (Figure 1) and asking which ones had the highest risk of evolving to skin cancer, melanoma, or non-melanoma, the pre-intervention test had only 3.1% (n=6) of correct answers regarding the right combination of images (1, 2 and 5), and, after the intervention, this percentage rose to 70.9% (n=139).[7]

At the end of the questionnaire, all participants judged the information as important (Table 3); 99.5% stated that they would pass this information on to other people; 96.9% stated that they would change their skincare after learning from the research.

DISCUSSION

The extension project "Look at your skin", developed by the Academic League of Dermatology of a teaching institution in Belo Horizonte, is an action for the primary prevention of skin cancer that uses the informative booklet of the Brazilian Society of Dermatology as a tool for information. The intervention is conducted in public spaces in Belo Horizonte - Minas Gerais, such as parks and squares, and the academics involved are responsible for guiding the participants on the association between the sun and skin cancer, applying sunscreen, using appropriate clothing, wearing hats and sunglasses, staying in the shade, and limiting sun exposure. They are also responsible for expanding knowledge about the most frequent skin neoplasms (melanoma, squamous cell carcinoma, and basal cell carcinoma), reinforcing the most striking characteristics of each one of them, encouraging the skin self-examination and periodic follow-up with a dermatologist to contribute to the early diagnosis of these skin lesions.

However, in 2019, the outbreak of the SARS-CoV-2 virus occurred in China, culminating in a global pandemic, requiring the adoption of severe preventive measures, including home isolation, one of the measures adopted to contain the spread of the virus and prevent its main complication, the severe acute respiratory syndrome. From this perspective, most outpatient procedures and dermatological treatments were postponed, except for emergency consultations and cancer patients. Given the

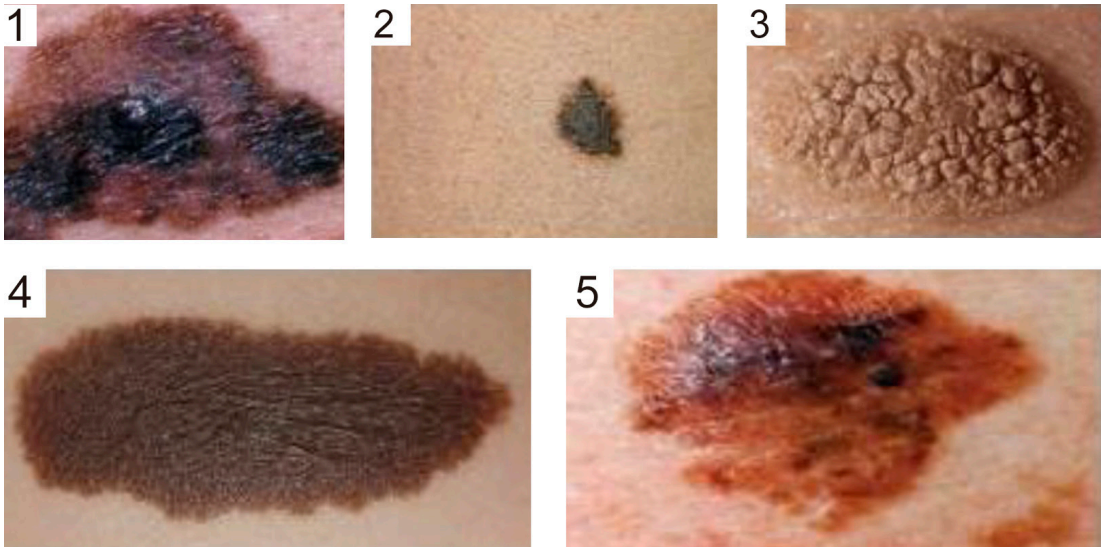

FIGURE 1: Images used to assess the participant's recognition of potentially malignant lesions

Table 3: Importance of information	
	Statistic
Do you think the information received is important?	
Yes	196 (100.0)
No	0 (0.0)
Will you pass this information on to others?	
Yes	195 (99.5)
No	1 (0.5)
Will you change your skin care?	
Yes	190 (96.9)
No	6 (3.1)

evolution of this health crisis, dermatologists have adopted the use of telemedicine as the best solution for the imposed social distance. Nevertheless, although it is a way of treating patients more safely, it limits the performance of a complete skin examination and the evaluation of pigmented lesions. [7,8]

A delay in diagnosing and treating skin cancer, especially melanoma, can lead to an increase in morbidity, mortality, and costs to the health system. Thus, initiatives related to population education and skin cancer screening, including the project "Look at your skin", developed by the Academic League, should be adapted to alternative models of prevention campaigns based on the same original principles, but exploring the various information services currently available that allow people to connect remotely.

A randomized clinical trial conducted at a California Department of Dermatology compared the effectiveness of written and video educational materials on individuals' understanding of melanoma. The results provided evidence that online videos are a more effective tool than written materials, that is, information leaflets. The population studied rated the video intervention as being more attractive and could perform better in the evaluative questionnaire applied by the team of researchers.[9]

Our project, conducted through the delivery of informative booklets, had to undergo modifications so that the intervention could continue to benefit the local community and disseminate information about skin cancer, even with the limitations imposed by the pandemic. The solution found was to transform the approach into a video and assess the retention of information through a self-administered online questionnaire in a population served at a Dermatology referral service.

Regarding the predominance of women among the study participants (63.3%), it is related to the fact that, based on the bibliographic review conducted by the researchers, there is a greater predominance of women in dermatological consultations, suggesting greater gender care concerning aesthetics and skin protection against the harmful effects caused by sun exposure. Also, some studies revealed a prevalence of skin neoplasms in women, which could arouse the interest of this group in receiving more information on the subject.[10,11]

The mean age found was 43.1 years, showing that the sample is composed of relatively young individuals located in the economically productive age group and who use more the means of communication currently available.

Regarding the frequency of sunscreen use by the respondents, we observed that about 76% of participants do not use sunscreen. This data highlights the need to conduct initiatives that reinforce the importance of its use in preventing skin neoplasms associated with educating the population on its correct use. The disuse of this sunscreen may be related to the high cost it represents in the population's budget and to the fact that it does not belong to the list of medicines provided by the Public Healthcare System (SUS), since 61.6% of the participants declared a monthly family income between one and six minimum wages. In this context, it is also necessary to encourage the recurrent use of physical sun protection, such as hats, shirts that cover the skin, and parasols, as they are more affordable and durable items.[12]

Another worrying factor found in the present study is related to the participants' level of prior knowledge about skin cancer. Approximately 70% of patients had never heard about melanoma. This prevalence worsens when analyzing the level of knowledge of non-melanoma skin cancers: more than 95% were unaware of these lesions.

The lack of knowledge on skin neoplasms may be related to the low level of education of the participants, considering that 68.3% of them had, at most, completed high school. Factors related to increased risk of skin cancer include low socioeconomic status and lower education.[13,14]

The evaluation of the educational approach was based on the participants' knowledge of the aspects that characterize the identification of melanoma using the acronym of the screening criteria in the visual examination of pigmented skin lesions, the ABCDE mnemonic (asymmetry, irregular borders, color variation, diameter >6 mm, and lesion evolution). We also used images of pigmented skin lesions to assess whether participants would be able to identify in practice the aspects that visually characterize melanoma. We could observe that the ability to recognize malignant skin neoplasms improved significantly after the intervention.

A randomized clinical trial conducted in Chicago recruited 100 volunteers, selected from those who met the inclusion criteria of having no prior history of counseling on how to perform skin self-examination. Volunteers participated in the educational intervention, and pre-assessment and post-assessment questionnaires were administered before and after the approach to evaluate the retention of transmitted information. The study concluded that determining the presence of the ABCDE criterion is a challenging skill. However, the intervention significantly contributed to improve the participants' ability to perform skin self-examination and identify potentially malignant lesions.[15]

Likewise, our study sought to assess the participants' degree of knowledge on aspects involving the identification of potentially malignant pigmented skin lesions before and after an educational intervention, seeking to improve skills related to skin self-examination.

The questionnaire applied before the educational approach represented the first contact of research participants with information about skin neoplasms and how to perform skin self-examination. Regarding the assessment of knowledge on the aspects involving the ABCDE mnemonic and the recognition of potentially malignant lesions, it was evident that most participants did not know the information necessary to identify melanoma correctly. Only 11.7% declared knowing the method before the educational intervention. Similarly, it was possible to observe a significant discrepancy in the aspects that make up the identification of these lesions, such as asymmetry, irregular edges, color variation, diameter, and evolution. Only 3.1% of the participants could identify the correct combination of images corresponding to malignant melanocytic lesions.

The questionnaire applied after the intervention showed a significant increase in the correct answers than the questionnaire applied after the intervention. The right combination of images corresponding to malignant melanocytic lesions increased to 70.09%. It shows that educational actions, such as those conducted by the Academic League, seem to be efficient for raising awareness of the population about skin neoplasms, such as performing self-examination and how to use sun protection measures correctly.

A study based on 3,187 cases of melanoma skin cancer in the state of São Paulo showed the total cost and the unit cost of treating the neoplasm based on its staging. Stage 0 melanomas, which are lesions in situ, represented, at the time, a unit cost for the SUS of R$ 382.84. For the treatment of advanced stage melanomas, III and IV, the cost was R$ 30,969.67 and R$ 32,054.23, respectively.[16,17]

The difference between the cost of treating early-stage and advanced-stage melanoma is significant. More than 95% of treatment costs are destined for the most advanced stages, increasing the importance of awareness and prevention campaigns. The recognition of potentially neoplastic lesions allows the patient to seek medical help early, reducing the chances of metastases and the need for prolonged treatments, with onerous costs for the SUS. Thus, educational campaigns in the video can educate the population to seek care in the disease's early stages and protect themselves from harmful sun exposure.

The main limitation of this study is its design in two phases, before and after an educational intervention. The fact that it is not a randomized clinical trial prevents the impact observed on the factors studied from being exclusively attributed to the educational intervention performed. Another aspect is that only literate individuals with access to the internet and mobile communication media were included, considering that illiteracy would prevent them from responding to the self-administered questionnaire. Also, it is noteworthy that the study was conducted in a public reference center, which makes the sample directed to a population with a lower socioeconomic level, limiting the generalization of the results.

CONCLUSION

Due to the low cost of production, the ease of distribution, and the accessible language, using a video proved to be an effective communication tool in the study. The high costs necessary to treat an advanced neoplasm justify the implementation of educational campaigns, in the video, to raise awareness of the population about sun protection and potentially neoplastic skin manifestations. This way, individuals can seek specialized medical care when recognizing potentially malignant lesions and effectively protect themselves from ultraviolet radiation.

Also, educational actions involving the recognition of potentially neoplastic skin lesions that encourage the self-examination need to be encouraged, especially during the COVID-19 pandemic, which limited the patients' contact with the dermatologists. Through these initiatives, it is possible to draw the patients' attention to the warning signs of the disease, boosting the immediate search for a specialist in view of the recognition of the characteristics that surround it. ●

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