

Impact of a Community Intervention for Early Skin Cancer Diagnosis Implementing Teledermatology

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This study was approved by the local ethics committee.

ABSTRACT The principal cause of skin cancer is sun exposure. In areas with high sun exposure levels, early diagnosis and sun protection education strategies must be developed. Aim of the study was to evaluate the impact of an early skin cancer diagnosis intervention implementing teledermatology. Transversal descriptive study on a population in the Western Costa del Sol. Primary care physicians were instructed on skin cancer diagnosis. They recruited consecutive at-risk patients and held four workshops for early skin cancer diagnosis and education on sun protection. The resulting variables on participants' satisfaction and intention to change were collected. 393 patients were recruited. The mean age was 52.9 years, and 65.4% were women. Suspicious lesions were detected in 24.1% of participants, and 11.7% were attended to via teledermatology. Of these, 65.2% were evaluated in person at the Dermatology Department. Fourteen basal cell carcinomas, 5 squamous cell carcinomas, and 2 melanomas were diagnosed. Regarding patient satisfaction, 67.7% found all aspects of the workshops of interest, 41.7% found the skin check-up of interest, and 26.4% found sun and skin cancer prevention information of interest. Of the patients attended to via teledermatology, 100% stated it was good or very good and 100% would consult again via this method. The intervention was successful in terms of participation, skin cancer diagnosis, and satisfaction, especially compared with other international campaigns. Therefore, although the data cannot be extrapolated to all environments, this initiative may be used as the basis for the development of future interventions.

KEY WORDS: skin cancer, melanoma, early detection of cancer, public health, telemedicine

INTRODUCTION

The principal cause of skin cancer is sun exposure. The Western Costa del Sol is known for sun-and-sand tourism and has a large community of foreign resi-

dents from central and northern Europe (up to 62% in some towns). It also has a high prevalence of skin cancer and high healthcare costs due to this disease (1).

For this reason, the *Disfruta del sol sin dejarte la piel* skin cancer prevention campaign (2), a collaborative project by the Costa Del Sol Healthcare Agency and primary care centers of the healthcare district, has been run since 2009 in order to develop coordinated health promotion strategies to reduce skin cancer incidence, mortality, and costs. Within this framework, an intervention (3) aimed at conducting early skin cancer detection workshops in primary care centers was carried out in 2012. It was a success in terms of participation, skin cancer and melanoma diagnosis, and satisfaction. For this reason, it was proposed in 2018 that these workshops be repeated, but implementing teledermatology for direct communication with the Dermatology Department, given that the area is geographically dispersed and accessing the healthcare system can be difficult.

The aim of this study was to evaluate the impact of the intervention for early skin cancer diagnosis implementing teledermatology.

PATIENTS AND METHODS

Design: Transversal descriptive study.

Target population: Residents of the Western Costa del Sol (population 462,598), an area characterized by great geographical dispersion along the coast and inland villages.

Intervention: The intervention, which consisted of a series of activities, was organized in three phases. The first one consisted of a training course and practical skills development in skin cancer and teledermatology for the participating primary care physicians (PCPs). The second involved the recruitment of patients for subsequent workshops, which were carried out by the PCPs. The third consisted of a group of workshops aimed at participating patients.

In regards to the third phase, workshops were held in four primary care centers (PCCs) throughout the week of 21 to 25 May, 2019, during which the following activities took place: a personal interview, clinical skin examination, dermatoscopic skin examination, teleconsultation with the Dermatology Department for suspected skin cancer/melanoma cases, personalized advice, provision of informational pamphlets, and provision of sun protection creams. If skin cancer and/or melanoma continued to be suspected or if there were doubts about the diagnosis following teleconsultation, the patient received an appointment in the Dermatology Department clinic for a physical examination. In cases in which there were doubts regarding the diagnosis or suspicion of a malignant lesion, a biopsy was then performed to confirm the diagnosis.

The teleconsultation application used was Teledermatología v2.0, which is the software developed by the Andalusian Public Healthcare System for the implementation of teledermatology in the autonomous community of Andalusia.

Study population

Patients with risk factors for skin cancer and/or melanoma who belonged to the Costa del Sol Healthcare District (outdoor workers, outdoor athletes, beachgoers with sunburns, people with a personal or family history of skin cancer and/or melanoma, people with more than 50 moles, people with moles that showed alarm signs, transplanted patients on immunosuppressor treatment, people with genetic diseases predisposing them to skin cancer and/or melanoma). Patients who did not wish to be evaluated and patients without skin cancer and/or melanoma risk factors were excluded.

Recruitment

Consecutive series of all residents in the area who voluntarily decided to participate after being selected by their PCP in the recruitment period.

Variables

Data were collected regarding the resulting variables (number of patients recruited and attended to, baseline characteristics and medical history, sun exposure and protection habits, number of suspicious lesions, final clinical/pathological diagnosis), satisfaction of patients attended to, intention to change following the workshops, and satisfaction of patients attended to via teledermatology.

In order to measure sun exposure and protection habits as well as intention to change and satisfaction of patients, pre-established questionnaires were given to all patients at the beginning of the workshops (sun exposure and protection habits questionnaire) and at the end (intention to change and patient satisfaction questionnaires). A specific questionnaire

Table 1. Sun protection habits of patients who participated in the workshops

	Never – Occasionally	Frequently – Always
Avoid the sun at midday	37.6%	62.2%
Use of umbrellas/shade	28.9%	70.5%
Use of a hat/cap	51.4%	48.4%
Use of sunglasses	35.1%	64.6%
Use of SPF >15 sunscreen	33.8%	65.1%
Use of shirt/clothes	48.1%	51.4%

Table 2. Participants' responses to surveys on satisfaction and intention to change submitted during the workshops

Satisfaction Questionnaire				
	Poor (%)	Fair (%)	Good (%)	Very Good (%)
In general, how would you evaluate this workshop?	0.4	0	31.1	68.6
	Not at all (%)	Somewhat (%)	Quite a lot (%)	A lot (%)
Have you gained new knowledge on sun and skin cancer risks?	0.0	0.7	47.2	52.1
Have you learnt to identify your phototype?	2.1	12.1	47.5	38.3
Have you learnt to identify skin cancer alarm signs?	1.4	10.7	45.4	44.5
Have you learnt different sun protection methods?	0.7	9.6	40.7	50.0
Have you improved your knowledge of sun protection creams?	0.7	8.6	40.7	50.0
Questionnaire on intention to change				
Do you believe you will improve your sun exposure habits?	0.4	7.4	37.9	54.3
I will stay in the shade	0.0	3.8	31.3	58
I will use a hat/cap	4.2	14.6	30.2	43.1
I will use long sleeves or trousers	8.0	30.2	30.9	23.6
I will avoid exposure in the middle of the day	0.0	8.0	25.7	59
I will use a sun protector with SPF >15	1.4	2.1	21.9	67.7
From now on, do you plan on checking your skin more often?	0.0	1.7	28.5	62.8

was given in cases in which a teleconsultation was needed. Questionnaire items are shown in Table 1 and Table 2.

Ethical aspects

This study complied with the Declaration of Helsinki and the Law on Biomedical Research (14/2007). No clinical data apart from that indicated herein were collected. All data were recorded anonymously, strictly adhering to data protection laws and regulations in force following Costa del Sol Research Ethics Committee approval in April 2018.

Statistical analysis

A descriptive analysis was carried out with central tendency and dispersion measurements for quantitative variables and frequency distribution for qualitative variables.

Results

In the first phase, 25 PCPs received instruction. They recruited 393 (100%) at-risk patients. Of these, 94.7% came to the workshops. Participant mean age was 52.9 years (SD 18) and 65.4% were women. 76% had phototype II-III (phototype II: 36.5%; phototype III: 39.5%). 8.9% of patients had a personal history of skin cancer and 1.6% of melanoma. 17.3% of patients

had a family history of skin cancer and 3.8% of melanoma. Sun protection habits, which were determined via the responses to the sun protection questionnaire, are shown in Table 1.

Of all patients, 24.1% had a lesion suspected of being skin cancer. Following another evaluation by the PCP in charge of teleconsultations, those with clearly benign lesions were excluded; as such, 11.7% of cases ended up having a teleconsultation (46 patients). 93.6% were women, and the mean age was 49.7 years (SD 23.6). Of this group, 65.2% were evaluated in person at the Dermatology Department clinic. Suspected and final diagnoses can be seen in Table 3. In summary, the following were diagnosed: 14 basal cell carcinomas, 5 squamous cell carcinomas, and 2 melanomas (one *in situ* and one infiltrating, Breslow thickness <1 mm).

In regards to what aspects of the workshops participants found most interesting, measured on the satisfaction questionnaire (Table 2), 67.7% responded that everything was interesting, 41.7% indicated the skin examination, 26.4% indicated the information on the sun and skin cancer prevention, 20.5% indicated the personalized advice, 17.4% indicated the advice on sun protection creams, and 13.5% indicated the pamphlets with recommendations. Responses regarding patients' intentions to change their habits after the workshops are shown in Table 2.



Table 3. Diagnosis of patients evaluated via teledermatology. Expressed as the percentage of total teleconsultations held (n=46)

	Suspected diagnosis n (%)	Teleconsultation response n (%)	Definitive diagnosis n (%)
Benign	-	13 (28.3)	19 (41.3)
Suspicious	-	7 (15.2)	-
Premalignant	-	2 (4.3)	4 (8.7)
Malignant	46 (100.0)	24 (52.2)	22 (47.8)
Basal cell carcinoma	20 (43.5)	17 (36.9)	14 (30.4)
Squamous cell carcinoma	9 (19.6)	6 (13.0)	5 (10.9)
Melanoma	11 (23.9)	1 (2.3)	2 (4.3)

When asked about the teleconsultation that was performed when necessary (teledermatology questionnaire), 100.0% of those attended to responded that the possibility of being evaluated using this tool was good or very good. 79.2% had a very high level of confidence, and 16.7% had a high level of confidence in the teleconsultation. 100.0% would consult again using the same method. Overall satisfaction was very high for 87.5% of patients and high for 12.5% of patients. All patients would recommend consultation via teledermatology to their family and friends.

DISCUSSION

The data obtained on this intervention's impact show its usefulness in a real-world setting. As shown in a previous intervention performed in 2012 in the same region (3) as well as in this study, this type of campaign can be considered a success in terms of participation, skin cancer/melanoma diagnosis, and participant satisfaction. In addition, in this intervention, teledermatology facilitated the workshops from an organizational point of view and, more importantly, from the patient's point of view, as patients with benign lesions did not have to travel for an examination and the patient was given an appointment directly in the clinic when required.

The high level of participation is probably due to the high degree of implication of primary care personnel. As demonstrated in a prior intervention (3), the recruitment actively carried out by PCPs led to greater participation when compared with other campaigns, probably due to the close bond and trust the population has with their PCP. In other early skin cancer detection campaigns, such as Euromelanoma, recruitment was carried out passively as the patients were those who request an evaluation. In the Euromelanoma campaign during 2009 and 2010 (4), a total of 1047 and 999 patients participated in Spain, respectively. On the other hand, 393 patients partici-

pated in our campaign – carried out only on the local level. With respect to definitive diagnosis of lesions, we were not able to make a direct comparison given that these data were not collected in the aforementioned work on Euromelanoma. However, regarding suspicious lesions in the Euromelanoma campaign in Spain (4), 53 carcinomas and 29 melanomas were found whereas in our study (again, on the local level); 19 carcinomas and 2 melanomas were histologically confirmed. When compared with other European countries such as Switzerland (5), 2795 people were attended nationally and 23 carcinomas and 6 melanomas were detected.

The high degree of satisfaction should be noted; 99.6% of participants positively evaluated the experience. Participants were most satisfied with having acquired knowledge about sun and skin cancer risks as well as having learnt sun protection methods and having improved their knowledge of sun protection creams. For this reason, this type of campaign should be considered when it comes to sun protection education. With regards to intention to change (Table 2), 92.2% participants believed they would improve their sun protection habits.

The main limitations of this type of study arise from the intervention's local nature. The results cannot be extrapolated to other populations whose baseline characteristics differ from our sample. Its strengths include the large sample size, the interdisciplinary participation of those involved, and its design for the evaluation of impact.

Although the quality of evidence supporting implementation is currently relatively low, all studies seem to indicate that these interventions are entirely beneficial, with greater early diagnosis of melanomas and of invasive/advanced forms of skin carcinomas (6,7). Although some studies have found lower skin melanoma mortality in populations that receive skin cancer screening campaigns (8), it has not been

possible to irrefutably confirm this in prior studies in European countries such as Germany (9).

CONCLUSIONS

We presented an intervention designed for sun protection education and early skin cancer diagnosis. Very good results were obtained compared with other campaigns carried out on higher levels, probably due to active selection of at-risk patients. The intervention was facilitated by teledermatology, which allowed delivery of care to a larger population without greater organizational difficulties. The results will allow for the design of future activities aimed at addressing shortcomings.

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