

Original Research

Role of community pharmacists in skin cancer screening: A descriptive study of skin cancer risk factors prevalence and photoprotection habits in Barcelona, Catalonia, Spain

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Abstract

Background: Skin cancer incidence is increasing alarmingly, despite current efforts trying to improve its early detection. Community pharmacists have proven success in implementing screening protocols for a number of diseases because of their skills and easy access.

Objective: To evaluate the prevalence of skin cancer risk factors and the photoprotection habits with a questionnaire in community pharmacy users.

Methods: A research group consisting of pharmacists and dermatologists conducted a descriptive cross-sectional study to assess photoprotection habits and skin cancer risk factors by using a validated questionnaire in 218 community pharmacies in Barcelona from May 23rd to June 13th 2016. All participants received health education on photoprotection and skin cancer prevention. Patients with ≥ 1 skin cancer risk factor were referred to their physician, as they needed further screening of skin cancer.

Results: A total of 5,530 participants were evaluated. Of those, only 20.2% participants had received a total body skin examination for skin cancer screening in the past by a physician and 57.1% reported using a SPF 50+ sunscreen. 53.9% participants presented ≥ 1 skin cancer risk factor: 11.8% participants reported having skin cancer familial history and 6.2% reported skin cancer personal history; pharmacists found ≥ 10 melanocytic nevi in 43.8% participants and chronically sun-damaged skin in 21.4%. Lesions suspicious for melanoma were reported in 10.9% of the participants and urgent dermatological evaluation was recommended.

Conclusions: Pharmacists can detect people with skin cancer risk factors amongst their users. This intervention can be considered in multidisciplinary strategies of skin cancer screening.

Keywords

Sunscreening Agents; Skin Neoplasms; Early Detection of Cancer; Pharmacies; Pharmacists; Cross-Sectional Studies; Spain

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INTRODUCTION

Keratinocyte carcinoma and cutaneous melanoma are the most common forms of skin cancer.^{1,2} The former, which comprises basal cell carcinoma and squamous cell carcinoma, accounts for over 90% of all skin cancers, although its mortality is low.³ In Europe, there is a high estimated incidence of keratinocyte carcinoma although it is greatly under-reported.² In the Catalan region of Girona between 2010 and 2012, 21% of all diagnosed cancers were keratinocyte carcinomas.⁴ The cumulative lifetime risk of developing non-melanoma skin cancer is 6.16% in women and 7.81% in men.⁴ In the United States, keratinocyte carcinoma incidence has doubled since the 1960s up to 8%, and treatment costs are an increasing worldwide economic burden.⁵⁻⁸ On the contrary, cutaneous melanoma represents only 5% of all skin cancers, but it accounts for 90% of skin cancer deaths. In Catalonia, like all over Europe, cutaneous melanoma incidence is increasing, with 10.2 new cases per year per 100,000 inhabitants in 2016.^{9,10}

Different National Health Systems (NHS) have launched skin cancer awareness and early detection campaigns. However, available resources were not enough to reach the necessary uptake to ensure its mainstream success. On the one hand, some initiatives are based on medical evaluation of self-reported suspicious lesions. They show a low detection rate in early stages and miss the diagnosis of occult skin cancer lesions.^{11,12} On the other hand, skin cancer population screening initiatives based on total body

skin examination (TBSE) are not cost-effective, despite detecting occult skin cancer lesions in early stages.¹³⁻¹⁵ In Servei Català de Salut (NHS in Catalonia), TBSE is not performed systematically due to lack of time in Primary Care settings and referrals to dermatologists are performed by general practitioners (GPs) when they need further evaluation of patient-reported suspicious lesions.¹⁶

Individual skin cancer risk factors assessment might be a good tool for triaging people with high risk for a more frequent follow-up.¹⁷ However, this information is not compiled systematically in patients' medical records. Skin cancer risk factors are well known and the most important ones may vary in different countries.¹⁸ In southwestern Europe the most important risk factors are a high count of nevi all over the body, having dysplastic nevi, familial history of melanoma, personal history of skin cancer and being of fairer Fitzpatrick phototypes.¹⁸ Some authors propose that arm nevi count could be a proxy assessment of whole body nevi count.¹⁹

Previous studies suggest that skin self-examination using melanocytic nevi count could be effective to triage skin cancer when combined with medical screening by dermatologists.^{11,20-23} However, when skin self-examination is performed by laypeople, nevi count overestimation and missing occult skin cancer lesions may occur.¹¹ Even healthcare professionals in training overestimate the nevi count, which suggests that proper training is crucial.²⁴

We hypothesize that triage of people according to their skin cancer risk factors might be essential to improve screening cost-effectiveness. This triage could be the first step of a skin cancer population screening protocol, which might help to prioritize people needing TBSE. GPs would perform TBSE in higher risk individuals who would be referred to dermatologists in case of skin cancer suspected diagnosis.

The inclusion of pharmacists in collaborative screening programs has successfully broaden the coverage for the detection of colorectal cancer, HIV and bacterial pharyngitis, since many patients more frequently visit pharmacies for health issues rather than their GPs due to the better accessibility and readiness offered by community pharmacists (CPs).²⁵⁻³⁰ Specific training on primary prevention has successfully enhanced pharmacists' interventions in skin cancer health education and counselling in the United States of America.³¹⁻³³ In Spain, CPs have been promoting photoprotection since late 1990s.³⁴ In Barcelona, the Col·legi de Farmacèutics de Barcelona (COFB, Barcelona Pharmacists Association) has developed programs sponsored all over Spain and other campaigns of its own.^{34,35}

Pharmacists, due to their skin healthcare and disease screening expertise, besides their versatility, proximity and convenience, seem to be part of an optimal strategy for skin cancer risk factor triage. Thus, COFB and the Department of Dermatology of the Barcelona Hospital Clínic have developed a program to evaluate melanoma and skin cancer risk factors and photoprotection use among people attending community pharmacies located in Barcelona, Catalonia, Spain. The programs' slogan was "Abans de deixar-t'hi la pell, consulta" (which means in

Catalan Save your own skin, seek advice), and it had two main aims: to evaluate skin cancer risk factors and the photoprotection habits and to assess later on this questionnaire as an initial step for a collaborative triage protocol involving physicians and pharmacists for skin cancer.

The present work has as objective to describe the prevalence of skin cancer risk factors and the fotoprotection habits in community pharmacy users participating in this program. We hypothesize that trained pharmacists could be responsible for triaging people with skin cancer risk factors and for referring them to their GPs in case TBSE is needed. Thus pharmacists' implication might broaden the coverage of skin cancer screening and optimize the use of resources and increase the cost-effectiveness.

METHODS

Study design

We report a descriptive cross-sectional study on photoprotection habits and skin cancer risk factors prevalence conducted by CPs in Barcelona for the future evaluation and development of a professional pharmacy service for skin cancer risk factors triage. The inclusion criteria were: users of community pharmacies, aged over 18 years old and willing to participate in the program during the period between May 23rd (Melanoma World Day) and June 13th (European Skin Cancer Prevention Day), 2016.

Skin cancer risk factor questionnaire

An expert committee, consisting of dermatologists and pharmacists, created and validated by consensus the content of a skin cancer risk factors triage questionnaire (Online appendix 1). The questionnaire collected information on demographic characteristics, photoprotection behaviours and skin cancer risk factors. Data on the five most important skin cancer risk factors in Southern and Central European population were registered: family and personal history of skin cancer, nevi arm count in one arm skin exploration was used as a skin cancer predictor to simplify triage by skin examination and nevi count, presence of sun-damaged skin and self-reported presence of melanoma-like suspicious lesions.^{18,19,36} A linguistic copyeditor evaluated the clarity of the questionnaire and its comprehension was validated by 11 laypeople ranging from 18 to 84 years old not related to healthcare professions. The final version of the validated questionnaire can be found on Online appendix 1.

Referral to dermatological follow-up

Those users with at least 1 risk factor were recommended to make an appointment for dermatological check-up with the GP within the next year (group R1). Those users reporting to have similar lesions to those in the skin cancer atlas (Online appendix 2) were advised to, urgently, set up an appointment with a dermatologist (group R2). Remaining participants with no skin cancer risk factors, were advised to report to their GPs any change detected in their skin, even though they do not have any risk factor of

those evaluated for follow-up (group R0). The project was notified to general practitioners from Societat Catalana de Medicina Familiar i Comunitària (CAMFIC, Catalan Society of Community and Family Medicine) who supported the initiative.

Skin cancer health education and perceived satisfaction

The questionnaire also gathered information about: photoprotection habits for skin cancer prevention; dermatological care that patients received from their GPs and dermatologists for skin cancer early detection; and perceived users' satisfaction with the service. Assessment of dermatological self-care was used by pharmacists to provide individualized health education for skin cancer prevention. It was focused on avoiding sunburns, exposure to sun during central hours of the day, to use cloths, hats and sunglasses and finally the use of sunscreen whenever they were exposed to sun, the promotion of higher sun protection factors (SPF), the application of sunscreen before going out at home and debunking myths and detecting barriers to enhance photoprotection habits amongst community pharmacy users. In addition, perceived satisfaction was also inquired using a Linkert-type rating scale.³⁷

Community pharmacists' recruitment and training

COFB made an open call to join the project through a communiqué sent on May 2nd 2016 to all registered CPs in the province of Barcelona (5,470 CPs working in 2,300 pharmacies). It introduced epidemiologic aspects of skin cancer, the importance of its early detection and included some information about the protocol, which would be further explained in the master-class to be held on May 12th 2016. This 2-hour cost-free master-class was held by a dermatologist from the Hospital Clínic de Barcelona Department of Dermatology, to train CPs to perform the nevi count technique on the arms; to detect markers of chronically sun-damaged skin; and were also instructed in clinical and epidemiological aspects of skin cancer. CPs were introduced to the use of the questionnaire as a tool for skin cancer risk factor screening, as well as for the evaluation of photoprotection habits to promote individualized health education. Attendees rated their satisfaction with the training session voluntarily. All pharmacies having at least one pharmacist who completed the training were included.

Media impact

A press conference about the project was held to raise awareness about skin cancer early detection and prevention amongst Barcelona population. The project was disclosed by the media with more than 40 pieces of news in television, radio and newspapers, both locally and all over Spain.³⁸

Pharmacist intervention

Each participating pharmacy user was first invited personally to take part in the study by a pharmacist, who provided him/her with medicines and healthcare products. CPs' evaluation of skin cancer risk factors and photoprotection habits was performed for free during the campaign. Participants had to grant verbal informed

Table 1. Personal phenotypic characteristics.				
N = 5530		n	%	95%CI
Age		56 yo	-	55.5:56.4
Gender				
	Male	1401	25.3%	24.2%:26.5%
	Female	4129	74.7%	73.5%:75.8%
Hair color				
	Black	1105	20.0%	18.9%:21.0%
	Brown	3576	64.7%	63.4%:65.9%
	Red hair	89	1.6%	1.3%:1.9%
	Fair	757	13.7%	12.8%:14.6%
	Uncertain	3	0.1%	0.0%:0.1%
Eyes color				
	Black	164	3.0%	2.5%:3.4%
	Hazel	3454	62.5%	61.2%:63.7%
	Mixed	316	5.7%	5.1%:6.3%
	Grayish	682	12.3%	11.5%:13.2%
	Green	910	16.5%	15.5%:17.4%
	Uncertain	4	0.1%	0.0%:0.1%
Phototype				
	I	151	2.7%	2.3%:3.2%
	II	1247	22.5%	21.4%:23.8%
	III	2701	48.8%	47.5%:50.2%
	IV	1071	19.4%	18.3%:20.4%
	V	300	5.4%	4.8%:6.0%
	VI	60	1.1%	0.8%:1.4%

consent to take part in the study, thus complying with the Declaration of Helsinki and Data Protection EU Directives and Spanish Laws. The pharmacist administered the questionnaire to each participant and performed a visible skin exploration to assess chronically sun-damaged skin and arm nevi count. CPs referred those participants who needed it for further dermatological follow-up, according to the results of the questionnaire. Moreover, all participants received personalized skin cancer health education by their CPs. The intervention was designed to take 15 min per participant. The questionnaire data was gathered on carbonless copy paper, so all participants were given the original of their answers to be handed to their physician. The copy was kept by the CP to include anonymized participants' data to a safe COFB-managed web-cloud database for further analysis.

Statistical analysis

Statistical analysis was performed using SPSS Statistics software version 22.0 (IBM Corp., Armonk, NY) and RStudio: Integrated Development for R (RStudio, Inc., Boston, MA). Results are expressed as average or its percentage with their corresponding 95% confidence interval.

RESULTS

Two-hundred eighteen (218; 9.5%) community pharmacies from the province of Barcelona were enrolled in the study. A total of 335 (6.1%) CPs received training from a dermatologist. Pharmacists rated the training with 4.42 (SD=0.86) out of 5. Participating pharmacists collected valid registries from 5,530 participants, accounting for about 1% of all the pharmacy users during the campaign. Most participants lived in cities with more than 100,000 inhabitants. The average age was 56.0 (SD=16.9) years old and the women to men ratio was 3 to 1 (Table 1).

Table 2. Photoprotection habits.				
N = 5530		n	%	95%CI
Do you use sunscreen when you are exposed to sun?				
	Never	763	13.8%	12.9%:14.7%
	Sometimes	1154	20.9%	19.8%:22.0%
	Usually	1090	19.7%	18.7%:20.8%
	Always	2519	45.6%	44.3%:46.9%
If you use sunscreen, which SPF do you use?				
	SPF < 15	96	1.7%	1.4%:2.1%
	SPF 15	331	6.0%	5.4%:6.7%
	SPF 30	1419	25.7%	24.5%:26.8%
	SPF 50+	3158	57.1%	56.0%:58.2%
	Uncertain	114	2.1%	1.7%:2.4%
You normally apply your sunscreen				
	At home. before going out	2727	49.3%	48.0%:50.5%
	On the beach or at the pool	2272	41.1%	39.9%:42.3%
	Before playing sports	147	2.7%	2.2%:3.1%
	Cannot remember when/where	51	0.9%	0.7%:1.2%
If you don't use always sunscreen, state the reason why				
	Because it is expensive	92	1.7%	1.3%:2.0%
	Because it is uncomfortable to use	303	5.5%	4.9%:6.0%
	Because I do not get burnt	243	4.4%	3.9%:4.9%
	Because I do not sunbathe	610	11.0%	10.2%:11.8%
	Because it irritates the eyes	34	0.6%	0.4%:0.8%
	Because I do not remember to use it	765	13.8%	13.0%:14.7%
	Other reasons	154	2.8%	2.3%:3.2%

The most common phenotype was brown hair, hazel eyes, and phototype III (Table 1). Regarding photoprotection habits (Table 2), 45.6% referred always using sunscreen, being SPF 50+ the most commonly used. On the contrary, 13.8% reported never using sunscreen. The main reason given not to use sunscreen was forgetfulness and perceived lack of sun exposure (Table 2).

Among all the surveyed users, 42.9% of them had a dermatological consultation in the past (Table 3). In 89.5% the examination had been performed by a dermatologist, but only half of those had a total body skin examination (TBSE) performed. Taking into account all participants, only 19.0% of them received TBSE by a dermatologist in the past and only 1.2% received it from their GP (Table 3).

Skin cancer risk factors prevalence data can be found on Table 3. Group R1 represented 53.9% of the users, and comprised participants who had personal or family skin cancer history, more than 10 melanocytic nevi on an arm and/or chronically sun-damaged skin. They were referred

by CP to their GP within the next year. Group R2 represented the 10.9% and reported having similar lesions to those in the atlas, hence, were recommended to urgently see a dermatologist by their CP (Table 3).

Participants older than 70 years old and women were more likely to receive a referral recommendation of any kind (both groups R1 and R2) than younger people (Table 4). Women presented more risk factors (and therefore, R1 referrals) than men, however, men were more likely to self-report suspicious lesions, hence, received an urgent R2 referral (Table 4). More women participated in the study, under the ratio 3 to 1, besides, men's participation increased with age (Table 4). Participants from rural areas were more likely to self-report suspicious lesions than users living in urban areas (Table 4). Users were asked to rate CPs' role in pathology prevention and they valued it highly positively with 4.9 points (SD=0.4) (in 5-point Likert-type scale).

Table 3. Dermatological control and skin cancer risk factors evaluation.				
N = 5530		n	%	CI 95%
Users receiving dermatological assessment		2370	42.9%	41.6%:44.2%
Who were examined by:				
General practitioner		273	4.9%	4.4%:5.5%
with Total Body Skin Exploration		64	1.2%	0.9%:1.4%
Dermatologist		2122	38.4%	37.9%:38.9%
with Total Body Skin Exploration		1049	19.0%	18.7%:19.2%
Others		53	1.0%	0.7%:1.2%
Uncertain		31	0.6%	0.4%:0.8%
Skin cancer risk evaluation				
Users with skin cancer familial history		650	11.8%	10.9%:12.6%
Users with skin cancer personal history		342	6.2%	5.5%:6.8%
Users with skin with > 10 melanocytic nevus on one arm		2423	43.8%	42.5%:45.1%
Users with chronically sun-damaged skin		1184	21.4%	20.3%:22.5%
Users with self-reported skin cancer lesions compared to an atlas		604	10.9%	10.1%:11.7%
Users with pharmaceutical recommendations:				
R1. Risk factor(s) detected: GP referral.		2982	53.9%	53.1%:54.7%
R2. Self-reported suspicious lesions: urgent referral.		604	10.9%	10.1%:11.8%

Table 4. Referral recommendations depending on gender, age groups and municipality.

	R0			R1			R2		
	N	%	95% CI	N	%	95% CI	N	%	95% CI
Gender									
Male (n=141)	530	37.8%	35.3%:40.4%	695	49.6%	47.0%:52.3%	176	12.6%	10.9%:14.4%
Female (n=4129)	1414	34.2%	32.8%:35.7%	2287	55.4%	53.9%:56.9%	428	10.4%	9.5%:11.3%
Age groups									
< 50 yo (n=1913)	783	40.9%	38.7%:43.2%	949	49.6%	47.3%:51.9%	181	9.5%	8.2%:10.9%
50 – 69 yo (n=2278)	807	35.4%	33.5%:37.4%	1252	55.0%	52.9%:57.0%	219	9.6%	8.4%:10.9%
>70 yo (n=1339)	354	26.4%	24.1%:28.9%	781	58.3%	55.6%:61.0%	204	15.2%	13.4%:17.3%
Municipality									
Rural (n=421)	120	28.5%	24.2%:33.1%	270	64.1%	59.3%:68.7%	31	7.4%	5.1%:10.3%
Urban (n=1306)	419	32.1%	29.6%:34.7%	715	54.7%	52.0%:57.5%	172	13.2%	11.4%:15.1%
Big city (n=3803)	1405	36.9%	35.4%:38.5%	1997	52.5%	50.9%:54.1%	401	10.5%	9.6%:9.6%
TOTAL	1944	35.2%	33.9%:36.4%	2982	53.9%	52.6%:55.2%	604	10.9%	10.1%:11.8%

R0: No risk factors. R1: Risk factor(s) detected: referral to general practitioner. R2: Self-reported suspicious lesions: urgent referral to physician.

DISCUSSION

The role of pharmacists in skin cancer has focused mainly on primary prevention in the past.^{31-33,39} Today, skin cancer screening experiences have been implemented in community pharmacies across Australia, Norway and UK, based on store-and-forward teledermoscopy imaging.⁴⁰⁻⁴⁶ Nonetheless, these services raised controversy regarding a possible professional intrusion and the omission of occult skin cancer lesions which could only be detected with total body skin examination (TBSE) by physicians.^{13,47-49} Our project has set the basis for an ongoing collaborative practice agreement for skin cancer screening, between pharmacists from Col·legi de Farmacèutics de Barcelona, the only professional registration body for pharmacists in Barcelona, and dermatologists from Hospital Clínic de Barcelona, one of the most important tertiary hospitals in Spain. In our program, diagnostic is exclusively reserved to TBSE by GP or dermatologists, and pharmacists' role is genuinely triaging based in well-described skin cancer risk factors.^{18,19,50,51} The prevalence of these skin cancer risk factors in Barcelona community pharmacy users is described here for the very first time.

There are several points to highlight regarding participation: Firstly, we managed to enroll 9.5% of all community pharmacies in the province of Barcelona, making this, the prevention awareness campaign with the highest participation ever. This emphasizes the willingness and motivation of CPs regarding pharmacist expanded role in skin healthcare. Presumably, an incentive to increase participation among pharmacists would be to establish a fee for the screening program, similarly to other screenings found in our NHS service portfolio.^{29,52} Secondly, we managed to reach 1% of our target population, a relatively small proportion, but an interesting milestone, since it is the first skin cancer screening strategy developed in our context. Thirdly, the screened population showed a high satisfaction level with an 87.9% of the participants rating the program with the maximum satisfaction score (5 points).

There might have been a potential selection bias, which reveals the gender (mainly women) and age (56 years old average) biases found in our data compared to general population. However, our present data comply the demographic profile found in other studies on disease prevention in community pharmacies.^{35,53,54} To avoid this

selection bias, invitation letters could be sent to the target population in the future. They should be accompanied with an informative leaflet about the importance of skin cancer early detection and a list of the nearest pharmacies participating in the program. This strategy has been highly effective to ensure the participation in the community pharmacy-based colorectal cancer screening program.⁵⁵

To evaluate individual risk of skin cancer for further medical referral, our triage protocol was based on performing a questionnaire and a simple arm skin examination. There has been a lot of variability amongst the tools to assess skin cancer risk factors in the past.⁵⁶⁻⁶¹ Recently, a consensus questionnaire for melanoma risk assessment, has been proposed.⁶² Our tool includes a version of it adapted to CPs, which includes most of items included in its section C (clinical examination and personal and familial history).⁶²

In 2013, COFB coordinated the Sol i Salut (Catalan for Sun and Health) campaign in which community pharmacies informed about photoprotection habits and spent a web-based survey. From the data obtained, we can detect that there has been an increase in the use of SPF 50+ sunscreen, from a 35% in 2013, to a 57.1% in 2016. Moreover, 23% of the participants reported having had their skin checked by a dermatologist in the past, while it increased to a 38.4%.³⁵ This increase in check-ups is an important factor for early diagnosis of skin cancer. However, it is worrisome that only 20.2% of all participants had a TBSE, which is essential for a proper screening.¹⁸

If we compare our current data to studies made in other Spanish settings, we can observe that sunscreen use frequency is lower in our participants.⁶³ A 2016 study showed that 69.1% of the Spanish people use sunscreen always, while our data revealed that only 45.6% uses it always.⁶³ SPF 30 is the most used all over Spain (50.1%), while in Barcelona, it is 50+ (57.1%).⁶³ The two most common Fitzpatrick types are phototype III (35.9%) and IV (36.6%) in a sample gathered in our country, while in Barcelona the two most common skin types are phototypes II (22.5%) and III (48.8%).⁶³

Our data has similar values to those observed in other studies performed in Southern Spain, when it comes to skin cancer family and personal history.⁶⁴ Furthermore, melanocytic nevi count proportion differs substantially from other studies, with 43.8% of participants with more

than 10 nevi on one arm in our case.^{19,20,36,64} This nevi over count could be due to different facts: the average age in our study is 56 years old, and only 31.5% of the participants are younger than 50 years old; while nevi counting of more than 20 nevi in both arms as a skin risk factor tool has only been proved useful in people younger than 50 years old.^{19,36} Moreover, the lack of clinical experience of pharmacists in this evaluation may explain the over count, which is similar to the one observed in medical professionals in training.²⁰ In the following editions, clinical case sessions with dermatologists will be held to improve pharmacists' training. Moreover, the correlation study will be carried out to estimate pharmacists' over count and to apply corrective measures to the protocol.

Participants' awareness of the need to receive periodical dermatological assessment does not cover most of the population, with 38.4% who have been to the dermatologist's and 4.9% who have been dermatologically assessed by their GPs at least once in their lives. Nevertheless, it is worrisome that only 46.9% of those patients receiving assessment by a dermatologist have been through a TBSE. It highlights the need to raise awareness among healthcare authorities to increment the time physicians spend seeing their patients to increase quality and introduce screening protocols.¹⁶ In addition, we propose that pharmacists could help enhance and optimize existing resources by developing collaborative skin cancer screening programs.²⁷

The skin cancer risk evaluation found a relatively high percentage of participants with some kind of skin cancer risk factor, with 53.9% people being referred to their doctors for screening and 10.9% reporting self-reported lesions to be evaluated urgently. The association between aging and skin cancer screening referral is concordant with the association between aging and skin cancer diagnosis previously reported, where 80% of the cancers diagnosed, are people older than 55 years.^{5,65-67} Moreover, older men living in rural areas are more likely to self-report suspicious lesions, which might be explained by possible occupational skin cancer and less visits to their healthcare professionals, leading to more advanced stages.⁶⁸

Limitations

The main limitation of the current phase of this study is the lack of registration of linkage-to-care and results of the medical evaluation. Even though we reached a considerable population, we could not determine the diagnostic predictive value of our tool, since we did not gather medical diagnostic results. However, it was never included as aim at this point, since we wanted to check the

feasibility of CPs involvement in this protocol first. Nonetheless, this will be further evaluated with a comparative correlation study between questionnaire-based evaluation by pharmacists and dermatologists. Furthermore, the selection bias may have caused overestimation of skin cancer risk factors, photoprotection habits, and thus referral rate. However, even if there is a selection bias of patients with higher risk of skin cancer, the value of triaging these patients for further medical evaluation cannot be denied.

CONCLUSIONS

This manuscript reports the initial part of a project, which revealed important data on photoprotection habits and skin cancer risk factors in users at the community pharmacy level in Barcelona. Thus, in the next phase we are planning to compare these risk assessment results with dermatologists' evaluation, therefore making the current results more resilient and contribute to the body of evidence in this topic. Moreover, it is the first step to develop an efficient and cost-effective collaborative screening program for skin cancer to pool physicians' and pharmacists' efforts for skin cancer early detection.

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CONFLICT OF INTEREST

JM and SP report personal fees for providing consultancy services, research and educational activities to BMS, MSD, Merk, AMGEN, Almirall, Leo Pharma, Novartis and Pierre-Fabre, outside the submitted work. The other authors have nothing to disclose.

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