Actas Dermosifiliogr. 2018;109(5):416–423

ACTAS Dermo-Sifiliográficas

Full English text available at www.actasdermo.org

ORIGINAL ARTICLE

Outpatient Dermatological Diagnoses in Spain: Results From the National DIADERM Random Sampling Project☆

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Available online 10 May 2018

KEYWORDS
Diagnoses;
Coding;
Outpatient clinic;
Outpatient activity;
Dermatology services;
Spain;
Random sampling;
Survey;
Cross-sectional study;
Prevalence

Abstract

Background: Dermatologists perform most of their work in outpatient or private clinics. Data on the diagnoses made by dermatologists in these settings are lacking, however, as outpatient activity, unlike hospital activity, is difficult to code. The aim of this study was to analyze the diagnoses made by members of the Spanish Academy of Dermatology and Venereology (AEDV) at dermatology clinics in Spain.

Methods: We selected a random sample of AEDV dermatologists drawn from the AEDV list and stratified by geographic area. The selected dermatologists received instructions on how to collect the data required. Each participant recorded the diagnosis reached and other data for patients seen during 2 specified periods: 3 days in January and 3 days in May. The diagnoses were subsequently coded by a dermatologist expert in applying the International Classification of Diseases (10th revision). In view of the complex nature of the sample, data were analyzed with standard error and finite population corrections.

☆ Please cite this article as: Buendía-Eisman A, Arias-Santiago S, Molina-Leyva A, Gilaberte Y, Fernández-Crehuet P, Husein-ElAhmed H, et al. Análisis de los diagnósticos realizados en la actividad ambulatoria dermatológica en España: muestreo aleatorio nacional DIADERM. Actas Dermosifiliogr. 2018;109:416–423.

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Results: The sample consisted of 124 dermatologists. Of these, 65% participated in the first phase of the study and 59% in the second. An estimated 621 562 patients (95% CI, 368 130-874 995) visit the dermatologist every month in Spain. This is the equivalent of 28 (25-31) patients per day per clinic. The most common diagnosis recorded was actinic keratosis, followed by basal cell carcinoma and melanocytic nevus. The vast majority of visits took place at the clinic, but 1% of patients (0.3%-3%) were assessed using teledermatology.
Conclusions: This is the first study in Spain to analyze diagnoses made by AEDV members at outpatient dermatology clinics. Our findings show a high volume of activity and will be useful for guiding health care planning, resource use, and future studies.
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PALABRAS CLAVE
Diagnósticos;
Codificación;
Consulta externa hospitalaria;
Actividad ambulatoria;
Servicios dermatología;
España;
Muestreo aleatorio;
Encuesta;
Estudio transversal;
Prevalencia

Análisis de los diagnósticos realizados en la actividad ambulatoria dermatológica en España: muestreo aleatorio nacional DIADERM

Resumen
Introducción: La actividad principal realizada por dermatólogos tiene lugar en la consulta externa hospitalaria o en los centros privados. A diferencia de la actividad hospitalaria, que es fácilmente codificada, no existen datos globales sobre los diagnósticos realizados por los dermatólogos en estos niveles. El objetivo de este estudio es analizar los diagnósticos realizados en las consultas de dermatología de los miembros de la Academia Española de Dermatología y Venereología (AEDV) en España.
Metodología: A partir del listado de dermatólogos de la AEDV se obtuvo una muestra aleatoria estratificada por secciones territoriales de la AEDV. A los dermatólogos participantes se les instruyó en la forma de recoger los datos. Cada participante recogió los diagnósticos y otros datos de los pacientes atendidos durante 6 días de consulta en 2 fases (3 días en enero y 3 días en mayo). Posteriormente la codificación de los diagnósticos la realizó un dermatólogo experto empleando la CIE-10. El análisis se realizó considerando el diseño muestral complejo empleado para corregir los errores estándar y el ajuste para poblaciones finitas.
Resultados: Se muestrearon 124 dermatólogos. Finalmente participaron en el estudio el 65% de los dermatólogos muestreados en la primera fase y el 59% en la segunda. El número de pacientes estimados que consultan al dermatólogo en toda España por mes sería de 621.562 (IC 95%: 368,130-874,995), con un promedio de 28 (25-31) pacientes por día de consulta. El diagnóstico más frecuente fue el de queratosis actínica, seguido de carcinoma basocelular y nevus melanocítico. La forma habitual de evaluar a los pacientes es mediante visita presencial y en el 1% (0,3%-3%) de los casos se realiza teledermatología.
Conclusiones: Se trata del primer estudio de ámbito nacional que analiza diagnósticos hechos en las consultas de dermatología de los miembros de la AEDV, mostrando una alta carga asistencial. Dicha información además será de utilidad para realizar una correcta planificación sanitaria, aprovechamiento de los recursos y planificar futuros estudios.
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Introduction

Although most routine dermatology services in Spain are provided in outpatient clinics, data on the diagnoses reached by dermatologists in these settings are lacking. Studies carried out by dermatologists tend to be local, retrospective, focused on a single disorder, or conducted in other settings such as primary health care facilities.[1–5]

A comparative study of common reasons for seeking care at dermatology services in Spanish and immigrant patients in Palma de Majorca found that benign tumors were the most frequent reason, followed by inflammatory conditions and viral skin diseases, with a total of 213 diagnoses reached during the 1-year study period.[3] Another study, carried out in Granada in patients over 65 years of age, found that basal cell carcinoma was the most frequent diagnosis, followed by actinic keratosis.[2]

A recent analysis of the burden of skin disease in the United States found that 26.9% of the population was seen by a physician for a skin condition in 2013, generating high direct and indirect costs, comparable to those associated with conditions such as diabetes or cardiovascular disease.[6] In view of the large number of patients seen in dermatology clinics each year, accurate knowledge about the most prevalent diseases would make it possible to analyze the management of these diseases and the costs associated with their treatment, and to distribute the available resources more efficiently in accordance with demand.

The diagnoses made by dermatologists in Spain have not previously been described by a prospective study of a representative sample of the country's dermatologists. The aim of this study was to estimate the prevalence of the diagnoses reached by members of the Spanish Academy of Dermatology and Venereology (AEDV) at dermatology clinics in Spain as well as the volume of activity.

Methods

Prevalence data were obtained in the DIADERM study through an anonymous survey of a representative random sample of dermatologists. The project was coordinated by the AEDV's Spanish Group for Epidemiology and Health Promotion in Dermatology, in collaboration with the academy's research unit.

We selected a random sample of dermatologists drawn from the AEDV list (which consisted of 2224 dermatologists as of November 2015) and stratified by geographic area (the AEDV is organized in sections that correspond approximately to Spain's autonomous communities, although the smallest communities are grouped together). The probability of selection was proportional to the number of dermatologists in each geographic area.

To maximize the response rate, the study was advertised through the AEDV's communication channels. All selected dermatologists were personally contacted by the study's regional coordinators and were offered upfront compensation for their participation.[7] Several reminders were also sent before the starting date of the study. After they agreed to participate, the selected dermatologists received instructions on how to collect the data required. Each participant recorded all diagnoses reached in the course of their clinical practice on 6 specified days (January 19, 20, and 21 and May 18, 19, and 20).

To estimate percentages of 5 per 1000 with a precision of ± 2 per 1000 and a 95% CI using a simple random sample, data from 4778 consultations would be needed (assuming 1 diagnosis per patient). Since consultations were grouped by dermatologist and a certain degree of diagnostic correlation was possible, it was important to consider the sampling method used (design effect). A design effect of approximately 2 was assumed.

An earlier publication estimated that 97% of dermatologists in Spain are AEDV members and that the mean number of daily consultations per dermatologist is 23.6.[8] If a dermatologist handles approximately 23 consultations per day, the total number of patients seen in 6 days is 138. Therefore, 35 dermatologists would be needed in order to reach an adequate estimate using a simple random sample. Taking the design effect into account, a total of 70 dermatologists would be needed. Assuming a 60% response rate and with corrections for each geographic area, we decided to contact 124 dermatologists.

At each consultation, the dermatologist collected the following data: diagnosis (free text), whether or not the patient was under 18 years of age, whether or not the consultation was done by teledermatology, reason for consultation, and any secondary diagnoses. If multiple diagnoses were established for a single patient, these diagnoses were marked as grouped. Other variables considered were whether the consultation took place in a public or private health care setting (a consultation was considered to have taken place in a public setting if the cost of medication was covered). Since many dermatologists work in both public and private settings, this aspect was associated not with the dermatologist but with the consultation. The origin of the visit—direct access to the dermatologist without a filter appointment, referral from primary care, referral from another specialist, or follow-up visit—was recorded. The patient destination was also recorded: discharge, follow-up with the dermatologist (including surgery), or follow-up with another physician. Neither personal data nor information about treatments were collected. Diagnosis was the unit of analysis. The dermatologists recorded diagnoses that corresponded to the reason for seeking care as well as any other diagnoses for which treatment—either medical or surgical—was prescribed. The survey was anonymous and no information was collected about the characteristics of the participating dermatologists or about their hospitals or clinics.

The diagnoses were coded by a dermatologist (AML) expert in applying the International Classification of Diseases, 10th revision (ICD-10). Textual descriptions of the diagnoses recorded in the survey and the corresponding codes were stored in a database. Quality control of the data coding was performed using a random sample of surveys. All diagnoses about which doubts existed were reviewed by 3 dermatologists with a particular interest in coding (YG, RT, and IGD), who belonged to the AEDV E-Dermatology and Imaging Group.

The statistical analysis took into account the data collection design and was carried out using the survey module of the Stata software package,[9] which incorporates standard error correction for correlated data. A finite population correction was not necessary because the real number of dermatologists yielded values close to 1 for each AEDV section.

The study was classified by the Spanish Agency of Medicines and Medical Devices as a non-postauthorization study and was approved by the research ethics committee of Granada province (October 8, 2014).

Results

Of the 124 randomly selected dermatologists, 80 (65%) participated in the first phase of the study and 73 (59%) in the second.

Over the 6-day study period, 11 223 diagnoses were recorded, but 224 were excluded because they were procedures and therefore could not be coded. A total of 10 999 diagnoses in 8953 patients were ultimately obtained, representing an estimated total of 208 141 diagnoses reached in 169 517 patients by all AEDV dermatologists. Hereinafter we will refer to the estimated data based on the total number of AEDV dermatologists.

As for the data coding quality control, a minimal error percentage (0.16%) was found in a sample of 621 diagnoses (5% of the total). In addition, all 764 diagnoses about which coding-related doubts existed (7% of the total) and an additional random sample of 1231 diagnoses (11% of the total) were reviewed by a group of dermatologists with a particular

Table 1 Distribution of Estimated Monthly Dermatology Consultations by Geographic Area.

Geographic Area (AEDV Section)	Percentage of Consultations in Spain	Estimated Monthly Consultations
Asturias, Cantabria, and Castile-León	8.5	52 928
Andalusia	15.1	93 966
Balearic Islands	2.2	13 611
Canary Islands	5.6	34 892
Catalonia	13.7	85 360
Central Spain	16.9	104 933
Galicia	10.0	62 073
Murcia	0.8	5236
Basque Country, Navarre, Aragón, and La Rioja	11.0	68 284
Valencia	16.1	100 280
Total	100	621 562

Abbreviation: AEDV, Spanish Academy of Dermatology and Venereology.

interest in coding, who belonged to the AEDV E-Dermatology and Imaging Group. Errors were found in 79 (4%) of these 1995 diagnoses.

Estimated Incidence of Consultations

Extrapolating the 6-day study period to the 22 working days in a month, an estimated 621 562 patients (95% CI, 368 130-874 995) are seen by a dermatologist in Spain each month, the equivalent of 28.2 (95% CI, 25.2-31.2) patients per day per clinic. The consultations were distributed geographically as shown in Table 1. Central Spain and Valencia were the geographic areas with the most consultations per month, each accounting for more than 100 000 patients (more than 16% of the total).

Consultation Characteristics

During the 6-day study period, an estimated 208 141 diagnoses (122 342-293 939) were made by AEDV dermatologists. Table 2 shows the distribution of the diagnoses by chapter of the ICD-10. The most common diagnoses, logically, were diseases of the skin, followed by neoplasms and certain infectious and parasitic diseases.

However, when the estimated diagnoses are classified by a more detailed breakdown of ICD-10 categories (Table 3), we find that the most frequent diagnosis was skin changes (L57), particularly actinic keratoses. An estimated 16 972 such cases (95% CI, 10 434-23 511) were diagnosed over the 6-day study period. Nonmelanoma skin cancers (C44), particularly basal cell carcinoma, were the second most frequent diagnosis, with an estimated 16 756 cases (95% CI, 8776-24 735).

Table 3 shows the 10 most frequent categories, as well as atopic dermatitis and urticaria, which were the 11th and 28th most frequent categories, respectively.

Consultation Types

The consultations took place at a clinic in 99% of cases (95% CI, 97%-99.7%) and teledermatology was used in 1% of diagnoses (95% CI, 0.3%-3.0%).

Reasons for Seeking Care

The principal diagnosis reached during the consultation was the main reason for seeking care in 82% of cases (95% CI, 80.7%-84.7%). Of the diagnoses that required some sort of treatment, 17.2% (15.3%-19.3%) were reached as a consequence of a secondary consultation with the dermatologist.

Percentage of Patients Under 18 Years of Age

Although patient age was not included in the survey, the dermatologists did record whether or not patients were under 18 years of age. Patients were under 18 years of age in 11.7% of cases (95% CI, 9.1%-14.9%). Table 4 shows the estimated number of diagnoses in patients under 18 years of age.

Public or Private Health Care Settings

Another important variable recorded was whether the consultation took place in a public or private health care setting. Consultations took place in public settings in 68.3% of cases (95% CI, 55.7%-78.7%) and in private settings in 31.7% of cases (95% CI, 21.3%-44.3%). The diagnoses reached most frequently in private settings were similar to those reached in public settings, with the 5 most common diagnoses being seborrheic keratosis, other benign neoplasms of the skin, melanocytic nevi, other disorders of pigmentation (solar lentigo/chloasma), and skin changes (actinic keratosis).

Table 2 Distribution of Estimated Diagnoses in Spain by ICD-10 Chapter During 6-Day Survey.

ICD-10 Chapter	No. of Diagnoses	Lower Limit of 95% CI	Upper Limit of 95% CI
Diseases of the skin and subcutaneous tissue (L00-L99)	123 621	74 166	173 076
Neoplasms (C00-D49)	52 766	31 054	74 477
Certain infectious and parasitic diseases (A00-B99)	20 407	11 553	29 260
Diseases of the digestive system (K00-K95)	2006	1034	2978
Diseases of the circulatory system (I00-I99)	1985	1109	2861
Congenital malformations... (Q00-Q99)	1772	905	2640
Not elsewhere classified (R00-R99)	1321	761	1880
Injury... (S00-T88)	1178	655	1700
Diseases of the musculoskeletal system... (M00-M99)	725	301	1149
Diseases of the genitourinary system (N00-N99)	721	209	1233
Endocrine diseases... (E00-E89)	522	323	722
Diseases of the blood... (D50-D89)	378	42	715
Diseases of the ear... (H60-H95)	286	123	450
Diseases of the eye (H00-H59)	283	98	468
Mental and behavioral disorders (F01-F99)	114	18	209
Pregnancy, childbirth, and the puerperium (O00-O9A)	56	0	121
Total	208 141	122 342	293 939

Abbreviation: ICD-10, International Classification of Diseases, 10th revision.

Table 3 Distribution of Estimated Diagnoses in Spain by ICD-10 Category During 6-Day Survey.

ICD-10 Category	No. of Diagnoses	Lower Limit of 95% CI	Upper Limit of 95% CI
L57: Skin changes (actinic keratosis, etc.)	16 972	10 434	23 511
C44: Nonmelanoma skin cancer (basal cell carcinoma, etc.)	16 756	8776	24 735
D22: Melanocytic nevi	15 668	9246	22 091
L82: Seborrheic keratosis	15 224	9253	21 195
D23: Other benign neoplasms of skin (nevus not otherwise specified)	12 991	7512	18 471
L40: Psoriasis	10 344	6260	14 428
L70: Acne	10 209	5996	14 423
B07: Viral warts (verruca vulgaris)	8970	4940	13 001
L81: Other disorders of pigmentation (solar lentigo/chloasma)	8211	4410	12 012
L30: Other or unspecified dermatitis (eczema not otherwise specified)	7215	4012	10 418
L20: Atopic dermatitis	5170	2660	7681
L50: Urticaria	1653	910	2396
Other	78 758	47 933	109 577
Total	208 141	122 342	293 939

Abbreviation: ICD-10, International Classification of Diseases, 10th revision.

Table 4 Distribution of Estimated Diagnoses in Spain by ICD-10 Category in Patients Under Age 18 Years During 6-Day Survey.

ICD-10 Category	No. of Diagnoses	Lower Limit of 95% CI	Upper Limit of 95% CI
L70: Acne	3680	2011	5350
L20: Atopic dermatitis	2824	1501	4148
D22: Melanocytic nevi	2514	1280	3748
B07: Viral warts (verruca vulgaris)	2511	1232	3791
B08: Other viral infections	1304	587	2021
D23: Other benign neoplasms of skin (nevus not otherwise specified)	1164	433	1894
L30: Other or unspecified dermatitis (eczema not otherwise specified)	814	264	1364
L21: Seborrheic dermatitis	622	221	1024
D18: Hemangioma and lymphangioma	569	167	972
L81: Other disorders of pigmentation (solar lentigo/chloasma)	525	0	1205
L40: Psoriasis	489	196	782
L82: Seborrheic keratosis	337	0	929
L57: Skin changes (actinic keratosis, etc.)	219	0	447
C44: Other malignant neoplasms of skin (basal cell carcinoma, etc.)	186	0	456
L50: Urticaria	154	0	337
Other	6342	2301	10 383
Total	24 254	10 193	38 851

Abbreviation: ICD-10, International Classification of Diseases, 10th revision.

Table 5 Estimated Origin and Destination of Patients Before and After Consulting With Dermatologists in Spain During 6-Day Survey.

Patient Origin	Percentage of Total Diagnoses in Public and Private Health Care Settings (95% CI)	Percentage of Total Diagnoses in Public Health Care Settings (95% CI)	Percentage of Total Diagnoses in Private Health Care Settings (95% CI)
Direct access without filter appointment	30.7 (22.1-41)	10.2 (7-14.9)	74.7 (66.5-81.4)
Primary care consultation	31.2 (25.1-37.9)	42.3 (37.2-47.4)	6.7 (2.8-15.1)
Consultation with another specialist	4.7 (3.9-5.6)	5.5 (4.2-7.2)	2.9 (1.7-4.9)
Dermatologist (including follow-up)	33.5 (29-38.3)	42 (37.4-46.8)	15.7 (10.7-22.4)
Patient Destination	**Percentage of Total Diagnoses in Public and Private Health Care Settings (95% CI)**	**Percentage of Total Diagnoses in Public Health Care Settings (95% CI)**	**Percentage of Total Diagnoses in Private Health Care Settings (95% CI)**
Discharge	27.6 (23-32.8)	27.1 (23-31.6)	28.6 (20-39)
Primary care consultation	4.7 (2.9-7.4)	6.4 (4.3-9.6)	1.2 (0.3-4.4)
Consultation with another specialist	2 (1.5-2.8)	2.2 (1.8-2.8)	1.6 (0.8-3.2)
Dermatologist (including follow-up)	65.6 (59.3-71.4)	64.2 (58.1-69.9)	68.6 (57.4-78)

Patient Origins

The top half of Table 5 shows the estimated percentages for patient origin before consultation with the dermatologist. The figures reveal differences between public and private health care settings. The most common patient origin in public settings was a primary health care consultation (42.3%). In private settings, the most common patient origin was direct access to the specialist without a filter appointment (74.7%). Follow-up was the patient origin in 42% of cases in public settings and 15.7% in private settings. Table 6 analyzes the diagnoses as a function of whether the patient was seeking care for the first time or attending a follow-up visit.

Patient Destinations After Consultation

The bottom half of Table 5 shows the estimated percentages for patient destination after consultation with the dermatologist. The most common patient destination, occurring in nearly 66% of cases (including follow-up appointments), was a new appointment with the dermatologist. Patients were discharged in nearly 30% of cases. The destination was consultation with another specialist in just 2% of cases and referral to a primary care physician in 5% of cases.

Discussion

We estimate that more than 600 000 patients are seen by AEDV dermatologists each month in Spain, with an average of 28 patients seen per day per clinic. The most frequent diagnosis was actinic keratosis, followed by basal cell carcinoma and melanocytic nevus. The vast majority of visits took place at clinics and less than 1% of patients were assessed using teledermatology. In one third of cases, the consultation took place in a private health care setting and the dermatologist was the patient's origin as well as destination.

Our findings show that a large number of patients are seen by AEDV dermatologists in Spain each month. Our figures are somewhat higher than those published by the Spanish Ministry of Health in 2014 (the most recent data on real activity currently available),[10] which indicate an annual total of 5 177 878 dermatology consultations in public and private health care facilities (hospitals and outpatient clinics). According to the ministry's report, 910 624 consultations (17.5%) took place in private health care settings, a lower percentage than that found in our study (31.7%). One possible explanation for this difference is that some private dermatology clinics are not included in the ministry's information collection systems. In fact, the ministry's statistics on specialized care centers are based on information provided by the centers listed in the national catalogue of hospitals, which omits many private dermatology clinics. According to the ministry's data, dermatology consultations accounted for 4.7% of all consultations, behind higher-volume specialties such as ophthalmology, traumatology, and gynecology but ahead of all others.[10] The mean number of daily consultations in our study—28.2 patients per day per dermatologist—was higher than the figure of 23.6 obtained in a previous study.[8]

The most frequent diagnosis in the DIADERM study was actinic keratosis, accounting for an estimated 8.2% of diagnoses, followed by basal cell carcinoma (8.1%) and melanocytic nevi (7.5%). In a multicenter survey conducted in 2013 and 2014, the prevalence of actinic keratosis in the dermatology outpatient population over the age of 45 years was 28.6%.[11] In one local study conducted in Majorca, the most frequent diagnosis was melanocytic nevi, followed by seborrheic keratosis and verruca vulgaris.[3] In a study of patients from Granada over 65 years of age, the most frequent diagnosis was basal cell carcinoma, followed by actinic keratosis and seborrheic keratosis.[2] In a 2006 study carried out in Barcelona, the most frequent diagnoses were seborrheic keratosis and melanocytic nevi.[12]

In all these studies, tumors or premalignant disease were the most frequent reasons for seeking care. This may be due to the growing incidence of skin cancer[13] or to patients' motivation to obtain an early diagnosis as a consequence of the AEDV's awareness-raising campaigns.[14] Probably as a result of these secondary prevention strategies, we observed that diagnoses of actinic keratosis and basal cell carcinoma were more frequent in follow-up patients than in first-time patients.

In public health care settings, the most common origin for patients seen by a dermatologist was a referral by a primary care physician or by another specialist (accounting for 47.8% of visits); in private settings, the most common origin was personal initiative (74.7%). In both public and private health care settings, follow-up was the patient destination in more than 60% of cases. Given that single-visit

Table 6 Most Frequent Diagnoses in First-Time and Follow-up Patients.

ICD-10 Category	Follow-up Patients	First-Time Patients
C44: Nonmelanoma skin cancer (basal cell carcinoma, etc.)	11 716	5040
L57: Skin changes (actinic keratosis, etc.)	10 711	6262
D22: Melanocytic nevi	7539	8129
L40: Psoriasis	6472	3872
L70: Acne	6037	4172
L82: Seborrheic keratosis	5614	9610

Abbreviation: ICD-10, International Classification of Diseases, 10th revision.

care is becoming increasingly common—especially in public settings—this percentage is rather high.

This study had various limitations. First, although the participation rate (greater than 60%) was quite high for surveys of this type, the number of dermatologists taking part decreased in the second phase of the study. Because the sample was random and representative and a total of 10 999 diagnoses were obtained, we consider that our findings reflect the reality of clinical practice in Spain quite well, despite the fact that data were collected over just 6 days. Second, surveys tend to have a certain degree of coding error, especially if double data entry is not used. In our study, however, a group of experts conducted a review and found that the data quality was good, with an error rate of less than 5%. Finally, personal details such as age and sex were not collected in our survey. Although these details would have provided interesting information, their collection would made the study procedure more complicated.

In conclusion, this is the first nationwide study in Spain to analyze the diagnoses reached in dermatology clinics by AEDV members. Our findings show a high volume of activity, with the most frequent diagnoses being actinic keratosis, basal cell carcinoma, and melanocytic nevi. This information will be useful for guiding health care planning, resource use, and future studies.

Funding

The DIADERM study was promoted by the AEDV's Fundación Piel Sana, which has received financial assistance from Novartis. The pharmaceutical company did not participate in data collection, data analysis, or the interpretation of the results.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

The DIADERM study was possible thanks to the collaboration of the project's participants and regional coordinators.

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