

ORIGINAL ARTICLES

Diagnostic Agreement Between Primary Care Physicians and Dermatologists in the Health Area of a Referral Hospital

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Abstract. *Introduction.* Skin diseases account for a high proportion of presenting complaints in primary health care. In Spain, the growing demand for consultations and the resulting longer waiting lists make it necessary to establish criteria for appropriate referrals to a specialist. This study aimed to investigate the characteristics of referrals from primary care centers to dermatology specialists as well as the correlation between the presenting complaint and the final dermatologic diagnosis.

Patients and methods. We collected data from 3164 patients seen for the first time by dermatologists in our specialist service during 1998. Patients were stratified according to the referring primary health care center and the reason for referral. The agreement between the presenting complaint and the final dermatologic diagnosis was studied. For each dermatologic condition, the positive predictive value, diagnostic sensitivity, and κ statistic were calculated.

Results. The overall diagnostic agreement was 65.52%. Primary care physicians were found to overdiagnose diseases caused by papillomavirus and the diagnostic sensitivity was very low for diseases such as basal cell carcinoma and seborrheic keratosis.

Conclusions. It is necessary to insist on training primary care physicians, ensuring appropriate referral from primary health care clinics, and promoting an effective dialogue with the specialist.

Key words: diagnostic agreement, dermatologic diagnosis, primary health care.

ESTUDIO DE CONCORDANCIA DIAGNÓSTICA EN DERMATOLOGÍA ENTRE ATENCIÓN PRIMARIA Y ESPECIALIZADA EN EL ÁREA DE SALUD DE UN HOSPITAL DE REFERENCIA

Resumen. *Introducción.* Las enfermedades dermatológicas representan un porcentaje importante de los motivos de consulta en Atención Primaria. En nuestro ámbito la creciente demanda de consulta y la consecuente aparición de listas de espera hace necesario establecer algún tipo de criterio para una adecuada derivación. Pretendemos en este estudio describir las características de la derivación desde los centros de Atención Primaria a las consultas de Dermatología, así como la correlación existente entre el motivo de consulta y el diagnóstico dermatológico final.

Material y métodos. Se recogen los datos de 3.164 pacientes atendidos por primera vez en nuestras consultas de Dermatología, durante 1998, clasificándose según el centro de Atención Primaria de procedencia y el motivo de consulta. Se realiza un estudio de concordancia entre el motivo de consulta y el diagnóstico dermatológico final, averiguando para cada caso el valor predictivo positivo, la sensibilidad diagnóstica y el índice de concordancia kappa.

Resultados. La concordancia diagnóstica global ha sido del 65,52 %. Se detecta por parte del médico de Atención Primaria un sobrediagnóstico de las enfermedades por papilomavirus y una sensibilidad diagnóstica muy baja en patologías como el carcinoma basocelular y las queratosis seborreicas.

Conclusiones. Se hace necesario insistir en la formación de los médicos de Atención Primaria, en una adecuada derivación desde los centros de Atención Primaria y en potenciar un buen modelo de interconsulta con el especialista.

Palabras clave: concordancia diagnóstica, diagnóstico dermatológico, Atención Primaria.

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Introduction

Skin disorders account for a high proportion of presenting complaints in primary health care settings.¹⁻³ Few studies,

however, have analyzed the ability of primary care physicians in Spain to diagnose and treat these disorders correctly, and data from similar studies conducted in the United States of America (USA) are not very encouraging.⁴⁻¹⁰

The growing demand for consultations and the subsequent emergence of waiting lists call for the development of appropriate referral criteria.

The aim of this study was to describe dermatology referrals made in a primary health care setting and to analyze the level of diagnostic agreement between primary care physicians and dermatologists.

Materials and Methods

We prospectively gathered data corresponding to patients who were seen for the first time in 1998 by primary care physicians and referred to the San José Specialist Center, which belongs to the health care district served by Hospital Miguel Servet in Saragossa, Spain.

The data were entered into purpose-designed patient files in a Microsoft Access database. Each file contained the following data: a patient identification number, the patient's date of birth and sex, the name of the referring (primary care) center, the location of the center (urban or rural), the date of the first consultation, the presenting complaint, and the diagnosis.

To facilitate statistical analysis, we created a database containing all possible diagnoses together with their corresponding codes according to the International Classification of Diseases (ICD), Ninth Revision, Clinical Modification and ICD-10.^{11,12}

The patients' data were also coded and stored for subsequent statistical analysis using the SPSS software package and Microsoft Excel spreadsheet software. The χ^2 test was used to analyze associations between qualitative variables and the *t* test to compare means of quantitative

variables. Statistical significance was set at a value of $P < .05$ in all cases.¹³⁻¹⁵

We analyzed agreement between the tentative diagnosis made by the primary care physician and the final diagnosis by the dermatologist, and calculated diagnostic sensitivity (percentage of patients with a given disease who were correctly suspected to have this disease), positive predictive value (percentage of patients with a given tentative diagnosis that was later confirmed), and the κ statistic (agreement between the 2 diagnoses).¹⁶

Results

We classified 3164 medical histories into 3 categories according to the information provided on the primary care referral form regarding the patient's presenting complaint. These categories were (1) no mention of presenting complaint, (2) description of presenting complaint but no mention of possible diagnosis, and (3) description of presenting complaint and clear mention of possible diagnosis.

We also classified the patients' medical histories according to the center from which they were referred: (1) a health care center in an urban setting, (2) a health care center in a rural setting, and (3) an old-style clinic that had not yet been converted into a primary health care center. Table 1 shows a summary of the types of referral made by the different types of centers.

No details of presenting complaints were given for 7.6% of patients. This lack of information was most common in old-style clinics (15.5%) and the differences between these and other types of centers were statistically significant ($P < .001$).

Almost a third (32.7%) of the referral forms analyzed contained a description of the patients' skin lesions but did not offer a tentative diagnosis. This second type of referral was more common in health care centers than in old-style

Table 1. Results According to Type of Referral and Referral Center

Referral Center		Presenting Complaint			
		No Mention	Description of Lesions	Tentative Diagnosis	Total
Urban primary health care center	No.	16	450	793	1259
	%	1.3	35.7	63.0	
Rural primary health care center	No.	13	202	314	529
	%	2.5	38.2	59.4	
Old-style clinic	No.	213	382	781	1376
	%	15.5	27.8	56.8	
Total	No.	242	1888	3164	
	%	7.6	32.7	59.7	

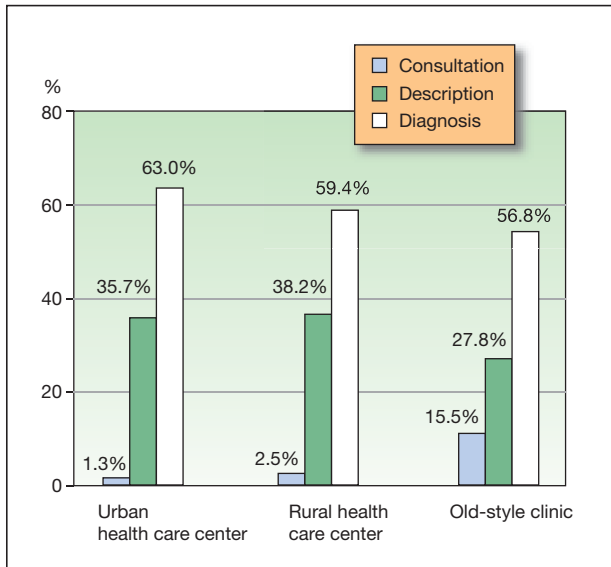


Figure. Comparison of types of referrals by referral center.

clinics, with highly significant differences ($P < .001$). The differences between centers in urban and rural settings, in contrast, were not significant.

The majority of referral forms provided a tentative diagnosis ($n=1888$, 59.67%), although these types of forms were least common in old-style clinics, for which the differences with urban health centers were statistically significant. The corresponding data are shown in the Figure.

Table 2 shows the different diagnoses offered by primary care physicians in order of frequency. The most common diagnoses were, again in order of frequency, warts, nevus, acne, eczema, alopecia, mycosis, psoriasis, seborrheic dermatitis, urticaria, plantar warts, and fibromas. It is noteworthy that 828 (43.9%) of the 1888 patients for whom a diagnosis was offered by the referring primary care physician were tentatively diagnosed with warts.

As mentioned, we analyzed the level of agreement between the diagnoses offered by primary care physicians and dermatologists, and calculated, in each case, the positive predictive value, the diagnostic sensitivity, and the κ statistic. In the case of diagnoses of warts suggested by primary care physicians, we observed a positive predictive value of 40.8%, a diagnostic sensitivity of 99.7%, and a κ statistic of 0.425. Not all of the lesions initially classified as warts, however, were actually caused by the human papillomavirus. Other causes included soft fibromas, seborrheic keratosis, melanocytic nevus, and even basal cell carcinoma (Table 3).

For certain diagnoses, such as acne, striae distensae, hyperhidrosis, impetigo, burns, hirsutism, and leukoplakia, we obtained a κ statistic of 1 and a diagnostic sensitivity and positive predictive value of 100%. The κ statistic, however, was extremely low for other diagnoses such as

Table 2. Tentative Diagnosis Mentioned on Referral Forms

Presenting Complaint	Frequency, No.	Percentage	Cumulative %
Wart	828	43.9	43.9
Nevus	216	11.4	55.3
Acne	156	8.3	63.6
Eczema	98	5.2	68.8
Alopecia	97	5.1	73.9
Mycosis	78	4.1	78.0
Psoriasis	72	3.8	81.8
Seborrheic dermatitis	48	2.5	84.4
Urticaria	45	2.4	86.8
Plantar warts	44	2.3	89.1
Fibroma	44	2.3	91.4
Angioma	26	1.4	92.8
Cyst	24	1.3	94.1
Seborrheic keratosis	22	1.2	95.2
Actinic keratosis	20	1.1	96.3
Atopic dermatitis	18	1.0	97.2
Herpes	14	0.7	98.0
Folliculitis	6	0.3	98.3
Scarring	5	0.3	98.6
Rosacea	4	0.2	98.8
Striae	4	0.2	99.0
Furunculosis	3	0.2	99.2
Hyperhidrosis	2	0.1	99.3
Basal cell carcinoma	2	0.1	99.4
Impetigo	2	0.1	99.5
Intertrigo	2	0.1	99.6
Bite	1	0.1	99.6
Burn	1	0.1	99.7
Pruritus	1	0.1	99.7
Hirsutism	1	0.1	99.8
Scabies	1	0.1	99.8
Molluscum contagiosum	1	0.1	99.9
Xanthoma	1	0.1	99.9
Leukoplakia	1	0.1	100
Total	1888	100	

Table 3. Diagnosis by Dermatologist of Conditions Identified as Warts by Primary Care Physicians

Diagnosis	Frequency, No.	Percentage	Cumulative %
Verruca vulgaris	255	30.8	30.8
Soft fibroma	181	21.9	52.7
Seborrheic keratosis	134	16.2	68.8
Melanocytic nevus	95	11.5	80.3
Plantar warts	36	4.3	84.7
Calluses or corns	23	2.8	87.4
Basal cell carcinoma	11	1.3	88.8
Filiform warts	11	1.3	90.1
Flat warts	10	1.2	91.3
Genital warts	8	1.0	92.3
Molluscum contagiosum	7	0.8	93.1
Pyogenic granuloma	6	0.7	93.8
Actinic keratosis	6	0.7	94.6
Keratoacanthoma	5	0.6	95.8
Epidermal cyst	5	0.6	95.8
Hyperkeratosis	4	0.5	96.3
Fibroma	4	0.5	96.7
Cutaneous horn	3	0.4	97.1
Histiocytoma	3	0.4	97.5
Congenital melanocytic nevus	2	0.2	97.7
Verrucous nevus	2	0.2	97.9
Angioma	2	0.2	98.2
Skin adnexal tumor	2	0.2	98.7
No disease diagnosed	2	0.2	98.7
Fibrous papule of the face	1	0.1	98.8
Dysplastic nevus	1	0.1	98.9
Acquired digital fibrokeratoma	1	0.1	99.0
Sebaceous cyst	1	0.1	99.2
Squamous cell carcinoma	1	0.1	99.3
Trichoepithelioma	1	0.1	99.4
Hidrocystoma	1	0.1	99.5
Nevus sebaceous	1	0.1	99.6
Angiokeratoma	1	0.1	99.6
Melanoma	1	0.1	99.9
Neurofibromatosis	1	0.1	100
Total	828	100	

basal cell carcinoma (0.198), seborrheic keratosis (0.19), and molluscum contagiosum (0.221).

The overall level of agreement between the tentative diagnoses offered by primary care physicians and the final diagnoses offered by dermatologists was 65.52%.

Table 4 shows a summary of the results for each of the diagnoses.

Discussion

As mentioned in the Methods section, we classified the 3164 referral forms analyzed in our study according to the type of referral center and the details provided on the presenting complaint. Forms containing no mention of the presenting complaint were more common in clinics that had not yet been converted into primary health care centers than in primary health care centers per se, with highly significant differences ($P < .001$). This confirmed our suspicion that old-style clinics referred more patients to the dermatologist than did conventional health care centers and that in many cases the forms were not properly completed.

Until very recently, the general physicians employed in old-style clinics worked part time and were not specialists in family and community medicine. This, added to the fact that they had to attend to a large number of patients in a short period of time, might explain why they referred—often inappropriately—more patients to the dermatologist than physicians working in conventional primary health care centers. Our findings highlight the importance of ensuring that all outpatient centers are fully equipped to operate as full-scale primary health care centers and allocated the resources to assign more time to each patient, as well as the need to provide better dermatology training for primary care physicians.

Referral forms containing a description of the patient's skin lesions were significantly more common in primary health care centers than in old-style clinics ($P < .001$), confirming that the physicians in the former were better equipped to provide guidance regarding their patients than those in the latter, as even those who did not offer a tentative diagnosis were able to provide a description of the lesions that justified referral to a specialist.

On analyzing the 1888 referral forms containing a tentative diagnosis, we found an overall level of agreement of 65.52% between the diagnoses made by the primary care physicians and those made by the dermatologist. This level of agreement is higher than the figure reported by Romani et al¹⁷ (42.3%) for a study performed in a regional hospital in Spain and also higher than the figures reported by several authors in the USA, including Fleisher et al¹⁸ (52.7%), Kirsner et al¹⁹ (40%–60%), Federman et al²⁰ (40%–60%), Solomon et al²¹ (48%), and Gerbert et al²² (50%), all of whom highlighted the poor knowledge of dermatology on

the part of primary care physicians.

A recent study by Graells et al²³ reported higher values than ours, specifically, a diagnostic agreement of 72% and a κ statistic of 0.69. The 2 studies, however, are not strictly comparable as Graells et al focused on skin lesions requiring possible surgery or cryotherapy while we focused on general skin diseases.

It is interesting to note that warts were the most common diagnosis offered by primary care physicians. Just over 43% of all patients for whom a tentative diagnosis was offered were diagnosed with warts, although some of the lesions actually corresponded to soft fibromas, seborrheic keratosis, nevi, and basal cell carcinoma, among others. This clearly indicates overdiagnosis of human papillomavirus infection, as has been reported elsewhere.¹⁷ Other diagnoses such as fibromas, seborrheic keratosis, and basal cell carcinoma had a very low diagnostic sensitivity (11%-15%).

If we compare our results to those of a study on the validity of the clinical diagnosis of basal cell carcinoma in a primary care setting in Spain, the diagnostic sensitivity observed in our study was lower (11.1% vs 27.5%) but the positive predictive value was higher (100% vs 78%).²⁴ Another Spanish study that also analyzed the validity of the clinical diagnosis of basal cell carcinoma but in a hospital setting (the Dermatology Department of Hospital Clínico de Madrid) reported a diagnostic sensitivity of 85.6% and a positive predictive value of 83.2%.²⁵ Both of these figures are higher than those reported for primary care centers.

The corresponding rates for the validity of the clinical diagnosis of melanocytic nevus obtained in a study by Herrera et al,²⁶ also at the Dermatology Department of Hospital Clínico de Madrid, were 93% and 83.2%, respectively. In the present study the positive predictive value and diagnostic sensitivity for nevus (diagnosed in 216 patients) were 84.3% and 62.8%, respectively. Both of these figures are lower than those reported by Herrera et al.

Conclusions

To conclude, we would like to stress the importance of training primary care physicians in the field of dermatology, to provide them with the knowledge needed to recognize common skin lesions such as warts and to avoid confusion with benign skin tumors such as soft fibromas and seborrheic keratosis, lesions often incorrectly identified as warts. Most skin conditions are morphologically distinctive, meaning that with adequate knowledge and clinical expertise, a correct diagnosis can be made in the majority of cases.

We therefore, once again, stress the importance of providing primary care physicians with the knowledge needed to recognize basic skin lesions and to become familiar with the most common skin disorders seen in primary care settings. We also believe that fostering good relationships

Table 4. Diagnostic Agreement

<i>Presenting Complaint</i>	<i>Positive Predictive Value, %</i>	<i>Diagnostic Sensitivity, %</i>	<i>κ Statistic</i>
Wart	40.8	99.7	0.425
Nevus	84.3	62.8	0.677
Acne	100	100	1.000
Eczema	63.3	88.6	0.726
Alopecia	95.9	98.9	0.972
Mycosis	63.7	85	0.718
Psoriasis	98.6	88.8	0.931
Seborrheic dermatitis	95.8	80.7	0.873
Urticaria	86.7	100	0.927
Fibroma	81.8	15.3	0.228
Angioma	100	65	0.784
Cyst	70.8	70.8	0.705
Seborrheic keratosis	90.9	11.9	0.194
Actinic keratosis	90	72	0.798
Atopic dermatitis	94.4	85	0.894
Herpes	92.9	86.7	0.896
Folliculitis	83.3	83.3	0.833
Scarring	100	100	1.000
Rosacea	100	66.7	0.799
Striae	100	100	1.000
Furunculosis	66.7	100	0.800
Hyperhidrosis	100	100	1.000
Basal cell carcinoma	100	11.1	0.198
Impetigo	100	100	1.000
Burn	100	100	1.000
Pruritus	100	100	1.000
Hirsutism	100	100	1.000
Scabies	100	25	0.399
Molluscum contagiosum	100	12.5	0.221
Xanthoma	100	100	1.000
Leukoplakia	100	100	1.000

between primary care physicians and dermatologists will contribute to improving the quality of health care.

Conflicts of Interest

The authors declare no conflicts of interest.

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