ORIGINAL ARTICLE

Bali Dermatology Venereology and Aesthetic Journal (BDVAJ) 2024, Volume 7, Number 2, 23-27
P-ISSN : 3046-7985, E-ISSN : 3046-7993

Published by
Department of Dermatology and
Venereology, Universitas Udayana

# A cross-sectional study on dermatology practice in general medicine: specialists' referral, training needs and teledermatology in Morocco

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Submitted: 2024-04-15
Accepted : 2024-06-30
Published: 2024-07-08

## ABSTRACT

**Background:** Demographic and geographic constraints make access to specialists difficult, reinforcing the role of general practitioners (GPs) in dermatology. The purpose was to investigate dermatology practice, referral patterns to dermatologists, training needs in this field, and their opinions on teledermatology.

**Methods:** A survey questionnaire was randomly distributed through Google Forms among Moroccan GPs. The statistical analysis of the collected data was carried out using SPSS.

**Results:** 189 responses were collected. The mean age was 41.2 years. 61.4% were female. The proportion of dermatological consultations in general practice was 10 to 20% in 42.9% of cases. Dermatological disorders were the main reason for consultation in 42.9% of cases. Approximately 75.6% of the GPs felt they were moderately or not proficient in dermatology. 64% were not satisfied with their initial training. 84.7% were interested in additional training courses dedicated mainly to inflammatory pathologies (82%), infectious diseases (78.8%), and facial dermatoses (71.4%). 64.6% favored teledermatology and saw it as interesting, mainly for obtaining a rapid diagnostic opinion (71.4%) and training through direct exchange with the specialist (67.7%). A multivariate analysis was performed using age, practice location, and recent continuing education.

**Conclusion:** Our study has highlighted insufficient initial training for current practice and, therefore, a need for further training. This suboptimal diagnostic capacity would contribute to the increase in the dermatologist use by GPs. The development of teledermatology could respond to this problem.

**Keywords:** Education, general practice, skin diseases, teledermatology.
**Cite This Article:** Oussous SA, Chakiri R, A cross-sectional study on dermatology practice in general medicine: specialists' referral, training needs and teledermatology in Morocco. *Bali Dermatology Venereology and Aesthetic Journal*. 2024;7(2):23-27. DOI: 10.51559/balidervenaesthj.v7i2.97

## INTRODUCTION

Skin conditions are commonly encountered in general medicine.[1] However, dermatology is often a challenging specialty for general practitioners. It is a transversal discipline that requires global knowledge in all fields.[2] Demographic and geographic constraints make access to dermatologists difficult, reinforcing general practitioners' role in this area.

Dermatology, being a visually oriented discipline, is well-suited for telemedicine. Telemedicine has increased since its implementation in the 1970s, especially during de COVID-19 pandemic. As a subset of telemedicine, teledermatology has also experienced growing popularity in many countries over the last decades. Teledermatology is a reliable tool for providing high-quality care to remote populations. Studies have also shown its effectiveness in reducing wait times and increasing patient satisfaction.[3,4]

We conducted this cross-sectional study to evaluate dermatology practice among Moroccan GPs, referral patterns to dermatologists, training needs in this field and to gather their opinion on teledermatology.

## METHODS

### Study design and setting

This is a cross-sectional study with descriptive and analytical aims. The study was conducted from June to September 2021. A survey questionnaire on the topic of this study was randomly distributed through Google Forms among Moroccan general practitioners.

We included questions to assess GPs' relevant practice patterns, perceived challenges, referral behaviors to dermatologists, and past and desired training and education. We also wanted to gather their opinion on teledermatology and whether they can integrate it into their current practice. Questions on demographic and other background characteristics of the participants were also included. Answer formats included yes/no, Likert-scales, multiple choice, and free text for 24 questions.

### Study participants

The target population was all general practitioners established in Morocco. Whether based in the private or public sector, alumni or recently graduated. Participation was voluntary.

### Study instruments

Survey data were saved automatically in Google Sheets. After cleaning partial survey responses, all data were imported into the Statistical Package for the Social Sciences (IBM SPSS Statistics for Apple macOS, version 28.0.0.0) for further analysis. On the one hand, descriptive statistics included frequency counts and percentages out of the total number of participants who answered the corresponding question. On the other hand, a multivariate analysis was carried out according to three variables: age, primary affiliation, and recent continuing education (CME). The two age categories were obtained with the median. The chi-square test of correlation was primarily used for analysis. For cell frequencies less than five, Fisher's exact test was employed. Any association for which the p-value was less than 0.05 was considered statistically significant.

## RESULTS

Of the 189 study participants, 116 were females, and 73 were males, with a mean age of 41.2 ± 12.9 years. Of the general practitioners (GPs) included in our study, 45% had 10 years of clinical experience, 31.2% had more than 20 years of clinical experience, and 23.8% had between 10 and 20 years of clinical experience. In most surveyed population, 61.9% were public health-based practitioners, and 38.1% were private-based practitioners (Table 1).

The proportion of patients with skin disorders in family medicine was between 10 and 20% in 42.9%. Dermatological disorders were the main reason for consultation in 42.9% and the secondary reason in 44.4% of cases. 56.1% of GPs were strongly interested in this discipline, and 36.5% were moderately interested. However, only 28.6% of them performed a systematic dermatological examination. The main reason for consulting the dermatologist was to perform a technical procedure (64%), followed by specific treatment (61%) and diagnostic difficulty or uncertainty (34%). The average delay in obtaining an appointment with the dermatologist was less than 15 days for 29.6%, within one month for 26.5%, and from one to three months for 26.5%. Despite geographical proximity (nearest dermatologist <5km in 48.7% of cases), communication with dermatologists was perceived as difficult for 36%.

Most practitioners (75.6%) felt they had low or moderate knowledge of dermatology. About 58.7% declared that they sometimes struggled to assess the urgency of the skin disorder. Thus, the most challenging skin disorders for our participants were facial dermatoses (n=94), skin neoplasms (n=93), and chronic wounds (n=80). 64% of GPs felt that their initial dermatology training was somewhat or insufficient for their daily practice. And 71.4% of respondents stated that they had not attended any further training on this topic in the past five years. However, most of these same GPs (84.7%) expressed interest in continuing medical education (CME), especially for inflammatory diseases (82%), infectious diseases (78.8%), and facial dermatoses (71.4%). The most requested training methods were case discussions and presentation of clinical photographs by participants.

**Table 1. Sociodemographic characteristics of the survey population (n=189)**

| | | Count | % |
|---|---|---|---|
| **Gender** | Female | 116 | 61.4% |
| | Male | 73 | 38.6% |
| **Primary affiliation** | Private practitioner | 72 | 38.1% |
| | Ministry of Health | 117 | 61.9% |
| **Duration of practice** | <10 years | 85 | 45% |
| | 10-20 years | 45 | 23.8% |
| | >20 years | 59 | 31.2% |

**Table 2. Analysis of responses according to age**

| Age < 40 years n (%) | | Age ≥ 40 years n (%) | p-value |
|---|---|---|---|
| **Interest in dermatology** | | | |
| Strong | 38 (35.8%) | 68 (64.2%) | p<0.001* |
| Medium | 44 (63.8%) | 25 (36.2%) | |
| Poor or not at all | 9 (64.3%) | 5 (35.7%) | |
| **Recent training in dermatology** | | | |
| Yes | 11 (20.4%) | 43 (79.6%) | p<0.001* |
| No | 80 (59.3%) | 55 (40.7%) | |
| **Difficulty with tumoral pathologies** | | | |
| Frequently | 16 (36.4%) | 28 (63.6%) | |
| Sometimes | 20 (39.2%) | 31 (60.8%) | p=0.009* |
| Rarely | 45 (54.9%) | 37 (45.1%) | |
| Never | 10 (83.3%) | 2 (16.7%) | |
| **Difficulty with facial dermatoses** | | | |
| Frequently | 19 (59.4%) | 13 (40.6%) | p=0.032* |
| Sometimes | 33 (53.2%) | 29 (46.8%) | |
| Rarely or never | 39 (41%) | 56 (59%) | |

*Significance if p<0.05

**Table 3. Analysis of responses according to primary affiliation**

| | Public health practitioner n= 117 (61.9%) | Private practitioner n= 72 (38.1%) | p-value |
|---|---|---|---|
| **Part of the dermatological consultations** | | | |
| <10% | 35 (29.9%) | 21 (29.2%) | p=0.013* |
| 10 à 20% | 41 (35%) | 40 (55.6%) | |
| > 20 % | 41 (35%) | 11 (15.3%) | |
| **The dermatological complaint** | | | |
| The main reason for consultation | 58 (49.6%) | 23 (31.9%) | p=0.011* |
| The secondary reason for consultation | 42 (35.9%) | 42 (58.3%) | |
| Revealed by clinical examination | 17 (14.5%) | 7 (9.7%) | |
| **Average time to get an appointment with a dermatologist** | | | |
| <15 days | 26 (22.2%) | 30 (41.7%) | |
| Within the month | 30 (25.6%) | 20 (27.8%) | p=0.029* |
| 1 to 3 months | 37 (31.6%) | 13 (18.1%) | |
| > 3 months | 24 (20.6%) | 9 (12.5%) | |

*Significance if p<0.05

**Table 4. Analysis of responses based on whether or not participants received training in the past 5 years**

| | Further training n= 54 (28.6%) | No training n= 135 (71.4%) | P-value |
|---|---|---|---|
| **Difficulty with tumoral pathologies** | | | |
| Frequently | 16 (36.4%) | 28 (63.6%) | p<0.001* |
| Sometimes | 23 (45.1%) | 28 (54.9%) | |
| **Difficulty with eczema** | | | |
| Frequently | 4 (25%) | 12 (75%) | p=0.014* |
| Sometimes | 17 (40.5%) | 25 (59.5%) | |
| **Difficulty in dealing with allergies** | | | |
| Frequently | 2 (13.3%) | 13 (86.7%) | p=0.051* |
| Sometimes | 14 (40%) | 21 (60%) | |
| **Recourse to dermatologists for technical procedures** | | | |
| Frequently | 44 (36.4%) | 77 (63.6%) | p=0.012* |
| Sometimes | 5 (13.5%) | 32 (86.5%) | |

*Significance if p<0.05

According to our survey, 64.6% of the GPs favored teledermatology. The main reported advantages were the ability to obtain a quick diagnostic opinion (71.4%) and the opportunity for training through direct exchange with the dermatologists (67.7%). In addition, teledermatology facilitates and organizes the patient's access to a specialized consultation (66.1%) and improves the patient's comfort (63.5%).

A multivariate analysis (Table 2-4) was performed according to age, primary affiliation, and recent attendance to CME in dermatology (less than 5 years). Both age categories were obtained with the median (40 years). Many age-related differences were noticed. Older physicians were more interested in dermatology than younger ones (p<0.001). They also attended more additional training courses (p<0.001). Younger GPs had more difficulty with facial dermatoses (p=0.032), whereas older physicians had more difficulty with skin neoplasms (p=0.009). There was no significant difference between the two groups regarding the preferred training method or interest in teledermatology.

Depending on the physician's primary affiliation, consultations for dermatological reasons were more frequent among GPs in the public sector (p=0.013). The average time to obtain an appointment with a dermatologist was shorter for physicians in private practice (p=0.029). There were no statistically significant differences in dermatology knowledge, interest in preferred training methods, or willingness to adopt teledermatology.

As for the CME, GPs who had attended recent training felt less challenged by skin neoplasms (p<0.001) and eczema (p=0.014) compared to other physicians. Also, GPs who had not attended any additional training had more recourse to the dermatologist for technical procedures (p=0.012).

## DISCUSSION

Our study focused on a current problem that will likely worsen in the coming years: access to care, especially in an under-resourced area, particularly dermatology. In Morocco, we count about 1 dermatologist per 61 328 people and 1 GP for each 4091 people.[5] These GPs are contributing to the dermatological workforce in our country.

Skin conditions are common, and GPs often serve as patients' first point of contact. In our series, the proportion of dermatological consultations in general practice was 10 to 20%, according to

42.9% of the participants. However, In France, it was estimated at 8% according to the Observatory of General Medicine in 2009.[6] In Australia, the percentage was 15%, and 24% in the United Kingdom.[7,8] These numbers demonstrate a disparity between countries.

Despite the geographical proximity (dermatologist <15km in 80.4%), communication with the dermatologist was perceived as difficult or very difficult by 56.1% of GPs. In addition, the delay in having an appointment was more than 1 month, 43.9% (Table 4). These delays can be considered long, especially for certain conditions such as melanoma. Nevertheless, they remain lower than those observed in a French study conducted by Ben Kacem et al.[2] Thus, it can be assumed that geographical proximity to a dermatologist is not the only factor determining better access to care. Also, our results showed a significant correlation between the type of practice and the accessibility to the dermatologist in terms of time to obtain an appointment (p=0.029). This can be explained by the greater number of private dermatologists.[5]

Concerning referral patterns, Moroccan GPs frequently consulted a dermatologist for specific therapeutic care, to perform a technical procedure, and for diagnosis uncertainty, like their French counterparts.[2] As for diagnostic difficulties, they can be limited by clinical experience and especially by training. This is what our results showed: recently trained physicians felt less difficulty with skin neoplasms (p<0.001) and eczema (p=0.014). They also had less recourse to the dermatologist (p=0.012).

In our study, most respondents (64.6%) favor teledermatology. Thus, tele-expertise is a valuable tool allowing faster access to specialized advice. It has become increasingly popular worldwide, especially in the COVID-19 Era. Several studies have proven the interest of telemedicine in dermatology in terms of efficiency, reduction of waiting times, and economic advantage by reducing medical transport.[2,9-12] However, teledermatology should not be seen as a substitute for a dermatology consultation. Indeed, it is difficult to diagnose precisely on a simple photograph, palpation is an important element in a dermatology consultation. According to a systematic review, the diagnostic accuracy of cutaneous tumors in teledermatology remains inferior to face-to-face consultation.[12]

Dermatological disorders are the most common reason patients visit their family physicians. Therefore, the ability to accurately diagnose and treat these conditions is crucial. In our study, we found that initial training was insufficient for current practice according to 64% of participants, and consequently, there was a need for further training. This was in line with data from other French studies conducted in several regions (Picardy, Brittany, and Haute-Normandie).[2,13,14] According to Rousset et al., 92% of French interns in general medicine also felt that their knowledge of dermatology was not sufficient for their future practice, and dermatology ranked fifth in the list of specialties they would like to improve after pediatrics, cardiology, pneumology and gynecology.[15]

When asked about their comfort level in dealing with dermatological cases, 75.6% of Moroccan GPs felt they had moderate or no experience at all. A survey conducted among GPs in Brittany showed a lack of competence in dermatology.[13] In another study in the Nord-Pas-de-Calais region, physicians seemed to doubt their abilities and easily referred patients to dermatologists.[9] This suboptimal diagnostic capacity of GPs may explain the increased recourse to dermatologists.

The lack of training can significantly impact the quality of care provided to patients. To address this issue, there is a clear need for CME in dermatology.[16] One effective way to improve GPs skills in this field is through case-based learning.[17] Indeed, case discussions involve presenting real patient cases, with physicians analyzing the history, examination findings, and diagnosis. So, physicians can apply their knowledge to actual cases and learn from their colleagues' perspectives. Our participants highlighted another valuable training method: the presentation of clinical photographs by GPs. It is known that visual memory is mandatory in dermatology learning. By analyzing the visual characteristics of various skin disorders, GPs will improve their diagnostic accuracy and better understand the wide range of presentations of dermatological conditions. Also, teledermatology seems to be a convenient way for GPs to improve their skills in dermatology by direct exchange with the specialist.[2]

This study has several limitations that should be considered when interpreting the results. The online nature of the survey may have affected our response rate and likely limited our reach to some physicians. Indeed, only 2.1% of Moroccan GPs responded to our survey. This small sample may not be representative of the larger population. Another limitation is selection bias. Volunteers were likely to have a prior interest in the topic. Additionally, information bias may affect the accuracy of the results as self-evaluation can lead to over or underestimation of certain items.

The Perspectives of our study include implementing a tele-dermatology system within the university hospital SOUSS-MASSA. This could potentially improve access to dermatological care for patients in remote areas. However, further studies are necessary to gather the perception of dermatologists and investigate patient adherence to a telemedicine system.

## CONCLUSION

Dermatology is a complex and ever-evolving field, with new research and treatments constantly emerging. General practitioners are usually the first line of contact for patients with skin burden. Therefore, they must thoroughly understand the diagnosis and management of common skin conditions. Moreover, referral to dermatologists was considered rather difficult by Moroccan GPs. This issue could be addressed by implementing teledermatology in our country and developing continuing medical education programs in dermatology.

## ETHICS IN PUBLICATION

This manuscript was developed in compliance with ethical standards, and participant anonymity was preserved throughout the study.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## FUNDING

No funding sources.

## AUTHOR CONTRIBUTIONS

All authors contributed equally.

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