FEATURE ARTICLE

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The Evolving Role of Primary Care Practitioners in Dermatology

Current Status and Emerging Educational Resources

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ABSTRACT: Skin disorders account for a significant portion of cases managed by primary care practitioners (PCPs). However, previous studies show that PCPs are inadequately trained for this role and are significantly less effective than board-certified dermatologists with respect to the diagnosis and treatment of cutaneous disorders. This is most concerning in regard to life-threatening skin diseases such as malignant melanomas, which must be correctly diagnosed and treated in a timely manner. Increasing the coverage of cutaneous disorders during medical school and residency would likely improve the proficiency of future PCPs with respect to dermatological disorders. Similarly, practicing PCPs face a shortage of dermatology educational resources that are compatible with their busy schedules. To address this need, novel resources such as Internet-based continuing medical education courses, point-of-care decision support software, and teledermatology are being further developed to promote the delivery of precise and cost-effective healthcare in the primary care setting. In addition, the greater need for dermatology PCPs has been met with a rise in the role of dermatology nurse practitioners.

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Diseases of the skin, hair, and nails are among the most common reasons for physician visits, accounting for 4%–7% of all outpatient encounters each year (Fleischer, Herbert, Feldman, & O'Brien, 2000). However, board-certified dermatologists tend only to approximately a third of all such cases, the balance being seen by primary care practitioners (PCPs; Ramsay & Fox, 1981). In fact, 20%–30% of all patients seen by a PCP have at least one dermatologic issue among their list of complaints (Fien, Berman, & Magrane, 2005). With the recent focus on lowering healthcare costs, it is likely that the decades-long trend toward a diminished role for dermatologists in caring for cutaneous disease will continue into the foreseeable future (Stern & Nelson, 1993).

Despite their increasing role in the care of patients with dermatological complaints, PCPs may lack the experience to diagnose cutaneous disorders, rating their abilities as only "mediocre" (Whitaker-Worth, Susser, & Grant-Kels, 1998). This is largely a reflection of insufficient time devoted to teaching dermatology during medical school and subsequently in the primary care specialty residency training as well as limited venues to learn dermatology after the conclusion of training. It is thus essential to focus on better preparing current and future PCPs in the diagnosis and management of cutaneous disorders.

THE CURRENT ABILITIES OF PCPS WITH RESPECT TO THE DIAGNOSIS AND MANAGEMENT OF CUTANEOUS DISEASE

Given the sizeable portion of primary care patients who present with dermatological complaints, PCPs would be well served by the ability to adequately diagnose and treat commonly encountered cutaneous diseases. Accuracy and efficiency in the diagnosis of dermatologic conditions

serves several end points. For one, a timely diagnosis decreases the burden of disease on patients, thus increasing patient satisfaction (Ramsay & Fox, 1981). Moreover, a correct initial diagnosis serves to decrease healthcare costs by eliminating the need for referral to secondary providers.

Multiple studies evaluating the capability of PCPs to diagnose the most common cutaneous conditions indicate that further training is necessary. Ramsey and Fox (1981) assessed the ability of 285 PCPs to correctly diagnose 20 commonly encountered dermatoses. Overall, PCPs were able to correctly identify 54% of lesions, compared with a mean score of 96% for dermatologists who took the same examination. Pariser and Pariser (1987) performed a 20-month-long prospective study to determine the nature of errors made by PCPs in the diagnosis and management of dermatologic conditions. They found 319 mistakes in 260 patients, 86% of which were errors of diagnosis. Specifically, PCPs tended to overdiagnose infectious dermatoses while underdiagnosing inflammatory dermatoses such as psoriasis. These data are consistent with subsequent studies that similarly suggest that PCPs have poor diagnostic acumen with respect to common dermatologic conditions (Federman, Hogan, Taylor, Caralis, & Kirsner, 1995; Lowell, Froelich, Federman, & Kirsner, 2001).

Malignant melanomas pose a unique challenge within dermatology, in that they are often fatal if not recognized and treated early in the course of disease. PCPs are unlikely to be expected to make treatment decisions regarding skin cancers. However, they are the first providers to encounter most of all skin cancers and thus have a responsibility to correctly identify and refer patients with potentially malignant lesions (Geller et al., 2002). Cassileth et al. (1986) found that less than 40% of PCPs correctly identified at least four of six examples of melanoma as such and that 58% were unable to diagnose dysplastic nevi. Gerbert and colleagues reported that PCPs were 50% less proficient than dermatologists in their ability to triage lesions suspicious for skin cancer (Gerbert et al., 1996). Even more alarming is a study indicating that PCPs fail to perform a full-body skin examination on over 40% of patients at high risk for melanoma (Geller et al., 2004). These studies and others indicate that PCPs need further training to attain sufficient vigilance to serve in a screening role for malignant melanoma (Brochez, Verhaeghe, Bleyen, & Naeyaert, 2001; Gordon, 2014; Goulart et al., 2012; Whited, Hall, Simel, & Horner, 1997).

Beyond the diagnosis of dermatological conditions, PCPs may need to perform various management responsibilities, including prescribing medications, performing biopsies, and knowing when to refer patients to skin specialists. Studies have shown that PCPs generally prefer a less intensive approach to the treatment of dermatological conditions than do dermatologists. Specifically, PCPs are reluctant to prescribe more potent topical steroids and are less likely than dermatologists to prescribe oral antibiotics for skin conditions (Resnick, Hornung, & Konrad, 1996). An overly conservative approach to disease management can have tangible negative consequences for patients, including repeated treatment failure and increased costs.

With respect to the management of lesions suspicious for cancer, the foremost duty of the PCP is to decide whether biopsy, referral, or both is warranted. The decision to perform biopsies is a difficult skill that must be gradually learned and perfected with years of practice. However, it is only one of many skills covered in primary care residencies, and it has been shown that evaluating the need for biopsy of a skin lesion is among the most common error committed by PCPs (Whitaker-Worth et al., 1998). In a study involving the diagnosis and management of nonmelanoma skin cancer and malignant melanomas, primary care residents failed 33% of the time to recommend biopsies for cancerous lesions (Gerbert et al., 1996). Similarly, PCPs were found to make the wrong triage decision regarding suspicious lesion 22% of the time (Gerbert, Bronstone, Maurer, Hofmann, & Berger, 2000). Needless to say, any delay in the treatment of a malignant lesion is intolerable and poses grave consequences for patients.

THE STATE OF DERMATOLOGY EDUCATION AMONG U.S. MEDICAL SCHOOLS AND PRIMARY CARE RESIDENCIES

Up to 40% of all medical students eventually enter primary care specialties where they will often be faced with dermatological complaints (Fleischer et al., 2000). On the basis of national surveys, medical schools currently require a median of 10 hours of total dermatology instruction, an allotment that has decreased steadily over the past 3 decades (McCleskey, Gilson, & DeVillez, 2009; Ramsay & Mayer, 1985). This trend continues into the clinical years, with only a handful of schools mandating enlistment in a dermatology clerkship before graduation (Ramsay & Weary, 1996). The obvious imbalance between time devoted to dermatology and the expectations placed on PCPs is acknowledged by primary care residents, 63% of whom rate their medical school curriculum as inadequately preparing them to diagnose common dermatologic diseases (Hansra, O'Sullivan, Chen, & Berger, 2009).

Educational opportunities pertaining directly to dermatology are equally inadequate in most primary care residencies. Only 28% of family medicine residents and 14% of internal medicine residents receive at least 1 month of clinical dermatology training (Whitaker-Worth et al., 1998). These low figures have been attributed to several factors. Because there are many more primary care residency programs than there are dermatology residency programs, there are many institutions in which a primary care residency program exists in the absence of an associated department of dermatology. Such programs may lack the faculty and patient population necessary to provide dedicated dermatology rotations. Even at institutions with independent departments of dermatology, the dermatology residency programs may not have dermatology rotations

implemented into their curriculum. (Ramsay & Weary, 1996). One way to fill the unfilled need for dermatology practitioners is by increasing the number of dermatology residencies. In addition to increasing the supply of dermatologists, new dermatology residencies would help by providing a place for primary care residents and medical students to perform clinical dermatology clerkships. Nonetheless, devoting additional time to the coverage of dermatological topics during medical school and primary care residency would be a worthwhile and efficient way to improve the ability of future PCPs with respect to the diagnosis and management of cutaneous disorders.

CURRENT AND EMERGING DERMATOLOGY EDUCATIONAL OPPORTUNITIES FOR PRACTICING PCPS

After the residency period, many PCPs report an inability to dedicate sufficient time to educational opportunities such as further training in dermatology. Even PCPs willing to commit long hours to learning complain about a lack of resources that provide dermatological training of adequate depth and duration (Ramsay & Weary, 1996). One of the few options available to current PCPs for the advancement of their knowledge about cutaneous disease is a continuing medical education (CME) course. However, CME courses with a focus on dermatology tend to cater to busy PCPs interested in enhancing their income. Accordingly, many of these courses are geared toward teaching cosmetic procedures rather than enhancing the participant's understanding of cutaneous disease (Ramsay & Weary, 1996). Opinions are varied about the efficacy of CME courses in terms of achieving improvements in healthcare outcomes (Davis, Thomson, Oxman, & Haynes, 1995). Brochez and colleagues showed that a lecture on malignant melanoma was effective in significantly improving diagnostic abilities, as shown by a rise in sensitivity of PCPs to recognize malignant melanoma from 72% to 84% (Brochez et al., 2001). Similarly, instructing PCPs on the basic use of dermoscopy, which can be achieved in a course as short as 1 hour in duration, enables PCPs to achieve higher sensitivity without a reduction in specificity when triaging malignant skin lesions (Argenziano et al., 2006; Westerhoff, McCarthy, & Menzies, 2000). On the other hand, Dolan, Ng, Martin, Robinson, and Rademaker (1997) reported that two 1-hour educational seminars on skin cancer control did not significantly alter the long-term attitudes, beliefs, knowledge, or behaviors of PCPs toward skin cancer control (Dolan et al., 1997).

It is apparent that there is an unmet need for dermatological educational resources that are user-friendly for busy PCPs. One set of emerging resources that fulfill the criteria necessary for such resources are Internet-based educational mediums (Goulart et al., 2011). A 2005 survey revealed that most PCPs regularly use the Internet in their professional lives (Bennett, Casebeer, Kristofco, & Collins, 2005). Over three quarters of all PCPs believe that the Internet is useful and important to physicians (Bennett et al., 2005). Web-based learning resources, including online CME courses, are accessible to anyone with an Internet connection and are relatively inexpensive compared with traditional mediums such as dermatology journals, textbooks, or CME courses with live lectures (Hanson et al., 2011). These resources give physicians the freedom to learn content in the setting of their choosing, at a pace best suited to their individual style of learning. Moreover, computer-based teaching methods tend to be interactive and accompanied by instant feedback, two approaches that have been proven to enhance learning in adults (O'Connor et al., 2009; Slotnick, 1996). Notably, primary care learners have been particularly receptive to the American Academy of Dermatology Basic Dermatology Curriculum, a standardized, online curriculum developed primarily for medical student learners (McCleskey, 2013).

Although the literature is inconclusive as to whether Internet-based CME options are superior to traditional-based models, multiple studies have shown that this teaching model is effective at positively changing the clinical behaviors of PCPs (Bloom, 2005; Cook et al., 2008; Davis et al., 1999; Fordis et al., 2005; Mansouri & Lockyer, 2007; Satterlee, Eggers, & Grimes, 2008). The use of online resources is also associated with decreased healthcare spending, as one study found a six-fold reduction of inappropriate referrals after the completion of an online curriculum by nondermatologists (Gerbert et al., 2000).

Beyond resources aimed at extending PCPs' fund of knowledge, various tools have been developed to help PCPs make correct diagnoses at the point of care. Despite the great efforts of PCPs to improve their breadth of dermatology knowledge, they are likely to frequently encounter conditions with which they are not familiar. Decision support software are intended to help clinicians develop differential diagnoses based on morphologic findings of cutaneous lesions. Newer renditions of this software class, such as VisualDx, greatly improve ease of use by implementing graphically based interface for inputting visual symptoms, thus eliminating the need for familiarity with software-specific terminology (Tleyjeh, Nada, & Baddour, 2006). The use of decision support software has been proven to greatly improve the diagnostic abilities of PCPs. In one study, PCPs chose the wrong triage decision (36.7%) without using decision support software; using the decision support software, they chose the wrong response only 13.3% of the time. Overall, the use of decision support software led to 64% decrease in the error rate of nondermatologists evaluating skin cancers (Gerbert et al., 2000).

At some point, all PCPs involved in seeing patients with cutaneous complaints will find themselves in need of assistance from a specialist. The advent of teledermatology as a feasible care model has provided a new avenue for PCPs to conveniently receive diagnostic help. Teledermatology allows remote inspection of dermatological lesions by dermatologists, using telecommunications technology to transfer digital images of lesions in question. As with any other

technology, the accuracy of teledermatology is inherently dependent on the skill of the interpreting dermatologist (Weinstock, 2009). Furthermore, teledermatologists who have any doubt in making a digital diagnosis may instead recommend an in-person appointment with a dermatologist. With these limitations in mind, teledermatology can provide timely diagnostic support to PCPs at a fraction of the time and cost of a regular visit (Landow, Mateus, Korgavkar, Nightingale, & Weinstock, 2014; Roman & Jacob, 2014; Shapiro et al., 2004). Over 90% of patients have been approving of the teledermatology model (Scheinfeld, Fisher, Genis, & Long, 2003). A large-scale study in the Netherlands involving over 37,000 teleconsultations showed that the use of teledermatology prevented 74% of physical referrals that would have otherwise occurred, resulting in cost savings of 18% (van der Heijden, de Keizer, Bos, Spuls, & Witkamp, 2011). Interestingly, PCPs involved in the study reported that 85% of all teleconsultations had a lasting, beneficial educational effect. However, requirements for reimbursement and interstate licensure and practice have complicated the process of collecting payment for teledermatology services and have limited some efforts to provide dermatologic services to remote regions with a scarcity of specialists (Bashshur et al., 2014).

Alongside further training of physicians, the greater need for dermatology practitioners has been met with an increasing role for dermatology nurse practitioners (NPs). Dermatology NPs were present at over 10% of dermatology practices in 2007, with particularly high representation at academic practices, dermatology-only group practices, and multispecialty group practices (Resneck & Kimball, 2008). Fittingly, the Nurse Practitioners' Society of the Dermatology Nurses' Association reported a membership of 386 members in its first 2 years of existence in 2007 (Resneck & Kimball, 2008). NPs are generally required to obtain a master's degree and pass national certification examinations before beginning practice (Resneck & Kimball, 2008). In addition, most NPs undergo a formal dermatology clerkship during nursing school, receive "on-the-job training," and attend dermatology lectures sponsored by professional societies (Resneck & Kimball, 2008).

NPs are uniquely positioned to fill gaps in dermatology care because, in most states, they are given the authority to independently prescribe drugs and receive direct reimbursement from insurance companies (Mundinger et al., 2000). Dermatologists expect NPs to see both new and established patients, although over 90% of physicians report being on-site to oversee NPs (Resneck & Kimball, 2008). In almost 80% of practices, NPs are entrusted with patients with medical dermatology complaints rather than cosmetic or surgical needs (Resneck & Kimball, 2008). NPs spend almost twice as much time with each patient (Schuttelaar, Vermeulen, Drukker, & Coenraads, 2010). However, because the salary of NPs is less than a third of that of dermatologists, NPs offer cost saving to patients and the practices for which they work (Schuttelaar et al., 2010). In several studies, the quality of care provided to dermatologic patients by NPs has been comparable with that of dermatologists in terms of improvements in disease severity and quality of life (Schuttelaar et al., 2010).

CONCLUSION

Despite the large fraction of primary care visits that involve cutaneous complaints, PCPs are currently undertrained to manage dermatological issues. This is most concerning in regard to potential skin malignancies, which may pose life-threatening risk to patients if not diagnosed and treated in a timely manner. Improving the dermatologic proficiency of PCPs must begin in medical school and residency, where coverage of dermatological topics is disproportionately low relative to the number of dermatological conditions encountered by PCPs in practice. For PCPs already in practice, the shortage of dermatology educational resources is being met by emerging resources such as Internet-based CME, point-of-care decision support software, and teledermatology, which aim to promote the delivery of precise and cost-effective healthcare in the primary care setting. In addition, the greater need for dermatology PCPs has been met with a rise in the role of dermatology NPs. ■

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