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DERMATOLOGY | RESEARCH ARTICLE

Primary care physicians' knowledge and self-perception of competency in dermatology: An evaluation study from Yemen

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Abstract: *Purpose:* Dermatologists recognize the role of primary care clinics where 6–7% of visits are for skin complaints and are seen by primary care physicians (PCPs). Previous studies investigated PCPs' competency in dermatology but few studies investigated PCPs' knowledge and self-perception of competency in dermatology which is the main aim for the current study. *Methods:* A cross-sectional study was conducted and 40 PCPs were recruited from nine randomly selected clinics in Aden, Yemen during April–May 2014. *Findings:* The majority (47.5%) of PCPs perceived their competencies in diagnosing and treating skin diseases as average. There were no significant differences in classification scores of skin lesions among PCPs by self-perception competency group "Good, Average, Bad". Half of the PCPs identified correctly that topical antifungal monotherapy is superior to topical antifungal/corticosteroid combinations for the treatment of fungal skin infections. Only 12.5% of PCPs correctly identified that glucocorticoids are not the first-line treatment for anaphylactic reactions. Proper knowledge in allergy and skin infections seems to be associated with higher ability to classify skin lesions ($p < 0.05$). *Implications:* self-perception of competency was not associated with higher ability to classify skin lesions. PCPs need continuing medical education to improve their knowledge in dermatology.

Subjects: Health and Social Care; Medicine, Dentistry, Nursing & Allied Health; Public Health Policy and Practice

Keywords: dermatology; Yemen; primary care physicians; self competency; allergy

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Salwa Omer Bahelah, MD, PhD, is associate professor of Dermatology and Venereal diseases at Aden University, Yemen. Her research focuses on infectious skin diseases among children and developing preventive measures to reduce such infections mainly among poor patients. One of these measures is to adequately train primary care physicians who work in primary care clinics where the majority of poor patients in Yemen seek medical care.

PUBLIC INTEREST STATEMENT

Competent physicians feel confident about their own ability to manage health problems and have adequate level of knowledge to diagnose and treat such health problems. We studied how primary care physicians (PCPs) assess their own competency in diagnosing and treating the common skin diseases in Aden, Yemen and how this affects their ability to classify skin lesions. We also assessed their knowledge regarding the common skin diseases seen in primary care clinics in Aden. Our study shows that self-perception of competency was not associated with higher ability of classifying skin lesions and that PCPs were not properly prepared to manage the common skin diseases in Aden. Our findings call for providing continuous medical education for PCPs in skin diseases.

1. Introduction

Primary care physicians (PCPs) represent the backbone of any health care system as they provide the basic health services demanded by the majority of patients. While the majority of ambulatory patient visits are seen by PCPs, it is estimated that 6–7% of all these visits are for dermatologic complaints (Ahiarah, Fox, & Servoss, 2007; Bruner & Schaffer, 2012; Federman & Kirsner, 2000; Ramsay & Fox, 1981) and about a quarter of all patients seen in primary care settings will present with skin lesions at some point during their life (Bruner & Schaffer, 2012; Federman & Kirsner, 2000). Not surprisingly, however, 60% of all these visits are seen by non-dermatologists (Ahiarah et al., 2007; Federman & Kirsner, 2000; Ramsay & Weary, 1996) and this figure is even expected to increase (Ramsay & Weary, 1996).

The competency of non-dermatologists to diagnose and treat skin diseases is a concern to many health professionals and was studied extensively (Ahiarah et al., 2007; Al-Hoqail, Gad, & Crawford, 2001; Chen, Bravata, Weil, & Olkin, 2001; Federman & Kirsner, 2000; Federman, Reid, Feldman, Greenhoe, & Kirsner, 2001; Feldman, Fleischer, Young, & Williford, 1999; McCarthy, Lamb, Russell, & Young, 1991; Ojeda & Graells, 2011; Pariser & Pariser, 1987; Ramsay & Fox, 1981). Consequently, correct diagnosis and treatment of skin lesions by PCPs is essential to reduce patients' referrals to dermatologists, prevent misdiagnosis and its impact on patient's health, increase trust and satisfaction of patients in the competency of PCPs and overall performance of the health care system and possibly reduce the cost of health care. Previous studies have evaluated the effect of university-based residency programs on training PCPs in the diagnosis and treatment of skin diseases (Al-Hoqail et al., 2001; Cohen et al., 2012), measured the impact of short interventional educational courses on the diagnostic and therapeutic abilities of PCPs in skin diseases (Ahiarah et al., 2007; Al-Hoqail et al., 2001), analyzed the diagnostic accuracy between dermatologists and PCPs regarding skin diseases (Chen et al., 2001; Corbo & Wismer, 2012), and other studies even compared the time spent during evaluation of patients' condition between dermatologists and PCPs (Feldman et al., 1999).

All these approaches evaluating the competency of PCPs against dermatologists in the diagnosis and treatment of skin diseases represent the important role played by PCPs in the management of dermatologic diseases and the fact that many patients seek medical care at primary care settings for a variety of health problems including those related to the skin. However, PCPs' self-perception of competency in dermatology and how it affects their diagnostic and therapeutic skills and referral frequency to a dermatologist was not evaluated.

To our best knowledge, only one study evaluated PCPs' self-perceptions of their bedside skills and competencies in dermatologic diseases (Hussain, Hafiji, Stanley, & Khan, 2008). Evaluating PCPs' knowledge in dermatology and preparing a continuing medical education course to target the gaps identified will be a cost-effective and important step in preparing competent PCPs. The aim of this study was to evaluate self-perception and attitudes of PCPs toward their competencies in diagnosing and treating skin diseases and to identify misconceptions among PCPs related to common skin diseases and therapeutic drugs frequently prescribed for skin complaints.

2. Methods

2.1. Study design and settings

A cross-sectional study was conducted in Aden governorate, a Southern seaport of Yemen, which divided administratively into eight districts. Among all public primary care clinics in Aden ($N = 15$), a random sample of nine clinics was selected using a random number table (Scheaffer, Mendenhall, & Ott, 1996). All PCPs working in the selected clinics were invited to participate, study aims were explained to all participants and data were gathered using a self-administered anonymous questionnaire distributed during April and May, 2014. The questionnaire required no more than 10–15 minutes to be completed. The first and third authors (SOB and MB) paid several visits to approach PCPs at their convenient time, in order to maximize participation and to collect the completed

questionnaires. The study protocol was approved by the ethical research committee at Aden University Faculty of Medicine and Health Sciences.

2.2. Study instruments and variables

The scope and type of questions were selected based on the study objectives, the authors' own experience in primary care clinics, and a review of the literature and established treatment guidelines. The authors took into consideration the most common dermatologic diseases in these clinics and the most frequently prescribed therapies for skin diseases (unpublished data). The questionnaire was independently reviewed by a panel of three experts who were not involved in the study: two dermatologists and one epidemiologist. The questionnaire was consequently modified according to the experts' recommendations and was pilot tested on a sample of 10 PCPs working in a clinic other than the study sites. No changes were made to the questionnaire after the pilot testing.

The final version of the questionnaire consisted of eighteen questions divided into three sections: socio-demographics, attitudes and perceptions, and knowledge. Five questions on a five-point Likert scale (Very good, Very bad) were used to assess PCPs' self-perception of their competency in diagnosing and treating skin diseases, frequency of referral to a dermatologist (always, never), and attitudes toward quality of care at private clinics (strongly agree, strongly disagree). Self-perception of competency was assessed by PCPs' self-evaluation of their clinical skills in dermatology, how confident they feel when diagnosing a patient with skin manifestations and prescribing a treatment. Assessment of knowledge was divided into five questions about allergy, treatment of anaphylaxis, skin infections, and differentiation between primary and secondary skin lesions with "true", "false", or "do not know" as possible answer choices.

Respondents' ability to differentiate between primary and secondary skin lesions was assessed. Respondents were provided with a description of 10 common skin lesions and were asked to classify each condition into primary or secondary lesion. Each correct answer was given a score of 1 and 0 for a wrong answer. A score of 10 indicates that the respondent was able to classify all skin lesions correctly.

2.3. Data analysis

Outcome variables were: (1) ability to classify skin lesions summarized as average score, and (2) self-perception of competency classified into three categories: good, average (neither good nor bad), and bad. Because the data violated the normality assumption, Mann-Whitney *U* (2 groups) or Kruskal-Wallis (>2 groups) testes were used to test group differences in knowledge scores. Quantitative variables were transformed into categorical variables when appropriate in order to compare the test scores among categories. Chi-squared (χ^2) test was used to test the associations among categorical variables. All tests were two-tailed and $p < 0.05$ was considered statistically significant. Data were analyzed using SPSS v19 (IBM: Armonk, New York).

3. Results

Among the 50 questionnaires distributed, 40 were completed and returned representing a response rate of 80%. The mean age (SD) of the sample was 39 (7.4) years, 85% being females, with a mean (SD) of 12.36 (6.7) years of clinical experience. Table 1 presents selected characteristics of the sample.

Table 2 presents PCPs' self-perception of competency in dermatology. Fifteen PCPs (37.5%) perceived their ability to diagnose skin diseases as very good/good and 16 (40.0%) PCPs perceived their ability to treat skin diseases as very good/good. All PCPs referred a patient with skin manifestations to a dermatologist at some point during their clinical practice, 3 (7.5%) PCPs always referred a patient with skin manifestations to a dermatologist and 12 (30%) usually do so. Two-thirds of PCPs believe patients receive better medical care at private clinics than public clinics (Table 2). PCPs who believed that patients receive better medical care at private clinics than public clinics referred patients more frequently to a dermatologist than those who did not believe so ($\chi^2 = 4.952$, $DF = 1$, $p = 0.026$).

Table 1. Demographic and clinical characteristics of primary care physicians recruited from primary care clinics, Aden, Yemen, 2014 (N = 40)

	N (%)
Clinic	
Al-Mansoorah	8 (20)
Al-Medan	5 (12.5)
Ma'alla	5 (12.5)
Sheikh Othman	4 (10)
Dar Sa'ad	4 (10)
Alqateea'	4 (10)
Al-qahiraa	4 (10)
Khormaksar	4 (10)
Al-sha'ab	2 (5)
Sex	
Female	34 (85)
Male	6 (15)
Age (years)	
27-36	15 (37.5)
37-46	19 (47.5)
47-57	6 (15)
Highest educational level	
MD/MBBS	35 (87.5)
Specialized diploma	3 (7.5)
Master degree	1 (2.5)
Others	1 (2.5)
Received medical degree from Yemeni University	
Yes	35 (87.5)
No	5 (12.5)
Clinical experience (years)	
<1	1 (2.5)
1-10	17 (42.5)
11-20	18 (45)
21-30	4 (10)
Average number of patients examined/week	
<50	22 (55)
50-100	13 (32.5)
101-200	4 (10)
201-300	1 (2.5)
Received specialized training in dermatology after graduating medical school	
Yes	1 (2.5)
No	39 (97.5)
Has the physician ever requested a skin test?	
Yes	13 (32.5)
No	27 (67.5)

(Continued)

Table 1. (Continued)

	N (%)
Evaluation of dermatologic training during medical school	
Very good	7 (17.5)
Good	22 (55)
Fair	8 (20)
Bad	1 (2.5)
Very bad	2 (5)

Table 3 presents assessment of PCPs’ knowledge regarding the common dermatologic diseases and basic therapies frequently used in dermatologic practice in Aden clinics, Yemen. Overall, PCPs did not show adequate knowledge in the common skin diseases and therapies.

The average score of PCPs’ ability to classify skin lesions was 7.48 (± 1.2) (out of 10). Ability to classify skin lesions was not related to highest educational level or years of clinical experience ($p = 0.41$ and $p = 0.69$ respectively). We were unable to investigate the effects of training in dermatology and gender on the ability to classify skin lesions due to small cell size. PCPs who perceived their ability to diagnose and treat skin diseases as good had higher average classification scores of skin lesions than those who perceived their ability to diagnose and treat skin diseases as bad, this difference was

Table 2. Primary care physicians’ self-perception of competency and management of skin diseases

	No. (%)
Evaluation of self-ability to diagnose skin diseases	
Very good	1 (2.5)
Good	14 (35)
Average	19 (47.5)
Bad	5 (12.5)
Very bad	1 (2.5)
Evaluation of self-ability to treat skin diseases	
Very good	1 (2.5)
Good	15 (37.5)
Average	19 (47.5)
Bad	4 (10)
Very bad	1 (2.5)
Frequency of referral to a dermatologist	
Always	3 (7.5)
Usually	12 (30)
Sometimes	25 (62.5)
Rarely	0
Never	0
Patients receive better care at private vs. public clinics	
Strongly agree	8 (20)
Agree	18 (45)
Neutral	5 (12.5)
Disagree	6 (15)
Strongly disagree	3 (7.5)

Table 3. Proportion of PCPs who gave correct, wrong, or do not know response to each question that assesses knowledge regarding the common dermatologic diseases and therapies in Aden, Yemen (N = 40)

Item	Correct response	Classification of PCPs by answer category to each question, N (%)		
		Correct	Wrong	Do not know
Daily antihistamines prevent atopic dermatitis	False	25 (62.5)	7 (17.5)	8 (20)
There is a cure for allergy	False	23 (57.5)	12 (30)	5 (12.5)
Glucocorticoids are the first-line therapy for anaphylactic reactions	False	5 (12.5)	35 (87.5)	0
For the treatment of fungal skin infections, preparations that combine topical antifungal/corticosteroid are superior to antifungal alone	False	20 (50)	16 (40)	4 (10)

not statistically significant ($p = 0.53$). However, our results show a significantly higher average score of classifying skin lesions among those identified topical antifungal monotherapy as superior to a combination therapy for fungal skin infections ($p = 0.018$). PCPs who correctly answered daily antihistamines cannot prevent atopic dermatitis were able to classify skin lesions significantly better than those who had wrong answers to this question ($p = 0.018$).

4. Discussion

Self-perception and self-assessment may not necessarily correlate always with clinical competency (Evans, McKenna, & Oliver, 2002). In our study, there was no relationship between ability to classify skin lesions and PCPs' self-perception of competency in dermatology. These findings are consistent with previous studies. For example, Tracey, Arroll, Barham, and Richmond (1997) found a poor correlation between general practitioners' self-evaluation and their test scores which consisted of true and false question style similar to the one used in our study. Edwards, Matthews, Matthews, et al. (1998) found that PCPs were able to assess their knowledge correctly if the relevant questions based on patients' needs were asked. The majority of PCPs in our study evaluated their competencies as average, followed by good and fewer numbers evaluated their competencies as bad. Our results are comparable to previous findings from a study assessing self-perceptions of competency among physicians providing immunization in Riyadh City, Saudi Arabia. In this study, 67.3% of participants evaluated themselves as average, 30.7% as excellent, and 2% as poor immunization providers (Al-Rukban et al., 2005).

Misconceptions encountered during the practice of dermatology were detected in our sample. It is known that epinephrine is the essential medication for anaphylaxis (Kemp, Lockey, Simons, & World Allergy Organization ad hoc Committee on Epinephrine in Anaphylaxis, 2008; Sheikh, Shehata, Brown, & Simons, 2009; Simons et al., 2011; Working Group of the Resuscitation Council (UK), 2008). While being recommended as a third-line therapy for anaphylactic reactions (Santos & Lack, 2013), glucocorticoids (e.g. hydrocortisone) are often inappropriately administered as a first-line therapy instead of epinephrine (Choo, Simons, & Sheikh, 2012). The administration of glucocorticoids for anaphylactic reactions in clinical practice is increasing (Santos & Lack, 2013) and our respondents are no exception in which the majority (87.5%) gave positive answers to the question concerning the use of glucocorticoids as a first-line therapy for anaphylactic reactions. We believe this is what they also practice. This reflects the level of knowledge among PCPs regarding the pharmacologic mechanisms and therapeutic benefits of each medicine which need to be emphasized in medical schools' curricula and during clinical training.

The use of topical antifungal/corticosteroid combinations has been debated in the literature. Based on a review of the literature and authors' experience, it is better to avoid unnecessary use of this combination unless otherwise indicated (e.g. severe inflammatory reactions) as they may decrease local immunity and prevent elimination of infectious agents (Erbagci, 2004; Fox, 2008). Non-dermatologists were more likely to prescribe anti-infective/corticosteroid combinations than dermatologists (Smith, Fleischer, & Feldman, 1998) and in our study 50% of PCPs erroneously answered antifungal/corticosteroid topical combinations are superior to antifungal monotherapy for the treatment of skin infections. Interestingly, the same figure (51.6%) of topical corticosteroids prescription was reported in northern Palestine (Sweileh, 2006). More than one-third of respondents in our sample erroneously answered that daily antihistamines can prevent atopic dermatitis (AD) episodes. Although antihistamines are widely prescribed to AD patients, the evidence behind their therapeutic efficacy is low (Buddenkotte, Maurer, & Steinhoff, 2010).

This study comes with limitations. First, using multiple-choice questions to assess ability to classify skin lesions can be less accurate than showing actual photos for skin lesions for evaluating clinical skills. However, multiple-choice questions provide ease in comparing previous studies and in statistical analysis (Al-Hoqail et al., 2001). Second, the relationship between higher classification ability of skin lesions and proper knowledge of AD and treatment of fungal skin infections could be biased due to unknown confounders. However, we believe that proper knowledge in allergy and skin infections are associated with better identification of skin lesions but we are unable to give exact reasons behind this association.

5. Conclusions

In Aden governorate, there was no relationship between ability to classify skin lesions and PCPs' self-perception of competency in dermatology. PCPs were not properly trained to diagnose and treat skin diseases. Dermatologic training and curricula at medical schools need a comprehensive evaluation. Continuous medical training in dermatology for PCPs, specialization degree programs such as diplomas and master's need to be established. When effectively applied, such programs can improve clinical skills and management of PCPs in dermatology.

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Competing interests

The authors declare no conflict of interest.

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References

- Ahjarah, A., Fox, C., & Servoss, T. (2007). Brief intervention to improve diagnosis and treatment knowledge of skin disorders by family medicine residents. *Family Medicine*, 39, 720–723.
- Al-Hoqail, I. A., Gad, A., & Crawford, R. I. (2001). Dermatology practice in primary health care services: Where do we stand in the Middle East? *International Journal of Dermatology*, 40, 4–7.
- Al-Rukban, M. O., Al-Migbal, T. H., Al-Mutlaq, A. A., Al-Marshady, M. A., Al-Salhi, A. H., Al-Rsheed, A. A., ... Al-Thagafi, S. A. (2005). Characteristics of immunization providers in Riyadh and their self-perception of competency. *Journal of Family and Community Medicine*, 12, 35–41.
- Bruner, A., & Schaffer, S. D. (2012). Diagnosing skin lesions: Clinical considerations for primary care practitioners. *The Journal for Nurse Practitioners*, 8, 600–604.
<http://dx.doi.org/10.1016/j.nurpra.2012.04.016>
- Buddenkotte, J., Maurer, M., & Steinhoff, M. (2010). Histamine and antihistamines in atopic dermatitis. *Advances in Experimental Medicine and Biology*, 709, 73–80.
<http://dx.doi.org/10.1007/978-1-4419-8056-4>
- Chen, S. C., Bravata, D. M., Weil, E., & Olkin, I. (2001). A comparison of dermatologists' and primary care physicians accuracy in diagnosing melanoma. A Systematic Review. *Archives of Dermatology*, 137, 1627–1634.
- Choo, K. J., Simons, F. E., & Sheikh, A. (2012). Glucocorticoids for the treatment of anaphylaxis. *Cochrane Database of Systematic Reviews*, 18, 1–17.

- Cohen, S. M., Fishinghawk, B. G., Urban, D. M., Schropp, K. P., Person, E., Mammen, J. M. V., ... Cohen, M. S. (2012). Are university-based residency training programs lacking in resident education of proper diagnosis and treatment for common skin and breast lesions? *The American Journal of Surgery*, 204, 981–987.
<http://dx.doi.org/10.1016/j.amjsurg.2012.07.028>
- Corbo, M. D., & Wismer, J. (2012). Agreement between dermatologists and primary care practitioners in the diagnosis of malignant melanoma: Review of the literature. *Journal of Cutaneous Medicine and Surgery*, 16, 306–310.
- Edwards, A., Matthews, M. R., Matthews, S., Houston, H., Wilkinson, C., Crilly, M., ... Tracey, J. (1998). General practitioners' self assessment of knowledge. *BMJ*, 316, 1609. <http://dx.doi.org/10.1136/bmj.316.7144.1609>
- Erbagci, Z. (2004). Topical therapy for dermatophytoses: Should corticosteroids be included?. *American Journal of Clinical Dermatology*, 5, 375–384.
<http://dx.doi.org/10.2165/00128071-200405060-00002>
- Evans, A. W., McKenna, C., & Oliver, M. (2002). Self-assessment in medical practice. *Journal of the Royal Society of Medicine*, 95, 511–513.
<http://dx.doi.org/10.1258/jrsm.95.10.511>
- Federman, D. G., & Kirsner, R. S. (2000). The primary care physician and the treatment of patients with skin disorders. *Dermatologic Clinics*, 18, 215–221.
[http://dx.doi.org/10.1016/S0733-8635\(05\)70166-2](http://dx.doi.org/10.1016/S0733-8635(05)70166-2)
- Federman, D. G., Reid, M. C., Feldman, S. R., Greenhoe, J., & Kirsner, S. (2001). The primary care provider and the care of skin disease. *Archives of Dermatology*, 137, 25–29.
- Feldman, S. R., Fleischer, A. B., Young, A. C., & Williford, P. M. (1999). Time-efficiency of nondermatologists compared with dermatologists in the care of skin disease. *Journal of the American Academy of Dermatology*, 40, 194–199.
[http://dx.doi.org/10.1016/S0190-9622\(99\)70187-8](http://dx.doi.org/10.1016/S0190-9622(99)70187-8)
- Fox, G. N. (2008). 10 Derm mistakes you don't want to make. *Journal of Family Practice*, 57, 162–169.
- Hussain, W., Hafiji, J., Stanley, A. G., & Khan, K. M. (2008). Dermatology and junior doctors: An evaluation of education, perceptions and self-assessed competencies. *British Journal of Dermatology*, 159, 505–506.
<http://dx.doi.org/10.1111/bjd.2008.159.issue-2>
- Kemp, S. F., Lockey, R. F., Simons, F. E. R., & World Allergy Organization ad hoc Committee on Epinephrine in Anaphylaxis. (2008). Epinephrine: The drug of choice for anaphylaxis. A statement of the World Allergy Organization. *Allergy*, 63, 1061–1070.
<http://dx.doi.org/10.1111/all.2008.63.issue-8>
- McCarthy, G. M., Lamb, G. C., Russell, T. J., & Young, M. J. (1991). Primary care-based dermatology practice: Internists need more training. *Journal of General Internal Medicine*, 6, 52–56. <http://dx.doi.org/10.1007/BF02599393>
- Ojeda, R. M., & Graells, J. (2011). Effectiveness of primary care physicians and dermatologists in the diagnosis of skin cancer: A comparative study in the same geographic area. *Actas Dermosifiliogr*, 102, 48–52.
<http://dx.doi.org/10.1016/j.ad.2010.06.020>
- Pariser, R. J., & Pariser, D. M. (1987). Primary care physicians' errors in handling cutaneous disorders. *Journal of the American Academy of Dermatology*, 17, 239–245.
[http://dx.doi.org/10.1016/S0190-9622\(87\)70198-4](http://dx.doi.org/10.1016/S0190-9622(87)70198-4)
- Ramsay, D. L., & Fox, A. B. (1981). The ability of primary care physicians to recognize the common dermatoses. *Archives of Dermatology*, 117, 620–622. <http://dx.doi.org/10.1001/archderm.1981.01650100022020>
- Ramsay, D. L., & Weary, P. E. (1996). Primary care in dermatology: Whose role should it be? *Journal of the American Academy of Dermatology*, 35, 1005–1008.
[http://dx.doi.org/10.1016/S0190-9622\(96\)90137-1](http://dx.doi.org/10.1016/S0190-9622(96)90137-1)
- Santos, A. F., & Lack, G. (2013). Commentary on “Glucocorticoids” for the treatment of anaphylaxis. *Evidence-Based Child Health*, 8, 1295–1296.
- Scheaffer, R. L., Mendenhall, III, W., & Ott, R. L. (1996). *Elementary survey sampling* (5th ed., pp. 426–427). Belmont, CA: Duxbury Press.
- Sheikh, A., Shehata, Y. A., Brown, S. G., & Simons, F. E. (2009). Adrenaline for the treatment of anaphylaxis: Cochrane systematic review. *Allergy*, 64, 204–212.
<http://dx.doi.org/10.1111/all.2009.64.issue-2>
- Simons, F. E. R., Arduoso, L. R. F., Bilò, M. B., El-Gamal, Y. M., Ledford, D. K., Ring, J., ... The World Allergy Organization. (2011). World allergy organization guidelines for the assessment and management of anaphylaxis. *WAO Journal*, 4, 13–37.
- Smith, E. S., Fleischer, A. B., & Feldman, S. R. (1998). Nondermatologists are more likely than dermatologists to prescribe antifungal/corticosteroid products: An analysis of office visits for cutaneous fungal infections, 1990–1994. *Journal of the American Academy of Dermatology*, 39, 43–47. [http://dx.doi.org/10.1016/S0190-9622\(98\)70400-1](http://dx.doi.org/10.1016/S0190-9622(98)70400-1)
- Sweileh, W. M. (2006). Audit of prescribing practices of topical corticosteroids in outpatient dermatology clinics in north Palestine. *East Mediterranean Health Journal*, 12, 161–169.
- Tracey, J. M., Arroll, B., Richmond, D. E., & Barham, P. M. (1997). The validity of general practitioners' self assessment of knowledge: Cross sectional study. *BMJ*, 315, 1426–1428.
<http://dx.doi.org/10.1136/bmj.315.7120.1426>
- Working Group of the Resuscitation Council (UK). (2008). *Emergency treatment of anaphylactic reactions. Guidelines for health care providers*. Retrieved March 19, 2015, from <http://www.resus.org.uk/pages/reaction.pdf>



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