

## Pharmacology and Therapeutics

# Knowledge, attitudes, and practices of community pharmacists toward the management of acne vulgaris in Palestine: a cross-sectional study

Rania E. Ghanem, MSc, Saja H. Mostafa, BSc, Najla K. Abu Hamamda, BSc and Maher R. Khdour, PhD 

Faculty of Pharmacy, Al-Quds University,  
Abu Deis, West Bank, Palestine

**Correspondence**

Maher R. Khdour, PHD  
Faculty of Pharmacy  
Al-Quds University  
Abu Deis, PO Box 20002  
Jerusalem  
Palestine  
E-mail: mkhdour@staff.alquds.edu

Conflict of interest: None.

Funding source: None.

doi: 10.1111/ijd.14764

**Abstract**

**Background** Acne vulgaris (AV) is a common dermatological disease affecting almost 85% of teenagers. Patients with AV usually present at community pharmacies during the early stages of their disease.

**Aim** The aim of this study was to assess community pharmacists' knowledge, attitudes, and practice toward AV management in West Bank in Palestine.

**Methods** This study was a cross-sectional questionnaire-based study. The questionnaire included four sections: 1) demographic, 2) knowledge, 3) attitude and practice items related causes, and 4) treatment options and counseling during management of patients with AV. A convenience sampling method was implemented in this study. Parametric and non-parametric tests were used to compare different issues as appropriate.  $P < 0.05$  were considered significant.

**Result** A total of 270 community pharmacists were interviewed, and more than half (54.1%) were males. The study revealed that community pharmacists had an inadequate level of knowledge on management of AV; only 7.7% had high levels of knowledge. Pharmacists have positive attitude regarding AV management, but inadequate knowledge was reflected on their treatment practices; only 10% of participants independently dealt with AV without referral. Pharmacists with a low level of knowledge showed five times more referrals than those with a high level of knowledge (OR: 5.3;  $P < 0.001$ ), and those with a bachelor degree showed three times more referrals than postgraduates (OR: 3.3;  $P < 0.001$ ).

**Conclusion** There is a demand to update dermatological knowledge of community pharmacists and encourage them to attend structured training programs about the management of AV.

**Introduction**

Acne vulgaris (AV) is a very common skin condition, affecting 85% of teenagers at some point,<sup>1</sup> and each year it accounts for 5 million general practitioner (GP) office visits.<sup>2</sup> Although acne is common among teenagers (aged 13–18 years), acne also affects adults in 15% of women and 5% of men aged over 40 years.<sup>3,4</sup> AV can be defined as a chronic inflammatory pilosebaceous disease that affects the skin by creating lesions in areas rich in large sebaceous glands; e.g., the face, chest, shoulders and upper back.<sup>5</sup> *Propionibacterium acnes* (*P. acnes*) plays a major role in blocking the follicles and producing inflammatory lesions. Lesions characterized by comedones, papules, pustules, inflamed nodules, which sometimes heal with scarring and pigmentation, may lead to considerable psychological distress.<sup>6</sup> Psychological distress such as embarrassment, poor self-image, lack of

self-esteem, anxiety, and avoidance of social activities with peers have been reported.<sup>7–10</sup>

The severity of AV can be classified into mild, moderate, and severe based on the number and type of lesions.<sup>11</sup> The pathogenesis of AV is influenced by the interaction of environmental and genetic factors, which may be responsible for the appearance of AV within a family or community.<sup>12</sup> Spencer et al<sup>13</sup> reported in their systematic review that dairy products (foods rich in carbohydrates, chocolate) increase the risk for acne. In addition, it is also known that steroids, neuro-psychotherapeutics, and immunomodulatory drugs increase the risk of acne.<sup>13</sup> Other risk factors might be considered as contributing factors to the prevalence and severity of acne including physiological factors such as the menstrual cycle, pregnancy, anxiety, and depression.<sup>14</sup>

The prevalence and incidence of acne varies depending on the study populations and the method of estimation used. In

one study conducted in the UK, they reported the prevalence of AV in a community sample of 14- to 16-year-olds as 50%.<sup>14</sup> The other study in New Zealand reported that the estimated prevalence of AV among students was found to be 91% of males and 79% of females, and in a similar population in Portugal, the prevalence of AV was 82%.<sup>15,16</sup>

The mainstay therapy for treatment of mild-to-moderate acne is over-the-counter (OTC) topical medications. Benzoyl peroxide is the most commonly used treatment for acne and is available in a variety of strengths and formulations.<sup>17</sup> Other topical agents include salicylic acid, tretinoin, isotretinoin, and antimicrobial ointments.<sup>18,19</sup> Systemic therapy that includes oral tetracycline, minocycline, hormones, and retinoids indicated the treatment of moderate-to-severe cases.<sup>20</sup> Early treatment of AV is very crucial for disease remission, prevents scars, and minimizes psychological impact.<sup>19</sup>

Community pharmacists in an ideal position play a major role in recommending appropriate treatment for those with mild-to-moderate cases and referral of severe cases for further evaluation.<sup>21</sup> Knowledge of pharmacist plays a critical role in effective treatment of AV and its psychological implications; therefore, this study was conducted among pharmacists working at community pharmacies in the West Bank, to explore their knowledge, attitude, and practice for acne management.

## Methods

### Study design

The study was a cross-sectional questionnaire-based survey, which surveyed the licensed working Palestinian pharmacists who registered at the Palestinian Pharmaceutical Syndicate (PPS).

### Study population and sampling procedure

This study was carried out in different districts in the West Bank in Palestine – Central (Ramallah and East Jerusalem), North (Nablus and Tulkarm), and South (Bethlehem and Hebron). A convenience sampling procedure was involved in this research. Community pharmacies located in cities, villages, and refugee camps in different governorates were visited, and only one pharmacist was invited to participate in the study. The pharmacists were interviewed by researchers who are expert in the research field. The data were collected from December 2018 to February 2019.

### Sample size

The sample size selected from each governorate is proportionate to the relative size of that governorate in the study population. The total number of community pharmacies in all studied governorates was 1019 pharmacies; the sample size was calculated using Raosoft<sup>®</sup> sample size calculator, with a predetermined margin of error of 5% and CI level of 95%. Only one pharmacist was recruited from each

pharmacy, and the minimum recommended sample size was 256 pharmacists. A total of 280 questionnaires were distributed; however, 270 questionnaires were included in final analysis.

### Data collection form

A semi-structured questionnaire with closed-ended questions was developed using the precedence set by similar studies.<sup>22,23</sup> The questionnaire comprised four sections; in the first section, questions on sociodemographics were requested. The second section comprised 11-item knowledge questions to assess the pharmacists' level of knowledge in the treatment of acne vulgaris. Each correct answer carried (1) point and a zero point for wrong answer. The levels were determined on a range of (0–4) as low level, (5–8) as moderate level, and (9–11) as high level. The third section comprised 5-item statements to explore the pharmacists' practices in counseling and treating acne vulgaris patients. The fourth section comprised 5-item statements to explore the pharmacists' attitudes while treating acne vulgaris.

The content of the questionnaire was reviewed by a panel of three specialist/professors who are expert in pharmaceutical researches for face validity, and it was piloted among 15 pharmacists in order to judge the time needed for administration and to test for clarity and reliability. The questionnaires used in the pilot study were not included in the final statistical analysis.

### Data analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS; version 23, SPSS, Chicago, IL, USA) for data screening, descriptive statistics, and univariate analysis. Data of the study were presented with descriptive measures such as means and numbers with percentages and/or graphical presentations for categorical variables. Chi-squared test was also used to explore the association between categorical variables at  $P < 0.05$  significant level.

### Ethical considerations

The study protocol was revised and approved by both the ethics committee of Al-Quds University and the Palestinian Pharmaceutical Syndicate. An explanation of the study rationale was provided, and pharmacists confirmed that the survey would measure knowledge and practice regarding AV. Willingness to participate was a fundamental condition in the study.

## Results

### Demographic characteristics of participant

A total of 315 pharmacists were approached and asked to participate in the study; however, 270 agreed to fill out the forms with a response rate of 85.7%. Of the 270 pharmacists, 146 (54.1%) were males. The highest percent of participants (167, 61.9%) were between the ages of 23 and 35. The majority of

participants (223, 82.6%) had a bachelor degree in pharmacy, whereas 45 (16.7%) had a master of pharmaceutical sciences. One-third of the participants (94, 33.6%) had 5 years or less of experience (Table 1).

**Knowledge**

The 11 knowledge items were tested; the median score of knowledge on causes, pathophysiology, and treatment of AV was found to be 5.88 (interquartile range: 4.9–7.1). The overall levels of the pharmacists' knowledge on the AV managements are summarized in Figure 1, which shows that the majority of community pharmacists had moderate levels of knowledge (69.3%) and only 7.7% had a high level of knowledge about AV management.

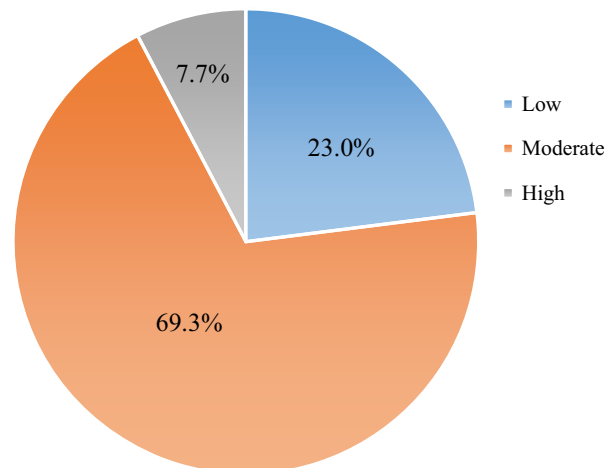
Response of community pharmacists to questions on the causes and physiological problem of AV is illustrated in Figure 2. The majority of pharmacists (88.3%) reported that it is a hormonal problem, 85.6% reported that it is a bacterial infection, and 57.9% believed that it is caused by drug use.

The majority of participated community pharmacists reported that the most used medication for the treatment of AV in general is topical antibiotic (67.1%), and 96% of the pharmacists believed in not using topical antifungal agents in the treatment of AV (Fig. 3).

When we asked the pharmacist about the treatment of mild acne, half of the participants (50.4%) preferred to use benzoyl peroxide lotion and 34.4% preferred salicylic acid ointment. Other treatments are shown in Table 2.

**Table 1** Demographic characteristics of participant community pharmacists included in the study

Variable	N (%)
Gender	
Male	146 (54.1)
Female	124 (45.9)
Age (years)	
23–35	167 (61.9)
36–45	64 (23.7)
46–55	29 (10.7)
>56	10 (3.7)
Education level	
Bachelor degree	223 (82.6)
Master degree	45 (16.7)
PhD	2 (0.7)
Years of experience	
1–5	94 (33.6)
6–10	84 (30.0)
11–15	45 (16.7)
>15	47 (16.8)
Location of the pharmacy	
City	178 (65.9)
Village	86 (31.8)
Camp	6 (2.2)
Job	
Owner	153 (56.7)
Employee	117 (43.3)



**Figure 1** Pharmacists' levels of knowledge about the management of acne vulgaris

Participating community pharmacists indicated that they rely on pharmacy textbooks (39.1%) and internet (31.2%) as their first choice for information resources; while 25.6% of them were depending on the information that is given by the dermatologists or medical representative person.

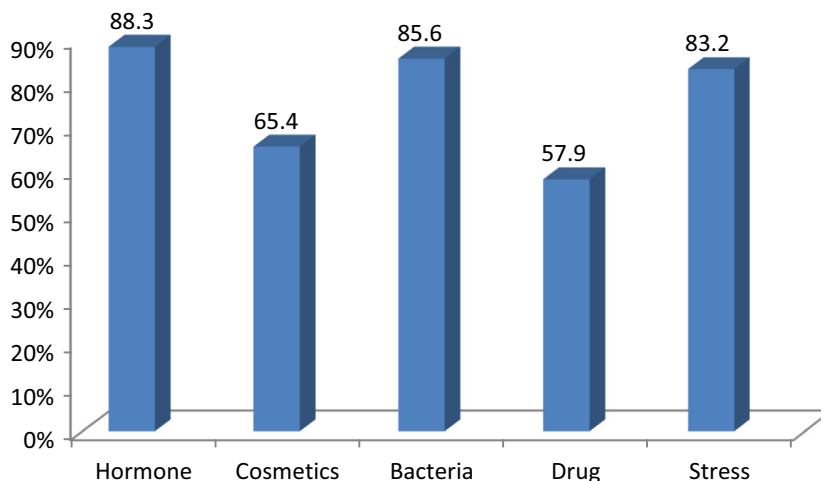
**Practice of acne management**

Evaluating the Palestinian pharmacists' practice toward management of AV, 72% of them agreed that the treatment duration should be more than 1 month. About 65% of the participants admitted to follow-up of their patients, and 90% of the pharmacists preferred to refer patients with severe acne to a dermatologist. Regarding patients' counseling for AV, 88% of the pharmacists gave advice for diet modification, 60% asked the patient to avoid manipulating pimples, 67% encouraged the patients to take care of skin and facial hygiene, 54% enhance for stress relief, 74% educated their patients to adhere to the therapy (Table 3).

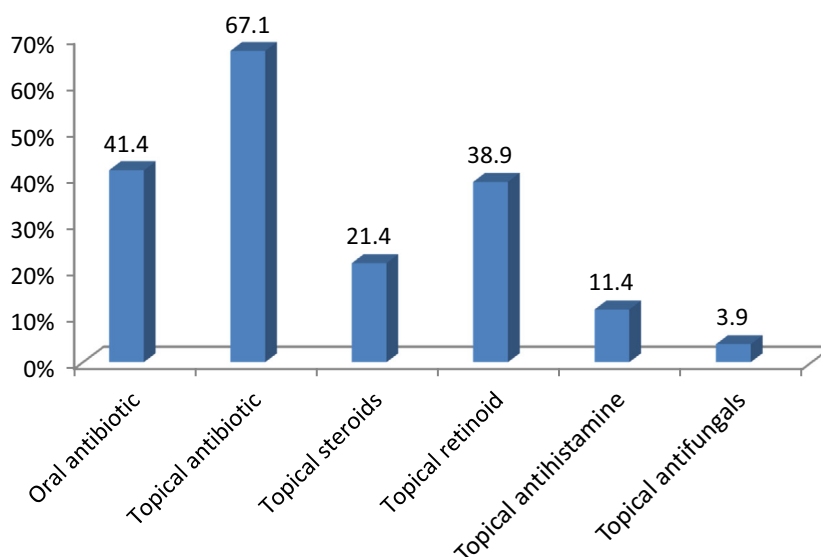
Concerning the community pharmacists' characteristics associated with referral patients with AV to physician/specialist, Table 4 shows that levels of knowledge and qualification were significantly ( $P < 0.05$ ) associated with the number of referral patients. Community pharmacists with low level of knowledge made five times referrals more often than did those with higher levels (OR: 5.3;  $P < 0.001$ ). Community pharmacists with a bachelor degree made three times more referrals than those with a master's degree (OR: 3.3;  $P < 0.001$ ).

**Attitudes and behaviors**

Concerning our participants' responses on their attitudes toward management of patients with AV, the participants showed a good attitude while treating AV. About 90.7% of the community pharmacists ask the patients about pregnancy or planning for pregnancy, 83% ask female patients for the hormonal regularity, and 81.9% ask the patients for their medical and medication



**Figure 2** Pharmacists' levels of knowledge on causes of acne vulgaris



**Figure 3** Drugs commonly used in the management of acne

history. Only 47.8% ask the patients for their family history regarding AV (Table 5). The data show community pharmacists have a good attitude on the treatment of AV but need to increase asking about family history regarding AV.

Finally, when we asked the pharmacists about the challenges faced them while treating or counseling patients with AV, several real challenges were reported. The major challenges were

poor pharmacist–patient communication due to limited space in the pharmacy (66%), lack of experience in the management of AV (62%), and difficulty to access the latest treatment guidelines for AV (61%).

**Discussions**

To the best of our knowledge, this was the first study to explore the knowledge, attitude, and management of AV among community pharmacists in the West Bank, Palestine. In general, two-thirds of community pharmacists had relatively moderate knowledge scores on AV management.

Similarly, almost two-thirds of pharmacists in Zambia correctly answered the terms regarding the management of AV.<sup>22</sup> Another study conducted on primary care physicians reported that 70% of primary healthcare physicians had insufficient knowledge regarding common dermatological disorders,

**Table 2** Drugs commonly used for managing mild acne

Type of medication	N (%)
Benzoyl peroxide lotion	136 (50.4)
Salicylic acid ointment	93 (34.4)
Topical retinoid	80 (29.6)
Sulfur-based soap	52 (19.3)
Others	41 (15.2)

**Table 3** Practice of acne management among community pharmacists

Practices	Values	N (%)
What is the average duration of treatment in AV	1 week	4 (2)
	2–4 weeks	72 (27)
	More than 1 month	193 (72)
Follow-up your AV patients	Yes	175 (65)
	No	95 (35)
Refer patients with acne for dermatologist	Yes	200 (90)
	No	70 (10)
How do you treat patients with severe AV?	Refer to dermatologist without any intervention	174 (64)
	Provide advice only	25 (10)
	Prescribe medications by your own	71 (26)
	Frequent facial washing	181 (67)
Other advices that you provide to the patient with AV	Adhere to treatment regimen	200 (74)
	Avoid manipulating pimples	163 (60)
	Avoid stress	147 (54)
	Diet modification	237 (88)

**Table 4** Referral of acne patients by participating pharmacists in relation to their knowledge, experience, and qualification

Variables (n)	Referral (yes, n = 200)	OR (CI 95%)	P value
Knowledge level			
High (n = 21)	7 (33.3)	1.0 <sup>a</sup>	0.001
Moderate (n = 187)	142 (75.9)	2.2 (1.2–6.3)	
Low (n = 62)	51 (82.3)	5.3 (2.4–9.9)	
Working experience			
1–5 years (94)	67 (71.2)	1.0 <sup>a</sup>	0.117
6–10 years (84)	62 (71.4)	1.1 (0.4–1.9)	
11–15 years (45)	36 (80.0)	1.6 (0.3–2.2)	
>15 years (47)	35 (74.5)	1.2 (0.5–1.8)	
Qualifications			
Master/PhD degree (47)	24 (51.1)	1.0 <sup>a</sup>	0.001
Bachelor degree (223)	176 (78.9)	3.3 (1.41–5.26)	
Gender			
Male (146)	103 (70.5)	1.0 <sup>a</sup>	0.121
Female (124)	97 (78.2)	1.4 (1.1–2.4)	

CI, confidence interval; OR, odds ratio.

<sup>a</sup>Reference group.

whereas 22% of them had good knowledge and only 5% had excellent knowledge.<sup>23</sup> The British American Dermatologist Association of 2007 found primary physicians and pharmacists lack the adequate knowledge regarding AV management.<sup>24</sup>

The participants in the present study reported that hormone disturbances are the major cause of AV. This is inconsistent with other studies in which hormone disturbances provide the initial trigger for the onset of acne.<sup>25,26</sup> It was evident by many

**Table 5** Pharmacist's attitude on the treatment of acne vulgaris

Practices	Values	N (%)
Asking about patients medical and medication history	Yes	221 (81.9)
	No	49 (18.1)
Asking about patients family history regarding AV	Yes	129 (47.8)
	No	141 (52.2)
For female: asking about hormonal regularity	Yes	224 (83.0)
	No	46 (17.0)
Asking about pregnancy or planning for pregnancy	Yes	245 (90.7)
	No	25 (9.2)

studies that acne is a result of *P. acnes*.<sup>27</sup> However, the pathogenesis of AV is multifactorial, which may be caused by genetic factors, diets, stress, cosmetics, and drugs.<sup>28–31</sup>

Regarding community pharmacists' practices to manage AV in the West Bank, a wide range of modalities are available for treating mild-to-moderate acne. They usually prescribe benzoyl peroxide lotion, salicylic acid ointment, and/or acne soap. Topical retinoid was recommended by only 19.3% of the participants despite the international guidelines which consider topical retinoid as the first-line treatment, alone or in combination, for mild-to-moderate inflammatory cases.<sup>32</sup>

More than two-thirds of community pharmacists agreed that treatment should last for more than a month, which is inconsistent with international guidelines. Other recommended practices – counseling their patients to adhere to medication; stress on avoidance of manipulating pimples; avoiding diets, emotional stress, and environmental factors that trigger AV – were performed by a majority of participants.<sup>33</sup>

We found that 90% of the participants may refer acne cases to the physician/specialist; this high percentage referral rate in our sample could be explained by low focus in continuing care and lack of counseling skills. The present study showed that pharmacists with low level knowledge and bachelor degree pharmacists have higher referral rates ( $P < 0.01$ ) compared with high levels of knowledge and those who had a master's degree. Lack of knowledge, counseling skills, and proper communications among community pharmacists were reflected in their practices; only one quarter can manage AV independently at their pharmacies.

In the last two decades, a pharmacist's role expanded from product oriented to patient focus oriented.<sup>34,35</sup> Pharmacists should have communication skills and should counsel acne patients on available products, treatment use, the important of adherence, and likely side effects such as dryness and irritation. Pharmacists are in an ideal position to make a valuable counseling to the care of patients with AV though this role needs to be more clearly defined.<sup>36</sup>

Nevertheless, our community pharmacists have positive attitudes and behaviors regarding the management of AV. On the contrary, many studies showed negative attitude by both

provider and patients due to sociopsychological factors on acne and other skin conditions.<sup>36</sup> About 91% of the community pharmacists ask the patients about pregnancy or planning for pregnancy, 83% ask female patients for the hormonal regularity, and 82% ask the patients for their medical and medication history. However, community pharmacists need to improve their counseling on asking about patient and family medical history regarding AV.

Several challenging factors such as poor pharmacist-patient communication due to limited space in the pharmacy and gender embarrassment,<sup>37</sup> lack of experience in the management of AV, and difficulty to access the latest treatment guidelines for AV were reported by participant pharmacists. This calls for more educational programs to community pharmacists through continuing education and professional development and the need for development of national guidelines for treatment of AV.

### Study Limitations

This study was conducted only on community pharmacists; the exclusion of hospital pharmacists and primary care pharmacists might limit the generalizability of the study. Even though a sufficient sample size was recruited and conducted only in the West Bank, the opinions expressed may not be representative of all pharmacists in Palestine. Furthermore, the use of a questionnaire-based study may create problems in question understanding (over- or under-evaluating), which can lead to a possible information bias.

### Conclusion

The present study showed that community pharmacists have a positive attitude and practice on the treatment of AV, but they need to increase their knowledge. Only 7.7% had high knowledge, while a large proportion of Palestinian pharmacists was within the medium and basic level of knowledge. Pharmacists play a critical role as healthcare providers, counseling patients on appropriate medication, drug-induced acne, drug safety, and drug interactions. Better knowledge, perception, and practice are very important for the development of national guidelines and to clearly define the pharmacist's role in the management of AV. Besides, there is a demand to encourage the pharmacists to attend structured professional training programs about the management of AV.

### References

- 1 Chu TC. Acne and other facial eruptions. *Medicine* 1997; **25**: 30-33.
- 2 Dawson A. Acne vulgaris. *BMJ* 2014; **346**: 2634.
- 3 Perkins A, Cheung C, Hillebrand G, et al. Comparison of the epidemiology of acne vulgaris among Caucasian, Asian, Continental Indian and African American women. *J Eur Acad Dermatol Venereol* 2011; **25**: 1054-1060.
- 4 Garner S. Acne vulgaris. In: Williams H, ed. *Evidence-based dermatology*. London: BMJ, 2003.
- 5 Kulthanan K, Jiamton S, Kittisarapong R. Dermatology life quality index in Thai patients with acne. *Siriraj Med J* 2007; **59**: 3-7.
- 6 Misery L. Consequences of psychological distress in adolescents with acne. *J Invest Dermatol* 2011; **131**: 290-292.
- 7 Magin P, Adams J, Heading G, et al. Psychological sequelae of acne vulgaris: Results of a qualitative study. *Can Fam Physician* 2006; **52**: 978-979.
- 8 Loney T, Standage M, Lewis S. Not just 'skin deep': psychosocial effects of dermatological-related social anxiety in a sample of acne patients. *J Health Psychol* 2008; **13**: 47-54.
- 9 Purvis D, Robinson E, Merry S, Watson P. Acne, anxiety, depression and suicide in teenagers: a cross-sectional survey of New Zealand secondary school students. *J Paediatr Child Health* 2006; **42**: 793-796.
- 10 Fried RG, Wechsler A. Psychological problems in the acne patient. *Dermatol Ther* 2006; **19**: 237-240.
- 11 Herane MI, Ando I. Acne in infancy and acne genetics. *Dermatology* 2003; **206**: 24-28.
- 12 Tan H-H, Tan AWH, Barkham T, et al. Community-based study of acne vulgaris in adolescents in Singapore. *Br J Dermatol* 2007; **157**: 547-551.
- 13 Spencer EH, Ferdowsian HR, Barnard ND. Diet and acne: a review of the evidence. *Int J Dermatol* 2009; **48**: 339-347.
- 14 Smithard A, Glazebrook C, Williams HC. Acne prevalence, knowledge about acne and psychological morbidity in mid-adolescence: a community-based study. *Br J Dermatol* 2001; **145**: 274-279.
- 15 Pearl A, Arroll B, Lello J, et al. The impact of acne: a study of adolescents' attitudes, perception and knowledge. *N Z Med J* 1998; **111**: 269-271.
- 16 Amado JM, Matos ME, Abreu AM, et al. The prevalence of acne in the north of Portugal. *J Eur Acad Dermatol Venereol* 2006; **20**: 1287-1295.
- 17 Tanghetti E. The evolution of benzoyl peroxide therapy. *Cutis* 2008; **82**(5Suppl): 5-11.
- 18 Cook D, Krassas G, Huang T. Acne: best practice management. *Aust Fam Physician* 2010; **39**: 656-660.
- 19 Yeung CK, Teo LHY, Xiang LH, et al. A community-based epidemiological study of acne vulgaris in Hong Kong adolescents. *Acta Derm Venereol* 2002; **82**: 104-107.
- 20 Pawin H, Beylot C, Chivot M, et al. Physiopathology of acne vulgaris: recent data, new understanding of the treatments. *Eur J Dermatol* 2004; **14**: 4-12.
- 21 Foster K, Acne CC. *Handbook of Nonprescription Drugs*. 15th edn. 803-815. Washington, D.C.: American Pharmacists Association.
- 22 Prashar L, Kachipond F, Nagalamika O. Assessment of level of knowledge of management of Acne vulgaris among community pharmacists and prescribers in Lusaka urban. *AJPNMS* 2015; **3**: 143-150.
- 23 Al-Shobaili HA. Knowledge and practice of primary healthcare physicians for management of acne vulgaris in Qassim region, Saudi Arabia. *J Egypt Public Health Assoc* 2013; **88**: 26-31.
- 24 Smithard A, Glazebrook C, Williams HC. Acne prevalence, knowledge about acne and psychological morbidity in mid-adolescence: a community-based study among Saudi acne patients. *Br J Dermatol* 2001; **145**: 274-279.
- 25 Thiboutot D, Gilliland K, Light J, et al. Androgen metabolism in sebaceous glands from subjects with and without acne. *Arch Dermatol* 1999; **135**: 1041-1045.

- 26 Alhazmi A, Aljarallah JS. Knowledge, attitude and practice of physicians working in primary health care centers towards acne vulgaris. *Saudi Epidemiol Bull* 2006; **13**: 19–20.
- 27 Bergfeld WF. The pathophysiology of acne vulgaris in children and adolescents, part 1. *Cutis* 2004; **74**: 92–97.
- 28 Herane MI, Ando I. Acne in infancy and acne genetics. *Dermatology* 2003; **206**: 24–28.
- 29 Du-Thanh A, Kluger N, Bensalleh H, et al. Drug-induced acneiform eruption. *Am J Clin Dermatol* 2011; **12**: 233–245.
- 30 Boone JL, Anthony JP. Evaluating the impact of stress on systemic disease: the MOST protocol in primary care. *J Am Osteopath Assoc* 2003; **103**: 239–246.
- 31 Hajj A, Hallit S, Azzo C, et al. Assessment of knowledge, attitude and practice among community pharmacists towards dental care: a national cross sectional survey. *Saudi Pharm J* 2019; **27**: 475–483.
- 32 Rathi SK. Acne vulgaris treatment: the current scenario. *Indian J Dermatol* 2011; **56**: 7.
- 33 Hayashi N, Imori M, Yanagisawa M, et al. Makeup improves the quality of life of acne patients without aggravating acne eruptions during treatments. *Eur Dermatol* 2005; **15**: 284–287.
- 34 Mukattash TL, Hayajneh WA, Ibrahim SM, et al. Prevalence and nature of off-label antibiotic prescribing for children in a tertiary setting: a descriptive study from Jordan. *Pharm Pract* 2016; **14**: 725.
- 35 Jarab AS, Mukattash TL, Al-Azayzih A, et al. A focus group study of patient's perspective and experiences of type 2 diabetes and its management in Jordan. *Saudi Pharm J* 2018; **26**: 301–305.
- 36 Tucker R, Duffy J. The role of community pharmacists in the management of skin problems. *J Pharm Care Health Syst* 2014; **1**(Pt 1): 105–108.
- 37 Khdour MR, Hallak HO. Societal perspectives on community pharmacy services in West Bank-Palestine. *Pharm Pract* 2012; **10**: 17–24.