

## **Knowledge and perception of Community Pharmacists' towards generic medicines in Saudi Arabia.**

**Syed Wajid\*, Mohamed N Al-Arifi, Hamad A Al Nomay, Yazeed N Al Mousa, Salmeen D Babelghaith**

Department of Clinical Pharmacy, College of Pharmacy, King Saud University, Saudi Arabia

### **Abstract**

**Aim:** To evaluate the Saudi Community Pharmacists' knowledge and perception towards generic medicines.

**Materials and Methods:** A cross-sectional survey using a self-completed paper-based survey with sample size (450) was conducted among a random sample of community pharmacists in central Saudi Arabia (SA).

**Statistical analysis:** The data were analyzed using IBM-SPSS; version 22.0 both descriptive and inferential statistical analysis were applied.

**Results:** Responses were obtained from 365 pharmacies (response rate, 81.1%). About 80.0% of the community pharmacists agreed that all products that are approved as generic equivalents can be considered therapeutically equivalent with the innovator medicines. More than 72.2% of respondents believed that a generic medicine must be in same dose form and dose as brand name medicine. Only 51.3% thought that generic medicines have more side effect than brand name medicines. Nearly, two- third (62.5%) trusted that brand name medicines are required to meet higher safety standards than generic medicines.

**Conclusion:** The Saudi community pharmacists' have lack of information and/or trust in the generic medicines. An educational program among pharmacists and relevant government agencies should be implemented. Additionally, national generic medicine policies and guidelines are warranted in SA.

**Keywords:** Knowledge, Community Pharmacists, Generic medicines, Saudi Arabia.

*Accepted October 08, 2015*

### **Introduction**

Globally, Healthcare costs are rising, including pharmaceutical expenditures [1, 3]. Expenditures on pharmaceutical is considered a significant factor that leads to rising health care costs in many countries, and cost-containment strategies for developed countries, such as New Zealand, have been well-described in the literature [1, 3]. The Saudi Arabia reports showed that spending on prescription drugs has increased sharply with a faster growth rate than other major components of the health care system [4]. In 2006 the amount of Saudi's drug expenditure exceeded 1.6 billion US dollars, which accounts for 10% of health care costs [4]. According to 2012 data in Saudi Arabia generic medications represented by value only 8.1% of the total medicine market and only 9.1% of the prescription medicines market. Moreover, it is forecasted to reach approximately 11.5% in 2020 [5]. A significant

strategy to slow health care costs is to promote the use of less expensive generic drugs instead of the more expensive branded equivalents [4, 6].

The use of generic medicines can provide significant cost savings and increased access to medicines, and generic substitution is widely encouraged by many government authorities across in many countries as a cost-containment strategy [7, 9]. A 'Generic' medicine is a pharmaceutical product and is a bioequivalent, to a brand name drug in dosage form, safety, strength, route of administration, quality, performance characteristics and intended use [4].

The concept of generic prescribing and generic substitution is being controversial and questions remain about the generic practices among healthcare professionals [6, 10, 13]. This controversy surrounds issues of quality, safety and efficacy of the generic medicines. There is insufficient knowledge pertaining to the quality, safety, and efficacy

of generic medicines among healthcare professionals [6].

In fact, there is no generic medicine policy and guidelines how to provide generic substitution in Saudi Arabia [4]. The studies on health care providers' knowledge on generic medicines is only a few studies on the topic, however, a study carried out in Riyadh city among physicians. The study found most of physicians support generic medicine, but in life threatening situations the use of branded medicines was preferred and it is emphasized to increase the check and balance over the quality of generic medicines [4]. A study was done in Riyadh city among physicians to assess their perception and attitude about local generic medicines [14]. This study found that the physicians' knowledge on local generic medicines was poor and low prescription of generic drug [14].

In other hand a qualitative study carried out by Albadar and his colleagues have addressed factors influencing community pharmacist's decision to dispense generic medicines [15]. They found that physical appearance of the consumer and physician's recommendation are the most important factors influencing the pharmacists' generic drug substitution. However this study did only in Alhasa city, it could not be generalized to represent the knowledge of pharmacists in Saudi Arabia. In order to play their role in the implementation of generic substitution policy, pharmacists need to be properly trained on their understanding about generic medicines. Studies from other countries have found that pharmacists were generally motivated to generic substitution and viewed generic medicines as being safe and effective [7, 9]. Therefore this study was aimed to find out the Knowledge, attitude of community pharmacists' towards generic medicines in Saudi Arabia.

## **Materials and methods**

A cross-sectional survey of community pharmacists (CPs) in Riyadh region, Saudi Arabia was conducted over a period of 3 months from November, 2014 through February 2015. Data collection was carried out using a structured self-administered paper-based questionnaire. This study involved all the community pharmacy outlets (including chain and independent pharmacies) in Riyadh city, Saudi Arabia.

The instrument to collect the data for this study was designed and validated by the researchers. The questionnaire was formed on previous studies; the questionnaire related to the knowledge and perception was adapted from Chua et al. (2009). In addition to questions on the demographic and professional characteristics, a 14 item was used to evaluate knowledge and perception of CPs. All items answered on a five point Likert scale (from strongly agree to strongly disagree). All the correct answer for the generic

medicines knowledge questions was given 1 score. Scores were calculated as the sum of correct answers, the highest possible score was 6.

The first draft of questionnaire was reviewed by an expert panel which consist of a clinical pharmacist, a pharmacologist, and a physician, all of whom had experience in their respective fields. The questionnaire was pilot tested among 12 CPs before distribution. The reliability test showed a Cronbach's alpha of 0.77 for knowledge survey and 0.69 for perception questions. Based on the result of this pilot study the questionnaire was used with some modifications and the final questionnaire was handed over to participants in person or sent through mail or E-mail.

A stratified random sample of 2000 registered community pharmacists practicing in Riyadh region were randomly selected for visits according to their geographical distribution (i.e., north, south, east, and west). According to (Raosoft Inc.) online calculator, found that if the error rate tolerates was 5%, and 95% confidence levels were employed the sample size should be 323. The study selected 450 community pharmacies using a stratified random selection method. The selection of facilities was done at random with a clear intention to include different areas of Riyadh region. The questionnaire was followed up for collection on later date that range from one to three weeks. Non-respondents were telephoned, emailed or visited to return their questionnaires. All returned usable questionnaires were completed anonymously.

## **Data analysis**

The data were entered into statistical package for social sciences (SPSS) version 22.0 for windows (SPSS Inc., Chicago, Illinois). To analyze data both descriptive and analytic statistics were applied. For descriptive analysis, results are expressed as numbers, percentages, mean ( $\pm$  SD and 95% CI). The Mann-Whitney U test and the Kruskal-Wallis test were used to assess intergroup differences in knowledge score. Repeated Mann-Whitney with Benferroni's adjustment method was utilized to determine the difference between subgroup. These two non-parametric testing was used as the data in this survey is not normal distribution. Also Fisher's exact test was used for group comparisons at a significance level of 0.05.

## **Ethical consideration**

The study was approved by Research Ethics Committee of Faculty of Pharmacy, King Saud University Riyadh SA.

## **Results**

### ***Demographic Characteristics of Community pharmacies***

Out of 450 questionnaires were distributed to CPs, 365 CPs

responded (response rate of 81.1%). All the responded CPs were male and their ages were between 25- 35 (54.5%) years old. The respondents had been in CP practice. The majority of respondents were graduated from Egypt (47.7%). Demographic data of participant were shown in (Table 1).

Table 2 represents the response of CPs on various statements toward their understanding of generic medicines. Majority of respondents believe that a generic medicine is bioequivalent to a brand name medicine (80.2% as strongly agree and agree). More than 72.2% of respondents thought that a generic medicine must be in same dose form and dose as brand name medicine. Almost of respondents have doubts regarding the efficacy of generic medicine (62.5%) and 51.3% thought that generic medicines have more side effect than brand name medicines. Nearly, two- third (62.5%) trusted that

**Table 1:** Demographic data of participants.

Characteristic	N (%)
<b>Age</b>	
25-35	199 (54.5)
36-45	145 (39.7)
46-55	21 (5.8)
More than 50	
<b>Number of experiences (years)</b>	
Less than 10 years	161 (44.1)
11-20	160 (43.8)
21-30	34 (11.8)
More than 30	1 (0.3)
<b>Country of graduation</b>	
Egypt	174 (47.7)
Sudan	53 (14.5)
Syria	47 (12.9)
Jordan	51 (14.0)
Yemen	29 (7.9)
Pakistan	11 (3.0)
<b>Do you dispense generic medicine</b>	
Yes	221(60.5)
No	144(39.5)

brand name medicines are required to meet higher safety standards than generic medicines.

Comparative analysis between groups for, number of years in practice, country of graduation where they obtained their bachelor of pharmacy found significant differences ( $P<0.05$ ) in their answer to knowledge questions (Table 3). When specifically comparing pharmacists' knowledge based on those in dispense and non-dispense generic medicines groups, the results also showed significant difference in their knowledge (Table 3).

Repeated Mann -Whitney U tests with Bonferroni's adjustment method was used with significant level of 0.017 found significant difference between less than 10 years and 21-30 years groups ( $P=0.001$ ) as shown in Table 4. Comparing pharmacists' knowledge based on the universities where they obtained their bachelor of pharmacy degree, the results again found differences between Yemen and Egypt ( $P=0.007$ ), Yemen and Sudan ( $P=0.018$ ), and between Egypt and Syria ( $P=0.013$ ) as mentioned in Table 4.

### **Community Pharmacies' Perception of Dispensing Generic Medicines**

Table 3 shows the response of CPs on various statements toward their dispensing of generic medicines in Saudi Arabia. Majority of CPs (78.5%) believed that a standard guideline is needed to pharmacist on brand Substitution process. About (80%) of CPs suggested that the quality use of generic medicine among consumers can be achieved if both GPs and pharmacists work together. Of these, (76.5%) of CPs agreed that patients should be educated with enough information on generic medicines in order to make sure they understand about the medicines they are taking. In addition, CPs were asked to point out their response on factors affecting their dispensing. Nearly, Two-third of CPs agreed that believe advertisement by the drug companies can play a role in their Dispensing pattern. A large majority of CPs indicated that information on the

**Table 2:** Community pharmacies' knowledge of generic medicines.

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. A generic medicines is bioequivalent to a brand name medicines	117(32.1)	176 (48.1)	56 (15.3)	11 (3.0)	5 (1.4)
2. A generic medicines must be in the same dosage form (e.g., tablet, capsule) as the brand name medicines	93 (25.5)	173 (47.4)	64 (17.5)	18 (4.9)	17 (4.7)
3. A generic medicines must contain the same dose as the brand name medicines	81 (22.2)	184 (50.4)	62 (17.0)	24 (6.6)	14 (3.8)
4. eneric medicines are less effective compared to brand name medicines	34 (9.3)	194 (53.2)	70 (19.2)	48 (13.2)	19 (5.2)
5. Generic medicines produce more side effects compared to brand name medicines	24 (6.6)	163 (44.7)	97 (26.6)	56 (15.3)	25 (6.8)
6. Brand name medicines are required to meet higher safety standards than generic medicines	32 (8.8)	196 (53.7)	81(22.2)	47 (12.9)	9 (2.5)

safety and efficacy of the generic medicines (64.2%), patient's socio-economic factors (74.3%) patients demands (60.3%), and credibility of manufacturers/supplier (61.1%) were important factors affecting their dispensing. In other hand, about two- third of CPs (59.1%) thought that product bonus offered by pharmaceutical companies may influence their decision of medicines.

When comparing between pharmacists' perception based on who dispensed generic to those that did not, the study

**Table 3:** A comparison of knowledge on generic medicines in graduates from different university groups.

Items	Mean ( median)	P
Age group		
25-35	2.7 (3)	0.067*
35-45	2.8 (3)	
46-55	3.5 (3)	
Practice Less than 10 years		
11-20	2.8 (3)	0.002*
21-30	2.8 (3)	
31-40	2.3 (3)	
	1 (1)	
Country of graduation		
Egypt	2.7 (3)	0.014*
Sudan	2.6 (3)	
Syria	3.2 (3)	
Jordan	2.9 (3)	
Yemen	3.3 (3)	
Pakistan	2.5 (3)	
Dispensing generic medicine		
Yes	2.3 (2)	1.01 **
No	3 (3)	

\*Kruskal-Wallis Test

\*\*Mann-Whitney U test

shows significant difference ( $P < 0.05$ ), in their answer to all questions except Q8 ( $P = 0.068$ ) (Table 6).

## Discussion

A response rate of about 81% was achieved. It is counted as one of the strengths of study compared to other studies. Al-Rukban et al. [16] achieved a response rate of 70% in across sectional study using self-administrated questionnaire among CPs in Riyadh, SA. A high response rate (82%) was achieved by Al-Arifi [17] in his survey study among CPs. Some factors could be contributed to this high response rate, including the short time required to complete the questionnaire, filling in the survey form while in the pharmacy and multiple visits to pharmacy.

Community Pharmacists play a key role in drug therapy and have a professional responsibility can help patients in the selection of quality, safe, effective, and inexpensive drug products. In addition, CPs having adequate knowledge, positive attitude and practice about generic medicines may influence the selection of pharmaceutical products and promote access to medicines [18].

A clear understanding of essential concepts with generic medicines and specific regulatory standards for drugs to be registered as generic is a critical and there are important measurements of knowledge, attitude and practice [10]. This included bioequivalence concepts that determine systemic drug delivery [6, 10]. It was interesting that the majority of CPs thought a generic medicine is bioequivalent to a brand name medicine however, our finding was better than previous studies, where pharmacists had inadequate knowledge on bioequivalence of generic medicines [6, 19]. In addition, most of respondents thought that

**Table 4:** Community pharmacies' perceptions on dispensing generic medicines.

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. I believe we need a standard guideline to pharmacist on brand Substitution process	60 (16.4)	228 (62.5)	57 (15.6)	13 (3.6)	7 (1.9)
2. In my opinion, quality use of generic medicines among Saudi consumers can be achieved if both GPs and pharmacist work together	72 (19.7)	222 (60.8)	61 (16.7)	8 (2.2)	2 (0.5)
3. I think patient should be given an enough information about generic medicines in order to make sure they really understand about the medicines they take	78 (21.4)	201 (55.1)	66 (18.1)	20 (5.5)	(0)
4. I believe advertisement by the drug companies will influence my future Dispensing pattern	43 (11.8)	191 (52.3)	67 (18.4)	48 (13.2)	16 (4.4)
5. Patient's socio-economic factor will affect my choice of medicines	58 (15.9)	213 (58.4)	70 (19.2)	17 (4.7)	7 (1.9)
6. I feel that patient's demand of medicine influence my dispensing	28 (7.7)	193 (52.9)	120 (32.9)	20 (5.50)	4 (1.1)
7. Credibility of the manufactures/suppliers are my concern when Dispensing	44 (12.1)	179 (49.0)	87 (23.8)	51 (14.00)	4 (1.10)
8. Pharmaceutical companies product bonuses will influence my choice of medicines	64 (17.5)	152 (41.6)	52 (14.2)	56 (15.3)	41 (11.2)
9. I would dispense generic medicine to my patients	28 (7.7)	193 (52.9)	120 (32.9)	20 (5.50)	4 (1.1)

**Table 5:** A comparison of knowledge on generic medicines in number of years in practice, and country of graduation graduates from different university groups.

Items	Mean ( median)	P*
Practice in years		
Less than 10 years	2.8(3)	0.97
11-20	2.8(3)	
Less than 10 years	2.8(3)	0.001
21-30	2.3(3)	
Less than 10 years	2.8(3)	0.12
31-40	1(1)	
11-20	2.8(3)	
31-40	1(1)	0.09
Country of graduation		
Yemen		
Egypt	3.3(3)	0.007
	2.7(3)	
Yemen		
Sudan	3.3(3)	0.018
	2.6(3)	
Yemen		
Pakistan	3.3(3)	0.087
	2.5(3)	
Egypt		
Syria	2.7(3)	0.013
	3.2(3)	
Syria		
Sudan	3.2(3)	0.05
	2.6(3)	
Syria		
Jordan	3.2(3)	0.37
	2.9(3)	
Syria		
Pakistan	3.2(3)	0.15
	2.5(3)	

\* Mann-Whitney U test

manufacturing standards for generic medicines were as stringent as for branded products. All these two findings showed a good knowledge on the regulatory requirements of generic medicines may have a positive impact on the confidence in generic drugs and ultimately the future of generic dispensing.

This study found that CPs have doubts on therapeutic efficacy and safety profiles of generic drug products. This finding may conclude that pharmacists have inadequate information on bioequivalence and safety and toxicity of generic medicines. The bioequivalence is belonged to pharmacodynamics concepts that the therapeutic effect of a drug is related to the concentration of its active ingredient in the blood stream [20]. A generic drug is proven as bioequivalent to innovator brand, where both delivered the active ingredient to the blood stream at the same rate and to the same extent [21]. This misconception could be related to their poor knowledge about the concept

**Table 6:** A comparison of perception on generic medicines among pharmacists who dispensing generic medicines and non-dispensing.

Items		Dispensing generic medicine		P*
		Yes n (%)	No n (%)	
Q1				
	Strongly agree	46 (76.7)	14 (23.2)	0.002
	Agree	141(61.8)	87 (38.2)	
	Neutral	23 (40.4)	34 (59.6)	
	Disagree	7 (53.8)	6 (46.2)	
	Strongly disagree	4 (57.1)	3 (42.9)	
Q2				
	Strongly agree	57 (79.2)	15 (20.8)	0.001
	Agree	130 (58.6)	92 (41.4)	
	Neutral	32 (52.5)	29 (47.5)	
	Disagree	2 (25.0)	6 (75.0)	
	Strongly disagree	----	2 (100)	
Q3				
	Strongly agree	50 (64.1)	28 (35.9)	0.003
	Agree	133 (66.2)	68 (33.8)	
	Neutral	31(47.0)	35 (53.0)	
	Disagree	7 (35.0)	13 (65.0)	
	Strongly disagree	--	--	
Q4				
	Strongly agree	34 (79.1)	9 (20.9)	0.068
	Agree	113 (59.2)	78 (40.8)	
	Neutral	41 (61.2)	26 (38.8)	
	Disagree	24 (50.0)	24 (50.0)	
	Strongly disagree	9 (56.3)	7 (43.8)	
Q5				
	Strongly agree	27 (90.0)	3 (10.0)	0.001
	Agree	143 (69.8)	62 (30.2)	
	Neutral	39 (39.4)	60 (60.6)	
	Disagree	8 (30.8)	18 (69.2)	
	Strongly disagree	4 (80.0)	1 (20.0)	
Q6				
	Strongly agree	34 (58.6)	24 (41.4)	0.006
	Agree	144 (67.6)	69 (32.4)	
	Neutral	30 (42.9)	40 (57.1)	
	Disagree	9 (52.9)	8 (47.1)	
	Strongly disagree	4 (57.1)	3 (42.9)	
Q7				
	Strongly agree	33 (75.0)	11 (25.0)	<0.001
	Agree	126 (70.4)	53 (29.6)	
	Neutral	47 (54.0)	40 (46.0)	
	Disagree	14 (27.5)	37 (72.5)	
	Strongly disagree	1 (25.0)	3 (75.0)	
Q8				
	Strongly agree	46 (71.9)	18 (28.1)	0.001
	Agree	74 (48.7)	78 (51.3)	
	Neutral	36 (69.2)	16 (30.8)	
	Disagree	42 (75.0)	14 (25.0)	
	Strongly disagree	23 (56.1)	18 (43.9)	

\*Fisher's exact test

of bioequivalence. In addition, the respondents may not know that the strictly regulates the registration of generic products is approved by the Saudi food and drug authority (SFDA) [14]. However, this finding is consistent with the findings from other studies published in Malaysia and

Qatar [6, 22]

The community pharmacists' attitudes on generic medicines in this study are comparable to previous studies where pharmacists were positively tending to generic substitution as they view it as identification of their role as drug therapy experts [9, 21, 23]. However, this study revealed that CPs reported the need for a standard guideline on branded substitution. The implementation of national systemic effort for established a generic medicine policy in Saudi Arabia for pharmacists on how and when to make brand substitution for their customers would additional encourage the use of generic medicines and maintain accessibility and affordability of medicines [6, 24, 25].

This study revealed that CPs agreed that it is important to establish collaboration between the general practitioner (GPs) and pharmacists could improve generic medicine use by the general public. In addition, the CPs have also reported the need for patient education to improve use of generic medicines. The results of recent study in Saudi Arabia, on consumers' perception of generic medicine revealed that Saudi consumers had negative perception on generic medicines and generic substitution [26]. This could be attributed to insufficient knowledge on generic medicine. Therefore, consumers should be educated more regarding generic medicine. In addition, upgrading the healthcare professionals' knowledge on generic medicine is potentially stimulating the use of generic medicine among consumers. Studies have shown that education programs significantly increases generic acceptability among patients and health care professionals, particularly physicians and pharmacists [27]. Patients' acceptability can stimulate practitioners' motivation, behavior and knowledge of generic forms. Patient confusion due to different brands of the same medicine mentioned as a factor that prevents physicians from prescribing generic [28]. To overcome this problem, the UK Medicine and Healthcare Products Regulatory Agency (MHRA) has suggested that the labeling of medicine based on the international non-proprietary name (INN) as it helps patients to identify their medication and minimizes confusion when brand substitutions occur [29]. Additionally, it is documented that patients are more accepting of generic medicines if substitution is explained clearly and assured about the quality and therapeutic equivalence of generic products. For this reason, several techniques develop such as leaflets and pamphlets about generic medicines [18].

Two-third of CPs reported that advertising and product bonuses offered by drug companies, would influence their selection of medicines. This is a major factor influencing generic substitution however findings is also consistent with other studies, which found that pharmacists' dispensing behavior was affected by their interaction with

pharmaceutical companies [18].

CPs in this survey reported that patient's socio-economic status and patents demand were the most important factors influencing the pharmacists' generic drug substitution practice. These factors have been similarly reported in similar studies [6, 28]. We strongly believe that this reflective evaluation of Saudi pharmacists' knowledge, and Perceptions on generic medicines are necessary step prior to the improvement and accomplishment of any policy for change [21, 18, 28, 30, 31]. The results of this study could be used to assist the Saudi health policy makers to sound in favor of promotion the quality use of generic medicines in community pharmacies [24] to ensure quality, safety, and cost effective access to Saudi population.

The recent findings call for educational intervention programs to improve the knowledge of healthcare professionals, namely pharmacists and physicians [6]. Moreover, if generic medicine policies were implemented in SA, there would be a need for nationwide education programs to update all the pharmacists and prescribers as well as educational institutions (colleges of pharmacy and colleges of medicines).

### Study limitation

The finding of this study is having some limitations. One of the limitations is single site study; the second limitation is study participants involved only male community pharmacist because in Saudi Arabia female are not allowed to work in community pharmacy.

### Conclusion

The majority of community pharmacists in SA had basic knowledge regarding generic medicines. A large proportion of pharmacists reported that consumer choice, consumer's demands as well as advertising and product bonuses offered by drug companies were identified as key factors influencing generic substitution A national systematic effort is needed to establish a generic medicine policy and guidelines, either separately or as part of a broad national medicine policy in SA. Future educational programs should be developed and conducted to enhance the quality of and support the practice of generic medicines in SA.

**Funding** – None.

**Conflicts of interest** - The Author(s) declare(s) that they have no conflicts of interest to disclose.

### References

1. Cumming J, Mays N, Daube' J. How New Zealand has contained expenditure on drugs. *BMJ* 2010; 340: 2441.
2. Tordoff JM, Norris PT, Reith DM. Managing prices for hospital pharmaceuticals: a successful strategy for New Zealand? *Value Health* 2005; 8: 201-208.

3. Tordoff JM, Norris PT, Reith DM. Price management and its impact on hospital pharmaceutical expenditure and the availability of medicines in New Zealand hospitals. *Value Health*, 2008; 11: 1214-1226.
4. Alghasham AA. Generic drug prescribing in central Saudi Arabia: perceptions and attitudes of physicians. *Ann Saudi Med* 2009; 29: 24-29.
5. Business Monitor International (BMI). Saudi Arabia Pharmaceuticals & Healthcare Report Q2. Business Monitor International Ltd. 2013.
6. Awaisu A, Kheir N, Ibrahim MI, El-Hajj M, Hazi H, Khudair N, Barazi R. Knowledge, attitudes, and practices of community pharmacists on generic medicines in Qatar. *Int J Clin Pharm* 2014; 36: 394-404.
7. Kirking DM, Gaither CA, Ascione FJ, Welage LS. Pharmacists' individual and organizational views on generic medications. *J Am Pharm Assoc* 2001; 41: 723-728.
8. Allenet B, Barry H. Opinion and behavior of pharmacists towards the substitution of branded drugs by generic drugs: survey of 1,000 French community pharmacists. *Pharm World Sci* 2003; 25: 197-202.
9. Al-Gedadi NA, Hassali MA. Pharmacists' views on generic medicines: a review of the literature. *J Generic Med* 2008; 5: 209-218.
10. Birkett DJ. Generics-equal or not? *Austr Prescriber* 2003; 26: 85-87.
11. Lamy PP. Generic equivalents: issues and concerns. *J Clin Pharmacol* 1986; 26: 309-316.
12. Campbell M, Bateman DN, Lee A, Smith J, Beaney A. The pros and cons of generic medicines. *Pharmacoeconomics* 1995; 8: 362-323.
13. Carroll NV, Wolfgang AP. Risks, benefits, and generic substitution. *J Consum Aff* 1991; 25: 110-121.
14. Huda O, Salhia, Anna Ali, Naser L Rezk, Ashraf El Metwally. Perception and attitude of physicians toward local generic medicines in Saudi Arabia: A questionnaire-based study. *Saudi P J* 2015; 23: 379-404.
15. Albadr Y, Khan TM. Factors influencing community pharmacist decision to dispense generic or branded medicines; Eastern Province, Alahsa, Saudi Arabia. *Saudi Pharm J* 2015; 23: 143-146.
16. Al-Rukban MO, Khalil MA. Adherence to OTC directory—the perception of community pharmacists in Saudi Arabia. *J Ayub Med Coll Abbottabad* 2012; 24: 43-46.
17. Al-Arifi MN. Availability and needs of herbal medicinal information resources at community pharmacy, Riyadh region, Saudi Arabia. *Saudi Pharm J* 2013; 21: 351-360.
18. Babar ZUD, Grover P, Stewart J, Hogg M, Short L, Seo HG. Evaluating pharmacists' views, knowledge, and perception regarding generic medicines in New Zealand. *Res Soc Adm Pharm* 2011; 7: 294-305.
19. Toklu HZ, Dülger GA, Hıdıroğlu S, Akici A, Yetim A, Gannemoğlu HM, Güneş H. Knowledge and attitudes of the pharmacists, prescribers and patients towards generic drug use in Istanbul – Turkey. *Pharmacy Practice (Internet)* 2012; 10: 199-206.
20. Hassali MA. A comparison between senior medical students' and pharmacy pre-registrants' knowledge and perceptions of generic medicines. *Med Educ* 2007; 41: 703-710.
21. Chong CP, Hassali MA, Bahari MB, Shafie AA. Evaluating community pharmacists' perceptions of future generic substitution policy implementation: a national survey from Malaysia. *Health Policy* 2010; 94: 68-75.
22. Chong CP, Hassali MA, Bahari MB, Shafie AA. Exploring community pharmacists' views on generic medicines: a nationwide study from Malaysia. *Int J Clin Pharm* 2011; 33: 124-131.
23. Chong CP, Hassali MA, Bahari MB, Shafie AA. Generic medicine substitution practices among community pharmacists: a nationwide study from Malaysia. *J Public Health* 2011; 19: 81-90.
24. Kaplan WA, Ritz LS, Vitello M, Wirtz VJ. Policies to promote use of generic medicines in low and middle income countries: a review of published literature, 2000–2010. *Health Policy* 2012; 106: 211-224.
25. Mott DA, Cline RR. Exploring generic drug use behavior: the role of prescribers and pharmacists in the opportunity for generic drug use and generic substitution. *Med Care* 2002; 40: 662-674.
26. Abdulrahman AA. Consumers' perceptions on generic medicines in Taif city, Saudi Arabia *Saudi J Health Sci* 2013; 3: 18-22.
27. Valles J, Barreiro M, Cereza G, Ferro J, Martinez M, Escriba J. A prospective multicenter study of the effect of patient education on acceptability of generic prescribing in general practice. *Health Policy* 2003; 65: 269-275.
28. Hassali M, Kong D, Stewart K. Generic medicines: perceptions of general practitioners in Melbourne, Australia. *Journal of Generic Medicines* 2006; 3: 214-225.
29. Guidance note no. 25: best practice guidance on labelling and packaging of Medicines. London: Medicines and Healthcare products Regulatory Agency 2003.
30. Babar ZUD, Awaisu A. Evaluating community pharmacists' perceptions and practices on generic medicines: a pilot study from Peninsular Malaysia. *J Generic Med* 2008; 5: 315-330.
31. Jamshed SQ, Ibrahim MIM, Hassali MA, Babar ZUD, Alkalami R, Siddiqui MJ. Do hospital pharmacists in Pakistan understand the concept of generic medicines? a mixed-method approach. *Res Soc Adm Pharm* 2012; 8: e17.

**Correspondence to:**

Wajid Ali Syed  
King Saud University  
Riyadh  
Saudi Arabia