



Preference of Health, Non-Health Care Students and Practicing Pharmacists of Brand or Generic and Imported and Locally Made Medicines

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Abstract

Background: Food and Drug Administration's approved generic medicine use in the treatment of diseases on the basis of its bioequivalence to counterpart brands. WHO recommends generic as long as they have the same active and chemical composition like brands and passes the quality standards during manufacturing, and packaging.

Objective: This study was carried out to assess the knowledge and preference of pharmacy and engineering students and the practicing pharmacists towards generic and locally made medicines as compared to brand and imported ones. **Method:** A cross-sectional survey has been designed at the University of Sharjah- the United Arab Emirates. The participants included 164 students of colleges of pharmacy and engineering 29 practicing pharmacists. Data has been analysed using Statistical Package for Social Sciences (IBM SPSS) and the Chi-square test was used to ascertain the dependent and independent variables. The level of significance was considered at $p < 0.05$. Two separate questionnaires were prepared for students and pharmacists both having three choices as Yes, no, and I don't know for the included questions.

Result: Completely filled questionnaires were received from 76 and 55 pharmacy and engineering students respectively representing response rates of 76% and 55%. The female students were more and of final study year and around 50% were self-sponsored and the rest are on scholarships. Despite the difference in knowledge of the meaning of generics, both pharmacy and engineering students have the same views and attitudes towards preference of brand medicines. Similarly, both pharmacists and pharmacy students prefer brand medicine and have a negative attitude toward generic medicines.

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Keywords: Preference; Generic medicines; Brand medicines; Pharmacy students and pharmacists; Bioequivalence.



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Conclusion: In this study, despite having the knowledge regarding generic medicines, both pharmacy students and practicing pharmacists possess a negative attitude towards generics. There is still a need to focus on promoting generic prescribing and dispensing through pharmacy and medical education as well as continuing educational programs. Increasing the awareness of the public towards generic medicines is also a beneficial intervention.

Introduction

Prescription analysis can demonstrate the trend and extent of prescribing of generic versus brand medications which may not be in accordance with the recommendation of the world health organization (WHO) [1]. In an earlier study in UAE, the common trend of prescribing among both general practitioners and consultant physicians was more in favor of brand medicines [2]. This pattern is also strengthened by the fact that patients owing to their previous experience with certain medicines may force the prescribing physician to prescribe brand medicines. Adding to this is the influential promotional activities of brand medicines through mass media.

A brand medicine is a drug, which is discovered, developed, and marketed by a renowned pharmaceutical organization. The company files a patent to prevent other companies from making a copy of their medicine. On the other hand, a bioequivalent generic drug becomes available after the expiration of the patent of brand medicine [3]. The Food and Drug Administration [4] approval of use of a generic medicine in the treatment of diseases is based mainly on its bioequivalence to the counterpart brand considering its quality, safety profile and other pharmaceutical aspects. As per the WHO, generic medicines are pharmaceutical products that are intended to use interchangeably with comparator products. Both generic and brand medicines possess similar active ingredients, chemical composition and pass through similar quality standards in terms of manufacturing and packaging [5]. Brand drug discovery and development passes through intensive and costly basic, preclinical, and clinical testing that has to be accounted for in pricing. On the other hand, generics are intentionally exempted from such expensive testing to be priced at lower affordable costs than brands. As a result, generic medicines, according to estimates of Food and Drug Administration (FDA), are usually 20%-70% less expensive than their counterpart brands [4]. Differences in prices also exist between locally made (usually generics or franchised) and imported medicines. There is evidence that both physicians and pharmacists hold negative views of generics and are inclined to prescribe and dispense brand medicines [6, 7]. Such a trend is further enhanced by the patient's lack of knowledge, and his/her misconceptions about generics [8, 9]. These negative views on generics and locally manufactured drugs is not only held by the layman but also by educated patients [8]. The present study was undertaken to evaluate the knowledge and perception of pharmacy and engineering students, and practicing community pharmacists towards generic and locally manufactured medicines.

Material and methods

Study design

A cross-sectional survey carried out in the University of Sharjah- the United Arab Emirates from January to April 2020 among pharmacy and engineering students.

Study participants

The total population size who participated in this study was 164, and the target number was calculated using online calculator Raosoft with 95% confidence interval and 5% margin of error. We included final study years' students from fourth and fifth years from the colleges of engineering and pharmacy respectively, and practicing community Pharmacists. University students from other colleges and years of study were excluded from the study. We also excluded targeted students who refused to participate in the study.

Questionnaire development

An anonymous questionnaire was developed based on the information needed for the study, written in English language and was pre-piloted for face validity by distributing it to 4 students of each targeted colleges and 6 community pharmacists and their comments and recommendations were considered in the final version of the survey but their responses were not included in the results. The time to complete the questionnaire was estimated to be 15-20 minutes. To university students, we distributed the questionnaire in classes with the approval of the class instructor. The researchers briefly explained the nature and purpose of the questionnaire, distributed the questionnaire and information sheet and a written consent was obtained from those who willingly agreed to participate. The questionnaire for community pharmacists was distributed in pharmacies across the Emirate of Sharjah and collected the second day with signed written consent.

The student's questionnaire

The formulated questionnaire consisted of three main parts. The answers were of 3-point choices (Yes, no, and I don't know). The first section included questions concerning demographic characteristics of the participants such as gender, age, college, ethnicity, self-paid tuition or scholarship, parent's salary and whether having medical insurance or not. The second section assessed the students' knowledge regarding generic and brand medications. This part included questions such as; Do you know what's is meant by brand or generic? What would you choose a brand or generic medicine of the same medicine? Do you prefer a brand over generic? Do you think the quality of brand is better than generic? Does the price of the medicine matter to you? Does the presentation of the medicine package influence your choice?

Student were also asked have to select other factors that affect their choice, such as; "Package of medicine ", "Name of the pharmaceutical company ", "country of origin ", "Earlier experience ", "Physician's recommendation ", "Pharmacists' recommendation ", "Cost is covered by insurance ", "More expensive drugs act better ", "More expensive drugs have less side effect ".

The third section is about to choose what the students prefer "Imported Vs locally made medicine ". The type of questions asked include "Which medicine do you prefer imported or locally made?", Based on their choice, they have to justify their preference such as; "Better quality than other type ", "Better package presentation ", "More effective ", "More expensive ", "Had earlier experience with the medicine ", "Physician's recommendation ", "Pharmacist's recommendation ", "Influenced by advertisement ".

The pharmacists' questionnaire

The formulated questionnaire consisted of three main parts.

The answers were of a 3-point choices (Yes, no, and I don't know). The first section included questions concerning demographic characteristics of the participants such as gender, age, degree, ethnicity, county of study, years of experience. The second section assessed the pharmacist's knowledge regarding generic and brand medications. This part included questions such as; Do patients without prescriptions ask for brand or generic medicine?

What would you choose a brand or generic medicine to dispense? Do you prefer a brand over generic? Do you think the quality of brand is better than that of the generic? Do you think generics are cheaper than brand medicines? Does the price of the medicine you dispense matters to you? Pharmacists were also asked to select factors that affect their choice, such as; "Quality of package of medicine ", "Name and reputation of pharmaceutical company ", "country of origin ", "Earlier experience ", "Physician's recommendation ", "Cost is covered by insurance ", "More expensive drugs act better ", "More expensive drugs have less side effect ""Influenced by advertisement ", "Influenced by medical representative ".

The third section was whether the pharmacist prefers "Imported Vs locally made medicine ". Based on their choice they have to select answers to justify their preference such as; "Better quality than other type ", "Better package presentation ", "More effective ", "More expensive ", "Had earlier experience with the medicine ", "Physician's recommendation ", "Name and reputation of pharmaceutical company ", "Influenced by advertisement ", "Influenced by medical representative".

Statistical analysis

The participants' responses were encoded and the data was analyzed using Statistical Package for Social Sciences (IBM SPSS statistics for windows, version 20.0, IBM Corp., Armonk, NY, USA). We adopted descriptive analysis to calculate the response proportion of each group of respondents for each item in the questionnaire. We also used the Chi-square test to ascertain the association between the dependent variables and other independent selected variables considering the level of $p < 0.05$ as the cut-off value of significance.

Ethical approval

Ethical approval of the study was obtained from the Research Ethics Committee of the University of Sharjah, United Arab Emirates (UAE). Approval number REC- 20-02-12-01- S (Appendix-1).

Results

Socio-demographic characteristics of university students

We received back 76 and 55 completely filled survey from the colleges of pharmacy and engineering producing response rates of 76% and 55% respectively. Among students, females were more than males and the majority (75, 56%) of students being of age ranging from 23-25 years. All participants were final year students and most (118, 88.1%) of them were Arabs (Table 1). More than 50% of the participants were self-sponsored (79, 59%) while the rest were on scholarships. Parent's monthly salary ranged from less than 5000AED (about \$1388) to more than 20,000AED (about \$5555). Participants with medical insurance comprised 75 (56%) students.

Table 1: Socio-demographic data of pharmacy and engineering students.

Characteristic		Respondents(n=134)
		Frequency (Percentage)
Gender	Male	59(44%)
	Female	75 (56%)
Age (years)	20-22	30 (22.4%)
	23-25	75 (56%)
	25-27	29 (21.6%)
Ethnicity	Arab	118 (88.1%)
	Non-Arab	16 (11.9%)
College	Pharmacy	76 (56.7%)
	Engineering	55 (41%)
	Missing data	3 (2.2%)
Year of Study	Final year (4 th)	26 (19.4%)
	Final year (5 th)	108 (80.6%)
Sponsorship	Scholarships	55 (41%)
	Self-Sponsored	79 (59%)
Parent's Salary (AED)	<5,000	7 (5.2%)
	5,000-10,000	31(.1%)
	10,000-15,000	42 (31.3%)
	15,000-20,000	18 (13.4%)
	>20,000	33 (24.6%)
	Missing data	3 (2.2%)
Medical Insurance	Yes	75 (56%)
	No	59 (44%)

Table 2: Socio-demographic data of practicing pharmacists.

Characteristic		Respondents (n=29)
		Frequency (Percentage)
Gender	Male	17 (58.6%)
	Female	12 (41.4%)
Age (years)	22-27	13 (44.8%)
	28-33	2 (6.9%)
	34-39	4 (13.8%)
	40-45	2 (6.9%)
	46-51	2 (6.9%)
	Above 52	6 (20.7%)
Ethnicity	Arab	28 (96.6%)
	Non-Arab	1 (3.4%)
Degree	Bachelor	16 (55.2%)
	PhD	9 (31%)
	Missing data	4 (13.8%)
Years of Experience	2-4	15 (51.7%)
	5-10	5 (17.2%)
	11-20	3 (3%)
	> 20	6 (20.7%)
Country of Study	Australia	1 (3.4%)
	Egypt	1 (3.4%)
	Saudi Arabia	11 (37.9%)
	USA	2 (6.9%)
	UAE	10 (34.5%)
	UK	1 (3.4%)
Missing data	3 (10.3%)	

Socio-demographic characteristics of practicing pharmacists

We targeted 50 pharmacists practicing in community and hospital pharmacies but only 29 responded producing a response rate of 58%. Males were more than females and 13 (44.8%) were within the age range of 22-27 years. Most (28, 96.6%) of the participants were Arabs. Slightly more than 50% of the pharmacists were with 2-4 years' experience. More than two thirds of the pharmacists obtained their pharmacy degrees from Saudi Arabia or UAE and only few with degrees from Western countries (Table 2).

Preferences and views of students on brand versus generic medicines

Table 3 shows that significantly more pharmacy (61, 80.3%) than engineering (18, 32.7%) students know what is meant by brand and generic medicines. However, when both groups of students were asked about the quality of the medicine, and whether its price and presentation of its package would influence their choice, most students in both colleges agreed that these factors influence their choice and preferred brand over generic medicines if they have to choose between the two.

Table 3: Brand versus generic medicines among Pharmacy and Engineering students.

Question	Responses						Chi square test *P value
	Pharmacy (n=76)			Engineering (n=55)			
	Yes	No	I do not know	Yes	No	I do not know	
1. Do you know what is meant by brand and generic medicine?	61 (80.3%)	18 (23.7%)	9 (11.8%)	18 (32.7%)	23 (41.8%)	13 (23.6%)	0.001
2. Do you think the quality of brand is better than that of the generic	38 (50%)	28 (36.8%)	10 (13.2%)	22 (40%)	15 (27.3%)	17 (30.9%)	0.06
3. Does the price of the medicine matters to you?	49 (64.5%)	21 (27.6%)	6 (7.9%)	25 (45.5%)	21 (38.2%)	9 (16.4%)	0.20
4. Does the presentation of the medicine package influence your choice?	41 (53.9%)	20 (26.3%)	15 (19.7%)	31 (56.4%)	14 (25.5%)	10 (18.2%)	0.90
	Brand	Generic	I do not know	Brand	Generic	I do not know	
5. Do you prefer a brand or generic?	51 (67.1%)	16 (21.1%)	8 (10.5%)	27 (49.1%)	11 (20%)	17 (30.9%)	0.10
6. Given the choice, would you choose a brand or generic of the same medicine?	38 (50%)	23 (30.3%)	14 (18.4%)	25 (45.5%)	14 (25.5%)	16 (29.1%)	0.80

*Significance level at P<0.05.

Preferences and views of pharmacy students and practicing pharmacists on brand versus generic medicines

Surprisingly when we compared the responses of both pharmacy students and practicing pharmacists, there were no significant differences in their preferences or choices among brands versus generics. The majority of both groups favored brand medicines (Table 4). However, among pharmacists, the number of respondents choosing brand was similar to those choosing generic medicines but when asked for their preference, more pharmacists preferred brands. Again, the majority (more than 50%) of each group agreed that the quality, package presentation and price positively influence their preference and choice of brand medicines (Table 4).

Preferences of students and pharmacists of imported versus locally made medicines

Table 5 shows the responses of university students and practicing pharmacists to the question on their preferences of imported or locally manufactured medicines. With no significant variation between responses of pharmacy and engineering students and practicing pharmacy, more than 70% of each of the three groups of participants preferred imported medicines over locally manufactured ones. They also showed the same trend when purchasing a prescription drug to a family member (Table 5).

When pharmacists with B. Pharm and Pharm D were asked whether they are, in their practice, product- or patient- oriented, more than 50% of them were patient oriented with the rest of each clearly stating that they are product-oriented.

Table 4: Brand versus generic medicines among Pharmacy and Pharmacists.

Question	Responses						Chi square test *p value
	Pharmacy students (n=76)			Pharmacists (n=29)			
	Brand	Generic	I do not know	Brand	Generic	I do not know	
1. Given the choice, would you choose a brand or generic of the same medicine?	38 (50%)	23 (30.3%)	14 (18.4%)	14 (48.3%)	14 (48.3%)	1 (3.4%)	0.20
2. Which do you prefer a brand or generic?	51 (67.1%)	16 (21.1%)	8 (10.5%)	18 (62.1%)	10 (34.5%)	1 (3.4%)	0.50
	Yes	No	I do not know	Yes	No	I do not know	
3. Do you think the quality of brand is better than generic medicine?	38 (50%)	28 (36.8%)	10 (13.2%)	18 (62.1%)	11 (37.9%)	0 (0%)	0.07

4. Does the price of the medicine you dispense matters to you?	49 (64.5%)	21 (27.6%)	6 (7.9%)	15 (51.7%)	13 (44.8%)	1 (3.4%)	0.30
5. Does the presentation of the medicine package influence your choice?	41 (53.9%)	20 (26.3%)	15 (19.7%)	16 (55.2%)	13 (44.8%)	0 (0%)	0.07

Table 5: Preferences of students and pharmacists of imported versus locally made medicines.

Questions	Respondents' preference, Frequency (%)			
	Pharmacists (n=29)	Pharmacy students (n=76)	Engineering students (n=55)	Chi square test *p value
Which medicines you prefer?				
Imported	23 (79.3%)	67 (88.2%)	39 (70.9%)	0.60
Locally made	6 (20.7%)	8 (10.5%)	15 (27.3%)	
Which medicine you select while purchasing a prescribed drug to a family member?				
Brand	15 (51.7%)	31 (40.8%)	17 (30.9%)	0.90
Generic	7 (24.1%)	17 (22.4%)	12 (21.8%)	
Imported	4 (13.8%)	15 (19.7%)	15 (27.3%)	
Locally made	3 (10.3%)	13 (17.1%)	11 (20%)	

*Significance level at P<0.05.

Discussion

The role of the pharmacist has evolved substantially with more focus on patient rather than product. As such, pharmacists, as frontline healthcare providers, should ensure the rational and cost-effective use of medicines. They also promote healthy lifestyle, increase awareness of the public of important health issues. Such pharmaceutical services surpass the traditional role of the pharmacist which concentrates on preparing and dispensing medications to patients. The new roles include influencing the prescribing process and the delivery of pharmaceutical care services that make pharmacists more involved in patient care [10].

In the present study, the majority of the practicing pharmacists were Arabs with a bachelor degree of pharmacy and about one third of them were PhD holders and more than 50% were of 2-4 years of professional experience. Surprisingly, similar percentages of pharmacists and pharmacy students prefer brand and if to choose they will select brand medicines. Again, similar percentages stated that for brands the quality is better, the package presentation influence their choice, and the price matters to them as indicative of high quality medicine. Similar attitude was observed among the engineering students; however, this attitude would be expected and acceptable from someone with no medical background but it is not at all acceptable from a senior pharmacy student or a practicing pharmacist. Our results are comparable to those previously reported for UAE [11] and also for Pakistan [12]. A generic medicine is a multisource pharmaceutical product which is meant to be interchangeable with the comparator product also called innovator, proprietary or brand product [4]. It is rather a common misconception among the public that an expensive and an imported item medicine is of higher quality than a cheaper and locally manufactured one. The public in general and healthcare professionals must not cultivate such misconceptions and must be promoters of generic prescribing and dispensing. Practicing pharmacists and senior pharmacy students should also be aware that a generic medicine is not inferior to its counterpart brand and can be a suitable substitute to the innovative branded medicine particularly for patients who have no medical insurance and cannot afford expensive brand medicines. Availability of affordable medicines to the financially unprivileged patients helps to improve thera-

peutic outcomes by enhancing drug adherence. In addition, providing patients with a rationally effective drug at an affordable cost, both the prescribers and dispensers help reducing the escalating burden on healthcare budget and improve the access of public to essential medicines [13].

The negative attitude of pharmacy students and practicing pharmacists towards generic medicines is not restricted to UAE but extends to other countries such as Australia, Ethiopia, Yemen, New Zealand, Palestine, and Pakistan [5, 11, 12, 13, 14] where large percentages of participants claimed that generics are inferior to counterpart brands. Such a negative attitude is strengthened by results of the present study where pharmacist as well as pharmacy students preferred brands and imported medicines over generics and locally made medicines. Moreover, in real practice the majority would select brands and imported medicines when purchasing prescribed drugs for a family member. Such attitude clearly indicates that knowledge itself may not be alone a propulsive motive to enhance generic prescribing and dispensing. There is an urgent need to increase the awareness of the public towards generic medicines. Moreover, more emphasis must be made in related courses of pharmacy and programs of continuing pharmacy education to improve the knowledge of pharmacy graduates and practicing pharmacists regarding generic medicines. The same applies to physicians as prescribers of medicines.

Limitation

Because of the COVID-19, distance learning and lack of time, the samples size was small and may not allow generalization of results.

Conclusion

Collectively, from this study it is possible to conclude that despite their knowledge of some aspects of generic medicines, pharmacy students and practicing pharmacists, c.f. engineering students, still have negative attitudes towards generics. There are still areas for improvement in the knowledge, perception and attitudes of all the participants in the present study. Therefore, efforts must be directed towards increasing awareness of not only healthcare professionals but the public in general towards generic medicines. Focus on university students regardless of their major seems a major intervention since they are a

large sector of any society. In addition, incorporation of extensive topics on generic medicine in pharmacy curricula and in continuing pharmaceutical and medical educational programs would certainly help in promoting generic prescribing and dispensing.

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Conflict of interest

The authors declare no conflict of interest.

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