

# Medical and Pharmacy Students' Perceptions Regarding Generic Medicines in Yemen

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## Abstract

**Objective:** The study is to evaluate Yemeni medical and pharmacy students' knowledge and attitude regarding generic medicines. **Method:** A cross-sectional survey was used to collect data from final-year medical and pharmacy students at six public and private universities in Yemen. The questionnaire was distributed among the students through their course coordinators. Students were clearly informed about the objective of the study and their written consents were taken before the survey. The responses were entered in SPSS, and descriptive and inferential analyses were carried out. **Results:** The response rate was 60.1%. Overall the half of participants' perception regarding generic medicine was positive. Perceptions of pharmacy students' regarding generic medicines were better than those of the medical students.

**Conclusion:** The present study concluded that both studied groups had insufficient knowledge about quality, safety and bioequivalence of generic medicines. The medical students showed poorer knowledge than pharmacy students which need to give more attention from educators regarding the use of generic medicines.

**Key words:** Generic drugs, Medical students, Perception, Pharmacy students, Yemen.

## INTRODUCTION

Generic medicine is not inferior than innovative or branded medicine and thus it can be substitutable with an innovative/branded medicine.<sup>[1]</sup> The main purpose of introducing the idea of generic medicine was to reduce escalating health care costs and to improve the access of public to essential medicine.<sup>[2-3]</sup> The high price of branded medicines was reported as the main barrier toward access to the medicines, mainly in developing countries.<sup>[4]</sup> Yemen is among the lowest country on annual health expenditure.<sup>[5]</sup> In such a scenario like Yemen, it is highly desirable to encourage the use of generic medicines throughout the nation. Physicians and pharmacists can play influential role in this regard through prescribing and dispensing generic medicines respectively, provided they should work collectively.<sup>[6]</sup> But, there is controversial perception regarding bioequivalence, safety, and quality of generic medicines<sup>[7]</sup> which affect prescribing attitude of physicians<sup>[8]</sup> and dispensing behaviour of practising pharmacists.<sup>[9]</sup> This problem can be downgraded by providing educational interventions about the benefits of generic prescribing to the prescribers, dispensers, medical students, and pharmacy students. There are limited studies in the low- and middle-income countries on the assessment and comparison of the knowledge and perception of final year medical and pharmacy students regarding generic medicine and brand substitution. In near future, final year medical and pharmacy students would become the registered professionals. Thus, their knowledge and perception at this level

would reflect their future practice, in term of prescribing and dispensing, of generic medicines.<sup>[8-9]</sup> In Southeast Yemen, knowledge, attitudes, and perceptions of pharmacy and medical students were assessed, and the finding revealed that those students had knowledge deficit regarding generic medicines' bioequivalence, safety, and quality.<sup>[10]</sup> The findings of this study can be considered as a point of reference for legislation, policy makers, pharmacy and medical schools and future healthcare professionals in Yemen. The objective of the study is to evaluate Yemeni medical and pharmacy students' knowledge and attitude regarding generic medicines.

## METHODS

A cross-sectional survey was used to collect data from medical and pharmacy students at six public and private universities in Yemen in 2013. This study was approved from the ethical research committee in the University of Science and Technology, Sana'a, Yemen. Anonymity and confidentiality for all participants were ensured. Participation Consent was implied by the completion and return of the survey.

Data were collected using pre-tested questionnaire.<sup>[4]</sup> The Questionnaire used in the survey was divided into two sections. The first section comprised demographic variables including student's nationality, age, gender, and type of scholarship and university. The second section was further divided into

three set of questions, the first part was concerned with student's knowledge and perception regarding generic medicine, the second part was concern with student' perception regarding quality, safety of generic medicines versus brand-name, and the third part was concerned with current education background of medical and pharmacy students about generic medicines. The questions in the second section were formatted into a five-point Likert-scale (i.e. 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree). Content validity of the questionnaire, including relevance, clarity, and conciseness of the questions were evaluated by experts. Experts' comments and observations were considered in the final form of the questionnaire.

Data was gathered from all medical and pharmacy students at three public and three private universities in Sana'a Yemen. The sampling criteria included all sixth year medical students and fifth year pharmacy students who were registered as full-time student at three public and three private universities during the study period (N=608). The number and list of registered students were obtained from the respective lecturer coordinators in each of the universities. Subjects of the study were informed about the objective of the survey through an explanatory letter attached to the survey questionnaire. The questionnaire was distributed among the students through the respective academic coordinators of their universities.

Respondents' demographic information, such as frequencies and percentages was represented using descriptive statistical analyses. Association between categorical variables were assessed using Chi-square test. A statistical significance level was set at  $P < 0.05$ .

## RESULTS

Three hundred sixty five (60.1%) out of 608 students who had received the questionnaires completed the questionnaire. Among the respondents, 165 (45%) were medical students and 200 (55%) were pharmacy students (Table 1). The students with age 23 or more were 297 (81.4%), and the students with age less than 23 were 68 (18.6%). A total of 239 (65.5%) of the participants were male compared with female students who comprised 126 (34.5%) of the participants.

Three questions were used to evaluate the students' knowledge and perception about generic equivalence (Table 2). Compare to medical students, high percentage of pharmacy students (54% and 48.5%) correctly responded that the agents that are evaluated as generic equivalent are considered therapeutically equivalent to each other and to innovator brand product, respectively. Also, most of the pharmacy students (79.5%) reported their desire to know more information on how to conduct bioequivalence tests. Significant associations between medical and pharmacy profession and their all responses were detected as shown in Table 2, table 3 and table 4.

Regarding respondents' perception about quality and safety of a generic medicine compared with its brand-name, five items were used (Table 3). Higher

Demographic Data		Freq.	%
Group	Medical students	165	45.2
	Pharmacy students	200	54.8
Age	Less than 23	68	18.6
	23 or more	297	81.4
Gender	Male	239	65.5
	Female	126	34.5
Nationality	Yemeni	307	84.1
	Others	58	15.9
Scholarship	Government	185	50.7
	Private	143	39.2
	Others	37	10.1
University response rate	Government	247	67.7
	Private	118	32.3

percentage of pharmacy students (74.5%, 74%; respectively) understood that the dosage form and dose strength of a generic medicine must be the same as its brand-name medicine. Almost one third of pharmacy students (35%) thought that generic medicine produces side effects more than that of brand name medicine; this percentage was less with medical students (18.8%). High percentage of medical students (78.8%) disagreed that the generic medicine is less expensive than brand name medicine; this issue was less with pharmacy students (10%).

In the last part, three items were used to assess the students' perception regarding current education about generic medicines (Table 4). A high percentage of pharmacy students (80%) agreed that they need more information regarding issues belonging to generic medicines' safety and efficacy compared with 13.9% of medical students. The majority of pharmacy students (75.5%) agreed that they have the confidence to substitute generic medicine for its brand-name; additionally, high percentage of pharmacy students (62.5%) agreed that it is easier to recall the generic names of drug rather than the brand names. Compared with pharmacy students, most medical students (44.9%) disagreed with substituting the innovator brand by a generic product. also, most of them (47.3%) disagreed that the generic name is easier than the brand names to recall medicine's therapeutic class.

## DISCUSSION

The attempted objective was to asses and compare knowledge and perception of final year medical and pharmacy students about generic medicines. The current study showed statistically significant difference between medical and pharmacy students regarding the medicines that were rated as generic equivalent should be considered as therapeutically equivalent to each other and to their corresponding brand-name medicines.

Statement		SD	D	N	A	SA	Chi-square	p-value
A generic medicine that is rated as "generic equivalent" is therapeutically equivalent to its brand medicines.	Pharmacy	7.0%	18.0%	26.5%	36.5%	12.0%	28.9	<0.001
	Medicine	9.7%	41.2%	21.2%	21.8%	6.1%		
Generic medicines that are rated as "generic equivalents" are therapeutically equivalent to each other.	Pharmacy	7.5%	17.5%	21.0%	39.5%	14.5%	47.8	<0.001
	Medicine	7.9%	43.6%	27.3%	17.0%	4.2%		
I need more information on how to conducted bioequivalence tests for a generic product	Pharmacy	1.5%	6.0%	13.0%	29.0%	50.5%	221.4	<0.001
	Medicine	41.2%	38.8%	11.5%	7.9%	0.6%		

Total number of pharmacy students =200, medical students=165.

SD=strongly disagree, D=disagree, N=neutral, A=agree, and SA=strongly agree.

**Table 3: Quality and safety Perception regarding generic and brand-name medicines.**

Statement		SD	D	N	A	SA	Chi-square	p-value
A generic medicine is bioequivalent to its innovator brand	Pharmacy	6.5%	21.5%	9.0%	52.5%	10.5%	22.1	<0.001
	Medicine	6.7%	20.6%	26.1%	37.0%	9.7%		
The dosage form of generic medicine must be the same as that of brand name medicine (e.g. tablet, capsule)	Pharmacy	2.5%	13.0%	10.0%	42.0%	32.5%	141.1	<0.001
	Medicine	20.0%	40.0%	26.1%	11.5%	2.4%		
Dose strength of a generic medicine must equal that of brand name.	Pharmacy	6.5%	9.0%	10.5%	30.5%	43.5%	138.1	<0.001
	Medicine	29.7%	30.9%	25.5%	10.9%	3.0%		
Generic medicines are expected to produce more side-effects than brand name medicines.	Pharmacy	9.0%	29.0%	27.0%	21.0%	14.0%	14.1	0.007
	Medicine	14.5%	31.5%	35.2%	13.3%	5.5%		
Generic medicines are expected to be less expensive than brand name medicines.	Pharmacy	2.5%	7.5%	7.0%	33.5%	49.5%	226.8	<0.001
	Medicine	41.8%	37.0%	10.9%	8.5%	1.8%		

Total number of pharmacy students =200, medical students=165

SD=strongly disagree, D=disagree, N=neutral, A=agree, and SA=strongly agree.

**Table 4: Perception of current education regarding generic medicines.**

Statement		SD	D	N	A	SA	Chi-square	p-value
I need more information on the issues related to generic medicines' safety and efficacy.	Pharmacy	1.0%	7.5%	11.5%	29.5%	50.5%	191.5	<0.001
	Medicine	32.1%	39.4%	14.5%	11.5%	2.4%		
From the knowledge I have, I have the confidence to substitute an brand-name by its generic medicine	Pharmacy	2.5%	10.5%	11.5%	47.5%	28.0%	91.4	<0.001
	Medicine	15.8%	29.1%	27.9%	22.4%	4.8%		
It is easier to recall the class of medicine using generic names rather than brand names.	Pharmacy	4.0%	16.5%	17.0%	45.5%	17.0%	64.1	<0.001
	Medicine	10.3%	37.0%	30.9%	12.1%	9.7%		

Total number of pharmacy students =200, medical students=165

SD=strongly disagree, D=disagree, N=neutral, A=agree, and SA=strongly agree.

These findings may be justified by possible differences in the educational background and training received during their education. The result in this study agreed with the finding reported by previous studies.<sup>[11-12]</sup> Moreover, Siam *et al.* reported that there was a significant difference among pharmacy and medical students regarding knowledge of generic medicine in Bangladesh.<sup>[4]</sup> In contrast, a study conducted by Basak and Sathyanarayana in India showed that many of the pharmacists and drug retailers have misconception regarding generic medicines, and they lack enough knowledge about generic substitution, even if the prescribed medicines are not available.<sup>[13]</sup>

High proportion of medical students pointed that they do not need more information on conducting bioequivalence tests. This was in contrast with the reports by Das and Das and Hassali *et al.*<sup>[14,11]</sup> but it may reflect misunderstanding of medical students about the importance of such courses. On the other hand, pharmacy students were eager to accept more information when it was offered to them; especially, when a topic was more related to pharmacy curriculum.

There was a significant difference among pharmacy and medical students about the perception on generic medicine and its bioequivalence to the corresponding brand-name medicines. Medical students thought that the dosage form of a generic medicine is not required to be the same as its corresponding brand-name medicine. This result is consistent with other studies conducted in South Yemen by Al-Tamimi *et al.*<sup>[10]</sup> and in Australia by Hassali *et al.*<sup>[11]</sup> which highlighted the issue probably due to their less education on drug formulation compared with pharmacists. Regarding medication dose, pharmacy students were more aware than medical students that the dose strength of a generic medicine must be the same as its corresponding brand-name medicine. As previously justified, some courses such as pharmaceuticals and clinical pharmacy are not addressed at

medical schools' curricula and this might be anticipated to have impact on the medical students' responses regarding such question.

Pharmacy students pointed that a generic medicine costs less than its corresponding brand-name; however, medical students denied. This knowledge can be attributed to the students who had training in community or hospital pharmacies are more experienced in terms of pricing than medical students. This issue is supported by what has been found in Australia by Hassali *et al.*<sup>[11]</sup>

Medical students do not prefer to have more information about generic medicines' safety and efficacy. These responses obviously showed deficit perception about the current medical education, and importance of such courses in future practice. A nationwide study conducted in Malaysia also supports this finding. The findings of the study showed a negative perception of physicians regarding quality, safety, and efficacy of generic medicines.<sup>[15]</sup> Another study by Gyawali *et al.* in Nepal also go along with this.<sup>[16]</sup> But, the study conducted in Afghanistan by Bashaar *et al.* found the opposite.<sup>[17]</sup>

Pharmacy students responded that it is easier for them to identify the class of certain drug using the generic names rather than the brand names. This can be attributed mainly to the extensive use of generic names in pharmacy education and the practice of such names during community and hospital pharmacies practice.

The present study concludes that both groups have knowledge deficit regarding some issues, specifically on some issues of quality and safety of generic medicines; however, medical students show poorer knowledge than pharmacy students. These area of deficits need to be addressed by

educator of both groups and the value of generic medicines warranted to be discussed with future practitioners.

## Limitations

One of the main drawbacks of this study is that a convenience sample was used to draw study respondents. In addition, this study did not consider the relationship between the curriculum content for both groups and the perception about the use the generic medicines. Furthermore, only three out of ten medical schools were included in this study. Similarly, from more than 15 public and private pharmacy schools, only 5 pharmacy schools were included. Further study are suggested to focus on such limitation in order to detect the obstacle that may result in negative perception regarding generic medicines use.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest

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