RESEARCH ARTICLE

Pharmacy Students' Perceptions of Generic Medicines in Southern Vietnam

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Abstract

Context: Various studies concerning the knowledge of pharmacy students regarding generic medicines have been conducted worldwide although this issue has not previously been investigated in Vietnam. **Aims:** The present study therefore aims to assess the knowledge of pharmacy students regarding generic medicines in Southern Vietnam. **Materials and Methods:** A cross-sectional survey study was conducted between January and April 2017. A total of 608 undergraduate pharmacy students from various universities in Southern Vietnam were questioned using a 22-item questionnaire. **Statistical Analysis used:** The Chi-square, t-test, and analysis of variance were manipulated to calculate the association between the study variables. **Results:** Some 800 forms were initially distributed, which led to an effective response rate of 76.0% when 608 forms were returned by 306 students from private universities and 302 students from public universities. The numbers of participants who had previously heard of the brand name and generic medicines were 93.3% and 90.6%, respectively. The major sources of students' knowledge included textbooks (72.7%) and lectures (82.6%). Almost 90% of students exhibited the ability to distinguish generic and brand name medicines. Of the ten questions investigating participants' knowledge of generic medicines, the average score of the 608 students was 5.19 ± 2.43. In this regard, the public university students scored higher with 5.65 ± 2.61 than the private students with 4.73 ± 2.15 ($t = -4.770$, $P < 0.001$). **Conclusions:** In general, the lack of awareness among pharmacy students varied between universities so that both the education system and the government should pay a greater attention to the education of future pharmacists.

Key words: Generic, knowledge, perception, pharmacy, students, Vietnam

INTRODUCTION

Medicine is an important product that serves to reduce morbidity and mortality as well as improve quality of life although only one-third of the global population can access adequate medical care. More than half of the population of certain developing countries in Asia and Africa has no access to essential medicines.[1] Yet, generic medicines appear to offer the potential to overcome the biggest barrier to access to medical care, that is, the price of drugs.[2]

The World Health Organization defines a generic product as a pharmaceutical product that has the same utility as an innovative product but is produced without a license from the company that created it following the expiration of the patent.[3] The price of generic medicine is cheaper than that of brand name drugs. For instance, the Congressional Budget Office (CBO) has found that generic medicines are 75% cheaper than brand name medicines, and hence, they saved 93 billion US dollars for the health-care system in 2010.[4] A research program of the CBO conducted with senior citizens with disabilities showed that the cost for medical plans or the pharmacies will be reduced by about 55% if generic medicines are used instead of the brand name medicines.[4] The savings made on the use of generic medicines can help the government to focus its financial resources on developing new services for patients as an urgent goal.[5]

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Pharmacists now play a very important role in reducing medical expenses since it has been found that patients more commonly attend pharmacies (at a rate of 42%) than hospitals and clinics in Malaysia.[6] In Australia, Hassali *et al*. noted that brand-name drugs on prescription can be substituted for generic medicines following advice from the pharmacist and assurances of efficacy.[7,8] Another study by Hassali *et al*. conducted in eight countries (the US, United Kingdom, Finland, Sweden, Australia, Japan, Malaysia, and Thailand) in 2013, as well as the study by Babar *et al*. conducted in Malaysia in 2010, suggest that pharmacists are generally in favor of promoting the use of generic medicines to their clients.[9,10]

One reason for this lack of knowledge on the part of doctors could be the limited scope of college programs concerning the concept of generic medicines, which may need to be supplemented by additional education to enhance the future use of generic medicines.[11] Both pharmacists and doctors acknowledge that there is insufficient knowledge about the quality, safety, and efficacy of generic medicines.[12,13] A study conducted in Bangladesh found that students' perspectives with regard to generic medicines were moderate (63.29%), while there was a difference between the perspectives of medical students and pharmacists, with about 85% of students having heard of the concept of generic and brand name drugs.[14] Pharmacy students are the practitioners of the future, and their knowledge and perspectives will thus play an important role in promoting the use of high-quality medications.[15] Othman and Abdulghani (2015) found that more than 70% of students believed that the generic medicine was lower quality and less effective than the brand-name medicine. That results needed for distinctiveness and prevention pre-registrants to contribute inappropriately to generic medicine use.[16]

To determine the extent to which future practitioners are aware of generic prescriptions and generic substitutes, and in light of the fact that studies on the impact of pharmacy students on the use of generic medicines in Vietnam are limited, the current study aims to assess the knowledge and perspectives of pharmacy students in Southern Vietnam regarding generic medicines.

MATERIALS AND METHODS

Study design and study sample

This cross-sectional survey study was conducted with sophomore to senior students attending various universities between February and April 2017. The study sample was achieved through convenience sampling. The University of Medicine and Pharmacy at Ho Chi Minh City and Can Tho University of Medicine and Pharmacy are two public universities with full facilities and experienced teachers to train pharmacists, with their numbers of students per year being about 300 and 150, respectively. In contrast, Hong Bang International University and Nguyen Tat Thanh University are two private universities that in recent years have trained larger number of pharmacists (400 and 950 students per year, respectively).

This study used the Raosoft online tool to determine the sample size.[17] The estimated enrolment for the relevant university courses was approximately 5450 students (which was calculated according to the average indicator training multiplied by the number of years of relevant training). The minimum sample size for the study was 359, which was estimated using an online sample size calculator (Raosoft) with a confidence level of 95% and 5% margin of error. However, a larger sample size was then obtained by doubling the result of the formula and eliminating the sampling error. The total response rate was 81.5% (n = 652) after 800 questionnaires had been distributed and voluntarily completed by the students. After excluding the inadequate forms, 608 questionnaires were selected for the final analysis, which gave an effective response rate of 76.0%. The information obtained from the survey was secure in terms of the participants' privacy and confidentiality.

Data collection

A 22-item questionnaire based on that used in the study by Siam *et al*. was reviewed and modified so as to match the conditions in Vietnam to achieve the objectives of the present study.[14] The questionnaire was validated with a sample of 30 randomly selected students. The feedback received from those students helped to adjust the questionnaire before the survey being conducted. To ensure the consistency of the questions, a confidence scale was applied. Indeed, Cronbach's alpha value for this research tool was 0.806, while the KMO (Kaiser-Meyer-Olkin) was 0.673.

The questionnaire consists of three main parts. The first part contains questions intended to elicit general information about the students, including their age, gender, and university, while four questions were added to this part to assess the students' knowledge of generic medicines. The first question sought to determine whether the students have ever worked in a pharmacy or hospital. The next two questions used "yes" or "no" options to ask if the students had previously heard about generic or brand name drugs. The final question sought to understand the source(s) of the students' information about brand-name and generic medicines. The four questions that comprise part two of the questionnaire are related to the students' knowledge about generic and brand name drugs and how they distinguish between these two types of drugs. The ten questions in the final section use a five-point Likert scale (5= strongly agree to 1= strongly disagree) to evaluate the students' perceptions of generic medicines.

Data analysis

The collected data were imported into Microsoft Excel for Windows® version 2016. The data were then sorted, grouped, and extracted into the SPSS® version 20.0 (SPSS Inc., Chicago, IL) package to create descriptive statistics. A descriptive statistical analysis, including the frequency and percentage, was used to describe the general information concerning the participating students. Non-parametric statistics (Chi-square) were used to examine the variables reflected in the general information. The data were checked for standard deviations, and the *t*-test and analysis of variance (ANOVA) were used to examine the relationship between the cognitive points and factors. All statistical analyses in this study were set at a 95% confidence level or a $P < 0.05$.

Ethical approval

Ethical approval for this study was received from the University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam. Participation in the study was entirely voluntary, and all collected information was anonymous and used only for research purposes.

RESULTS

General information concerning participants

A total of 608 questionnaires were analyzed in this study (the effective response rate was 76% after 800 forms had been distributed).

Among the students who completed the questionnaire, 302 students from public universities (University of Medicine and Pharmacy at Ho Chi Minh City and Can Tho University of Medicine and Pharmacy) and 306 students from private universities (Hong Bang International University and Nguyen Tat Thanh University) were participated. The percentage of female students who participated in the study is higher than that of the male participants (n = 383, 63.0%). The average age of the students was 22.0 ± 2.04 years old. More than two-thirds of students had not undertaken work experience or medicine contact at pharmacies. However, in terms of the students participating in the study who had previously heard about generic medicine and branded medicine, there were very high rates of 93.4% and 90.6%, respectively. The public university students had often received more information about these two types of drugs than the private university students. Table 1 details the general characteristics of the participants.

Knowledge of generic and brand-name medications

The participants' general knowledge regarding the two kinds of medicine is illustrated in Table 2. Generic medicines were understood by the students to be those medicines produced and distributed without a license (n = 557, 91.6%) and those produced by domestic pharmaceutical companies (n = 541, 89.0%). Branded medicines were understood to be developed and manufactured by a company that holds the protected copyright (n = 548, 90.1%) as well as produced by multinational companies (n = 532, 87.5%).

The results of the knowledge survey concerning branded and generic medicines are displayed in Table 3. Nearly two-thirds of participants agreed that generic medicines are bioequivalent to brand-name medicines. More than two-thirds of participants believed that generic and innovator brand products are available in the same dosage form. The number of participants who agreed and disagreed that brand-name drugs are safer than generic medicines was similar at 41.2% and 41.1%, respectively. Approximately 41.8% of students disagreed that the drugs produced by multinational companies are more reliable than those manufactured by the national firms, while about 62.9% of participants expressed that generic medicine is of lower quality than branded medicine. The participants generally disagreed with the idea that generic medicines have more side effects than branded medications.

To quantify the participants' understanding, the scoring of the responses was performed with the mean score being 5.19 ± 2.43 Table 4. A statistical analysis was performed using the *t*-test and ANOVA to detect differences in the subgroup of domains (i.e. university, gender, academic year, work experience, and age). The perceptions of the public universities students were higher than those of the private universities, which was found to be statistically significant ($t = -4.77$, $P < 0.001$).

DISCUSSION

To the best of our knowledge, the current study is the first to evaluate pharmacy students' perceptions in Vietnam. A high proportion of students in Vietnam have heard of the definition of generic and branded medication, which could be explained by the main sources of information (70–80%) that Vietnamese students learn from being textbooks and lectures. This result indicates that Vietnamese education focuses on this issue, which correlates well with the findings of a previous study conducted in Bangladesh. Students attending both public (85.7%) and private (77.4%) universities agreed with the notion that generic medicines are less expensive than brand-name medicines and hence that they help to reduce the cost of treatment. Similar results have been reported in studies conducted in Afghanistan (71.4%), Bangladesh (75.7%), and Pakistan (79.7%) for students in the medical field.[14,19,20] This result can be explained by the concern of policymakers regarding the content of education programs and the fact that generic drugs are important in terms of reducing medical costs.

Table 1: Participants' demographics and general knowledge about generic medications (*n*=608, *n* [%])

Variable	Public universities[a] (*n*=302)	Private universities[b] (*n*=306)	Total (*n*=608)	*P*[c]
Age				
19–21	61 (20.2)	226 (73.9)	327 (53.8)	*P*<0.001
22–23	194 (64.2)	18 (5.9)	212 (34.9)	
≥24	47 (15.6)	22 (7.2)	69 (11.3)	
Mean±SD	21.8±1.39	22.16±2.45	22.0±2.04	
Gender				
Male	126 (41.7)	99 (32.4)	225 (37.0)	*P*<0.001
Female	176 (58.3)	207 (67.6)	383 (63.0)	
Work experience in hospital or community pharmacy/job experience?				
Yes	109 (36.1)	79 (25.8)	188 (30.9)	*P*<0.001
No	193 (63.6)	227 (74.2)	420 (69.1)	
Have you ever heard of generic medicine?				
Yes	289 (95.7)	278 (90.8)	568 (93.4)	*P*<0.001
No	13 (4.3)	27 (8.8)	40 (6.6)	
Have you ever heard of branded medicine?				
Yes	290 (96.0)	261 (85.3)	551 (90.6)	*P*<0.001
No	12 (4.0)	45 (14.7)	57 (9.4)	
Academic year				
2nd year	52 (17.2)	22 (7.2)	74 (12.2)	*P*<0.001
3rd year	104 (34.4)	271 (88.6)	375 (61.7)	
4th year	74 (24.5)	13 (4.3)	87 (14.3)	
5th year	72 (23.8)	0 (0.0)	72 (11.8)	
Source of knowledge				
Textbook	246 (81.5)	196 (64.1)	442 (72.7)	*P*<0.001
Newspaper	101 (33.4)	61 (19.9)	162 (26.6)	
Lecturer	245 (81.1)	257 (84.0)	502 (82.6)	
Visit to hospitals/clinics	63 (20.9)	31 (10.1)	94 (15.5)	

[a]University of Medicine and Pharmacy at Ho Chi Minh City and Can Tho University of Medicine and Pharmacy, [b]Hong Bang International University and Nguyen Tat Thanh University in Ho Chi Minh city, [c]Statistics with the average value and actual value determined using Chi-square test. SD: Standard deviation

The results of this study showed that public university students agreed that generic medicines are bioequivalent and therapeutically equivalent to brand-name drugs by a proportion of 72.2% and 53.3%, respectively, while the figures were 65.3% and 56.1%, respectively, with private university students. However, when asked about the safety, quality, and side effects of generic medicines, the results differed. For the public university students, some 73.6% did not believe or understand that generic medicines are less safe than brand-name drugs. About half of the students considered that generic medicines are of lower quality and have more side effects than the innovator branded product. For the public university students, the results were better, being 58.9%, 30.1%, and 47.7%, respectively. A weak understanding of bioequivalence and therapeutic equivalence may be associated with negative beliefs regarding generic medicines. This result was found in a study conducted in Afghanistan, where in half of the participants were concerned about the quality, safety, and efficacy of the drugs.[19] In Australia, a study found that generic medicines were considered to be lower in quality and less effective,[11] while in New Zealand, 65% of participants felt that innovator branded products are of higher quality than generic products.[9] In India, there is a widespread distrust of the quality control practiced by manufacturers of generic drugs.[21] In contrast, the results of a study conducted in the United States found that 68% of participants believed in the safety of the drug.[22] However, it has been suggested to be common knowledge that generic drugs are of weak quality.[23]

Table 2: Participants' views about the definitions of generic and branded medication

Statements about generic and branded medicines	Group	Public universities (*n*=302, %)	Private universities (*n*=306, %)	Total (*n*=608, %)
A drug that is produced and distributed without patent protection. The generic drug may still have a patent on the formulation but not on the active ingredients	(i)	292 (96.7)	265 (87.7)	557 (91.6)
	(ii)	10 (3.3)	41 (13.6)	51 (8.4)
A drug that is the property of the company that manufactures it through research and development and markets it under a patent. No other companies are allowed to produce it until the patent expires	(i)	16 (5.3)	44 (14.6)	60 (9.9)
	(ii)	286 (94.7)	262 (86.8)	548 (90.1)
Drugs manufactured by local/national pharmaceutical firms are	(i)	283 (93.7)	258 (85.4)	541 (89.0)
	(ii)	19 (6.3)	48 (15.9)	67 (11.0)
Drugs manufactured by multinational firms under propriety rights are	(i)	25 (8.3)	51 (16.9)	76 (12.5)
	(ii)	277 (91.7)	255 (84.4)	532 (87.5)

(i): Generic medication, (ii): Branded medication

A majority of students from both public and private universities (78.2% - 88.7%) like using generic medicines due to the reduction in the cost of treatment. These results are in agreement with those obtained in research reports from Bangladesh (75.6%), Afghanistan (98.0%), and Pakistan (50.5%).[14,19,20] Bertoldi *et al*. and Hassali *et al*. found that the majority of participants considered that the affordability of treatment could be improved and reductions in family expenses made if generic medicines were used because they cost less.[24,25]

Future pharmacists also misunderstand the safety standards associated with the generic products. Some 60.5% of public university students and 70.4% of private university students did not know or understand that generic drugs have higher safety standards. In Bangladesh and Yemen, this rate was found to be 86.4% and 81%, respectively.[14,16] Due to safety concerns, students tend to prefer brand name drugs over generic drugs when treating life-threatening conditions (45.7% and 64% for public university students and private university students, respectively). The participants' responses may be the result of limitations in the scope and explanation of bioequivalence for generic medicines in the current pharmacy curricula. Therefore, policymakers should pay more attention to the content of education as well as the reception of student knowledge.

The mean scores among the groups showed the public university students to exhibit better perceptions (5.65 ± 2.61) than the private university students (4.72 ± 2.15). This is most likely due to different teaching styles in each university, which can be attributed to the highly qualified and experienced teaching staff employed in public universities. Contrary to expectations, this study did not find a significant difference between gender and job experience; however, the observed differences between university, academic year, work experience, and group age in this study were significant. The present results are consistent with those of Siam *et al*., who found that gender did not significantly influence students' perceptions.[14]

The current research is limited because the data are collected from only certain universities in the south of Vietnam. In addition, the research did not evaluate the factors that influence the perceptions of generic medicines or the impact of current educational programs. Future research studies should therefore be conducted nationwide and further assess the impact of students' perceptions.

CONCLUSION

Research concerning future pharmacists has demonstrated a lack of knowledge among such students, particularly those attending private universities, in relation to the use of generic medications. Although the concept of bioequivalence is known by many students, the number of students who correctly understand the concept remains low. This issue should hence be addressed by pharmacy educators to enhance the knowledge and confidence of students regarding generic medicines.

Table 3: Participants' perceptions of generic medications

Statement	Public universities (*n*=302, %)					Private universities (*n*=306, %)					Total (*n*=608, %)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
A generic medicine is bioequivalent to a brand name medicine	14 (4.6)	48 (15.9)	22 (7.3)	138 (45.7)	80 (26.5)	18 (5.9)	57 (18.6)	52 (17.0)	145 (47.4)	34 (11.1)	32 (5.3)	105 (17.3)	74 (12.2)	283 (46.5)	114 (18.8)
Generic types of a particular medicine are therapeutically equivalent to the innovator branded product	13 (4.3)	76 (25.2)	52 (17.2)	114 (37.7)	47 (15.6)	13 (4.2)	74 (24.2)	39 (12.7)	159 (52.0)	21 (6.9)	26 (4.3)	150 (24.7)	91 (15.0)	273 (44.9)	68 (11.2)
Branded medicines are safer than generic medicines because they have been tested through bioequivalence studies	29 (9.6)	95 (31.5)	47 (15.6)	68 (22.5)	62 (20.5)	21 (6.9)	60 (19.6)	56 (18.3)	96 (31.4)	73 (23.9)	50 (8.2)	155 (25.5)	103 (16.9)	164 (27.0)	135 (22.2)
Generic medicines are in the same dosage form (e.g., tablet and capsule) as branded medicine	4 (1.3)	45 (14.9)	43 (14.2)	144 (47.7)	66 (21.9)	10 (3.3)	44 (14.4)	43 (14.1)	178 (58.2)	31 (10.1)	14 (2.3)	89 (14.6)	86 (14.1)	322 (53.0)	97 (16.0)
Medicines manufactured by multinational companies are more reliable than those manufactured by national firms	24 (7.9)	97 (32.1)	53 (17.5)	86 (28.5)	42 (13.9)	26 (8.5)	107 (35.0)	64 (20.9)	84 (27.5)	25 (8.2)	50 (8.2)	204 (33.6)	117 (19.2)	170 (28.0)	67 (11.0)
Branded medicines should be preferred over generic medicine for life-threatening conditions	35 (11.6)	92 (30.5)	37 (12.3)	76 (25.2)	62 (20.5)	19 (6.2)	47 (15.4)	43 (14.1)	110 (35.9)	86 (28.1)	54 (8.9)	139 (22.9)	80 (13.2)	186 (30.6)	148 (24.3)
The cost of treatment will be less if generic medicines are used	6 (2.0)	12 (4.0)	25 (8.3)	113 (37.4)	146 (48.3)	8 (2.6)	27 (8.8)	34 (11.1)	158 (51.6)	79 (25.8)	14 (2.3)	39 (6.4)	59 (9.7)	271 (44.6)	225 (37.0)
Generic medicines are of inferior quality to brand name drugs, which is why they are less expensive	80 (26.5)	131 (43.4)	37 (12.3)	40 (13.2)	14 (4.6)	36 (11.8)	135 (44.1)	54 (17.6)	66 (21.6)	15 (4.9)	116 (19.1)	266 (43.8)	91 (15.0)	106 (17.4)	29 (4.8)
Generic medicines produce more side effects than branded medicines	49 (16.2)	109 (36.1)	92 (30.5)	44 (14.6	8 (2.6)	24 (7.8)	106 (34.6)	77 (25.2)	83 (27.1)	16 (5.2)	73 (12.0)	215 (35.4)	169 (27.8)	127 (20.9)	24 (3.9)
Brand name medicines are required to meet higher safety standards than generic medicines	29 (9.6)	89 (29.5)	40 (13.2)	81 (26.8	62 (20.5)	12 (3.9)	48 (15.7)	51 (16.7)	115 (37.6)	80 (26.1)	41 (6.7)	137 (22.5)	91 (15.0)	196 (32.2)	142 (23.4)

1: Strongly disagree, 2: Disagree, 3: Do not know, 4: Agree, 5: Strongly agree

Table 4: Mean score comparison of the perceptions of generic medicines

Variable	Mean±SD	*P*
Perception score	5.19±2.43	
Median (IQR) [a]	5 (3–7)	
University		
Public universities	5.65±2.61	*t*=−4.770[b] *P*<0.001
Private universities	4.72±2.15	
Gender		
Male	4.96±2.43	*t*=−1.756[b] *P*=0.080
Female	5.32±2.42	
Academic year		
2nd year	4.12±2.09	*P*<0.001[c]
3rd year	4.83±2.22	
4th year	6.76±2.58	
5th year	6.25±2.44	
Work Experience		
Yes	5.73±2.38	t=3.753[b] *P*<0.001
No	4.94±2.42	
Age		
20–21	4.14±2.22	*P*<0.001[c]
22–23	5.88±2.60	
≥24	4.61±2.45	

SD: Standard deviation. [a]Interquartile range, [b]independent samples t-test, [c]ANOVA: Analysis of variance

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