

The Pharmacy Student's Knowledge And Perception About Generic Medicine: Web-based Cross-Sectional Study

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ABSTRACT

Background: The promotion of generic medicines in developing nation like India plays a crucial role in the availability of essential drugs for everyone. The main objective of this survey is to understand the knowledge and perception of the pharmacy student about generic medicine along with its safety and efficacy profile. **Methods:** The web-based cross-sectional study was carried out from September 2020 to February 2021 utilizing the Google form. The google form had four questionnaire sections, i.e., socio-demographic section, overall knowledge section, knowledge regarding safety and efficacy section, and perception section. **Results:** Most students believe they require additional knowledge regarding how bioequivalence tests are performed for generic drugs. Of 463 students, 419 students (88%) agrees generic medicine is cheaper than branded medicines, and 339 students (73%) agrees wider use of generic medicines in India helps in decreasing health care cost whereas 215 students (45%) are not aware generics are only marketed after the patent expiry of the branded medicine. Of 441 students, 127 students (27%) wrongly agree that generic medicines are less effective than branded medicine, and 196 students (43%) wrongly agree that generic medicine costs less because

they are inferior to branded medicine. Most pharmacy students believe doctors and patients should be given enough knowledge about generic medicine and that branded medicine use is influenced by advertisements.

Conclusion: This study concludes that there is a gap in knowledge among pharmacy students about generic medicine. The responsible authorities should establish relevant curriculum revisions to increase students' knowledge about generic medications.

Key words: Branded medicine, Pharmacist, Pharm-D, Safety, Efficacy, Economical.

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DOI: 10.5530/ijpi.2021.3.59

INTRODUCTION

Medicines have been utilized throughout human history, but with the growth of knowledge, allopathic medicine has surpassed the limitations of traditional medicine. However, while allopathic medications are incredibly successful in managing disease and disorder, they are out of reach for one-third of the world's population and nearly half of Asia's population.^{1,2} The primary reason for limited accessibility is financial constraints. Branded medications are expensive, and to address this issue, generic medicines are placed on the market, which is 30%–70% less costly than branded medications.³ Not only is a generic drug a cost-effective alternative to branded medicine, but it also contributes to the reduction of off-patent branded medication prices.⁴

India's health care system has a mix of private and public components.⁵ The public sector is subsidized by the government, whereas individuals must pay for private health care. In India, only 42% of the population is admitted to public hospitals and 95% is treated with allopathic medicine, despite the fact that one-fifth of the population lives below the national poverty line.⁶ Due to the country's higher proportion of middle-class and poor people, the use of branded medicines increases the cost of the drugs, imposing an additional economic burden on the poor and middle-class. In low- and middle-income nations, pharmaceuticals account for between 20% and 60% of overall health spending.⁴ Thus, it is critical to promote generic medicines to increase accessibility, thereby lowering the cost of health care in India.

To improve the accessibility of generic medicine for poor people government of India started "Jan Aushadhi" initiative under which all

over India 3200 pharmacy stores exist which dispenses generic medicine, and the Medical Council of India (MCI) has recommended every doctor to prescribe generic medicine.⁷ The Government of India also ensured the quality of generic medicine by giving precise guidelines that state that 90% of confidence intervals should exist between the ratio of generic medicine to brand medicine for important pharmacokinetic parameters.⁷

Although such measures improve generic medicine usage, there is a hesitancy among health care providers in India to utilize generic medicine.^{8,9} The pharmacist in India is not confident about the promotion of generic medicine. This low confidence in the advancement of generic medicine may be due to limited exposure to the topic in their curriculum. So, it is essential to identify the difficulty most students face regarding generic medicine and solve the problem, ultimately improving the utilization of generic medicine. This study aims to understand pharmacy students' perception and knowledge on the differences between branded drugs and generic drugs and on the safety, efficacy, and other details regarding generic medicines.

MATERIALS AND METHODS

The web-based cross-sectional survey was conducted among pharmacy students from September 2020 to February 2021, in which data collection time was from September 2020 to November 2020. For this research, pharmacy students of south India, especially Bangalore, were chosen on social media. The study has been reported according to the Strengthening

the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.^{10,11}

Development of questionnaire

22 items structured query was established utilizing google forms which had 4 segments. The initial segment contained socio-demographic specifics based on 4 items, followed by three segments, i.e., General Knowledge, Knowledge regarding Quality, Safety and Efficacy, and Perception, which contained 6 items questions, respectively.¹² The questions were established using various fact sheets, information leaflets, research articles, and books. All questionnaires were multiple-choice questions with 5 choices for knowledge and perception-related questions, i.e., strongly agree, agree, neutral, disagree, strongly disagree. The questionnaire primarily focused on the basic understanding of pharmacy students about generic medicine and its importance in developing countries like India for the affordability of the treatment.

Validity and reliability test

The initial questionnaire was validated by subject experts, mainly the faculty members and the professors at various pharmacy colleges in Karnataka, using both face and content validity methods.^{13,14} The questionnaire was validated for the correctness, clarity, appropriateness, and use of jargon.

The revised questionnaire was assessed for reliability using the split-half method (internal reliability) and test-retest method (external reliability) in a pilot study of 20 participants.¹⁴ For the statistical test, the multiple-choice question was converted into 5 points Likert scale (strongly agree=1, agree=2, neutral=3, disagree=4, and strongly disagree=5). In the Split-half reliability test, the question was divided into two halves (first-half items and second-half items). Then, it was distributed among the pilot participants, where responses between two sets of questions were correlated using the spearman brown coefficient, i.e., 0.7. In the test-retest method, the questionnaire was given twice to the same pilot participant with one week between the first attempt and second attempt. The correlation coefficient was calculated using intra-class correlation (ICC) and was found to be 0.8. Therefore, the correlation coefficient above ≥ 0.7 is measured to specify the reliability.¹⁴

Sample size

The sample size was calculated using the formula

$$n = \frac{N * X}{X + N - 1}$$

Where,

$$X = Z_{\alpha/2}^2 * \rho * (1 - \rho) / MOE^2$$

The least possible of 377 student's participation is essential for 95% confidence interval, 5% margin of error for the population distribution of 20000 students at 50% response distribution. In this study, 502 students have volunteered.

Selection of students

The participant was selected based on the exposure about generic medicine in their curriculum to maintain the quality of the study. After extensive study of the syllabus of various pharmacy courses and discussion with the faculty member and professor, the criteria were made for this study. For this Study, B-Pharm (Bachelor of Pharmacy) 3rd year and above, Pharm-D (Doctor of Pharmacy) 3rd year and above, and M-Pharm (Master of Pharmacy) students could participate.

Distribution of questionnaire

The revised final questionnaire after validation and reliability test was developed utilizing Google forms.¹² It was circulated to undergraduate and graduate scholars from several social media platforms like WhatsApp, Facebook, Messenger, and Telegram. In addition, the Google form was distributed to social media groups of many pharmacy institutions, pharmacy students, and the class monitor of the batch for efficient circulation of form and to control the submission of the form by an ineligible volunteer. The volunteers were requested to participate in the study by answering the questionnaire in the google form devoid of time restraints. Numerous submissions were reduced by recording the participant's name and Google feature limit to one submission.

Ethical consideration

This study has been approved by the Research Review Board (RRB) of Mallige College of Pharmacy (MCP/RRB/001/20-21). The purposes of the survey were clarified to the volunteer and were requested to submit their consent of voluntary willingness before participation in the study. All the procedures taken for this survey had followed the declaration of Helsinki 1964 and its later amendment.¹⁵ The internet survey was performed and reported strictly agreeing to the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines.¹⁶

RESULTS

Socio-demographic characteristics of the participant

The Socio-Demographic information of the participants is summarized in Table 1. A total of 502 Pharmacy students responded to the questionnaire in which 222 (44%) were male, and 280 (56%) were female. Of 502 students, 268 (53.3%) students fall in the age group of 18-25 years old, 216 (43.02%) students fall in the age group of 22-25, and 18 (3.49%) students fall in the age group of 26 years and above. Of 502 students, 247 (49%) students were from PharmD, 211 (42%) were from Bpharm, and 44 (9%) were from Mpharm.

Overall knowledge of pharmacy students toward generic drugs

Table 2 summarizes the overall knowledge of pharmacy students regarding generic drugs. Of 463 responses, 419 students (88%) agree that generic medicines are economical compared to the branded medicine, whereas 25 students (5%) were unaware of this fact, and 19 students (3%) disagreed. Only 341 students (73%) out of 460 students agrees that generic medicine is bioequivalent to branded medicine, whereas 119 students (24%) of students were either unknown about the fact or disagreed with the truth. 138 students (28.8%) out of 461 students were unaware that composition, dose, and indications of generic medicine are alike as branded medicine or disagreed with the fact. In this survey, it

Table 1: Socio-demographic details.

Socio-Demographic details	Participants Distribution	
Age (years)	18-21	268 (53.3%)
	22-25	216 (43.02%)
	26-29	12 (2.3%)
	≥ 30	06 (1.19%)
Gender	Male	222 (44%)
	Female	280 (56%)
Degree Enrolled	Pharm-D	247 (49%)
	B-Pharm	211 (42%)
	M-Pharm	44 (9%)
Total Participants	502	

Table 2: Overall knowledge of pharmacy students towards generic medicines.

S.No.	Questionnaire	Participant Distribution	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
1	Generic medicines are economical compared to branded medicines.	463	214 (46%)	205 (42%)	25 (5%)	12 (2%)	7 (1%)
2	A generic medicine is bioequivalent to a branded medicine.	460	96 (20%)	245 (53%)	82 (17%)	31 (6%)	6 (1%)
3	Composition, dose and indications of generic medicines are alike branded medicines.	461	114 (24%)	209 (45%)	87 (18%)	47 (10%)	4 (0.8%)
4	Generic medicine is manufactured after the expiry of patent right of branded medicine.	456	102 (22%)	139 (30%)	95 (20%)	99 (21%)	21 (4%)
5	I want additional details on how bioequivalence tests are carried out for generic medicines.	459	142 (30%)	247 (53%)	54 (11%)	14 (3%)	2 (0.4%)
6	The extensive use of generic medicines in India supports reducing the country's health care expenses.	460	166 (36%)	173 (37%)	59 (12%)	50 (10.8%)	12 (2%)

Table 3: Knowledge regarding safety and efficacy of generic medicine.

S.No.	Questionnaire	Participant Distribution	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
1	Generic medicines are less effective than branded medicines	441	30 (6%)	97 (21%)	79 (17%)	177 (40%)	58 (13%)
2	Generic medicines shows extra adverse effects than branded medicines	441	15 (3%)	62 (14%)	110 (24%)	192 (43%)	62 (14%)
3	Brand-name medicines need more sophisticated safety standards than generic medicines	436	50 (11%)	150 (34%)	113 (25%)	96 (22%)	27 (6%)
4	Generic medicines are not as safe as branded drugs.	443	15 (3%)	59 (13%)	88 (19%)	208 (46%)	73 (16%)
5	Generic medicine takes more time to act in the body.	443	19 (4%)	81 (18%)	121 (27%)	166 (37%)	56 (12%)
6	Generic medicine are economical as they are substandard to branded drugs.	440	61 (13%)	135 (30%)	75 (17%)	112 (25%)	57 (12%)

was found that a vast number of students, i.e., 215 students (45%), disagreed or were unaware of the fact that generic medicine is promoted after the termination of the patent right of the branded drug. 389 students (83%) agree that they want additional details on how bioequivalence tests are carried out for generic medicine, and 339 students (73%) agree that extensive usage of generic drugs in India supports diminishing the country's health care expenses.

Knowledge regarding safety and efficacy of generic medicine

Table 3 summarises the knowledge of participants regarding the safety and efficacy of generic medicines. Of 441 students, 235 students (53%) correctly disagreed that generic drugs are less effective than branded medicines. On the other hand, 187 students (41%) were either unaware or didn't know that generic medicine doesn't produce more adverse effects than brand once. In this survey, it was found that 313 students (70%) wrongly agreed that branded drugs need more sophisticated standards than generic medicines or were unaware of the fact. Of 443 students still, 162 students (35%) wrongly agree that generic medicines are not as safe as branded drugs or were unaware of the fact. 222 students (49%) correctly disagreed that generic medicine takes more

time to act in the body than branded medicines, whereas 221 students (49%) wrongly agreed or were unaware of the fact. Of 440 students, 271 students (60%) are either unaware of the truth or have the wrong concept that generic medicine is economical because they are substandard to branded medicine.

Perception

Perception-related questionnaires and frequency of response of pharmacy students are summarised in Table 4. Of 452 students, 407 students (89%) agree that patients and doctors should be given enough knowledge about genetic medicines. 385 students (83%) know drug companies impact the use of branded medicine. In this survey, it was found that 396 students (86%) out of 455 believe that doctors and pharmacists should work together in prescribing and dispensing drugs based on their generic names. Most of the students i.e, 377 students (83%), agree that they want extra details on the safety and efficacy of generic medicines. Only 375 students (75%) agree that they find it easier to remember a medicine's therapeutic class using generic names rather than branded names. 307 students (70%) out of 453 students agree that their pharmacy school education covers cost-effective use of medicines very well.

Table 4: Awareness of pharmacy student towards generic medicine.

S. No.	Questionnaire	Participant distribution	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	I think patients and doctors should be given enough information about generic medicines.	452	218 (48%)	189 (41%)	30 (6%)	7 (1%)	8 (1%)
2	I believe that marketing by drug companies impacts the use of branded medicines.	455	167 (36%)	218 (47%)	50 (10%)	14 (3%)	6 (1%)
3	Doctors and pharmacists should work together in prescribing and dispensing drugs based on their generic names.	455	224 (49%)	172 (37%)	36 (7%)	14 (3%)	9 (1%)
4	I want additional details on the issues of the safety and efficacy of generic medicines	453	141 (31%)	236 (52%)	61 (13%)	11 (2%)	4 (0.8%)
5	I find it easier to remember a medicine's therapeutic class using generic names rather than brand names.	452	169 (37%)	175 (38%)	87 (19%)	15 (3%)	6 (1%)
6	My pharmacy school education covers the topic of cost-effective use of medicines very well.	453	114 (25%)	207 (45%)	103 (22%)	16 (3%)	13 (2%)

DISCUSSION

The purpose of this study is to ascertain pharmacy students' knowledge and perception of generic medications. The majority of participants in this survey (90.4%) believed that generic medicines are less expensive than their branded counterparts, consistent with findings from studies conducted in Australia and Pakistan.^{3,17} This indicates that most pharmacy students in these nations understand the critical role generic drugs play in the lives of everyday people. In contrast, respondents in a Sierra Leone survey disagreed with this statement.¹⁸

70% of respondents in our study accepted that generic drugs have the same composition, dose, and indications. This finding is strikingly similar to that of a study conducted in Saudi Arabia, which found that 72.6% agreed on the same thing.¹⁹ This suggests that 30% of them still disagree or are unaware of this fact. Similar to the findings from the study conducted in north India (56.2%), only half of our respondents (52.8%) agreed that generic drugs are marketed after the patent innovator drug expires.²⁰ On the other hand, almost 20% were neutral. This indicates that the other half is not very well acquainted with this notion. The plausible explanation is that the curriculum does not include sufficient information about drug patents and generic medicine manufacturing.

Most of our pharmacy students agreed that they required additional knowledge regarding the bioequivalence test being carried out on generic drugs. A similar finding is observed in the survey carried out in Nepal and Sierra Leone.^{8,18} This implies the lack of effective biopharmaceutical or pharmaceutical studies in the curriculum.

Three-fourths of our respondents nearly or strongly agree that broader use of generic medicines decreases countries' health care expenditure. About 68.2% of the respondents in the study conducted in Palestine also agree to the same.²¹ There is more exposure to generic medicine among Indian students compared to Palestinian students. However, according to a 2014 NSSO poll, 82% of the urban population and 86% of the rural population are not covered by any health expenditure support scheme. Wider use of generic drugs might make a difference, which is only possible if the young talents are aware and promote generic medicines.²²

Almost half of our respondents disagreed that generic medicines take a longer time to act in the body, and 37% disagree that generic drug costs less because they are inferior to the brand once. On the other hand, in the study conducted in north India, 87.6% and 89.9% disagree with these notions, respectively.²⁰ This difference might be due to various factors that affect the student's knowledge, like seminars, conferences and workshops conducted on generic medicine.

According to our Study, most pharmacy students are likely to nearly or strongly agree that patients and doctors need to be given more information regarding prescribing and dispensing generic drugs. Furthermore, the Study from Saudi Arabia also points out that the consumers needed to be educated regarding generic drugs.¹⁹ Hence, even though the Indian medical council act has recommended doctors prescribe generic drugs, it's still a reality that not all doctors are following.⁷ One of the many reasons behind it could be the lack of awareness among doctors and patients regarding the advantages of prescribing generic drugs, preventing the doctors from prescribing and the patients from demanding to prescribe and dispense generic medicines from the medical professionals.

Study limitations

Due to the disparate participation of various pharmacy cadres in this survey, the study cannot generalize to the entire student population. In addition, since the survey was conducted via an online poll, there is a chance of social desirability bias. The survey gathered responses solely from participants who were active on multiple social media platforms. Finally, because the study is cross-sectional, it cannot determine cause and effect and can only provide a glimpse of the condition.

CONCLUSION

Our study demonstrates that pharmacy students have a significant knowledge gap about generic medications. Pharmacy students do not have a firm grasp of the fundamentals of generic drugs. There is a need for curriculum enhancement and effective generic medicine training programs, seminars, and workshops, which will aid in the widespread usage of generic medications.

ACKNOWLEDGEMENT

We are thankful to the volunteers who participated in this study. No funding has been granted for this study from any institute or organization.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Article History: Submission Date : 19-06-2021; Revised Date : 27-07-2021; Acceptance Date : 06-08-2021.

Cite this article: Chaudhary AP, Nelson AK, Mydhily S, Chaithanya KJ, Jamuna TR. The Pharmacy Student's Knowledge And Perception About Generic Medicine: Web-based Cross-Sectional Study. *Int. J. Pharm. Investigation.* 2021;11(3):333-7.