

Quality of Pharmacotherapy Lectures and Instructor Teaching Skills of the Pharm D Program in India: A Nationwide Survey

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ABSTRACT

Objectives: The present study aimed to evaluate the quality of pharmacotherapy (PT) lectures provided to PharmD students and to assess the teaching skills of the instructors.

Materials and Methods: A cross-sectional study was conducted using a self-administered Instructional Skills Questionnaire (ISQ) instrument containing 39 items which was distributed to 1000 PharmD students who completed the PT courses during their third and fourth years of the PharmD program in India during the 2017/2018 academic year.

Results: A total of 695 students completed the survey (response rate of 69.5%). The mean age (\pm standard deviation) was 21.9 ± 1.57 years, females 63% who completed their PT course during third- (49.1%) and fourth years (50.9%) of the PharmD program. The student participants indicated that their PT lecturer dedicated an average of 5.29 ± 3.39 hr/week to classroom teaching and 2.70 ± 3.29 hr to bedside teaching. Only a limited number of PharmD students agreed that their instructor explained the subject clearly (27.8%), gave PT summaries (32%), made the lectures enjoyable (33.8%) and discussed important topics (38.7%) with them. Overall, more than half (58%) of the students rated their quality of PT lectures as "average," and only 28.3% of the PharmD students agreed that they achieved PT learning outcomes. **Conclusion:** Our study revealed that most student participants rated the quality of PT lectures as "average" resulting in sub-optimal achievement of their learning outcomes. PharmD programs should continue to review the quality of PT lectures and incorporate advanced pedagogical practices to improve PT instructor teaching skills.

Key words: Clinical pharmacy, Pharmacotherapy, Evaluation, Education, Teaching, India.

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INTRODUCTION

In higher education study programs, student ratings of the courses are often used to evaluate lecturers teaching quality and should become an extensive practice worldwide.¹⁻⁵ They serve to provide relevant feedback to the instructors in order to improve the quality of their teaching. Assessing the quality of lectures is also useful for faculty development program initiatives. However, this contemporary evaluation in higher education is often under-reported or underutilized, particularly in medical education.⁶⁻¹⁰ The student's evaluation of teaching can measure lecturers' instructional

skills and provide useful feedback regarding the strengths and weaknesses of their teaching approaches.

Doctor of Pharmacy (PharmD) is a clinically oriented pharmacy program was implemented in the United States of America (USA) in 1950¹¹ and created a positive impact that led to the implementation of clinical pharmacy studies in many developing countries, including India in 2008.¹²⁻¹⁸ The pharmacotherapy (PT) course has remained the backbone of the PharmD program and is characterized by the transference of clinical knowledge and skills to provide better

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understanding of the pharmacological properties, efficacy, and safety of drugs and rational prescribing practices in order to improve patient care.¹⁹ During the six-year postgraduate PharmD program, honing PT skills can provide the required leap needed to become a competent clinical pharmacist. To date, no attempts have been made to investigate the quality of teaching of the PT course and the extent of instructor skills in understanding the subject matter. This study aimed to assess the quality of PT lectures provided to the PharmD students in various universities at the national level in India.

MATERIALS AND METHODS

Study design

A nationwide, cross-sectional, self-administered survey was conducted using a 37-item instrument to obtain PharmD students' opinions on the quality of PT courses and their PT lecturers' instruction skills. PharmD students from 130 institutions across India were randomly selected and the survey instrument was distributed between June and December 2018. Participants were PharmD students who completed PT courses during their third- and fourth years as part of their obligatory PharmD program during the 2017/2018 academic year. Students were approached through PharmD students' groups and invited to participate through a group email containing a web-link (<https://ap1trial.au1.qualtrics.com/jfe/>). Furthermore, students were also encouraged to share the survey tool with their friends and classmates to maximize the responses.

Sample size

The sample size was calculated using "Creative Research Systems,"²⁰ an online sample size calculator, to identify the appropriate number of participants for the survey. We estimated 1500 PharmD students might have completed their third and fourth years of the PharmD program during the 2017/2018 academic year. Using a 95% confidence level and estimating that at least 50% of the randomly selected students from various universities may respond to the survey has given us a confidence interval of 2.68. By estimating dropouts of 15-20%, a total sample size of 1000 participants was decided upon and invited to participate in the study.

Assessment tool

The Instructional Skills Questionnaire (ISQ) survey instrument was adapted from *Knol et al.* study.²¹ It was developed to evaluate the quality of courses and generate specific feedback for professors to improve their instructional skills.²¹ The obtained questionnaire

was framed according to our study objective, and the adjusted version was tested for reliability, psychometric properties, internal content, and construct validity. The reliability test (Cronbach's alfa) was found to be 0.89, indicating an excellent internal consistency of the survey instrument's adjusted version.²² Furthermore, the questionnaire was pretested among 20 senior students as a pilot study before the survey officially started. The answers to these responses were not included in the results.

Content of the survey instrument

The final survey questionnaire contained 39-items that were further divided into three sections. The first part (8 items) included student characteristics such as age, gender, the region of origin, and year of study. The remaining questions focused on the mode of delivery of PT, time spent by the PT instructors (hours/week) in the classroom, bedside teaching, and student quality rating of the PT lectures. In section two, ISQ with seven dimensions containing lecturing skills as measured by 28-items (4 items × 7 dimensions) that included structure, explication, stimulation, validation, instruction, comprehension, and activation was utilized. Each dimension was assessed using a 5-point Likert scale (1-strongly disagree to 5-strongly agree, or 1-never occurred to 5-always occurred) [Appendix 1]. The third section contained 3 items regarding student perceptions of their learning outcomes and was assessed using a 5-point Likert scale (1-strongly disagree to 5-strongly agree). The survey took an average of seven to ten minutes to complete.

Ethical considerations

The survey participation was entirely voluntary, and no compensation was provided. Confidentiality of study participants was strictly followed by not disclosing any of their personal information. All questionnaire items were collected and analyzed anonymously and did not include any personal information. Ethical approval to undertake the survey was obtained from the Vaagdevi College of Pharmaceutical Sciences, Research Ethics Committee, Warangal and Telangana. The study's aim and purpose were described in the email and provided a web-link to confirm their willingness to participate. All the responses were treated anonymously, and the confidentiality of the participants was maintained throughout the study. All the data was stored securely.

Data analysis

Survey responses were analyzed using SPSS 24.0 (IBM Corp., Armonk, NY, USA). Sociodemographic characteristics were summarized as descriptive statistics and

inferential analyses. Mean, standard deviation (SD) and percentages were computed for all the other variables. The chi-square test was used to determine the differences in the student groups and instructor teaching skills. In all analyses, values of $p < 0.05$ were considered statistically significant.

RESULTS

A total of 695 PharmD students participated in the study, giving a response rate of 69.5%. The mean age of the study participants was 21.9 ± 1.57 (SD). Of that, 63% were females, and those who completed the PT course during the third (49.1%) and fourth year (50.9%) of the PharmD program equally participated. Power Point presentations (66.6%) and blackboard (66%) were the most common teaching methods used, while team-based learning (TBL) (22.3%) and problem-based learning (22%) were less frequently used to deliver PT lectures [Figure 1]. Around half of the students reported that their PT instructor spends only 3-5 hr/week to discuss the course in the classroom (51.5%), and in the majority of courses, no hours were dedicated to the teaching of PT topics at the bedside (57.7%) [Table 1].

When students were asked to rate their overall satisfaction with PT lectures, most of them (58%) expressed that the quality of PT lectures was “average,” and 32% reported the study courses as “poor”. Of these, a significant proportion of students rated poor (25%) and average (30.8%) as their instructor spent no time teaching at the bedside [Figure 2].

A descriptive overview of the student’s evaluation their PT instructors according to the ISQ dimensions is summarized in Table 2 and Table 3. Briefly, 53.8% of the students reported that PT instructors presented the PT subject topics incoherently and in a disorganized fashion (53.1%). When asked about PT instructors’ explanation of complex PT topics, 27.8% reported that their PT instructors provided clear explanation, but that it was hard to follow (73.8%). Over two-thirds of

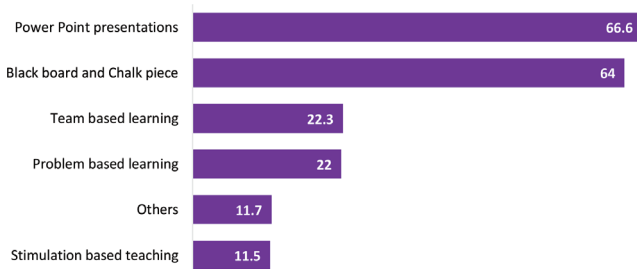


Figure 1: Different mode of Pharmacotherapy teaching methods used in PharmD program.

Table 1: Characteristics of study participants (N=695).		
Variable	N (%)	
Age (Mean±S.D)	21.9±1.57	
Gender		
Male	257 (37)	
Female	438 (63)	
Year of Pharm.D		
Completed III rd year	341 (49.1)	
Completed IV th year	354 (50.9)	
Hometown		
Urban	470 (67.6)	
Rural	225 (32.4)	
How many hours does your PT lecturer spends time with you (hours per week)	Classroom teaching	Bedside teaching
	Average hours spent per week	
0	5.29 ± 3.39	2.70 ± 3.29
1-2 hrs	10 (1.4)	401 (57.7)
3-5 hrs	176 (25.3%)	150 (21.5%)
≥6 hrs	358 (51.5%)	80 (11.5%)
	151 (21.7%)	64 (9.2%)

SD: standard deviation; PT: pharmacotherapy

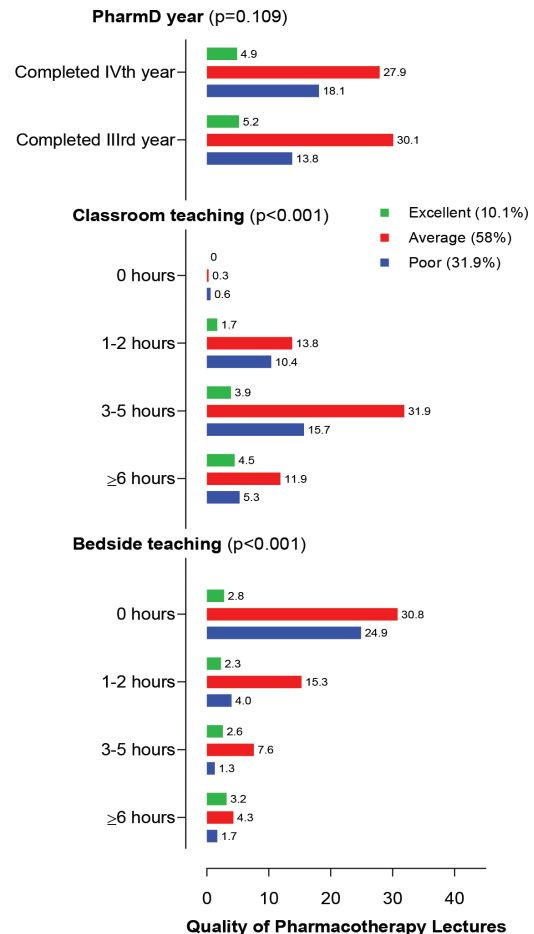


Figure 2: PharmD students rating on quality of Pharmacotherapy teaching in India.

Table 2: Students evaluating their Pharmacotherapy (PT) instruction teaching skills (N=695).

Statements	Extent of which these occurred N (%)	
	Agree	Disagree
Structure (<i>The extent to which the PT subject topics are handled systematically and in an orderly way</i>)		
The lectures have a clear structure	230 (33.1)	465 (66.9)
The lecturer gave clear PT summaries	222 (31.9)	473 (68.1)
The subject matter is presented incoherently (confusion)*	374 (53.8)	321 (46.2)
The lectures are unorganized*	369 (53.1)	326 (46.9)
Explication (<i>The extent to which the PT lecturer explains the subject topics, especially the more complex topics</i>)		
The PT lecturer explains the subject clearly	193 (27.8)	502 (72.2)
The PT lecturer is unclear*	451 (64.9)	244 (35.1)
The PT lecturer's explanations are hard to follow*	513 (73.8)	182 (26.2)
The PT lecturer gives clarifying examples	289 (41.6)	406 (58.4)
Stimulation (<i>The extent to which the PT lecturer instructs students in the subject matter</i>)		
The PT lectures are boring*	479 (68.9)	216 (31.1)
The PT lecturer made more interesting of the subject matter	235 (33.8)	460 (66.2)
It is hard to stay focused on the lectures*	405 (58.3)	290 (41.7)
The PT lectures interests you in the subject a lot	314 (45.2)	381 (54.8)
Validation (<i>The extent to which the PT lecturer stresses the benefits and the relevance of the PT subject for educational goals or future occupation</i>)		
Little is said about the application of the PT subject in patient care*	354 (50.9)	341 (49.1)
The PT lectures indicates the relevance of the PT subject	318 (45.8)	377 (54.2)
The utility of the PT topics is hardly discussed*	410 (59)	285 (41)
The PT lecturer showed why the topics are important	269 (38.7)	426 (61.3)
Instruction (<i>The extent to which the PT lecturer provides instructions about how to study the PT</i>)		
The PT lecturer is unclear about which aspects of the subject matter are important*	408 (58.7)	287 (41.3)
It is often unclear what the main and side issues are*	354 (50.9)	341 (49.1)
It is clear what the PT lecturer requires of me to learn	291 (41.9)	404 (58.1)
The PT lectures indicates which parts of the subject are essential	303 (43.6)	392 (56.4)
Comprehension (<i>The extent to which the PT lecturer creates opportunities for questions and remarks regarding the PT subject</i>)		
The PT lecturer provided insufficient occasion to ask questions*	452 (65)	243 (35)
The PT lecturer encourages students to ask questions about the topic	365 (52.5)	330 (45.5)
The PT lecturer checks whether students understand the topic or not	267 (38.4)	428 (61.6)
The PT lecturer hardly addresses the students' comments*	447 (64.3)	248 (35.7)
Activation (<i>The extent to which the PT lecturer encouraged students to actively think about the subject matter</i>)		
Students are encouraged to think along during the lecture	254 (36.5)	441 (63.5)
The PT lecturer provides little opportunity for discussions*	417 (60)	278 (40)
During his PT lecture there is hardly any occasion to discuss the topic*	440 (63.3)	255 (36.7)
The PT lecturer involves students in the lecture	293 (42.2)	402 (57.8)
Learning outcomes		
Cognition: I learned a lot from the PT lecture	199 (28.6)	496 (71.4)
Affection: Because of the PT lecturer, I want to learn more about the PT topic	252 (36.3)	443 (63.7)
Regulation: Because of the PT lecture, I now know what I have yet to study on the topic	283 (40.7)	412 (59.3)

*negative questions

the students felt that the PT lectures were boring (69%) and did not stimulate any further interest in the PT subject (66.2%).

When students were asked to express their opinion about whether their instructors explained about the benefits of PT subject topics, around 45.8% “agreed” that their lectures were relevant to the PT subjects, while others opinion was that little information was provided about the application of PT subjects to patient care (51%). However, 58.7% of the students believed that the PT topics were unclear, but that their PT teachers instructed them about which subject matter was essential (43.6%). Moreover, a higher proportion of the PharmD students also “agreed” that their instructors encouraged them to ask questions about the PT subject topics (52.5) but not frequently enough (65%) and did not adequately addressed their comments (64.3%) [Table 2]. Table 3 shows the agreement on various ISQ domains among students. Only a limited number of students who completed the PT course during their third year and fourth years of the PharmD program agreed that the ISQ domains such as structure (11.8% and 10%), explication (12.2% and 7.9%), stimulation (11.4% and 9.8%), validation (8.1% and 8.2%), instruction (8.1% and 8.2%), comprehension (6.5% and 6.8%) and activation (7.5% and 7.1%) were achieved. A significant difference in the explication domain of ISQ was observed between the student groups ($p=0.002$).

Figure 3 shows the students’ opinions on PT learning outcomes. Nearly one-third of students (36.2%) believed that their instructors encouraged them to learn more about the PT topics, and they were familiar with the topics to study (41%).

DISCUSSION

After several years of experience with PharmD degree curricula abroad, the PharmD programs were also

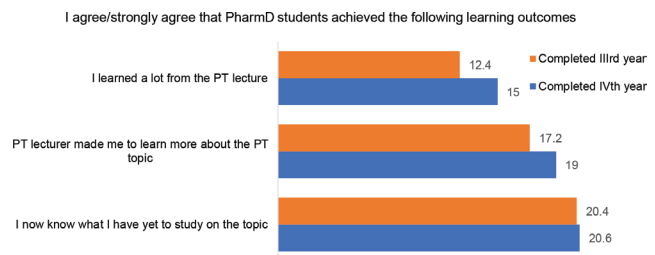


Figure 3: Level of achievement (%) Pharmacotherapy learning outcomes among PharmD students.

implemented in developing countries, including India, in 2008. We conducted this first survey as a study to evaluate the quality of PT courses within the PharmD degree program and the quality of the instructors’ teaching skills after a decade of the existence of PharmD degree courses in India. The adjusted ISQ scale was used to assess the quality of courses and teaching behavior of instructors following course completion. The seven ISQ dimensions focused on investigating various categories of teaching skills and behavior,²¹ namely, structure, stimulation, instruction, and activation. Several other studies have used a similar approach to investigate teaching skills and behavior across various branches of higher education.²³⁻²⁷ For instance, *Miller et al.* surveyed 248 business administration students using a theory-planned behavior questionnaire which indicated that the teachers’ teaching behavior is a strong predictor of the students’ academic achievements and can affect student professional satisfaction.²⁸ Therefore, the process of lecture evaluations by the students can significantly contribute to improving the academic quality and effectiveness of teaching.

In our study, the PharmD students in India evaluated their PT courses within the study program and when the students were asked to rate the overall quality of PT lectures and the amount of time their PT instructors spent with them, around 60% of them indicated that they were “average” and teachers spent as little as 3-5 hr/week on classroom teaching and no time on bedside teaching. It seems that pharmacy colleges and schools in India are not devoting adequate time during PT classes to improve the quality of PT knowledge in PharmD students. The instructors need to spend more time with students and improve their teaching quality by making the education sessions more interactive and increasing clinical knowledge transfer through problem-based solving and learning. In recent years, several teaching methods, such as virtual learning,^{29,30} fishbowl activities,³¹ mobile-based lectures,³² and TBL,³³⁻³⁵ have been developed and tried in order to improve clinical

Table 3: Agreement of the PharmD students with the domains of Instructional Skills Questionnaire (ISQ).

Instructional teaching skills	Occurred in III rd year	Occurred in IV th year	p-value*
Structure	82 (11.8)	70 (10.1)	0.199
Explication	85 (12.2)	55 (7.9)	0.002
Stimulation	79 (11.4)	68 (9.8)	0.227
Validation	57 (8.2)	56 (8.1)	0.759
Instruction	56 (8.1)	57 (8.2)	0.918
Comprehension	45 (6.5)	47 (6.8)	0.667
Activation	52 (7.5)	49 (7.1)	-

*chi-square test

pharmacy education. Of all those mentioned, TBL has been given greater emphasis for pharmacotherapy courses since it is associated with several benefits for student learning and reduces the amount of time taken by the instructors.³³⁻³⁵ TBL in the pharmacotherapeutic course has increased student accountability, strengthened student teamwork, improved professional development, and optimized faculty workload.³² Therefore, we recommend piloting the team-oriented approach in the teaching of PT rather than traditional passive style of lectures.

According to our study results, the quality of teaching of PharmD courses in India needs to be substantially improved to improve graduates overall study satisfaction. Based on our survey results, a very high percentage of the students highlighted that their PT lectures are presented incoherently (53.8%) and are disorganized (53.1%), which makes them hard to follow (73.8%) and to focus on PT lectures (58.3%). According to students' opinion, the lectures did not provide information on the application of PT subjects in patient care (50.9%), the students felt unclear of what to study (58.7%), and the lectures provided them little opportunity to discuss the PT topics (60%). Thus, instructors should focus on improving their teaching skills related to PT topics, place emphasis on the teaching style, and be prepared to obtain formative and regular constructive feedback soon after completion of their PT courses to continuously improve the quality of their classes.²⁴ On the other hand, some students were of the opinion that their PT instructor explained the subjects clearly (27.3%), made their lectures enjoyable towards the subject (33.8%), guided them to focus on essential topics (38.7%), discussed examples relevant to the PT subjects (41.6%), and encouraged them to ask questions on the PT topics (52.5%). This feedback from the students' demonstrates that the PT instructors are already improving their instruction skills by incorporating more active learning strategies. For instance, one-third of the students "agreed" that they learned more about PT topics because of their instructors and learned a lot from the PT lectures. Therefore, some unsatisfactory results described above can also be outweighed by some satisfactory findings suggesting the possible quality improvement of courses and teachers in India.

The evaluation study of the quality of PT courses and the instructors' skills helped us obtain valuable feedback from more than 695 PharmD students in India, nearly ten years after the initiation of these courses. As already shown by previous studies, evaluation has a much higher impact when summarized immediately or soon after the lectures to improve the quality of teaching

during ongoing courses.³⁶⁻³⁹ However, national comparisons are also essential to receive feedback on cross-regional differences that may further stimulate local improvements in specific areas. As clinical pharmacy teaching in India is becoming highly tailored to meet students' needs, new methods such as bedside teaching, case-solving, and interdisciplinary education should be implemented.

PharmD graduates' competencies depend on their rational pharmacotherapy knowledge and skills to practice clinical pharmacy at the novice or advanced beginner level in clinical settings.⁴⁰ There is a need for advanced programs to help students understand the individualization of drug regimens in highly complex patients such as the older population. Except for quality courses in rational pharmacotherapy and individualization of drug regimens, the wise use of specific software such as INOMED EU can be utilized as a supportive tool to improve the student learning process and provide immediate feedback on their instructor skills.

Limitations

This study is not without limitations. Firstly, we used a self-administered ISQ questionnaire on PharmD students who completed their PT courses during the 2017/2018 academic year; therefore, the results cannot be generalized to other pharmacy program branches. Secondly, the data presented here are self-reported, and some respondents may have provided extreme responses that might be subject to recall bias. Thirdly, because of the study design, we could not assess the characteristics of non-respondents in this study to statistically estimate whether and to what extent students' responses may differ due to potential selection bias. However, the response rate (69.5%) partially eliminates the significance of this type of bias. As the study's design was cross-sectional, we also did not investigate the longitudinal trends in the quality of PharmD education. Such information can be obtained by further comparative longitudinal studies in this area.

CONCLUSION

Our findings revealed that most Indian PharmD students rated the quality of PT lectures as "average" and felt that achievement of the PT subjects' learning outcomes was suboptimal. However, the "average" rating should not be taken as satisfactory feedback, and PT teaching instructors should continue to dedicate more time to PharmD students to discuss the topics, include more hours of bedside teaching, utilize more modern teaching methods, and explain complicated

topics clearly. Also, faculty development programs in India should be supported to improve PT learning outcomes. Further studies in this area are needed to confirm the positive impact and future quality improvement of PharmD degree education in India.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

Ethical approval

Vaagdevi College of Pharmaceutical Sciences (MGMH/ VIPS/PharmD/2016/10/07).

Informed consent

Written informed consent was obtained from each participant.

ABBREVIATIONS

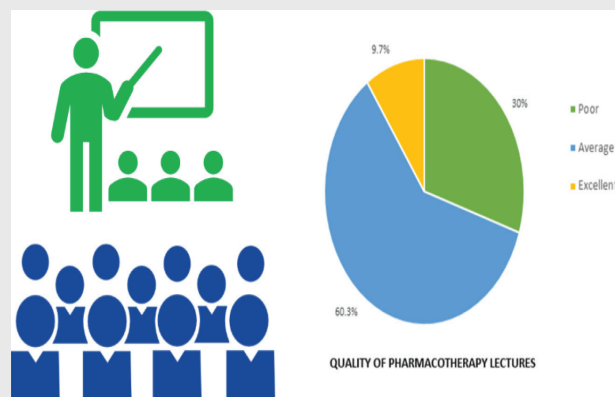
ISQ: Instructional Skills Questionnaire; **PharmD:** Doctor of Pharmacy; **PT:** Pharmacotherapy; **SD:** Standard deviation; **TBL:** Team-based learning; **USA:** United States of America.

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PICTORIAL ABSTRACT



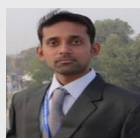
SUMMARY

This research investigated the quality of pharmacotherapy education and Instructor teaching skills among the newly launched six-year PharmD program in India during 2017-18. Senior PharmD students from various institutions were asked to rate the quality of pharmacotherapy education program and evaluating the lecturer's teaching skills. We found that the Indian PharmD students rated the quality of PT lectures as "average" and felt that achievement of the PT subjects' learning outcomes was suboptimal. Most of the PharmD students indicated PT teaching instructors are spending less hours at bedside teaching. Thus, faculty development programs in India should be supported to improve PT learning outcomes.

About Authors



Akshaya Bhagavathula is a Ph.D. student working under Prof. Daniela Fialova and his Ph.D research focused to understand the Irrational medication use in the older population in the developing countries particularly focusing in polypharmacy and potentially inappropriate medication use. His research also focused on strategies to improve the quality of clinical pharmacy education in developing countries. He published several research papers and received international awards from WHO, USAID and SIAPS.



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