



Original Research Article

Knowledge, Attitude and Perception of Medical Students regarding Deprescribing in Lahore, Pakistan

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Abstract:

Name of Authors:

Muhammad Umar Safdar¹, Abu Ans Waseer^{2*}, Sohaib Irfan³, Muzna Suhail⁴, Muhammad Bilal Rana⁵, Momin Shah⁶, Ayan Amir⁷, Muhammad Irfan⁸, Abdul Rehman Khan⁹, Ahmed Husnain¹⁰

Affiliation:

^{1-3,5-10}Akhtar Saeed College of Pharmaceutical Sciences, Bahria Town Lahore, Pakistan.

⁴The University of Lahore, Lahore, Pakistan. Akhtar Saeed College of Pharmaceutical Sciences, Bahria Town Lahore, Pakistan.

Corresponding Author:

Abu Ans Waseer
Abuansw@gmail.com

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Background: Deprescribing is of great importance in both medical education and practice. To reduce or stop the use of medicine that might be harmful or are of no use to the patient is described as deprescribing. It is of great significance for rational use of medicine and deprescribing. This study aims to evaluate the Knowledge, Attitudes, and Perception regarding deprescribing among undergraduate students across various healthcare disciplines in Lahore, Pakistan. **Methods:** Among 281 students from MBBS, BDS, Pharm.D, DPT, and Nursing programs, a cross-sectional study was conducted using a questionnaire distributed via online platforms. Student demographics, curriculum exposure to deprescribing, knowledge, attitudes, perceptions, and perceived barriers were assessed. **Results:** Only 40.2% of participants were familiar with the term "deprescribing," and 34.2% reported receiving deprescribing education as part of their curriculum. Participants depicted good attitude and perception towards deprescribing, acknowledging its importance in patient safety and rational therapy. However, knowledge-based answers revealed gaps in clinical understanding, with poor correct response rates on deprescribing principles. Because of the conclusion of deprescribing in their courses students studying MBBS and Pharm.D degrees showed better knowledge on the topic. **Conclusion:** Although students show good attitudes and perceptions but there was a big gap between theoretical understanding and practicality. This study highlights the need for structured deprescribing education in the future healthcare professionals' curricula to improve students' readiness to implement deprescribing in clinical settings.

Keywords: Deprescribing; Medical education; Knowledge, Attitude, Perception; Rational use of medicines; Healthcare students.

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1. INTRODUCTION

The term "deprescribing" first emerged in the literature in 2003. As concerns about the adverse effects of medication overuse continue to rise globally, there is growing focus on strategies to reduce harm (Reeve, Thompson, & Farrell, 2017). The idea of deprescribing was first highlighted as a Tier 1 issue in the newly

published 2019 edition of the American College of Clinical Pharmacy (ACCP) Pharmacotherapy Didactic Toolkit. Deprescribing can be defined as "a systematic process of identifying and discontinuing medications in instances in which existing potential harms outweigh existing or potential benefits within the context of an individual patient's care goals, current level of functioning, life expectancy, values, and preferences,"

is a term that is becoming increasingly popular in the medical community (Clark *et al.*, 2020).

In order to limit polypharmacy and inappropriate medication use multidisciplinary approaches are considered effective. Likewise, the participation of pharmacists and nurses can play a key role in facilitating deprescribing. Many patients feel comfortable having a pharmacist or nurse involved in the deprescribing process alongside their general practitioner (Peterson *et al.*, 2018). Although deprescribing is an integral part of prescribing, it is not a common practice, as this has been evidenced previously by the reports of high prevalence of polypharmacy and the use of potentially inappropriate medications (PIMs) in the elderly (Jungo *et al.*, 2021). Polypharmacy is defined as *"the use of multiple medications, recognized as a risk factor for adverse drug reactions and healthcare utilization among older adults"* (Aggarwal, Woolford, & Patel, 2020; Lund, Carnahan, Egge, Chrischilles, & Kaboli, 2010; Wastesson, Morin, Tan, & Johnell, 2018). As the percentage of the population over the age of 65 continues to grow, the demand for healthcare professionals trained to care for this demographic also increases (Wu *et al.*, 2010). Older age is linked to a higher risk of developing multiple long-term conditions. Multi-morbidity and polypharmacy contribute to a gradual decline in resilience and impaired homeostasis, leading to a substantial health and social care burden (Aggarwal *et al.*, 2020).

The knowledge definition by the Canadian Institutes of Health Research is *"a dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system."* This definition has been incorporated by others including the United States National Center for Dissemination of Disability Research and the World Health Organization (WHO) (Straus, Tetroe, & Graham, 2009).

Since physicians are primarily responsible for prescribing and monitoring drug therapy, their perception of deprescribing and knowledge of available deprescribing tools is crucial (Akanke-Sholabi, Ajilore, & Ilori, 2023). Deprescribing is a complex task that involves clinical expertise, shared decision-making with patients and caregivers, and effective communication among all care providers.

In the United States, the entry-level degree required to practice pharmacy is the Doctor of Pharmacy (Pharm-D). In addition to medication distribution, pharmacists regularly work in clinical roles, collaborating with medical providers to optimize medication therapies. Recent studies have highlighted the importance of pharmacists in facilitating deprescribing via provision of continuous healthcare services (Martin, Tamblyn, Benedetti, Ahmed, & Tannenbaum, 2018). Older adults are living longer and using more medications. Adverse drug reactions (ADRs) are considered one of the top five major health risks for this population. Prescribing medications with known adverse drug reaction risks to older adults has been associated with increased

healthcare utilization and mortality. Identifying and minimizing the use of medications that pose more risks than benefits in older adults is crucial (Ammerman, Simpkins, Warman, & Downs, 2019).

Attitude definition with reference to psychology states *"a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor"* (Eagly & Chaiken, 1993, p. 1). Attitude namely is a tendency, entity (or attitude object), or evaluation describing the important feature of this definition (Eagly & Chaiken, 2007). Deprescribing should be regarded as an essential aspect of good prescribing and viewed by physicians in the same light as prescribing or continuing a medication, considering both with the potential of benefit and harm. In general, deprescribing is a complex process that requires clinical expertise, shared decision-making with patients and caregivers, and effective communication among all healthcare providers (Al Omari *et al.*, 2023). Similarly, perception is defined by Longman Dictionary of Contemporary English as; a) *the way you think about something and your idea of what it is like;* b) *the way that you notice things with your senses of sight, hearing etc.;* or c) *the natural ability to understand or notice things quickly"* (Agbor Njang-Tyson, 2023). In philosophy, psychology, and cognitive science, perception is the process of having awareness or understanding of sensory information. "Perception" is from the Latin words, *percipio*, which means "receiving, collecting, action of taking possession, and apprehension with the mind or senses (Bai, 2001).

The need for deprescribing education in health professions curricula is well established around the world, as it equips future healthcare professionals with the skills to optimize medication use. Increasing emphasis on interprofessional simulations and structured educational interventions aligning with the existing recommendations, highlighting the necessity for institutions to integrate deprescribing training into medical education (Cernasev *et al.*, 2024).

Deprescribing has emerged as a crucial skill for healthcare professionals. Pharmacists are particularly well positioned to identify medications that should be discontinued, such as those with no clear indication or benefit, intolerable adverse effects, or known risks due to drug-drug or drug-disease interactions (Al Omari *et al.*, 2023).

This study's initial aim is to explore whether students were taught about deprescribing and the methods through which it was taught, such as through lectures, case studies, or hands-on experience. It will then examine the student's perceptions of their pharmacy school's curriculum regarding deprescribing, their views on patients' readiness to undergo deprescribing, and the barriers they identified in implementing deprescribing.

The main objective of this study, is to determine the Pakistani students' attitude, knowledge and perception towards deprescribing, their self-reported abilities, and confidence level in carrying out deprescribing practices. With the rising prevalence of polypharmacy, deprescribing has become an essential aspect of patient-

centered care, particularly in managing multi-morbidity and minimizing medication-related harm.

2. METHODOLOGY

2.1. Ethical Consideration

This study was approved by the ethical committee of Akhtar Saeed College of Pharmaceutical Sciences. Before conducting the research, informed consent was also obtained from each participant. Research ethics were taken into consideration, with no misleading information employed as the basis for this study.

2.2. Study Design

A cross-sectional study was conducted from January 2025 to June 2025. Individuals who were residing in Lahore, Pakistan were included in the study. The sample comprised of healthcare related students of their respected discipline; Bachelor of Medicine, Bachelor of Surgery (MBBS), Bachelor of Dental Surgery (BDS), Doctor of Pharmacy (Pharm.D), Doctor of Physical Therapy (DPT), and Nursing.

2.3. Study Population

The research included a total of 281 participants. The following criteria was considered a basis for inclusion and exclusion of individuals in the study.

a. Inclusion Criteria

This study included individuals who were enrolled in a recognized healthcare-related degree program, including MBBS, BDS, Pharm.D, DPT, and Nursing. To ensure consistency in academic experience and training, only students admitted during the academic years 2020, 2021, or 2022 were considered, from senior professionals, who were being taught clinical in their curriculum. Furthermore, only those who fully completed the questionnaire were included, ensuring the reliability and completeness of the collected data for analysis.

b. Exclusion Criteria

This study excluded those individuals who were not willing to participate in the study, and if they were not enrolled in one of the specified healthcare-related degree programs (MBBS, BDS, Pharm.D, DPT, or Nursing) or if their enrollment year fell outside the academic years 2020, 2021, or 2022. Additionally, individuals who submitted incomplete or partially filled survey forms were excluded to maintain the accuracy and completeness of the collected data.

2.4. Procedure

Participants were drawn randomly from various social media platforms based on convenience sampling method. Before the initiation of the survey, the students' consent to participate in the study was obtained. The questionnaire was in English language and was developed as a soft copy using Google form and distributed via electronically to the participants taking part in the research. The filled questionnaires were collected at a suitable time indicated by the respondents.

2.5. Sample Size

Raosoftware scale was used to calculate the sample size, yielding a sufficient number of participants for the study. Considering an error of % in mind to get a minimal response ratio a total of sample size of 281 was considered as the final number required for data collection.

2.6. Questionnaire Development

The systematic creation of a questionnaire relied on extensive literature research for assessing medical students' deprescribing-related knowledge and attitudes together with their opinions. All three sections comprised of pre-validated and reliable tools to evaluate the aforementioned characteristics.

1. Basic Data about Study Participants

Demographics such as age, gender, current year of study, academic concentration, public or private educational setting and past experience in elderly patient care were recorded during the first phase of their questionnaire.

2. Knowledge Regarding Deprescribing

This part of the questionnaire evaluated students' understanding of deprescribing processes and fundamental principles by providing them closed-ended response options. One question comprised of medication appropriateness for older individuals and other questions addressed suitable replacements for discontinued medications and strategies used for deprescribing. A five-item Likert scale containing strongly disagree, disagree, neutral, agree, and highly agree response was enabled to assess the detailed evaluation of participant's knowledge about deprescribing methods and their confidence in applying them.

3. Attitudes Towards Deprescribing

The section regarding deprescribing attitudes used several statements, and was also presented via Likert scale. It aimed to evaluate the perspectives of medical students regarding deprescribing practices and their preparedness to perform it while identifying obstacles they might encounter. This section assessed the participants' opinions regarding the appropriateness of deprescribing medications that have vague indications, complex dosages or included the drugs patients wanted to discontinue.

4. Perception of Deprescribing Practices

In order to understand how medical students perceived the deprescribing process, a tool comprising of closed-ended questions was included in the questionnaire. This part focused on surveying the students about the responsibilities of healthcare providers in deprescribing (prescribers, pharmacists, and nurses) together with the importance given to patient education and the necessity of team collaboration for successful deprescribing approaches.

2.7. Data Analysis

Data analysis was accompanied using Statistical tools. Statistical Package for Social Sciences (**IBM SPSS, version 26.0**), has been used for analysis of the collected data. Descriptive analysis was conducted to evaluate the responses of the participants in the form of frequencies and percentages.

3. RESULTS

A total of 281 students took part in the study, the majority of them were women (63%), 48% of the participants were in their final year, and the most of them (71.2%) were from private institutions. Additionally, 59.4% had previous experience of providing care to senior citizens.

Table 1. Sociodemographic Characteristics of Participants

Demographic Characteristics	Student Population n = 281	
	Frequencies (N)	Percentages (%)
Gender		
Male	103	37
Female	177	63
Year		
3 rd Professional	48	17.1
4 th Professional	96	34.2
Final Professional	137	48
Institute		
Public	81	28.8
Private	200	71.2
Caring for older people		
Yes	167	59.4
No	114	40.6
Current work space		
Student	228	81.1
Practitioner	16	5.7
Internee	21	7.5
Unemployed	16	5.7
Field of study		
MBBS	72	25.6
Pharm.D	51	18.1
BDS	49	17.4
DPT	56	19.9
Nursing	53	18.9

About half of the participants (50.5%) reported being familiar with the term "medication review" (table 2). Additionally, 34.2% believed that deprescribing instruction is a necessary part of the curriculum. Lectures were the most commonly cited method for delivering deprescribing

education (36.7%). Notably, 6.8% of participants indicated that their institution did not cover deprescribing at all. The majority (70.8%) believed that prescribers should be responsible for deprescribing.

Table 2. Participant's familiarity and exposure to Deprescribing and related terms within their university curriculum

	Frequencies (n)	Percentages (%)
Familiar with the following terms:		
Medication review	142	50.5
Poly pharmacy	116	41.3
Deprescribing	113	40.2
Instruction on Deprescribing as part of the curriculum		
Yes , required part	96	34.2
Yes , elective part	82	29.2
No	39	13.9
I'm not sure	64	22.8
If instructions on deprescribing was part of the curriculum at your institute, during what curricular activities did this occur?		
Lectures	103	36.7
Community training	72	25.6
Hospital training	101	35.9
Patient centered case problem	45	16
Clinical simulations	18	6.4
Research projects	15	5.3
Online course work	18	6.4
Not covered in any educational activities	19	6.8
Who do you think is responsible for deprescribing?		
Prescriber	199	70.8
Pharmacist	57	20.3
Nurses	22	7.8
Patient themselves	3	1.1

In general, participants showed an admirable attitude toward deprescribing in table 3. Most subjects agreed that thinking about removing drugs from prescription is not appropriate (42%), also taking out drugs written without a clear indication (52%), or drugs that are unlikely to help a patient in their remaining years (44.8%). Similar to this, participants expressed interest to consider deprescribing medications with complicated dosing schedules (43.4%), with delayed benefits (44.5%), and based on patient preferences (46.3%).

Table 3. Participants attitude towards deprescribing

Attitude-relates questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	N (%)	N (%)	N (%)	N (%)	N (%)
Q1: I would consider deprescribing potentially inappropriate medications	106 (37.7)	118 (42)	47 (16.7)	9 (3.2)	1(.4)
Q2: I would consider deprescribing medication lacking a specific indication.	64 (22.8)	146 (52)	60 (21.4)	8 (2.8)	3 (1.1)
Q3: I will Consider deprescribing medication unlikely to benefit within life Span	80 (28.5)	126 (44.8)	63 (22.4)	12 (4.3)	0 (0)
Q4: I would consider deprescribing medication with delayed benefits	77 (27.4)	122 (43.4)	61 (21.7)	17 (6.0)	4 (1.4)
Q5: Would consider deprescribing based on patient preferences	84 (29.9)	125 (44.5)	58 (20.6)	12 (4.3)	2 (.7)
Q6: I would consider deprescribing medication with complex dosing regimens.	69 (24.6)	130 (46.3)	65 (23.1)	15 (5.3)	2 (.7)

In table 4 majority of participants *strongly agreed* (40.9%) that it is important to ask about patient knowledge and medication use before deprescribing. For other statements, the majority selected *agree* as their response: 51.2% agreed on reviewing risks and benefits, 45.6% on checking medications against clinical guidelines, and 48.8% on reviewing clinical information

such as interactions, adverse drug reactions, and allergies. Similarly, 42% agreed on the need to collaborate with primary care physicians, 44.1% on recommending alternative treatments, 45.6% on planning a tapering schedule for medications with withdrawal risks, and 45.9% on educating the patient after physician approval.

Table 4. Medical Students' perception towards deprescribing

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	N (%)	N (%)	N (%)	N (%)	N (%)
Q1: I have to ask patients about their knowledge and their use of their medications before consider deprescribing	115 (40.9)	106 (37.7)	56 (19.9)	3 (1.1)	1(.4)
Q2: I have to review patients' medications for potential risk and expected benefits before consider deprescribing	93 (33.1)	144 (51.2)	39 (13.9)	4 (1.4)	1 (.4)
Q3: I have to check patients' medications following national and international guidelines before consider deprescribing	86 (30.6)	128 (45.6)	58 (20.6)	4 (1.4)	5 (1.8)

Q4: I have to check additional clinical information (e.g. drug interaction, ADRs, allergy, etc.) before consider deprescribing	67(23.8)	137 (48.8)	65 (23.1)	9 (3.2)	3 (1.1)
Q5: I have to communicate and collaborate with primary care physician before consider deprescribing	98 (34.9)	118 (42)	52 (18.5)	11 (3.9)	2 (.7)
Q6: I may have to recommend appropriate alternative pharmacologic and non-pharmacological treatment options before consider deprescribing.	66 (23.5)	124 (44.1)	77 (27.4)	13 (4.6)	1 (.4)
Q7: I may have to plan a tapering schedule of patient's medications that may cause withdrawal symptoms before consider deprescribing.	77 (27.4)	128 (45.6)	65 (23.1)	8 (2.8)	3 (1.1)
Q8: If my deprescribing recommendation is approved by the primary care Physician, I have to educate patients about the deprescribing process	83 (29.5)	129 (45.9)	62 (22.1)	6 (2.1)	1 (.4)

The results from table 5 shows limited level of knowledge among participants regarding deprescribing. 38.8% of participants indicated that acetaminophen was not targeted for deprescribing. Only 14.9% reported there was no acceptable alternative to zolpidem. Paroxetine was identified as inappropriate due to its anticholinergic

activity by 21.4% of respondents. The correct deprescribing strategy for alprazolam was selected by 37.4%, just 6% select the need to taper omeprazole after ICU discharge. In the last, 28.1% pick the rationale for the antipsychotic black box warning.

Table 5: Participants' Knowledge About Deprescribing

Question	Frequency (n)	Percentage (%)
For an older patient who complains of chronic mild low back pain, which of the following Medications Would you NOT target for Deprescribing from his regimen? Correct answer = Acetaminophen	109	38.8
Zolpidem has been identified as a drug to avoid in the elderly. Which of the following is an acceptable? Alternative? Correct answer = None of the above	42	14.9
Which of the following are considered potentially inappropriate for older patients due to Anticholinergic activity? Correct answer = Paroxetine	60	21.4
When recommending Deprescribing of alprazolam 0.5mg four times daily in patients of 65 years of age, which of the following is the BEST initial approach? Correct answer = Reduce to alprazolam 0.25mg four times daily.	105	37.4
In a patient recently discharged home from the hospital where he was in the intensive care unit For 2 weeks, which of the following strategies should be used to Deprescribing omeprazole 40mg daily that was started for stress ulcer prophylaxis? Correct answer = Reduce omeprazole to 20 mg daily	17	6.0

Antipsychotics should not be used on older patients with dementia. Which of the following is the rationale behind this black box warning? Correct answer = Antipsychotics increase the risk of death	79	28.1
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4. DISCUSSION

This study included 281 medical students from public and private institutions in Lahore, Pakistan, enrolled in MBBS, BDS, Pharm.D, DPT, or Nursing programs. In this study we explored how future healthcare professionals understand and approach deprescribing as an important process for optimizing medication use, especially in elderly patients with polypharmacy. The objective was to assess whether students from different healthcare disciplines possess the necessary guidance to shape their knowledge, attitudes, and perceptions related to deprescribing. We hypothesized that medical and pharmacy students would have greater understanding in deprescribing, but only if they had received education on the topic within their curriculum.

The findings show the insights into student familiarity regarding deprescribing. (40.2%) of participants were familiar with the term “deprescribing,” and 34.2% reported it as a required part of their curriculum. Lectures and hospital training were the most common modes of exposure. This depicted how student have had limited practical involvement. As hypothesized, students from medical (MBBS) and pharmacy (Pharm.D) backgrounds, were more likely to learn about deprescribing in the form of proper lectures delivered to them, showed relatively higher awareness and confidence among them. This match with previous literature who found that curricular exposure directly influences students’ knowledge and attitudes (Clark et al., 2020; Al Omari et al., 2023).

This study also showed that the prescribers and pharmacists were primarily responsible for deprescribing, which supports interprofessional collaboration models seen in international studies. However, the overall low scores in specific knowledge-based questions highlighted a gap between theoretical understanding and clinical application (Clark et al., 2020). These findings aligned with past global research showing that, even with positive attitudes, healthcare students often lack the knowledge and practicality for deprescribing without training

When compared with recent literature, the findings of this study showed similar results in lieu with previous work conducted among healthcare students. A 2023 study found that pharmacy students in Jordan had positive attitudes towards deprescribing but they found gaps in knowledge and confidence, which is similar to our findings (Al Omari et al., 2023). Similarly, Akande et al highlighted that physicians’ understanding of deprescribing was Insufficient without formal training and this support our hypothesis that curricular inclusion improves competence (Akande- Sholabi et al., 2023). Also, Scott et al. reported that structured deprescribing education play

important role in enhances students’ readiness to deprescribe and impart good impact on interprofessional collaboration (Scott, Cernasev, Barenie, Springer, & Axon, 2023). Comprehensively, this study reinforces the need to add deprescribing into medical and pharmacy curricula to close the gap between knowledge and practice.

This work has highlighted the useful information about how medical students understand deprescribing. It shows that while many students have a positive attitude, their knowledge and practical skills are not strong enough unless they are taught about deprescribing in their courses. Many students believed deprescribing is mainly the responsibility of prescribers. In addition, pharmacy students agreed that working in teams, reviewing clinical information, and educating patients were important steps. This showed that they have a good overall perception of deprescribing. Adding proper deprescribing education in medical and pharmacy programs can help future healthcare workers to make better decisions, reduce unnecessary medicines, and improve patient safety.

Although students from different healthcare fields took part in this study, however it had some limits. It was done only in Lahore, included no follow-up, and used a one-time survey. These problems were also seen in similar recent studies. To get a wider perspective regarding deprescribing concept in Pakistan, a nationwide study is required to assess the need and importance of this emerging global practice in Pakistan.

CONCLUSION

This study demonstrates that medical students from different fields in Lahore have a mostly positive attitude and perception toward deprescribing. However, many of them lack strong knowledge and are not fully prepared to use deprescribing in clinical settings. Only a few students were familiar with key deprescribing ideas or had been properly taught about it in their classes. Many students’ response that doctors and pharmacists play a key role in deprescribing. But their low scores in knowledge questions suggested a need for proper teaching and training tools, to prepare the future healthcare professionals to provide rational use of medication and safer prescribing habit.

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