

Assessment of Indonesian Dental Clinical Students' Knowledge of Pharmacological Considerations for Geriatric Patients

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ABSTRACT

Background: Indonesia is experiencing an aging population, leading to an increasing number of geriatric patients who often present with multiple comorbidities and require special pharmacological considerations during dental treatment. Insufficient knowledge in this area may increase the risk of medical complications and affect treatment outcomes.

Objective: This study aimed to assess the knowledge of dental clinical students regarding pharmacological considerations in geriatric patient care.

Methods: A descriptive cross-sectional study was conducted among 86 dental clinical students at a faculty of dentistry of a private university in Jakarta, Indonesia. Data were collected using a questionnaire and analyzed using univariate analysis.

Results: Most respondents demonstrated a good level of knowledge (48.84%). The highest percentage of correct responses was found in questions related to the definition and characteristics of geriatric patients, while the lowest was observed in questions regarding polypharmacy.

Conclusion: Dental clinical students generally demonstrated good knowledge of pharmacological considerations in geriatric patient care. However, knowledge gaps between question categories, particularly concerning polypharmacy, indicate the need for further educational improvement.

KEYWORDS: Geriatric, polypharmacy, drug-side effect, drug interaction

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INTRODUCTION

Indonesia is currently experiencing a demographic transition toward an aging population.^{1,2} According to the World Health Organization (WHO), older adults are classified as middle-aged (45–54 years), elderly (55–65 years), young old (66–74 years), old (75–90 years), and very old (>90 years).^{3,4} In 2020, the number of older adults reached approximately 27 million (10% of the total population) and is projected to increase to 57 million (17.9%) by 2045.^{5,6} This growing elderly population presents new challenges to the healthcare system, including dental care.

Aging is associated with physiological changes and multiple chronic diseases that alter drug pharmacokinetics and pharmacodynamics, increasing the risk of adverse drug reactions and affecting treatment outcomes.^{7,8} Geriatric patients frequently experience multimorbidity and require multidisciplinary healthcare, often resulting in the use of

multiple medications.⁹ Polypharmacy, commonly defined as the concurrent use of five or more medications, increases the adverse drug reactions, risk of drug interactions, and reduced treatment adherence.^{10,11}

The likelihood of adverse drug reactions in geriatric patients rises substantially as the number of medications increases used, particularly in patients with malnutrition, renal or hepatic disease, diabetes, asthma, and other systemic disorders.¹² Previous studies have reported that the risk of adverse drug reactions rises from approximately 6% in patients taking two medications to 50% in those taking five medications and nearly 100% in those taking eight or more medications.⁸

Drug interactions are another important consequence of polypharmacy in geriatric patients. It may alter the effectiveness or toxicity of medications.¹³ Drugs frequently prescribed for chronic conditions, such as

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antihypertensives, anticoagulants, antidiabetics, and non-steroidal anti-inflammatory drugs (NSAIDs), are commonly involved in clinically significant interactions.¹⁴

In dental practice, these polypharmacy effects may increase the risk of excessive bleeding, reduce therapeutic efficacy, or contribute to oral adverse effects such as gingival hyperplasia, thus complicate dental treatment.^{15,16} Consequently, pharmacological considerations play a crucial role in the dental management of geriatric patients.

Dental students, as future practitioners, should possess adequate knowledge of these pharmacological considerations. However, previous studies have suggested that although dental students generally demonstrate positive attitudes toward treating geriatric patients, many still lack sufficient knowledge and confidence in managing their complex healthcare needs.¹⁷

Therefore, this study aimed to assess the knowledge of dental clinical students regarding pharmacological considerations in the dental management of geriatric patients. It is important to evaluate their level of understanding to identify educational gaps and improve geriatric dental education.

METHODS

This descriptive cross-sectional study was conducted among dental clinical students at the Faculty of Dentistry, Universitas Prof. Dr. Moestopo (Beragama), who were actively undergoing clinical training in 2026. Total of 86 students who met the inclusion criteria were recruited using a snowball sampling technique.

Data were collected between April and May 2026 using a self-administered online questionnaire consisting of closed-ended multiple-choice questions to assess knowledge of pharmacological considerations in geriatric patients. Each correct answer was scored as 1 and each incorrect answer as 0. Knowledge scores were calculated as the percentage of correct responses and categorized as good (76–100%), moderate (56–75%), or poor (≤55%).

As the questionnaire was newly developed, its reliability and validity were evaluated using Cronbach’s alpha and corrected item–total correlation, with acceptable values defined as >0.70 and ≥0.30, respectively. The collected data later were analyzed using univariate descriptive statistics.

RESULTS

A total of 86 dental clinical students participated in this study. The demographic characteristics of the respondents are presented in Table 1.

Table 1. Distribution of Respondents Based on Gender

Gender	Frequency	Percentage (%)
Male	21	24,4
Female	65	75,6
Total	86	100

The questionnaire comprised four domains:

Table 2. Domains and Questions

Domain	Question
I. Definition and characteristics of geriatric patients	1. What is the age threshold for classifying a patient as an older adult (elderly)?
	2. Which of the following is the primary characteristic of an elderly patient?
	3. Which of the following is the primary characteristic of a geriatric patient?
	4. Which statement best describes comorbidity in geriatric patients?
	5. Which of the following is the primary consideration in pharmacotherapy for geriatric patients?
II. Pharmacokinetics and pharmacodynamics in geriatric patients	6. Which of the following is a clinical consequence of altered drug pharmacokinetics in geriatric patients?
	7. How is the oral absorption of drugs typically affected in older adults?
	8. What is the effect of reduced drug metabolism in older adults?
	9. How does renal drug excretion change in older adults?
	10. How does the pharmacodynamic response to drugs change in older adults?
III. Polypharmacy in geriatric patients	11. According to medical criteria, a patient is considered to have polypharmacy when taking: ...
	12. Which health risk may result from polypharmacy in geriatric patients?
	13. Which statement best describes the consequences of drug interactions in geriatric patients?
	14. Which factor is the primary cause of the increased risk of drug interactions in geriatric patients?
	15. Which medication carries the highest risk of causing bleeding-related drug interactions?

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IV. Drug interactions and adverse effects in geriatric patients	16. Which statement best describes the risk of adverse drug reactions in older adults?
	17. Which analgesic is considered relatively safe for use in geriatric patients?
	18. Which adverse effect is most commonly associated with the use of non-steroidal anti-inflammatory drugs (NSAIDs), such as aspirin and mefenamic acid, in geriatric patients?
	19. What factors should be considered before prescribing medications for geriatric patients?
	20. What is the primary cause of medication non-adherence among geriatric patients?

As shown in Table 3, the highest mean percentage of correct responses was observed for the domain "Definition and Characteristics of Geriatric Patients" (83.5%), whereas the lowest was found for "Polypharmacy in Geriatric Patients" (66.74%).

Table 3. Percentage of Correct Answers and Mean per Domain

Domain	Question	Correct Answers (%)	Mean per Domain (%)
I	1	91,9	83,50
	2	94,2	
	3	55,8	
	4	94,2	
	5	81,4	
II	6	60,5	67,22
	7	72,1	
	8	47,7	
	9	75,6	
	10	80,2	
III	11	48,8	66,74
	12	76,7	
	13	69,8	
	14	60,5	
	15	77,9	
IV	16	83,7	80,22
	17	87,2	
	18	75,6	
	19	80,2	
	20	74,4	

The respondents achieved a mean knowledge score of 74.42 out of a maximum possible score of 100, with scores

ranging from 20 to 100. Knowledge levels were classified as good (76–100), moderate (56–75), and poor (≤ 55). As presented in Table 4, the largest proportion of respondents demonstrated a good level of knowledge (48.84%), followed by a moderate level (33.72%) and a poor level (17.44%).

Table 4. Respondent's Level of Knowledge

Knowledge Level	Quantity	Percentage (%)
Good	42	48,84
Moderate	29	33,72
Poor	15	17,44
Total	86	100

The reliability and validity of the newly developed questionnaire were evaluated using the study data. As shown in Table 5, the questionnaire demonstrated good internal consistency, with a Cronbach's alpha coefficient of 0.798, indicating acceptable reliability.

Table 5. Questionnaire's Reliability test

Estimate	Cronbach's α
Point estimate	0.798*
95% CI lower bound	0.730
95% CI upper bound	0.853

*Significant if > 0.7

The validity of each questionnaire item was assessed using the item-rest correlation, and the results are presented in Table 6. Most questions met the validity criteria, except question number 1, 3, 4, 5, 7, 10, and 17.

Table 6. Questionnaire's Validity Test

Item	If item dropped	
	Cronbach's α	Item-rest correlation
1	0.797	0.215
2	0.792	0.360*
3	0.796	0.282
4	0.797	0.223
5	0.796	0.254
6	0.793	0.328*
7	0.807	0.076
8	0.788	0.395*
9	0.792	0.319*
10	0.798	0.218

11	0.786	0.423*
12	0.770	0.675*
13	0.784	0.448*
14	0.780	0.513*
15	0.782	0.497*
16	0.784	0.471*
17	0.795	0.257
18	0.786	0.422*
19	0.778	0.564*
20	0.791	0.348*

*Significant if ≥0.30

DISCUSSION

Dentistry is a field of healthcare that provides services for elderly patients who often present with complex conditions resulting from physiological changes, systemic diseases, and the use of multiple medications, thereby requiring special attention.¹⁸ As future general dentists who will be at the forefront of oral healthcare services, dental clinical students need to possess adequate knowledge regarding the management of geriatric patients.¹⁹ However, several studies have reported that student’s knowledge and readiness to treat geriatric patients remain insufficient, highlighting the importance of evaluating their level of knowledge as a basis for developing a curriculum that places greater emphasis on geriatric care.²⁰

The questionnaire results showed that the highest percentage of correct answers was obtained for the topic of the definition and characteristics of geriatric patients. This finding is consistent with the study by Douglas et al. (2024), which reported that educational programs in geriatric care often emphasize aging, attitudes toward older patients, perceived competence, and empathy.²¹ Conversely, the topic of polypharmacy yielded the lowest percentage of correct answers. The complexity of pharmacological management in older adults, particularly regarding drug interactions in patients with multimorbidity, may contribute to students’ limited knowledge in this area. Similar findings were reported by Misra et al. (2026), who demonstrated that dental professionals continue to exhibit knowledge gaps in the management of polypharmacy among geriatric patients, potentially leading to inappropriate prescribing practices.²²

Overall, this study showed that the majority of clinical students demonstrated a good level of knowledge (48.84%). This relatively high level of knowledge may be attributed to the academic learning acquired during pre-clinical education, combined with the clinical experience.

Clinical students generally receive more comprehensive theoretical instruction and direct patient exposure, which may contribute to a better understanding of the subject matter. This finding is supported by Singh et al. (2024), who reported that clinical dental students possess greater knowledge than preclinical students as a result of increased learning opportunities and clinical exposure during professional education.²³ Nevertheless, the questionnaire was completed independently without direct supervision, thus respondents may have consulted external sources while answering the questions. Therefore, the potential for response bias should be considered when interpreting the relatively high level of knowledge observed in this study.

The responses obtained from the participants were also used to evaluate the questionnaire through reliability and validity testing. The reliability analysis yielded a Cronbach’s alpha value of 0.798 (greater than 0.70), indicating good internal consistency and suggesting that the questionnaire is a reliable instrument for assessing clinical students’ knowledge of pharmacological considerations in geriatric patients.²⁴ Nonetheless, the validity analysis showed that several questionnaire items did not meet the validity criteria. This may happen because not all items adequately represent the knowledge construct being measured. Invalid items can result from various factors, including unclear wording, excessively high or low levels of difficulty, ambiguous interpretation, or poor alignment between the questions and the intended knowledge domain.²⁵

However, most of the questionnaire items met the validity criteria, indicating that the instrument generally has a good ability to measure students’ knowledge of geriatric patient care. The satisfactory results of the reliability and validity analyses suggest that this questionnaire has the potential to be further developed and refined as an instrument for assessing knowledge of pharmacological considerations in the management of geriatric patients.

CONCLUSION

This study indicates that dental clinical students generally demonstrate a good level of knowledge regarding pharmacological considerations in geriatric patients. Nevertheless, knowledge was not evenly distributed across all domains assessed. While students performed well on topics related to the definition and characteristics of geriatric patients, lower scores were observed for topics related to polypharmacy. This disparity may reflect the greater emphasis placed on the higher-scoring domain, with comparatively less attention given to lower-scoring ones.

The authors acknowledge that this study represents an initial step in assessing dental clinical students’ knowledge of pharmacological considerations in geriatric patient management. Several questionnaire items did not meet the validity criteria and could be improved in future studies by refining their wording, reducing ambiguity, and adjusting their level of difficulty. In addition, administering the

questionnaire under closer supervision may minimize the use of external references and ensure that the results more accurately reflect respondents' actual knowledge. Despite these limitations, the satisfactory reliability and overall validity of the instrument suggest that it has the potential to be further refined and evaluated in larger and more diverse populations, ultimately contributing to the development of a standardized tool for assessing dental students' knowledge of geriatric patient care.

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