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RESEARCH ARTICLE

# The implementation of the CDS-quiz, a novel educational method, in augmenting the knowledge and competence of pharmaceutical technical personnel

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## Abstract

**Background:** Pharmaceutical personnel are crucial to therapy implementation within healthcare facilities. The predicament lies in optimising the role of pharmaceutical technical staff within clinical pharmacy services, acting as a support system for pharmacists. The impediment to achieving higher satisfaction is attributable to pharmaceutical personnel's inadequate knowledge and skills. Therefore, a need arises for an efficient educational method to enhance their knowledge and proficiency. **Objective:** To examine the implementation of the CDS-Quiz for enhancing patient knowledge and satisfaction. **Method:** Over 90 day-research was conducted employing *ceramah*-, discussion-, and skill-quiz (CDS-Quiz). The respondents consisted of ten PTPs in healthcare facilities. The assessment of patient contentment was undertaken before and following the intervention. **Result:** After implementing the CDS-Quiz, there was a statistically significant enhancement in PTPs' knowledge and proficiency ( $p < 0.001$ ). These include a substantial upswing in patient contentment levels concerning reliability (68.8% to 89.6%), responsiveness (71.1% to 88.8%), and empathy (81.2% to 92.6%) in the provision of pharmaceutical services within the healthcare facility. There was also an increase in assurance (88.2% to 95.5%) and tangible (86% to 91.7%). **Conclusion:** The CDS-Quiz method proved the enhancement of the knowledge and skills of PTPs in healthcare services and can be applied to maximise pharmaceutical services.

## Introduction

Community-based healthcare demands the involvement of pharmacists in rendering pharmaceutical services centred around the patients. Pharmaceutical services are anticipated to concentrate on treatment optimisation, chronic disease management, enhancement of health and well-being, patient empowerment, coordination, and collaboration with the healthcare team (Bennett & Goode, 2016). Pharmacists, in the execution of pharmaceutical practice, are aided by pharmaceutical technical personnel (PTP). The PTPs are trained to assume a more

pronounced role in prescription preparation, compounding pharmaceutical formulations, patient identification for pharmacist consultations, dispensing over-the-counter (OTC) medication information, administration, and the like (Mattingly & Mattingly, 2018).

The quality of excellent pharmaceutical services is gauged through patient satisfaction. Previous research indicates that patient satisfaction levels with pharmaceutical services within healthcare facilities are still low. Patient satisfaction needs to be improved (Bunet *et al.*, 2020). Effective communication, the selection of easily understandable language, and

detailed explanations regarding medications can be implemented; the hindrances to achieving this lie in pharmaceutical personnel's need for more knowledge and skills. Hence, there is a need for effective and efficient educational methods to enhance the knowledge and skills of PTPs. Education and training for PTP can be provided by pharmacists who actively participate as educators for staff and other healthcare personnel (Bennett & Goode, 2016).

The other methods such as “discussion” and practicing skills and quizzes produced the same results (Bowers et al., 2023; Nahak et al., 2022; Zekri, Ganefri, & Anwar, 2020). Based on the literature search, no approach has combined methods to enhance good knowledge and skill. Based on the case description provided, the researchers were intrigued to apply the novel education method, “Ceramah-Quiz”, “Discussion-Quiz, and Skill-Quiz” (CDS-Quiz), within a healthcare facility in Semarang. The researchers aimed to examine its implications for enhancing patient knowledge and satisfaction.

## Methods

### Design

This pre-experimental research utilised a one-group pre-test-post-test approach. The study was conducted at a healthcare facility in Semarang, Indonesia, over a period of 90 days. The respondents comprised ten PTPs at the chosen healthcare facility. The instrument employed was a questionnaire to assess the PTPs' knowledge levels before (pre-test) and after (post-test) the intervention. The intervention was administered through the novelty of the *Ceramah-Quiz*, *Discussion-Quiz*, and *Skill-Quiz* (CDS-Quiz) methods. The *ceramah* (lectures) gave theories about the management of symptoms in pharmacy using leaflets every Monday. The discussion was held on a Wednesday in the form of questions and answers using problems/cases related to the materials. The skill trained communication skills with patients through simulation, drug storage, and dosage calculations. The skill training was conducted on Friday. The quiz was conducted three days a week (Tuesday, Thursday and Saturday). This method was conducted for 90 days.

Patient satisfaction was assessed before and after the intervention using a sample of 30 patients. The instrument employed was a five-dimensional SERVQUAL questionnaire encompassing reliability, responsiveness, assurance, empathy, and tangibles (Mohapatra et al., 2017).

This study also obtained ethical approval from the Research Ethics Committee of the Faculty of Medicine, Universitas Islam Sultan Agung, under reference number 331/VIII/2023/Komisi Bioetik.

### Data analysis

Data analysis was conducted through SPSS, starting with the normality test using Shapiro-Wilk. Subsequently, a comparative analysis was performed using the Paired T-test, and the Wilcoxon Test was employed for data that were not normally distributed.

## Results

The study involved ten PTPs from a healthcare facility in Semarang city with demographic characteristics (Table I). All the PTPs were female. The largest number was aged 25-30 (60%) with a Diploma as an education background (60%). The assessment results of PTP knowledge (Table II) yielded a  $p < 0.001$ , indicating a significant difference in respondents' knowledge before and after receiving the CDS-Quiz, with a score of 66.3% (moderate), improving to 86.9% (good). The knowledge level was categorised as good, with a score or value ranging from 76-100%, moderate (56-75%), and poor (<56%) (Nursalam, 2016). The result is presented in Table II.

**Table I: Demographic characteristics of PTPs**

Parameter	Category	Number	Percentage (%)
Gender	Male	0	0
	Female	10	100
Age	18-25	4	40
	25-30	6	60
Educational background	Pharmacy high school	4	40
	Diploma	6	60

**Table II: PTP knowledge before and after education**

Variable	Score (%)	Category	p-value
Pre-test	66.3	Fair	< 0.001
Post test	86.9	Good	

The questionnaire responses were scored on a scale of one to five. Subsequently, these scores were transformed into percentages and classified using the Customer Satisfaction Now Index into the following

categories: "Very Satisfied" (81-100%), "Satisfied" (66-80.99%), "Moderately Satisfied" (51-65.99%), "Less Satisfied" (35-50.99%), and "Dissatisfied" (0-34.99%) (Dewi, Lukmandono, & Prasetyo, 2021). Among the total patients, (63.4%) were female. The largest number of aged patients between 18 and 25 (63.4%). More than half of the patients (53.3%) were from senior high school as shown in (Table III).

**Table III: Patient characteristics**

Parameter	Category	Number	Percentage (%)
Gender	Male	11	36.6
	Female	19	63.4
Age	18-25	19	63.4
	26-35	4	13.3
	36-45	7	23.3
Educational background	No School	2	6.7
	Elementary	7	23.3
	Junior high school	1	3.4
	Senior high school	16	53.3
	College	4	13.3
Job	Farmer	3	10
	Labourer	5	16.7
	Self-employed	6	20
	Civil servant	1	3.3
	Housewife	11	36.7
	University student	3	10
	Others	1	3.3

Patient satisfaction with service reliability (Table IV) before the intervention was categorised as "satisfied" (68.8%); it experienced a significant improvement ( $p < 0.001$ ) to 89.6%, categorised as "very satisfied". Patient satisfaction with the assurance (Table IV) increased. Patient satisfaction previously indicated "very satisfied" (88.2%), which then increased to 95.5%.

**Table IV: Patient satisfaction with pharmaceutical services**

Dimension	Score (%)	Score (%)	Category	p-value
Reliability	Before	68.8	Satisfied	<0.001
	After	89.6	Very satisfied	
Responsiveness	Before	71.1	Satisfied	0.004
	After	91.3	Very satisfied	
Assurance	Before	88.2	Very satisfied	0.068*
	After	95.5	Very satisfied	
Empathy	Before	81.2	Very satisfied	0.005
	After	92.6	Very satisfied	
Tangible	Before	86	Very satisfied	0.114*
	After	91.7	Very satisfied	

\* $p > 0.05$  is not significant

## Discussion

Methods such as lectures and leaflets have led to significant knowledge improvement (Nahak et al., 2022). The discussion could enhance participants' understanding by allowing them to express opinions, solve problems, and collectively arrive at conclusions (Rahmawati & Markamah, 2020)—by combining each learning approach with a quiz. The quizzes could be a valuable learning tool that impacted examination study behaviours, performance, and confidence (Bowers et al., 2023). The skills can be increased using simulation and problem-based learning reported significant improvement (Zekri et al., 2020).

The reliability dimension consists of the ability to communicate, drug information service, answer patient questions related to drugs, and give alternatives when the drug is not available. Patient satisfaction with the drug information service indicates service quality-related reliability (Djuria, 2021). Effective communication between healthcare providers and patients is the foundation for safe and efficient therapy. Utilising easily understandable language is crucial. The ability to provide solutions when the required medication is unavailable necessitates training in communication skills to reassure patients emotionally and address their concerns regarding the transition in treatment. The CDS-Quiz connected theory and practice to enhance

knowledge and skill. Implementation of the combination of lecture, discussion, skill-focused on drug information, and how to communicate well and clearly through simulation using mock patients. The quiz was used to review the level of understanding among the PTPs of the CDS that has been taught.

Strategies that can be implemented include facilitating communication skills training for PTPs through conversation scenarios, which has proven effective in enhancing their preparedness to handle real-life cases (Schackmann *et al.*, 2023). Discussions and case-based learning could enhance communication and critical thinking skills (Akaho, Nakagawa, & Katz, 2010). In line with the curriculum previously obtained, it focused on preparing PTPs with the competence to provide patient-centred care (Sodnomsen *et al.*, 2022).

Patient satisfaction with PTP responsiveness (Table IV) before the administration of the CDS-Quiz was 71.1%, categorised as "*satisfied*", which then improved to "*very satisfied*" (91.3%). The responsiveness of PTPs has improved in providing prompt service, being quick to respond to requests, aiding customers, and recommending appropriate medications. The CDS-Quiz led to an increase in knowledge and skill. The discussion contained in the CDS-Quiz also helped to accustom PTPs to the questions and answers related to the content of the shared instructional materials. The skills taught through simulations with mock patients also helped to train the PTPs to respond quickly. Responsiveness is linked to the competency and knowledge required by pharmaceutical personnel. Other critical attributes include patient waiting time during medication services (Patel *et al.*, 2020)).

The CDS-Quiz focused on the knowledge and skill of PTPs about the comprehension of the medication information that should be provided by pharmacists or PTPs as part of assurance. The skill of drug storage contained within the CDS-Quiz. Good drug storage is important to ensure drug safety. In this regard, assurance is paramount for meeting pharmaceutical service standards. To ensure the quality of pharmaceutical services, the procurement of pharmaceutical products must be conducted through authorised distributors. Pharmaceutical service standards mandate that the pharmaceutical services ensure dispensed medications' safety, quality, and efficacy (Permenkes, 2016).

Additionally, patient satisfaction in empathy (Table IV) significantly increased after being given the CDS-Quiz, rising from 81.2% to 92.6%, categorized as "*very satisfied*". Good communication skills include providing empathy. Empathy, in service, entails inquiring about their complaints or symptoms and expressing gratitude. Patients are inclined to choose pharmacies

with personnel who exhibit friendly, caring, helpful, and approachable attitudes (Patel *et al.*, 2020).

Patient satisfaction in the tangible (Table IV) experienced an increase before and after providing the CDS-Quiz, with a percentage going from 86% to 91.7%, categorised as "*very satisfied*". The CDS-Quiz also mirrored the performance of PTPs in providing good service through knowledge and skill training. The availability of medications, the performance of pharmaceutical personnel, and facility aspects such as waiting rooms, cleanliness, and proper lighting could be improved upon to enhance patient satisfaction (Fadlilah & Listyorini, 2022; Kabba *et al.*, 2021; Patel *et al.*, 2020).

## Conclusion

The application of the CDS-Quiz method proves the enhancement of the knowledge and skills of PTPs in healthcare services. The knowledge level of PTPs improved from a fair score of 66.3% to a good score of 86.9%. Implementing the CDS-Quiz method leads to increased patient satisfaction on reliability, responsiveness, and empathy, with patient satisfaction levels increasing from 68.8% to 89.6%, 71.1% to 91.3%, and from 81.2% to 92.6%. The CDS-Quiz method also increased assurance and tangibles, with patient satisfaction levels increasing from 88.2% to 95.5% and from 86% to 91.7%. Therefore, the CDS-Quiz method can be applied as a strategy to maximising pharmaceutical services.

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