Evaluating the Effectiveness of Training and Continuing Education Programs in Enhancing the Skills and Knowledge of Pharmacy Technicians

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Abstract

This study examines the effectiveness of training and continuing education (CE) programs in enhancing the skills and knowledge of pharmacy technicians. A mixed-methods approach was employed, combining quantitative survey data from 50 pharmacy technicians with qualitative insights from semi-structured interviews. The findings indicate that CE programs significantly improve clinical knowledge, job performance, and confidence among pharmacy technicians. However, barriers such as time constraints, financial costs, and limited employer support hinder participation. The study highlights the importance of relevant and practical CE content and suggests that addressing participation barriers is crucial for maximizing the benefits of continuing education. Future research should explore the long-term impact of CE on professional development and the effectiveness of different educational formats.

Keywords: pharmacy technicians, continuing education, professional development, skills enhancement, barriers, training programs

Introduction

Pharmacy technicians play an essential role in the healthcare system, supporting pharmacists in various tasks, including medication preparation, dispensing, and patient interaction. As the responsibilities of pharmacy technicians continue to expand, there is a growing demand for skilled technicians who can adapt to evolving healthcare environments. In this context, ongoing training and continuing education are critical in ensuring that pharmacy technicians maintain and enhance their skills and knowledge to meet the needs of modern pharmacy practice (White and Hohmeier, 2015).

The importance of continuing education for healthcare professionals has been widely recognized. For pharmacy technicians, effective training programs can directly impact patient safety and the quality of care provided. Studies have shown that well-trained pharmacy technicians contribute to reducing medication errors and improving pharmacy workflow efficiency (Rubin et al., 2016). Despite the clear benefits, access to and participation in continuing education programs vary significantly among pharmacy technicians, often depending on workplace policies and resource availability (Schafheutle et al., 2012).

This study aims to examine the effectiveness of ongoing education programs for pharmacy technicians in enhancing their skills and knowledge. Specifically, it will assess how training programs impact job performance, knowledge retention, and professional development. By evaluating the outcomes of these programs, this research seeks to contribute to the growing body of literature on pharmacy education and inform future strategies for optimizing training for pharmacy technicians.

The findings from this study are expected to have implications for pharmacy practice, particularly in improving the delivery of care through better-trained technicians. Furthermore, it will provide insights into the challenges and opportunities for implementing more comprehensive continuing education programs in various pharmacy settings.

Research Objectives

1. To evaluate the effectiveness of ongoing education programs for pharmacy technicians in enhancing their job performance.
2. To assess the impact of continuing education on the retention of knowledge and skills among pharmacy technicians.
3. To explore the barriers and facilitators to accessing continuing education programs for pharmacy technicians.

Literature Review

Current Training Programs for Pharmacy Technicians: Pharmacy technicians 'roles and responsibilities have expanded significantly over the years, necessitating more comprehensive training and continuing education (CE) programs. Traditionally, pharmacy technician training was limited to on-the-job learning, with varying levels of formal education across regions and institutions (White and Hohmeier, 2015). However, the growing complexity of the pharmacy environment has led to the development of structured training programs, including certification programs offered by institutions such as the Pharmacy Technician Certification Board (PTCB). Certification requirements typically include passing a standardized exam and completing continuing education credits to maintain certification (Alkhateeb et al., 2011).

Research has highlighted that pharmacy technicians who undergo formal training programs demonstrate higher levels of competency and job readiness compared to those who rely solely on on-the-job training (Stewart et al., 2011). These programs cover various critical topics, including medication safety, pharmacy law, and patient communication, which contribute to more effective and efficient pharmacy operations.

Impact of Continuing Education on Pharmacy Technicians: Continuing education plays a pivotal role in ensuring that pharmacy technicians stay updated with the latest developments in pharmacy practice, regulations, and technology. According to Rubin et al. (2016), participation in continuing education programs has been shown to improve pharmacy technicians' proficiency in medication management and reduce medication errors in clinical settings. These findings suggest that ongoing training helps bridge the gap between initial certification and the evolving demands of the profession.

Moreover, research by Desselle and Holmes (2007) indicated that pharmacy technicians who regularly engage in continuing education report higher levels of job satisfaction and confidence in performing their duties. This increased confidence translates into better service delivery and enhanced patient outcomes. CE programs also provide opportunities for pharmacy technicians to specialize in specific areas such as sterile compounding or medication therapy management, further contributing to career advancement (Desselle and Holmes, 2007).

Barriers to Continuing Education for Pharmacy Technicians: Despite the recognized benefits of continuing education, there are several barriers that pharmacy technicians face in accessing and completing CE programs. Financial constraints are one of the most frequently cited challenges, as many pharmacy technicians are responsible for funding their own education, and some employers may not offer reimbursement or support (Schafheutle et al., 2012). Additionally, workload and time management are significant barriers, as many technicians struggle to balance their work responsibilities with the demands of continuing education (Schafheutle et al., 2012).

Another factor affecting participation in CE programs is the availability of resources. In rural or underserved areas, access to formal training programs may be limited, resulting in fewer opportunities for ongoing education (Desselle and Holmes, 2015). This geographical disparity can contribute to unequal professional development opportunities among pharmacy technicians, potentially affecting the quality of care provided in different settings.

Effectiveness of Continuing Education Programs: While there is evidence supporting the benefits of continuing education, the overall effectiveness of these programs is still under investigation. Studies have shown that the quality and format of CE programs can significantly influence their impact. For instance, online continuing education programs offer flexibility, which can lead to higher participation rates, but they may lack the hands-on training that is crucial for certain skills (Stewart et al., 2011).

Moreover, Desselle and Holmes (2007) found that programs incorporating interactive elements, such as simulations and workshops, tend to produce better knowledge retention and skill application compared to passive learning methods like lectures or reading materials. This finding underscores the importance of

designing CE programs that engage pharmacy technicians in active learning, allowing them to apply new knowledge and skills in real-world scenarios.
However, more research is needed to determine the long-term effects of continuing education on pharmacy technicians' job performance and career development. For example, studies could investigate whether regular participation in CE programs leads to measurable improvements in patient outcomes, error rates, or overall pharmacy efficiency.

Methodology

Study Design: This study employed a cross-sectional, mixed-methods design to evaluate the effectiveness of training and continuing education (CE) programs in enhancing the skills and knowledge of pharmacy technicians. The research combined quantitative surveys with qualitative semi-structured interviews to gather both broad trends and in-depth insights into participants' experiences with ongoing education. This dual approach allowed for a comprehensive assessment of CE program effectiveness.
Study Population and Sampling: The study targeted certified pharmacy technicians working in tertiary hospitals. A total of 50 pharmacy technicians from diverse geographical locations were recruited for the study. Participants were selected through stratified random sampling to ensure representation across different work environments and experience levels. The inclusion criteria required that participants had completed at least one continuing education program in the past year. Technicians who were currently enrolled in training but had not yet completed a program were excluded.
Data Collection : Data collection occurred over a two-month period. Quantitative data were collected through an online survey, which was distributed to participants via email. The survey consisted of 20 multiple-choice and Likert-scale questions designed to assess participants' perceptions of the effectiveness of CE programs on their skills, knowledge, job performance, and professional development. Additionally, demographic information, such as age, years of experience, and type of pharmacy setting, was gathered.
To complement the quantitative data, semi-structured interviews were conducted with 10 pharmacy technicians selected from the survey respondents. The interviews were conducted either in person or via video conferencing, based on participants' availability and preference. Each interview lasted approximately 30 minutes and focused on participants ’experiences with continuing education, perceived barriers, and the impact of CE programs on their work. The interviews were audio-recorded and transcribed for analysis.
Data Analysis: Quantitative data from the surveys were analyzed using descriptive and inferential statistics. Descriptive statistics, including means, standard deviations, and frequencies, were used to summarize the data. Inferential statistics, such as t-tests and ANOVA, were employed to identify significant differences in the perceived effectiveness of CE programs based on variables such as years of experience, type of pharmacy setting, and geographical location. A significance level of $p < 0.05$ was used for all statistical tests.
For the qualitative data, thematic analysis was conducted to identify recurring themes and patterns in the interview transcripts. The analysis followed a structured process: familiarization with the data, coding, generating themes, reviewing themes, defining themes, and writing up the findings. Two researchers independently coded the data to ensure reliability, and any discrepancies were resolved through discussion. NVivo software was utilized to assist with qualitative data analysis.

Ethical Considerations: The study received approval from the ethics committee. Informed consent was obtained from all participants before their involvement in the study. Participation was entirely voluntary, and participants were assured of their right to withdraw from the study at any time without penalty. All data were anonymized to protect participants' identities, and confidentiality was maintained throughout the research process.

Limitations: While the study provides valuable insights into the effectiveness of CE programs for pharmacy technicians, several limitations should be noted. The small sample size of 50 participants may limit the generalizability of the findings to the broader population of pharmacy technicians. Additionally, the cross-sectional design restricts the ability to assess long-term effects of continuing education on pharmacy technicians' skills and knowledge. Lastly, the self-reported nature of the survey data may be subject to response bias, as participants might overestimate the impact of CE programs on their professional abilities.

Findings

The findings of this study are presented in two sections: quantitative results from the survey and qualitative insights from the semi-structured interviews.

Quantitative Findings: A total of 50 pharmacy technicians participated in the survey. The data were analyzed to assess the perceived effectiveness of training and continuing education (CE) programs in enhancing skills, knowledge, and job performance. The results are summarized in the following tables.

Table 1: Demographic Characteristics of Participants (N = 50)

Characteristic	Frequency (n)	Percentage (%)
Gender		
Male	20	40%
Female	30	60%
Years of Experience		
1-5 years	15	30%
6-10 years	20	40%
11+ years	15	30%
Pharmacy Setting		
Hospital	25	50%
Retail Pharmacy	15	30%
Long-term Care Facility	10	20%

Table 2: Perceptions of Effectiveness of CE Programs (N = 50)

Aspect	Mean (SD)**	% Agree/Strongly Agree
Improved job performance	4.3 (0.7)	86%
Enhanced clinical knowledge	4.5 (0.6)	90%
Increased confidence in performing tasks	4.2 (0.8)	84%
Helped in career advancement	3.9 (0.9)	78%
Relevance of content to daily practice	4.1 (0.8)	82%

*Note: Responses were measured on a 5-point Likert scale, where 1- Strongly Disagree & 5 - Strongly Agree.

Table 3: Perceived Barriers to Continuing Education Participation (N = 50)

Barrier		
Lack of time	30	60%
Cost of programs	25	50%
Inaccessibility of courses	20	40%
Lack of employer support	15	30%
Limited availability of relevant CE programs	10	20%

The quantitative findings indicate that the majority of participants found CE programs to be beneficial, particularly in enhancing their clinical knowledge (90%) and job performance (86%). However, several barriers to participation in CE programs were identified, with time constraints (60%) and cost (50%) being the most commonly reported.

Qualitative Findings: The qualitative component of the study involved semi-structured interviews with 10 pharmacy technicians. Thematic analysis revealed four main themes, with sub-themes emerging from participants ’responses.

Theme 1: Impact of Continuing Education on Professional Skills

Sub-theme 1.1: Enhanced Clinical Competence

- **Participant 3:** "After completing several CE programs, I felt much more confident in handling complex prescriptions and patient counseling."
- **Participant 7:** "The training helped me keep up with the latest medications and treatment protocols, which is essential for patient safety."

Sub-theme 1.2: Increased Confidence in Work

- **Participant 2:** "I've noticed that I approach my tasks with more assurance now. I'm no longer second-guessing myself as much."
- **Participant 9:** "With each CE course, I feel like I'm sharpening my skills and becoming more efficient in my work."

Theme 2: Relevance of Continuing Education to Daily Practice

Sub-theme 2.1: Practical Application of Knowledge

- **Participant 4:** "The courses I took were directly related to what I do every day, especially in compounding medications and understanding drug interactions."
- **Participant 6: "**What I learned was immediately applicable in my job, especially in terms of patient counseling and medication safety."

Sub-theme 2.2: Gaps in Content

- **Participant 1:** "While some programs were very helpful, others didn't really cover the real-world challenges we face. I think they need to update the content more frequently."
- **Participant 5:** "Some CE programs are too theoretical. I wish there were more hands-on workshops or case studies."

Theme 3: Barriers to Continuing Education

Sub-theme 3.1: Time Constraints

- **Participant 8:** "Finding time to complete CE courses is tough. Between work and personal life, it's hard to fit it all in."
- **Participant 10:** "I often have to do my CE courses during my time off, which can be stressful."

Sub-theme 3.2: Financial Costs

- **Participant 3:** "CE programs can be expensive, and not all employers are willing to reimburse the costs. It's a significant investment."
- **Participant 7:** "I've had to skip certain courses because they were just too pricey for me."

Theme 4: Employer Support and Opportunities for Career Advancement

Sub-theme 4.1: Lack of Institutional Support

- **Participant 6:** "I wish my employer was more supportive in terms of offering paid time off for CE or at least providing more resources."
- **Participant 2:** "Some of us don't get much encouragement to pursue further education. It feels like it's not a priority for the management."

Sub-theme 4.2: Professional Growth Opportunities

- **Participant 4:** "CE has definitely opened up some new doors for me, but I had to be proactive about finding those opportunities."
- **Participant 10:** "The more I learn, the more I feel prepared to take on leadership roles in the future."

Discussion

This study explored the effectiveness of training and continuing education (CE) programs in enhancing the skills and knowledge of pharmacy technicians. The findings reveal that CE programs are generally perceived as beneficial by pharmacy technicians, with notable improvements in clinical competence, job performance, and confidence. However, several barriers to participation in CE programs were also identified, including time constraints, financial costs, and limited employer support.

Effectiveness of Continuing Education Programs: The quantitative data showed that the majority of participants perceived CE programs as highly effective in enhancing their clinical knowledge and job performance. Specifically, 90% of respondents agreed that CE programs increased their clinical knowledge, while 86% reported improvements in job performance. These results are consistent with previous research suggesting that ongoing education is essential for maintaining and enhancing the competencies of healthcare professionals, including pharmacy technicians. CE programs help technicians stay updated on new medications, treatment protocols, and regulatory requirements, all of which are critical in ensuring safe and effective patient care (Alkhateeb et al., 2012; Stewart et al., 2011).

The qualitative findings further support these quantitative results. Many participants shared that CE programs had a direct impact on their day-to-day work, particularly in areas like medication compounding, patient counseling, and understanding drug interactions. This aligns with existing literature that emphasizes the role of practical and relevant continuing education in improving job performance and patient outcomes . Moreover, increased confidence was a recurring theme in the interviews, as participants noted that ongoing education made them feel more competent and assured in their roles. This is particularly important in the healthcare field, where confidence can translate into more efficient and effective care delivery(White and Hohmeier, 2015; Desselle and Holmes, 2015).

Barriers to Participation in Continuing Education: Despite the perceived benefits of CE programs, the study also identified significant barriers to participation. Time constraints were the most commonly reported challenge, with 60% of participants citing lack of time as a major barrier. This is consistent with previous research, which has shown that healthcare professionals often struggle to balance the demands of their work with the need to pursue continuing education (Schafheutle et al., 2012) . The qualitative findings revealed that many technicians had to complete CE programs during their personal time, which added to their stress and limited their ability to fully engage with the educational content.

Financial costs were another significant barrier, reported by 50% of participants. The cost of CE programs, particularly when not reimbursed by employers, can be prohibitive for many technicians. This finding highlights the need for more affordable or subsidized CE options, as well as greater employer support in covering the costs of professional development. Prior studies have also emphasized the importance of financial support in enabling healthcare professionals to participate in ongoing education(Schafheutle et al., 2012; Desselle and Holmes, 2015).

Limited employer support was also mentioned as a barrier by 30% of participants. Pharmacy technicians expressed a desire for more institutional encouragement, including paid time off for CE programs and access to relevant resources. This echoes findings from other studies that underscore the role of organizational support in facilitating continuous professional development. Employers that actively promote and support continuing education are more likely to have a workforce that is skilled, knowledgeable, and capable of delivering high-quality care.

Relevance and Practicality of Continuing Education Programs: While CE programs were generally perceived as beneficial, some participants raised concerns about the relevance and practicality of the content. The qualitative data revealed that certain CE programs were seen as too theoretical and not directly applicable to the real-world challenges pharmacy technicians face. This points to the need for more practical, hands-on CE opportunities that focus on real-world scenarios and case studies. As the literature suggests, CE programs that incorporate active learning methods, such as simulations and case-based learning, are often more effective in improving professional practice .

Implications for Practice: The findings of this study have several important implications for practice. First, pharmacy technician CE programs should focus on providing practical, relevant content that directly relates to technicians' daily work. Incorporating more hands-on learning opportunities, such as workshops and simulations, could enhance the effectiveness of CE programs and improve participants' job performance. Second, addressing barriers to participation, such as time constraints and financial costs, is crucial. Employers can play a key role in supporting their technicians by providing financial assistance for CE programs and allowing time off for continuing education. Finally, ongoing education should be seen as an integral part of a

pharmacy technician's professional development, and both employers and regulatory bodies should ensure that accessible and relevant CE opportunities are available.

Limitations of the Study: While this study provides valuable insights into the effectiveness of CE programs for pharmacy technicians, several limitations must be acknowledged. The sample size of 50 participants, though sufficient for preliminary insights, limits the generalizability of the findings. Additionally, the cross-sectional nature of the study does not allow for the examination of long-term outcomes of CE participation. Finally, the reliance on self-reported data may introduce response bias, as participants may overestimate the impact of CE programs on their skills and knowledge.

Future Research: Future research could address these limitations by conducting longitudinal studies that track the long-term effects of CE participation on pharmacy technicians 'skills, knowledge, and career progression. Additionally, larger, more diverse samples could be used to improve the generalizability of the findings. Finally, future studies could explore the impact of different types of CE programs, such as online versus in-person formats, to determine which methods are most effective in enhancing pharmacy technicians' professional development.

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