



EVALUATING PHARMACY TECHNICIANS' KNOWLEDGE AND ATTITUDES TOWARD MEDICATION SAFETY AND ERROR PREVENTION: A SURVEY STUDY

Fawzeyah saleem Aldafiri^{*}, Mashaal hamud AL shammary, Manal Marzook Alshammary, Kholoud mohsen alenazi, Anood Rabaah Alshammary, Ikhlas Rabah Alshammar

^{*}Pharmacy technicians

Abstract

Medication errors are a major patient safety issue. Pharmacy technicians play a crucial role in dispensing processes, yet limited research evaluates their capabilities around safe practices. This study surveyed 254 pharmacy technicians across 5 hospitals in Saudi Arabia assessing knowledge and attitudes related to medication safety using a validated instrument. Results revealed moderate baseline knowledge regarding error types, risk factors, prevention strategies and reporting procedures (average score of 67% correct). Technicians showed generally positive safety attitudes, although scores were lower around fear of consequences for errors and ability to oppose unsafe prescribing. Supervisors had better knowledge but not attitude scores. Targeted education and training to correct misconceptions, along with improved safety culture fostering accountability without blame, can enhance this vital workforce's preparedness to reduce medication error risks.

Keywords: medication safety; pharmacy technicians; knowledge; attitudes; survey

Introduction

Medication errors are a major global patient safety issue, contributing to adverse events, hospitalizations, disability, and even death (Aljadhey et al., 2014; Keers et al., 2018). While mistakes can occur at all steps of the medication use process, dispensing errors by incorrect drug, dose, quantity, or labeling are a prime concern (Keers et al., 2013). Pharmacy technicians play an integral role in dispensing responsibilities, yet limited research examines their capabilities around safe practices (Gatchel & Schultz, 2012). As Saudi Arabia expands technician roles, ensuring sound knowledge, skills and safety orientations is critical to prevent errors (Bajis et al., 2018).

This study surveyed pharmacy technicians across hospitals in Riyadh regarding knowledge and attitudes pertinent to medication safety using a validated instrument. Results provide insights into current gaps and strengths to guide education and training initiatives targeted to this vital



All the articles published by Chelonian Conservation and Biology are licensed under a [Creative Commons Attribution-NonCommercial4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/) Based on a work at <https://www.acgpublishing.com/>

personnel group's needs and practice context. Bolstering technicians' capabilities is crucial to enable greater pharmacist clinical roles through task reallocation while ensuring dispensing safety (Bajis et al., 2018).

Background

Medication Safety Significance

Medication errors refer to lapses in prescribing, transcribing, dispensing, administration or monitoring that compromise care (World Health Organization, 2017). Such mistakes affect 1 in 20 inpatients globally, prolonging treatment and hospitalization (Donaldson et al., 2018). While errors span all aspects, dispensing is a prime concern with high risk and severity (Flynn & Barker, 2008). Sound pharmacist and technician knowledge, practices and collaboration are essential safety buffers.

Pharmacy Technicians' Role

Pharmacy technicians undertake crucial dispensing steps including order entry, product selection, labeling, recordkeeping and inventory management. Their central role positions them to prevent mistakes via checks (Aljadhey et al., 2014). However, evidence shows gaps in technicians' safety skills (Gatchel & Schultz, 2012). Surveys reveal limited training, knowledge deficits in error types and reporting, and misconceptions around causes (Abdel-Latif, 2016). Targeted capability-building is advised (Flynn & Barker, 2008). Saudi Arabia's phasing in of expanded technician roles warrants ensuring rigor through education on safe practices.

Conceptual Framework

This research was guided by Reason's Swiss Cheese Model of how latent errors and local factors circumvent safety barriers, and frameworks for assessing safety culture, knowledge and climate (Lawton et al., 2012; Sorra et al., 2016). Assessing technician capability gaps informs interventions on training, technology, procedures and motivation to enhance safeguards.

Methods

Study Design and Setting

A survey-based cross-sectional study was conducted in the pharmacy departments of 5 hospitals under the Ministry of Health in Riyadh between June-August 2022.

Sample

The sample included 254 pharmacy technicians involved in dispensing functions, exceeding the required minimum of 210 for a margin of error of 5% based on the total technician population across participating sites.

Survey Instrument

Technicians completed an anonymized questionnaire including:

- 20 knowledge items on error types, causes, reporting procedures, based on validated measures (Abdel-Latif, 2016).
- 15 attitude questions on perspectives toward medication safety using Likert scales (Gatchel & Schultz, 2012).
- Demographics including experience, education and prior safety training.

Data Collection and Analysis

Completed questionnaires were gathered and data entered into SPSS v25.0 for analysis. Knowledge scores were calculated overall and by item. Attitudes were analyzed by descriptive statistics. Group differences were tested using t-tests and ANOVA. Thematic analysis was applied to open-ended responses.

Ethical Considerations

The study was approved by institutional review boards and principles of confidentiality and informed consent were maintained.

Results

Sample Characteristics

Among the 254 technicians surveyed, 62% were female which closely mirrors the pharmacy technician workforce gender distribution in Saudi Arabia (Bajis et al., 2018). The mean age was 29.5 years (range 21-56 years) and average experience as technicians was 5 years. Only 18% held a bachelor's qualification in pharmacy technology. Just 27% had undertaken prior continuing education related to medication safety specifically.

Knowledge Scores

The mean total score on the 20-item medication safety knowledge questionnaire was 67.2% (SD 12.4%), indicating moderate baseline understanding. The lowest scoring domains included questions on look-alike sound-alike drugs, high alert medications, wrong dose errors and reporting procedures. Supervising technicians scored higher than staff-level (72% vs. 63%), although still below mastery. Years of experience did not correlate significantly with knowledge level.

Attitude Survey

Overall, technicians exhibited generally positive perspectives around the importance of medication safety and their role in prevention. However, scores were lower around items on fear of consequences for making mistakes and willingness to speak up about unsafe prescribing orders. Staff-level technicians reported lower safety participation attitudes compared to supervisors.

Qualitative Feedback

Open-ended responses emphasized desire for more applied education through simulations and practical examples focused on the most frequent and high-risk aspects of technicians' dispensing roles.

Discussion

This survey provides important insights into Saudi pharmacy technicians' capabilities regarding medication safety, revealing moderate foundational knowledge coupled with gaps in key domains and attitudes toward accountability. The knowledge deficits around look-alike/sound-alike drugs, high alert medications, dose calculations and reporting reinforce literature on common educational needs among technicians globally (Gatchel & Schultz, 2012; Abdel-Latif, 2016). The lower scores around safety participation attitudes also mirror challenges around authority gradients and fear of consequences impeding speaking up about risk (Lawton et al., 2012).

Tailored training initiatives are advised focused on addressing prevalent knowledge gaps, strengthening risk recognition, using simulations and case examples for applied learning, and fostering accountability without blame. Ongoing competency assessments can further enhance skills. Targeted development will be crucial amidst Saudi Arabia's planned expansion of technician practice authorities to ensure sound capabilities around this safety-critical role.

Study limitations include self-reported data and the limited hospital settings. However, surveying knowledge and perspectives provides valuable direction for improvement initiatives to bolster this workforce's preparedness in preventing the real-world problem of medication errors through practice enhancements, education, technology support and cultural change.

Conclusion

This survey of Saudi pharmacy technicians revealed important opportunities to strengthen capabilities related to safe dispensing practices through targeted training addressing knowledge gaps, fostering positive safety participation attitudes, and emphasizing application to practice. Technicians are eager for practical learning focused on priority risks in their role. Sustained development is advised to support expanded pharmacy technician practice and combat the pressing patient safety issue of medication errors.

References

Abdel-Latif, M.M.M. (2016). Knowledge of medication error among pharmacy technicians in Saudi Arabia. *Saudi Pharmaceutical Journal*, 24(4), 390-394. <https://doi.org/10.1016/j.jsps.2015.02.023>

Aljadhey, H., Mahmoud, M. A., Hassali, M. A., Alrasheedy, A., Alahmad, A., Saleem, F., Sheikh, A., Murray, M., & Bates, D. W. (2014). Challenges to and the future of medication safety in Saudi Arabia: A qualitative study. *Saudi pharmaceutical journal : SPJ : the official*

publication of the Saudi Pharmaceutical Society, 22(4), 326–332. <https://doi.org/10.1016/j.jsps.2013.05.004>

Bajis, D. A., Al-Arifi, M. N., Al-Ghamdi, E. A., Al-Kaldi, Y. M., Al-Muhaya, R. A., Al-Zaidi, A. K., Balubaid, H. S., & Allah Alajlan, A. M. (2018). Pharmacy practice and the health care system of Saudi Arabia. *Canadian pharmacists journal : CPJ = Revue des pharmaciens du Canada : RPC*, 151(3), 134–150. <https://doi.org/10.1177/1715163518765981>

Donaldson, L. J., Kelley, E. T., Dhingra-Kumar, N., Kieny, M. P., & Sheikh, A. (2017). Medication Without Harm: WHO's Third Global Patient Safety Challenge. *Lancet (London, England)*, 389(10080), 1680–1681. [https://doi.org/10.1016/S0140-6736\(17\)31047-4](https://doi.org/10.1016/S0140-6736(17)31047-4)

Flynn, E. A., Barker, K. N., Gibson, J. T., Pearson, R. E., Berger, B. A., & Smith, L. A. (1999). Impact of interruptions and distractions on dispensing errors in an ambulatory care pharmacy. *American journal of health-system pharmacy*, 56(13), 1319–1325. <https://doi.org/10.1093/ajhp/56.13.1319>

Gatchel, R. J., & Schultz, I. Z. (Eds.). (2012). *Handbook of occupational health and wellness*. Springer Science & Business Media.

Keers, R. N., Williams, S. D., Cooke, J., & Ashcroft, D. M. (2013). Causes of medication administration errors in hospitals: a systematic review of quantitative and qualitative evidence. *Drug safety*, 36(11), 1045–1067. <https://doi.org/10.1007/s40264-013-0090-2>

Keers, R. N., Williams, S. D., Vattakatuchery, J. J., Brown, P., Miller, J., Prescott, L., & Ashcroft, D. M. (2018). Prevalence, nature and predictors of prescribing errors in mental health hospitals: a prospective multicentre study. *BMJ open*, 8(9), e019001. <https://doi.org/10.1136/bmjopen-2017-019001>

Lawton, R., McEachan, R. R., Giles, S. J., Sirriyeh, R., Watt, I. S., & Wright, J. (2012). Development of an evidence-based framework of factors contributing to patient safety incidents in hospital settings: a systematic review. *BMJ quality & safety*, 21(5), 369–380. <https://doi.org/10.1136/bmjqs-2011-000443>

Sorra J. (2016). Module 10. Agency for Healthcare Research and Quality. Retrieved from <https://psnet.ahrq.gov/primer/primer-module-10-measurement>

World Health Organization. (2017). *Medication Errors: Technical Series on Safer Primary Care*. World Health Organization. <https://apps.who.int/iris/handle/10665/252274>. License: CC BY-NC-SA 3.0 IGO