Pharmacy technician self-efficacies: Insight to aid future education, staff development, and workforce planning

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ABSTRACT

Background: The roles of pharmacy technicians are increasingly prominent given pharmacy's transition to patient-centered activities and evolving scopes of practice in many U.S. states and throughout the world.

Objectives: The aims of this study were to assess U.S. pharmacy technicians' self-efficacies for and attitudes toward performing current and emerging roles in hospital and in community pharmacy and to identify factors related to pharmacy technician self-efficacies in these roles.

Methods: A total of 5000 pharmacy technicians from 8 U.S. states were sent an electronic survey eliciting data on current involvement, self-efficacies, and attitudes for practicing in an expansive list of practice activities. The 8 states from which the sample was drawn were selected from a stratified randomized procedure using U.S. Census Bureau geographically defined regions. Pre-notification and response reminders were employed. Data were analyzed descriptively and with univariate, inferential tests, as appropriate, to determine associations with commitment, practice environment, experience level, and other variables.

Results: Of the 612 participants who responded, 494 were currently working as a technician and not enrolled in a PharmD program of study. Participants reported various activities in which they were highly engaged. Overall, attitudes toward performing most of the activities and self-efficacies were quite favorable, even for those activities in which technicians were currently less involved. There were some notable differences between technicians practicing in community versus hospital setting. Years of experience, profession commitment, and advanced employee ranking were associated with higher levels of self-efficacy, overall.

Conclusions: This initial examination of pharmacy technician self-efficacies identified areas that along with other factors could help employers with further expanding technician practice activities and vocational institutions with considerations for education and development of these key members of the workforce. The results would suggest technicians to be ready for continued evolution in their practice.

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1. Introduction

Attention has been recently afforded to pharmacy technicians and other workforce cadres in discussions of pharmacy practice. This attention comes after years of relative omission, particularly when considering that the practice of support staff would naturally mature if pharmacists are to delegate some of their previous responsibilities to engage in more patient-centered care. Much recent literature has focused on role expansions for technicians in the United States (U.S.), this has most recently been codified in various State Board of Pharmacy statutes allowing for "check-tech-check", wherein technicians have the final review of refill prescription orders for accuracy. This follows a designated CheckTech position authorized in the United Kingdom (U.K.) for nearly a decade and a study in New Zealand demonstrating the effectiveness of a similar program with evidence that as a result, pharmacists actually shifted considerable amounts of time in practice from dispensing to patient-focused activities. Recently, some U.S. states have either passed or are considering legislative rules allowing technicians to administer immunizations, such as for influenza inoculation.

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The recent expansion of legal and regulatory scopes of practice for technicians follows a couple of decades where the roles of technicians were piloted and implemented on a limited basis, often to a particular health system. Examples of such roles include technician involvement in tobacco cessation programs, naloxone distribution, medication safety director, medication reconciliation, and medication-history taking, to name but a few. These roles represent expansions of technician responsibility and autonomy, even if not necessarily emblematic of regulatory or legal practice change. Whether regulatory or not, and even whether the expanded role(s) underscore significant increases in cognitive workload and judgment, there is debate about technician education, training, and skills development that has been ongoing for quite some time. On a global level, this can be witnessed by the myriad approaches taken in both developed and developing nations, where education requirements vary from standardized education in Denmark to what is akin to apprenticeship, elsewhere. Within the U.S., calls for standardization and elevation of education and training have been made repeatedly.

While preliminary evidence suggests technicians generally embrace new roles and are effective in their performance, there has been no research evaluating on a broader scale their willingness to take on emerging responsibilities and their confidence in doing so. For that matter, there has been very little if any research evaluating technicians’ self-efficacy in their performance of current responsibilities. Self-efficacy is an important construct implicated in attitude, performance, and behavior change. Self-efficacy has been examined in pharmacists and demonstrated to be critical in their proficiency for delivering patient care. Additionally, identification of areas where self-efficacy is lacking can become the backbone of future educational interventions and perhaps even help identify areas for restructure of technician vocational education, on-the-job training, and professional revalidation.

These lines of thought regarding self-efficacy in technician practice come in light of emerging data on pharmacy workforce cadres. Pharmacy support staff have varied roles worldwide, where some technicians are basically the only dispensers of medications in certain under-developed nations, to others where they have taken on a more clinical role examined specifically for their part in safety within the medication use process. From a global perspective, technicians take on varied roles and education training in certain settings, even while in some countries such as Denmark, all technicians (pharmaconomists) are educated entirely at one institution nationwide, regardless of setting. In the U.S., technicians ostensibly have different roles than other pharmacy support staff, such as clerical personnel; however, it has been noted that at least among the lay clients (patients), there is often difficulty distinguishing one staff member type from another and that their roles might not always be clearly delineated. Very few studies have examined, or compared responsibilities and attitudes between technicians in various practice settings. While some technicians might have practiced in various settings throughout their career, others might very well have been in either hospital or community practice for an extensive period of time. The two settings vary considerably, with the pharmacy technician, particularly in the U.S., responsible for customer service and an integrated series of steps involved in the prescription dispensing process, whereas hospital pharmacy technicians interact little with the public/patients, yet have a wider range of responsibilities beyond medication dispensing, owing to the complexity of distribution, storage, inventory, and record-keeping inherent to the hospital setting.

To that end, the aims of this study were to assess U.S. pharmacy technicians’ self-efficacies for and attitudes toward performing current and emerging roles in hospital and in community pharmacy and to identify factors related to pharmacy technician self-efficacies in these roles.

2. Methods

2.1. Design and sample

Institutional review board (IRB) exemption for study procedures were granted by the universities home to the investigators of this study. The study design was cross-sectional, featuring use of a survey to a stratified randomized sample of technicians from 8 U.S. states. Using a sample size calculation recommended by Dillman et al., an estimated 384 respondents were deemed required to meet the study objectives. Assuming a response rate of approximately 10%, the researchers conservatively sought contact information from 5000 subjects from these states. Selection at the state level was performed with geographic diversity as a key tenet. The U.S. is divided into 4 geographic regions by the U.S. Census Bureau: Northeast, Southeast, Midwest, and West. Two states from each of these regions were sampled. The State Boards of Pharmacy from those states selected were contacted to provide its registry of technicians. If the State Board was unable to provide such a registry in an appropriate form (e.g., Excel spreadsheet or comma-delimited electronic format), or if the registry was cost-prohibitive (over $500), then another state from that geographic region was sampled. Once the registry of all technicians from all 8 states was acquired, the total number of registrants (eligible respondents) was determined by summing them; and that sum served as a denominator to calculate an equal proportion of the sample from each state. The study subjects were then selected from each state using a random number generator program that provided the numbers corresponding to the record number of each state registry. The survey was designed and implemented using Qualtrics technology. The procedures for survey conduct were in accordance with recommendations by Dillman et al. to maximize rate of return. Sampled subjects received a pre-notification email approximately 9–10 days prior to launch of the survey, with an option to contact a research investigator to opt out with their preference not to participate. In doing so, those who opted out were replaced by the next individual from their state of residence by the next registrant from the random number generator. Eleven respondents opted out and were replaced, in addition to another 94 whose pre-notification were returned as undeliverable. Respondents then received the survey via an email link along with a cover letter. The cover letter explained the salience of the study in advancing pharmacy technician professionalization, education, and preparation for future practice, as well as proper consent and assurances via IRB approval. The sampled technicians then received three additional reminder emails approximately one week apart, with the survey coming to a close on 1 March 2017.

2.2. Study variables

Self-efficacy in performing roles/activities was assessed using 10-point scales of confidence wherein respondents indicated such as it pertains to them currently performing the role. This mechanism of measurement is adopted from Bandura’s self-efficacy theory using a similar approach to assess confidence specific to a certain task or behavior. This is apt for measuring affinity toward roles or tasks that are situation-specific and takes into account perceived difficulty, as opposed to self-esteem, which is an overall evaluation of one’s worth, otherwise known as the self-concept. For the same set of tasks/roles (36 for community pharmacy and 36 for hospital pharmacy, with those like totals being coincidental).
respondents also indicated the extent to which they are currently involved in that activity, the extent they would like to be involved in that activity, and their attitude toward that activity. These variables are components of the theory of planned behavior (TPB). While this study was not aimed to test the explanatory power of TPB among technicians, it was believed that current involvement and attitude toward the role/activity would provide key insights into their self-efficacy for performing it. Level of involvement was measured on a 4-point scale from "not at all" to "very often," as was their desire for level of involvement in the future ("not at all important" to "very important"). A list of activities upon which to measure self-efficacy was derived from the literature, borrowing much from a previous study of pharmacist workforce, which itself was taken from a previous Pharmacy Technician Certification Board (PTCB) task analysis unique for technicians in institutional and community practice settings. This list of activities was derived in conjunction with members of PTCB, American Association of Colleges of Pharmacy, American Pharmacists Association, and American Society of Health-System Pharmacists, all comprising the Pharmacy Workforce Center. This was supplemented with additional activities suggested in recent literature, specifically responsibilities identified in a study of technicians from developed nations generally and from one U.S. state (Idaho) whose Board of Pharmacy had just recently updated the scope of practice for technicians to be among the most progressive in the U.S. Total self-efficacy scores were derived by summing the individual self-efficacy responses to each of the activities for hospital and for community pharmacy technicians. Using skip logic, technicians from community pharmacy were automatically directed to only the community pharmacy list of activities, as was the case similarly for those in hospital practice. Level of involvement and preference for level of involvement was also summed across all activities. Technicians in other practice environments did not participate in this component of the survey; the Qualtrics technology employed skip logic to take respondents from these other settings directly to the end of the survey.

In addition to the aforementioned, demographic and work environment data were captured. This included employment status (currently working, part- or full-time), state of residence, practice setting, job rank (eg, entry-level versus advanced or specialty technician), gender, age, and measures of organizational and profession commitment used previously on an entirely different sample of U.S. pharmacy technicians. This measure, rather than attempting to gauge an amount of the time in the future the respondent plans to stay with the organization and profession, proposes contexts on an ordinal continuum as to whether the respondent is firmly rooted, could be easily provoked to make an employment change, or feels entrenched for the long haul.

2.3. Data analysis

The data were prepared for analysis on SPSS, Version 21.0 following export from Qualtrics. Frequency distributions were tabulated for all relevant questions. Survey scales were subjected to a principal components analysis with oblique rotation, item analysis, and internal consistency reliability analysis to evidence construct validity, internal consistency reliability, and appropriateness of each item prior to their use in inferential statistics. Correlation analysis (Pearson's r) was undertaken to determine relationships between continuous variables, particularly self-efficacy variables with years of experience, attitude toward the activities, and level of involvement in those activities. This included an examination of relationships between level of involvement, preference for involvement, and self-efficacies. Independent t tests and one-way analyses of variance (ANOVAs, F test), were conducted to determine any relationships between the demographic/practice setting variables with self-efficacy and with performance ability.

3. Results

3.1. Participant characteristics

Out of 5000 surveys distributed, responses were obtained from 612 participants (12.2% response rate). Respondent employment status and other characteristics are provided in Table 1. Of the 612 respondents, 494 were currently working as a pharmacy technician and not enrolled as a PharmD student. The ensuing analyses and discussion is restricted only to those individuals. Nearly ¾ of those were working full-time, and over ¾ were female. Responses were received from all states sampled and generally in line with the population of those states, respectively. For example, the population of Florida is approximately twice that of New Jersey, both of which exceed all other states. Louisiana's population is a bit higher than Oregon's; however, the response rate from Louisiana was somewhat lower. As such, the response rates from each state might have differed only slightly. "Other" respondents came from various states, usually bordering one of the sampled states. Nearly 2/3 of respondents had earned some sort of higher tier or specialty technician designation. The majority of respondents came from community pharmacy, with 16.4% from the hospital setting. Respondents had been working as a technician for 8.15 years and had been with their current employer for 5.64 years. Most respondents reported at least modest commitment toward their employer. They also reported high levels of commitment to the profession, although more than ¼ of respondents indicated either looking to leave or stating that it might not take much to get them to change their career.

3.2. Community pharmacy technician self-efficacies

Table 2 provides the list of tasks/activities investigated for community pharmacy technicians (all community pharmacy settings combined), the respondents' level of involvement, their attitude toward these tasks/activities, and their level of self-efficacy in performing them. Participants reported high levels of involvement around the entire task for prescription acquisition and initial filing, which incidentally loaded together on the principal components analysis. Likewise, their attitudes toward performing these activities and their self-efficacies for doing so were very high. There were a number of activities wherein respondents indicated being less involved but still having a positive, to very positive attitude regarding their conduct and reported a relatively high level of self-efficacy. Examples of such activities include compounding prescriptions, maintaining equipment, supervising other technicians, checking the work of other technicians, receiving prescriptions from prescribers, and maintaining files of habit-forming drugs. Activities that respondents reported positive attitudes but with somewhat lower self-efficacy included communicating lifestyle changes to patients, discussing effectiveness of treatment plans for returning patients, collaborating with other health professionals to monitor drug therapy effectiveness, providing information to providers and patients on medication issues, transferring prescriptions, and administering immunizations. Overall, respondents' attitudes toward most of the activities were above the scale midpoint 2.50, with notable exceptions for administering immunizations and entering prescription data remotely from home. These were activities in which the participants were less involved, along with transferring prescriptions to another pharmacy, accepting verbal prescription orders, and assuming responsibility.
for disaster preparedness. Activities involvement with high standard deviations included repackaging non-sterile products, maintaining equipment, and assisting with prescription assistance program for patients; this would be indicative of consistency in either high or very low levels of involvement for these activities. Those with lower standard deviations included administrating immunizations, entering data remotely from home, assessing prescription for completeness, and identifying problems with a prescription, indicative of those tasks being performed at either a consistently low or consistently high level among the respondents. With respect to self-efficacies, overall, on 36 items (tasks/activities), with a potential range of self-efficacy scores of 36–360 (10-point scale), the lowest response total was 84 and the highest was 360, with an overall mean of 251.95 ± 19.98, well above the scale’s midpoint of 198. Female respondents from community practice reported an overall self-efficacy of 238.71 ± 24.71, versus that of 247.62 for males (t = 2.74, p < 0.05). Those working full-time reported an overall self-efficacy of 261.33 ± 47 versus 240.24 for those working part-time (t = 2.92, p < 0.05). Respondents with a rank of Technician II and III reported self-efficacies of 269.51 ± 22.37 and 270.12 ± 28.21, respectively, versus a mean self-efficacy of 239.14 ± 21.84 for those with a Technician I rank (F = 5.02, p < 0.01).

3.3. Hospital pharmacy technician self-efficacies

Table 3 provides the list of tasks/activities investigated for hospital pharmacy technicians, the respondents’ level of involvement, their attitude about those tasks/activities, and their level of self-efficacy in performing them. The level of involvement in the various tasks/activities for hospital pharmacy technicians was more disparate between the tasks than was the case for community pharmacy technicians. Participants reported high levels of involvement around replenishing dose carts, ensuring proper storage of medication, assisting with medication distribution and maintaining automated dispensing technology. They reported low levels of involvement in many of the activities, including oversight of medical assistance programs, preparation of clinical monitoring information, administering immunizations, providing information to patients, and collaborating with other health professionals to evaluate the effectiveness of medication therapy. In spite of low levels of current involvement, respondents reported rather positive attitudes about the performance of most of the tasks, in general, with exceptions being preparation of clinical monitoring information, updating medication administration records, assisting with transitions of care, and administering immunizations. Activities with relatively positive attitudes wherein respondents were only moderately involved included purchasing and inventory management, controlled substances systems management, supervising, and checking the work of other technicians. On the other hand, attitude toward assistance with medication distribution was only modest, in spite of a relatively high level of involvement in that activity. Activities involvement with higher standard deviations included maintaining files of habit-forming drugs, evaluating labels and packaging of drugs, checking the work of other technicians, assuming responsibility for quality assurance activities, and following up on medication distribution problems. Those with lower standard deviations included entering prescription orders, oversight of medication assistance programs, preparation of clinical monitoring information, assisting with hiring other technicians, and running medication utilization reports, all of which saw respondents involved rather consistently at a low level. With respect to self-efficacies, overall, on 36 items (tasks/activities), with a potential range of self-efficacy scores of 36–360 (10-point scale), the lowest response total was 71 and the highest was 360, with an overall mean of 242.22 ± 24.56, still above the scale’s midpoint of 198. Males reported an overall self-efficacy of 249.35 ± 36.82 versus that of 239.82 ± 25.11 for females (t = 2.11, p < 0.05). Respondents with a rank of Technician II and Technician III reported self-efficacies of 259.12 ± 29.19 and 257.38 ± 28.94, respectively, versus those with a rank of Technician I reporting a mean self-efficacy of 233.76 (F = 4.81, p < 0.01).
and initial evidence would suggest they are vital in helping to ameliorate the deleterious outcomes of illicit drug dependence. Lack of self-efficacy has been cited as a major barrier in determining their readiness for embracing new practice roles, particularly those of varied backgrounds. In fact, pharmacist self-efficacy was paramount in determining their readiness for embracing new practice roles, such as ameliorating the deleterious outcomes of illicit drug dependence. Lack of self-efficacy has been cited as a major impediment to implementation of pharmaceutical care and suggested to be a critical factor in the training of pharmacists for designing interventions. The salience of self-efficacy in care delivery is also well reported outside of pharmacy.

The continued transition of pharmacy to a more patient-centered philosophy of practice hinges upon the readiness and competence of pharmacists and their support personnel. Physicians play key roles in pharmacy care all throughout the world, and initial evidence would suggest they are vital in helping to ensure patient safety, all while promoting efficiency in pharmacy operations. Logically, then, an evaluation of technicians' self-efficacy and preparedness to engage in current and emerging roles is critical.

When evaluating technicians' roles, respondents from this study in community pharmacy reported relatively high levels of involvement, self-efficacy in, and positive attitudes toward a large number of tasks, many of which revolved around prescription receipt and dispensing processes. Still, there were a number of tasks, many of which revolved around prescription receipt and dispensing processes. Still, there were a number of activities for the most part that are legal for practice, with some exceptions in certain states. Technicians would like to be involved in supervisory activities and with participating not only in their own professional development, but in assisting their peers with other accounting functions. Determine future staffing needs.

Reconcile errors or other issues with medication administration records.

Update medication administration record or patient's profile.

Preparation of clinical monitoring information for pharmacist review.

Assist with or facilitate patient transitions of care.

Run medication utilization reports.

Assist with distribution of medications throughout facility.

Follow-up on medication distribution issues or problems.

Communicate with nurses and other professionals regarding patient therapy.

Ensure proper storage of medications.

Participate in protocol or guideline adherence monitoring activities.

Communication medication storage issues with nurses.

Assume responsibility for quality assurance activities.

Participate in disaster preparedness activities.

Provide information to patients on drug interactions, side effects, and medication storage.

Collaborate with other health professionals to plan, monitor, review and evaluate the effectiveness of medication therapy.

Maintain files of narcotic and habit-forming drugs in accordance with legal requirements.

Evaluate labels, packaging and advertising of drug products.

Administer immunizations.

4 Discussion

To the authors' best knowledge, this is the first study to closely examine the self-efficacy beliefs of pharmacy technicians. The salience of self-efficacy beliefs has been underscored in pharmacists, for example, by their ability to communicate effectively with patients, particularly those of varied backgrounds and other vulnerable populations like those at-risk of or currently engaging in substance abuse. In fact, pharmacist self-efficacy was paramount in determining their readiness for embracing new practice roles, such as ameliorating the deleterious outcomes of illicit drug dependence. Lack of self-efficacy has been cited as a major impediment to implementation of pharmaceutical care, and suggested to be a critical factor in the training of pharmacists for designing interventions. The salience of self-efficacy in care delivery is also well reported outside of pharmacy.

The continued transition of pharmacy to a more patient-centered philosophy of practice hinges upon the readiness and competence of pharmacists and their support personnel. Physicians play key roles in pharmacy care all throughout the world, and initial evidence would suggest they are vital in helping to ensure patient safety, all while promoting efficiency in pharmacy operations. Logically, then, an evaluation of technicians' self-efficacy and preparedness to engage in current and emerging roles is critical.
knowledge. Technicians' involvement in some activities, such as communication with nurses, is almost unavoidable or inherent to the job; thus, the fact that self-efficacies are only low to moderate for these activities should provide insight for employing institutions, vocational training programs, and even credentialing (eg, certification) organizations for future educational and development endeavors.

These findings coincide with calls for re-examining and further leveraging the maturing of technician education and professionalization, including the potential for work redesign so that pharmacy could reach its full potential.\textsuperscript{44,45} It also reinforces the need for use of sound pedagogy when educating technicians on emerging roles such as providing immunizations to ensure that trainees are not only provided basic concepts, but are also instilled with the confidence that they can contribute effectively to the goals of the pharmacy organization, Regardless of practice setting. These findings also support the most recent calls for standardizing education requirements for technicians, advocating for their certification, and more careful planning by employers to promote efficiency in pharmacy operations while at the same time helping technician practice to become a career choice rather than just a job.\textsuperscript{2}

There were differences in self-efficacies reported among various groups. Females in community practice reported higher self-efficacy, while the opposite was true in hospital practice. This could possibly be owing to females having reported greater caring behaviors when dealing directly with patients,\textsuperscript{46,47} but the study design here precludes definitive conclusions in that regard. Respondents working full-time in community pharmacy reported higher self-efficacy than part-time workers in community, but not hospital settings. Again, greater experience in a more customer- or patient-oriented practice could be implicated in this finding, and this has ramifications for job training and evaluation of part-timers. Those with higher “rank” or designations (eg, Tech II or Tech III) reported much higher self-efficacies than entry-level technicians in both settings. This might suggest that employers' job promotion efforts have been successful, and might provide evidence for even more ubiquitous career-laddering mechanisms for technicians.\textsuperscript{44,45}

The relationship between technician commitment and self-efficacy merits some attention. While there was little association with employer commitment, there was a significant relationship self-efficacy and career commitment, at least among respondents in community practice. A similar link between self-efficacy, career commitment, and work engagement has been reported for nurses.\textsuperscript{46} It also has been reported that nurses demonstrated greater resilience after untoward job events when they possess higher levels of job self-efficacy.\textsuperscript{45} Additionally, nursing assistants with higher self-efficacy were able to overcome difficulties in practice and were even able to reshape their practice.

### Table 3

<table>
<thead>
<tr>
<th>Task/Activity</th>
<th>Involvement(\text{mean} \pm \text{SD})</th>
<th>Attitude(\text{mean} \pm \text{SD})</th>
<th>Self-efficacy(\text{mean} \pm \text{SD})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect or communicate patient information</td>
<td>3.57 ± 0.83</td>
<td>2.91 ± 0.29</td>
<td>8.59 ± 1.81</td>
</tr>
<tr>
<td>Assess prescription for completeness, accuracy, authenticity, and legality</td>
<td>3.63 ± 0.72</td>
<td>2.95 ± 0.26</td>
<td>8.95 ± 1.58</td>
</tr>
<tr>
<td>Input prescriptions into computer</td>
<td>3.44 ± 0.58</td>
<td>2.94 ± 0.46</td>
<td>8.73 ± 2.20</td>
</tr>
<tr>
<td>Provide prescription to patient</td>
<td>3.41 ± 1.02</td>
<td>2.74 ± 0.60</td>
<td>8.19 ± 2.35</td>
</tr>
<tr>
<td>Triage patient needs for referral to pharmacist</td>
<td>3.10 ± 1.14</td>
<td>2.68 ± 0.63</td>
<td>8.20 ± 2.77</td>
</tr>
<tr>
<td>Identify any problems with prescription (eg, dosage, patient instructions, missing information, medication name other)</td>
<td>3.33 ± 0.88</td>
<td>2.89 ± 0.36</td>
<td>8.71 ± 1.72</td>
</tr>
<tr>
<td>Discuss over-the-counter medication options with patients</td>
<td>2.21 ± 1.12</td>
<td>2.38 ± 0.72</td>
<td>6.55 ± 3.11</td>
</tr>
<tr>
<td>Repackage or reconstitute non-sterile products</td>
<td>2.62 ± 1.30</td>
<td>2.56 ± 0.72</td>
<td>7.61 ± 3.35</td>
</tr>
<tr>
<td>Compound prescriptions</td>
<td>1.76 ± 1.03</td>
<td>2.30 ± 0.82</td>
<td>5.76 ± 3.74</td>
</tr>
<tr>
<td>Inventory management</td>
<td>3.04 ± 1.09</td>
<td>2.73 ± 0.54</td>
<td>8.31 ± 2.45</td>
</tr>
<tr>
<td>Manage medications currently in stock, including organization, storage, and stock rotation</td>
<td>3.38 ± 0.97</td>
<td>2.76 ± 0.52</td>
<td>8.87 ± 2.17</td>
</tr>
<tr>
<td>Maintain automated dispensing technology and other equipment</td>
<td>2.37 ± 1.26</td>
<td>2.38 ± 0.82</td>
<td>6.52 ± 3.52</td>
</tr>
<tr>
<td>Communicate with insurance companies regarding patient eligibility and other issues</td>
<td>3.09 ± 1.15</td>
<td>2.71 ± 0.55</td>
<td>7.86 ± 2.97</td>
</tr>
<tr>
<td>Explain use of medical equipment, appliances, or other devices to the patient</td>
<td>3.10 ± 1.06</td>
<td>2.34 ± 0.74</td>
<td>6.84 ± 3.19</td>
</tr>
<tr>
<td>Communicate lifestyle changes to patients</td>
<td>1.70 ± 1.06</td>
<td>2.23 ± 0.84</td>
<td>5.04 ± 3.61</td>
</tr>
<tr>
<td>Engage in your own continuous professional development</td>
<td>3.07 ± 0.98</td>
<td>2.70 ± 0.58</td>
<td>8.18 ± 2.48</td>
</tr>
<tr>
<td>Supervise other technicians</td>
<td>2.24 ± 1.27</td>
<td>2.34 ± 0.83</td>
<td>6.91 ± 3.33</td>
</tr>
<tr>
<td>Discuss effectiveness of treatment plan for returning patients</td>
<td>1.72 ± 1.12</td>
<td>2.43 ± 0.88</td>
<td>4.96 ± 3.77</td>
</tr>
<tr>
<td>Accounting and record-keeping</td>
<td>2.55 ± 1.22</td>
<td>2.50 ± 0.73</td>
<td>7.14 ± 3.20</td>
</tr>
<tr>
<td>Dispose of expired or altered medications</td>
<td>2.90 ± 1.12</td>
<td>2.71 ± 0.60</td>
<td>8.16 ± 2.56</td>
</tr>
<tr>
<td>Assist with prescription assistance programs</td>
<td>2.23 ± 1.26</td>
<td>2.33 ± 0.70</td>
<td>6.28 ± 3.67</td>
</tr>
<tr>
<td>Assume responsibility for quality assurance activities</td>
<td>2.44 ± 1.26</td>
<td>2.50 ± 0.73</td>
<td>6.70 ± 3.27</td>
</tr>
<tr>
<td>Assume responsibility for disaster preparedness</td>
<td>1.79 ± 1.13</td>
<td>2.20 ± 0.83</td>
<td>5.57 ± 3.54</td>
</tr>
<tr>
<td>Receive prescriptions from medical doctors or other prescribers</td>
<td>2.29 ± 1.35</td>
<td>2.46 ± 0.78</td>
<td>6.79 ± 3.55</td>
</tr>
<tr>
<td>Check patients' medication histories</td>
<td>3.07 ± 1.05</td>
<td>2.67 ± 0.59</td>
<td>8.05 ± 2.68</td>
</tr>
<tr>
<td>Ensure proper dosage and drug compatibility before dispensing</td>
<td>2.71 ± 1.24</td>
<td>2.63 ± 0.69</td>
<td>7.07 ± 3.33</td>
</tr>
<tr>
<td>Label liquid medicines, ointments, powders, and other medicines before dispensing</td>
<td>3.48 ± 0.96</td>
<td>2.81 ± 0.51</td>
<td>8.80 ± 2.21</td>
</tr>
<tr>
<td>Provide information to providers and patients on drug interactions, side effects, and medication storage</td>
<td>2.08 ± 1.22</td>
<td>2.47 ± 0.79</td>
<td>6.07 ± 3.50</td>
</tr>
<tr>
<td>Collaborate with other health professionals to plan, monitor, review and evaluate the effectiveness of medication therapy</td>
<td>1.61 ± 0.33</td>
<td>2.33 ± 0.87</td>
<td>4.91 ± 3.71</td>
</tr>
<tr>
<td>Maintain prescription files of narcotics and habit-forming drugs in accordance with legal requirements</td>
<td>2.36 ± 1.22</td>
<td>2.66 ± 0.65</td>
<td>7.79 ± 2.90</td>
</tr>
<tr>
<td>Evaluate labels, packaging, and advertising of drug products</td>
<td>2.28 ± 1.24</td>
<td>2.24 ± 0.79</td>
<td>6.23 ± 3.53</td>
</tr>
<tr>
<td>Administer immunizations</td>
<td>1.17 ± 0.65</td>
<td>2.03 ± 0.95</td>
<td>5.91 ± 3.69</td>
</tr>
<tr>
<td>Accept verbal prescription orders from a physician or other prescriber</td>
<td>1.45 ± 0.92</td>
<td>2.23 ± 0.96</td>
<td>5.32 ± 3.83</td>
</tr>
<tr>
<td>Transfer a prescription from on pharmacy to another</td>
<td>1.63 ± 1.09</td>
<td>2.23 ± 0.90</td>
<td>5.66 ± 3.86</td>
</tr>
<tr>
<td>Check the work of other technicians (check-tech-check)</td>
<td>2.51 ± 1.23</td>
<td>2.50 ± 0.73</td>
<td>7.51 ± 3.17</td>
</tr>
<tr>
<td>Enter prescription data remotely from home</td>
<td>1.23 ± 0.70</td>
<td>1.91 ± 0.73</td>
<td>5.10 ± 4.06</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Possible respondents (n) = 312. Actual number of respondents ranged from 250 to 302 on various questions.

\textsuperscript{b} 4-point scale anchored from less (1) to more (4) involved or more positive.

\textsuperscript{c} 10-point scale.
environments. This finding likewise further evidences the need for leaders and educators to bolster self-efficacy among pharmacy technicians during early training and perhaps reinforcement of such throughout their careers during development and even recertification or re-validation initiatives.

4.1. Study limitations

This study has several limitations that warrant caution when interpreting the results. The response rate, even while favorable when compared to similar survey research endeavors, is low enough so that any number of response biases could be manifest. This could include responses more likely acquired from those more highly engaged in the profession and from those very unsatisfied with their working conditions. With survey research of this sort, the prospect of respondents providing socially desirable responses cannot be precluded. Also, some caution and consideration is merited when examining the range and mean of responses around “attitude” toward certain activities. For some specialized activities, such as providing immunizations and assistance with monitoring drug therapy, the respondent would likely be either involved or not at all involved in such activities. As such, their attitude could be based upon a relative lack of knowledge for such an activity. The responses came predominately from 8 states in the U.S. randomly sampled and from which the scopes of practice might vary to some degree, but none of which are known in recent history for any grounding scope of practice changes for technicians.

5. Conclusion

The study evaluated the self-efficacies of pharmacy technicians in community and hospital practice across a broad range of current and evolving job tasks/activities. Self-efficacies were generally high, especially for the tasks centered around medication order/prescription receipt, preparation, and dissemination. There are a number of activities for which technicians reported very positive attitudes and at least modest self-efficacy, which might be instructive for their greater involvement in these areas. At the same time, there were areas reported wherein technicians can be afforded more education and training. Association of self-efficacies with other work-related facets such as commitment, further evidence the potential benefit of career planning, ladderling, and professional development for these important members of the workforce.

References


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