


National Survey of Medication Safety Practice: Environmental Culture and Staff Competency at Primary Healthcare Centers/ Community Pharmacies in Riyadh, Saudi Arabia

Yousef Ahmed Alomi*,  The Former General Manager of General Administration of Pharmaceutical Care Former Head, National Clinical Pharmacy and Pharmacy Practice Former Head, Pharmacy R and D Administration Ministry of Health, Riyadh, SAUDI ARABIA.

Zainab Abdulmunem Almuallem, Saudi Food and Drug Authority Riyadh, SAUDI ARABIA.

Manar Mohammed Alslim, Staff Pharmacist, Prince Sultan Military Medical City Riyadh, SAUDI ARABIA.

Rana Mohammed Alslim, Staff Pharmacist Ministry of Health Riyadh, SAUDI ARABIA.

Khulud Abdulrahman Alamoudi, Narcotic in-charge, Alhammadi Hospital Riyadh, SAUDI ARABIA.

Adel Mehmas Hamdi Alragas, Medical City-king Saud University, Riyadh, SAUDI ARABIA.

Correspondence:

Dr. Yousef Ahmed Alomi,
The Former General Manager of General Administration of Pharmaceutical Care Former Head, National Clinical Pharmacy and Pharmacy Practice Former Head, Pharmacy R and D Administration Ministry of Health, Riyadh, SAUDI ARABIA.

Phone no: +966504417712
E-mail: yalomi@gmail.com

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ABSTRACT

Objective: To explore the national survey of medication safety practices with an emphasis on environmental factors and staff competencies at primary healthcare centers (PHCs) and community pharmacies (CPs) in Saudi Arabia, Riyadh city. **Method:** This is a 4-month cross-sectional medication safety practice survey conducted at pharmacies of PHCs of Ministry of Health and CPs in Riyadh city. The survey consisted of the modified version of the Medication Safety Self-Assessment® for Community/ Ambulatory Pharmacy from the Institute of Safe Medication Practices (ISMP). The survey consisted of a demographic section and 10 domains with questions on environmental factors, staff competency and education. The authors distributed the questionnaire and followed-up on a daily basis by physically visiting or via telephonic call. The survey was prepared in an electronic format and it was analyzed through the Survey Monkey system and Microsoft Excel version 10. **Result:** The survey was distributed to 13 PHCs and 23 CPs. The average score of all the ISMP-self assessment of medication safety items at PHCs was 2.75 ± 0.36 (54.94%) (95% confidence interval (95% CI) = 2.55–2.95; $P < 0.05$; range = 2.04–3.38). The average score of all ISMP-self assessment of medication safety items at CPs was 3.14 ± 0.42 (62.86%) (95% CI = 2.90–4.38; $P < 0.05$; range = 2.40–3.88). The average score of environmental factors, workflow and staffing domain at PHCs was 2.7 ± 0.45 (54%) (95% CI = 2.53–2.87; $P < 0.05$; range = 1.55–3.68), whereas in CPs, the average score was 3.58 ± 0.43 (71.6%) (95% CI = 3.44–3.717; $P < 0.05$; range = 2.63–4.37). The average score of staff competency and education at PHCs was 3.02 ± 0.298 (60.4%) (95% CI = 2.9–3.2; $P < 0.05$; range = 2.64–3.55), whereas in the CPs, the average score was 4.15 ± 0.20 (83%) (95% CI = 4.03–4.27; $P < 0.05$; range = 3.78–4.53). Conclusion: The PHCs implemented only half of the environmental factors, workflow and staff competency domains preventive measures for medication safety and lower than CPs. Targeting of improving environmental culture and staff competency for medication safety at PHCs is highly recommended in KSA.

Key words: Medication, Safety, Environmental culture, Staff competency, Primary Healthcare centers, Community pharmacy, Riyadh, Saudi Arabia.

INTRODUCTION

Each healthcare facility should follow standard regulations in order to obtain accreditation from the national or international agencies.^{1,2} The engineering department at Ministry of Health (MOH) collaborated with concern professional administration to design the building. Each healthcare professional should have a specific place in the hospital. There has to be a pharmacy at all Primary Care Centers (PHCs). Moreover, the General Administration of Pharmaceutical Care (GAPC) releases the number workforce that should be available per each center and per pharmacy staff competencies.^{3,4} We have previously published a study about patient satisfaction,⁵ in which we analyzed information on patient satisfaction with respect to the location of pharmacy and environmental weather to explore the baseline condition for future improvements. The MOH released the updated laws and regulations regarding the design, required facilities and the place for pharmacy extemporaneous preparation in CPs.

Similar to other professions, having a good environment will affect the performance level of the employees. In PHCs or Community Pharma-

cies (CPs), medications should be prepared and dispensed in a safe and well-organized physical space which allows the pharmacist to remain focused on their work without unnecessary distractions. To enhance safety and work efficiency, it is important to have a well-designed process and workflow at PHCs and CPs. In addition, it is important to have qualified practitioners who can handle the work load without compromising patient safety. To enhance the work efficiency, it is important to know the factors affecting it. These factors include poor lighting, cluttered work space, interruptions, noise, continuous activity, inability of the staff member to remain focused and reduced number of staff members which might increase the work load of the existing pharmacist. However, well-constructed workflow patterns and process can help to reduce chance of error.

Furthermore, staff education is an important error prevention strategy. However, even the most educated, experienced and careful professionals will make errors. Therefore, to overcome errors, it is important to combine error prevention strategies with other strategies. Staff education can

help in preventing errors when it is focused on priority topics such as new medication being used in the pharmacy; high alert medications; protocols, policies and procedures related to the use of medication and errors occurred in the organization or other organization and its prevention strategy. The surrounding factors and not-so well-competent pharmacist might harm the patient safety. The implementation of medication safety practice with an emphasis on related environmental issues and pharmacy competencies are critical for patient safety. Several publications showed the prevention factors for mistakes should be considered were environmental factors and staff competencies.⁶⁻⁸ The Institution of Safe Medication practice (ISMP) releases preventive measures of medication errors with an emphasis on patient competency and environmental culture.⁹ Two studies have been conducted at hospitals in the United States about medication safety in relation to environmental factors and staff competency by using ISMP self-assessment tools. They found that the key element of environmental factors increased from 53 to 64%, whereas the key element of staff competency increased from 48 to 68%.^{10,11} A local study conducted during Hajj reported that the key elements of the environmental factors and staff competency were 78 and 73.8%, respectively.¹² All previous investigations have focused on hospital environment and staff competency. However, to the best of our knowledge, there are no studies conducted on the medication safety assessment using ISMP tool at PHCs or CPs. Therefore, in this study, we aimed to explore the national survey of medication safety practices with an emphasis on environmental factors and staff competencies. Thus, it is important to make sure that the ISMP recommendation is being applied in PHCs and CPs in the KSA.

METHODS

This is a 4-month cross-sectional medication safety practice survey conducted at PHCs and CPs in Riyadh city. The survey has been modified from ISMP Medication Safety Self-Assessment for Community/Ambulatory Pharmacy.¹³ It consisted of a demographic section and 10 domains with 198 questions. The 10 domains included patient information; drug information; communication of drug orders and other drug information; drug labeling, packaging and nomenclature; use of medical devices; environmental factors; staff competency and education; patient education; quality processes; and risk management domain. The survey was conducted at PHC pharmacies of MOH and CPs located in Riyadh city. We used 5-point Likert response scale system to obtain responses. The scoring key was identified as number (1) equal to (A): *No activity to implement*, (2) equal to (B): *Considered, but not implemented*, (3) equal to (C): *Partially implemented in some or all areas*, (4) equal to (D): *Fully implemented in some areas* and (5) equal to (E): *Fully implemented throughout*. The survey was distributed to the directors of PHCs and CPs. The authors distributed the questionnaire and followed-up on a daily basis by physically visiting and by making a telephonic call. The study questionnaire was prepared in an electronic format and the results were analyzed through the Survey Monkey system and Microsoft Excel version 10. Based on GAPC and Saudi Central Board of Accreditation for Health Care Institutions (CBAHI) standards, we suggested some solutions to improve the scores of the medication safety practice and the results of the ISMP self-assessment.¹⁴ The 10 domains were divided into several parts for the sake of analysis, discussion and solution. Part one consisted of patient information. Part two consisted of drug information and part three consisted of medication preparation and dispensing (communication of drug orders and other drug information, drug labeling, packaging and nomenclature). Part four consisted of medication administration (drug standardization, storage and distribution, medication devices acquisition, use and monitoring). Part five consisted of environmental factors, workflow, staffing and staff competency and part six consisted of patient education, quality processes and risk management. In this study,

we emphasized on part one; it is the finding from medication safety self-assessment for community/ambulatory pharmacy in Riyadh city.

RESULTS

The survey was distributed to 13 PHCs and 23 CPs. Most of the PHCs were types M1 and M3 (4 (30.8%) and 3 (23.1%), respectively). Most of the CPs were large (8 (33.3%)) and medium type (8 (33.3%)). The majority of PHCs and CPs had obtained accreditation from the Saudi Commission of Health Specialties (7 (70%) and 20 (87%), respectively). Most of PHCs dispensed more than 100 prescriptions daily (7 (53.9%)), whereas CPs dispensed less than 20 prescriptions daily (11 (45.8%)). Most of the responders in PHCs were females (9 (69.2%)) (4 (30.8%) were males) and in CPs, all of them were male (25 (100)). The majority of responders in PHCs was Saudi (12 (92.3%)) while non-Saudi (25 (100%)) in the CP. Most of the responders were in the age group of 30–44 years (9 (69.2%)), whereas those in CP were in the age group of 18–29 (15 (62.5%)). Most of the responders in PHCs had obtained a diploma or a Bachelor of Science degree in Pharmacy or a Master of Science degree in clinical pharmacy (2 (22.2%), 3 (33.3%) and 2 (22.2%), respectively). Most of the responders in the CP had a Bachelor of Science degree in Pharmacy (22 (88%)). Most of the pharmacy staff had not obtained accreditation from the Board of Pharmaceutical Specialties (8 (88.9%) and 21 (91.3%) working in the PHCs and CP, respectively) (Tables 1 and 2). The average score of environmental factors, workflow and staffing domain at PHCs was 2.7 ± 0.45 (54%) (95% CI = 2.53–2.87; $P < 0.05$; range = 1.55–3.68), whereas in the CP was 3.58 ± 0.43 (71.6%) (95% CI = 3.44–3.717), $P < 0.05$ and range = 2.63–4.37). The average score of staff competency and education at PHCs was 3.02 ± 0.298 (60.4%) (95% CI = 2.9–3.2; $P < 0.05$; range = 2.64–3.55), whereas in the CP, it was 4.15 ± 0.20 (83%) (95% CI = 4.03–4.27; $P < 0.05$; range = 3.78–4.53) (Table 3).

At PHCs, the highest score of the environmental factors, workflow and staffing key element with Core #11 was obtained for the statement “Temperature and humidity are comfortable for workers” (3.64 (72.8%)), whereas at CPs, the highest score was obtained for the statement “Refrigerators are used only for the storage of medical products and are of sufficient size to allow all drugs to be refrigerated in an organized manner” (4.37 (87.4%)). The lowest score at PHCs was obtained for the statement “Educational program on stress management has been provided to staff” (1.82 (36.4%)), whereas at CPs, the lowest score was obtained for “All telephone calls to the pharmacy are electronically or manually triaged and forwarded to the dispensing area only when necessary” (3.21 (64.2%)) (Table 4). The highest score of the environmental factors, workflow and staffing key element with Core #12 at PHCs was obtained for the statement “Pharmacists are able to maintain a safe balance between time spent in dispensing prescriptions and counseling patients” (3.2 (64%)), whereas at CPs, it was obtained for “Pharmacy management provides proper balance between operational objectives and pharmaceutical care responsibilities” (3.89 (77.8%)). The lowest score at PHCs was obtained for the statement “Prescriptions are scanned into the computer or received electronically via a hand-held device or computer” (1.55 (31%)), whereas at CPs, it was obtained for “A magnifying box or lens is in a fixed location and used to facilitate readability of prescriptions and labels” (2.78 (55.6%)) (Table 5). The highest score of the environmental factors, workflow and staffing key element with Core #13 was obtained for the statement “Technician and pharmacist staffing takes into account use of supportive dispensing technology and prescription volume and pharmacist/technician ratios are ideally suited to minimize dispensing errors” (3.45 (69%)) at PHCs, whereas at CP, it was obtained for “Pharmacists have at least 8 hrs of rest between shifts worked. Exception: isolated situations outside of usual operations” (3.94 (78.8%)). The lowest score at PHCs was obtained for the statement “Pharmacy personnel undergo an annual physical examination, including eye and hearing

Table 1: Demographic information of hospitals.

| Region of work | Primary care centers | | Community pharmacies | |
|--|----------------------|------------------|------------------------|------------------|
| | Response Count | Response Percent | Response Count | Response Percent |
| M1: Referral PHCS for post graduate studies services up to 32,000 of population. | 4 | 30.8% | Super Pharmacy | 7 (29.2%) |
| M2: Referral internal sector PHCS services up to 32,000 of population. | 0 | 0.0% | Large Pharmacy | 8 (33.3%) |
| M3: Referral PHCS services internal cities up to 44,000 of population. | 3 | 23.1% | Medium Pharmacy | 8 (33.3%) |
| M4: Referral PHCS services internal cities with housing up to 32,000 of population | 1 | 7.7% | Small Pharmacy | 1 (4.2%) |
| M5: Referral external sector PHCS services up to 16,000 of population. | 0 | 0.0% | Other (please specify) | 0 (0.0%) |
| M6: Referral external sector with housing PHCS services up to 16,000 of population. | 0 | 0.0% | Answered question | 24 |
| M7: Referral small PHCS services up to 32,000 of population. | 1 | 7.7% | Skipped question | 1 |
| A0: primary care centers located at more than 35 Km distance and services 2,000-9,000 of population | 2 | 15.4% | | |
| B1: Big primary care center located at outside cities and within, 35 Km distance from referral PHCS, services 15,000-25,000 of population. | 1 | 7.7% | | |
| B2: Big primary care center located at outside cities and within, 35 Km distance from referral PHCS, services 12,000-15,000 of population. | 0 | 0.0% | | |
| B3: Big primary care center located at outside cities and within, 35 Km distance from referral PHCS, services 3,000-12,000 of population. | 0 | 0.0% | | |
| Other (please specify) | 1 | 7.7% | | |
| Answered question | 13 | | | |
| Skipped question | 0 | | | |
| The hospital accreditation | | | | |
| CIBAHI | 1 | 10.0% | 3 | 13.0% |
| Joint Commotion USA | 0 | 0.0% | 0 | 0.0% |
| Canada | 1 | 10.0% | 0 | 0.0% |
| Saudi commission of health accreditation | 7 | 70.0% | 20 | 87.0% |
| Non-accredited | 1 | 10.0% | 0 | 0.0% |
| Answered question | 10 | | 23 | |
| Skipped question | 3 | | 2 | |
| Number of prescriptions per day | | | | |
| No more than 20 prescriptions | 0 | 0.0% | 11 | 45.8% |
| No more than 30 prescriptions | 0 | 0.0% | 5 | 20.8% |
| No more than 50 prescriptions | 1 | 7.7% | 2 | 8.3% |
| No more than 70 prescriptions | 1 | 7.7% | 1 | 4.2% |
| No more than 100 prescriptions | 3 | 23.1% | 4 | 16.7% |
| more than 100 prescriptions | 4 | 30.8% | 1 | 4.2% |
| 100-499 prescriptions | 2 | 15.4% | 0 | 0.0% |
| 500-999 prescriptions | 0 | 0.0% | 0 | 0.0% |
| = or > 1000 prescriptions | 1 | 7.7% | 0 | 0.0% |
| Other (please specify) | 1 | 7.7% | 0 | 0.0% |
| Answered question | 13 | | 24 | |
| Skipped question | 0 | | 1 | |

Table 2: Demographic information of responder's qualifications.

| Gender | Primary care centers | | Community pharmacies | |
|---|----------------------|------------------|----------------------|------------------|
| | Response Count | Response Percent | Response Count | Response Percent |
| Female | 9 | 69.2% | 0 | 0.0% |
| Male | 4 | 30.8% | 25 | 100.0% |
| Answered question | 13 | | 25 | |
| Skipped question | 0 | | 0 | |
| Nationality | | | | |
| Saudi | 12 | 92.3% | 0 | 0.0% |
| Non- Saudi | 1 | 7.7% | 25 | 100.0% |
| Answered question | 13 | | 25 | |
| Skipped question | 0 | | 0 | |
| Age | | | | |
| <18 | 1 | 7.7% | 0 | 0.0% |
| 18 - 29 | 3 | 23.1% | 15 | 62.5% |
| 30 - 44 | 9 | 69.2% | 9 | 37.5% |
| 45 - 59 | 0 | 0.0% | 0 | 0.0% |
| 60+ | 0 | 0.0% | 0 | 0.0% |
| Answered question | 13 | | 24 | |
| Skipped question | 0 | | 1 | |
| Academic Qualification (s): | | | | |
| Diploma Pharmacy | 2 | 22.2% | 1 | 4.0% |
| Bsc. Pharm | 3 | 33.3% | 22 | 88.0% |
| M.S | 0 | 0.0% | 0 | 0.0% |
| Msc. Clinical Pharmacy | 2 | 22.2% | 1 | 4.0% |
| Pharm.D. | 1 | 11.1% | 2 | 8.0% |
| Ph.D | 0 | 0.0% | 1 | 4.0% |
| MBA | 0 | 0.0% | 1 | 4.0% |
| Pharmacy Residency Two years (R1) | 0 | 0.0% | 0 | 0.0% |
| Pharmacy Residency one year (R2) | 0 | 0.0% | 0 | 0.0% |
| Fellowship | 0 | 0.0% | 0 | 0.0% |
| Other (please specify) | 1 | 11.1% | 1 | 4.0% |
| Answered question | 9 | | 25 | |
| Skipped question | 4 | | 0 | |
| Board of Pharmaceutical Specialty | | | | |
| Board Certified Ambulatory Care Pharmacist (BCACP) | 1 | 11.1% | 0 | 0.0% |
| Board Certified Critical Care Pharmacist (BCCCP) | 0 | 0.0% | 1 | 4.3% |
| Board Certified Nuclear Pharmacist (BCNP) | 0 | 0.0% | 0 | 0.0% |
| Board Certified Nutrition Support Pharmacist (BCNSP) | 0 | 0.0% | 0 | 0.0% |
| Board Certified Oncology Pharmacist (BCOP) | 0 | 0.0% | 0 | 0.0% |
| Board Certified Pediatric Pharmacy Specialist (BCPPS) | 0 | 0.0% | 1 | 4.3% |
| Board Certified Pharmacotherapy Specialists (BCPS) | 0 | 0.0% | 0 | 0.0% |
| Board Certified Psychiatric Pharmacist (BCPP) | 0 | 0.0% | 0 | 0.0% |
| Non | 8 | 88.9% | 21 | 91.3% |
| Answered question | 0 | | 0 | |
| Skipped question | 9 | | 23 | |

Table 3: The scores of key elements of Institute of Safe Medication Practice Medication Safety: environmental culture and staff competency at primary healthcare center/community pharmacy in Riyadh city

| Medication Safety Items | Type of pharmacy | Mean score | SD | Confidence Level (95%) | Range | Median | Mode | Percent | SD % | Confidence Level (95%) | Range % | USA, 2000 Scores % | USA, 2011 Scores % | KSA, 2017 Scores % |
|---|------------------|------------|-------|------------------------|-------------|--------|------|---------|------|------------------------|---------------|--------------------|--------------------|--------------------|
| VII Environmental Factors, Workflow and Staffing | PHCS | 2.7 | 0.45 | 0.17 | 1.55 – 3.68 | 2.77 | 2.55 | 54 | 9 | 3.4 | 31.00 – 73.60 | 53.00 | 64.00 | 78.6 |
| | CP | 3.58 | 0.43 | 0.137 | 2.63 – 4.37 | 3.61 | 3.89 | 71.6 | 8.6 | 2.74 | 52.60 – 87.4 | | | |
| VIII Staff competency and education | PHCS | 3.02 | 0.298 | 0.18 | 2.64 – 3.55 | 3 | 3 | 60.4 | 5.96 | 3.6 | 52.80 – 71.00 | 48.00 | 68.00 | 73.80 |
| | CP | 4.15 | 0.20 | 0.12 | 3.78 – 4.53 | 4.11 | 4.11 | 83 | 4 | 2.4 | 75.60 – 90.6 | | | |

screenings” (1.91 (38.2%)), whereas at CPs, it was obtained for “Schedules and workload permit pharmacists to take at least one 15-mins break and one 30-mins break (for a meal) per shift of work each day. Exception: isolated situations outside of usual operations” (2.63 (52.6%)) (Table 6). The highest score of the staff competency and education with Core #14 at PHCs was obtained for the statement “All new pharmacy staff undergo a period of supervision, training, observation” (3.55 (71%)) and at CPs, it was 4.39 (87.8%). The lowest score at PHCs was obtained for statement “At least annually, a supervisor evaluates each pharmacy staff member to assess his/her skills and knowledge related to safe medication practices” (2.64 (52.8%)), whereas at CPs, it was obtained for “During orientation, pharmacists and technicians receive information about the pharmacy’s actual error experiences as well as published errors that may have occurred in other facilities” (4.00 (80%)) (Table 7). The highest score of the staff competency and education with Core #15 at PHCs was obtained for “Pharmacy staff is sufficiently trained on the proper use and maintenance of devices dispensed from the pharmacy” (3.36 (67.2%)), whereas at CPs, it was obtained for “Medication errors and ways to avoid them are routinely discussed at staff meetings and in conversations between pharmacists, technicians and managers” (4.53 (90.6%)). The lowest score at PHCs was obtained for the statement “When errors occur, educational efforts are widespread among all pharmacy personnel who may make a similar error, rather than remedial and directed at only those who were involved in an error” (2.64 (52.8%)), whereas at CPs, it was obtained for “Pharmacy management supports educational programs for staff, such as live continuing education courses, professional meetings, journal club or in services on new drugs and/or important drug safety issues” (3.78 (75.6%)) (Table 8).

DISCUSSION

The GAPC released the requirement staff for PHCs during the pharmacy strategic plan at the MOH,^{14,15} whereas at the CPs, it depended on the owners. In addition, there are recent regulations from the international pharmacy accreditation agency which recommends the use of enough staff. Therefore, we explored the environmental factors related issues and staff competencies at PHCs and CPs in Saudi Arabia. Our results showed that the environmental factors related to medication safety at CPs were better than those obtained at PHCs. This might be because CP is a bigger space, required staffing and is more organized than that of PHCs. These results are similar to the results of previous international and local studies.^{10,11,16} Moreover, the scores of staff competency at CPs were better than PHCs. In the CPs, especially in the chain pharmacies, although the PHCs had pharmacist competencies, they had a better system of education and training for staff pharmacist. Both of these results are similar to previous international and local studies.^{10,11,16}

The lowest score of environmental factors at PHCs was obtained for “Missed the administration skills including the stress management education courses”. However, the refrigerators at CPs were not sufficient to store the medications or were not properly organized in the refrigerator. This aspect needs correction at CPs. Core elements of the environmental section (Core # 12) is related to the usage of computerized facilities and related issues; our results showed that most of them did not use an electronic system for prescribing and dispensing medications. At PHCs, there were problems with regard to the annual examination of staff, whereas at CPs, there was high workload and shortage of breaks during daily work. Both factors may increase stress of staff which may in turn lead to mistakes in the preparation and dispensing of medications.

The finding this study with respect to Core # 14 of staff competency related to safety showed that at PHCs, the evaluation of pharmacy staff is not appropriate to assess their skills and knowledge. This is related to old system of staff evaluation. There is updated information on staff evaluation from Civil Ministry. At CPs, there should be orientation program on

Table 4: The highest and lowest scores items of domain environmental factors, workflow and staffing core # 11.

| VII: Environmental Factors | | | | | | | | | |
|----------------------------|--|---|---|---|---|----|----------------|---------|----------------|
| | Key elements | A | B | C | D | E | Rating Average | Percent | Response Count |
| | Core #11: Medications are prepared and dispensed in a safe and orderly physical space and in an environment that allows practitioners to remain focused on medication use without unnecessary distractions | 1 | 2 | 3 | 4 | 5 | | | |
| | The highest scores items of Primary care center pharmacy | | | | | | | | |
| 93 | C) Temperature and humidity are comfortable for workers. | 1 | 1 | 3 | 2 | 4 | 3.64 | 72.8 | 11 |
| | The highest scores items of community pharmacy | | | | | | | | |
| 103 | M) Medication refrigerators are used only for medical product storage and are of sufficient size to allow all drugs to be refrigerated in an organized manner (including dangerous medications that require refrigeration and segregation from other medications). | 0 | 0 | 3 | 6 | 10 | 4.37 | 87.4 | 19 |
| | The lowest scores items of Primary care center pharmacy | | | | | | | | |
| 105 | O) In the past year, an educational program on stress management has been provided to staff. | 6 | 2 | 2 | 1 | 0 | 1.82 | 36.4 | 11 |
| | The lowest scores items of community pharmacy | | | | | | | | |
| 95 | E) To minimize distractions, all telephone calls to the pharmacy are electronically or manually triaged and forwarded to the dispensing area only when necessary. | 3 | 4 | 2 | 6 | 4 | 3.21 | 64.2 | 19 |

Table 5: The highest and lowest scores items of domain environmental factors, workflow and staffing core # 12.

| VII: Environmental Factors | | | | | | | | | |
|----------------------------|--|---|---|---|---|---|----------------|---------|----------------|
| | Key elements | A | B | C | D | E | Rating Average | Percent | Response Count |
| | Core #12: The processes and flow of work have been designed to enhance safety and worker efficiency. | 1 | 2 | 3 | 4 | 5 | | | |
| | The highest scores items of Primary care center pharmacy | | | | | | | | |
| 108 | R) Pharmacists are able to maintain a safe balance between time spent in dispensing prescriptions and counseling patients compared to time spent with claims processors and pharmacy benefits managers in clarifying insurance claims and formulary coverage issues. | 2 | 1 | 2 | 3 | 2 | 3.20 | 64 | 10 |
| | The highest scores items of community pharmacy | | | | | | | | |
| 107 | Q) Pharmacy management provides proper balance between operational objectives (e.g., cost-containment, efficiency, productivity, turnaround-time, profit and loss, etc.) and pharmaceutical care responsibilities. | 1 | 2 | 3 | 5 | 8 | 3.89 | 77.8 | 19 |
| 108 | R) Pharmacists are able to maintain a safe balance between time spent in dispensing prescriptions and counseling patients compared to time spent with claims processors and pharmacy benefits managers in clarifying insurance claims and formulary coverage issues. | 0 | 4 | 1 | 6 | 7 | 3.89 | 77.8 | 18 |
| 109 | S) Plans for new and/or expanded services are well communicated to all affected personnel and appropriate consideration of resources is addressed prior to implementation so that the additional work volume will be met without compromising patient safety. | 0 | 3 | 3 | 5 | 7 | 3.89 | 77.8 | 18 |
| | The lowest scores items of Primary care center pharmacy | | | | | | | | |
| 115B | Z) Prescriptions are scanned into the computer or received electronically via a hand-held device or computer. | 8 | 1 | 1 | 1 | 0 | 1.55 | 31 | 11 |
| | The lowest scores items of community pharmacy | | | | | | | | |
| 116 | AA) A magnifying box or lens is in a fixed location and used to facilitate readability of prescriptions and labels. | 4 | 5 | 3 | 3 | 3 | 2.78 | 55.6 | 18 |

Table 6: The highest and lowest scores items of domain environmental factors, workflow and staffing core # 13.

| VII: Environmental Factors | | | | | | | | | |
|----------------------------|--|---|---|---|---|---|----------------|---------|----------------|
| | Key elements | A | B | C | D | E | Rating Average | Percent | Response Count |
| | Core #13: The complement of qualified, well-rested practitioners and supportive staff matches the workload without compromising patient safety | 1 | 2 | 3 | 4 | 5 | | | |
| | The highest scores items of Primary care center pharmacy | | | | | | | | |
| 127 | MM) Technician and pharmacist staffing (or pharmacy student, intern or resident) takes into account use of supportive dispensing technology and prescription volume and pharmacist/technician ratios are ideally suited to minimize dispensing errors. | 2 | 0 | 3 | 3 | 3 | 3.45 | 69 | 11 |
| | The highest scores items of community pharmacy | | | | | | | | |
| 120 | EE) Pharmacists have at least 8 hrs of rest between shifts worked. Exception: isolated situations outside of usual operations. | 2 | 0 | 3 | 5 | 8 | 3.94 | 78.8 | 18 |
| | The lowest scores items of Primary care center pharmacy | | | | | | | | |
| 117 | BB) Pharmacy personnel undergo an annual physical examination, including eye and hearing screenings. | 7 | 1 | 1 | 1 | 1 | 1.91 | 38.2 | 11 |
| | The lowest scores items of community pharmacy | | | | | | | | |
| 121 | FF) Schedules and workload permit pharmacists to take at least one 15-mins break and one 30-mins break (for a meal) per shift of work each day. Exception: isolated situations outside of usual operations. | 5 | 4 | 1 | 4 | 2 | 2.63 | 52.6 | 16 |

Table 7: The highest and lowest scores of items of domain staff competency and education core # 14.

| VIII: Staff competency and education | | | | | | | | | |
|--------------------------------------|--|---|---|---|---|----|----------------|---------|----------------|
| | Key elements | A | B | C | D | E | Rating Average | Percent | Response Count |
| | Core #14: Practitioners and support staff receive sufficient training and Orientation to the dispensing process and undergo baseline and annual evaluation of knowledge and skills related to safe medication practices. | 1 | 2 | 3 | 4 | 5 | | | |
| | The highest scores items of Primary care center pharmacy | | | | | | | | |
| 129 | A) All new pharmacy staff undergo a period of supervision, training, observation while performing typical functions and evaluation of skills and knowledge before participating independently in dispensing activities. | 2 | 1 | 1 | 3 | 4 | 3.55 | 71 | 11 |
| | The highest scores items of community pharmacy | | | | | | | | |
| 129 | A) All new pharmacy staff undergo a period of supervision, training, observation while performing typical functions and evaluation of skills and knowledge before participating independently in dispensing activities. | 0 | 1 | 1 | 6 | 10 | 4.39 | 87.8 | 18 |
| | The lowest scores items of Primary care center pharmacy | | | | | | | | |
| 134 | F) At least annually, a supervisor evaluates each pharmacy staff member to assess his/her skills and knowledge related to safe medication practices. | 3 | 2 | 3 | 2 | 1 | 2.64 | 52.8 | 11 |
| | The lowest scores items of community pharmacy | | | | | | | | |
| 132 | D) During orientation, pharmacists and technicians receive information about the pharmacy's actual error experiences as well as published errors that may have occurred in other facilities. | 0 | 1 | 3 | 9 | 5 | 4.00 | 80 | 18 |

Table 8: The highest and lowest scores of items of domain staff competency and education core # 15.

| VIII: Staff competency and education | | | | | | | | | |
|--------------------------------------|---|---|---|---|---|----|----------------|---------|----------------|
| | Key elements | A | B | C | D | E | Rating Average | Percent | Response Count |
| | Core #15: Practitioners are provided with ongoing education about medication error prevention and the safe use of drugs and devices that have the greatest potential to cause harm if misused. | 1 | 2 | 3 | 4 | 5 | | | |
| | The highest scores items of Primary care center pharmacy | | | | | | | | |
| 136 | H) Pharmacy staff is sufficiently trained on the proper use and maintenance of devices dispensed from the pharmacy (e.g., glucose monitors, humidifiers, spacers used with inhalers, etc.). | 2 | 2 | 1 | 2 | 4 | 3.36 | 67.2 | 11 |
| | The highest scores items of community pharmacy | | | | | | | | |
| 138 | J) Medication errors and ways to avoid them are routinely discussed at staff meetings and in conversations between pharmacists, technicians and managers. | 0 | 0 | 2 | 4 | 11 | 4.53 | 90.6 | 17 |
| | The lowest scores items of Primary care center pharmacy | | | | | | | | |
| 140 | L) When errors occur, educational efforts are widespread among all pharmacy personnel who may make a similar error, rather than remedial and directed at only those who were involved in an error. | 3 | 1 | 5 | 1 | 1 | 2.64 | 52.8 | 11 |
| | The lowest scores items of community pharmacy | | | | | | | | |
| 141 | M) Pharmacy management supports educational programs for staff, such as live continuing education courses, professional meetings, journal club or in services on new drugs and/or important drug safety issues. | 0 | 4 | 4 | 2 | 8 | 3.78 | 75.6 | 18 |

medication safety given to pharmacy staff. The basic medication safety course should be conducted for all CP staff with passing certification. Renewal of medications safety certification should be obtained either annually or once in two years. The pharmacy management of PHCs and CPs should support the medications safety education for pharmacists and pharmacy technicians. The very critical issues related to environmental factors were computerized system-related factors, the workload, medications safety education and training and pharmacy administration support. All these elements should be corrected to prevent medication errors at PHCs and CPs in the KSA.

CONCLUSION

Self-assessment of medication safety with emphasis on environmental culture and staff competency at PHCs and CPs is the first study in the Middle East countries. The medication safety measures of CPs is acceptable while PHCs need massive improvement. Annual or every two years self-assessment tools is a requirement for all PHCs and CPs in the KSA.

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CONFLICT OF INTEREST

None

ABBREVIATIONS

PHCs: Primary healthcare centers; **CPs:** Community pharmacies; **CBAHI:** Saudi Central Board of Accreditation for Health Care Institutions; **GAPC:** General administration of pharmaceutical care; **ISMP:** Institute of Safe Medication Practice; **MOH:** Ministry of Health; **KSA:** Kingdom of Saudi Arabia; **USA:** United States of America.

ORCID ID

Yousef Ahmed Alomi  <https://orcid.org/0000-0003-1381-628X>

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