



Contents lists available at ScienceDirect

Exploratory Research in Clinical and Social Pharmacy

journal homepage: www.elsevier.com/locate/rcsop

Evaluation of patient safety culture in community pharmacies

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ARTICLE INFO

Keywords:

Knowledge
Medication error
Patient safety
Perception

ABSTRACT

Background: The majority of medical mistakes risking patient safety have been related to medication. Numerous international health organizations support assessing safety culture in healthcare organizations as a successful tactic for long-term safety development.

Objective: This study aimed to assess patient safety culture, investigate determinants of patient safety in community pharmacies and identify strengths and possible improvements concerning patient safety in the Lebanese community.

Method: An observational descriptive cross-sectional study was conducted using the Pharmacy Survey on Patient Safety Culture (PSOPSC). It was distributed among Lebanese community pharmacists.

Results: One hundred forty-five community pharmacists completed the survey. High percent positive response (PPR) was seen in the domains of patient counseling (86.4%) and teamwork (83.9%). “Staffing, Work Pressure, and Pace” composite scored 41.2%. Female pharmacists were shown to be more dedicated to patient safety culture, namely in patient counseling skills ($P < 0.05$). Working for 32 to 40 h per week ($\beta = 19.305$), and for >40 h per week ($\beta = 18.315$) were significantly associated with increased patient safety score.

Conclusion: An overall positive perception towards patient safety culture was seen among Lebanese community pharmacists.

Introduction

Adverse Drug events (ADE) and medication errors (ME) still represent a challenging problem in modern medicine, especially with the growing complexity of therapies, aging populations, and increasing multimorbidity.¹ Adverse drug events are defined as “unintended, harmful events attributed to the use of medicines”.¹ Sixty four percent of adverse drug reactions can most likely or definitely be avoided.² ADEs result in over 700,000 emergency department visits and 120,000 hospitalizations in hospitals across the United States (US).³

The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) defines a medication error as “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient or consumer”.⁴ They are the eighth leading cause of avoidable and preventable death in the US, causing around 225,000 fatalities per year.⁵ In the United Kingdom, it is estimated that 237 million medication errors occur each year in England.⁶

According to the World Health Organization (WHO), patient safety is the freedom of a patient from unnecessary injury or possible harm caused by adverse events in any health care setting.⁷ The evolving complexity in

health care systems and the resulting rise of patient harm in health care facilities explain the necessity of focusing on improving patient safety especially in Arab country. This can be accomplished by fostering a safety culture among medical personnel. In fact, according to the Institute of Medicine, “the biggest challenge to moving toward a safer health system is changing the culture from one of blaming individuals for errors to one in which errors are treated not as personal failures, but as opportunities to improve the system and prevent harm”.⁸

Drug safety constitute a crucial part of patient safety. It is related to pharmaceutical products, and usually concentrates on their harm-benefit ratio in terms of adverse drug reactions (ADRs).⁹

Pharmacists' responsibility has expanded to include patient care-oriented responsibilities. In fact, they are responsible for ensuring ensure proper medication prescribing with appropriate dose regimens and dosage forms, clarifying instructions on medicine use (patient counseling), avoiding potential harmful interactions and minimizing unnecessary treatment.¹⁰ A meta-analysis of 13 studies of pharmacist interventions during transitions of care estimated a 37% reduction in medication errors and a decrease in emergency department visits after hospital discharge.¹¹

The Advisory Committee on the Safety of Nuclear Installations (ACSNI) defined safety culture as a “product of individual and group values,

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Received 7 January 2023; Received in revised form 31 March 2023; Accepted 31 March 2023

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attitudes, perceptions, competencies, and patterns of behavior that determine commitment to, and the style and proficiency of the organization's health and safety management".¹² Safety culture studies have emerged in healthcare to prevent and eliminate risks, errors, and harm to patients during healthcare delivery.¹³ Communication based on mutual trust, shared perceptions of the importance of safety, and faith in the efficiency of preventative measures distinguish organizations with a positive safety culture.¹⁴

Understanding the safety culture in pharmacies settings is a crucial requirement nowadays, as community pharmacists continues to expand their activities beyond distributing medications to include other more targeted and individualized services.¹⁴

Many countries such as the United States, Canada, Australia, Oman, and Saudi Arabia are adopting patient safety culture programs to improve their health systems. Health institutions such as the Agency for Healthcare Research and Quality (AHRQ) started developing tools to measure the degree of patient safety culture in various health organizations. These tools are designed to assess the factors that lead to adverse events and patient harm in healthcare organizations, as well as to develop and evaluate safety improvement measures.⁸

Patient safety culture has been assessed in many community pharmacies globally such as in China,¹⁵ Wisconsin,¹⁴ Sweden,¹⁶ United Kingdom,¹⁷ and Canada (Saskatchewan).¹⁸ Within the Arab region, this type of study is done in Qatar,¹⁹ Kuwait,²⁰ Iraq,²¹ Saudi Arabia,²² and United Arab Emirates.²³

Patient safety culture was also assessed in Lebanese hospitals in 2010.²⁴ However, to our knowledge, no research was conducted among Lebanese community pharmacies. Thus, this study aims to assess patient safety culture, investigate the determinants of patient safety in community pharmacies and identify the strengths and possible improvements concerning patient safety in the Lebanese community.

Methods

An observational descriptive cross-sectional study was conducted between June 2021 and October 2021, using a self-administered questionnaire. The questionnaire was distributed to a conveniently selected sample of community pharmacists from the eight governorates of Lebanon.

The Lebanese University School of Pharmacy Research Committee waived the need for an ethical approval since the study was observational, respecting confidentiality, autonomy, non-maleficence, beneficence, justice, and no traceability of participants, in conformity with the International Ethical Guidelines for Biomedical Research Involving Human Subjects (1982). The study included registered pharmacists and other pharmacy personnel (registered pharmacy technicians, pharmacy assistants, pharmacy interns/externs) working in community pharmacies in Lebanon during the study period. Using Epi Info (version 7.2.4.0) sample size calculations, providing a population size of 4000 community pharmacists,²⁵ a confidence level of 95%, a margin of error of 8%, and assuming 50% of pharmacists have good attitude towards patient safety, a minimal sample of 145 pharmacists was targeted.

The Pharmacy Survey on Patient Safety Culture (PSOPSC), developed by the Agency for Healthcare Research and Quality (AHRQ); community pharmacy version, was used to collect data for the study.²⁶ It includes 36 items that measure the 11 areas of organizational culture to patient safety (Table 1). In addition, the survey includes 7 items about respondent's demographics (gender, age, last degree in pharmacy, governorate) and characteristics (years of experience, working hours, pharmacy position). Three items about the frequency of documenting mistakes, an overall rating question, and a section for open-ended comments. The PSOPSC is a validated tool.²⁶ The items for the parts were measured using the 5-point Likert response scale of agreement (Strongly Disagree to Strongly Agree) or frequency (Never to Always). The questionnaire was distributed in its original English language. The web-based survey was administered using Google Forms. The survey link was distributed to online groups of community pharmacists via Facebook, WhatsApp, and LinkedIn. In order to ensure

Table 1

AHRQ community pharmacy patient safety culture composites.

Communication About Mistakes	Staff discuss mistakes that happen and talk about ways to prevent mistakes.
Communication About Prescriptions Across Shifts	Information about prescriptions is communicated well across shifts and there are clear expectations and procedures for doing so.
Communication Openness	Staff freely speak up about patient safety concerns and feel comfortable asking questions; staff suggestions are valued.
Organizational Learning—Continuous Improvement	The pharmacy tries to figure out what problems in the work process lead to mistakes and makes changes to keep mistakes from happening again.
Overall Perceptions of Patient Safety	There is a strong focus and emphasis on patient safety and the pharmacy is good at preventing mistakes.
Patient Counseling	Patients are encouraged to talk to the pharmacist; pharmacists spend enough time talking to patients and tell them important information about new prescriptions.
Physical Space and Environment	The pharmacy is well organized and free of clutter; the pharmacy layout supports good workflow.
Response to Mistakes	The pharmacy examines why mistakes happen, helps staff learn from mistakes, and treats staff fairly when they make mistakes.
Staff Training and Skills	Staff get the training they need, new staff receive orientation, and staff have the skills they need to do their jobs well.
Staffing, Work Pressure, and Pace	There are enough staff to handle the workload, staff do not feel rushed, staff can take breaks, and work can be completed accurately despite distractions.
Teamwork	Staff treat each other with respect, work together as an effective team, and understand their roles and responsibilities.

anonymity, the questionnaire was self-administered and did not include any identifiers. The survey included an informed consent and was available in its original language: English.

The Statistical Package for Social Science (SPSS) software, version 24 was used for analyzing the data. Closed-ended question responses were coded and entered into SPSS. Internal consistency of the instrument was measured by calculating Cronbach's coefficient for the 11 composites. The value for each composite was 0.8 (>0.7) indicating a good correlation between the composite scores.

The respondent's demographics were displayed using descriptive statistics: frequency and percentages. Positive responses were determined by adding the respective percentage responses of "strongly agree" and "agree" or "always" and "most of the time". Neutral responses represented "neither agree nor disagree" or "sometimes" response categories. Negative responses were calculated by combining "strongly disagree" and "disagree" or "never" and "rarely" response categories, depending on the response options used for any item. For negatively worded items, positive response is based on those who responded with "strongly disagree" or "disagree" or "never" or "rarely". Negatively worded survey items were reverse scored such that a higher score meant a more positive response to the question. For each of the 11 composites, a composite percent positive response was calculated by adding the calculated percent positive response for all the items in the composite and dividing the sum of the percent positive responses by the number of items in the composite. The frequency of reported events was added to the univariate analysis. For each of the 11 composites, a score was calculated by adding each item assuming the following coding: strongly disagree = 1, disagree = 2, Neither agree nor disagree = 3, agree = 4, strongly agree = 5). In reverse coded variables, strongly agree took the lowest number:1 and strongly disagree took the highest:5. The total patient safety score was calculated by adding the 11 scores. Does Not Apply or Don't Know choice was excluded from the calculation strategy. The Total questions assessed to calculate the total patient safety score are 36 items. The maximum score for every question answered by a participant is 5 (strongly agree). This led us to calculate the maximum patient safety score for each individual = 36*5 = 180.

The Chi-square and Fisher exact tests were performed to associate multinomial variables and compare percentages. The Student and Kruskal-Wallis (non-parametric) tests were conducted to determine whether a statistical association exists between the total patient safety score and other independent variables (demographic variables, documenting mistakes variables and the rating variable), after checking the score normality. Variables that showed a p -value <0.2 in the bivariate analysis were used to construct the multivariate model. Using Linear regression, the model was setup to examine the relationship and effect of the variables on the total patient safety score. Assumptions of residuals normality, linearity, homoscedasticity, and non-collinearity were ensured.

Results

A total of 145 questionnaires were completed. The demographic and professional characteristics of the respondents are represented in Table 2. Females account for (69.7%) of responses, while males account for (30.3%), with a predominance of the age group 20–29 accounting for (65.5%) of the total. Responses were not proportional from different governorates across the country. The three highest response levels were respectively from North Lebanon (31.0%), Mount Lebanon (29.0%) and Beirut (21.4%). South Lebanon (6.2%), Akkar (5.5%), Nabatiyeh (3.4%), and Beqaa (2.8%) had the lowest participation rates. No responses were registered from Baalbek-Hermel. The majority of those who responded were pharmacists (78.2%), followed by pharmacy student interns/externs (16.2%), pharmacy technicians (4.2%), pharmacy clerks, and pharmacy

Table 2
Socio-demographic characteristics of participants ($n = 145$).

Variables	n	%
Gender		
Male	44	30.3
Female	101	69.7
Age		
20–29	95	65.5
30–39	23	15.9
40–49	21	14.5
≥ 50	6	4.1
Governorate		
North Lebanon	45	31.0
Mount Lebanon	43	29.7
Beirut	31	21.4
South Lebanon	9	6.2
Akkar	8	5.5
Nabatiyeh	5	3.4
Beqaa	4	2.8
Last Degree in Pharmacy		
Bachelor	55	37.9
Master	45	31.0
PharmD	39	26.9
Other	6	4.1
Position in the pharmacy		
Pharmacist	111	78.2
Pharmacy student intern/extern	23	16.2
Pharmacy technician	6	4.2
Pharmacy clerk or pharmacy cashier	2	1.4
Work experience		
< 6 months	25	17.5
6 months to <1 year	19	13.3
1 year to <3 years	40	28.0
3 years to <6 years	26	18.2
6 years to <12 years	16	11.2
≥ 12 years	17	11.9
Working Hours (per week)		
1 to 16 h	23	16.3
17 to 31 h	45	31.9
32 to 40 h	33	23.4
>40 h	40	28.4

cashiers (1.4%). Twenty eight percent of the participants had one year or less than three years of experience in the pharmacy sector (Fig. 1). 31.9% of those surveyed worked for 17 to 31 h each week and 28.4% worked for >40 h per week.

Community pharmacy employees' perceptions concerning their pharmacies' patient safety culture are presented in Table 3. The safety culture dimensions with the highest positive score were patient counseling (86.4%), teamwork (83.9%), organizational learning (82.7%), and communication mistakes (80.96%). However, the only dimension scoring a very low score comparing to all other dimensions was staffing work pressure and pace (41.2%) (Fig. 3).

The percentages of positive responses for documenting various types of errors were nearly similar: 38.5% for documenting mistakes that reaches the patient and could cause harm but does not, 31.1% assumed for mistakes that reach the patient but has no potential harm and 36.3% for mistakes that could harm the patient but are corrected before the medication leaves the pharmacy (Table 4).

40% of the respondents reported a “very good” patient safety grade and 24.8% reported an “excellent” grade. While only 1.4% assumed a “poor” patient safety culture in their pharmacies (Fig. 2).

Chi-square and Fisher exact test were conducted to investigate whether gender influenced the percentage of positive responses of the respective survey items (Table 5). Significance was basically noticeable in items referring to Section B that was dealing with: communication and work pace in the survey. It was also shown that females felt more at ease when speaking to their supervisor about patient safety concerns (86.1% vs 68.2%, $p = 0.038$). All items in patient counseling composite showed significant association with gender. Females had clearer expectations about exchanging important prescription information across shifts (84.7% positive responses), which is significantly higher than 59.5% scored among males ($p = 0.004$). Ability to talk about ways to prevent mistakes from happening again was higher among female participants in comparison to males (74.4% vs 87.9%, $p = 0.008$). One-fifth of females (20.4%) reported not feeling rushed when processing prescriptions comparing to 37.5% of males ($p = 0.012$).

Using bivariate analysis, the association of patient safety total score was tested for association with participants' characteristics including age, gender, location of community pharmacy (Table 6). Kruskal Wallis test showed a significant association between the rating of patient safety by community pharmacists and the actual score of patient safety (p -value <0.001). The association of the score with the frequency of documenting different types of mistakes was also shown to be significant (Table 7). Kruskal Wallis, however, have shown an insignificant association of patient safety total score with age, last degree in pharmacy, pharmacy's location, duration of work experience, working hours and position of the personnel in the pharmacy.

Taking the total patient safety score as the dependent variable, and after checking that the assumptions for linear regression have been met (independence, normal distribution and uniform variance of residuals), linear regression analysis (using Enter method) was conducted to assess the relationship between patient safety score and respondents' characteristics which scored p -values of <0.2 in the bivariate analysis (gender, work hours, governorate, pharmacy rating regarding patient safety and frequency of documenting different types of mistakes) (Table 8).

Results have shown that the correlation between the total patient safety culture score and the aforementioned variables is a strong, positive, linear correlation ($r = 0.718$). Furthermore, these variables were shown to explain approximately 38.9% of the observed changes in the patient safety total score.

The main significant characteristics which determined changes in the total score are working hours (32–40 h/week and > 40 h per week) and pharmacy personnel's perception and rating of patient safety (poor, fair, good, excellent). In fact, working for 32–40 h per week and >40 h per week are expected to increase the total score by 19 ($\beta = 19.305$), and 18 points ($\beta = 18.315$) respectively. Rating of patient safety in the pharmacy as poor, fair and good are expected to decrease the total score by 49 ($\beta = -49.288$), 20 ($\beta = -20.678$) and 12 ($\beta = -12.154$) points respectively.

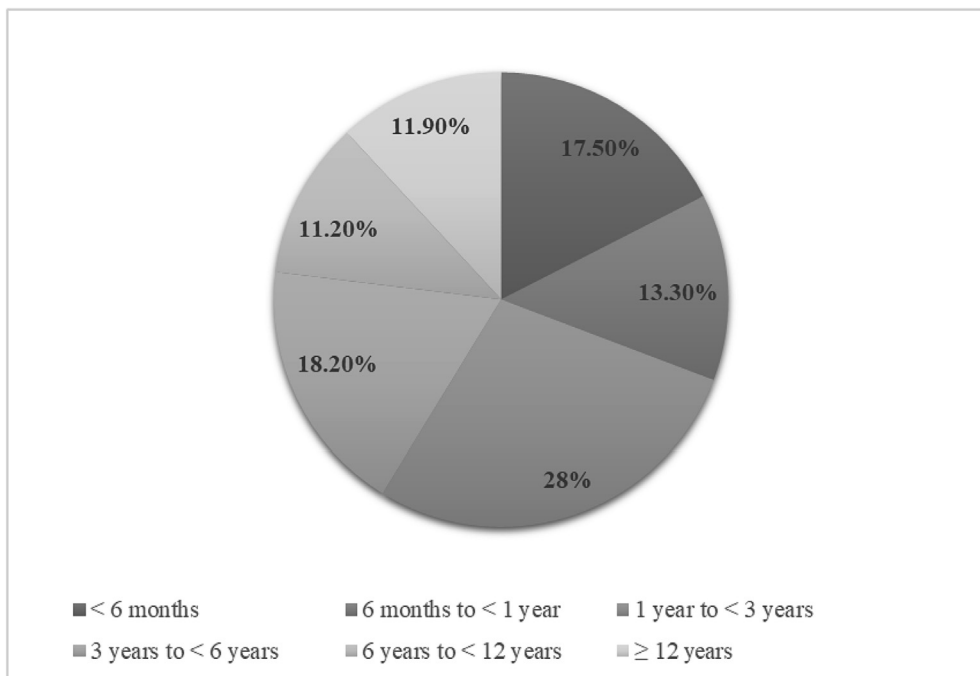


Fig. 1. Years of work experience.

In contrary, rating patient safety as excellent in the pharmacy is correlated with 9 points increase in the total score. Other characteristics were not significantly correlated with patient safety total score.

Discussion

To our knowledge, this is the first study assessing patient safety culture among community pharmacists in Lebanon. Many studies have already tackled this aspect in different countries such as the United States,¹⁴ Qatar,¹⁹ Kuwait,²⁰ and Abu Dhabi.²³ In Lebanon, patient safety has only been investigated in hospitals, not in pharmacies. Such studies are quite essential since medication errors in the community are really common and even more frequent than in inpatient settings.²⁷

Percent positive responses were calculated for all 11 safety culture composites. All of them received >70% positive responses except for staffing, work pressure, and pace which received 41.2% positive responses. Furthermore, females were shown to be more dedicated to patient safety culture especially in the patient counseling dimension. In fact, females were shown to encourage patients to talk to pharmacists about their medications, to spend enough time talking to patients about how to use their medications, and to tell patients important information about their new prescriptions. Add to this, our study showed that working for >32 h per week, and patient increases the patient safety culture score, and the patient safety culture perception among pharmacists affects differently patient safety culture.

In our study, the highest positive score was that of patient counseling which scored 86.4% positive responses similar to many other studies assessing patient safety culture in community pharmacies like Qatar (94.6%), the United States (91%) studies.^{14,19} This implies that Lebanese community pharmacy personnel prioritize counseling and consider it as an essential component of their work. This feature is important since pharmacists play a major role in drug therapy, public health, and disease prevention through counseling especially in a community similar to that of Lebanon, in which patients might consult pharmacists before visiting any physician.²⁸ Furthermore, patient counseling improves public health literacy, empowers, and assists citizens in achieving safe, effective, and appropriate use of drugs among patients. Thus, Lebanese community pharmacists are dedicated to counseling. In fact, the Order of Pharmacists in Lebanon hosts a series of continuing education conferences in Beirut. Unfortunately, this constitutes big challenges for pharmacists in areas outside

of the city, who face transportation and time constraints.²⁹ This is why online continuing educational programs can be suggested as a practical alternative.

The second highest score was that of teamwork which received a score of 83.9% similar to studies done in the United States (85%), Qatar (93.7%), Abu Dhabi (91.9%) as well as that in Lebanese hospitals (82.3%).^{14,19,23,24} One possible explanation for this high score is that pharmacists usually choose staff according to their perceptions and values which helps in forming a cooperative team with similar backgrounds. Having such a team spirit in pharmacies contributes to better patient safety culture.¹⁴

The composite assessing staffing, work pressure and pace scored the lowest positive response rate (41.2%). The case is the same in many other countries including the United States (37%), Qatar (50.6%), and Kuwait (49.7%).^{14,19,20} In Lebanese community pharmacies, it was shown that only 48.9% of the staff believe that they are taking adequate breaks, only 25% think that they do not feel rushed when processing prescriptions, and only 24% feel that they do not get distracted or interrupted. According to Gadkari et al. (2009),³⁰ it was shown that high work pressure among community pharmacists is negatively associated with drug therapy services. Pharmacists also might not have the time anymore to check for the accuracy of the prescription which might increase the risk of drug-drug interactions.^{31,32}

The workload mentioned does not only include the physical stress but also mental stress. It has been shown that not only do pharmacists commit more mistakes if under pressure, but their ability to detect dispensing errors also diminishes.³³ Immediate preventive steps should be taken by increasing the number of pharmacists who are responsible for drugs prescription, reducing the workload on individual pharmacists and ensuring convenient working conditions. Pharmacists should also form a team who focus on risk management and performance evaluation.³⁴ This could be done by collecting and analyzing the data of patient events which is actually the main aim of the Patient Safety and Quality Improvement Act issued in the United States in 2005.³⁵

The scores of all three items in the patient counseling composite are significantly higher in females than in males. This shows that females were more dedicated to performing adequate patient counseling: they encourage patients to talk to them about their medications, they spend enough time talking to patients about how to use their medications and they tell patients

Table 3
Percentage of positive, neutral and negative responses of individual items and dimensions across all community pharmacies (n = 145).

	N (%) Positive	N (%) Neutral	N (%) Negative
1) Physical Space and Environment (Cronbach's $\alpha = 0.856$)	77.26%		
A1. This pharmacy is well organized.	117(80.7)	11(7.6)	17(11.7)
A5. This pharmacy is free of clutter.	96(70.1)	24(17.5)	17(12.4)
A7. The physical layout of this pharmacy supports good workflow.	115(81.0)	11(7.7)	16(11.3)
2) Teamwork (Cronbach's $\alpha = 0.851$)	83.9%		
A2. Staff treat each other with respect	125(86.8)	11(7.6)	8(5.6)
A4. Staff in this pharmacy clearly understand their roles and responsibilities	117(81.8)	12(8.4)	14(9.8)
A9. Staff work together as an effective team.	120(83.3)	11(7.6)	13(9.0)
3) Staff Training and Skills (Cronbach's $\alpha = 0.856$)	78.45%		
A3. Technicians in this pharmacy receive the training they need to do their jobs.	96(70.1)	22(16.1)	19(13.9)
A6. Staff in this pharmacy have the skills they need to do their jobs well	121(84.0)	13(9.0)	10(6.9)
A8. Staff who are new to this pharmacy receive adequate orientation.	117(82.4)	8(5.6)	17(12.0)
A10. Staff get enough training from this pharmacy.	109(77.3)	18(12.8)	14(9.9)
4) Communication Openness (Cronbach's $\alpha = 0.844$)	79.9%		
B1. Staff ideas and suggestions are valued in this pharmacy	100(69.0)	33(22.8)	12(8.3)
B5. Staff feel comfortable asking questions when they are unsure about something.	129(90.2)	8(5.6)	6(4.2)
B10. It is easy for staff to speak up to their supervisor/manager about patient safety concerns in this pharmacy.	117(80.7)	17(11.7)	11(7.6)
5) Patient Counseling (Cronbach's $\alpha = 0.849$)	86.4%		
B2. We encourage patients to talk to pharmacists about their medications.	124(87.3)	12(8.5)	6(4.2)
B7. Our pharmacists spend enough time talking to patients about how to use their medications.	123(85.4)	12(8.3)	9(6.3)
B11. Our pharmacists tell patients important information about their new prescriptions.	122(86.5)	12(8.5)	7(5.0)
6) Staffing, Work Pressure, and Pace (Cronbach's $\alpha = 0.870$)	41.2%		
B3. Staff take adequate breaks during their shifts.	68(48.9)	35(25.2)	36(25.9)
B9. We feel rushed when processing prescriptions. (Negatively worded)	35(25.4)	46(33.3)	57(41.3)
B12. We have enough staff to handle the workload.	93(66.4)	16(11.4)	31(22.1)
B16. Interruptions/distractions in this pharmacy (from phone calls, faxes, customers, etc.) make it difficult for staff to work accurately. (Negatively worded)	33(24.1)	42(30.7)	62(45.3)
7) Communication About Prescriptions Across Shifts (Cronbach's $\alpha = 0.849$)	76.1%		
B4. We have clear expectations about exchanging important prescription information across shifts.	108(77.1)	21(15.0)	11(7.9)
B6. We have standard procedures for communicating prescription information across shifts.	104(74.8)	23(16.5)	12(8.6)
B14. The status of problematic prescriptions is well communicated across shifts.	107(76.4)	22(15.7)	11(7.9)
8) Communication About Mistakes (Cronbach's $\alpha = 0.853$)	80.96%		
B8. Staff in this pharmacy discuss mistakes.	110(77.5)	19(13.4)	13(9.2)
B13. When patient safety issues occur in this pharmacy, staff discuss them.	115(81.6)	14(9.9)	12(8.5)
B15. In this pharmacy, we talk about ways to prevent mistakes from happening again.	119(83.8)	12(8.5)	11(7.7)
9) Response to Mistakes (Cronbach's $\alpha = 0.856$)	72.6%		
C1. Staff are treated fairly when they make mistakes.	108(75.0)	22(15.3)	14(9.7)
C4. This pharmacy helps staff learn from their mistakes rather than punishing them.	115(81.0)	14(9.9)	13(9.2)
C7. We look at staff actions and the way we do things to understand why mistakes happen in this pharmacy.	114(82.6)	15(10.9)	9(6.5)
C8. Staff feel like their mistakes are held against them. (Negatively worded)	71(51.8)	32(23.4)	34(24.8)
10) Organizational Learning—Continuous Improvement (Cronbach's $\alpha = 0.853$)	82.7%		
C2. When a mistake happens, we try to figure out what problems in the work process led to the mistake.	126(87.5)	11(7.6)	7(4.9)
C5. When the same mistake keeps happening, we change the way we do things.	115(82.7)	13(9.4)	11(7.9)
C10. Mistakes have led to positive changes in this pharmacy.	109(77.9)	21(15.0)	10(7.1)
11) Overall Perceptions of Patient Safety (Cronbach's $\alpha = 0.859$)	74.7%		
C3. This pharmacy places more emphasis on sales than on patient safety. (Negatively worded)	89(62.2)	21(14.7)	33(23.1)
C6. This pharmacy is good at preventing mistakes.	112(78.3)	21(14.7)	10(7.0)
C9. The way we do things in this pharmacy reflects a strong focus on patient safety.	117(83.6)	14(10.0)	9(6.4)

important information about their new prescriptions. A cross-sectional study has shown that females had significantly better attitudes to patient safety which might be related to the fact that women are usually more sensitive to patients' health.³⁶ One practical step is to integrate and emphasize on patient safety knowledge and practice in university curricula. This way, whether male or female, future pharmacists will feel more confident in the work environment and have better attitudes with better implications to patient safety in their practice.

Although working for over 40 h per week is proven to be associated with mental fatigue,³⁷ which negatively affects the ability of pharmacists to assure patient safety, our study showed that working for 32 to 40 h and >40 h per week in the pharmacy helps improve patient safety culture. This finding is the opposite of a recent Japanese study that showed that long working hours is associated with low patient safety culture.¹² This outcome, however, can be explained by the fact that long working hours allow the pharmacist to stay updated about the patient's health and develop a

Table 4
Frequency of events reported by the community pharmacists (n = 145).

In this pharmacy, how often the following types of mistakes documented?	Never/rarely n (%)	Sometimes n (%)	Most of the time/ always n (%)	PPR n (%)
D1. When a mistake reaches the patient and could cause harm but does not, how often is it documented?	62(45.9)	21(14.5)	52(38.5)	52(38.5)
D2. When a mistake reaches the patient but has no potential to harm the patient, how often is it documented?	70(51.9)	23(17.0)	42(31.1)	42(31.1)
D3. When a mistake that could have harmed the patient is corrected BEFORE the medication leaves the pharmacy, how often is it documented?	65(48.1)	21(15.6)	49(36.3)	49(36.3)

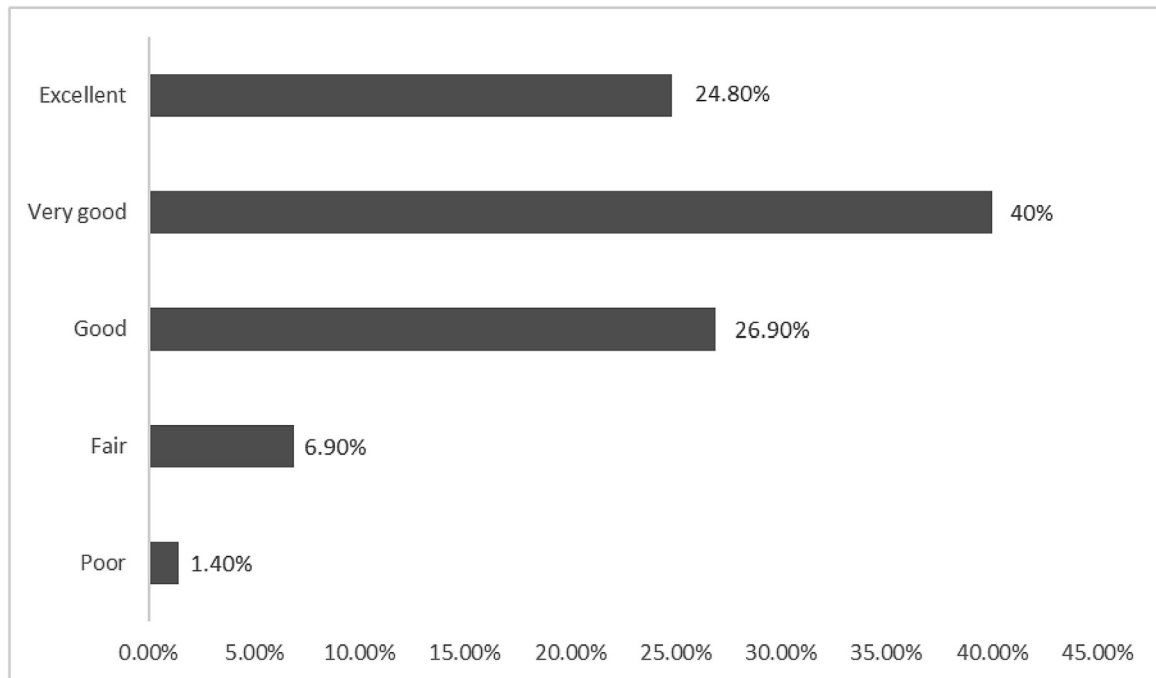


Fig. 2. Overall rating of patient safety culture among Lebanese community pharmacy personnel.

deep bond with them. This aids in achieving the best psychological and physical benefit to the patient. Furthermore, spending more time at the pharmacy increases the chance of familiarizing with the work environment and ameliorates communication and coordination among staff.

Interestingly, results of the multivariate analysis have shown that when pharmacists perceive and rate patient safety in their pharmacy as poor or fair decreases the total score significantly. Rating patient safety as good

also decreases the score but to a limited extent compared to poor and fair ratings. In contrary, reporting an excellent patient safety actually increases the total score. Since the increase in patient safety rating is directly associated with the total score, this might infer that community pharmacists understand well how to define and rate patient safety in their pharmacies. What is more essential, however, is to ensure that poor rating is followed by an adequate intervention to improve patient safety culture.

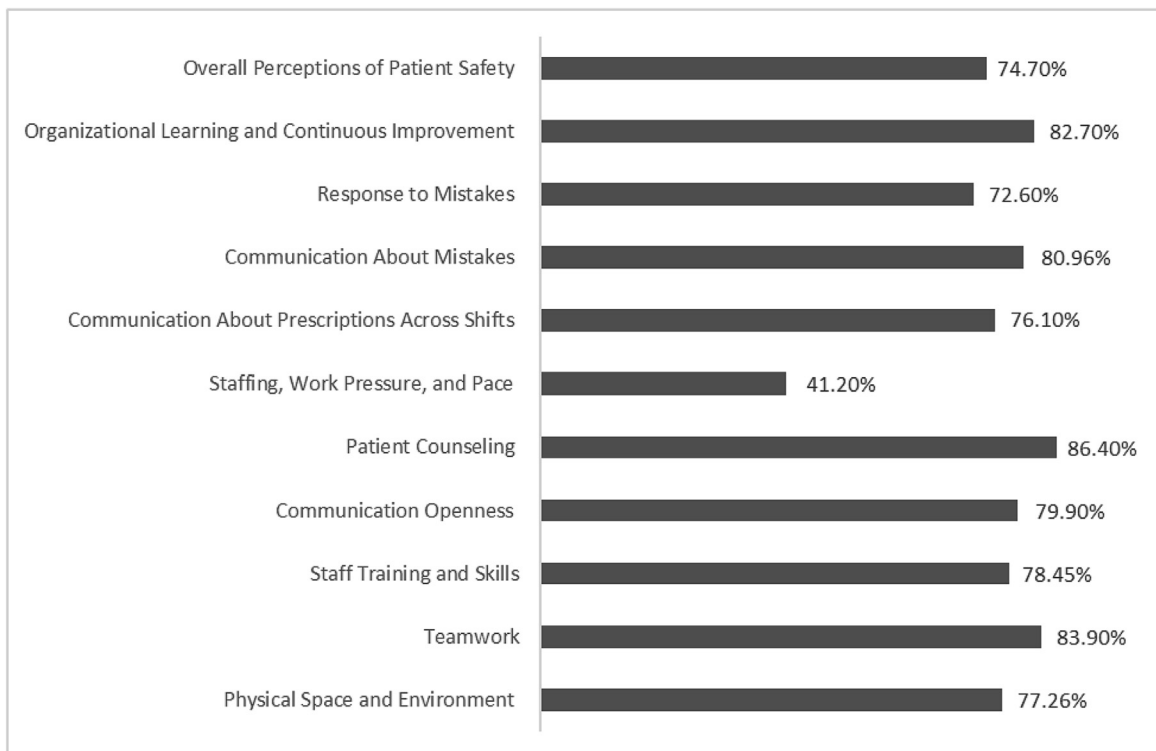


Fig. 3. Percentage of positive responses on patient safety culture among Lebanese community pharmacy personnel.

Table 5
Percent positive responses (PPR) for survey items in 11 composites according to gender.

	N (PPR %)		P value
	Male	Female	
1) Physical Space and Environment			
A1. This pharmacy is well organized.	33 (75.0)	84 (83.2)	0.435
A5. This pharmacy is free of clutter.	25 (62.5)	71 (73.2)	0.080
A7. The physical layout of this pharmacy supports good workflow.	33 (76.7)	82 (82.8)	0.653
2) Teamwork			
A2. Staff treat each other with respect	38 (88.4)	87 (86.1)	0.661
A4. Staff in this pharmacy clearly understand their roles and responsibilities	35 (81.4)	82 (82)	0.882
A9. Staff work together as an effective team.	37(84.1)	83(83)	0.587
3) Staff Training and Skills			
A3. Technicians in this pharmacy receive the training they need to do their jobs.	30(73.2)	66(68.8)	0.873
A6. Staff in this pharmacy have the skills they need to do their jobs well	38(86.4)	83(83)	0.932
A8. Staff who are new to this pharmacy receive adequate orientation.	33(75)	84(85.7)	0.134
A10. Staff get enough training from this pharmacy.	34(79.1)	75(76.5)	0.694
4) Communication Openness			
B1. Staff ideas and suggestions are valued in this pharmacy	28(63.6)	72(71.3)	0.112
B5. Staff feel comfortable asking questions when they are unsure about something.	36(81.8)	93(93.9)	0.014
B10. It is easy for staff to speak up to their supervisor/manager about patient safety concerns in this pharmacy.	30(68.2)	87(86.1)	0.038
5) Patient Counseling			
B2. We encourage patients to talk to pharmacists about their medications.	35(79.5)	89(90.8)	0.025
B7. Our pharmacists spend enough time talking to patients about how to use their medications.	32(72.7)	91(91)	0.001
B11. Our pharmacists tell patients important information about their new prescriptions.	34(77.3)	88(90.7)	0.007
6) Staffing, Work Pressure, and Pace			
B3. Staff take adequate breaks during their shifts.	25(58.1)	43(44.8)	0.218
B9. We feel rushed when processing prescriptions. (Negatively worded)	15(37.5)	20(20.4)	0.012
B12. We have enough staff to handle the workload.	25(58.1)	68(70.1)	0.295
B16. Interruptions/distractions in this pharmacy (from phone calls, faxes, customers, etc.) make it difficult for staff to work accurately. (Negatively worded)	10(24.4)	23(24)	0.802
7) Communication About Prescriptions Across Shifts			
B4. We have clear expectations about exchanging important prescription information across shifts.	25(59.5)	83(84.7)	0.004
B6. We have standard procedures for communicating prescription information across shifts.	32(76.2)	72(74.2)	0.144
B14. The status of problematic prescriptions is well communicated across shifts.	28(66.7)	79(80.6)	0.125
8) Communication About Mistakes			
B8. Staff in this pharmacy discuss mistakes.	30(69.8)	80(80.8)	0.153
B13. When patient safety issues occur in this pharmacy, staff discuss them.	33(76.7)	82(83.7)	0.092
B15. In this pharmacy, we talk about ways to prevent mistakes from happening again.	32(74.4)	87(87.9)	0.008
9) Response to Mistakes			
C1. Staff are treated fairly when they make mistakes.	32(72.7)	76(76)	0.586
C4. This pharmacy helps staff learn from their mistakes rather than punishing them.	34(77.3)	81(82.7)	0.028
C7. We look at staff actions and the way we do things to understand why mistakes happen in this pharmacy.	36(81.8)	78(83)	0.027
C8. Staff feel like their mistakes are held against them. (Negatively worded)	26(59.1)	45(48.4)	0.402
10) Organizational Learning—Continuous Improvement			
C2. When a mistake happens, we try to figure out what problems in the work process led to the mistake.	36(81.8)	90(90)	0.286
C5. When the same mistake keeps happening, we change the way we do things.	35(81.4)	80(83.3)	0.515
C10. Mistakes have led to positive changes in this pharmacy.	33(78.6)	76(77.6)	0.216
11) Overall Perceptions of Patient Safety			
C3. This pharmacy places more emphasis on sales than on patient safety. (Negatively worded)	28(65.1)	61(61)	0.789
C6. This pharmacy is good at preventing mistakes.	34(77.3)	78(78.8)	0.304
C9. The way we do things in this pharmacy reflects a strong focus on patient safety.	34(81)	83(84.7)	0.214

This study has several notable strengths. To our knowledge, it is the first study investigating patient safety culture among community pharmacists in Lebanon. A second main strength was utilizing PSOPSC questionnaire which is a validated and standardized tool designed specifically to assess patient safety culture in community settings. The usage of this tool permits to compare the results of our study to other international studies investigating patient safety culture.

Despite these strengths, several limitations of the current study warrant discussion. First, our study was based on convenience sampling (snowball sampling) by sending the online questionnaire to accessible pharmacists. This might have introduced selection bias in our study since the selection of participants was not done randomly. Added to this, despite the fact that the form was freely open for six months, the number of participants remained limited. In fact, the survey was distributed in its original English language. Due to the linguistic barrier, pharmacists who prefer to speak Arabic or French may have declined to fill it. As a result, the non-probability sampling and the small sample size may impair the study's external validity and generalizability.

Concerning the sample representability, a relatively low representation of pharmacists from the south region, Akkar, Nabatiyeh, Beqaa and the no representation from Baalbek Hermel, suggests a probable overestimation of

the results obtained in our study. Add to this, the majority of the study's participants were female. This gender unbalanced sample might have affected our results, introduced gender bias and decreased representativeness of our study.

Third, the use of an online questionnaire as an instrument to collect data might introduce response bias as some pharmacists may have understood some questions differently. The risk of such bias might even be higher in our study due to pharmacists' fear on pharmacies' reputation. Response bias could have been reduced if the survey was supplemented with actual observation of patient safety practices in Lebanese pharmacies.

Conclusion

According to our study's findings, the surveyed community pharmacists in different governorates in Lebanon had a generally good positive attitude about patient safety culture at their workplaces. Participating pharmacists focused mainly on patient counseling and teamwork. Females were more focused on patient counseling and communication openness than males, which might be related to their sensitivity or having general positive attitudes towards patient safety culture. Although long working hours were

Table 6
Comparison of mean total composite score across demographic and rating variables.

Variables	Mean total composite score (SD)	P value
Gender		0.168
Male	139.13 (26.352)	
Female	144.21 (17.002)	
Age		0.285
20–29	144.04 (16.680)	
30–39	140.84 (21.657)	
40–49	135.10 (32.106)	
≥ 50	154.48 (5.841)	
Last degree		0.792
Bachelor	143.72 (20.058)	
PharmD	144.76 (14.077)	
Master	138.97 (24.778)	
Other	147.16 (21.536)	
Governorate		0.092
Akkar	146.95 (5.916)	
Beirut	134.59 (19.611)	
Beqaa	141.46 (8.902)	
Mount Lebanon	145.88 (17.800)	
North Lebanon	143.73 (25.536)	
Nabatiyeh	151.20 (17.065)	
South Lebanon	141.86 (12.897)	
Work Experience		0.259
<6 months	140.96 (19.060)	
6 months to <1 year	150.06 (14.064)	
1 year to <3 year	142.01 (17.186)	
3 year to <6 year	140.59 (18.810)	
6 years to <12 years	139.94 (22.101)	
>12 years	143.88 (33.468)	
Work hours		0.128
1 to 16 h per week	140.02 (22.287)	
17 to 31 h per week	141.32 (17.213)	
32 to 40 h per week	145.70 (13.812)	
>40 h per week	145.70 (24.089)	
Position		0.401
Pharmacist	142.71 (21.003)	
Pharmacy technician	135.30 (19.989)	
Pharmacy clerk / cashier	135.75 (7.425)	
Pharmacy student intern/ extern	144.60 (18.225)	
Rating Patient safety		<0.001
Poor	98.23 (20.892)	
Fair	122.47 (27.845)	
Good	131.97 (22.644)	
Very good	145.77 (12.233)	
Excellent	157.34 (9.757)	

Table 7
Comparison of mean total composite score across documenting mistakes variables.

Documenting mistakes	Mean total composite score (SD)	P value
Documenting mistake that could cause harm but does not		0.005
Never documented	133.24 (27.189)	
Rarely documented	136.70 (20.189)	
Sometimes documented	145.58 (13.452)	
Most of the time documented	147.25 (17.337)	
Always documented	151.82 (14.502)	
Documenting mistake that reaches patient but does not cause Harm		0.003
Never documented	136.07 (24.366)	
Rarely documented	136.47 (22.131)	
Sometimes documented	142.49 (17.839)	
Most of the time documented	150.56 (13.051)	
Always documented	153.39 (15.622)	
Documenting corrected mistakes		<0.001
Never documented	135.73 (24.498)	
Rarely documented	135.51 (22.746)	
Sometimes documented	139.83 (14.642)	
Most of the time documented	151.93 (11.946)	
Always documented	152.13 (13.543)	

Table 8
Multivariate analysis linear regression.

Variable	Unstandardized coefficient B	P-value	95% CI for B
Gender	4.678	0.172	[− 2.067,11.424]
Governorate			
Akkar	7.244	0.284	[− 6.097, 20.585]
Beirut	− 4.582	0.279	[− 12.932, 3.767]
Beqaa	2.691	0.771	[− 15.576, 20.958]
North Lebanon	0.011	0.997	[− 7.215, 7.238]
Nabatiyeh	15.838	0.057	[− 0.507, 32.184]
South Lebanon	− 1.274	0.840	[− 13.780, 11.233]
Working Hours			
1–16 working hours	15.314	0.102	[− 3.096, 33.724]
17–31 working hours	15.000	0.106	[− 3.221, 33.221]
32–40 working hours	19.305	0.034	[1.473, 37.138]
>40 working hours	18.315	0.045	[0.420, 36.210]
Rating patient safety			
Poor patient safety rating	− 49.288	0.000	[− 73.111, − 25.466]
Fair patient safety rating	− 20.678	0.001	[− 32.595, − 8.760]
Good patient safety rating	− 12.154	0.001	[− 19.189, − 5.118]
Excellent patient safety rating	9.449	0.014	[1.984, 16.914]
Documenting mistake that could cause harm but does not			
Never documented	− 3.813	0.735	[− 26.096, 18.470]
Rarely documented	1.897	0.856	[− 18.713, 22.507]
Sometimes documented	8.387	0.419	[− 12.101, 28.874]
Most of the time documented	8.760	0.390	[− 11.351, 28.871]
Always documented	11.174	0.251	[− 8.015, 30.363]
Documenting mistake that reaches patient but does not cause Harm			
Never documented	2.848	0.816	[− 21.344, 27.040]
Rarely documented	− 4.265	0.705	[− 26.550, 18.021]
Sometimes documented	− 7.842	0.458	[− 28.696, 13.012]
Most of the time documented	− 1.815	0.870	[− 23.733, 20.103]
Always documented	− 1.893	0.873	[− 25.241, 21.455]
Documenting corrected mistakes			
Never documented	− 4.141	0.629	[− 21.089, 12.808]
Rarely documented	− 4.303	0.624	[− 21.662, 13.056]
Sometimes documented.	− 7.073	0.409	[− 23.989, 9.843]
Most of the time documented.	1.390	0.867	[− 14.994, 17.775]
Always documented.	− 0.105	0.991	[− 17.605, 17.396]

associated with better patient safety score, most participants reported high pressure and low staffing in their pharmacies. Thus, efforts to improve this particular deficient area: low staffing and high work pressure, may result in improved outcomes for pharmacists and their patients. Other aspects encouraging patient safety in Lebanese pharmacies such as exchanging important prescription information and communicating mistakes should also be implemented.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Declaration of Competing Interest

The authors declare no conflicts of interest in preparing this article.

Acknowledgements

First and foremost, I thank Allah, the Almighty, for providing me with strength and patience, for providing me with health and time, and for instilling in me the desire and bravery to complete this task.

Then, I'd want to express my gratitude to my thesis supervisor, Doctor Pascale Salameh, for the trust she placed in me by agreeing to supervise this

work, for her numerous valuable suggestions, and for all the hours she spent supervising this thesis. She was constantly available, patiently answered my many questions, and was always interested in how my work was progressing.

Thank you for everything.

I'd also want to thank Dr. Amal Al-Hajje and Dr. Salam Zein for agreeing to examine my work. Despite an overburdened schedule, I was honored by your participation in my defense jury.

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