



Knowledge of and readiness for medication therapy management among community pharmacists in Lebanon

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Abstract

Background To follow international standards, the Lebanese Order of Pharmacists would like to start to implement the medication therapy management in community pharmacies. **Objective** The objective of this study is to evaluate community pharmacists' knowledge of and readiness for medication therapy management. **Setting** Community pharmacists from all Lebanese regions. **Method** A cross-sectional observational descriptive study was conducted. Pharmacists at their workplace completed self-administered anonymous standardized questionnaires between June and December 2016, with no compensation in return. Statistical analysis was conducted using bi-variate and multi-variable methods. **Main outcome measure** The major dependent variable of interest was the willingness to engage in medication therapy management activities. **Results** While only 376 (46%) of the interviewed pharmacists declared to be familiar with this concept, the majority of interviewed pharmacists 646 (78.8%) agreed on the importance of patient-centered care. Although this service will not be remunerated at this stage, 529 (64.5%) were willing to attend advanced training sessions to become actively engaged in medication therapy management, particularly those who had adequate workflow, staff and time at their workplace (aOR = 1.51; $p = 0.045$) and those agreeing to review a patient's medication profile and provide interventions as part of their role (aOR = 6.10; $p < 0.001$). **Conclusion** Lebanese pharmacists have adequate knowledge and a positive attitude towards medication therapy management services implementation; however, barriers could arise such as inadequate time, workflow and physical space. Efforts should be exerted by the Lebanese Order of Pharmacist to extend the role of the pharmacist and its positive effect on patient outcome.

Keywords Community pharmacy · Implementation · Knowledge · Lebanon · Medication therapy management · Readiness

Impacts on Practice

- Lebanese pharmacists have a positive attitude towards medication therapy management, of which implementation is expected to be smooth.
- Lebanese patients would benefit from the provision of medication therapy management through better medication efficacy and safety.
- The implementation of medication therapy management is expected to positively impact on the health care system through improving patient's compliance and minimizing medication errors and overprescribing.

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Introduction

Pharmacist's role has evolved through the years. Nowadays, the pharmacy practice switched from primarily supervising medication distribution and counseling patients to a more extended team-based clinical role providing patient-centered medication therapy management, health improvement and disease prevention [1–4]. According to the American Pharmacist Association, pharmaceutical care is the cooperation of a caregiver team to reach an ultimate goal such as preventing diseases and assessing safety and efficacy of drug therapy regimen [5].

Consequently, pharmaceutical care focuses on the attitudes, behaviors, commitments, concerns, ethics, functions, knowledge, responsibilities and skills of the pharmacist on the provision of medication therapy management (MTM) with the goal of optimizing therapeutic outcomes and improving the patients' quality of life and health status through performing a comprehensive medication therapy review of prescribed and over the counter medications, resolving medication-related problems, adjusting complex regimens, designing adherence programs, and recommending cost-effective therapies [6–8].

Providing MTM services has shown to improve patient's clinical and economical outcomes. Actually, applying MTM decreases medication related problems, where it is estimated that in the United States 1.5 million preventable adverse drug events occur each year accounting for \$ 177 billion of add on expenses to the therapy cost yearly [9]. Moreover, the pharmacists themselves will benefit from this concept. This novel opportunity in pharmacy will help pharmacists use their clinical knowledge to improve health care and achieve better clinical outcomes. This, in turn, could help to expand the pharmacy profession in new direction. Similar advantages of MTM services were seen in European countries such as the Netherlands [10] and Sweden [11].

The application of the MTM service in the pharmacy practice should include 5 main elements: medication therapy review (MTR), personal medication record (PMR), medication related action plan (MAP), intervention or referral, documentation and follow-up [9]. Even though MTM can be applied in any setting, the community pharmacy is an ideal place for such service since the pharmacists have the opportunity to interact with their patients more frequently, especially when they are refilling their prescriptions [12].

Although some countries provide successful MTM in community pharmacy practice, the provision of MTM services in Lebanese community pharmacies is not yet to be found [13]. In 2016, the Lebanese Order of Pharmacists (OPL), which is the official pharmacy association in

Lebanon, took the initiative of starting an MTM service in Lebanese community pharmacies. In this perspective, the OPL started working on a web-based platform, the Lebanese Advanced Patient Profile (LAPP), that includes a section for patient profile with the possibility of running a real-time drug–drug interaction check while dispensing the medications, a section for the MTM, and other administrative sections.

To introduce the MTM to the pharmacists, the appointed scientific committee within the OPL (that has the role of carrying-out educational activities including conferences and congresses in addition to conducting surveys to support evidence-based decision-making), organized five educational weekends in all Lebanese regions, covering major chronic diseases. Furthermore, soft skills sessions were also organized in OPL premises to complete the training. During all these activities, pharmacists were asked to fill out a form regarding their interest to join a pilot of the MTM project: among participants, around 10% agreed to take part.

Aim of the study

To evaluate community pharmacists' knowledge of, and readiness for MTM in Lebanon.

Ethics approval

The Lebanese University ethics committee waived the approval for this study since it is an observational study that respects participants' confidentiality and autonomy, with no traceability.

Method

A cross-sectional descriptive study was conducted by completing self-administered anonymous questionnaires between June and December 2016. Community pharmacists from all Lebanese regions were invited to fill out a questionnaire with no compensation in return.

Sample size

The sample size was calculated using the online sample size calculator assuming that there are 4000 community pharmacists, and the percentage of those who wanted to participate in the project was 10%. A total of 522 pharmacists and above would provide a representative sample with 2% margin error and 95% confidence level. To allow for a 50% refusal rate, we targeted 1000 pharmacists.

Questionnaire and data collection

The questionnaire was written in English then translated into Arabic, the native language. It included demographic information such as age, gender, university degree and years of experience as well as 18 questions related to MTM knowledge, attitude, aptitude and readiness [14, 15]. The questionnaire was tested for appropriateness by several experts and further adjustments were done after pilot testing with 20 pharmacists. The questionnaire was handled by interviewers (pharmacists employed at the OPL) to the first 1000 community pharmacists they visited during their usual nationwide random round, and once completed, it was put in closed boxes to ensure anonymity and pharmacist confidentiality.

Major variables

The major variable of interest, termed the dependent variable, was the answer to the question: “I am willing to attend advanced sessions for clinical guidelines to become able to be actively engaged in MTM”: answering “agree” was coded 1, while “neutral/disagree” was coded 0. This allowed us to divide our population into 2 comparison groups. In addition, independent variables were as follows: 2 questions about attitude, 8 about declared knowledge, 3 about aptitude (physical capacity), and 4 about medication errors. These variables were inspired from previous studies [14, 15] that, unfortunately, did not include any validated tool.

Statistical analysis

The results were analyzed using Statistical Package for the Social Science (SPSS®) version 23 (IBM, New York—USA). Categorical data were expressed as frequencies (percentages) while continuous data as means \pm standard deviations (SD). The Pearson Chi square test was used to compare percentages between the two groups of comparison stated above (after ensuring that expected values were higher than 5 in at least 80% of the contingency cells; otherwise, Fisher’s Exact test was used), while the Student *t* test was used to compare means (after ensuring normality and variance homogeneity). Afterwards, a binary logistic regression was performed, using a backward stepwise likelihood ratio method. All factors associated to the dependent variable in the bivariate analysis with a *p* value < 0.2 were entered in the model, in addition to age that was deemed necessary to force into the model. The model was accepted after ensuring its adequacy by Hosmer–Lemeshow testing, and adjusted OR were calculated. In all cases, a *p* value of < 0.05 was considered significant.

Results

Pharmacists’ characteristics and community work

Among 1000 targeted pharmacists, 820 answered the questionnaire (82% participation rate). The mean age of participants was 40.41 with a majority of females $N = 487$ (59.4%). Five hundred and seven (62%) had a BS Pharmacy, 488 (60%) had 10 years or more professional experience, and 662 (81%) worked 8 h per day or more on average. As for continuing education, 335 (41%) declared relying on the OPL, while 410 (50%) declared using their own resources. Seven hundred and three (86%) had loyal customers, 386 (47%) interacted with 30 patients per day or more and 260 (32%) served 2 patients or more concomitantly (Table 1).

Attitude and knowledge of pharmacists regarding MTM services

The majority of the respondents had a positive attitude towards MTM: 646 (79%) agreed on reviewing the patient’s medication profile and providing interventions when necessary while 591 (72%) confirmed that the information provided by the physician is not enough and patients need pharmacist’s counseling. However, only 376 (46%) were familiar with the MTM concept. Among those who would provide this service, 582 (71%) would look for adverse drug reactions, 549 (67%) would make sure the route of administration is adequate, 523 (64%) would check for the correct dose, and 549 (67%) would assess drug–drug interactions before dispensing. On the other hand, 368 (45%) would follow-up on patient’s adherence, while 352 (43%) would not look for unnecessary medications and 410 (50%) would not check for additional needed therapy (Table 2).

Aptitude and willingness of community pharmacists to provide MTM services

While 679 (83%) of the respondents had a computer in their pharmacy, only 394 (48%) had a private consultation area, and 321 (39%) declared to have the adequate workflow, time and staff to provide MTM service. Overall, 529 (64.5%) were willing to attend advanced sessions for clinical guidelines and become actively engaged in MTM (Table 3).

Factors associated to the willingness to attend advanced sessions for clinical guidelines to become actively engaged in MTM services

In Table 4, we present the bivariate analysis of factors associated with the willingness to Attend Advanced Sessions

Table 1 Pharmacists' characteristics and community work (N=820)

Characteristic	Frequency (percentage) or mean \pm SD [range]
Age (years)	40.41 \pm 11.17 [22–74]
Sex	
Females	487 (59.4)
Males	327 (39.9)
Degree	
BS pharmacy	409 (49.9)
Diploma in pharmacy	98 (12)
Pharm.D.	186 (22.7)
Master	69 (8.4)
Ph.D.	54 (6.6)
Years of professional experience	
< 2	46 (5.6)
2–5	104 (12.7)
5–10	180 (22)
\geq 10	488 (59.5)
Average working hours per day	
< 4	6 (0.7)
4–8	148 (18)
\geq 8	662 (80.7)
Tool to stay updated	
OPL continuing education	335 (40.9)
Independent resources	410 (50)
Social media	55 (6.7)
I don't use any tool	7 (0.9)
Interaction with patients per day	
< 20	133 (16.2)
20–30	297 (36.2)
\geq 30	386 (47.1)
Type of customers	
Loyal customers	703 (85.7)
Pass by customers	99 (12.1)
Both	11 (1.3)
Serve 2 patients at the same time	
Always	67 (8.2)
Frequently	193 (23.5)
Rarely	355 (43.3)
Never	201 (24.5)

for Clinical Guidelines and engage in MTM services (the dependent variable). Being a female (68 vs. 61.2% for males; $p=0.047$), relying on OPL or social media for continuous education versus independent or no resources (70.2–69.1 vs. 61.2–42.9%; $p=0.04$), agreeing on reviewing the patient medication file (73.4 vs. 21–50%; $p<0.001$), thinking that physicians do not give enough information about medications to patients (72.3 vs. 42–52%; $p<0.001$), being familiar with the MTM concept (75.9 vs. 53–62%; $p<0.001$), and

having an adequate workflow, time and staff (68.7 vs. 57.9%; $p=0.005$) were positively and statistically associated with the willingness to perform MTM. However, pharmacists who declared they rarely or never saw medication errors (59.2 vs. 67–72%; $p=0.012$) and would take no action in case of one (0 vs. 61–71%; $p=0.004$) would have lower willingness to offer MTM services. All other factors were not significantly associated to the dependent variable (Table 4).

Factors independently associated to the willingness to attend advanced sessions for clinical guidelines to become actively engaged in MTM services

After assessing the model adequacy (Hosmer–Lemeshow test >0.05), we came out with a final model that could explain 22.7% of the variance of the willingness to attend advance sessions and engage in MTM. Reviewing a patient's medication profile and providing interventions as a part of pharmacist role (aOR = 6.10; $p<0.001$) and having adequate workflow, time and staff (aOR = 1.51; $p=0.045$) were the only independent factors that were significantly associated with the willingness to participate to MTM; all other included factors in the model gave borderline results (Table 5).

Discussion

This study showed that Lebanese pharmacists have adequate knowledge about patient centered care and a positive attitude towards MTM services implementation, although only half of them are familiar with the definition of this concept. They are also willing to engage actively in this activity after being trained adequately. However, several barriers were found such as inadequate time, workflow and physical space within the community pharmacies.

The majority of interviewed pharmacists (60%) had 10 years or more professional experience; 41% relied on the OPL for their continuing education, while 50% used their own resources. These results are similar to those of the OPL database [16].

While only 46% of the interviewed pharmacists declared to be familiar with the MTM concept, the majority of interviewed pharmacists agreed on the importance of patient centered care: 79% would review the patient's medication profile and provide interventions when necessary, while 72% consider that the patients need pharmacist's counseling as the information provided by the physician is not enough. Our results are similar to the findings of a study conducted in Tucson Arizona in 2006 where 79% stated that the most appropriate primary providers of MTM services were pharmacists, 59% agreed that annual personal medication review would benefit patient outcomes, while only 17% declared

Table 2 Attitude and knowledge regarding MTM services (N = 820)

Statement or question	Frequency (percentage)
“Reviewing a patient’s medication profile and providing interventions to prevent adverse events are important aspects of the role of a pharmacist”	
Disagree	95 (11.6)
Neutral	72 (8.8)
Agree	646 (78.8)
“Patients receive adequate information about their chronic diseases from their physicians so no need for the pharmacist counselling”	
Disagree	591 (72.1)
Neutral	99 (12.1)
Agree	125 (15.2)
Rate your level of familiarity with MTM	
Not familiar	233 (28.4)
Not sure	190 (23.2)
Familiar	376 (45.9)
If you provide MTM service, would you check for adverse drug reactions?	
No	92 (11.2)
Yes	582 (71.0)
If you provide MTM service, would you check for route of administration?	
No	131 (16.0)
Yes	549 (67.0)
If you provide MTM service, would you check for the dose?	
No	152 (18.5)
Yes	523 (63.8)
If you provide MTM service, would you check for drugs interactions?	
No	129 (15.7)
Yes	549 (67.0)
If you provide MTM service, would you follow-up on the patient’s adherence?	
No	290 (35.4)
Yes	368 (44.9)
If you provide MTM service, would you check for unnecessary medications?	
No	352 (42.9)
Yes	299 (36.5)
If you provide MTM service, would you check for additional needed therapy?	
No	410 (50.0)
Yes	232 (28.3)

that patients receive adequate information about their chronic disease(s) from their providers [17]. These results are also in line with those found in some European countries: in Poland, a study conducted in Poznan between June 2011 and March 2012 found that a majority of pharmacists (85.3%) indicated that individual medication management would have a positive influence on pharmaceutical care implementation in Poland [18].

Overall, 64.5% were willing to attend advanced training sessions to become actively engaged in MTM although it will not be remunerated at this stage. In West Virginia, pharmacists were similarly interested in and open to receiving education and training for implementation of MTM [19].

Assessing ADRs, dosing and drug interactions were also given a higher importance.

We note that a low percentage of pharmacists stated knowing that MTM includes assessment of patients’ adherence to medication (44.9%), unnecessary medication (36.5%) and additional needed therapy (28.3%). Consequently, although the majority declare knowing about MTM definition [20], there are some activities included in the official consensus MTM that Lebanese pharmacists may not know about or are not willing to undertake. These results suggest that special efforts have to be deployed and trainings to pharmacists should emphasize on these points, in addition to other related concepts.

Table 3 Aptitude and willingness of community pharmacists to provide MTM services (N = 820)

Question or statement	Frequency (percentage)
Do you have a computer in your pharmacy?	
No	113 (13.8)
Yes	679 (82.8)
Does your practice site have a private/semiprivate consultation area?	
No private consultation area—no space to create one	147 (17.9)
Semiprivate consultation area	251 (30.6)
Private consultation area	394 (48.0)
Does your practice site have adequate workflow, time, and staff to provide MTM service?	
No staff/No time	211 (25.7)
Yes workflow/no enough staff	210 (25.6)
Yes workflow/time/staff	321 (39.1)
“As a community pharmacist, I am willing to attend advanced sessions for clinical guidelines to become able to be actively engaged in MTM”	
Disagree	128 (15.6)
Neutral	155 (18.9)
Agree	529 (64.5)

The barriers to MTM implementation in Lebanon that were identified were numerous. In fact, although the majority of interviewed pharmacists have computers in their pharmacy setting, around 50% only have a private consultation area and 60% lack adequate work conditions to provide MTM services. Inversely, based on multivariable analysis, 2 factors were significantly associated with the willingness to participate to MTM: considering that the reviewing of a patient's medication profile and providing interventions are an important part of the pharmacist's role and having adequate work conditions (workflow, time and staff). Similarly, in the US, the most common barriers identified for those interested in providing MTM services were lack of additional staffing (89.6%) and poor access to medical information (84.0%) [21]. Additionally, when presented with challenges to workload and resources, 64% of surveyed pharmacists stated that they did not have sufficient time available for patient care services to maximize patient outcomes, and 65% indicated that pharmacists struggle with setting aside enough time during business hours to meet one-on-one with patients [17].

Moreover, in the US, pharmacists providing MTM with compensation were significantly less likely to agree with barriers relating to management, documentation, and compensation compared with those providing MTM without compensation [21]. Thus, in Lebanon, efforts should be done by the OPL to overcome physical barriers and awareness should be raised to encourage patients to participate in MTM programs. Once the system established, other barriers could be expected similarly to other countries: pharmacists' inadequate time, lack of reimbursement by the insurance companies, low payment for MTM services, difficult billing

and inadequate supportive staff [22]. Nevertheless, this project implementation will remain a pioneer in the pharmacy practice within the Middle-Eastern region as, to this date, there is still no established MTM system in any of the neighboring countries [23, 24].

Limitations

This study has several limitations, including the possibility of a selection bias, since we have no information about pharmacists who refused to fill out the questionnaire; however, we have no reason to believe that our sample is not representative, since our sample was a random one and our results were similar to those of the OPL database [16], which confirms the representativity of our sample. There is also a possibility of information bias, since pharmacists may answer with a positive attitude for social desirability, particularly since the interviewers were OPL employed pharmacists. Since the evaluation by a questionnaire may not deliver the “real world” performance, other strategies such as mystery shoppers might be more appropriate to better assess the situation. Finally, a residual confounding is possible since we did not measure all factors that could affect the readiness of pharmacists to engage in the MTM program, specifically their professional satisfaction and stress levels.

Future considerations

The OPL is keen to implement the provision of MTM services in community pharmacies as this global approach is the best in optimizing patient care in comparison with approaches only focused on patient medication reviews as

Table 4 Factors associated to the willingness to attend advanced sessions for clinical guidelines to become actively engaged in MTM services (bivariate analysis)

“I am willing to attend advanced sessions for clinical guidelines to become able to be actively engaged in MTM”	Disagree/ neutral (n = 283)	Agree (n = 529)	<i>p</i> value ^a
Age	40.55 ± 11.35	40.28 ± 11.06	0.744
Sex			0.047
Females	155 (32.0)	329 (68.0)	
Males	125 (38.8)	197 (61.2)	
Degree			0.567
BS pharmacy	150 (36.9)	256 (63.1)	
Diploma in pharmacy	31 (32.0)	66 (68.0)	
Pharm.D.	64 (34.8)	120 (65.2)	
Master	19 (27.5)	50 (72.5)	
Ph.D.	17 (32.1)	36 (67.9)	
Years of professional experience			0.746
< 2	18 (40.0)	27 (60.0)	
2–5	35 (33.7)	69 (66.3)	
5–10	67 (37.2)	113 (62.8)	
≥ 10	163 (33.9)	318 (66.1)	
Average working hours per day			0.408
< 4	1 (16.7)	5 (83.3)	
4–8	47 (31.8)	101 (68.2)	
≥ 8	233 (35.6)	421 (64.4)	
Interaction with patients per day			0.141
< 20	53 (40.2)	79 (59.8)	
20–30	91 (30.8)	204 (69.2)	
≥ 30	137 (36.0)	244 (64.0)	
Type of customers			0.285
Regular customers	236 (33.9)	460 (66.1)	
Pass by customers	37 (37.8)	61 (62.2)	
Both	6 (54.5)	5 (45.5)	
Serve 2 patients at the same time			0.053
Always	22 (32.8)	45 (67.2)	
Frequently	60 (31.1)	133 (68.9)	
Rarely	113 (32.4)	236 (67.6)	
Never	85 (42.7)	114 (57.3) ^b	
Tool to stay updated			0.040
OPL CE	99 (29.8)	233 (70.2) ^b	
Independent resources	157 (38.8)	248 (61.2) ^b	
Social media	17 (30.9)	38 (69.1)	
I don't use any tool	4 (57.1)	3 (42.9)	
“Reviewing a patient's medication profile and providing interventions to prevent adverse events are important aspects of the role of a pharmacist”			< 0.001
Disagree	75 (78.9)	20 (21.1)	
Neutral	35 (50.0)	35 (50.0)	
Agree	170 (26.6)	470 (73.4)	
“Patients receive adequate information about their chronic diseases from their physicians so no need for the pharmacist counselling”			< 0.001
Disagree	162 (27.7)	423 (72.3)	
Neutral	47 (48.5)	50 (51.5)	
Agree	73 (58.4)	52 (41.6)	
Rate your level of familiarity with MTM			< 0.001

Table 4 (continued)

“I am willing to attend advanced sessions for clinical guidelines to become able to be actively engaged in MTM”	Disagree/ neutral (n = 283)	Agree (n = 529)	p value ^a
Not familiar	110 (47.4)	122 (52.6)	
Not sure	75 (39.5)	115 (60.5)	
Familiar	89 (24.1)	281 (75.9)	
How often do you encounter drug-related errors?			0.012
Daily	28 (32.9)	57 (67.1)	
Weekly	57 (29.7)	135 (70.3)	
Monthly	45 (28.5)	113 (71.5)	
Rarely/never	152 (40.8)	221 (59.2) ^b	
What is the action taken when you face medication errors?			0.004
Contact physician	181 (34.0)	351 (66.0)	
Inform patient to consult physician	31 (29.0)	76 (71.0)	
Provide alternative or solution	13 (36.1)	23 (63.9)	
Depending on error severity	47 (38.8)	74 (61.2)	
No action	6 (100)	0 ^b	
Do you document medication errors at your site to authorities such as OPL?			0.684
Always	26 (39.4)	40 (60.6)	
Sometimes	29 (33.7)	57 (66.3)	
Never	215 (34.1)	415 (65.9)	
Do you have a computer software in your pharmacy?			0.582
No	40 (36.4)	70 (63.6)	
Yes	227 (33.7)	447 (66.3)	
Does your practice site have a private/semiprivate consultation area?			0.589
We have a private consultation area	140 (35.9)	250 (64.1)	
We don't have a private consultation area nor available space to create one	51 (35.2)	94 (64.8)	
We have a semiprivate consultation area	80 (32)	170 (68)	
Does your practice site have adequate workflow, time, and staff to provide MTM service?			0.005
No	88 (42.1)	121 (57.9)	
Yes	165 (31.3)	362 (68.7)	

^at test for means; Pearson Chi square test for proportions

^bCategory proportion differs significantly from other proportions at the 0.05 level

shown in a study conducted in New Zealand where medication utilization review detected a low number of clinical drug-related problems when compared to clinical medication review services [25].

In parallel, the OPL is working on establishing Good Pharmacy Practice standards within community pharmacies. Those standards will take into account all lacking elements that allow the pharmacist to apply MTM such as an adequate setting and appropriate resources.

On the other hand, it is obvious that applying mandatory MTM services in community pharmacies requires a clear legal framework and the OPL is negotiating with the relevant authorities to issue the necessary legislation. Meanwhile, the OPL has started piloting the project on 20 community pharmacies with the objective to implement the system within pharmacies willing to engage in this activity on a voluntary basis. Nevertheless, since the provision of

MTM services is time-consuming, it is expected that pharmacists might stop reviewing the patients' medications thoroughly if not appropriately remunerated by relevant authorities as it is the case in Germany [26].

Conclusion

In conclusion, Lebanese pharmacists have adequate knowledge about patient centered care and a positive attitude towards MTM services implementation; however, several barriers could arise such as inadequate time, workflow and physical space within the community pharmacies. Efforts should be exerted by the OPL to extend the role of the pharmacist and its positive effect on patient outcome.

Table 5 Factors independently associated to the willingness to attend advanced sessions for clinical guidelines to become actively engaged in MTM services (multivariable analysis)

“I am willing to attend advanced sessions for clinical guidelines to become able to be actively engaged in MTM”	aOR	95% CI	<i>p</i> value ^a
Sex			0.086
Females	1.38	0.96–1.99	
Serve 2 patients at the same time			0.088
Never	Ref		
Always	1.69	0.84–3.40	0.143
Frequently	1.65	0.98–2.78	0.061
Rarely	1.78	1.12–2.83	0.014
“Reviewing a patient’s medication profile and providing interventions to prevent adverse events are important aspects of the role of a pharmacist”			<0.001
Disagree	Ref		
Neutral	2.89	1.22–6.87	0.016
Agree	6.10	3.07–12.10	<0.001
“Patients receive adequate info about their chronic diseases from their physicians so no need for the pharmacist counselling”			0.031
Agree	Ref		
Disagree	1.68	0.95–2.97	0.077
Neutral	0.87	0.43–1.76	0.705
Rate your level of familiarity with MTM			0.007
Not familiar	Ref		
Not sure	0.70	0.43–1.14	0.149
Familiar	1.44	0.92–2.27	0.114
What is the action taken when you face medication errors?			0.764
Depending on error severity	Ref		
No action	–	–	–
Contact physician	1.41	0.84–2.36	0.195
Inform patient to consult physician	1.38	0.70–2.72	0.349
Provide alternative or solution	1.11	0.40–3.06	0.847
Does your practice site have adequate workflow, time, and staff to provide MTM service?			0.045
Yes	1.51	1.01–2.25	

aOR adjusted odds ratio

^aBinary logistic regression: Backward LR selection; Nagelkerke R² 22.7%

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Conflicts of interest We declare that the corresponding and main co-author Hala SACRE is a full-time employee at the Lebanese Order of Pharmacists, Drug Information Center Department. The author Georges SILI is the current president of the Lebanese Order of Pharmacists (non-profit position) and the author Pascale SALAMEH is the current chair (non-profit position) of the scientific committee at the Lebanese Order of Pharmacists. We have no other conflict of interest to declare.

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