

Original Research

# Attitudes of Lebanese pharmacists towards online and live continuing education sessions

Hala SACRE , Samah TAWIL , Souheil HALLIT , Aline HAJJ , Georges SILI, Pascale SALAMEH .

Received (first version): 28-Dec-2018

Accepted: 26-Apr-2019

Published online: 4-Jun-2019

## Abstract

**Background:** Continuing education (CE) is an internationally recommended approach as a lifelong learning model for pharmacists, enabling them to maintain the necessary knowledge, skills and ethical attitudes so as to remain current and competent in their practice.

**Objectives:** The objective of this study is to 1) describe factors associated with taking different types of CE courses among pharmacists in Lebanon, and 2) assess the correlation between types of CE activity and the attitude of Lebanese pharmacists (motivation and value) and their computer literacy.

**Methods:** This is a cross-sectional observational study conducted between February and May 2017, using a random sample of Lebanese pharmacists from all districts of Lebanon. All pharmacists were eligible to participate; the sample consisted of those who agreed to complete the questionnaire. The questionnaire includes questions about computer literacy, motivation and value about CE, in addition to sociodemographic characteristics of pharmacists.

**Results:** Out of the 750 questionnaires distributed, 628 (83.73%) were filled out and returned to be analyzed. The mean age of the participants was 39.04 (SD 10.57) years, 66.9% of them were females, and 41.1% of them had a bachelor degree in pharmacy and worked in Mount Lebanon. Among the 628 respondents, 567 (90.3%) have earned at least one CE credit. Of those, 5.4% took mainly online courses, 15.4% took mainly live courses and the remaining took both types of CE. Higher motivation (aOR=1.05; CI 0.994-1.109) and higher value (aOR=1.076; CI 0.968-1.197) were associated with higher odds of taking live CE courses. Higher motivation (aOR=1.07; 95%CI 0.994-1.152) was associated with higher odds of taking online CE courses. Higher motivation (aOR=1.059; 95%CI 1.006-1.114) and higher general confidence with computer use (aOR=1.058; 95%CI 1.012-1.106) were significantly associated with higher odds of taking both types of CE courses.

**Conclusions:** A high percentage of Lebanese pharmacists enrolled in the CE system, mainly driven by motivation and value of CE, in addition to a higher general confidence in computer use. Further efforts should be exerted by the Lebanese Order of Pharmacists to motivate pharmacists and help them improve their computer literacy, which is expected to improve not only enrollment in CE activities, but also the completion of their CE requirements.

## Keywords

Education, Pharmacy, Continuing; Attitude to Computers; Computer Literacy; Pharmacists; Motivation; Attitude of Health Personnel; Surveys and Questionnaires; Multivariate Analysis; Lebanon

## INTRODUCTION

Continuing education (CE) is an internationally recommended approach to lifelong learning for pharmacists and other health care professionals, enabling them to acquire the necessary knowledge, skills and ethical attitudes, while remaining current and competent in their practice.<sup>1,2</sup> Regulatory bodies in many countries have the responsibility to ensure the enrollment of health care professionals to CE programs. In a changing and

increasingly complex profession, and with rapid medical and technological advances, the need for lifelong learning for pharmacists is irrefutable as it has been shown to increase the knowledge of pharmacists about several topics of importance to their practice; this is expected to have positive effects on patients' outcomes and is motivating pharmacists to enroll in CE programs.<sup>3,4</sup> In fact, motivation is an important factor in adult learning because it is where their ideas and emotions join to fulfill personal, cultural, and spiritual commitments.<sup>5</sup>

Nevertheless, despite the importance of CE, some pharmacists are still reluctant to adhere to CE programs: several factors (lack of time, long distances, costs, etc.) constitute barriers to enroll in CE programs, and many studies evaluated these barriers and suggested solutions to overcome it.<sup>6-8</sup> Moreover, some learners feel that they are self-learners and prefer individual work over a collaborative activity: in the US, the Institute of Medicine described self-directed learning by "an approach to learning whereby the structure, planning, implementation, and evaluation of learning are initiated by the learner".<sup>9</sup> Thus, one solution to overcome barriers to live CE attendance and please self-learners was the introduction of new technologies, such as online learning: in fact, e-learning rapidly became a part of undergraduate courses and an adjunct to traditional

**Hala SACRE.** PharmD. Drug Information Center, Order of Pharmacists of Lebanon; & INSPECT-LB: Institut National de Santé Publique, Epidémiologie Clinique et Toxicologie. Beirut (Lebanon). [halasacre@hotmail.com](mailto:halasacre@hotmail.com)

**Samah TAWIL.** PharmD, MPH. Drug Information Center, Order of Pharmacists of Lebanon. Beirut (Lebanon). [samah.tawil@opl.org.lb](mailto:samah.tawil@opl.org.lb)

**Souheil HALLIT.** PharmD, MSc, MPH, PhD. INSPECT-LB: Institut National de Santé Publique, Epidémiologie Clinique et Toxicologie; & Faculty of Medicine and Medical Sciences, Holy Spirit University of Kaslik (USEK). Jounieh (Lebanon). [souheilhallit@hotmail.com](mailto:souheilhallit@hotmail.com)

**Aline HAJJ.** PharmD, PhD. Faculty of Pharmacy, Saint-Joseph University; & Laboratoire de Pharmacologie, Pharmacie Clinique et Contrôle de Qualité des Médicaments, Saint-Joseph University. Beirut (Lebanon). [aline.hajj@hotmail.com](mailto:aline.hajj@hotmail.com)

**Georges SILI.** PharmD. Drug Information Center, Order of Pharmacists of Lebanon. Beirut (Lebanon). [gmsili@hotmail.com](mailto:gmsili@hotmail.com)

**Pascale SALAMEH.** PharmD, MPH, PhD. INSPECT-LB: Institut National de Santé Publique, Epidémiologie Clinique et Toxicologie; & Faculty of Pharmacy and Faculty of Medicine, Lebanese University. Beirut (Lebanon). [pascalesalameh1@hotmail.com](mailto:pascalesalameh1@hotmail.com)

learning activities for healthcare professionals in many countries, especially Europe, USA, Australia, and Canada.<sup>10</sup> Evidence from Great Britain indicates that the majority of pharmacists were able to demonstrate they can self-direct their learning at the required level.<sup>11,12</sup> Consequently, computer skills play a major role in the preference of the type of CE activity. In Australia, pharmacists prefer self-learning online activities due to barriers of accessibility to reach conferences, in terms of time, location and cost, but the lack of confidence in using technology might still be affecting the choice of pharmacists regarding the type of CE programs.<sup>13</sup>

In Lebanon, the total number of registered pharmacists is 7391 with 61.1% females, and the highest percentage of pharmacists work in a community setting (47.2%). In January 2014, the Lebanese Order of Pharmacists (OPL, the official pharmacists' association in Lebanon) started implementing the law number 190 that was enacted in November 18, 2011, on mandatory CE to Lebanese pharmacists.<sup>14</sup> This law stipulates that all pharmacists living in Lebanon and registered with the OPL are required to complete 15 CE credits per year of which at least 5 should be live, in order not to lose their registration with to the OPL. In Lebanon, registration with the OPL is mandatory to practice pharmacy after earning a pharmacy degree and passing the national examination termed "colloquium".<sup>15,16</sup>

To help pharmacists complete their live requirements, the OPL organized scientific annual congresses, professional days and conferences in Beirut and remote regions. No tests are performed nor required to earn credits related to these live activities, but the attendance is strictly monitored. The OPL also acquired a Learning Management System (LMS) for online courses of interest to many sectors of the profession, where participants must pass a test (passing grade 80%) after taking the course. This LMS, available through the OPL e-Library platform, records all the activities and allows generating reports with detailed activity per pharmacist. It also allows the administrator to add external activities (not organized by the OPL) so all the credits can be retrieved in one file. It is accessible from any connected device (phone, tablet or computer) thus, pharmacists can take their required credits anywhere anytime.<sup>17</sup> All CE activities (online and live) are offered to the pharmacists free of charge, as stipulated by the law.

There are few published studies in Lebanon showing the extent to which Lebanese pharmacists from different professional sectors are currently involved in CE programs, their value and motivation towards CE, and the type of CE activities they prefer. For this sake, the objective of the present study is to 1) describe factors associated with taking different types of CE courses among pharmacists in Lebanon, and 2) assess the correlation between types of CE activities and the attitude of Lebanese pharmacists (motivation and value) and their computer literacy.

## METHODS

### Study Design

This is a cross-sectional observational study conducted between February and May 2017, using a random sample of Lebanese pharmacists from all districts of Lebanon. All

pharmacists were eligible to participate; the sample consisted of those who agreed to complete the questionnaire.

### Data collection

Data collection was done by a team of pharmacists who were not related to the study. Prior to the questionnaire administration, they explained the study objectives that are stated at the beginning of the questionnaire with no further information to avoid influencing respondents. After obtaining an oral approval, the participant was handed the self-administered questionnaire. The investigator remained at the disposition of the participant for any clarification needed. Each questionnaire required 15 minutes to complete.

### Sample size and questionnaire distribution

According to the Epi info sample size calculations, providing a population size of 7391 pharmacists (OPL, 2017), a confidence level of 95%, a margin of error of 4%, and since 67% of the pharmacists have enrolled in the CE system (OPL official reports, 2017), a minimal sample of 495 pharmacists was targeted. Based on a comprehensive list of all registered pharmacists provided by the OPL, the questionnaire was distributed to a random sample of 750 pharmacists out of a total of 7391 pharmacists living in Lebanon to take refusals into account; 628 (83.73%) pharmacists filled out and returned the questionnaire.

### Questionnaire

The questionnaire was developed and reviewed by ten experienced academics and pharmacy practitioners. It was then piloted on a sample of 10 pharmacists prior to its finalization and distribution. The pilot study revealed no need for modification; its results were thus included in the study. The final version of the questionnaire is presented in Appendix.

The questionnaire comprised four distinct sections. Section 1 clarified socio-demographic characteristics, including years of experience in pharmacy practice, the number of working hours per day, and the highest degree achieved. Section 2 was designed to obtain information about technology and computer literacy; questions included were about the pharmacist's available connected device, the type of smart phone owned, time spent over the internet per day, and some questions about difficulty accessing the OPL e-library and LMS platform to take online courses. In addition, the general confidence with computer use scale<sup>18</sup>, composed of twelve items, was used to assess computer literacy among community pharmacists. The answers were scored according to a Likert scale (1 for strongly disagree and 5 for strongly agree). The total score was computed by adding the answers to all questions; higher scores would indicate higher computer literacy. Section 3 was designed to assess the pharmacists' communication with OPL, by asking questions about having the OPL mobile application, reading messages the OPL sends through the application or by text message, if the pharmacist is aware about the number of CE credits earned to date and to be completed by the end of December 2019. Section 4 assessed questions about CE. Four questions were used to assess how much the pharmacist values CE and eight questions to assess his/her motivation to enroll in

a CE program respectively.<sup>17,19</sup> For motivation and value of CE, questions were summarized into indices: one for motivation, and one for value. Moreover, questions about reasons for rarely/not adhering to CE were included as well.

### Major variables

The major dependent variables were enrolling in the CE system, defined as the earning of at least one CE credit, taking mainly online courses versus no (includes taking live courses, mixed courses, and not taking any CE), taking mainly live courses versus no (includes taking online courses, mixed courses, and not taking any CE). The major independent variables were: motivation for CE, value of CE and computer literacy, as defined in the abovementioned section.

### Statistical analysis

Statistical analyses were performed using SPSS version 23 (IBM SPSS Software, Chicago, IL, USA). Descriptive statistics were calculated using mean and standard deviation for continuous measures, counts and percentages for categorical variables.

To confirm the questionnaire construct validity in the Lebanese population, a factor analysis was launched using the principal component analysis technique, with a promax rotation for the motivation, value and general confidence with computer use scales since the extracted factors were found to be significantly correlated. The Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity were ensured to be adequate. The retained number of factors corresponded to Eigenvalues higher than one. Moreover, Cronbach's alpha was recorded for reliability analysis for the different scales. This maneuver was conducted respectively for motivation, value and confidence with computer use scales.

The data was not normally distributed; however, having a big sample size would not affect the use of parametric tests.<sup>20</sup> In the bivariate analysis, the Student t-test was used to compare the means of 2 groups, whereas the ANOVA test was used to compare between 3 or more means. The Pearson correlation coefficient was used to correlate between quantitative variables.

A multinomial regression was conducted using a stepwise method, and taking the type of CE done (none, live only, online only and both types) as the dependent variable. The significance level for variables entering in the multinomial regression model was set at 0.2 to decrease confounding. Adjusted odds ratios (aOR) and 95% confidence intervals (95% CIs) were calculated. A p-value of 0.05 was considered statistically significant.

### Ethical aspect

The Lebanese University ethics committee waived the need for approval as the study was observational and respected participants' confidentiality.

## RESULTS

### Sociodemographic characteristics

Out of the 750 questionnaires distributed, 628 (83.73%) were filled out and returned to be analyzed. Among the

628 respondents, 567 (90.3%) have earned at least one CE credit. Of those, 5.4% declared taking mainly online courses, 15.4% mainly live courses and the remaining both types of CE.

The sociodemographic characteristics of the participants are summarized in Table 1. The mean age of the participants was 39.04 (SD 10.57) years, 66.9% of them were females, and 41.1% of them had a bachelor degree in pharmacy and worked in Mount Lebanon. In addition, the highest percentage of interviewed pharmacists (62.4%) were community pharmacy employers, with a mean years of practicing pharmacy for the whole sample of 13.32 years, a mean of 6.01 working days per week and a mean of 10.56 working hours per day. The results also showed that 373 (59.4%) owned a computer, 355 (56.5%) owned a smart phone. The description of other characteristics of participants can be found in Table 2.

### Scales validity and reliability

The description of the answers to each question of the motivation, value and general confidence of computer use can be found in Online appendix Table 1. The Cronbach alpha of the value index was 0.686 and that of the motivation scale was 0.800. As for the computer literacy scale, it was 0.716. The factor analyses conducted on the

		N (%)
Gender	Male	208 (33.1%)
	Female	420 (66.9%)
Education level	Bachelor of Science in Pharmacy	258 (41.1%)
	Pharmacy Doctor	249 (39.6%)
	Masters	98 (15.6%)
	Philosophy Doctor	23 (3.7%)
University you graduated from	Lebanese University	115 (18.3%)
	Saint Joseph University	147 (23.4%)
	Beirut Arab University	89 (14.2%)
	Lebanese American University	55 (8.8%)
	Lebanese International University	61 (9.7%)
	American University of Beirut	3 (0.5%)
	Outside Lebanon	157 (25%)
Work location	Not working yet	18 (2.9%)
	Beirut	92 (14.6%)
	Mount Lebanon	258 (41.1%)
	North Lebanon	20 (3.2%)
	South Lebanon	120 (19.1%)
	Bekaa	119 (18.9%)
Sector of work	Not working yet	18 (2.9%)
	Community employer	391 (62.4%)
	Community employee	122 (19.5%)
	Hospital/clinical	28 (4.5%)
	Scientific office/medical representative	37 (5.9%)
	Academia	11 (1.8%)
	Public sector	14 (2.2%)
	Industry	6 (1%)
		<b>Mean ± SD</b>
Age (in years)		39.04 ± 10.57
Number of years practicing pharmacy		13.32 ± 9.42
Number of working days per week		6.01 ± 1.11
Number of working hours per day		10.56 ± 6.03

Owning a computer	No	255 (40.6%)
	Yes	373 (59.4%)
Owning a smart phone	No	273 (43.5%)
	Yes	355 (56.5%)
Owning a tablet	No	565 (90%)
	Yes	63 (10%)
Connected to the internet for at least 4 hours per day	No	54 (8.6%)
	Yes	549 (87.4%)
	Only when needed	25 (4%)
Ease of accessing OPL e-library account	Never tried	70 (11.1%)
	Easy	242 (38.5%)
	Intermediate	211 (33.6%)
	Difficult	105 (16.7%)
Ease of accessing OPL LMS platform	Never tried	94 (15%)
	Easy	205 (32.6%)
	Intermediate	216 (34.4%)
	Difficult	113 (18%)
Having OPL mobile application	No	96 (15.3%)
	Yes	532 (84.7%)
Read OPL messages through the application or by text message	No	27 (4.3%)
	Yes	515 (82%)
	Sometimes	86 (13.7%)
Know the number of CE credits earned to date	No	294 (46.8%)
	Yes	216 (34.4%)
	More or less	118 (18.8%)
Know the number of CE credits to be completed by December 2019	No	311 (49.5%)
	Yes	198 (31.5%)
	More or less	119 (18.9%)
Completed any type of CE	No	61 (9.7%)
	Yes	567 (90.3%)
Completing online CE sessions only	No	594 (94.6%)
	Yes	34 (5.4%)
Completing live CE sessions only	No	531 (84.6%)
	Yes	97 (15.4%)

general confidence scale with computer use, the value and motivation scales are presented in Online appendix Table 2.

Out of all the items of general confidence with computer use scale, none of the items was removed. All items could be extracted from the list, since no items over-correlated to each other ( $r > 0.9$ ), had a low loading on factors ( $< 0.3$ ) or because of a low communality ( $< 0.3$ ). The factor analysis for the general confidence with computer use scale was run over the whole sample (Total  $n = 628$ ). The scale items converged over a solution of two factors that had an Eigenvalue over 1, explaining a total of 57.11% of the variance. A Kaiser-Meyer-Olkin measure of sampling adequacy of 0.878 was found, with a significant Bartlett's test of sphericity ( $p < 0.001$ ).

Out of all the items of the value scale, none of the items was removed. All items could be extracted from the list,

since no items over-correlated to each other ( $r > 0.9$ ), had a low loading on factors ( $< 0.3$ ) or because of a low communality ( $< 0.3$ ). The factor analysis for the general confidence with computer use scale was run over the whole sample (Total  $n = 628$ ). The scale items converged over a solution of one factor that had an Eigenvalue over 1, explaining a total of 67.62% of the variance. A Kaiser-Meyer-Olkin measure of sampling adequacy of 0.773 was found, with a significant Bartlett's test of sphericity ( $p < 0.001$ ).

Out of all the items of the motivation scale, none of the items was removed. All items could be extracted from the list, since no items over-correlated to each other ( $r > 0.9$ ), had a low loading on factors ( $< 0.3$ ) or because of a low communality ( $< 0.3$ ). The factor analysis for the general confidence with computer use scale was run over the whole sample (Total  $n = 628$ ). The scale items converged over a solution of two factors that had an Eigenvalue over 1, explaining a total of 60.86% of the variance. A Kaiser-Meyer-Olkin measure of sampling adequacy of 0.868 was found, with a significant Bartlett's test of sphericity ( $p < 0.001$ ).

#### Bivariate analysis

The bivariate analysis of factors associated with enrolling in the CE program showed that significantly higher means value and motivation indices were found in pharmacists who enrolled in the CE program compared to those who did not. Significantly higher percentages of pharmacists with PharmD (41.3%) or PhD (3.9%) degrees, in South Lebanon (44.1% vs. 17.7%), who found the access to OPL e-library (40.2%) and OPL LMS platform (34.9%), and who had the OPL mobile application (87.3% vs. 60.7%), were found among enrolled compared to those who were not enrolled. Finally, there were more pharmacists aware of the number of credits to be completed by December 2019 and of the number of credits they earned so far among pharmacists enrolled in the CE program compared with those who did not (34.4% vs. 4.9% and 37.4% vs. 6.6%), respectively (Table 3).

The bivariate analysis of factors associated with taking online CE credits showed that significantly higher means general confidence with computer use (38.38 vs. 34.86), number of working days per week (6.50 vs. 5.98) and number of working hours per day (12.33 vs. 10.46) were found in pharmacists taking online CEs compared to those who were not. In addition, significantly lower mean age (35.02 vs. 39.27) and mean number of years practicing pharmacy (9.54 vs. 13.53) were found in pharmacists taking online CEs compared to those who were not. Moreover, a significantly higher percentage of pharmacists with a Pharm.D. degree, graduating from outside Lebanon, working in South Lebanon, finding the access to the OPL e-library easy, and less aware of the number of CE credits earned so far, took online CEs among those who took online CEs. Finally, a significantly higher percentage of male pharmacists were found among pharmacist took online CEs compared to those who did not (61.8% vs. 31.5%) (Table 3).

Table 3. Bivariate analysis of factors associated with taking vs. not taking online CE mainly, taking vs. not taking live CE mainly and those enrolling or not in CE in general.										
		Did not take online CE N=594 (94.6%)	Took online CE N=34 (5.4%)	p-value	Did not take live CE N=531 (84.6%)	Took live CE N=97 (15.4%)	p-value	Did not enroll in CE N=61 (9.7%)	Enrolled in CE N=567 (90.3%)	p-value
<b>Value</b>		14.25 ± 3.40	13.70 ± 3.39	0.364	14.22 ± 3.38	14.20 ± 3.49	0.962	12.90 ± 4.54	14.36 ± 3.22	<b>0.001</b>
<b>Motivation</b>		31.28 ± 6.18	31.50 ± 4.19	0.840	31.15 ± 6.25	32.05 ± 5.05	0.183	29.04 ± 9.36	31.53 ± 5.58	<b>0.046</b>
<b>Computer literacy</b>		34.86 ± 5.64	38.38 ± 5.65	<b>&lt;0.001</b>	35.02 ± 5.78	35.19 ± 5.19	0.790	34.62 ± 5.59	35.10 ± 5.70	0.534
<b>Age (in years)</b>		39.27 ± 10.68	35.02 ± 7.36	<b>0.003</b>	39.74 ± 10.72	35.21 ± 8.78	<b>&lt;0.001</b>	35.23 ± 9.33	35.02 ± 7.36	0.914
<b>Number of years of practicing pharmacy</b>		13.53 ± 9.50	9.54 ± 6.88	<b>0.003</b>	13.93 ± 9.62	9.93 ± 7.41	<b>&lt;0.001</b>	10.09 ± 8.81	9.54 ± 6.88	0.758
<b>Number of working days per week</b>		5.98 ± 1.12	6.50 ± 0.66	<b>0.008</b>	6.03 ± 1.05	5.87 ± 1.37	0.272	6.16 ± 1.11	6.50 ± 0.66	0.114
<b>Number of working hours per day</b>		10.46 ± 5.82	12.33 ± 8.85	0.079	10.70 ± 6.20	9.84 ± 4.98	0.197	10.98 ± 5.99	12.33 ± 8.85	0.404
<b>Educational level</b>	Bachelor Science Pharmacy	31 (50.8%)	227 (40%)	<b>0.036</b>	206 (38.8%)	52 (53.6%)	<b>0.016</b>	31 (50.8%)	227 (40%)	<b>0.036</b>
	Pharmacy Doctor	15 (24.6%)	234 (41.3%)		224 (42.2%)	25 (25.8%)		15 (24.6%)	234 (41.3%)	
	Masters' degree	14 (23%)	84 (14.8%)		81 (15.3%)	17 (17.5%)		14 (23%)	84 (14.8%)	
	Philosophy Doctor	1 (1.6%)	22 (3.9%)		20 (3.8%)	3 (3.1%)		1 (1.6%)	22 (3.9%)	
<b>University you graduated from</b>	Lebanese University	112 (18.9%)	3 (8.8%)	<b>0.007</b>	105 (19.8%)	10 (10.3%)	<b>0.003</b>	8 (13.1%)	107 (18.9%)	0.07
	Saint Joseph University	146 (24.6%)	1 (2.9%)		134 (25.3%)	13 (13.4%)		8 (13.1%)	139 (24.6%)	
	Beirut Arab University	85 (14.3%)	4 (11.8%)		74 (14%)	15 (15.5%)		10 (16.4%)	79 (14%)	
	Lebanese American University	50 (8.4%)	5 (14.7%)		44 (8.3%)	11 (11.3%)		11 (18%)	44 (7.8%)	
	Lebanese International University	56 (9.4%)	5 (14.7%)		44 (8.3%)	17 (17.5%)		7 (11.5%)	54 (9.5%)	
	American University of Beirut	3 (0.5%)	0 (0%)		3 (0.6%)	0 (0%)		0 (0%)	3 (0.5%)	
	Outside Lebanon	141 (23.8%)	16 (47.1%)		126 (23.8%)	31 (32%)		17 (27.9%)	140 (24.7%)	
<b>Work location</b>	Not working yet	19 (3.2%)	0 (0%)	<b>0.003</b>	14 (2.6%)	5 (5.2%)	0.066	19 (3.2%)	0 (0%)	<b>0.003</b>
	Beirut	89 (15%)	3 (8.8%)		71 (13.4%)	21 (21.6%)		89 (15%)	3 (8.8%)	
	Mount Lebanon	250 (42.1%)	8 (23.5%)		229 (43.1%)	29 (29.9%)		250 (42.1%)	8 (23.5%)	
	North Lebanon	20 (3.4%)	0 (0%)		18 (3.4%)	2 (2.1%)		20 (3.4%)	0 (0%)	
	South Lebanon	105 (17.7%)	15 (44.1%)		102 (19.2%)	18 (18.6%)		105 (17.7%)	15 (44.1%)	
	Bekaa	111 (18.7%)	8 (23.5%)		97 (18.3%)	22 (22.7%)		111 (18.7%)	8 (23.5%)	

Table 3 (Cont.). Bivariate analysis of factors associated with taking vs. not taking online CE mainly, taking vs. not taking live CE mainly and those enrolling or not in CE in general.										
		Did not take online CE N=594 (94.6%)	Took online CE N=34 (5.4%)	p-value	Did not take live CE N=531 (84.6%)	Took live CE N=97 (15.4%)	p-value	Did not enroll in CE N=61 (9.7%)	Enrolled in CE N=567 (90.3%)	p-value
Sector of work	Not working yet	18 (3%)	0 (0%)	0.506	13 (2.5%)	5 (5.2%)	0.188	2 (3.3%)	16 (2.8%)	0.188
	Community pharmacy employer	365 (61.6%)	26 (76.5%)		342 (64.5%)	49 (50.5%)		38 (62.3%)	353 (62.4%)	
	Community pharmacy employee	115 (19.4%)	7 (20.6%)		101 (19.1%)	21 (21.6%)		18 (29.5%)	104 (18.4%)	
	Hospital/clinical	27 (4.6%)	1 (2.9%)		24 (4.5%)	4 (4.1%)		0 (0%)	28 (4.9%)	
	Scientific office/medical representative	37 (6.2%)	0 (0%)		27 (5.1%)	10 (10.3%)		3 (4.9%)	34 (6%)	
	Academia	11 (1.9%)	0 (0%)		6 (1.1%)	5 (5.2%)		0 (0%)	11 (1.9%)	
	Public sector (MOPH)	14 (2.4%)	0 (0%)		13 (2.5%)	1 (1%)		0 (0%)	14 (2.5%)	
Connected to the internet for at least 4 hours per day	Industry	6 (1%)	0 (0%)		4 (0.8%)	2 (2.1%)		0 (0%)	6 (1.1%)	
	No	48 (8.1%)	6 (17.6%)	0.151	72 (13.6%)	7 (7.2%)	0.083	3 (4.9%)	51 (9%)	0.130
	Yes	522 (87.9%)	27 (79.4%)		459 (86.4%)	90 (92.8%)		53 (86.9%)	496 (87.5%)	
Ease to access OPL e-library account	As needed	24 (4%)	1 (2.9%)		0 (0%)	0 (0%)		5 (8.2%)	20 (3.5%)	
	Never tried	24 (39.3%)	46 (8.1%)	<0.001	47 (8.9%)	23 (23.7%)	<0.001	24 (39.3%)	46 (8.1%)	<0.001
	Easy	14 (23%)	228 (40.2%)		230 (43.3%)	12 (12.4%)		14 (23%)	228 (40.2%)	
	Intermediate	7 (11.5%)	204 (36%)		181 (34.1%)	30 (30.9%)		7 (11.5%)	204 (36%)	
Ease to access OPL LMS platform	Difficult	16 (26.2%)	89 (15.7%)		73 (13.7%)	32 (33%)		16 (26.2%)	89 (15.7%)	
	Never tried	88 (14.8%)	6 (17.6%)	0.150	63 (11.9%)	31 (32%)	<0.001	33 (54.1%)	61 (10.8%)	<0.001
	Easy	200 (33.7%)	5 (14.7%)		196 (36.9%)	9 (9.3%)		7 (11.5%)	198 (34.9%)	
	Intermediate	201 (33.8%)	15 (44.1%)		194 (36.5%)	22 (22.7%)		7 (11.5%)	209 (36.9%)	
Gender	Difficult	105 (17.7%)	8 (23.5%)		78 (14.7%)	35 (36.1%)		14 (23%)	99 (17.5%)	
	Male	187 (31.5%)	21 (61.8%)	<0.001	178 (33.5%)	30 (30.9%)	0.618	26 (42.6%)	182 (32.1%)	0.097
OPL mobile application	Female	407 (68.5%)	13 (38.2%)		353 (66.5%)	67 (69.1%)		35 (57.4%)	385 (67.9%)	
	No	91 (15.3%)	5 (14.7%)	0.923	77 (14.5%)	19 (19.6%)	0.200	24 (39.3%)	72 (12.7%)	<0.001
Read OPL messages	Yes	503 (84.7%)	29 (85.3%)		454 (85.5%)	78 (80.4%)		37 (60.7%)	495 (87.3%)	
	No	24 (4%)	3 (8.8%)	0.171	22 (4.1%)	5 (5.2%)	0.871	5 (8.2%)	22 (3.9%)	0.084
	Yes	491 (82.7%)	24 (70.6%)		437 (82.3%)	78 (80.4%)		44 (72.1%)	471 (83.1%)	
Know number of credits to be completed by December 2019	Sometimes	79 (13.3%)	7 (20.6%)		72 (13.6%)	14 (14.4%)		12 (19.7%)	74 (13.1%)	
	No	288 (48.5%)	23 (67.6%)	0.094	239 (45%)	72 (74.2%)	<0.001	53 (86.9%)	258 (45.5%)	<0.001
	Yes	191 (32.2%)	7 (20.6%)		184 (34.7%)	14 (14.4%)		3 (4.9%)	195 (34.4%)	
Aware of the number of CE credits earned so far	More or less	115 (19.4%)	4 (11.8%)		108 (20.3%)	11 (11.3%)		5 (8.2%)	114 (20.1%)	
	No	268 (45.1%)	26 (76.5%)	0.002	221 (41.6%)	73 (75.3%)	<0.001	53 (86.9%)	241 (42.5%)	<0.001
	Yes	210 (35.4%)	6 (17.6%)		201 (37.9%)	15 (15.5%)		4 (6.6%)	212 (37.4%)	
	More or less	116 (19.5%)	2 (5.9%)		109 (20.5%)	9 (9.3%)		4 (6.6%)	11 (20.1%)	

Table 4. Multivariable analysis: multinomial logistic regression					
<b>Model 1: Comparing participants taking live CEs versus no CEs as the dependent variable.</b>		<b>p-value</b>	<b>aOR</b>	<b>95%CI</b>	
Motivation score		0.080	1.05	0.994	1.109
Value score		0.176	1.076	0.968	1.197
<b>Model 2: Comparing participants taking online CEs versus no CEs as the dependent variable.</b>		<b>p-value</b>	<b>aOR</b>	<b>95%CI</b>	
Motivation score		0.072	1.070	0.994	1.152
<b>Model 3: Comparing participants who enrolled vs. those who did not in CE program.</b>		<b>p-value</b>	<b>ORa</b>	<b>95%CI</b>	
Value score		0.105	1.087	0.983	1.203
Motivation score		0.030	1.059	1.006	1.114
General confidence with computer use (Fogarty score)		0.013	1.058	1.012	1.106

The bivariate analysis of factors associated with taking live CE credits or not, showed that significantly higher mean age (39.74 vs. 35.21) and number of years of practicing pharmacy (13.93 vs. 9.93) were found in pharmacists who did not take live CEs compared to those who did. Among those who took live CEs compared to those who did not, we found a higher percentage of pharmacists with a BS Pharmacy (53.6% vs. 38.8%), who graduated from LIU (17.5% vs. 8.3%), who never tried the OPL e-library account (32% vs. 11.9%), who do not own a computer (23.7% vs. 12.3%), who did not know the number of credits to be completed by December 2019 (74.2% vs. 45%) and who were aware of the number of credits they earned so far (75.3% vs. 41.6%) (Table 3).

#### Multivariable analysis

The results of the multinomial logistic regression analyses are shown in Table 4. A first logistic regression, comparing participants taking live CEs only versus no CEs as the dependent variable, showed that higher motivation to CE (aOR=1.05) and higher value of CE (aOR=1.076) were associated with higher odds of doing live CEs (Table 4, Model 1). When comparing participants doing online CEs only to those who did not do any CEs, the results showed that higher motivation to CE (ORa=1.07) was associated with higher odds of doing online CEs (Table 4, Model 2). When comparing participants who do both live and online CEs versus those not doing any CEs, the results showed that higher motivation to CE (ORa=1.059) and higher general confidence with computer use (computer literacy) (ORa=1.058) were significantly associated with higher odds of doing both types of CEs (Table 4, Model 3).

#### DISCUSSION

In this study, we found that significantly higher value and motivation indices were associated with enrolling in the CE system. Higher motivation to do CE and higher value of CE were associated with higher odds of doing live CE. Higher motivation to do CE was associated with higher odds of doing online CE. Also, a higher motivation to do CE was significantly associated with higher odds of doing both types of CEs.

#### Limitations and strengths

This study has several limitations. To start with, there is an over-representation of pharmacists who have enrolled in the CE system (90.3% in the sample vs. 67% in OPL official reports): this could be explained by the fact that the majority of respondents are pharmacists interested in CE programs. However, we do not think that this would affect

our results in a major way. Second, our results might be prone to self-report bias. The pharmacists subjectively self-assessed themselves in terms of computer skills; therefore, the findings might be overestimated as a result of potential social desirability bias. Furthermore, there were items that required the pharmacists to recall some historical data, thereby predisposing the findings to recall bias. Another major limitation was the participation of many interviewers in data collection, which may lead to interviewer bias. For this sake, prior training of the interviewers and the use of a single translated version of the questionnaire were applied to limit this type of bias. Not to forget the workload at some pharmacies that prevented them from filling out accurately the questionnaire, which ended up in lack of information. This study is also limited by the fact it is evaluating the early stages of applying the CE system, with the possibility that results could change with time. Therefore, to assess long-term outcomes of the program, further research needs to be undertaken to learn about sustained impact on skills and use of the Internet as a source of information for practice. Finally, a residual confounding might be possible due to the fact that some variables were not studied in this analysis.

Despite these limitations, this study is among the few studies conducted in the region to assess the effect of computer literacy, motivation for CE and value of CE among pharmacists, on enrollment in a CE program. Moreover, the survey was distributed on the six governorates of Lebanon which may increase the generalizability of the results.

#### Interpretation of findings

These results are similar to those reported through other studies where motivation increased participation to CE; several researchers explain these results using the self-determination theory presented by Deci & Ryan, where tendency to grow is a natural process of human beings; it finds its roots in intrinsic and extrinsic motivation, while amotivation is a state of passive behavior, where humans are unable to accomplish required outcomes.<sup>21,22</sup> Moreover, studies state that learning and motivation should be well integrated to ensure that professionals maintain a positive attitude towards CE and meet their needs for current practice.<sup>23</sup>

A significantly higher percentage of pharmacists with a PharmD (41.3%) or PhD (3.9%) degree enrolled in the CE program compared with those who did not. This can also be explained by the self-determination theory, since people who voluntarily achieve higher degrees of education (although not officially required) are the ones who mainly

have an intrinsic autonomous motivation for all types of education, driven by the interest and joy in the task itself.<sup>22</sup>

Moreover, a significantly higher percentage of pharmacists who found the access to OPL e-library (40.2%) and OPL LMS platform (34.9%) easy, enrolled in the CE program compared with those who did not. In parallel, the bivariate analysis showed that a significantly higher mean of computer literacy (38.38 vs. 34.86) was found among pharmacists doing online CE credits; this result was confirmed in multivariable analysis for all types of CE, where a higher general confidence with computer use (aOR=1.058) was significantly associated with higher odds of doing both types of CEs. This finding is expected, given that using the OPL e-library requires some basic computer skills, and people with very low computer literacy would not undergo such endeavor. Furthermore, people in remote areas have difficulties to connect to the Internet since they have access only to low-speed Internet when available. Our results are similar to those of Chiu et al. in a study conducted in Taiwan in 2016 showing that internet self-efficacy was essential to increasing self-regulated learning in online continuing education, especially among older pharmacists.<sup>24</sup>

#### Future research

Since we did not assess the factors associated with value and motivation of pharmacists to enroll in the CE program, further research is suggested focusing on the following factors to meet pharmacists' expectations: quality of

instruction, quality of curriculum, relevance and pragmatism, interactive classrooms and effective management practices, progressive assessment and timely feedback, self-directedness, conducive learning environment, and effective academic advising practices. All these factors proved to be crucial according to previous studies among adult learners.<sup>5,25</sup> Furthermore, assessing autonomous and controlled motivation types would be essential to further increase motivation types among Lebanese Pharmacists.<sup>26</sup>

#### CONCLUSIONS

A high percentage of Lebanese pharmacists earned at least one CE credit, mainly driven by motivation and value of CE, in addition to a higher general confidence in computer use. Further efforts should be exerted by the OPL to motivate pharmacists and help them improve their computer literacy, which is expected to improve not only enrollment in CE activities, but also the completion of their CE requirements.

#### CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

#### FUNDING

None.

## References

1. Rouse MJ. Continuing professional development in pharmacy. *Am J Health Syst Pharm*. 2004;61(19):2069-2076. <https://doi.org/10.1093/ajhp/61.19.2069>
2. International Pharmaceutical Federation – FIP (2014). Continuing Professional Development/Continuing Education in Pharmacy: Global Report. The Hague, The Netherlands: International Pharmaceutical Federation. Available at: [https://www.fip.org/files/fip/PharmacyEducation/CPD\\_CE\\_report/FIP\\_2014\\_Global\\_Report\\_CPD\\_CE\\_online\\_version.pdf](https://www.fip.org/files/fip/PharmacyEducation/CPD_CE_report/FIP_2014_Global_Report_CPD_CE_online_version.pdf) (accessed Oct 3, 2018).
3. ASHP statement on the pharmacist's role in informatics. *Am J Health Syst Pharm*. 2007;64(2):200-203. <https://doi.org/10.2146/ajhp060364>
4. Forsetlund L, Bjørndal A, Rashidian A, Jamtvedt G, O'Brien MA, Wolf F, Davis D, Odgaard-Jensen J, Oxman AD. Continuing education meetings and workshops: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev*. 2009;(2):CD003030. <https://doi.org/10.1002/14651858.CD003030.pub2>
5. Sogunro OA. Motivating factors for adult learners in higher education. *Int J Higher Educ*. 2014;4(1):22-37. <https://doi.org/10.5430/ijhe.v4n1p22>
6. Alkateeb FM, Attarabeen OF, Alameddine S. Assessment of Texan pharmacists' attitudes, behaviors, and preferences related to continuing pharmacy education. *Pharm Pract (Granada)*. 2016;14(3):769. <https://doi.org/10.18549/PharmPract.2016.03.769>
7. Driesen A, Leemans L, Baert H, Laekeman G. Flemish community pharmacists' motivation and views related to continuing education. *Pharm World Sci*. 2005;27(6):447-452. <https://doi.org/10.1007/s11096-005-0950-7>
8. Wilbur K. Continuing professional pharmacy development needs assessment of Qatar pharmacists. *Int J Pharm Pract*. 2010;18(4):236-241. <https://doi.org/10.1111/j.2042-7174.2010.00034.x>
9. Institute of Medicine. Redesigning continuing education in the health professions. Washington (DC): National Academies Press (US); 2010.
10. Brown MC, Kotlyar M, Conway JM, Seifert R, St. Peter JV. Integration of an Internet-based medical chart into a pharmacotherapy lecture series. *Am J Pharm Educ*. 2007;71(3):53.
11. Hull H, Rutter P. A cross-sectional survey of UK community pharmacists' views on continuing education and continuing professional development. *Int J Pharm Educ*. 2003;1(2):12.
12. Mottram DR, Rowe P, Gangani N, Al-Khamis Y. Pharmacists' engagement in continuing education and attitudes towards continuing professional development. *Pharm J*. 2002;269(7221):618-622.
13. Marriott JL, Duncan GJ, Namara KPM. Barriers to pharmacist participation in continuing education in Australia. *Pharm Educ*. 2007;7(1):11-17.



14. Lebanese Republic. Law 190 related to the mandatory continuing education of pharmacists in Lebanon. Available through the Lebanese Order of Pharmacists' website. <http://opl.org.lb/newdesign/lawsandregulations.php>. (accessed Oct 3, 2018).
15. Lebanese Order of Pharmacists website. Available at: <http://www.Opl.Org.Lb> (accessed Oct 4, 2018).
16. Dib JG, Saade S, Merhi F. Pharmacy practice in Lebanon. *Am J Health Syst Pharm*. 2004 Apr 15;61(8):794-795. <https://doi.org/10.1093/ajhp/61.8.794>
17. Lebanese Order of Pharmacists. Learning Management System. Available at: <https://swankhealth.ae/default.aspx> (accessed Oct 4, 2018).
18. Fogarty G, Cretchley P, Harman C, Ellerton N, Konki N. Validation of a questionnaire to measure mathematics confidence, computer confidence, and attitudes towards the use of technology for learning mathematics. *Math Educ Res J*. 2001;13(2):154-160. <https://doi.org/10.1007/BF03217104>
19. Young AM. A prescription for reframing continuing pharmacy education in Massachusetts, Northeastern University; 2012.
20. Lumley T, Diehr P, Emerson S, Chen L. The importance of the normality assumption in large public health data sets. *Annu Rev Public Health*. 2002;23:151-169. <https://doi.org/10.1146/annurev.publhealth.23.100901.140546>
21. Tsoi STA. The Role of Motivation in Continuing Education for Pharmacists, University Utrecht; 2017.
22. Deci EL, Ryan RM. Handbook of self-determination research. University Rochester Press; 2002.
23. McCombs BL. Motivation and lifelong learning. *Educ Psychol*. 1991;26(2):117-127.
24. Chiu YL, Liang JC, Mao PCM, Tsai CC. Improving Health Care Providers' Capacity for Self-Regulated Learning in Online Continuing Pharmacy Education: The Role of Internet Self-Efficacy. *J Contin Educ Health Prof*. 2016;36(2):89-95. <https://doi.org/10.1097/CEH.0000000000000066>
25. Namara KPM, Duncan GJ, McDowell J, Marriott JL. Community pharmacists' preferences for continuing education delivery in Australia. *J Contin Educ Health Prof*. 2009;29(1):52-57. <https://doi.org/10.1002/chp.20006>
26. Gelayee DA, Mekonnen GB, Birarra MK. Involvement of community pharmacists in continuing professional development (CPD): a baseline survey in Gondar, Northwest Ethiopia. *Global Health*. 2018;14(1):15. <https://doi.org/10.1186/s12992-018-0334-0>