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Editorial

Scholarly publishing depends on peer reviewers

Fernando FERNANDEZ-LLIMOS, Pharmacy Practice 2017 peer reviewers.
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Abstract:
The peer-review crisis is posing a risk to the scholarly peer-reviewed journal system. Journals have to ask many potential peer reviewers to obtain a minimum acceptable number of peers accepting reviewing a manuscript. Several solutions have been suggested to overcome this shortage. From reimbursing for the job, to eliminating pre-publication reviews, one cannot predict which is more dangerous for the future of scholarly publishing. And, why not acknowledging their contribution to the final version of the article published? PubMed created two categories of contributors: authors [AU] and collaborators [IR]. Why not a third category for the peer-reviewer?

Keywords: Peer Review; Peer Review, Research; Open Access Publishing; Periodicals as Topic

In recent years, we have attended to major changes in scholarly publishing. Not so many years ago, journals printed the issues they published and distributed them by postal mail. We tend to think that this distribution targeted a reduced number of people who, somehow, paid for all the costs. Payment could be made through subscriptions, individual or institutional, or by becoming affiliated with the scientific society that published the journal. In fact, however, this is not completely true. Many of these scientific or professional societies considered publishing to be their social responsibility and published journals without any for-profit business model: the so-called gratis journals.

The advent of new technologies, such as the internet, the PDF, cheap formatting tools, and free journal management systems, have made it possible for scientific and professional societies to keep publishing their journals but also for new societies to begin the adventure of publishing for free. Gratis journals are frequently and purposefully ignored in the open access debate. Of the 9,699 journals indexed in the Directory of Open Access Journals (DOAJ) in 2017, 6,827 have no article processing charges. They are gratis journals published according to a collaborative publishing philosophy.

However, gratis journals live 'between two fires': subscription journals and APC journals. Both are owned by large corporations that publish under a for-profit business model. Many of the discussions in journalology are biased in that they take into account only these two main types of business-oriented publishers.

One of these hot topics is also one of the main problems in today's scholarly publishing: peer review. Although peer review may have a very long history[1], this process was systematically implemented in publishing only in the 1960s.[2] From that time forward, we consider "peer-reviewed journals" as synonymous with quality journals. However, we are facing a massive crisis in publishing: editors face a huge problem when trying to find high-quality peer reviewers for a manuscript. Editors have to ask many potential reviewers in order to obtain two or three who accept the task. The other potential reviewers usually decline because they are too busy at that moment. Authors should be aware that this lengthy process is responsible for the publication delay that annoys them so much.[3,4]

The peer-review crisis is posing a risk to the scholarly peer-reviewed journal system. One can find an amazing number of articles predicting the future of peer review. Publishers have also produced a report entitled "What might peer review look like in 2030".[5] It seems that, years ago, reviewers accepted collaboration for the sake of contributing to the dissemination of scientific knowledge. Then, giving credit to the reviewers became crucial. In addition, more recently, the idea of reimbursing reviewers for their service is frequently raised.[6] The absence of pre-publication review has also been presented as a solution to the peer-review crisis.

If we want the paying-to-review model, we have to consider who should pay. Copiello calculated the costs of peer review and suggested a "reward scheme for peer review".[7] He suggested that subscription journal publishers and publishers charging APC should reallocate a portion of their "two-digit profit rates". How can we control this? At the end of the day, subscribers and authors would end up paying for the peer review. And, again, we would be ignoring the existence of gratis journals.

The elimination of pre-publication peer-review is an extreme solution that has also been suggested. A post-publication review system is commonly used in some disciplines such as physics, where a researcher publishes an idea that is then critiqued by colleagues. However, a major difference between physics and

* **Fernando FERNANDEZ-LLIMOS**. PhD, PharmD, MBA.
Editor-in-chief, Pharmacy Practice. Institute for Medicines Research (iMed.ULisboa), Department of Social Pharmacy, Faculty of Pharmacy, Universidade de Lisboa. Lisbon (Portugal).
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medical or pharmaceutical fields exists: in our areas, we make decisions that affect patients and healthcare systems based on what is published. In these cases, while peer review is not a guarantee, it helps to reduce errors not only in publications but also in clinical practice.[8]

Before supporting these new systems, a thorough evaluation of their consequences in different areas should be conducted through rigorous studies. Rennie recently reminded us that "any advertised advantages of new arrangements are unsupported assertions".[9]

The shortage of peer reviewers makes no sense for many reasons. The term 'peer' is the key in this rationale. Peer means colleague, or equal. Authors and reviewers are essentially the same people with different tasks. In fact, a good peer review represents an enormous contribution to a good paper, so the contribution of peer reviewers should be recognized in the final version of the paper. The first barrier to giving credit is the maintenance of the anonymized review. While many journals are moving to open the review process, or testing the feasibility[10] of doing so, others have started offering the ability to conceal the process even more.[11] Solutions such as Publons (publons.com) were created to register assignments completed by reviewers, and curriculum platforms such as ORCID (orcid.org) are now importing these records. If we take into consideration that a peer reviewer is a contributor to the final version of the paper, why not acknowledge that contribution in the same way that we acknowledge collaborators in PubMed? Since March 2008, NLM includes the names of the individual collaborators that make up a collective authorship in a field called 'Investigator'.[12] Thus, NLM currently differentiates two levels of contributorship to an article: authors [AU] and investigators [IR] (displayed as collaborators). Why not include a third level of contributorship, the reviewer?

Pharmacy Practice wants to recognize the extremely important role of reviewers by publishing an editorial in the first issue of each year with a collective authorship including all the reviewers that contributed during the previous year.

Pharmacy Practice 2017 peer reviewers

Two reviews

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Denise Yeung, Parkland Health & Hospital System, United States

Kazeem B. Yusuff, King Faisal University, Saudi Arabia

Mohamed E. El Zowalaty, Jazan University, Saudi Arabia

One review

Eyob D. Adane, Ohio Northern University, United States

Sinaa Al-Aqeel, King Saud University, Saudi Arabia

Ali Azeez Al-Jumaili, University of Iowa, United States

Edita Alili-Idrizi, State University of Tetovo, Macedonia

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Francesca Wirth, University of Malta, Malta

Amber Young, University of Otago, New Zealand

Tracy Zembles, Children's Hospital of Wisconsin, United States

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Original Research

Development and validation of a survey instrument to measure factors that influence pharmacist adoption of prescribing in Alberta, Canada

Lisa M. GUIRGUIS, Christine A. HUGHES, Mark J. MAKOWSKY, Cheryl A. SADOWSKI, Theresa J. SCHINDEL, Nese YUKSEL, Chowdhury F. FARUQUEE.

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Abstract

Objective: Study objectives were to develop a questionnaire to assess factors influencing pharmacists' adoption of prescribing (i.e., continuing, adapting or initiating therapy), describe use of pre-incentive and mixed mode survey, and establish survey psychometric properties.

Methods: Questions were developed based on prior qualitative research and Diffusion of Innovation theory. Expert review, cognitive testing, survey pilot, and main survey were used to test the questionnaire. Six content experts reviewed the questionnaire to establish face and content validity. Ten pharmacists from diverse practice settings were purposefully recruited for a cognitive interview to verify question readability. Content analysis was used to analyze the results. A pre-survey introduction letter with a monetary incentive was mailed via post to 100 (i.e. pilot) and 700 (i.e., main survey) randomly selected pharmacists. This was followed by an e-mail with a personalized link to the online questionnaire, e-mail reminders, and a telephone reminder if required. The psychometric properties of scales were evaluated with an exploratory factor analysis and Cronbach's alpha. Scale responses were described.

Results: Engagement of six experts and ten pharmacists clarified definitions (e.g., prescribing), terminology, recall periods, and response options for the 34-item response scale. Fifty-six pharmacists completed the online pilot survey. Based on this data, ambiguous questions and routing issues were addressed. Three hundred and seventy-eight pharmacists completed the online main survey for a response rate of 54.6%. The factors analysis resulted in 27 questions in eight scales: (1) self-efficacy, (2) support from practice environment, (3) support from interprofessional relationship, (4) impact on professionalism, (5) impact on patient care), (6) prescribing beliefs, (7) technical use of electronic health record (EHR) and (8) patient care use of the EHR. Prescribing beliefs and technical use of the EHR scales had low reliability while the remaining six scales had strong evidence for reliability and validity.

Conclusion: Through a multi-stage process, a survey instrument was developed to capture pharmacists' perceptions of prescribing influences. This questionnaire may support future research to develop interventions to enhance adoption of prescribing and enhance direct patient care by pharmacists.

Keywords

Pharmacists; Drug Prescriptions; Prescription Drugs; Pharmaceutical Services; Professional Role; Validation Studies as Topic; Psychometrics; Surveys and Questionnaires; Canada

INTRODUCTION

The scope of pharmacist practice is expanding across the world. Pharmacist prescribing has taken root in the United States[1], United Kingdom (UK)[2], and Canada.[3] Each jurisdiction has a unique model and pharmacists may not have a shared understanding of what constitutes prescribing. For example, recommending non-prescription medications, continuing existing medications, and dose adjustments may be considered prescribing in some contexts and not others.[4] Pharmacy practice researchers are striving to understand the uptake and application of prescribing privileges in the real world of practicing pharmacists.

In Alberta, Canada, three types of pharmacist prescribing were defined 1) adapting a prescription (i.e., adapting an existing prescription or extending a prescription for continuity of care, 2) prescribing in an emergency, and 3) additional prescribing authority (APA) (i.e., prescribing a new medication for initial therapy or to manage ongoing conditions). To obtain APA, pharmacists must complete a detailed application of actual patient cases which are assessed by peers. Alberta is an ideal province to study the extent of prescribing in pharmacy practice. No other jurisdiction in Canada has the range of prescribing privileges currently available to Alberta pharmacists.[3] The Alberta model is unique as qualified pharmacists, with APA, have independent prescribing authority. Albertan pharmacists do not require a written agreement with a

Lisa M. GUIRGUIS. BScPharm, MSc, PhD, Associate Professor. Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta. Edmonton, Alberta (Canada). lisa.guirguis@ualberta.ca
Christine A. HUGHES. BScPharm, PharmD, FCSHP, Professor. Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta. Edmonton, Alberta (Canada). christine.hughes@ualberta.ca
Mark J. MAKOWSKY. BSP, PharmD, Associate Professor. Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta. Edmonton, Alberta (Canada). makowsky@ualberta.ca
Cheryl A. SADOWSKI. BSc(Pharm), PharmD, FCSHP, Professor. Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta. Edmonton, Alberta (Canada). cherylas@ualberta.ca
Theresa J. SCHINDEL. BSP, MCE, FCSHP, Associate Clinical Professor. Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta. Edmonton, Alberta (Canada). tschin@ualberta.ca
Nese YUKSEL. BScPharm, PharmD, FCSHP, NCMP, Professor. Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta. Edmonton, Alberta (Canada). yuksel@ualberta.ca
Chowdhury F. FARUQUEE. BPharm, MPharm, MBA. Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta. Edmonton, Alberta (Canada). ffchowdh@ualberta.ca

physician to prescribe as in the US model.[1] Furthermore, pharmacists do not require additional training with a physician partner as in the UK model.[2]

Our research group used qualitative methods to describe pharmacists' adoption of prescribing in Alberta and characterized their prescribing practices as focused on product, diseases, and patients.[5] Qualitative methods, alongside the Diffusion of Innovation theory[6], were used to study pharmacists' adoption of prescribing. Adoption was influenced by physician relationships, practice setting, how prescribing fit with previous practice behaviours as well as pharmacists' own self-efficacy toward prescribing, beliefs about patients' responsibility for prescribing, and focus on patient care.

Survey research methodologies are suitable to gather large-scale descriptions of pharmacists' prescribing behaviours and build on prior qualitative research. Survey findings would inform researchers, policy makers, and educators about the uptake of prescribing and allow for the development of interventions to enhance the adoption of pharmacist prescribing and direct patient care by pharmacists. While surveys have been used in the UK to evaluate training programs around prescribing[7], these surveys were not applicable to Alberta as both the prescribing and practice models differ. No survey instrument exists that captures pharmacist prescribing in Alberta, so we aimed to address this gap.

Our research objectives were to:

1) Develop a questionnaire to measure factors that influence pharmacists' adoption of prescribing

2) Describe use of pre-incentive and mixed mode survey

2) Establish the initial psychometric properties of the survey instrument

METHODS

The survey instrument was developed and then refined in three stages. Based on the Diffusion of Innovation theory[6], prior literature[7-9], and data gathered from prior qualitative work[5,10], a survey instrument was developed to assess pharmacists' adoption of prescribing. Diffusion of Innovation is a multifaceted model and was selected to characterize the social processes behind pharmacists' adoption of prescribing. The questions were refined through 1) expert review for face validity, 2) cognitive interviews, and 3) small-scale survey distribution before the main survey was conducted. Evidence for validity was established with expert review and cognitive interviews. Exploratory factor analysis and evidence for reliability were established by examining internal consistency reliabilities with small and large-scale samples. This study was approved by the Health Ethics Research Board Panel B, University of Alberta.

Survey Development

This paper focuses on survey items that affect pharmacists' adoption of prescribing, specifically use of electronic health records (EHR), self-efficacy toward prescribing, supporting factors, impact on practice and prescribing beliefs, which are grounded in the Diffusion of Innovation Theory for health service organizations.[6] Details of pharmacist prescribing behaviours have been previously published.[11]

To establish content and face validity, researchers identified six expert pharmacists via known contacts and invited them to review the questions for accuracy and completeness. Experts from Alberta, other jurisdictions in Canada, as well as the UK had experience with either the Alberta or other prescribing models. An information letter to explain the research purpose and the draft survey instrument were emailed to expert pharmacists. Experts were asked to provide written feedback about the clarity, quality, and scope of the instrument. The research team reviewed the feedback and made subsequent revisions to the instrument.

Cognitive Interview

Ten pharmacists from a variety of settings (i.e., community pharmacy, hospital, primary care or ambulatory team practice, and long-term care) were purposefully recruited to allow for a variety of respondents. A research assistant conducted face-to-face cognitive interviews at a convenient location. Individuals who participated in the expert review or cognitive interviews received a 50 CAD gift card for their time. Researchers used structured probes to uncover how respondents interpreted questions to verify the understanding and readability. Example probes included: "Tell me in your own words what this question is asking," "How did you decide on your answer to this question?" and "What does [survey concept] mean to you?" Interviews were audio recorded and transcribed verbatim. The research assistant and two members of the research team conducted a qualitative content analysis which was used to revise the questions.

Pilot Survey

The survey instrument was pilot tested in a random sample of 100 practicing pharmacists who were registered with the Alberta College of Pharmacists (i.e., the provincial regulatory authority) and who provided contact information for research purposes including mailing, telephone, and e-mail. This sample size was considered sufficiently large to gauge the response rate. Prior survey work in North America has found low response rates, so a novel mixed-mode (post, email, and telephone) strategy with a pre-incentive was used to increase response rates.[12]

Pharmacists were mailed a pre-survey notification letter which informed participants they had been randomly selected to share opinions on prescribing whether they were prescribing or not as well as an incentive of a 5 CAD coffee card for a national coffee chain to enhance response. Survey links were e-mailed three weeks later with three reminders in two weeks. Interviewers telephoned pharmacists who did not respond after two reminders to encourage participation in the online survey and asked ten questions to those who indicated they were not going to participate in the online survey. These questions established the type and frequency of pharmacist prescribing providing insight into the non-responder sub-group.

Table 1. Pharmacist Responses for Self-efficacy and Impact on Practice Items (Main Survey)

	N	Mean	SD	Scale Mean (SD)
Self-Efficacy Beliefs* How sure are you that you could:				
perform a patient assessment to prescribe?	324	3.10	1.12	Prescribing Self-efficacy 2.66 (0.66)
prescribe in a clinical area that you are familiar with?	323	3.35	1.04	
prescribe in a clinical area that you are not familiar with?	326	1.65	0.90	
adapt a prescription for patients starting a new therapy?	323	2.61	1.19	
initiate new therapy for a patient?	323	2.13	1.13	
accept responsibility for medication management?	325	3.10	1.11	
Valid N (listwise)	318			
Impact on Practice** To what extent has prescribing impacted the following for you,				
Job satisfaction?	324	3.87	0.74	Professionalism 3.72 (0.39)
Professional image?	323	4.02	0.63	
Quality of physician relationship?	324	3.27	0.69	
Time spent with patient?	324	3.82	0.62	Patient Care 3.95 (0.11)
Time spent assessing patients?	325	4.02	0.59	
Quality of patient care?	325	4.00	0.59	
Overall workload?	325	4.18	0.60	Removed
Personal financial reimbursement?	324	3.02	0.42	
Need for continuing professional development?	325	4.10	0.64	
Valid N (listwise)	321			

*Response options: 1=Not sure at all, 2=Slightly sure, 3=Somewhat sure, 4=Rather sure, 5=Quite sure, 6=Very sure, 7=Extremely sure
** Response options: 1=Greatly decreased, 2=Decreased. 3=Same, 4=Increased, 5=Greatly increased

Main Survey

The main survey was conducted in a sample of 700 practicing pharmacists who were registered with the Alberta College of Pharmacists. At the time of the survey, there were approximately 3,885 practicing pharmacists in Alberta. Assuming a 5% margin of error and a 95% confidence interval, at least 350 pharmacists in our sample were required.[13] With a mixed-mode approach, 60% response rate was anticipated and therefore 667 pharmacists were contacted to be confident of achieving at least 400 completed surveys.

As in the pilot, pharmacists were mailed a pre-survey notification letter and incentive of a 5 CAD coffee gift card. Survey links were e-mailed two weeks later with five reminders over seven weeks. Interviewers telephoned pharmacists who did not respond after three reminders in a four-day period which was the same as the small-scale survey.

Data Analysis

The main learnings from expert review and cognitive interview data were summarized. Response rates were calculated by dividing the number of people who participated by the number selected in the eligible sample. Descriptive analyses were used to characterize results. Variables were plotted and examined for normal distributions. In order to test the construct validity of the hypothesized scales, an exploratory factor analysis was conducted. Factor analysis reduced the number of items by grouping the related items and identifying the unrelated items for removal. Principal axis factoring was used, and factors with Eigenvalue's greater than one were chosen.[14] To facilitate the interpretation, Oblimin rotation was applied when the correlation between factors was >0.32.[14] A Kaiser-Meyer Olkin greater than six was used to measure data adequacy for dimension reduction.[14] Before running a factor analysis, a correlations matrix of survey items was used to identify and remove highly correlated (>0.90) or weakly correlated (<0.30) items from the analysis.[14] Items loaded on a factor if their loading was greater than 0.40 and no greater than 0.40 on another factor.[14] Internal consistency of the scales was calculated using Cronbach's alpha statistic and an alpha value greater than 0.70 was considered as adequately reliable.[15]

RESULTS

Survey Development

A survey instrument was designed to assess pharmacist prescribing behaviours and factors which influenced adoption of prescribing.

The survey questions were drawn from findings in our prior qualitative work[5,10] and published surveys. The survey instrument developed by Latter *et al*. provided insight on how to measure benefits of prescribing.[7] Questions on the technical and social benefits as well as perceived compatibility of prescribing were adapted from Westrick's survey on pharmacists' adoption of immunization services.[8] Pronk *et al*. used Roger's Diffusion of Innovation Theory to look at specific attributes of a pharmacy service innovation and six questions scale on observability, compatibility, trialability, relative advantage and complexity were added.[9] New questions were developed around self-efficacy, physician relationships, EHR use, patients' responsibility for ensuring continuity of care and legitimizing prior practices.[10]

The survey instrument started with practice descriptors including pharmacists' use of EHRs then pharmacists were routed to site-specific questions for community, hospital, primary care network, and continuing care which were designed to characterize the level of care provided at the practice sites. The second section captured pharmacists' prescribing behaviours which have been described in the

Table 2. Pharmacist Responses to Support and Prescribing Belief Items (Main Survey)

	N	Mean	SD	Scale Mean (SD)
Support* To what extent do the following factors affect your prescribing activities:				
Pharmacy staffing at my practice location?	325	3.10	1.32	Practice Environment 3.56 (0.28)
Access to patient information?	326	3.83	1.27	
My practice environment?	323	3.55	1.30	
Patient expectations?	323	3.59	1.12	
Employer's expectations?	322	3.71	1.14	
Relationships with physicians?	325	3.34	1.17	Interprofessional Relationships 3.41 (0.10)
Relationships with other health care professionals?	325	3.47	0.99	
My education and training?	323	3.94	1.24	Removed
Requirement to document patient care?	323	2.95	1.26	
Valid N (listwise)	312			
Prescribing Beliefs**				
Patients are responsible for ensuring they have a sufficient supply of medications?	373	5.28	1.01	Prescribing Beliefs 5.09 (0.71)
Pharmacist prescribing increases pharmacists' professional liability?	375	5.68	1.09	
Pharmacists should only extend refills once?	375	4.30	1.42	
Pharmacist prescribing is an extension of the role that pharmacists already fulfill?	376	5.38	1.10	Removed
Pharmacist prescribing helps patients avoid physician follow-up?	376	3.56	1.39	
Valid N (listwise)	371			

*Response options: 1=Strong barrier, 2=Weak barrier, 3=Not a factor, 4= Weak support. 5=Strong support
** Response options: 1=Completes disagree, 2=Strongly disagree, 3=Disagree, 4=Neither disagree nor agree, 5=Agree, 6=Strongly agree, 7=Completely agree

literature. These results have been reported.[11] All pharmacists who had prescribed in the last month were asked about the barriers and supports for prescribing, the impact of prescribing on professional activities, and self-efficacy toward prescribing. The third section addressed pharmacists' beliefs about prescribing. The fourth and last part captured pharmacists' demographics, training, and the presence of other prescribers, as well as time spent with patients versus technical duties. Pharmacists who did not provide patient care did not complete the second section. The questions described in this manuscript are in Table 1, Table 2 and Table 3. The final complete survey instrument with additional descriptive questions is available upon request.

Expert Review

Six pharmacy experts from the UK and Canada reviewed the initial draft survey instrument and provided feedback from a policy perspective with attention to terminology, response burden, and sequence of questions. Experts agreed the survey captured a wide range of factors that impacted prescribing and suggested changes to response scales. For example, behaviour and belief questions were converted from a seven to five point scale and the "very poor" to "very good fit" scale was converted to a "strong barrier" to "strong support" scale. Additional feedback was gathered on questionnaire flow, wording, and length. A detailed description of changes for each question is available in online Appendix 1.

Cognitive Interviews

Ten pharmacists (three from community practice, three from hospital practice, two in primary care or ambulatory team practice, and two from continuing care) participated in cognitive interviews for survey feedback. Overall, they took on the role of interpreting the questions as a pharmacist who would work in their current setting. They were not expected to interpret the survey instrument or provide feedback on settings other than their own. This resulted in clarified terminology, expanded response options, verified understanding of intended constructs, standardized recall periods, and removed or revised unclear response options and questions. The Alberta College of Pharmacists' (i.e., provincial regulatory association) categories of prescribing (e.g., adapt, provide emergency supply, or initiate/manage therapy) was repeated throughout the instrument to ensure consistency and clarity. Questions on the innovation from Pronk *et al.*[9], adopter receptivity to change[8], and influences on "not prescribing" were removed, as they were problematic for respondents. Belief response scales were reverted to 7-point scales to allow for more options. Finally, the survey

Table 3. Pharmacist Responses to purpose of using EHR* (Main Survey)

	N	Mean	SD	Scale Mean (SD)
Use of EHR** (Netcare) To look up:				
Demographic information including personal health care numbers (number from Alberta Health card)	333	3.83	1.22	Technical Use 3.90 (0.11)
Double doctoring or multiple pharmacies	332	3.98	0.96	
Medical history such as diagnostic tests and discharge or admission history	335	3.52	1.28	Patient Care 3.88 (0.32)
Lab values	337	3.98	1.12	
Medication history/allergies/refills including Pharmaceutical Information Network	337	4.13	0.90	
Valid N (listwise)	323			

*Response options: 1=Not at all, 2=Rarely, I use another system, 3=Rarely, 4= Occasionally, 5=Routinely
**Electronic Health Record

Table 4. Factor Analysis of Main Survey

Construct	Number of items	Kaiser–Meyer–Olkin	Number of Removed items*	Factors having >1 Eigenvalue	Scales and number of loaded items	Explained variance (%)	Cronbach's alpha
Self-efficacy	6	0.85	0	1	Prescribing Self-Efficacy(6)	65	0.89
Support from Practice	9	0.85	2	2	Practice Environment (5) Interprofessional Relationships (2)	41 10	0.78 0.85
Impact on Practice	9	0.74	3	2	Professionalism (3) Patient Care (3)	49 22	0.76 0.78
Prescribing beliefs	5	0.61	2	1	Prescribing Beliefs (3)	33	0.58
Use of EHR**	5	0.67	0	2	Technical Use (2) Patient Care (3)	27 43	0.51 0.80

Further details of the factors analysis are available in Appendix 2.
* Removed due to due to weak correlation (<0.3) with other scale items
**Electronic Health Record

was routed to ensure pharmacists who did not provide patient care did not answer questions on self-efficacy. Further details are available in online Appendix 1.

Pilot Survey

The pre-incentive letter was sent to 100 pharmacists. Two pharmacists were deemed ineligible (self-reported ineligibility to participate due to retirement and health reasons). Fifty-six pharmacists completed the online survey instrument and 52 pharmacists provided direct patient care. The response rate for this pilot study was 57.1%. The telephone reminder prompted up to 14 pharmacists (25% of final respondents) to complete the survey; the telephone survey was retained in the main survey. Based on the research team's review of the pilot data, the research team refined ambiguous questions and identified question routing issues based on respondent characteristics. To ensure all scales had sufficient items, three questions were added to support for prescribing (i.e., education and training, requirement to document, and employers' expectations) and two response items were added to the prescribing belief scale (i.e., avoid physician and extend one refill only). Upon inspection of responses, three redundant items were removed from the impact on practice (i.e., time with physicians, time and quality of relationships with other health care professionals) and one item was removed from prescribing beliefs (i.e., physician's responsibility for medication supply). Time for documentation was moved from an "impact" to a "support" question.

Main Survey

Of the 700 pharmacists who were invited on April 19, 2013, eight were deemed ineligible (e.g., not renewing their practice license) for a total of 692 eligible pharmacists. The majority of pharmacists (n=307, 81% of total respondents) responded after the third e-mail reminder (Figure 1). To increase the completion rate, a telephone call was made to the 385 non-respondents and the nine pharmacists who had incomplete surveys. Contact was made by the second call attempt for the majority of the pharmacists (n=331; 84.0% of telephone calls). Twenty-four pharmacists requested the email invitation be sent to them again including five who provided an alternate email address. From the start of the telephone reminders to the end of the data collection, pharmacists completed seventy-one surveys online. Almost one-third of those 71 online surveys were completed by pharmacists who had indicated during the telephone reminder that they would be willing to participate (n=46/71; 64.8%). Overall, three hundred and seventy-eight pharmacists completed the online survey instrument for a response rate of 54.6%. Pharmacists were predominately female (71.2%), full time (67.5%), working in a community pharmacy (76.7%), and working in larger urban centres (57.3%); 14% earned their initial pharmacy degree outside of Canada.[14]

During the telephone reminder, 40 (46.5%) of the 86 pharmacists who did not intend to do the online survey agreed to answer ten questions on their prescribing in the telephone reminder interview. Of the 40 of 86 pharmacists who did not intend to do the online survey instrument but completed the brief telephone questions, one had APA (2.5%) and 34 (85%) prescribed in the last year in comparison with 6.3% and 93% of online respondents respectively.[9] These pharmacists used prescribing in multiple ways with 34 (100%) prescribing for continuity of care and 30 (82.4%) prescribing to adapt therapy which again were similar to the main survey with 93.4% and 80.6% respectively.[9]

Factor Analysis

Exploratory factor analysis of self-efficacy belief, support from practice, impact on practice, prescribing belief scales and EHR use resulted in eight factors (Table 4). Details on the components, eigenvalues factor loadings and matrix structure can be found in Appendix 2. Six questions on self-efficacy belief scale were loaded on one factor with Cronbach's alpha >0.70 and represented pharmacists' self-efficacy toward prescribing. Two reliable factors from nine questions on support from practice were identified-practice environment (i.e., five questions) and interprofessional relationships (i.e., two questions). Two items were dropped as they had low factor loadings and conceptually did not fit with the other practice environment items. There were nine questions about the impact on practice, and three questions were excluded due to weak correlation with other scale questions. The remaining questions were loaded on two factors - professionalism and patient care having three questions each. Two out of five questions on prescribing belief were correlated weakly with other questions (<0.30). The remaining three questions were loaded on one factor representing prescribing beliefs (Cronbach's alpha=0.58). (Table 4) The five questions on use of EHR were loaded on

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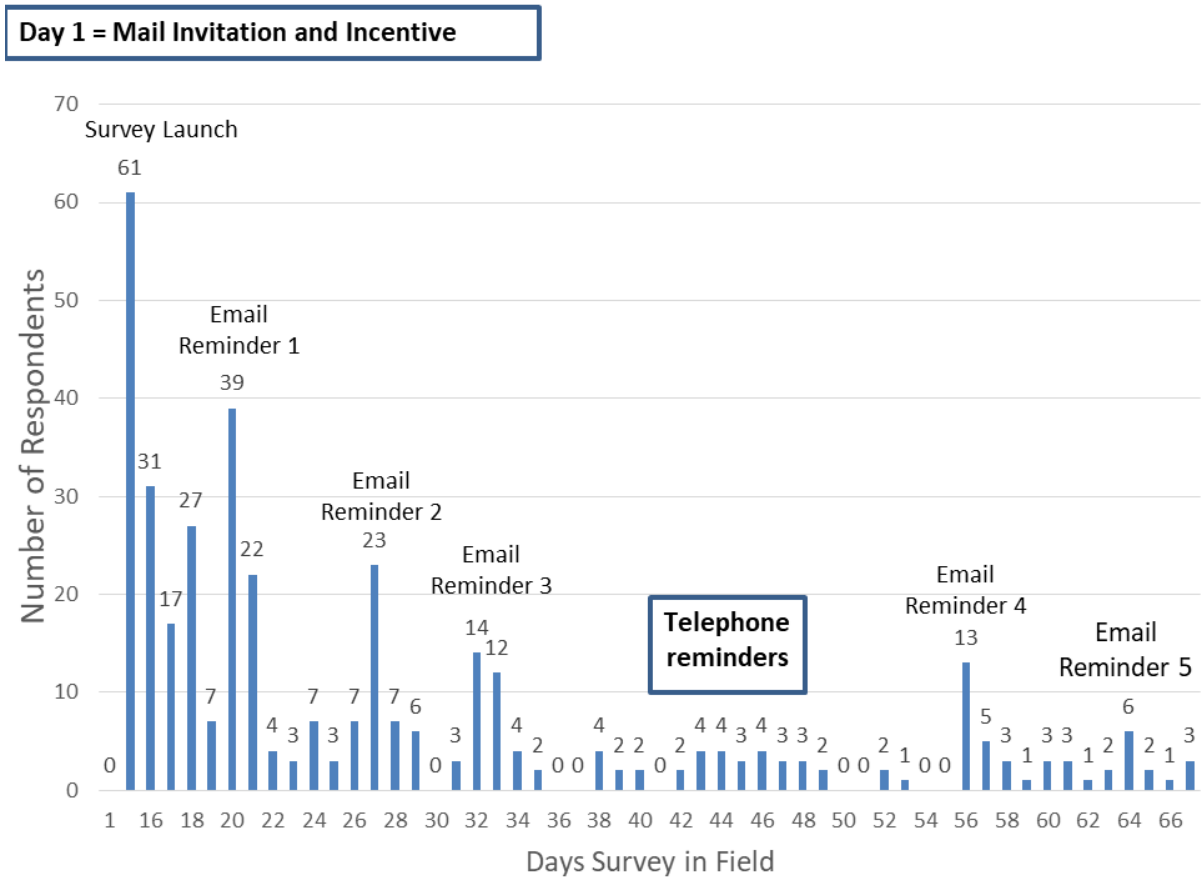

Figure 1. Number of Completed Online Survey by Days in Field and Data Collection Procedure

two factors technical (Cronbach's alpha=0.51) and patient care (Cronbach's alpha=0.80).

Description of Scales

Pharmacists' self-efficacy toward prescribing was moderate, with a mean of 2.66 and a standard deviation of 0.66 on a five-point scale. Looking at questions on the impact of prescribing on practice, pharmacists reported prescribing increased both patient care (mean=3.95, SD=0.11) and professionalism (mean=3.72, SD=0.39). Both practice environment (mean=3.56, SD=0.28) and interprofessional relationships (mean=3.41, SD=0.10) had a mean score between no impact and weak support for pharmacists' adoption of prescribing. Respondents with and without a patient care practice (n=378) scored a mean of 5.09 and a standard deviation of 0.71 on the prescribing beliefs on a seven-point scale meaning overall they agree with reasons to avoid prescribing. Pharmacists reported using the EHR occasionally for both technical (3.90 SD=0.11) and patient care (3.88 SD=0.32) purposes.

DISCUSSION

A survey instrument was developed to explore factors impacting pharmacists' adoption of prescribing. The instrument had 27 questions with eight scales: self-efficacy, support from practice (i.e., practice environment and interprofessional relationship), impact on practice (i.e., professionalism and patient care), prescribing beliefs, and use of the EHR (i.e., technical and patient care). Prescribing beliefs and use of the EHR for patient care had limited evidence for validity and reliability while the remaining six scales had strong evidence for reliability and validity. The prescribing beliefs scale items only predicted 33% of the variance; whereas other scales explained between 57% and 70% of scale variance.

Prior qualitative research on the use of prescribing in Alberta allowed for the selection of meaningful constructs to measure factors impacting prescribing and language to richly describe how pharmacists came to understand and incorporate prescribing into patient care.[5,10] First, the practice environment shaped patient care which in turn shaped pharmacists' use of prescribing. Prescribing itself did not drive practice change.[5] Thus, questions related to support in the practice setting, use of the EHR, and benefits in the environment were included. Second, prescribing belief questions on the importance of the patients' responsibility to ensuring a sufficient supply of medications as well as the belief that pharmacists should only extend refills once came directly from the pharmacist interviews.

Expert stakeholder feedback ensured the range of factors which influences practice were operationalized. Pharmacist cognitive interviews provided evidence for face validity as well as the understandability and readability of the questions. Confusion over the definition of prescribing during the cognitive interview reflected the findings that pharmacists had a diverse and context-specific definition of prescribing.[4,16] Consequently, the definition of prescribing was repeated throughout the survey instrument.

Low response rates for surveys of health care professionals are common.[17,18] Recent response rates for pharmacist surveys in Canada have been reported at 10%,19 13%,20 and 23%.21 Our higher response rate of 57% and low level of dropouts may be explained using social exchange theory which posits that pharmacists will weigh the rewards, costs, and their trust toward the researchers when deciding to participate in a survey.[12,18] Rewards were provided in the form of a monetary incentive, asking for pharmacist opinions whether they prescribe or not, and informing pharmacists that they were randomly selected to participate.[22] The costs to pharmacists were reduced by e-mailing personalized links, ensuring responders were not contacted for follow-up, and tailoring questions to respondents (i.e., practice setting and prescribing status) to reduce questions not applicable to a respondent. The incentive and invitation letter were provided in advance via post to increase trust. Finally, the use of both telephone and e-mail reminders served to increase the response rate. Available information from non-responders who agreed to complete a brief telephone survey found similar prescribing behaviours.

The item analysis generated evidence for scale validity and reliability. Exploratory factor analysis allowed for the removal of items with weak scale ties and confirmed the structure of the scales; thus providing evidence for construct validity. The prescribing beliefs and use of the EHR for patient care had insufficient validity and will require future addition of items or revisions of existing questions. For example, the item “Pharmacists should only extend refills once” had lower loading on prescribing beliefs’ scale and may be dropped if further analyses confirm an inadequate fit. The remaining six scales had strong evidence for reliability and validity.

With careful attention to survey instrument design as well as funding for participant incentives, survey research can produce a reasonable response rate. The proliferation of online survey tools has made surveys an accessible research tool and given a false illusion that conducting survey research is straightforward. Careful consideration of questionnaire development, design, psychometric properties, and recruitment is time-consuming, yet has remained critical to ensure representative results.

As these are original scales for nascent prescribing activities, direct comparisons are not available. Pharmacists’ self-efficacy was moderate and similar to that of pharmacists’ adoption of new smoking cessation services.[23] Pharmacists reported feeling that prescribing increased both professionalism and patient care in their practice with similar findings in qualitative research.[24,25] Practice environment and physician relationships are common barriers to prescribing.[4,26] Yet, pharmacists reported between no impact and weak support which was more positive than anticipated. Pharmacists in this study had up to six years to experience prescribing and may have found ways to collaborate with physicians or conversely physicians may have become accustomed to pharmacist prescribing. Pharmacists’ use of the EHR appeared in line with our prior work on pharmacists’ adoption of this system.[27]

A questionnaire was developed to measure factors which may influence pharmacists’ adoption of prescribing including self-efficacy, impact on practice, supports, and potential prescribing beliefs. As prescribing models in Canada, the UK, US, and other countries vary, this tool may need adaption to local needs.

Our survey instrument may aid in conducting research to understand how pharmacists have integrated prescribing into practice and serve as a catalyst to support the widespread uptake of pharmacists’ use of prescribing. By identifying factors which influence adoption of prescribing, it may enable future research and interventions aimed at increasing adoption as a means of enhancing direct patient care by pharmacists and patient outcomes. Results may also be useful in assessing pharmacy education curriculum changes that are necessary to prepare students to incorporate prescribing into their practice.

Limitations

This study has several limitations which should be considered when extrapolating these results. Pharmacists in Alberta have a broad range of prescribing activities which allowed for the efficient study of m but this may limit generalizability to other jurisdictions. The prescribing beliefs scale has low reliability, and further research is needed to develop this scale. The incentive was not randomized; thus the response rate cannot be directly attributed to the incentive. Finally, these findings are from a 2013 survey, so while the tool is applicable, the findings represent adoption of prescribing at that time.

CONCLUSIONS

Engagement of stakeholders, experts, and pharmacists contributed to the creation of a 27-item measure of factors impacting pharmacists’ prescribing: self-efficacy toward prescribing, prescribing beliefs, support from practice, use of the EHR and benefits to practice. A high response rate was achieved with the use of a pre-survey incentive and online survey administration results in efficient tailoring of the survey navigation for each participant. The prescribing beliefs and use of the EHR had some evidence for validity and reliability while the remaining six scales had strong evidence for reliability and validity. This survey instrument may help researchers, policy makers, and educators understand what influences the uptake of prescribing and allow for the development of interventions to enhance adoption of prescribing and direct patient care by pharmacists.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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Original Research

Type B adverse drug reactions reported by an immunoallergology department

Maria J. COSTA, Maria T. HERDEIRO, Jorge J. POLÓNIA, Inês RIBEIRO-VAZ, Cármen BOTELHO, Eunice CASTRO, Josefina CERNADAS.

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Abstract

Objective: Characterization of the adverse drug reactions (ADR) reported by the immunoallergology department (IAD), Centro Hospitalar de São João (Porto), to the Northern Pharmacovigilance Centre (NPC).

Methods: An observational, descriptive and retrospective study was conducted, based in a spontaneous report system. Participants were all the patients from the IAD, with suspected ADR, reported to NPC by specialists after the study was completed.

Results: Studied population had a median age of 41 years, with the predominance of the female gender (73.2%). Allergic rhinitis and asthma were the most frequent comorbidities. All studied ADR were type B, 89.6% were serious, 86.4% unexpected and 2.6% associated with drugs that presented less than 2 years in the market. The most represented drug classes were the non-steroidal anti-inflammatory drugs (NSAIDs) (52.6%) and antibiotics (25.2%). Skin symptoms represented 61.2% of the reported complaints. About 52.9% of these ADR occurred in less than one hour after intake. The most frequent ADR treatment at the time of the reaction was drug interruption (86.2%), followed by the prescription of anti-histamines (42.2%).

Conclusions: Reported ADR to NPC by the Drug Alert Unit were mainly serious, unexpected, associated with NSAIDs and antibiotics and related with marketing authorization medicines older than two years. These results could be very useful to develop strategies to prevent the clinical and economic consequences of ADR.

Keywords

Drug-Related Side Effects and Adverse Reactions; Adverse Drug Reaction Reporting Systems; Inpatients; Anti-Inflammatory Agents, Non-Steroidal; Anti-Bacterial Agents; Portugal

INTRODUCTION

The awareness that "any substance that is capable of producing a therapeutic effect can also produce unwanted or adverse effects", is the foundation of the adverse drug reaction (ADR) concept.[1] The World Health Organization (WHO) defines ADR as "a response to a medicine which is noxious and unintended, and which occurs at doses normally used in man".[2] The European directive 2010/84/EU states that the definition of 'adverse reaction' should be amended to ensure that it covers noxious and unintended effects resulting not only from the authorised use of a medicinal product at normal doses, but also from medication errors and uses outside the terms of the marketing authorisation, including the misuse and abuse of the medicinal product.[3]

ADR are a worldwide public health problem. The incidence of ADR as cause of hospitalization ranges between 1% and 5,3%.[4,5] In a meta-analysis of prospective studies from USA hospitals, in hospitalized patients the incidence of serious ADR was 6,7% and fatal ADR was 0,32%, placing ADR between the fourth and sixth cause of death.[6] It has been estimated that approximately ADRs cause 197,000 deaths annually throughout the EU.[7,8] In general population, fatal ADR can represent the seventh death cause.[9]

According to drug-induced allergies, there are some studies, related to specific drugs[10] or to specific age groups[11] concluding that reported allergic reactions should be further explored. The ADRs clinical, economic and public health consequences enhance the need to persist with pharmacoepidemiologic studies and pharmacovigilance systems. Drug hypersensitivity reactions are typically unpredictable and potentially life-threatening. They may cause or prolong patient's hospitalization, and may constraints future therapeutic options.[12]

In this context, we conducted a pharmacoepidemiologic study aiming to characterize the ADR reported by the Immunoallergology Department (IAD) of the Centro Hospitalar de São João (Porto) to the Northern Pharmacovigilance Centre (NPC) that deals particularly with evaluation of possible drug hypersensitivity reactions (DHR after suspicion of an allergic reaction.

METHODS

A pharmacoepidemiologic retrospective study was conducted, descriptive and based in a spontaneous ADR report system.

Maria João COSTA. MVD. Department of Community Medicine, Information and Decision Sciences (MEDCIDS), Faculty of Medicine, University of Porto. Porto (Portugal). amvcasa@netcabo.pt
Maria Teresa HERDEIRO. PharmD, MSc, PhD. Institute for Research in Biomedicine – iBiMED, Department of Medical Sciences, University of Aveiro. Aveiro (Portugal). teresaherdeiro@ua.pt
Jorge Junqueira POLÓNIA. MD, PhD. Porto Pharmacovigilance Centre, Faculty of Medicine, University of Porto. Porto (Portugal). jjpolonia@gmail.com
Inês RIBEIRO-VAZ. PharmD, MSc, PhD. Center for Health Technology and Services Research; & Porto Pharmacovigilance Centre, Faculty of Medicine, University of Porto. Porto (Portugal). inesribeirovaz@gmail.pt
Cármen BOTELHO. MD. Immunoallergology Department, Hospital São João. Porto (Portugal). carbotelho@gmail.com
Eunice CASTRO. MD. Immunoallergology Department, Hospital São João. Porto (Portugal). eunicediascastro@gmail.com
Josefina CERNADAS. MD. Immunoallergology Department, Hospital São João. Porto (Portugal). josefinacernadas@gmail.com

Participants

All patients from the IAD of Centro Hospitalar de São João (Porto) with reported ADR by the IAD to the NPC were included in the study. These reported ADRs have one feature in common. All were previously considered compatible with a drug hypersensitivity reaction (DHR), with the suspicion of an allergic reaction and reason why the patients were referred to the IAD of the Centro Hospitalar de São João, for further study.

In order to achieve the study objectives, the extracted data were organised in two different groups of variables:

1.Patient characterization: Age, gender, and co-morbidities (asthma, rhinitis, dermatitis, chronic urticaria, food allergy, latex allergy, house dust mite allergy, hymenoptera allergy, pollen allergy, ADR history associated with surgical acts, and ADR history associated with complementary diagnostic exams).

2.ADR characterization:

- Seriousness: according to the Guidelines on Pharmacovigilance for Medicinal Products for Human Use, a serious ADR is any occurrence that causes: death; can be life threatening; requires hospital admission or causes delay in hospital discharge or results in persistent or significant disability/incapacity and congenital anomalies.[11]
- Expected vs unexpected: according to the same Guidelines, unexpected ADR are the ones partially or totally not described in the summary of products characteristics.[13] Expected ADR are the ones totally described in the summary of products characteristics.
- Recent placing on the market: the threshold of 2 years was established for the characterization of recent placing on the market. This limit considered the community regulation[14] for semiannual drug safety reports during the first 2 years of market authorization.
- Drug class: drugs suspected of ADR were classified according with the pharmaceutical classes, referred in the summary of products characteristics, and then aggregated in accordance with common characteristics (e.g., beta-lactams, macrolides and quinolones form the class of antibacterials).
- ADR characterization: described according with the Medical Dictionary for Regulatory Activities (MedDRA) terminology. Symptoms were grouped in accordance with the body system.
- Time elapsed until ADR: the time between drug administration and the occurrence of the first symptom(s). Data were then grouped in immediate and non-immediate ADRs. Immediate ADR were those occurring within the first hour after the last drug administration, and the non-immediate occurred more than one hour after the last drug administration.[15-17]
- ADR duration: time between the first ADR symptom(s) and to-tal remission of symptoms.
- ADR treatment: the treatment interventions studied were: drug withdraw; adrenalin administration; anti-histamines; corticosteroids and non-steroidal anti-inflammatory (NSAIDs) administration.
- Drug reintroduction: re-administration of the suspected drug after the reported ADR episode.

An ADR recurrence was considered, when the adverse event was reproducible with the drug reintroduction.

Data collection and analysis

Data were collected from the report forms sent to the NPC by the IAD, between the 1st of January 2006 and the 31st of December 2010. The descriptive statistical analyses were performed using the software SPSS version 20.0.

RESULTS

Between January 2006 and December 2010, among the patients followed in the Drug Alert Unit, 117 developed ADR originating 125 reports to the NPC.

The patients' median age was 41 years, ranging from 8 months to 78 years of age, and 72% were female (Table 1). In total, 25.7% of participants had no comorbidities and the most common comorbidities were: rhinitis (25.7%); asthma (17.8%); and chronic urticaria (5.9%).

Report forms with data for ADR history to the same or other drug(s) were respectively 42 and 51. ADR history to the same drug occurred in 14.3%, and to other drug(s) in 88.2%. The drugs reported were: NSAIDs (44.7%), antibacterials (44.7%), proton pomp inhibitors (2.1%), analgesics and antipyretics (2.1%), antitussives (2,1%), antiepileptics and anticonvulsants (2,1%), sulfonamides and associations (2,1%), local anesthetics (2,1%), and thiocolchicoside (2,1%).

ADR characterization is summarized in Table 2. All reported ADR were classified as type B because the studied population was composed exclusively by patients with suspected drug allergy studied in the DAU of IAD. Type B reactions include hypersensitivity drug reactions, that can be distinguished in allergic (drug allergy) and non-allergic hypersensitivity reactions (Table 2).

According to the ADR seriousness, 89.6% of the reported ADR were considered serious, with 41.1% causing hospitalization and 4.5% considered life-threatening. 86.4% of the reported ADR were classified as un-expected, according to the guidelines.

For recent placing on the market, 11 ADR reports were excluded, be-cause they presented the suspected active substance instead of the drug name. Drugs up to 2 years of placing on the market were identified in 2.6% of the reported ADR. The remaining 97.4% were drugs marketed for more than two years.

The most frequent drug classes involved in the reported reactions were NSAIDs (52.6%) and antibacterials (25.2%).

In this study, 81 different symptoms were identified, corresponding to a total of 338 occurrences. The skin symptoms were the most frequent, corresponding to 61.2% of the occurrences. The most common cutaneous

Table 1. Sociodemographic and clinical practice characteristics of the patients		
	n	**%**
Age (years)		
[0;35	36	32.4
35;50	44	39.6
50;78	31	27.9
NI	14	-
Gender		
Female	90	73.2
Male	33	26.8
NI	2	-
Comorbidities		
Asthma	17	17.8
Chronic urticarial	5	5.9
Dermatitis	2	2.2
Food allergy	2	2.2
House dust mite allergy	14	14.9
Hymenoptera allergy	1	1.1
Latex allergy	1	1.1
Pollen allergy	3	3.2
Rhinitis	24	25.7
No comorbidities	24	25.7
NI	24	-
ADR history to the same drug		
Yes	6	14.2
No	36	85.7
NI	83	-
ADR history to a different drug		
Yes	45	88.2
No	6	11.8
NI	74	-
*ADR means Adverse Drug Reaction; *NI means No Information available		

Table 2. Reported Adverse Drug Reactions characterization.		
	n	**%**
Seriousness		
Serious	112	89.6
Hospitalization	46	41.1
Life threatening	5	4.5
Other	66	58.9
Not serious	13	10.4
Expected vs Unexpected		
Expected	17	13.6
Unexpected	108	86.4
Recent placing on the market		
Up to 2 years	3	2.6
More than 2 years	111	97.4
Drug Class		
Non-steroidal anti-inflammatory	71	52.6
Antibacterials	34	25.2
Corticosteroids	7	5.2
Others	23	17.0
Symptoms		
Cutaneous	207	61.2
Respiratory	48	14.2
Gastrointestinal	35	10.4
Cardiovascular	10	3.0
Anaphylaxis	7	2.1
Other	31	9.2
Total	338	100
Beginning time		
Immediate	45	52.9
Non-immediate	40	47.1
Treatment		
Anti-histamines	49	42.2
Anti-inflammatory	28	24.2
Corticosteroids	27	23.3
Non-steroidal	1	0.9
Adrenaline	3	2.6
Drug withdraw	100	86.2
Drug re-introduction		
Yes	7	41.2
With ADR recurrence	6	85.7
Without ADR recurrence	1	14.3
No	10	58.8
*ADR means Adverse Drug Reaction.		

complaints were: urticaria (2.6%), rash (24.6%) and pruritus (8.7%). Respiratory symptoms represented 14.2%, and dyspnea was the most reported respiratory symptom (47.9%). Gastrointestinal symptoms were present in 10.4% of the reported occurrences.

For the characterization of ADR beginning time, 40 reports were excluded, because of incomplete information. In 85 reports, 52.9% of the ADR were immediate and 47.1% were non- immediate.

For the study of ADR duration and total remission, 83 report forms were excluded, because of incomplete information. In 42 ADR, 24 (57%) had a duration up to 24 hours. The remaining 18 (43%) ADR lasted for more than 2 days.

Considering the characterization of ADR treatment, 9 reports were excluded, because of incomplete information. The most frequent ADR treatment at the time of the reaction was drug withdraw (86.2%), followed by the administration of anti-histamines (42.2%), corticosteroids (23.3%) and NSAIDs (0.9%). Adrenalin injection was reported in 3 (2.6%) ADR. In this sample drug provocation with the suspected culprit was per-formed in seven patients with a recurrence of ADR of 85.7%.

DISCUSSION

This was an observational retrospective study, based in a spontaneous report system. According to our results, we can characterize the ADR reported by the IAD of Centro Hospitalar de São João (Porto) has being mainly serious, unexpected, associated with NSAIDs and antibacterials, and related with drugs marketed for more than two years.

These results can be very useful to characterize the type and severity of the reactions, the most involved drugs, alert patients about their problem and call the attention of health care providers about the direct and indirect costs involved and to create a universal informatics alert system about specific reactions, to one or more drugs for each patient.

The studied population was composed by the patients with ADR, referred to the DAU, with suspected drug allergy. The median age was 41 years, mainly of the female gender (73.2%), data that is consistent with other studies.[18,19]

ADR are more frequently described in older populations.[19-27] The most represented comorbidities in this study were rhinitis, asthma. Although these diseases have already been reported in one study[28], other concomitant diseases states associated with an increased risk for drug allergy, like viral causes: HIV, Epstein-Barr virus, Human Herpes virus 6, Human Herpes virus 7 and Cytomegalovirus infections have been described.[18,29] The HIV patients was not included in this study.

The most frequent drug classes reported in ADR history were NSAIDs and antibacterials, with predominance of NSAIDs. Considering all the patients studied with DHR, the results are consistent with other studies where NSAIDs, followed by antibacterials are the most frequent drugs involved in DHR.[30-32]

This study focused only in type B ADR, because all the patients presented ADR suspected of DHR. According with the classification proposed by Hunziker *et al*.[33], the allergic drug reactions are included in the type B reactions.

Serious ADR were the most frequent (89.6%), 41.1% caused hospitalization and 4.5% were life threatening. These results are consistent with the characteristics of type B reactions, which tend to be more serious[25], and should alert health professionals and patients about the importance of drug use surveillance and pharmacovigilance.

The majority of the ADR were related to drugs that presented a marketing authorization with more than 2 years. Our results may be explained by the specific characteristics of the type B studied ADR.

The most frequent drug classes were NSAIDs (52.6%) and the antibacterials (25.2%). Usually, antibacterials are the most represented drug class (18, 34, 35, 36) In a self-report drug allergy study, beta-lactams and NSAIDs were the most frequently involved drugs.[37] In an analysis of spontaneous reports from a regional database, there were 49.6% reports of serious ADRs associated with antimicrobials and 60.3% associated with NSAIDs[38] other study performed for paediatric population based in a national database, vaccines were the most represented group (42%) followed by antibacterials for systemic use (17%).[39]

The most common ADR complaints were related to skin (61.2%), as expected when compared with other studies.[18,28,34,35,40] In drug-induced allergic reactions, cutaneous symptoms or signs are the most common physical manifestations.[34]

Concerning the duration of ADR, 43% lasted for more than 2 days. This is important in different aspects, one of them is the negative influence in the patient's quality of life, but also, because it raises the importance of ADR economic negative impact, contributing to the increase of direct and indirect costs.[41]

The most frequent ADR treatment at the time of the event was drug withdraw (86.2%), followed by the administration of anti-histamines (42.2%), corticosteroids and NSAIDs. Surprisingly adrenalin injection was reported only in 3 (2.6%) patients. These results are in accordance with the management of the acute drug reactions: withdraw of the suspect drug, treatment of acute reaction according to the severity and the referral to a specialized Center for study.[29]

Drug reintroduction, either accidental or not has presented a very high risk of a similar or even worse ADR (85.7%). This is of outmost importance concerning prevention.[42]

As described in other studies[26,30], the probable and possible ADR were the most represented causality assessment results.

The main limitations of the study were: (i) information bias, including the incomplete data presented in the spontaneous report system[43]; (ii) the participants' selection, (important bias referring to the studied sample, exclusively composed by the patients studied in a Drug Allergy Units (DAU) with suspected DHR).

CONCLUSIONS

The DAU of IAD reported ADR that were mainly serious, unexpected, associated with NSAIDs and antibacterials, and related with drugs marketed for more than two years. It is very important to analyze, characterize and report ADR from different hospitals and departments to allow health professionals, patients and health authorities to develop strategies to ensure drug safety knowledge, and its benefit/risk balance.

CONFLICT OF INTEREST

None.

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Original Research

Satisfaction of patients receiving value added-services compared to traditional counter service for prescription refills in Malaysia

Boon-Tiang LAU, Abdul-Rani NURUL-NADIAH-AUNI, Siew-Yen NG, Shuen-Nie WONG.
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Abstract

Background: Patients' satisfaction is the key parameter to measure the quality of healthcare services. Value added-services (VAS) were introduced to improve the quality of medication deliveries and to reduce the waiting time at outpatient pharmacy.

Objective: This study aimed to compare the satisfaction levels of patients receiving VAS and traditional counter service (TCS) for prescription refills in Port Dickson Hospital.

Methods: A single-center, cross-sectional study was conducted in the outpatient pharmacy department of Port Dickson Hospital from 1 March to 30 June 2017. Systematic sampling method was utilized to recruit subjects into the study, except mail pharmacy in which universal sampling method was used. Data collection was done via telephone interviews for both groups.

Results: There was 104 and 105 in TCS and VAS group respectively. The response rate was 99.5%. Overall, a significant higher total mean satisfaction score in VAS group was observed as compared to TCS group (43.39 versus 40.49, p=0.002). The same finding was observed after confounding factors were controlled (VAS=44.66, 95% CI 43.07:46.24 versus TCS=39.88, 95% CI 38.29:41.46; p<0.001). VAS respondents reported more satisfaction than TCS respondents for both general and technical aspects. Among the VAS offered, mail pharmacy service respondents showed highest total mean satisfaction score, but no significant different was seen between groups (p=0.064).

Conclusion: VAS respondents were generally more satisfied than TCS respondents for prescription refills. A longitudinal study is necessary to examine the impact of other dimensions and other types of VAS on patients' satisfaction levels.

Keywords

Patient Satisfaction; Community Pharmacy Services; Professional Practice; Pharmacies; Pharmacists; Cross-Sectional Studies; Malaysia

INTRODUCTION

Patients' satisfaction has been recognized as a crucial parameter for measuring the quality of healthcare services.[1-7] In the pharmacy profession, the welfare and health of patients have always been and will continue to be the primary concern for pharmacists.

Government-subsidized health care facilities in Malaysia warrants affordable health care services for the nations, which incurs reasonable treatment charges for both standard and specialist care.[8] This makes high patient volumes and long waiting time a norm in these settings. Conventionally, patients are directed to the outpatient pharmacy counter with valid prescriptions to collect their medications after receiving consultations from their respective disciplines. At the outpatient pharmacy department, patients are given queue ticket and wait for their turn to get medications dispensed via queuing system.[9] Studies showed that patients reported high dissatisfaction with the time spent to collect medications.[10-14] Long waiting time had been reported profoundly affecting patients' perceptions of the pharmacy service quality, which in turn has an impact on their treatment satisfaction and outcomes.[3,9,15] This was supported by a cross-sectional survey conducted by Sa'ed *et al*.[16], which found that low treatment satisfaction led to poor treatment adherence.

Value added services (VAS) were introduced by Malaysia pharmacy service division to improve the quality of medication deliveries for refill prescriptions.[17] Patients can decide their preferred VAS, namely integrated drug dispensing system, appointment card service, drive-through pharmacy service, mail pharmacy service, short message service-and-collect service, call-and-collect service, email-and-collect service, fax-and-collect service, Locker4U, and others.[18] Thus far, there are still limited studies done regarding the impact or outcome of VAS. One study evaluated the satisfaction of patients with TCS versus VAS in a tertiary hospital[19], while another recent study evaluated the impact of VAS on ambulatory waiting time.[20] Both studies reported positive outcomes with VAS over TCS. Nevertheless, VAS offered by these two hospitals were slightly different and there was no recent study evaluating the satisfaction of patients utilized integrated drug dispensing system, mail pharmacy service, and appointment card service.

Hence, this study aimed to compare satisfaction of patients receiving VAS and TCS for prescription refills in the

Boon-Tiang LAU. MSc (Clin Pharm). Department of Pharmacy, Hospital Port Dickson. Port Dickson (Malaysia). boontianglau@gmail.com
Abdul-Rani NURUL-NADIAH-AUNI. MPharm. Department of Pharmacy, Hospital Port Dickson. Port Dickson (Malaysia). nadiah229@gmail.com
Siew-Yen NG. MSc (Comm Health). Ampangan Health Clinic. (Malaysia) .jnsy7265@yahoo.com
Shuen-Nie WONG. BPharm (Hons). Department of Pharmacy, Hospital Port Dickson. Port Dickson (Malaysia). shuennie1212@gmail.com

outpatient pharmacy department of Port Dickson Hospital. The VAS studied included integrated drug dispensing system, mail pharmacy service, and appointment card service.

METHODS

Study Design

This was a single-centered, cross-sectional study conducted in the outpatient pharmacy department of Port Dickson Hospital in Malaysia over a period of three months, from 1 March to 30 June 2017. Registration with Malaysia National Medical Research Registry (NMRR-16-2651-31387) was done and approval by Medical Research and Ethics Committee (KKM/NIHSEC/P17-746) was obtained prior to the start of the study.

Study Subjects

The target population was the individual patient who collected medications over the outpatient pharmacy counter in this district hospital between 1 October 2016 and 31 December 2016. Patients aged 18 years and above who had at least one prescription refills in the past 6 months, and patients who understood Malay or English language met the inclusion criteria. Participants retained the right to withdraw from the study at any point of time during the research period.

This study was powered with a sample size to detect a mean score difference of 4.6 (standard deviation=10.69) between TCS and VAS.[19] From PS Power and Sample Size Calculation Program[21], 86 respondents were required for both TCS and VAS groups, respectively (ratio 1:1), to obtain 80% power and 0.05 type 1 error level. A total of 105 respondents were required for each group after accounted for 20% dropout rate.

Patients who received TCS and VAS were arranged in the chronological order according to the time and date they received their respective services. For mail pharmacy service arm, universal sampling method was used due to its limited population, whereby all patients who received this service were recruited as study subjects. The remaining VAS study subjects were then identified via systematic sampling method, in which every third patients receiving integrated drug dispensing system and appointment card services were recruited until a total number of 105 VAS study subjects was met. This was done by initially enrolling study subjects into the integrated drug dispensing system group (due to its smaller sample size), followed by recruiting study subjects into the appointment card group. On the other hand, systematic sampling method was utilized to recruit every third study subjects into the TCS group until a total of 105 were met.

Data Collection

Pre-set data collection form/questionnaire was developed for the interview sessions with patients. The questionnaire was adapted from Chan *et al*.[19], with permission granted by the corresponding author Chan HK and colleagues in their study titled 'Satisfaction with traditional counter versus value-added services for prescription claims in a Malaysian Tertiary Hospital', prior to the conduct of the current study. The questionnaire included patients' demographic data (i.e. age, sex, race, educational level, employment, income, number of morbidities, and number of medication), and ten statements regarding their satisfaction level towards the TCS or VAS they received previously. Telephone interviews with the patients were conducted either in Malay or English language by two registered pharmacists during office hours. Verbal consent was obtained from every respondent prior to the start of the interview session. If eligible respondents refused to give their consent or would like to stop the interview sessions, the conversations would be terminated immediately.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 24. Descriptive statistics were presented either as continuous data with means and standard deviations or as categorical data with frequencies and percentages. The baseline demographic data of respondents were compared by using either the independent t-test for continuous data (i.e. age, number of morbidity, and number of medication) or Pearson's Chi-square test for categorical data (i.e. sex, race, educational level, and employment). There were five individual statements in general aspects and five individual statements in technical aspects of the questionnaire. Each statement was scored on a five-point Likert-scale, namely 1 (strongly disagree), 2 (disagree), 3 (uncertain), 4 (agree), and 5 (strongly agree). Hence, total satisfaction scores could range from 10 to 50. The negative statement (the fifth statement) was reversed in order to be analyzed with other statements. Initial comparison of mean satisfaction scores between VAS and TCS groups were computed with the independent t-test. Further analysis with ANCOVA was performed to compare mean satisfaction scores between these two groups. Evaluations of mean satisfaction scores among the three types of VAS were performed with Kruskal-Wallis test. A confidence interval of 95% was utilized and results are statistically significant when the p-value was <0.05 (two-tailed).

RESULTS

There were 209 out of 210 respondents completed the interview sessions with the researchers, yielding 99.5% response rate. There was only one TCS respondent had trouble understanding Malay or English language. Data from that respondent was excluded from statistical analysis. The demographic data of respondents are presented in Table 1.

The Cronbach's alpha values for the general aspects domain, technical aspects domain, and the whole tool were 0.961, 0.836, and 0.947 respectively. The majority of the respondents (86.2%) scored a mean total satisfaction score of 31 or more out of 50 regardless of service types. Overall, 93 (89.4%) TCS respondents and 101 (96.2%) VAS respondents were satisfied with the services they received from the outpatient pharmacy department (defined as having mean total satisfaction scores of 31 and above). The mean satisfaction scores of TCS and VAS groups were compared and summarized in Table 2. VAS group showed statistically significant higher total mean satisfaction score compared to TCS (p=0.002). After adjusted for demographic variables (i.e. age, sex, race, educational level,

Table 1. Demographic data of respondents

Variables (N=209)	TCS (n=104)	VAS (n=105)	p-value
Age, n (SD)	55.63 (15.44)	61.87 (13.40)	0.002[a]
Sex, n (%)			0.060[b]
Male	64 (55.7)	51 (44.3)	
Female	40 (42.6)	54 (57.4)	
Race, n (%)			0.012[b]
Malay	63 (60.0)	42 (40.0)	
Chinese	21 (38.9)	33 (61.1)	
Indian	20 (40.0)	30 (60.0)	
Educational level, n (%)			0.186[b]
No formal education/Primary	28 (43.1%)	37 (56.9%)	
Secondary	47 (49.0%)	49 (51.0%)	
Tertiary	29 (60.4%)	19 (39.6%)	
Employment, n (%)			0.054[b]
Self-employed	13 (44.8%)	16 (55.2%)	
Employee	31 (67.4%)	15 (32.6%)	
Pensioner	37 (43.0%)	49 (57.0%)	
Unemployed	23 (47.9%)	25 (52.1%)	
Income, n (%)			0.352[b]
Less than MYR1,000	56 (47.1%)	63 (52.9%)	
MYR1,001-MYR3,000	38 (50.7%)	37 (49.3%)	
More than MYR3,000	10 (66.7%)	5 (33.3%)	
Number of morbidity, n (SD)	1.52 (0.65)	1.90 (0.87)	<0.001[a]
Number of medication, n (SD)	3.62 (1.76)	4.73 (2.32)	<0.001[a]

[a]p-value of independent t-test.
[b]p-value of Pearson's Chi-Square test.
SD=standard deviation; TCS=traditional counter service; VAS=value added-services

employment, income, number of morbidity, and number of medication), VAS respondents were still statistically more satisfied than TCS respondents, as reflected via mean satisfaction score in general aspects (VAS=22.03, 95% CI 20.98:23.07 versus TCS=18.93, 95% CI 17.89:19.98; p<0.001), technical aspects (VAS=22.63, 95% CI 22.03:23.23 versus TCS=20.94, 95% CI 20.33:21.54; p<0.001), as well as in total mean satisfaction score (VAS=44.66, 95% CI 43.07:46.24 versus TCS=39.88, 95% CI 38.29:41.46; p<0.001).

Table 3 shows the comparisons of satisfaction scores among VAS respondents for three different types of services. All integrated drug dispensing system respondents were satisfied with the amount of money they spent for the service compared to appointment card and mail pharmacy respondents (p=0.005). However, integrated drug dispensing system respondents also showed least satisfaction level regarding the time they needed to spend to get the medications compared to the other two VAS respondents (p=0.046).

DISCUSSION

This study was conducted to evaluate and compare the satisfaction of patients receiving TCS versus VAS. VAS are novel services introduced to improve pharmacy efficiency in delivering medications to patients.[17] The tool used to assess respondents' satisfaction had internal consistency coefficients in the range of 0.836 to 0.961, which were considered as desirable by Numally.[22]

Overall, TCS respondents demonstrated more dissatisfaction than those receiving VAS. This was

Table 2. Comparisons of satisfaction scores between traditional counter service and value added-services respondents.

Item	Mean satisfaction score		Mean difference (95% CI)	p-value[a]
	TCS (n=104)	VAS (n=105)		
General aspects				
1	3.89	4.27	-0.37 (-0.61, -0.14)	0.002
2	3.89	4.21	-0.32 (-0.56, -0.07)	0.012
3	3.69	4.25	-0.56 (-0.83, -0.28)	<0.001
4	3.78	4.07	-0.29 (-0.57, -0.00)	0.048
10	3.97	4.38	-0.41 (-0.59, -0.23)	<0.001
Subtotal	19.23	21.17	-1.94 (-3.08, -0.80)	0.001
Technical aspects				
5	4.89	4.95	-0.06 (-0.15, 0.03)	0.205
6	4.16	4.41	-0.25 (-0.40, -0.10)	0.002
7	3.90	4.09	-0.18 (-0.45, 0.09)	0.188
8	4.15	4.37	-0.22 (-0.38, -0.06)	0.007
9	4.17	4.39	-0.22 (-0.36, -0.08)	0.002
Subtotal	21.27	22.21	-0.90 (-1.57, -0.23)	0.008
Total	40.49	43.39	-2.81 (-4.56, -1.05)	0.002

[a]p-value <0.05 is considered statistically significant (independent t-test).
CI=confidence interval; SD=standard deviation; TCS=traditional counter service; VAS=value added-services.

Table 3. Comparisons of satisfaction scores among value added-services respondents

Item	Mean satisfaction score		Integrated drug dispensing system (n=41)	p-value[a]
	Appointment card (n=53)	Mail pharmacy (n=11)		
General aspects				
1	4.34	4.64	4.07	0.100
2	4.25	4.55	4.07	0.207
3	4.34	4.64	4.02	0.046
4	3.98	4.64	4.02	0.178
10	4.38	4.64	4.32	0.161
Subtotal	21.28	23.09	20.51	0.213
Technical aspects				
5	4.98	4.64	5.00	0.005
6	4.43	4.64	4.32	0.131
7	3.96	4.64	4.10	0.186
8	4.45	4.64	4.20	0.073
9	4.42	4.64	4.32	0.161
Subtotal	22.24	23.20	21.94	0.074
Total	43.52	46.29	42.45	0.064

[a]p-value <0.05 is considered statistically significant (Kruskal-Wallis test).

translated to a lower total mean satisfaction score especially in the general aspects. The mean satisfaction scores of the general and technical aspects were significantly higher in VAS group as well. These findings were different from a previous study conducted by Chan *et al*.[19], in which the VAS respondents showed significantly higher mean satisfaction score in the general aspects only. Of note, VAS studied in the former research involved mail pharmacy, call-and-collect, and drive-through pharmacy services, while the current one involved appointment card service, mail pharmacy, and integrated drug dispensing system. These two health care centers offered different VAS and patients might select VAS according to their preferences, subsequently affecting their satisfaction levels.

In a study performed at the University of Southern California, Los Angeles, United States of America, the overall satisfaction of patients with the pharmaceutical services was found to be strongly linked to their satisfaction with the waiting time.[23] This was supported by the current study, which showed respondents who used TCS demonstrated the lowest mean satisfaction score for the time they spent to collect medications over the pharmacy counter. This finding was also in-parallel with other studies, which reported a negative correlation between waiting time and satisfaction level.[4,10-14] During normal operating hours, pharmacist received a high amount of prescriptions over the counter every day. Long preparation time is required from the point when a prescription is being received, as it will be subsequently subjected to screening, filling, labeling, counter-checking, and lastly to the dispensing counter. Even though most of the prescriptions can be dispensed within the designated 30-minutes duration, patients have to wait at the pharmacy for this whole process to complete prior to receiving their respective medications. In contrary, medications in VAS are prepared in advance and ready to be dispensed according to the types of services, and thus reducing the amount of time spent in the pharmacy. The introduction of VAS was proven to be effective in reducing patient waiting time over the pharmacy counter. As reported by Loh *et al*.[20], the average waiting time of TCS was reduced significantly before versus after VAS promotion program (21.2 minutes; SD=7.1 vs 17.7 minutes; SD=12.9; p=0.033).

Both TCS and VAS groups showed higher mean satisfaction score for technical aspects and this was in-line with a study conducted by Chan *et al*.[19] However, it is noteworthy that both groups had the least satisfaction with the correct number of medications they received. This could be due to the fact that data collection was conducted during the period when the level of medication stock, especially antihypertensive and antidiabetic agents, was at stake. This was consistent with the finding by Abdosh[10] who reported that the availability of drugs was closely related to the overall satisfaction. Despite the problem with drug accessibility, respondents in the current study still felt that VAS saved their time and made it easier for them to get their medications refilled compared to the TCS. Nonetheless, additional preventive measures and efforts should be taken in order to ensure patients able to get sufficient medications refill irrespective of the types of services they received. Inevitable frequent visits to the pharmacy for medication refills might result in mental and physical stress to the patient and subsequently lead to a poorer quality of life. However, this is beyond the scope of the current study, and the causal relationship can be explored in the future.

In VAS group, particularly appointment card service, the lowest mean satisfaction score in the technical aspects was the correct number of medications respondents received from that service. Interestingly, the same VAS respondents claimed that the service did not make their life easier. Frequent visits to the pharmacy counter for partial medications supply due to stock shortage might be accounted for these results. Nevertheless, the majority of the VAS respondents agreed that they did not spend much money in getting their medications refilled. This is especially true for respondents who experienced integrated drug dispensing system, as it enables patients to collect their medications from the nearest government-subsidized health care facilities without hassle to travel afar. Contradictory, mail pharmacy respondents less agreed on the expenditure they were required to pay for the service. This is because some amount of payment is compulsory for mail pharmacy courier service, yet no payment required for appointment card and integrated drug dispensing system. Among three different VASs, integrated drug dispensing system respondents were found to have lower mean

satisfaction score in both general aspects and technical aspects compared to the other two pharmacy services. While patients using this service to collect their medications at the nearest facility without additional charges, they still need to receive their medications via traditional counter services at the appointed facility. Different finding was observed from a former study by Chan *et al*.[19], in which mail pharmacy service scored the lowest for both general and technical aspects particularly the expenditure for the service. This finding must be interpreted with caution as there was limited sample size for mail pharmacy service in the former and current studies.

Most of the studies reported a negative association between the number of medications received by the patients and their satisfaction with the pharmacy services.[19,24,25] It was hypothesized that patients with higher number of medications tend to have lower health status[24], and this was linked to lower levels of satisfaction with medical care.[26,27] Monthly income was also found to be correlated with satisfaction levels. Patients with higher socioeconomic status tend to be easily satisfied with the pharmacy services.[28] Other possible predictors for patients' satisfaction included convenience of prescription filling, self-assessed positive health status, communication between provider and patient and the view of prescription drugs as being inexpensive.[29] Factors that might predict the use of VAS against TCS were not explored in this study because pharmacists might have selected patients into the service with which they thought patients were most satisfied. Elderly, patients with more comorbidities and those with a higher number of medications were more likely to be selected for appointment card services as it enabled pharmacy staffs to get their medications refilled and counter checked beforehand, therefore reduce the waiting time via TCS. On the other hand, patients who sought medical treatment in this hospital but stay afar might have chosen integrated drug dispensing system as it enables them to collect medications at their conveniences.

Study Limitations

Despite the strengths showed, there were some limitations that should be considered. Firstly, the current study was conducted in a district hospital setting with fewer patient populations. Although the results observed were similar to that of the former study, generalization to other health care facilities might not be appropriate without taking into consideration of patients from different settings, socio-demographic background, and clinical characteristics. Secondly, systematic sampling and universal sampling methods were used for study subject selection without proper randomization. This was reflected through imbalanced numbers of respondents in different VAS groups, with the least numbers of respondents from the mail pharmacy service. Self-selection bias could also be observed in the current study, as elderly, patients with more comorbidities, and those with higher numbers of medications were recruited in the VAS groups. Thirdly, patients' demographic and satisfaction data were collected via telephone interviews, thus potentially involved self-interest bias, recall bias, and other confounding factors. Lastly, the questionnaires might be restructured to explore the impact of other dimensions towards patients' satisfaction, such as self-assessed health status, acceptance towards new services, and perceptions towards medications.

CONCLUSIONS

This study revealed that respondents were generally more satisfied with VAS compared to TCS for prescription refills. The same finding could be observed after confounding factors were controlled. Among three VASs provided, mail pharmacy was the most satisfied service, followed by appointment card service and integrated drug dispensing system. Due to a limited number of respondents in certain VAS group, the result should be interpreted with caution. A longitudinal study is necessary to examine the impact of other dimensions and other types of VAS on patients' satisfaction levels.

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CONFLICT OF INTEREST

None.

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Original Research

Health literacy and knowledge in a cohort of Australian patients taking warfarin

Angela W. YIU, Beata V. BAJOREK.
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Abstract

Objectives: To 1) characterise older patients taking warfarin, 2) assess these patients' level of warfarin knowledge, and 3) describe their strengths and limitations in health literacy, and 4) explore relationships between participants' characteristics, warfarin knowledge and health literacy.

Methods: A warfarin knowledge questionnaire and Health Literacy Questionnaire (HLQ) were administered to older patients (aged >65 years, N=34) taking warfarin in an Australian general practice setting.

Results: Key gaps in participant knowledge pertained to the consequences of an international normalized ratio (INR) being below the target INR range and safety issues such as when to seek medical attention. A limitation for participants with a lower level of health literacy was the ability to appraise health information. Patients who needed assistance in completing the HLQs had significantly lower warfarin knowledge scores (p=0.03). Overseas-born participants and those taking 5 or more long-term medications had lower HLQ scores for specific scales (p<0.05).

Conclusion: In this study warfarin knowledge gaps and a limitation of health literacy amongst a small sample of older patients were identified. The findings suggest that education and resources may need to be tailored to the needs of older patients taking warfarin and their carers to address these knowledge gaps and limitations in health literacy. Patients who may need greater support include those that need assistance in completing the HLQ, are overseas-born, or are taking 5 or more long-term medications.

Keywords

Patient Medication Knowledge; Warfarin; Aged; Health Literacy; Patient Education as Topic; Surveys and Questionnaires; Australia

INTRODUCTION

As the use of oral anticoagulants continues to rise, more attention is being paid to how well patients are being supported in their management of these treatment regimens. This is particularly the case in older persons who are high users of these medications for long-term indications, including stroke prevention in atrial fibrillation.[1,2] Older people are vulnerable to experiencing harm from so-called 'high alert' medicines, such as warfarin (traditional anticoagulant).[3] Therefore, patient education regarding adverse effects (i.e., bleeding), dietary Vitamin K consumption, potential drug interactions, need for regular monitoring, and actions around missed doses, is paramount[4] especially during transitions of care between hospital and primary care settings.[5] Despite the advent of direct oral anticoagulants (DOACs), warfarin and warfarin education may still be needed in certain patient populations who are not good candidates for DOACs, such as those patients who have: mechanical heart valves[6]; a creatinine clearance of <30mL/minute (calculated by the Cockcroft-Gault equation) ; haemodialysis[7]; other specific contraindications; and/or who cannot afford the relatively higher costs of the newer agents (depending on the medication subsidies available in each country).[8]

Angela W. YIU. BPharm, B Medical Science. Pharmacist. Graduate School of Health, University of Technology of Sydney. Ultimo, NSW (Australia). Angela.W.Yiu@student.uts.edu.au
Beata V. BAJOREK. PhD BPharm DipHospPharm GradCertEdStud(HigherEd). Associate Professor. Graduate School of Health, University of Technology of Sydney. Ultimo, NSW (Australia). Beata.Bajorek@uts.edu.au

The education of older persons regarding warfarin has, however, been suboptimal, contributing to poor therapeutic outcomes, such as sub- or supra-therapeutic INRs, adverse events (e.g., bleeds), or an increase in hospitalisations.[9] Educational challenges are more pronounced in older patients due to changing cognition, function, and psychological wellbeing, as well as lower health literacy.[10,11] Regarding the latter, the World Health Organisation (WHO) defines health literacy as `the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health' and 'implies the achievement of a level of knowledge, personal skills and confidence to take action to improve personal and community health by changing personal lifestyles and living conditions'.[12] In Australia, almost 60% of adults (15 to 74 years) have low health literacy[13], and it has been shown that older age is associated with lower health literacy scores.[14]

Health literacy has been recognized as a multi-dimensional concept and newer tools are now available to measure health literacy across several different domains.[15] In patients taking warfarin, low health literacy has been associated with deficits in warfarin knowledge.[16] Recognition of this is critical to developing effective educational interventions or resources to better support patients taking oral anticoagulants. To our knowledge in Australia, there have been no studies that have assessed both warfarin knowledge and the health literacy of older persons who are taking oral anticoagulants in a primary care setting. This is important given the increasing use of anticoagulation, and that warfarin therapy remains a

primary therapy, despite the increasing availability of alternative agents.

Therefore, the objectives of this descriptive pilot study were to: (1) report the characteristics of older patients taking warfarin in the local Australian primary care setting; 2) assess these patients' level of knowledge about warfarin; 3) describe their strengths and limitations in health literacy, and 4) explore relationships between participants' characteristics, warfarin knowledge and health literacy.

METHODS

Study Design

A descriptive, questionnaire-based pilot study was conducted in an Australian general practice (primary care) setting between September 2015 and January 2016. Approval to conduct this study was granted by the Human Research Ethics Committee of the University of Technology of Sydney (Project number: 201 4000 863).

Setting

A general practice medical centre in The Hills Shire (Greater Western Sydney, New South Wales, Australia) was the primary location for this study due to its ageing population[17] and therefore the high prevalence of warfarin users being treated for atrial fibrillation.

Participants and recruitment

The study participants comprised older patients who were:

- ≥ 65 years of age
- taking warfarin therapy for a long-term indication (regardless of when the medication was initiated)
- cognitively intact (based on the clinician's confirmed assessment and knowledge of the patient during the screening process)
- able to communicate in English
- able to provide informed consent

For patients who were unable to fulfill the last three inclusion criteria, the primary carer who was responsible for managing their warfarin therapy was invited to participate instead. The carer was asked to complete the surveys based on their own knowledge and health literacy.

To recruit participants, the medical centre staff (5 general practitioners, and one on-site cardiologist) screened their electronic patient records to identify 87 potential participants (80 patients and 7 carers) that met study criteria. 36 participants agreed to participate in the study, however, 2 participants dropped out during the study due to a lack of time to complete the questionnaires and provide feedback. Fifty one participants declined to participate in the study. The target sample size was based on an estimate of the proportion of participants likely to attain correct answers to the brief warfarin knowledge questionnaire. Using a point-estimate of effect of 65% (proportion of patients likely to get at least half the answers correct[18], with 90% confidence and 10% precision, the target sample size was 34 participants.

A medical receptionist then sent (via postal mail) each patient a generic letter informing them about the study and inviting them to contact the main researcher (AY). Non-responders received a once-only telephone call from the medical centre to follow up on the invitation (one week post first mail out). On contacting the researcher, the person's eligibility (per inclusion criteria) was confirmed and consent to participate in the study was obtained.

Data collection

Data collection occurred during scheduled face-to-face appointments with the researcher at the medical centre, or via the telephone. A set of questionnaires was used:

- purpose-designed questionnaire to record participants' medical history, medication history, history of warfarin use, previous education received about warfarin
- customised brief Warfarin Knowledge Questionnaire
- Health Literacy Questionnaire (HLQ).[19]

Warfarin Knowledge Questionnaire

To assess participants' knowledge about basic aspects of warfarin therapy, a brief customised 10-item questionnaire was developed. The questionnaire comprised a selection of open-ended and closed-ended questions (e.g., multiple choice answer-style questions), comprising nine questions used in previous studies[20-22] and one additional question (question 8) designed by the authors (online Appendix). This shorter customised questionnaire was used instead of others (e.g., Oral Anticoagulation Knowledge test (OAK), Anticoagulation Knowledge Assessment (AKA), Anticoagulation Knowledge Test (AKT)) to enable time-efficient knowledge assessment via a researcher-administered questionnaire, and to allow open-ended responses in this target older patient population.[20,23,24] The responses provided to the open-ended questions were categorised thematically and coded to enable quantitative analysis of data. Responses to all questions were given a score of 1 for a correct answer being given; each question had equal weighting. The participant's overall level of basic warfarin knowledge was reported as a total score out of ten, where a score 5 or greater out of 10 was considered as high or good knowledge. A score less than 5 out of 10 was considered as low or poor knowledge, as adapted from a previous study.[25]

Within this descriptive study, no further validation of the shortened questionnaire was undertaken beyond checking of face validity and pilot-testing among the researchers.

Health Literacy Questionnaire (HLQ)

The HLQ was chosen to determine health literacy after consideration of other studied health literacy measures such as the Newest Vital Sign[26], shortened version of the Test of Functional Health Literacy in Adults (S-TOFHLA)[26], shortened version of the Test of Functional Health Literacy in Adults (S-TOFHLA)[27], Rapid Estimate of Adult Literacy in Medicine- Short Form (REALM-SF)[28] and the Short Assessment of Health Literacy-English (SAHL-E).[29] The latter tools only focus on reading ability, comprehension and numeracy, and some also have substantive psychometric weaknesses, drawing different conclusions when applied

Table 1. Characteristics of participants (N=34)

Participant characteristics	Patients (n=30) (% in subgroup)	Carers (n=4) (% in subgroup)	Warfarin knowledge score (N=34)		p-value*
			Mean (SD)	Median (IQR)	
Median age (years), IQR	81.0, 11.0	61.0, 35.5	N/A	N/A	N/A
Age range (years)	67.0 to 99.0	43.0 to 85.0	N/A	N/A	N/A
Age Group (years)					P =0.37
<80 years	12 (40.0)	3 (75.0)	8.3 (1.8)	9.0 (0.8)	
≥80 years	18 (60.0)	1 (25.0)	8.1 (1.4)	8.0 (2.3)	
Gender					P=0.76
Male	24 (80.0)	1 (25.0)	8.1 (1.7)	8.0 (1.5)	
Country of birth					P=0.47
Born in Australia	21 (70.0)	1 (25.0)	8.2 (1.1)	8.0 (2.0)	
Born from overseas †	9 (30.0)	3 (75.0)	8.0 (2.2)	9.0 (3.3)	
English spoken at home	30 (100.0)	3 (75.0)	8.1 (1.6)	9.0 (2.0)	P=0.71
Aboriginal	1 (3.3)	0	N/A	N/A	P=0.77
Education and schooling					P=0.25
Primary school or less	1 (3.3)	0	N/A	N/A	
High school-partial completion	8 (26.7)	2 (50.0)	8.3 (1.2)	8.0 (2.3)	
High school (completed)	5 (16.7)	0	8.4 (1.9)	9.0 (2.5)	
TAFE or Trade	8 (26.7)	0	7.8 (1.2)	8.0 (2.3)	
University	8 (26.7)	2 (50.0)	8.4 (2.1)	9.0 (0.8)	
Private health insurance	25 (83.3)	3 (75.0)	8.2 (1.5)	8.5 (1.8)	P=0.95
Assistance required †† for the completion of the HLQ questionnaire	9 (30.0)	0	7.4 (1.1)	7.0 (2.0)	P=0.03
Lives alone	10 (33.3)	0	8.5 (1.5)	9.0 (2.5)	P=0.38

* Comparison of warfarin knowledge scores across subgroups using Mann-Whitney test.
† Born in countries including Germany, Taiwan, Philippines, New Zealand, United Kingdom and Malaysia.
†† Assistance refers to explaining questions, statements and responses to the participant.
Abbreviations: SD=standard deviation; IQR =Interquartile range; N/A: not applicable; TAFE: Technical And Further Education

concurrently, and providing limited guidance on how to improve health literacy.[14,19]

The HLQ uses a multidimensional health literacy profile which provides better insight into the health literacy strengths and limitations of both individuals and populations.[19] This tool may better reflect the overall health literacy of an individual, as it captures the broad components that contribute to it[30] and key elements from the perspective of the general population, practitioners and policymakers.[19] The HLQ scales have strong to very strong psychometric properties and provide unique insights across nine independent indicators of health literacy.[19] The HLQ comprises of 44 questions which can be administered quickly (reported average of 7 to 30 minutes) in 14 different languages.[31]

The validated HLQ measures health literacy and comprises 44 items spread across 9 scales.[15] For each item, participants were asked to respond as follows (Table 3):

- for scales 1 to 5: Strongly Disagree=1, Disagree=2, Agree=3, Strongly agree=4.
- for scales 6 to 9: Cannot do =1, Very Difficult=2, Quite Difficult =3, Quite Easy =4, Very easy =5.

To determine the overall scale scores, item scores were added and the sum divided by the number of items in that specific scale.[15] Using these scale scores, participants with a lower level of health literacy for a particular scale were defined as those having a:

- mean scale score of <3 for scales 1 to 5. That is, they on average "strongly disagree" or "disagree" with the item statement
  OR
- mean scale score of < 4 for scales 6 to 9. That is, they on average "cannot do" or find it "very difficult" or "quite difficult" to do those tasks listed in the item statements.

Conversely, participants with a higher level of health literacy for a particular scale were defined as having a:

- mean scale score of 3 or more for scales 1 to 5. That is, they on average "strongly agree" or "agree" with the item statements
  OR
- mean scale score of ≥4 for scales 6 to 9. That is, they on average found it "quite easy" or "very easy" to do the tasks listed in the item statements.

Data Analysis

Quantitative data were analysed using the software program IBM SPSS version 23.0 (SPSS Inc., Chicago, II, USA), and Microsoft Excel. Descriptive statistics, such as measures of central tendency (e.g., means, medians), were used to summarise the characteristics of the participants and responses to survey questions. Categorical variables were expressed as frequencies and percentages, and continuous variables were presented as medians (interquartile range). Inferential statistics (non-parametric tests, e.g., chi-square test, Mann-Whitney U test, Spearman correlation test) were used to explore differences in characteristics and responses between patient sub-groups, and to explore the relationship between warfarin knowledge and health literacy. A significant difference was defined as $p<0.05$. The categorisation of HLQ scores into lower and higher literacy does not rely on an assumption of normality in the data, and hence mean cut-off scores were used to categorise data.

Table 2. Patients' history of warfarin use, medical conditions and medications

Warfarin use and information provision Number of participants (% in subgroup)	Patients who self-manage their warfarin (N=30)	Patients whose warfarin is managed by carers (N=4)	All participants (N=34)
Duration of warfarin use			
< 1 years	2 (6.7)	0	2 (5.9)
1 to 5 years	7 (23.3)	3 (75.0)	10 (29.4)
6 to 10 years	10 (33.3)	1 (25.0)	11 (32.4)
11 to 15 years	5 (16.7)	0	5 (14.7)
16 to 20 years	3 (10.0)	0	3 (8.8)
>20 years	3 (10.0)	0	3 (8.8)
Indication for warfarin			
Atrial Fibrillation (AF)	19 (63.3)	2 (50.0)	21(61.8)
Stroke or transient ischaemic attack	2 (6.7)	1 (25.0)	3 (8.8)
AF and stroke or transient ischaemic attack	2 (6.7)	0	2 (5.9)
Deep vein thrombosis or Pulmonary Embolism	5 (16.7)	0	5 (14.7)
Valve replacement	2 (6.7)	1 (25.0)	3 (8.8)
Chronic medical conditions (≥3)	28 (93.3)	4 (100.0)	32 (94.1)
Types of medical conditions			
Cardiovascular	30 (100)	4 (100)	34 (100)
Respiratory	15 (50.0)	1 (25.0)	16 (47.1)
Rheumatology	13 (43.3)	3 (75.0)	16 (47.1)
Endocrine	12 (40.0)	2 (50.0)	14 (41.2)
Other ‡	17 (56.7)	4 (100.0))	21 (61.8)
Gastrointestinal	13 (43.3)	1 (25.0)	14 (41.2)
Neurology	8 (26.7)	2 (50.0)	10 (29.4)
Liver or kidney	8 (26.7)	1 (25.0)	9 (26.5)
Psychotropic	4 (13.3)	4 (100.0)	8 (23.5)
Cancer	5 (16.7)	2 (50.0)	7 (20.6)
Stroke or transient ischaemic attack	4 (13.3)	1 (25.0)	5 (14.7)
Polypharmacy (5 or more long term medications)	26 (86.7)	4 (100)	30 (88.2)
Number of patients taking long term medications in the following categories ‡ ‡			
Antithrombotic	30	4 (100)	34 (100)
Cardiovascular	26	4 (100)	30 (88.2)
Herbs/vitamins	18	4 (100)	22 (64.7)
Gastrointestinal	15	4 (100)	19 (55.9)
Analgesics	13	1 (25)	14 (41.2)
Dermatological	12	1 (25)	13 (38.2)
Respiratory	12	0	12 (35.3)
Psychotropic	9	3 (75)	12 (35.3)
Endocrine	8	2 (50)	10 (29.4)
Rheumatology	8	0	8 (23.5)
Genitourinary	8	0	8 (23.5)
Ophthalmic	6	1 (25)	7 (20.6)
Neurological	4	1 (25)	5 (14.7)
Antimicrobial	3	0	3 (8.8)
Other‡‡‡	11	1 (25)	12 (35.3)

‡ Other conditions include; ophthalmology, dermatology, ear, genitourinary, peripheral neuropathy, restless legs syndrome,obesity, bone marrow disorder and shingles.
‡‡ Patient's records may have reported more than one long term medication.
‡‡‡ Other long term medications include; ear ointment, antifungal, iron chelator, non-cytotoxic antineoplastic, intranasal corticosteroid spray and somatostatin analogue.
‡‡‡‡ Primary care settings include; General Practice Medical Centre, Community Pharmacy and Specialist's office.
Abbreviations: AF = atrial fibrillation; NA= Not Applicable.

RESULTS

Participant characteristics

Among the study's 34 participants, 30 were patients taking warfarin and 4 were carers of patients taking warfarin (Table 1). The median age for patients was 81.0 years, 80.0% were male, and 30.0% were born overseas. The highest level of education attained by the majority of patients was: University (26.7%), Technical and Further Education or Trade (26.7%) and partial high schooling (26.7%). The median age of carers was 61.0 years (range 43 to 85 years), with three being overseas-born females. Two carers completed partial schooling and the other two carers were university educated.

Approximately 94.1% of patients (n=32) had multimorbidity (i.e., co-occurrence of 3 or more chronic conditions[32]) and 88.2% (n=30) used polypharmacy (i.e. 5 or more medications[33]) (Table 2). Aside from cardiovascular issues, the most common chronic medical conditions were: respiratory (47.1%) and rheumatological (47.1%) (Table 2). The most common number of long-term medications used were: antithrombotics (100%) cardiovascular (88.2%) and complementary and alternative medicines (CAMS) including herbs or vitamins (64.7%) (Table 2).

The prevailing indication for warfarin was stroke prevention in atrial fibrillation (61.8%). Most patients had been taking warfarin for between 6 to 10 years (32.4%) and recalled

Table 2. (cont.) Patients' history of warfarin use, medical conditions and medications

Warfarin use and Information provision Number of participants (% in subgroup)	Patients who self-manage their warfarin (N=30)	Patients whose warfarin is managed by carers (N=4)	All participants (N=34)
Time since information about warfarin was last received			
0 to 1 years	4 (13.3)	0	4 (11.8)
1 to 5 years	9 (30)	3 (75.0)	12 (35.3)
6 to 10 years	9 (30)	0	9 (26.5)
11 to 15 years	2 (6.7)	0	2 (5.9)
16 to 20 years	2 (6.7)	0	2 (5.9)
>20 years	3 (10.0)	0	3 (8.8)
Not sure	1 (3.3)	1 (25.0)	2 (5.9)
Main provider or warfarin education / information when warfarin was initiated			
General Practitioner/Specialist	23 (76.7)	3 (75)	26 (76.5)
Pharmacist	2 (6.7)	0	2 (5.9)
General Practitioner/Specialist and Nurse	4 (13.3)	0	4 (11.8)
Not sure	1 (3.3)	0	1 (2.9)
No one	0	1 (25)	1 (2.9)
Location of education:			
Primary care setting‡‡‡‡	15 (50.0)	0	15 (44.1)
Hospital setting	12 (40.0)	2 (50)	14 (41.2)
Primary care and hospital settings	3 (10.0)	0	3 (8.8)
Not sure	0	1 (25)	1 (2.9)
Patient self-reported nil counselling received	0	1 (25)	1 (2.9)

‡ Other conditions include; ophthalmology, dermatology, ear, genitourinary, peripheral neuropathy, restless legs syndrome,obesity, bone marrow disorder and shingles.
‡‡ Patient's records may have reported more than one long term medication.
‡‡‡ Other long term medications include; ear ointment, antifungal, iron chelator, non-cytotoxic antineoplastic, intranasal corticosteroid spray and somatostatin analogue.
‡‡‡‡ Primary care settings include; General Practice Medical Centre, Community Pharmacy and Specialist's office.
Abbreviations: AF = atrial fibrillation; NA= Not Applicable.

receiving warfarin education from their general practitioner or specialist doctor (76.5%). The location of their warfarin education was most commonly a primary care setting (44.1%). The time since the participant last recalled receiving information about warfarin was 1 to 5 years (35.3%) for most patients. One carer reported never receiving any formal warfarin education.

Assessment of Warfarin Knowledge

Across the 34 participants, the mean warfarin score out of 10 was 8.3, indicating a good level of knowledge about the basic aspects of warfarin use. The questions that received the highest proportion of correct responses (Figure 1) were:

- question 1 (97.1%): "Reason for taking warfarin"
- question 8 (97.1%): "Informing other health care providers"
- question 3 (88.2%): "What to do if you miss a dose of warfarin"

The questions that received the lowest proportion of correct responses were:

- question 6: "The importance of a consistent diet" (58.8%)
- question 10: "When to seek urgent medical attention" (67.6%) and
- question 5: "What happens if an INR value is below the target INR range" (73.5%)

The mean warfarin knowledge score was the same for face-to-face and telephone interviews.

Assessment of Health Literacy

Table 3 summarises the median scores for each HLQ scale. The strengths and limitations for the sample population can be explained in terms of the number of participants with a lower or higher level of health literacy for each scale. The scale with the largest number of participants demonstrating a lower level of health literacy (N=17) was scale 5 ("Appraisal of health information"), i.e., many more participants indicated that they did not consistently appraise the quality and reliability of health information.

The scales with the most participants with a higher level of literacy was scale 1 ("Feeling understood and supported by healthcare providers") (N=32) and scale 6 ("Ability to actively engage with healthcare providers") (N=30).

There were no significant differences between the participants' warfarin knowledge scores and gender, country of birth, Aboriginal or Torres Strait Islander status, whether English spoken at home, number of chronic medical conditions, number of long-term medications, age, private health insurance status, duration of warfarin therapy, and the time since they last were educated about warfarin.

Patients who needed assistance in completing the HLQ had significantly lower warfarin knowledge scores compared to those patients who did not need assistance (p=0.03). Participants born overseas had significantly lower HLQ scores for scale 1 (Feeling understood and supported by healthcare providers) compared to those born in Australia (p=0.01). Participants who took 5 or more long-term medications had lower HLQ scores for scale 9, (Understand health information enough to know what to do) compared to those who took less than 5 medications (p=0.04). There

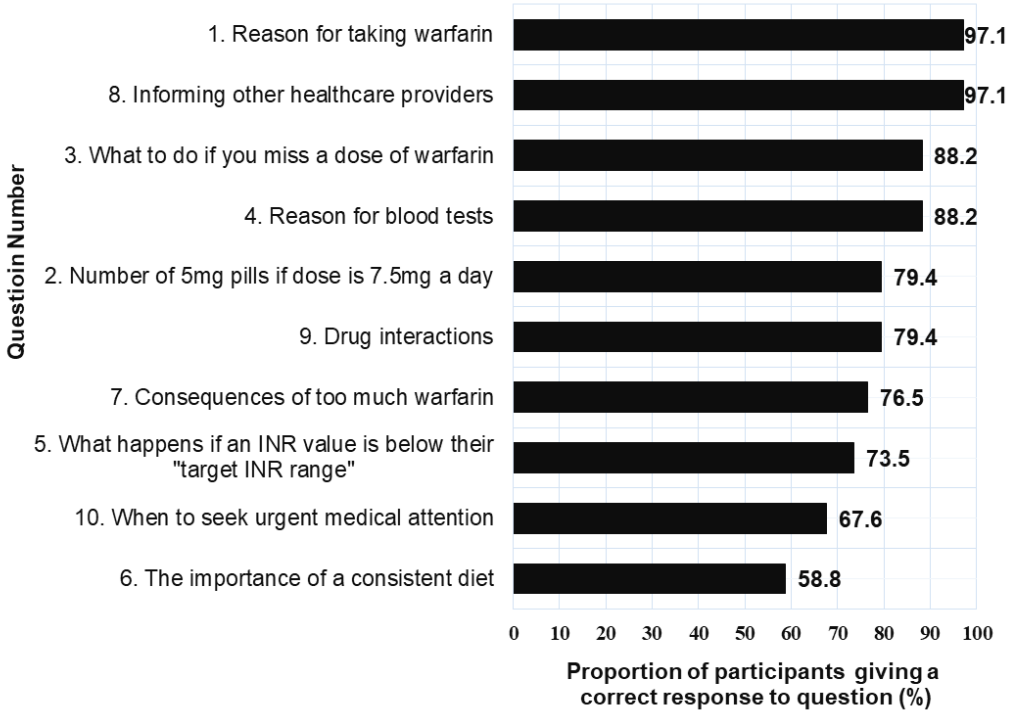

Figure 1. Proportion of participants correctly answering specific questions on Warfarin Knowledge Questionnaire

was no significant association between other characteristics, warfarin knowledge scores and HLQ scores.

DISCUSSION

This study has described the level of warfarin knowledge and assessed the health literacy amongst an older population taking warfarin and a few carers in the local Australian primary care setting.

The majority of participants in our study had several characteristics that highlight why the management of this older population can be complex. Older age has been associated with a lack of warfarin knowledge, low literacy[16] comorbidities[34], polypharmacy and drug interactions.[35] Polypharmacy has been also associated with increased mortality, stroke and major bleeding for patients with atrial fibrillation.[35] Consequently, the need for carer assistance in the management of warfarin for older patients may be required.

The gaps in warfarin knowledge encountered in this study primarily related to medication safety issues and self-management strategies with respect to a consistent diet, recognising when to seek medical attention and actions to

Table 3. Health Literacy Questionnaire (HLQ) scores for all participants (N=34)

	Median score (IQR) for all participants	Number of participants with a lower level of health literacy[§] within individual scale
HLQ Scale	Range 1 (lowest score) - 4 (highest score) [§§]	
1. Feeling understood and supported by healthcare providers (N= 4 items)	3.5 (0.8)	2 (5.9%)
2. Having sufficient information to manage my health (N= 4 items)	3.0 (0.3)	7 (20.6 %)
3. Actively managing my health (N= 5 items)	3.0 (0.7)	12 (35.3%)
4. Social support for health (N= 5 items)	3.1 (0.7)	8 (23.5%)
5. Appraisal of health information (N= 5 items)	2.9 (0.7)	17 (50.0%)
	Range 1 (lowest score) - 5 (highest score) [§§§]	
6. Ability to actively engage with healthcare professionals (N= 5 items)	4.2 (0.6)	4 (11.8)
7. Navigating the healthcare system (N= 6 items)	4.1 (0.5)	7 (20.6)
8. Ability to find good health information (N= 5 items)	4.0 (0.5)	12 (35.3)
9. Understand health information enough to know what to do (N= 5 items)	4.1 (0.8)	10 (29.4)

§ Lower level of health literacy was defined as a mean scale score of less than 3 for scales 1 to 5 and a mean scale score of less than 4 for scales 6 to 9.

§ § Mean Scale scores range between 1 and 4 for the first 5 scales. Items asked from how strongly the participant disagrees (lowest score of 1) to strongly agrees (highest score of 4).

§ § § Mean Scale scores range between 1 and 5 for scales 6 to 9. Items asked how difficult or easy the following tasks are for you now from cannot do (lowest score of 1) to very easy (highest score of 5).

Abbreviations: HLQ, Health Literacy Questionnaire; IQR, interquartile range.

Table 4. Recommended Communication Strategies for healthcare providers to use when caring for people with lower health literacy
• Prioritise the educational domains, standardise the educational content and deliver the content efficiently.[39]
• For leaflets use simple, clear statements in lay terminology that are easy to follow. Use simple and familiar icons and simple list formatting. Ensure patients are able to find information and take the appropriate actions.[57]
• Work with consumers for the development of simple and clear drug information.[57]
• Supplement written information with other modes of delivery such as verbal information, multidisciplinary programs involving doctors, nurses, dieticians and pharmacists, DVD, booklets, audiovisual resources depicting real-life scenarios, brown bag medication reviews, and visual aids.[58]
• Involve the carer and family members when doing patient education to older patients.[9,38]
• Use the teach back method for patients with low literacy to confirm comprehension.[58]
• Help patients to ask questions. For example, ask, "What are your questions?".[58]
• Help patients make decisions about their care. Communicate risks and benefits of information in a balanced and transparent way.[59]

take when the international normalised ratio (INR) readings are outside the desired target range.

A particularly significant finding here is the gap in knowledge regarding knowing when to seek help; in the context of high-risk anticoagulant therapy, patients and their carers must be acutely aware of the signs and symptoms of potentially life-threatening adverse effects from warfarin (e.g., haemorrhage) which require urgent medical attention. Increasing patient's knowledge about these will help to reduce their risk of major complications and poor treatment outcomes (including death).[36,37] These findings are similar to those reported by other studies in the literature, and highlight ongoing problems with respect to patient's understanding of these key points.[9,38] In addition to gaps in warfarin knowledge, the majority of our study participants had not received updated warfarin counselling in more than 1 to 5 years. These results highlight a need for effective and ongoing education with regular follow-up to address the knowledge gaps.

To overcome these knowledge gaps warfarin patient education needs to be standardised[39] and more targeted to topics relating to patient safety and actions required. In this study, most participants were educated by their general practitioners or physicians in the primary care setting, at the time of warfarin commencement. In our study, despite being long-term users of warfarin, the majority of participants had not had a warfarin 'refresher' in the previous one to five year period, nor had they received warfarin education by pharmacists. This is important as knowledge retention on some aspects of warfarin is as short as 28 to 56 days.[40] General practitioners or specialists may not have sufficient time to educate and follow-up on the patients about warfarin.[25] To address this barrier, a multidisciplinary approach, involving doctors, pharmacists, nurses and nutritionists[36], is suggested to facilitate patient follow-up and re-education. The beneficial role of pharmacists in supporting patients receiving anticoagulants in the hospital, community and general practice settings, has been particularly highlighted in the literature.[40-42]

In considering approaches to patient education (Table 4), it is important to note that around half of the study participants had a lower level of health literacy for scale 5 ("Appraisal of information"). These participants could not understand most health information and could become confused when there is conflicting information.[19] A unique finding was that patients who needed assistance in completing the health literacy questionnaire had significantly lower warfarin knowledge scores, suggesting they may also need specific assistance with understanding information about warfarin. Health care providers may need to communicate information about warfarin in appropriate formats so that these patients can understand the key messages and improve their knowledge. Although the literature identifies that health literacy must be assessed and addressed for effective patient education, there is limited research specifically reporting on successful interventions in the context of anticoagulation management. More broadly, one method of educating patients with limited health literacy includes pharmacist counselling about warfarin supported by a written information booklet.[40] In addition, the literature has suggested specific communication techniques to support patients with limited health literacy in understanding their medications, including: the Indian Health Service model (i.e., 3 key questions are asked to assess a patient's baseline knowledge: What were you told this medication is for?, How were you told to use it?, and What were you told to expect?)[43,44]; 'Teach-back'[45]; 'Ask-tell-ask' methods to confirm understanding[30]; "Ask Me 3" method (i.e., patients ask themselves: 1) What is my main problem?, 2) What do I need to do?, and 3) Why is it important for me to do this?)[46]; or use of a digitised colour menus of warfarin tablets to confirm regimen dosage concordance.[47] Other techniques include using slow speech, limiting the number of key points discussed to three or less[48], reinforcing messages using pictures or graphs[48], using plain language, assessing health information, and involving consumers in the process of developing information through focus groups, online surveys and telephone interviews, and using shared-decision making tools to communicate risk information about treatment options.[30] Regardless of the techniques that may be used, there is a need to implement specific policies in practice to guide the assessment of health literacy in patients and ensure it is appropriately addressed. In our local setting, these study findings have prompted the development of a warfarin action plan (written information leaflet) that considers the principles espoused in many of the communication techniques listed above. This warfarin action plan will be subsequently evaluated as a resource in the education of patients with limited health literacy, particularly older persons and their carers.

Other notable study findings included the lower level of health literacy identified in participants who were born overseas or who took five or more long-term medications. In our study, participants who were born overseas found it difficult to feel understood and supported by healthcare providers. Participants who took 5 or more long-term medications had difficulty in understanding health information to enable them to know what actions to take. Previous studies have reported similar findings[15], including

that patients using polypharmacy and who have inadequate health literacy also have low understanding of pre-admission medications such as the frequency and dosing of their medications.[49] Polypharmacy has been associated with increased mortality, stroke and major bleeding for patients with atrial fibrillation.[35] Consequently, vulnerable patients who are at risk of poor medication understanding (due to factors such as polypharmacy and low literacy) may need more intensive medication reconciliation, educational counselling and follow-up to prevent post-discharge adverse drug events.[49]

Culturally and linguistically diverse (CALD) patients may not be able to fully engage with doctors and other healthcare providers about anticoagulant therapy due to language barriers and cultural beliefs.[50,51] To address this, education about warfarin may need to involve the patient's family, friends or carers, accredited interpreters and/or a health care provider that can speak the same language. Further research is required to evaluate the use and impact of medical interpreters on improving knowledge in CALD patients.

To date, there has been limited research focusing on supporting older patients taking oral anticoagulants through the use of carers. For this reason, we included a small number of carers in our study. The role of the carer in shared decision-making has been noted in a previous qualitative study.[52] However, whilst we know the challenges around managing older patients, we also need to consider the challenges of supporting the carers of older persons, who are often older persons themselves (e.g., spouses, partners, adult children). In our study, the mean age of carers was 61 years; this signals a need to assess the warfarin knowledge and health literacy of carers as well as the patients themselves.

Whilst this study provides insights into the medication management challenges of high-risk patients in the local setting, this study has several limitations. First, the generalisability of the findings may be limited by: the relatively small sample size as this was a pilot study, the number of general practitioners agreeing to recruit patients, the number of participants agreeing to do the study, and by the specific characteristics of our study sample, i.e., 27% were university-educated with a median age of 80, were not culturally diverse nor warfarin-naïve, which may have influenced the level of warfarin knowledge. Furthermore, our patients were recruited from one specific setting (one medical centre).

The patients in this study may not represent the preferences and perspectives of the thousands of patients encountered in other practice settings, whether in Australia or more globally. Second, the medical staff was involved in identifying potential participants so this may have introduced some selection bias. Third, having the participants answer the questionnaire via the telephone may have adversely influenced their experience, compared to those who answered in person. Fourth, the shortened questionnaire was not specifically validated for use in this setting. Fifth, due to the small sample size, the data from both patients and carer was combined and precludes an exploration of whether any patient characteristics may have affected patient preferences. Nevertheless, the study provides some useful insights into the local Australian practice setting, identifying gaps that need to be filled.

Future research should focus on involving a greater number of participants and their carers from different cultural backgrounds, using the multi-dimensional HLQ tool to assess health literacy and a validated questionnaire to assess knowledge about oral anticoagulants (warfarin and the DOACs) in the community and hospital settings. In addition, health outcomes of health literacy, knowledge and health impact of self-managed patients versus carer-managed patients taking oral anticoagulants could be explored. Furthermore, although there have been some studies involving pharmacist education to older persons[40,42,53] and those with limited literacy[40], there is a need for pharmacists to develop interventions to support CALD patients about warfarin. Several studies in the literature have highlighted the need for medicines information among CALD patients.[54-56] Pharmacists have an important role in addressing this need for medicines information as they are easily accessible and are conveniently located in several health care settings (i.e. hospital, community and home).

CONCLUSIONS

This study provides insights regarding the challenges of managing warfarin in older persons due to their characteristics, and highlights the ongoing knowledge gaps about warfarin, the limitations of health literacy, and the importance of involving carers of the older persons during education. Participants born overseas and those using polypharmacy may require more support with tailored education and follow-up to improve their health literacy and warfarin knowledge.

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CONFLICT OF INTEREST

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Original Research

Attitudes towards continuous professional development: a study of pharmacists in Lebanon

Sylvia SAADE, Fatima GHAZALA, Ali FARHAT, Souheil HALLIT.
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Abstract

Objective: To investigate the views and assess motivation, attitudes of pharmacists in Lebanon towards mandatory continuous education (CE), its transition to Continuous Professional Development (CPD), and identify barriers to participation in CPD.

Methods: A cross-sectional observational study, conducted between February and May 2017, enrolled 591 pharmacists. The questionnaire used in this study was developed after an extensive literature review and based on previous similar studies in different countries.

Results: Half of the pharmacists who completed the questionnaire agreed that all the factors that were mentioned in the questionnaire motivated completing CPD, whereas 55.4% felt confident that CPD meets their needs. 78.4% felt confident in their abilities to assess what they have learned. 71.6% felt confident in their abilities to assess what additional CPD activity may be necessary. The majority of the pharmacists agreed that accessibility of group learning activities (location/distance) (69.6%), job restrictions (76.3%) and lack of time (80.6%) were the most essential barriers against participation in CPD. Motivation was significantly and positively correlated with attitude (r= 0.718), but negatively correlated with barriers (r= -0.243). Attitude was significantly and negatively correlated with barriers (r= -0.120).

Conclusion: Our findings contribute to informing the forward pathway for the profession. Attitude and motivation to CPD were positive in this study. Accessibility of group learning activities due to distance and location, job restrictions and lack of time were the major barriers to participation in CPD. Potential solutions can be sought to address these issues.

Keywords

Attitude of Health Personnel; Clinical Competence; Education, Pharmacy, Continuing; Pharmacists; Surveys and Questionnaires; Lebanon

INTRODUCTION

Continuing professional development (CPD) has become an increasingly significant attribute of most professions, especially those associated with health care.[1] The International Pharmacy Federation declared: "Maintaining competence throughout a career during which new and challenging professional responsibilities will be encountered is a fundamental ethical requirement for all health professionals".[2]

CPD is a lifelong learning process that needs continuous pharmacist proficiency through maintenance and enrichment of skills, performance and knowledge.[2,3] It aids health care practitioners to remain up to date and competent, thus, fit to practice.[4] CPD involves any education that helps pharmacists increase their skills, counting any continuing education (CE) whether it's workplace-based or distance learning or electronic learning (1). The role of the CPD process is to incite each health care professional into keeping up with the changes in practice and to ensure that the public confidence in their services they offer are being retained and developed.[1] Core elements of CPD include a pharmacist's self-directed, structured and outcomes-oriented activities for practice-based learning.[5] This continuing process is based on the 4-stage Kolb learning cycle of identification, planning, implementation/action, evaluation.[6] CPD is a principal element within a clinical governance context of professional accountability, in the provision of quality service, in the management and reduction of risks, and the continuous enhancement of standards.[1] Most countries with a CE or CPD system request all registered participants to demonstrate annual activity participation (lectures, seminars, congresses, conferences).[7]

Mandatory CPD requirements were implemented in the UAE[8] in November 2014 and in Qatar[9] in March 2016, whereas other countries such as Egypt are assessing the degree of readiness and acceptance for CPD in the healthcare sector.[10]

In Lebanon, there were no requirements of licensure prior to 2011. Stimulated by developments and initiatives in other countries, the Pharmacy Board of Lebanon (OPL) issued standards for mandatory CE in November 2011, that took effect actually in January 2014.[11] As a result, pharmacists practicing in Lebanon are required to document at least 15 credits of CE activity annually, of which at least 5 should be "live" CE.[11] Each pharmacist is to submit his/her records for review and monitoring. Failure to meet these standards could lead to disciplinary action up to license suspension. In addition, the OPL is operating in the meantime towards transitioning from CE to CPD.

In many countries, the evolution to a CPD approach and the use of a learning portfolio for documentation and reflection is fairly new for pharmacists. To date there is little

Sylvia SAADE. PharmD. School of Pharmacy, Lebanese International University. Beirut (Lebanon). sylviasaade@gmail.com
Fatima GHAZALA. PharmD. School of Pharmacy, Lebanese International University. Beirut (Lebanon). 41130101@students.liu.edu.lb
Ali FARHAT. PharmD. School of Pharmacy, Lebanese International University. Beirut (Lebanon). 31110086@students.liu.edu.lb
Souheil HALLIT. MSc, MPH. Research Department, Psychiatric Hospital of the Cross, Jal Eddib (Lebanon); & Faculty of Medicine and Medical Sciences, Holy Spirit University. Kaslik (Lebanon). souheilhallit@hotmail.com

published evidence on the impact of such changes and the pharmacists' views and attitudes towards CPD.[12] In 2001, a study conducted in Northern Ireland determined the perceptions of pharmacists on CPD. Barriers to participation were identified as lack of time, remuneration and lack of understanding of CPD.[13] Another study carried out on a small number of English community pharmacists (n=21) revealed that they needed additional support since they were not fully engaging in CPD.[14] A further study conducted on Scottish pharmacists' views and attitudes to CPD revealed four associated factors: "having positive support in the workplace, having access to resources and meeting learning needs, having confidence in the CPD process and motivation to participate in the CPD process". Hospital pharmacists reported having more confidence in the CPD process, while community pharmacists were identified as the pharmacy sector that needed most support regarding ability in participation.[4] In the United States, a study entitled 'The 5-state CPD pharmacy pilot program' was the first broad-based study evaluating the role of CPD in the pharmacy sector. Its objectives were to find out whether a structured educational intervention would aid pharmacists' utilization of a CPD approach as well as to assess its effectiveness and feasibility for pharmacists.[15]

In Lebanon, to the best of our knowledge, to date there is no published evidence regarding pharmacists' views and attitudes towards CE and its transitioning to CPD, particularly those offered by the OPL. In many countries, collection of these views and attitudes in the pharmacy profession has been commonly achieved using questionnaire methodology.[4] Via this means, studies have found that pharmacists agree with the notion of CPD.[13,16] By recognizing areas and identifying sectors where pharmacists' motivation to CPD is high, as well as pinpointing major barriers to participation, possible solutions can be sought for sectors of practice where views and attitude to CPD are less positive.[4]

The primary aim of the present study is to investigate the views and attitudes of pharmacists in Lebanon towards mandatory CE - particularly those offered by OPL- and its transition to CPD. Secondary outcomes include studying the barriers to participation in CPD.

METHODS

Study Design

This is a cross-sectional observational study, using a proportionate random sample of Lebanese pharmacists working in pharmacies from all districts of Lebanon. It was conducted between February and May 2017. A list of pharmacies was provided by the Order of Pharmacists in Lebanon (OPL). Pharmacists working on Lebanese premises were included in the study, whereas pharmacists living outside Lebanon were excluded. The questionnaire was distributed to 800 pharmacists out of a total of 7391 pharmacists living in Lebanon; 591 (73.87%) pharmacists filled and returned the questionnaire.

A sample of 525 pharmacists was targeted to allow for adequate power for bivariate analyses to be carried out. This minimal sample size was obtained by using a total number of registered pharmacists in OPL of 8500, a 39% expected frequency of pharmacists' confidence that the CPD meets their needs[1], and a 5% confidence limits.[17]

Study Procedure

The questionnaire used in this study was developed after an extensive literature review and based on previous similar studies in different countries.[13,14,16,18-20] Two links, one in English and one in Arabic, were sent via emails as well as via the OPL push notification application simultaneously every 2 weeks. Each pharmacist filled the online questionnaire once.

The questionnaire consisted of 9 parts (A to I), including information about the sociodemographic characteristics of the sample, factors affecting motivation towards CPD, the types of CPD used by the pharmacist, the causes behind using the CPD types mentioned before, and the evaluation of CPD (offered by OPL). Parts (B to E) were skipped by pharmacists who were not involved in practicing CPD yet.

Moving on, the questionnaire comprised questions concerning the attitudes of pharmacists to different elements of CPD (Identification, Planning, and Implementation). Furthermore, the questionnaire assessed the barriers to participation in CPD activities (part G). Finally, the questionnaire asked about future CPD in terms of abiding regulations offered by OPL (part H) and about the types of CPD that were used by the pharmacist (part I).

Motivation, attitudes and barriers scores

Pharmacists' motivation score was calculated using 5 questions by adding the scores for each question, with each question scoring 1 for strongly disagree and 5 for strongly agree. The questions that formed the motivation score were "I feel confident that CPD meets my needs", "I feel confident that my CPD is preparing me for practice development", "I have sufficient time to achieve my CPD goals that are mandated by OPL", "I have sufficient resources (computer access, internet access, 3G/Wi-Fi access, conferences) to achieve my CPD goals" and "I have sufficient enthusiasm to achieve my CPD goals". The motivation score ranged from 5 to 25, with a higher score indicating more motivation. The attitude score was calculated by adding the score for the following questions: "I feel confident in my ability to assess what I have learned", "I feel confident in my ability to assess what additional CPD activity may be necessary", "I feel confident in my ability to assess the benefits of my practice", "I feel confident in my ability to identify my own learning needs", "I need some help in identifying my learning needs", "I am fully aware of resources", "I am confident about my ability to access resources", "I have support (encouragement and sufficient time) in my workplace to carry out my CPD plans" and "I have adequate access to suitable CPD resources". The attitude score ranged from 9 to 45, with a higher score indicating a better/more positive attitude for CPD.

Concerning the barriers score, the same calculation method was used for the following questions: "Accessibility of group learning activities (location/distance)", "Job constraints (restrictions)", "Lack of time", "Cost of participation", "Lack of relevant learning opportunities", "Uninteresting subjects or topics", "Lack of quality learning

Table 1. Sociodemographic characteristics of the participants.

Demographics	Percentages	Effective numbers
Age (years)		
20-30	42.4	251
31-40	28.7	170
41-50	18.2	108
51-60	9	53
>60	1.7	10
Gender		
Females	63.2	374
Males	36.8	217
Marital status		
Single	37.5	222
Married	61.3	362
Divorced	0.8	5
Widowed	0.3	2
Pharmacy degree		
BS pharmacy	45.9	271
Pharm.D.	28.4	168
Masters	16.6	98
PhD	9.1	54
Current primary site of practice		
Community pharmacy	58.1	343
Hospital pharmacy	7.4	44
Medical representative	8.8	52
University teacher	3.5	21
Industry	2.0	12
Laboratory	1.0	6
Others	19.1	113
Monthly salary		
<1,200,000 L.L	21.3	126
1,200,000-1,800,000 L.L	32.4	191
>1,800,000 L.L	46.3	274
Practice experience (years)		
<15	73.5	434
15-25	19.8	117
>25	6.8	40
Place of living		
Beirut	22.6	134
Mount Lebanon	39.2	237
North Lebanon	10.3	61
South Lebanon	16.2	96
Bekaa	9.4	56
Outside Lebanon	2.2	13
Availability of computer/laptop		
No	4.5	27
Yes	95.5	564
Internet access		
No	9.2	537
Yes	90.8	54
Practiced CPD before		
No	30.7	181
Yes	69.3	410

activities", "Family constraints (restrictions)", "Subjects/ Topics are too specialized" and "Low personal priority of learning in relation to other activities". The barriers score ranged between 10 and 50, with a higher score indicating a higher number of barriers.

Statistical Analysis

Data was analyzed using the Statistical Package of the Social Sciences version 23. Descriptive statistics were calculated for all study variables. This includes the mean and standard deviation for continuous measures, counts and percentages for categorical variables. The Chi-square test was used for bivariate analysis of categorical variables, whereas Student test were used for comparison of means between two groups. ANOVA and Kruskal-Wallis tests were used to compare between three groups or more. Pearson correlation coefficient was used to correlate between quantitative variables. Bonferroni adjustment was used for ANOVA post hoc tests of between groups comparison. Statistical significance was set at $p<0.05$.

Table 2. Description of different variables among pharmacists practicing continuous professional development (CPD).

Variables	Practicing CPD
Age	
20-30	53.8%
31-40	74.1%
41-50	85.5%
51-60	90.2%
>60	87.5%
Gender	
Male	67.5%
Female	70.4%
Marital status	
Single	57.1%
Married	77.3%
Divorced	40.0%
Widowed	100%
Pharmacy degree	
BS pharmacy	64.9%
Pharm D	71.7%
Masters	69.8%
PhD	83.0%
Primary current site of practice	
Community pharmacy	70.6%
Hospital pharmacy	77.3%
Medical representatives	55.1%
University teacher	70.0%
Industry	81.8%
Laboratory	66.7%
Other	67.0%
Monthly salary	
<1,200,000 (<800) USD)	56.3%
1,200,000-1,800,000 (800-1200 USD)	69.7%
>1,800,000 (> 1200 USD)	74.9%
Place of living	
Beirut	70.2%
Mount Lebanon	72.1%
North Lebanon	65.0%
South Lebanon	74.5%
Bekaa	50.9%
Outside Lebanon	1.0%

RESULTS

The sociodemographic characteristics of the whole sample are summarized in Table 1, whereas the description of pharmacists practicing CPD can be found in Table 2. It is important to note that 69.3% of the respondents practiced CPD in the past.

Approximately half of the pharmacists that completed the questionnaire agreed that all the factors that were mentioned in the questionnaire motivate CPD, whereas 55.4% agreed that they feel confident that CPD meets their needs. In addition, 62% agreed that they feel confident that CPD is preparing them for practice development, whereas 34.8% agreed that they have sufficient time to complete required CPD credit hours. 76% agreed that they have sufficient resources (computer access, internet access, conferences) to achieve their CPD goals. 57.9% agreed that

Table 3. Views of pharmacists on factors affecting motivation towards continuous professional development (CPD).					
	Strongly agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
I feel confident that CPD meets my needs	13.6	41.8	26.6	13.2	4.8
I feel confident that CPD is preparing me for practice development	15.5	46.5	23.4	9.7	4.9
I have sufficient time to achieve my CPD goals that are fixed by OPL	6.7	28.1	25.8	25.3	14
I have sufficient resources (computer access, internet access, conferences) to achieve my CPD goals	21.5	54.5	14.3	6.7	3.0
I have sufficient enthusiasm to achieve my CPD goals	16.0	41.9	24.3	11.1	6.7
Challenges in my job motivate me to achieve my CPD goals	14.0	36.0	27.7	14.4	7.9
Live conferences with colleagues motivate me to achieve my CPD goals	16.7	43.6	23.0	10.4	6.3

they have sufficient enthusiasm to achieve their CPD goals (table 3).

Bivariate analysis results for factors affecting the pharmacist's motivation towards CPD showed that a significantly higher percentage of pharmacists aged between 20-30 years thought that available CPD programs did not meet their needs (57.1%), leads to their development (61.9%), had enough time to achieve CPD (43.3%), had sufficient resources (69.2%) compared to all other age groups. A significantly higher percentage of pharmacists aged between 31-40 years strongly disagreed that they had sufficient enthusiasm (51.7%) compared to the other age groups.

A significantly higher percentage of females agreed that they have enough time to achieve their CPD compared to their male counterparts (62.1% vs 37.9%; p=0.043; chi-square). It is of note that no significant difference was found for these 2 variables between males and females concerning the fact that CPD meets their needs, leads to their development, had sufficient resources or sufficient enthusiasm.

A significantly higher percentage of community pharmacists strongly disagreed that CPD meets their needs (42.9%) and leads to their development (52.4%) compared to all other sectors of the pharmacy profession (Table 4).

The most used CPD activities were the live activities (21.6%), computer/internet based activities (47.7%), and interactive workshops (21.3%). Almost 60% of the pharmacists agreed they use the type of CPD because it is at no cost. In addition, more than 70% of them agreed they had easy access to print/online material or because of their interest in learning about a specific topic regardless of the venue (Table 5).

Seventy-eight percent agreed that they feel confident in their abilities to assess what they have learned. 71.6% agreed that they feel confident in their abilities to assess what additional CPD activity may be necessary. 77.6% agreed that they feel confident in their abilities to assess the benefits of their practice. 81.2% agreed that they feel confident in their abilities to identify their own learning needs. 76% agreed that they are fully aware of resources available to them to address their CPD requirements. 76.7 agreed that they are confident about their abilities to access resources (computer access, internet access, 3G/Wi-Fi access, conferences) to address their CPD requirements and 69.6% agreed that they have adequate access to suitable CPD resources (Table 6).

The majority of the pharmacists agreed that accessibility of group learning activities (location/distance) (69.6%), job restrictions (76.3%) and lack of time (80.6%) were the most essential barriers to participation in CPD (table 7).

We calculated the reliability of each scale to assess the quality of our data. We obtained high Cronbach alphas for

Table 4. Bivariate analysis of different variables and views of pharmacists on factors affecting motivation towards continuous professional development (CPD).												
	CPD meets needs						**CPD leads to development**					
	Strongly agree	**Agree**	**Neutral**	**P-value**	**Strongly disagree**	**P-value**	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**P-value**
Age												
20-30 years	27.1%	30.4%	39.1%	40.4%	57.1%	0.018	28.4%	31.8%	42.6%	31.0%	61.9%	<0.001
31-40 years	28.8%	27.6%	31.3%	42.1%	28.6%		26.9%	26.9%	33.7%	54.8%	23.8%	
41-50 years	20.3%	27.6%	19.1%	14.0%	14.3%		19.4%	29.9%	14.9%	7.1%	14.3%	
51-60 years	16.9%	11.6%	9.6%	1.8%	0.0%		19.4%	10.0%	7.9%	2.4%	0.0%	
>61 years	6.8%	2.2%	0.9%	1.8%	0.0%		6.0%	1.5%	1.0%	4.8%	0.0%	
Gender												
Male	37.3%	32.0%	39.1%	50.9%	33.3%	0.139	35.8%	33.8%	38.6%	57.1%	28.6%	0.063
Female	62.7%	68.0%	60.9%	49.1%	66.7%		64.2%	66.2%	61.4%	42.9%	71.4%	
Primary current site of practice												
Community pharmacy	71.2%	59.1%	56.5%	56.1%	42.9%	0.017	68.7%	59.2%	54.5%	52.4%	52.4%	0.045
Hospital pharmacy	10.2%	8.8%	8.7%	3.5%	9.5%		11.9%	7.0%	10.9%	2.4%	9.5%	
Medical representative	1.7%	6.6%	10.4%	12.3%	14.3%		1.5%	8.5%	9.9%	14.3%	4.8%	
University teacher	8.5%	5.0%	0.9%	0.0%	0.0%		7.5%	4.5%	2.0%	0.0%	0.0%	
Industry	1.7%	1.1%	5.2%	0.0%	4.8%		1.5%	0.5%	5.0%	4.8%	4.8%	
Laboratory	1.7%	0.0%	0.9%	1.8%	0.0%		1.5%	0.0%	1.0%	2.4%	0.0%	
Other	5.1%	19.3%	17.4%	26.3%	28.6%		7.5%	20.4%	16.8%	23.8%	28.6%	

Table 5. Causes of using the above mentioned continuous professional development (CPD) types					
	Strongly agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Low or no cost	16.3	43.6	31.4	6.6	2.2
Effective advertising	7.4	38.0	41.9	9.7	3.0
Networking and socializing opportunities	6.7	47.4	36.5	6.7	2.7
Easily accessed print or online material	16.7	55.0	22.3	3.4	2.7
Interest in learning about topic regardless of the venue	19.0	55.3	17.8	5.3	2.6
Offered during a conference already attending	12.5	46.3	32.8	5.6	2.7

all scales as follows: motivation scale (0.858), attitude scale (0.862) and barriers scale (0.797). Based on fairly adequate internal consistency, we believe that the findings were relatively reliable.

The bivariate analyses between the different variables and barriers to participation in CPD showed that a significantly higher percentage of pharmacists aged 20-30 years (58.3%) disagreed that family constraints might be a barrier to participation in CPD (p=0.005), with no significant difference between age and other barriers. Furthermore, no significant difference was found between gender and the current practice site with all barriers (online Appendix).

The bivariate analyses showed that motivation was significantly and positively correlated with attitude (r=0.718; p<0.001), but negatively correlated with barriers (r= -0.243; p<0.001), years of experience (r= -0.201; p<0.001) and age (r=-0.236; p<0.001). A significantly higher mean for the motivation score was found in males (13.32) compared to females (12.44) (p=0.036). Neither the marital status nor the monthly salary were significantly associated with the motivation scale (p=0.465 and p=0.889, respectively).

The bivariate analyses showed that attitude was significantly and negatively correlated with barriers (r= -0.120; p=0.021), years of experience (r= -0.144; p=0.004) and age (r=-0.175; p<0.001). A significantly higher mean attitude score was found in males (21.45) compared to females (20.08) (p=0.018). Neither the marital status nor the monthly salary were significantly associated with the attitude scale (p=0.484 and p=0.238, respectively).

The bivariate analyses showed that the barriers score was not significantly correlated with age (r=0.001; p=0.988), the years of experience (r=0.002; p=0.966), gender (p=0.648), monthly salary (p=0.997) but was significantly correlated with the marital status (p=0.021).

No significant difference was found between all sectors of practice concerning attitude and barriers (p=0.209 and p=0.141, respectively). Regarding motivation, a higher motivation score was found in community pharmacists (13.21) compared to their hospital counterparts (10.91) (p=0.015). No significant difference was found between other groups (community vs medical representative (p=0.111) and hospital vs medical representative (p=0.069)).

DISCUSSION

Attitude and motivation have shown to be essential elements in CPD involvement.[21] Also, in the past, the aspect regarding pharmacists' motivation for participating in CPD has been studied as a key factor to learning.[4] Within the pharmacy profession, as well as in other healthcare professions' CPD practices, the magnitude of motivation has been acknowledged.[21] Our results showed that the identification of learning needs was the constituent of the CPD process the majority of pharmacists felt at ease with.[1] Confidence in their capability to recognize their individual training needs was high.[1] These findings are in agreement with a study conducted on Scottish pharmacists' views and attitudes towards CPD[1], although it contradicts previous findings, which state that "general medical practitioners' insights into their own educational needs were also poor".[15] One explanation is that means for enabling pharmacists to identify their own learning needs proactively ought to be further developed and made accessible.[1] Generally, in our study, motivation and attitude were positive. These findings are in agreement with a study carried out on Texan pharmacists' views, attitudes and preferences related to continuing pharmacy education that revealed approximately 83% of respondents (n=161, response rate 31%) found that currently available CE programs met their educational needs.[22] However, a significantly higher percentage of community pharmacists strongly disagreed that CPD meets their needs and leads to their development compared to all other sectors of the

Table 6. Attitudes of pharmacists to different elements of continuous professional development (CPD).					
	Strongly agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
I feel confident in my ability to assess what I have learned	17.0	61.4	15.8	4.2	1.6
I feel confident in my ability to assess what additional CPD activity may be necessary	16.8	54.8	19.8	6.1	2.6
I feel confident in my ability to assess the benefits of my practice	19.8	57.8	15.6	5.1	1.6
I feel confident in my ability to identify my own learning needs	21.7	59.5	16.0	1.5	1.3
I need some help in identifying my learning needs	8.2	36.0	31.4	18.1	6.3
I am fully aware of resources (computer access, internet access, 3G/Wi-Fi access, conferences) available to me to address my CPD requirements	20.8	55.2	16.4	5.3	2.3
I am confident about my ability to access resources (computer access, internet access, 3G/Wi-Fi access, conferences) to address my CPD requirements	21.5	55.2	16.6	4.7	1.9
I have support (encouragement and sufficient time) in my workplace to carry out my CPD plans	7.7	35.3	30.8	14.6	11.6
I have adequate access to suitable CPD resources (computer access, internet access, 3G/Wi-Fi access, conferences)	16.9	52.7	17.1	7.5	5.8

Table 7. Barriers to participation in continuous professional development (CPD).

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Accessibility of group learning activities (location/distance)	25.3	44.3	19.2	10.0	1.2
Job constraints (restrictions)	35.1	41.2	15.5	6.7	1.4
Lack of time	40.6	40.0	12.9	5.2	1.2
Cost of participation	6.1	19.7	41.1	24.1	9.0
Lack of relevant learning opportunities	11.1	29.2	40.5	16.9	2.3
Uninteresting subjects or topics	12.7	27.3	34.7	22.1	3.1
Lack of quality learning activities	10.9	26.0	38.8	19.3	5.0
Family constraints (restrictions)	17.3	30.4	26.7	18.1	7.5
Subjects/ topics are too specialized	7.3	20.6	39.8	26.0	6.3
Low personal of learning in relation to other activities	5.1	20.2	35.6	24.8	14.3

pharmacy profession. One explanation for this could be that community pharmacists are not generally involved in teams, and usually work in isolation compared to their hospital and primary care counterparts.[23] Thus the CPD resources and peer support may not be readily available to this sector.[4] Another explanation could be the frustration that community pharmacists feel towards the pace and intensity of pharmacy practice and how this negatively affects their capability to fully embrace CPD by incorporating learning into their practice.[12]

Within the study, two scores were collated; a motivational score which measured overall motivation towards CPD; and an attitudinal score which measured confidence, ability and support required taking part in the CPD cycle and the reflection process.[1] Our results show that motivation was significantly and positively correlated with attitude. This finding is in agreement with previous studies suggesting that a positive attitude towards CPD is a motivating aspect for efficient performance.[24] In addition, by evaluating the motivational and attitudinal median scores, our results show a significant difference between hospital and community pharmacists in the collated motivational median scores but not in the attitudinal score, with the latter proving the more motivated group. This finding is in opposition with other studies where primary care and hospital pharmacists tended to score higher than their community counterparts.[1] However, this may be due to the small number of response from hospital pharmacists encountered in our study. Thus, although community pharmacists' motivation scores were statistically higher than hospital pharmacists, the overall practical significance of these findings is to be limited. The real differences in the scores need to be assessed using larger sample size studies from both sectors in order to tell whether subgroups of highly or poorly motivated pharmacists may explain the overall findings.[1] No significance was found in other sectors of practice regarding motivation or attitude.

According to the majority of respondents, our results show that the essential barriers to participation in CPD include lack of time, difficulties in accessing group learning activities due to distance and job restrictions. Needless to say, these findings re-iterate results shown in previous studies.[16,18,20,25] In addition, our results show that attitude and motivation were significantly and inversely correlated with barriers to participation in CPD.

In previous studies, the lack of time for CPD[18,26,27] and a high workload[18] were the most commonly reported barriers to participation in CPD. Moreover, lack of information technology support[28] and type and location of available courses[26] have also been other commonly reported resource barriers to CPD. An important element affecting pharmacists' opinions of CPD was the ease of access to CPD resources.[14,29] Creating networks where pharmacists can talk about their CPD needs and access resources to reach their learning needs may prove helpful.[4]

In our study, the fact that most pharmacists perceived insufficient time to attain their CPD goals was highlighted.[1] Moreover, in England, a study found that pharmacist respondents recognized that they believed that a fraction of working time could be devoted to CPD activities (20). Other healthcare professionals working in medicine and dentistry have defined learning time 'protected' as their model to provide additional CPD support.[1] The finding in our study that respondents believed they did not have enough time to achieve their CPD goals suggests a similar need, although the idea of 'protected time' is not likely to be accepted by the workplaces where registered pharmacists are employed.[1]

Our results show that motivation and attitude were significantly and negatively correlated with years of experience and age. This finding, not surprisingly, is in line with earlier studies where it was found that older pharmacists were significantly less motivated towards participation in CPD than their younger colleagues.[18,27]

Higher significant mean attitude and motivation scores were found in males compared to females, the latter proving to be less motivated and to have less confidence in their ability to participate in CPD. This contradicts previous studies where females carried out significantly more hours of continuing education and CPD[16,18] or where no significant differences were found between men and women regarding motivation.[1] The fact that our results show a higher motivational and attitudinal score in males versus females could be attributed to different sample sizes and sampling methods to formerly published reports.[1]

The most used CPD activities were live in person ones, computer/internet based ones, and interactive workshops. This is due to the fact that these activities carry no cost and are easy to access.

Limitations

Our study suffers from some limitations. The sample size is small. A selection bias is possible because some areas were difficult to reach especially the remote ones. Furthermore, it was not possible to compare the characteristics of responders and non-responders. Additionally, nonobjective understanding of questions is possible, as in all

questionnaire-based surveys. An information bias is also possible since the use of a questionnaire in any population may not always be accurate: problems in question understanding, recall deficiency and over or under evaluating symptoms may still be possible.

CONCLUSIONS

Views and attitudes of Lebanese pharmacists towards continuing professional development were assessed in our study, along with their motivation level. Also, the barriers and obstacles to participation in CPD that they encounter while trying to further their education were identified. To date, there are limited data on Lebanese pharmacists' views, attitudes and barriers to participation in CPD; the information from our study contributes to informing the forward pathway for the profession. Generally attitude and motivation to CPD were positive in this study. Moreover, it is apparent that there are different views and attitudes towards participation in CPD among sectors of practice. However, these issues necessitate further study at a larger scale. A large number of pharmacists opted not to fill the questionnaire. Older pharmacists and female pharmacists appear to be the sectors requiring most support to increase not only their motivation to CPD but also their confidence and ability in participating in CPD. Accessibility of group learning activities due to distance and location, job restrictions and lack of time have shown to be the major barriers to participation in CPD. By acknowledging these findings, potential solutions can be sought where views and attitude to CPD are less positive.

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CONFLICT OF INTEREST

None.

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Original Research

An assessment of the impact of entrepreneurial skills of community pharmacists on pharmaceutical business performance in Jos metropolis, Nigeria

Iyeseun O. ASIEBA, Teresa M. NMADU.
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Abstract

Background: Community pharmacy has been a lucrative area of practice for pharmacists in Jos, Nigeria, until about the turn of the millennium where a decline in viability of the business has been observed.

Objective: This study assessed the entrepreneurial skills of community pharmacists, the business performance of community pharmacies and the impact of their entrepreneurial skills on business performance.

Methods: A cross sectional survey was conducted by administering a pretested questionnaire to 30 community pharmacists in Jos. An adaptation of the Bernelli model and the expanded Katz (1974)/Herron (1990) Skill Typology Model was used to assess nine entrepreneurial skills - product, organizational, industry, networking, leadership, executive, entrepreneurial, marketing and money skills; while sales growth, net profit and stock growth were used to assess business performance. Frequency distribution of results was presented, with further analysis done with the Epi-Info software using the chi square test of association.

Result: The results from this study showed that community pharmacies in Jos do possess requisite entrepreneurial skills, but to varying extents. Product skills ranked highest while money skills and entrepreneurial skills ranked least, portraying a need for skills enhancement in these areas. Business performance was suboptimal, being rated as average or poor by 56.6% of respondents. However, most respondents (90%) still assessed their businesses as profitable. Money skills had a significant impact on business performance (P=0.03) and stock growth (P=0.04); while stock growth was significantly affected by leadership skills (P=0.002) and entrepreneurial skills (0.02). Net profit was significantly affected by industry skills (P=0.008).

Conclusions: Community pharmacy business is still a profitable business venture in Jos though business performance is sub optimal. The entrepreneurial skills set of a community pharmacist set has an impact on business performance with money skills, leadership skills and entrepreneurial skills being most significant. This study recommended that entrepreneurial skills of community pharmacists in Nigeria are further developed to improve pharmaceutical business performance.

Keywords

Pharmacists; Pharmacies; Entrepreneurship; Community Pharmacy Services; Small Business; Surveys and Questionnaires; Nigeria

INTRODUCTION

The practice of community pharmacy can be said to have started in Nigeria in 1887 with the establishment of a drug store in Balogun Street, Lagos by Mr. Richard Bailey.[1] Over the years many successful entrepreneurs have emerged in the community pharmacy business. The Pharmacists Council of Nigeria Act 91 of 1992 grants the right to own and operate a pharmacy only to individuals and corporate bodies that are registered by the Council. An individual pharmacist has the option to practice his/her profession either as an entrepreneur or as an employee.[2] Community pharmacies are pharmacist-owned, privately-held business in varying practice settings.[3] In addition to clinical and traditional pharmacy services, independent pharmacists typically get involved in merchandising, marketing, and other general management functions. Community pharmacy business is a viable small to medium scale business which if well-developed can significantly reduce unemployment, improve economic indices and the health of the nation. In Nigeria, as in many other countries, small and medium scale enterprises (SMEs) usually make up a majority (up to 90%) of enterprises.[4] The contribution of SMEs to economic growth, job creation and innovation has been widely recognized. However, many of these SMEs do not survive their first years in business.[5] Community pharmacy practice has come of age, having been practiced in Nigeria for over a century.[1] Community pharmacy practice accounts for a greater proportion of pharmacists employed in Nigeria[6] and in the past, had been the most lucrative area of practice of pharmacy in Nigeria. However, in recent years, many of these businesses have been reported to have gradually become less profitable with reduced viability. Some community pharmacies have closed, and many community pharmacists have moved to other areas of pharmacy practice such as the academia, hospital, industry and development work. In the US, a 5% decline was observed in 2006 with 22% of independent pharmacies surveyed reporting their business as declining, poor, or unstable.[7] The appeal and affluence associated with many community pharmacies up to the 1980s and 1990s in Jos appear to have dwindled. Pharmacists have a specialized body of knowledge but are often not diverse enough in their training in business, management, finance and other areas important to pursuing an entrepreneurial venture. These entrepreneurs even though briefly schooled in some basics of management within the pharmacy training curriculum, appear to be deficient in the use of appropriate entrepreneurial skills that will improve business performance. This problem of poor business performance may be attributable to a lack of, or inefficiency in the use of entrepreneurial skills. About

Iyeseun Olusola ASIEBA. BPharm, FPCPharm, MPH, MBA. Nasara Pharmacy Ltd. Jos (Nigeria). iyeseunasieba@yahoo.com
Teresa M. NMADU. PhD. Professor. University of Jos. Jos (Nigeria). nmadutm@yahoo.co.uk

84.9% of pharmacists surveyed in the United Kingdom stated that their daily activities and performance were affected increasingly by business skills.[8] A study in Nigeria investigated effects of entrepreneurial skills on profitability of small business in Nigeria using a bakery industry in Lagos, Nigeria and concluded that there is a direct relationship between entrepreneurial skills and small business profitability.[9] The more effective the entrepreneurial skills applied to a business the more profitable it becomes and the higher the probability of it surviving hard times. Another survey indicated that independent community pharmacists rated the entrepreneurial aspect of their work highest ranked factor among all 47 profiles surveyed.[10] The entrepreneurial spirit is strong in independent community pharmacy and usually the motivating factor for this choice of vocation. The risk-taking capacity required for success in a highly competitive business space is required for a successful community pharmacist.

Although venture capitalists and the entrepreneurship theory consider the entrepreneur as the designer of a venture's strategy, the most important contributor for the success of the venture is the entrepreneur himself as distinct from his/her plans and strategies.[11] Even with several years of entrepreneurship research, the link between the entrepreneur's attributes and venture performance has remained elusive.[12] Evidence suggested that entrepreneurship performance research would be more effective examining skills rather than experience or traits of the individual entrepreneur.[13] Since managerial skills can be subdivided in many ways and viewed from many angles, it is preferred to use a typology rather than a list of skills[13] because typologies attempt to be all inclusive and thus avoid overlooking any skill.

The Katz Skill Typology states that human skills are required by all levels of an organization, conceptual skills more relevant at the higher level and technical skills more relevant at the lower levels.[16] Technical skills can be described as knowledge and proficiency in a specific kind of activity; human skill is the ability to interface effectively with others while conceptual skills are described as the capacity to visualize the enterprise as an integrated, open system. The Katz and Herron's Skill Typology is an expansion of the Katz typology to include organizational skills and industrial skills categories. Within the human skills category, leadership skills and networking skills were considered most important. Characteristics such as entrepreneurial drive, skill, risk taking propensity and self-confidence are considered important determinants of venture performance. This skill typology includes seven questions which address discovering opportunities, motivating employees, planning skills, recognizing trends in the industry, creating relationships with people outside the organization, evaluating the functions of the organization, and skill in the design of products and services. The skill typology displayed reliability (reliability coefficient of 0.76) and validity.[15] The Bernelli Method (5+5+5 model) is another skill typology model which describes 5 stages of learning and development. The five skill groups required for developing business skills and entrepreneurial thinking are self-starting skills (knowing how and where to look for opportunities), people skills (understanding human nature in an organizational setting), marketing skills (learning how to attract customers and sell themselves), money skills (managing assets of the business or organization) and leadership skills (making sound decisions in a timely manner under constraints).[17]

Since entrepreneurial skills and behavior cannot be comprehensively described by a single typology, for this study the established Katz and Herron's Skill Typology and Bernelli models were adapted for a robust assessment of the relevant skill set required for a successful community pharmacy. Nine skills described in the design of the questionnaires are: product skills - defined as knowledge and proficiency in pharmaceutical products and services; organizational skills - technical ability in understanding and evaluating the pharmacy business; industry skills - understanding of the trends and impact of the wider pharmaceutical industry on the business; leadership skills - proficiency in understanding and motivating employees for better performance; networking / people skills - interpersonal relationship and ability to use human network for the improvement of the organization; executive skills - ability in planning and administering the business; entrepreneurial skills - skill in discovering new opportunities to profitably change the business; marketing skills - ability in identifying potential customers and persuading them to buy products or services; and money skills - skill in managing and administering the finances of the organization.

Entrepreneurial leadership has been described as the process of creating value by assembling a unique package of resources for problem solving and making the best of an opportunity.[17] Pharmacists appear to have just begun to recognize the need to be more entrepreneurial in their business.[18] In a study of a program designed to enhance the entrepreneurial behavior of pharmacists, it was found that those who had entrepreneurial education experienced a higher level of job satisfaction than those who did not.[18] Entrepreneurship has been a long-standing component of the profession of pharmacy, going back to the earliest days of the corner drugstore.[18,19] While existing literature links entrepreneurship and pharmacy practice, there is a paucity of literature focusing on entrepreneurial skills in pharmacy and their impact on business performance. There is a therefore a need to investigate the entrepreneurial skills of community pharmacists and examine its possible impact in business performance.

METHODS

The scope of the study was limited to pharmacist-owned community pharmacies in Jos metropolis, duly registered by the government and in operation for at least 5 years. This was to ensure experience in the running of the business. Jos metropolis is defined as consisting of Jos Township and environs including Bukuru within Jos North and South LGAs. The owners of these premises are both pharmacists and the entrepreneurs who are responsible for the running of a business as opposed to pharmacists who are employed and do not have any role in the management of the business. The study was strategically located in Jos

metropolis, where most of the registered pharmaceutical premises within Plateau State are located.

Primary data was collected using self-administered structured questionnaires (online Appendix). A three-part questionnaire was deployed to collect relevant data. The first part was used to capture demographic data of respondents and included six questions on gender, profession, ownership status, number of years of practice as a pharmacist, number of years of the pharmacy business and information on any post-graduate training. The second part was used to generate information on entrepreneurial skills as self-assessed and rated by the respondents. An adaptation of the Bernelli Model and the expanded Katz (1974)/Herron (1990) Skill Typology Model[15-17] was used. This consisted of nine skills which were assessed: Product, Organizational, Industry, Networking, Leadership, Executive, Entrepreneurial, Marketing and Money Skills. All nine skills were defined with respondents providing a personal assessment of such skills.

A 4-point Likert-type scale format was used to elicit responses on the impact of the skills on of business performance. The scale captured responses as excellent, good (above average), fair (average) and poor (below average).

Additional information generated was on use of loans, breakeven time, overall performance and profitability of the business. Provision was made for further comments from respondents.

Questionnaires were pre-tested before administration to the research sample to ensure clarity of questions and understanding of the issues. Confidentiality of information gathered was ensured.

The study population for this research was pharmacist-owned registered community pharmacists in Jos, Plateau and in operation within 1999-2009 for at least 5 years. These were sixty-four (64) community pharmacists.

Using multi-stage purposive sampling technique, a sample of community pharmacies in Jos was selected from all registered premises in Jos, using a list collected from the register of pharmaceutical premises in Jos, the Directorate of Pharmaceutical Services, Ministry of Health, Plateau State.

Inclusion criteria was - registered community pharmacies in Jos which were pharmacist-owned premises and in operation for at least 5 years.

There were 120 registered community pharmacists in 2009 in Jos, consisting of 26 wholesale/manufacturing outlets, 8 premises outside Jos metropolis, 13 new premises less than 5 years in business and 9 retail pharmacies not managed by pharmacists. Thus, the number of community pharmacists eligible for enrollment in this was 64. For this study, the population was 64. A sampling interval of 2 was taken. Giving allowance for unacceptable/unreturned questionnaires, a sample size of 30 was used being about half of the entire population. Pre-tested questionnaires were administered to thirty randomly selected community pharmacies in Jos.

Data analysis

Descriptive statistics was presented using percentages and frequency tables. The dependant variables i.e. entrepreneurial skills were serially cross tabulated with parameters of business performance. Results were tested for statistical significance with statistical software, Epi info, using the Chi Square test of association.

RESULTS

The gender distribution of respondents showed that 77% were male. All respondents were pharmacists and the owners of the businesses. The larger proportion of respondents (47%) had practiced pharmacy for 20 to 29 years; 30% 10 to 19 years; 13 % >30 years; and 1–9 years 10%. The pharmacy business had been run for 6 to 10 years by 37% of respondents, 11- 15 years by 30%; 15% for 16 to 20 years and 1 to 5 years; and 7% >20 years. Only 37% reported having any post graduate training

The first objective of the study was to evaluate entrepreneurial skills of community pharmacists in Jos. Based on the Adapted skill typology by Katz (1974)/Herron (1990) and the Bernelli method[15-17] which measures entrepreneurial skills using a Likert scale, respondents were asked to assess and rate their entrepreneurial skills in the running or their pharmaceutical business. Using the skill definitions, all (100%) the respondents rated their product skills as excellent or good. Organization and leadership skills ranked next, being rated excellent and good by 87% of

Table 1. Results of assessment of entrepreneurial skills and business performance of community pharmacists

Variable	Excellent (4)	Good (3)	Fair (2)	Poor (1)
Skills				
a. Product Skill	83%	17%	0%	0%
b. Organizational Skills	30%	57%	13%	0%
c. Industry Skills	13%	67%	20%	0%
d. Leadership Skills	30%	56%	0%	3%
e. Networking skills	26%	53%	17%	3%
f. Executive skills	23%	60%	17%	0%
g. Entrepreneurial skills	27%	47%	27%	0%
h. Marketing skills	43%	40%	17%	0%
i. Money skills	20%	53%	27%	0%
Business performance				
a. Sales growth	7%	62%	24%	7%
b. Net profit	3%	44%	44%	9%
c. Stock growth over the last 5 years	3%	44%	47%	6%
d. Business performance	0%	56%	41%	3%

Table 2. Results of assessment of entrepreneurial business performance of community pharmacists		
Breakeven time	Frequency	Percent
Less than 1 year	1	3%
1-3 years	11	37%
3-5 years	9	30%
Over 5 years	4	13%
Have not broken even	5	17%
Total	30	100%

respondents. This was followed by marketing and executive skills ranked by 83% of respondents as good and excellent and 80% for networking and industry skills. Lowest ranked were money and entrepreneurial skills with 27% stating that their skills in those areas are fair or poor (Table 1).

About 70% of respondents stated sales growth was either excellent or good and just below 50% had the same response for net profit and stock growth. While 7% considered sales growth as excellent, only 3% considered net profit and stock growth as excellent. About 10% of respondents stated that their net profit over the last five years was poor. Sales growth was rated good and fair by over 85% of respondents with 7% reporting excellent or poor assessments in this indicator. However, 90% rated stock growth as fair or good with 3% and 6% reporting excellent and poor results respectively. Business performance was rated excellent by none but good, fair and poor by 43%, 53% and 3% respectively.

To further analyze the relationships between the variables, the chi square method was used, tabulating all tested skills and the business performance indicators (Table 2). With significance at a p-value of <0.05, the following indicators had significant relationships. Leadership skills had a significant relationship with stock growth (p=0.0023), industry skills significantly related to net profit (p=0.008) while both business performance and stock growth were significantly affected by the money skills of the respondents (p=0.0409 and 0.0036 respectively).

Assessment of business performance was significantly affected by sales growth (p=0.0005) but not by stock growth (p=0.1208). The number of years of practice as a pharmacist significantly affected stock growth (p=0.0158) but did not significantly affect sales growth (0.74) and break-even time (p=0.1589). The years of pharmacy business did not have a significant effect on net profit (p=0.0535), Expectedly, however, reports of net profit were significantly related to business performance.

A higher proportion of respondents (59%) reported ever taking a bank loan to keep afloat and 90% rated their business as profitable and 10% non-profitable. In response to the fourth research question - Are there factors other than entrepreneurial skills affecting business performance of community pharmacists in Jos?, the following challenges stated by respondents were the continuous capital injection required by community pharmacy practice thus demanding commitment, financial discipline and patience; harsh and unsupportive business environment; proliferation of quacks, patent medicine stores and low business ethics and inefficient regulation and protection by government and regulatory agencies.

DISCUSSION

Results from the study show that community pharmacists in Jos possess all the listed entrepreneurial skills. Product skills distinctly ranked highest, being rated by all respondents as excellent and good (83% and 17%) respectively. Being pharmacists and therefore technically competent, all respondents claim to have knowledge and proficiency in pharmaceutical products and services. Organizational skills were also rated relatively high. This is the technical ability in understanding and evaluating the pharmacy. Basic training and experience (at least five years in running the business) may be responsible for this.

Leadership skills ranked next as most respondents rated their proficiency in understanding and motivating employees for better performance as excellent or good. However, 3% ranked leadership skills as poor. This however, may be a personal deficiency on the part of the respondent. Leadership skills are key for the community pharmacist who as an entrepreneur provides leadership for the business team. Competence in leadership will ensure proper direction and organization as well as good coordination of other resources for the attainment of company goals and objectives.

Community pharmacists are self-starters who usually venture into business with relatively no experience.[20] Appropriate self-starting skills are essential to the growth of the venture. Comparing the responses to all skills, the lowest rated skills were executive, marketing, networking, industry, entrepreneurial and money skills in descending order.

This result is comparable to two surveys by the Delta Pharmacy institute[19] to determine where the organization's educational efforts should be focused on developing entrepreneurial leadership for pharmacists. Survey respondents were asked to rate their skills in the following areas indicated as key for entrepreneurs by the Bernelli Entrepreneurial Learning Method - self-starting, people, marketing, money, and leadership. Most respondents indicated they have above average or excellent self-starting, people, and leadership skills. In the first survey, money skills were rated as above average or excellent by 52% while the second survey only had 42% indicated above average or excellent. This study similarly had money skills (which was defined as skill in managing and administering the finances of the organization) rated lowest with only 20% rating such skills as excellent. Entrepreneurial skills were also closely rated low which may be responsible for the stagnation and inability of many pharmacy businesses to profitably change in response to the changing business environment.[20,21]

Parameters of business performance assessed were sales growth, net profit and stock or inventory growth.[22] These parameters measure the volume of business and indicate the business is growing. Survey result showed that less than 10% of respondents rated any of these as excellent and many respondents rated their business performance as fair or poor.

Net profit and stock growth were almost equally rated by respondents. However, sales growth was rated markedly higher than the other two parameters. This is probably due

to inflation and reducing value of the local currency (Naira) which results in higher sales value without a corresponding change in the venture performance.

Assessing the business performance of the pharmacies studied, most respondents rated their performance as fair or below average. This may not be unrelated to the challenging economic climate in Nigeria. In fact, many of the respondents referred to economic hardship in Nigeria[23] which was worsened by the crises in recent years in Jos, Nigeria.[24] Evidence shows that within hostile and munificent environments, entrepreneurial orientation plays a greater role in pharmacy business performance.[25] Another reason for the less than optimal performance of pharmacy business noted by many respondents was the overstretching of the business by the personal/family needs of the owner. This has severally resulted in the encroachment into the business capital rather than the profit.

Significantly, 90% of respondents still said the business has been profitable. Some of those who rated their business as not profitable admitted to having diverted pharmacy business funds to other business and family pursuits.

Break-even time was between 1 to 5 years for 67% of respondents. However, a significant number of respondents (30%) had not broken even after 5 years. Bank and family loans had been assessed by 59% of respondents e.g. temporary overdraft facility and support from family members. Some felt bank loans had been dangerous. However, none of these two parameters was statistically significantly related to entrepreneurial skills.

Stock growth was significantly affected by money skills and leadership skills with p-values 0.04 and 0.002 respectively. Poor money skills results in reduced financial prudence and consequent lack of stock growth due to venture decline. Leadership skills deal with proficiency in understanding and motivating employees for better performance. This was shown to significantly affect stock growth. The human resources of an organization are a key factor in its success.[26] Improved employee output will directly improve stock growth. Entrepreneurial skills also significantly affect business performance particularly stock growth; and a stratified analysis among respondents with 20-29 years of practice yielded a statistical significance of p=0.02. Stock growth was statistically significant in relation to the number of years as a pharmacist with a p-value of 0.02. Net profit and stock growth were significantly related to the number of years of the pharmacy business with a p-value of 0.05 and 0.02 respectively. These pointed to experience being a positive factor promoting business performance.

Expectedly, net profit and business profitability by respondent of their business were statistically significant with a p-value of 0.006. Similarly, sales growth and business performance were statistically significant while the possession of a post-graduate training in management or entrepreneurship did not significantly impact entrepreneurial skills or business performance probably due to a need to tailor training to the specific needs of community pharmacists.

This further corroborates the results of a study[21] where it was observed that about 62.9% of profit generated is explained by the application of entrepreneurial skills measured. The variables business management, financial, marketing and general marketing skills were seen to be sufficient reasons on which to hinge maintained profitability and sustenance in small businesses. This resulted in the null hypotheses being rejected as there was a significant relationship between small business profitability and its entrepreneurial skills. Many studies have further corroborated these findings when they commonly agreed that lack of what they described as managerial (entrepreneurial) skill necessary for running a small enterprise is the principal cause of their failure.[27-29]

Businesses do not exist in isolation thus the ability to understand the trends and impact of the wider pharmaceutical industry on the pharmacy business (industry skills) will also ultimately result in better business performance.[30] This was seen to significantly impact business performance and net profit. Sales growth did not yield any statistically significant result with all the entrepreneurial skills tested probably because currency depreciation may reduce the reliability of sales growth as a measure of business performance.

Entrepreneurial skills were not the sole determinants of low business performance. Other key contributors were reported to be the harsh business environment, need for continuous capital injection, proliferation of quacks and inefficient regulation and protection by government and regulatory agencies.

The study showed that community pharmacists in Jos possess requisite entrepreneurial skills, and business performance is largely fair. Entrepreneurial orientation has been found to have a positive relation with business performance.[31,32] Most skills clearly had some impact on business performance. However, only certain skills were statistically significant when compared with their impact on performance using chi square analysis. Money skills versus the stock growth (p=0.04); money skills versus overall business performance (p=0.03); Industry skills versus net profit (p=0.008); Leadership skills versus stock growth (P=0.002); Entrepreneurial skills in pharmacists with 20 to 29 years' experience versus stock growth (p=0.02).

The null hypothesis which stated that entrepreneurial skills of community pharmacists have no significant impact on business performance' is therefore rejected and the alternative hypothesis which stated that entrepreneurial skills of community pharmacists have a significant impact on business performance is accepted.

The need for the use of modern management tools for the growth of this significant sector of the economy cannot be overemphasized. Empirical literature on the relationship between entrepreneurial skills and pharmacy business is sparse. This study contributes to available evidence on this topic. Furthermore, improved business performance through improved entrepreneurial skills will directly improve the quality of services delivered by these healthcare professionals and ultimately result in better health care for the Nigerians. This study generates evidence to inform policy change for entrepreneurial skill development for community pharmacists in Nigeria. This is expected to improve the practice and business

performance of the practitioners. For any nation to develop there is the need for the growth of the private sector as benefits of small and medium scale enterprises in a nation are enormous.[33]

Limitations

Poor record keeping habits of many entrepreneurs make it difficult to ascertain business performance of organization.[34] The study is also limited by the likely restriction in divulgence of information such as sales, profitability and business growth which are generally considered confidential. In the absence of good records, assessment of profitability becomes difficult, necessitating the use of self-reports which may be considered subjective rather than objective. Assessment provided by respondents was self-reported and likely subject to human variability and largely subjective. However, evidence supports the use of subjective data in a study such as this, as financial data for many new businesses maybe unavailable and unreliable.[12] Further research using quantitative assessments is however recommended.

CONCLUSIONS

From the study, it can be concluded that entrepreneurial skills have a significant impact on business performance. Community pharmacists in Jos possess entrepreneurial skills set but deficiencies were observed in money skills, entrepreneurial skills, industry, and networking skills and community pharmacists may benefit from some skill enhancement training. The more effective the entrepreneurial skills applied to a business, the more profitable it becomes, and the higher the probability of is survival. The need for critical entrepreneurial skill learning cannot be overemphasized.[20,21] Community pharmacy business is still a profitable business venture in Jos as confirmed by 90% of respondents. However, business performance among community pharmacists in Jos was sub optimal. Entrepreneurial skills alone are not the sole determinants of business performance. Other significant factors which need to be investigated include the business environment i.e. the external environment consisting of the larger pharmaceutical industry, economic, legal and government impact; as well as other aspects of the internal environment such as the entrepreneur's drive, and personality traits.

The managerial implication of the study therefore, is that for the entrepreneur to successfully establish and run an enterprise, he must engage in critical entrepreneurial skills learning and implement same on the enterprise.[27,35,36]

It is recommended that entrepreneurial skills, particularly the financial management skills in pharmacy be enhanced at the undergraduate, postgraduate and in-service training levels.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest to disclose.

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Original Research

Factors associated with smoking cessation success in Lebanon

Zeina A. BACHA, Nelly LAYOUN, Georges KHAYAT, Souheil HALLIT.
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Abstract

Objective: The objective is to assess factors associated with the success rate of smoking cessation among Lebanese smokers in a smoking cessation center.

Methods: A cross-sectional data study, conducted between March 2014 and March 2016 in an outpatient smoking cessation center with 156 enrolled patients. The patient's nicotine dependence and motivation to quit smoking were evaluated according to the Fagerstrom Test for Nicotine Dependence and Richmond tests respectively.

Results: The number of packs smoked per year decreased the odds of smoking cessation success (p=0.004, ORa=0.982, CI 0.97-0.994), while the compliance with the offered treatment increased the odds of success by 7.68 times (p<0.001, ORa=7.68, CI 3.438-17.187). Highly dependent and highly motivated smokers had more success in the quitting process compared to those with a lower dependence and motivation respectively.

Conclusion: Our findings showed that many factors can influence smoking cessation, an experience described as difficult, most significantly the number of packs per year and compliance with the smoking cessation treatment. Moreover, although these outcomes are not representative of the entire Lebanese population, we believe that health authorities could utilize these results when implementing upcoming smoking cessations programs. All attempts at cessation should have a goal of reducing the number of packs smoked per year to improve the chances of ceasing into the future.

Keywords

Smoking Cessation; Tobacco Use Cessation; Tobacco Smoking; Epidemiologic Factors; Cross-Sectional Studies; Multivariate Analysis; Lebanon

INTRODUCTION

Smoking is the single largest preventable cause of disease and premature death worldwide, being a key causal factor in heart disease, stroke, chronic lung disease, and cancers.[1] It has been estimated by the World Health Organization (WHO) that 4.9 million people die per year because of smoking and the death toll is expected to rise to 8 million by 2030.[2] Of great concern is the lack of success in addressing smoking cessation among young people.[3] Smoking rates were highest in the Eastern Mediterranean countries among the population overall, reaching a peak of 53.9 percent in Lebanon.[4] Alarmingly, 78.9 percent of Lebanese children are exposed to passive smoking in their dwellings, while 74.9 percent are exposed to it outdoors.[4] Indeed, 42.9 percent of male adults and 27.5 percent of female adults are cigarette smokers.[5] Furthermore, the smoking prevalence rates are 14.8 percent and 6.7 percent for male and female youths respectively.[6]

Zeina Aoun BACHA. MD. Attending and Assistant Professor. Department of Pulmonology and Tobaccology, Hotel Dieu de France Hospital and Saint Joseph University. Beirut (Lebanon). zeinaabacha@gmail.com
Nelly LAYOUN. PhD. Research Center in Epidemiology, Biostatistics and Clinical Research, School of Public Health, Université Libre de Bruxelles. Brussels (Belgium). nelly_layoun@hotmail.com
Georges KHAYAT. MD. Attending and Assistant Professor. Department of Pulmonology and Tobaccology, Hotel Dieu de France Hospital and Saint Joseph University. Beirut (Lebanon). georges.khayat@usj.edu.lb
Souheil HALLIT. MSc, MPH. Research Department, Psychiatric Hospital of the Cross, Jal Eddib; & Faculty of Medicine and Medical Sciences, Holy Spirit University. Kaslik (Lebanon). souheilhallit@hotmail.com

Smoking cessation remains a big problem in Lebanon despite the evolution in socioeconomic standards, quality of life, education and preventive medicine. Lebanon is still lacking the vision to implement smoking cessation policies. The advantages of smoking cessation are indisputable and have been proven in populations of all ages and genders, in healthy populations, and in patients with comorbidities (cardiovascular disease or cancer).[7] Quitting smoking can be beneficial at any age. It increases treatment response in cases of COPD, coronary artery disease and cancer, and increases the response to chemotherapy.[8] Some countries in the developing world as of yet do not have the internal impetus to support the development of their own national guidelines to promote smoking prevention and cessation.[9] Health services, despite internal standards, are influenced by the social, economic and political state of the country. They are influenced by the wars around us, the mass movements of the population and civil conflicts. While much effort is being made to increase awareness about serious diseases and their treatment; it is time to make efforts to prevent them altogether. Our young Lebanese population is leading a sedentary, unhealthy lifestyle, on its way to potentially suffering from future chronic diseases.[10]

Many factors have been recognized as predictors of smoking, such as financial considerations, leisure, relief of pressure[11], parental smoking[12,13], having a sibling that smokes and peer smoking, all significantly associated with an adolescent being a smoker.[14-17] Exposure to cigarette advertisements on television has also been proven influential.[18]

Mobile phone technology has the potential to provide personalized smoking cessation support, with the latter being delivered wherever the person is located, without them having to attend services, and can be interactive, allowing quitters to obtain extra help when needed.[19] In fact, the rate of continuous abstinence at 6 months was significantly increased in the group that received text messages compared to those who did not (10.7% vs 4.9%).[20]

Smoking addiction is considered a chronic relapsing disease. Commonly, several failed cessation attempts occur before achieving permanent abstinence.[21] Since only 35 percent of smokers are able to quit smoking by themselves, most smokers need help and assistance to stop.[22] The aim of this study is to assess factors associated with the success rate of smoking cessation among Lebanese smokers in a smoking cessation center.

METHODS

Study design

A cross-sectional data study was conducted between March 2014 and March 2016 in an outpatient smoking cessation center. The center aims to offer personalized care and follow up, and assists patients in a multidisciplinary approach. The smoking cessation model combines proactive outreach to smokers with systematic counseling, treatment and ongoing support for a period of three months inclusive of medical requisites, medical support and special diets to curb the urge to smoke. Eligible participants were required to be aged >18 years, willing to quit smoking, and smoking at least one cigarette/day. Exclusion criteria included patients who came for only one or two visits, and were not motivated to stop smoking.

The professional team involved with the center is composed of a respiratory physician specialized in smoking cessation. This physician manages the program, assesses patients, provides them with medical treatment to achieve smoking cessation, and deals with relapses if/when these occur. A nurse is also present on board who, in addition to her usual responsibilities, visits and speaks with every smoker hospitalized in medical departments, assists in patients' motivation via phone or text messages and performs a CO test during each visit. A psychologist is also present to provide behavioral support and motivational sessions, as well as a dietician who helps control the risk of weight gain in these patients. The primary objective of the smoking cessation center is to offer specialized and professional help to all smokers and recent ex-smokers, in order to alleviate their nicotine withdrawal symptoms. As very few people can quit smoking on their own initiative, we provided throughout our study an approach that focused on listening, coaching, face-to-face conversations and long term support.

Recruitment and screening

Both, inpatients and outpatients who asked for help to quit smoking, were recruited by a trained nurse. The latter was responsible for educating patients about health-related problems, and performing basic medical tests and procedures. She received a thorough training by the tobacologists concerning all steps of approaching patients prior to the start of the data collection process.

A total of 156 smokers participated in the baseline interview; during this visit, the study's objectives were explained to each participant, who were informed about the length of the treatment program (three months) at the rate of one visit per week.

Before enrolling the participants in the program, two sessions with a psychologist were offered. They were conducted as follows: the first session included 20 to 30 minutes of motivation by the psychologist and another 15 minutes spent with the nurse to get the information about the program. The psychologist recorded information about the patient; a baseline assessment was completed. The patient's motivation to quit smoking was evaluated according to the Richmond test. The patient was also offered some tips on how to delay his cigarette intake. Fears concerning stopping smoking, the cognitive abilities, the past psychiatric history and related treatments, and other kind of addictions if present were also evaluated and recorded.

During the second session, which lasted for 15-20 minutes, the psychologist worked on motivation by discussing the advantages and disadvantages of smoking and quitting smoking, as well as explaining the principles of cognitive behavioral therapy (CBT). At the end of the second session, a full psychological assessment was completed to determine the ability of the smoker to quit. The patient had one week of reflexion and was reassessed again for his willingness to quit. If the assessment reinforced the intentions of the smoker to quit, and he/she had decided on a date to quit, the smoker was enrolled into the three-month smoking cessation program, with meetings scheduled on a weekly basis for the total duration of the program.

Ethical aspect

Ethical approval was obtained from the Institutional Review Board of the Saint-Joseph University. A written informed consent was obtained from all participants prior to enrolling in the study.

Program components

A three-month smoking cessation program, including behavioral counseling and pharmacological treatment, was given to all smokers. Each weekly, in-person behavioral counseling session had duration of 45 minutes, and involved discussions about aspects of smoking-related morbidity and mortality, the principal factors of nicotine addiction and the build-up of an action plan for quitting smoking that was specific for each patient. Some of the important topics covered were the identification of smoking triggers, functional analysis, handling of lapses, lifestyle balancing and problem solving. The therapy style was active and directive, with role playing used regularly as a training technique.

Each participant received a twelve-week pharmacological treatment course, which consisted of Nicotine Replacement Therapy (NRT), Varenicline (VAR) and Bupropion (BUP), depending on the patient's comorbidities and the level of their smoking dependence. The choice of

pharmacotherapy was based on clinical suitability and patient choice. Patients were asked to schedule follow up check-up and medication control visits at weeks two, four, eight and twelve after the scheduled quit day, and then on a monthly basis up to six months after the quit day. These medication control visits were scheduled on the same day of the weekly behavioral sessions. Smokers who had quit smoking for six months or more were followed up via a telephone call to check if they are still abstinent or not.

Questionnaire

On average, the questionnaire was completed by participants within approximately 10 minutes. The final version of the standardized questionnaire of the American Thoracic Society was administered in Arabic, the native language of Lebanon. Details about the translation process were presented in previous studies.[23-30] The Fagerstrom scale was used to assess nicotine dependence, whereas the Richmond scale was used to assess motivation to quit. The Fagerstrom scale included questions about (i) how soon after you wake up to you smoke your first cigarette, (ii) finding difficulty to refrain from smoking in places where it is forbidden, (iii) the cigarette the patient would hate most to give up, (iv) number of cigarettes smoked per day, (v) smoking frequently in the morning and (vi) smoking even if you are sick in bed most of the day. The Richmond scale included 4 questions as follows: "would you like to quit smoking if you could do it easily, how interested are you to quit smoking, will you try to stop smoking in the following 2 weeks and how likely are you to be a non-smoker in the following 6 months".

The questionnaire also included sociodemographic characteristics, smoking behavior, i.e., the number of packs smoked per year and the Fagerstrom Test for Nicotine Dependence with a cutoff point of five[31,32]; a score lower than 5 indicates low cigarette nicotine dependence, whereas a score more than 5 indicates high dependence. The motivation scale was evaluated using the Richmond test, with a total score ranging between 0 and 10. Scores between 0 and 4 indicate low motivation; 5–6 moderate motivation; and 7–10 high motivation to quit.[33]

Medication compliance

Medication compliance was operationalized as taking the prescribed doses per day for each day of the 12 weeks on the full dose of study medication. Prescribed medications are not available on the Lebanese market and are provided to the patient exclusively by the center. Therefore, medication compliance is monitored very closely and precisely. Subjects were coded as non-compliant if they stopped the treatment before the end of the 12 weeks. Thus, each subject received an overall compliance score; zero for non-compliant and one for compliant.

Assessment of abstinence

Abstinence was determined at each clinic visit by self-report of no smoking in the past seven days combined with a CO level of no more than 10 parts per million (ppm).[34] An exhaled CO test was performed at each visit. During follow-up, self-reported abstinence during the preceding seven days was verified by a CO analysis. Moreover, tests for cotinine dosage in urine were performed twice during the course of the program, once on the first visit when enrolled in the program (when the patient was still a smoker), and a second time after abstinence or to titrate the NRT. The second cotinine level guided the investigators as to whether the doses of NRT are low or the patient is experiencing craving, and consequently should be increased or if they are high and the patient is experiencing symptoms of intoxication and thus, doses should be decreased or other treatments should be introduced

Table 1. Results of smokers' success or failure to quit by gender, smoking dependence, motivation, compliance to treatment, program messaging and type of cessation therapy.

Variable	Failure	Success	p-value
Gender			0.789
Male	32 (50%)	48 (52.2%)	
Female	32 (50%)	44 (47.8%)	
Fagerstrom scale			0.379
Low dependence	8 (12.7%)	16 (18%)	
High dependence	55 (87.3%)	73 (82%)	
Motivation			0.027
Low	38 (65.5%)	37 (43%)	
Moderate	13 (22.4%)	29 (33.7%)	
High	7 (12.1%)	20 (23.3%)	
Self-reported compliance to treatment			<0.001
Yes	25 (39.7%)	73 (81.1%)	
Messaging program			0.503
Yes	21 (32.8%)	35 (38%)	
Nicotine gum 4 mg			0.116
Yes	33 (51.6%)	59 (64.1%)	
Magnesium and Vitamin B6			0.442
Yes	36 (56.3%)	46 (50%)	
Vitamin C			0.503
Yes	32 (50%)	41 (44.6%)	
Bupropion 150 mg			0.878
Yes	16 (25%)	24 (26.1%)	
Patch 25 mg			0.93
Yes	22 (34.4%)	31 (33.7%)	
Varenicline 1 mg			0.815
Yes	17 (26.6%)	26 (28.3%)	

Table 2. Results of smokers' success or failure to quit by continine results, pack/years, age and number of visits.

Factor	Cotinine-1*	Cotinine-2**	Packs/year	Age	Number of visits
Failure	1939 ± 4280	1387 ±1034	60.84 ± 42.61	52.12 ± 12.08	6.92 ± 3.80
Success	1314 ± 1018	43787 ± 290026	43.27 ± 29.98	49.05 ± 11.86	7.29 ± 4.34
p-value	0.289	0.327	0.003	0.118	0.57

Values are expressed as a mean ± standard deviation.
*Cotinine-1= cotinine measured during the first visit (when enrolled in the program)
**Cotinine-2= cotinine measured during the second measurement after abstinence or to titrate the nicotine replacement therapy.

(bupropion, varenicline). To assess the cotinine levels in the urine, we used high-performance liquid chromatography with UV detection, a simple, sensitive and rapid method.[35] Urinary cotinine samples were analyzed by the Faculty of Pharmacy, Saint-Joseph University, Lebanon.

Statistical analysis

Data analysis was performed on SPSS software, version 23. Categorical data was shown as absolute frequencies and percentages. Continuous data was presented as means and standard deviation (SD). Two-sided statistical tests were used; chi-2 test or the Fisher's exact test for dichotomous or multinomial qualitative variables, and Student's t-test for quantitative variables of normal distribution and homogeneous variances. Regarding the multivariate analysis, a backward logistic regression was performed, taking into account the variables in the bivariate analysis that showed a p-value <0.2. The regression took the failure/success to quit smoking as the dependent variable (yes/no). The statistical significance was set at a p-value< 0.05.

RESULTS

Table 1 summarizes the results of the bivariate analysis taking failure/success to quit smoking as the dependent variable. A significantly higher proportion of the smokers who successfully quit smoking (33.7 percent and 23.3 percent) as compared to those who failed (22.4 percent and 12.1 percent) had a moderate and high motivation to quit smoking respectively (p=0.027). A significantly higher proportion of those who succeeded in quitting (81.1 percent) were compliant with the treatment, compared to those who failed (39.7 percent) (p<0.001). No significant difference was found between both groups in terms of vitamins taken (magnesium & vitamin B6, vitamin C) or the text messaging system used (p>0.05 for all these variables) (Table 1).

In addition, smokers who were successful in quitting smoked a significantly lower number of packs per year compared to those who failed (43.27 versus 60.84 packs per year; p=0.003). The cotinine levels, age and the number of visits to the center did not significantly differ between those who failed and those who succeeded in quitting smoking (p>0.05 for all variables) (Table 2).

A backward logistic regression, taking the failure/success to quit smoking as dependent variable, showed that a higher number of packs per year decreased the odds of success to quit by 1.8 percent (p=0.006, ORa=0.982, CI 0.97-0.99), while the compliance with the treatment would significantly increase the odds of quitting success by 7.6 times more likely if they complied with the treatment (p<0.001, ORa=7.68, CI 3.43-17.18). Highly dependent smokers as shown by the Fagerstrom scale and highly motivated smokers as shown by the Richmond scale had more success in the quitting process compared to those who had low dependence and low motivation respectively. However, this association was not statistically significant (Table 3).

DISCUSSION

This is the first study conducted in Lebanon that assesses factors associated with the success rate of smoking cessation among Lebanese smokers. Compliance with treatment and the number of packs per year were significantly associated with smoking cessation among our Lebanese smokers. The study had a success rate, which is in line with international standards and which amounted to 37 percent. Our findings are also in agreement with those of Farkas *et al*, who showed that heavy smokers (those who smoked more than 15 cigarettes a day) were less successful at quitting in the preceding 18 months than light smokers.[36,37] A partial success can be considered achieved only if cigarette consumption is reduced from 60-80 cigarettes to 5-10 cigarettes per day.[38] Smoking cessation recommendation is a cornerstone for cardiovascular risk reduction, especially that a recent Lebanese study current cigarettes smoking would significantly increase the LDL levels more in waterpipe smokers as compared to non-waterpipe smokers.[39] Spreading awareness by health professionals about the drawbacks of cigarette and waterpipe smoking and their possible deleterious effects, can help educate the patients prevent cardiovascular diseases.

Any pharmacological treatment will be maximally effective if the patient is consistent with the treatment in terms of dose and duration in order to achieve positive therapeutic outcomes.[40] The importance of medication adherence to smoking abstinence was demonstrated in this study. Thus, increasing the effectiveness of smoking cessation interventions might be achieved by improving treatment adherence.[41]

Table 3. Multivariate analysis: Backward logistic regression taking the treatment failure/success as the dependent variable.

Factor	ORa	95% CI	p-value
Packs per year	0.98	0.97 : 0.99	0.006
Compliance with the treatment	7.32	3.20 : 16.78	<0.001
Fagerstrom: ≥5/<5*	1.88	0.56 : 6.30	0.31
Motivation			
6-8 /0-5*	1.86	0.73 : 4.69	0.16
9-10/0-5*	2.72	0.85 : 8.68	

Variables entered in the model: Number of packs per year, compliance with the treatment, Fagerstrom scale, and Richmond scale.* Reference group
ORa: adjusted odds ratio; CI: confidence interval

Compliance is the concept to determine whether a patient's behavior is consistent enough with the prescription or advice of a physician.[42] Therefore, improving adherence to existing treatments is an important avenue to explore in research trials and an essential component to include in behavioral programs designed to increase cessation rates. Similar to smoking cessation interventions[43], multidimensional adherence interventions, including behavioral components may be effective.[44]

The adoption of a combination of motivational enhancement, along with cognitive behavioral strategies and adherence counseling, could hypothetically be part of smoking cessation counseling.[43,44] Our data suggests that good adherence increased the quit rates seven fold compared with poor adherence. Thus, in the absence of newer and more effective treatments for nicotine dependence, it is crucial to better understand the drivers of medication non-adherence and how to maximize treatment utilization in order to maximize abstinence rates.[41]

Furthermore, our results showed that the higher the number of packs smoked per year correlated with an increase in the odds of smoking cessation failure, in line with the findings of Hays *et al.*[45] Most of the earlier literature reported nicotine dependence as a predictor for smoking cessation.[46-48] In particular, a decrease in levels of nicotine dependence among recent cohorts of smokers could partly explain higher rates of successful quitting among adults. Less-dependent smokers are more likely to successfully quit, presumably because of less-intense withdrawal symptoms.[36,49,50]

Recent findings from Lebanon showed that the motivation to quit was significantly associated with higher stages of readiness to quit[28] and would significantly increase the odds of having a real quit attempt duration of more than one month.[29] Our findings indicated that motivation did not have significant impact on the success of quitting, though this was likely, due to the small sample size. Current smokers with extrinsic motivations (i.e., social influences) were less likely to quit successfully than intrinsic motivations (i.e., health related influences).[51]

The influence of smoking cost on cessation was not addressed in our study, however, it is plausible that smokers react to price increases without consciously identifying them as a motivation to quit; this could be explained by underestimating the cost of the smoking by more than half.[52] Therefore, we are hopeful that the increase in taxes that was applied in March 2017 by the Lebanese government on tobacco products will encourage smokers to quit.

Limitations

Our study has several limitations. This is a cross-sectional design and therefore, we are unable to draw causal associations with such a design. The total sample size is small and however cannot be extrapolated to the whole population. The replication of this study in different settings and geographic locations would provide better generalizability of the results. A selection bias is still however possible because of the refusal rate. The use of a questionnaire in patients may not always be accurate: problems in question understanding, recall deficiency and over or under evaluating symptoms, which can lead to a possible information bias. In addition, we relied on each subject's self-reported data, which might contain some potential sources of bias. Other study limitation could be the cost of providing this quality of service to all smokers in Lebanon. The program complexity makes it less replicable by others and consequently, may not be generalizable to other populations. Further studies are warranted in more diverse populations. The self-report recall might be another source of bias as well.

CONCLUSIONS

Our findings showed that many factors can influence smoking cessation, an experience described as difficult, most significantly the number of packs per year and compliance with the smoking cessation treatment. All attempts at cessation should have a goal of reducing the number of packs smoked per year to improve the chances of ceasing into the future. Moreover, although these outcomes are not representative of the entire Lebanese population, we believe that health authorities could utilize these results when implementing upcoming smoking cessations programs. Further studies are needed in different populations and settings.

CONFLICT OF INTEREST

The authors have nothing to disclose.

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Original Research

Challenges and opportunities of clinical pharmacy services in Ethiopia: A qualitative study from healthcare practitioners' perspective

Henok G. TEGEGN, Ousman A. ABDELA, Abebe B. MEKURIA, Akshaya S. BHAGAVATHULA, Asnakew A. AYELE.

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Abstract

Background: Currently, clinical pharmacists have in-depth therapeutic knowledge and scientific skills to act as drug therapy experts in healthcare settings.

Objective: The aim of this study was to assess the opportunities and challenges of clinical pharmacy services from the health practitioners' perspective in University of Gondar (UOG) hospital Ethiopia.

Methods: A qualitative study was performed using face-to-face in-depth interviews with health practitioners who were directly involved in clinical pharmacy services (clinical pharmacists, physicians, and nurses) in UOG hospital.

Results: A total of 15 health professionals from various specialties were interviewed to express their views towards clinical pharmacists' competencies and identified challenges and opportunities regarding their clinical services. Based on interviewees report, the opportunities for clinical pharmacists includes acceptance of their clinical services among health specialties, new government policy and high patient load in hospital. However, inadequacy of service promotions, lack of continuity of clinical pharmacy services in wards, poor drug information services, lack of commitment, lack of confidence among clinical pharmacists, conflict of interest due to unclear scope of practice, and absence of cooperation with health workers were some of the challenges identified by the interviewees.

Conclusion: We identified health professionals working in UOG hospital are receptive towards clinical pharmacy services, but identified some of the potential challenges that needed to be focused to strengthen and promote clinical pharmacy services. Further, the opportunities at hand also need to be utilized astutely to boost the services.

Keywords

Pharmaceutical Services; Professional Practice; Pharmacy Service, Hospital; Pharmacists; Attitude of Health Personnel; Qualitative Research; Ethiopia

INTRODUCTION

The philosophy of pharmaceutical care (PC) is the sum of responsibilities of the pharmacist to meet all of the patient's drug-related needs through direct patient care and cooperation with other facets of the health care system. Clinical pharmacists possess in-depth therapeutic knowledge and scientific skills that allow them to act as drug therapy experts in healthcare setting.[1] The American College of Clinical Pharmacy (ACCP) defined clinical pharmacy as a discipline with specialized pharmacists concerned with the science and practice of rational drug therapy.[2] Clinical pharmacists apply scientific evidence to ensure and advice on best use of medications for optimal drug therapy. Further, they also engage in various research activities to generate new knowledge and practical skills that furthermore can improve patients' health and quality of life.[3] Over the years pharmacists' roles have evolved to include participation in bedside rounds as part of a multidisciplinary health care team, and in patient profile review aimed at the identification and resolution of any drug-related problems. Pharmacist interventions, such as counseling the patient to improve their adherence and compliance, have contributed to a consistent development of clinical pharmacy services all over the world.[4] Despite the importance of these receptive services to the improvement of patient outcomes, clinical pharmacists face many challenges such as poor awareness among general public, lack of specific legislation and recognition from other health care providers. Possible reasons may be unacceptance of pharmacists' professional standing by other health practitioners, lack of leadership qualities, patients' perceptions, and existence of communication gaps between pharmacists and doctors.[5-8] In particular, these challenges are highly noted in developing countries like Ethiopia.[8,9] Physicians' expectations and perceptions towards the pharmacists' roles and responsibilities are the main factor influencing the advancement of clinical pharmacy service in hospitals.[10,11]

In Ethiopia, recent reforms in hospital implementation guidelines state that pharmacists should be assigned to

Henok Getachew TEGEGN. B.Pharm, MSc, Assistant professor, Department of Clinical Pharmacy, School of Pharmacy, College of Medicine and Health Sciences, University of Gondar, Gondar (Ethiopia). heniget@gmail.com
Ousman Abubeker ABDELA. BPharm, MSc. Lecturer, Department of Clinical Pharmacy, School of Pharmacy, College of Medicine and Health Sciences, University of Gondar, Gondar (Ethiopia). ousmy2009@gmail.com
Abebe Basazn MEKURIA. B.Pharm, MSc, Lecturer, Department of Pharmacology, School of Pharmacy, College of Medicine and Health Sciences, University of Gondar, Gondar (Ethiopia). abeyohannes21@gmail.com
Akshaya Srikanth BHAGAVATHULA. PharmD. Assistant professor, Department of Clinical Pharmacy, School of Pharmacy, College of Medicine and Health Sciences, University of Gondar. Gondar (Ethiopia). akshaypharmd@gmail.com
Asnakew Achaw AYELE. Bpharm, MSc. Lecturer, Department of Clinical Pharmacy, School of Pharmacy, College of Medicine and Health Sciences, University of Gondar. Gondar (Ethiopia). asnake.21.uog@gmail.com

hospitals for the benefit of the patients.[12] Prioritizing the national guidelines, the undergraduate pharmacy curriculum shifted towards patient-focused practice by including a mandatory 1-year clerkship program as part of the academic training. At University of Gondar (UOG) hospital, clinical pharmacists began to work as integral parts of the health care teams since September 2013. During these years, around 25 full-time clinical pharmacists sporadically provided various patient care services. This includes medication therapy management, dosage adjustments, interventions to optimize drug therapy, and provided drug information to health professionals and patients. Recently, the UOG has launched the postgraduate program of clinical pharmacy (MSc) to improve and advance the work force in UOG hospital. A better understanding of health professionals' perspectives regarding clinical pharmacy services can provide a greater opportunity to identify the challenges and future opportunities of clinical pharmacists in UOG hospital. Thus, the present qualitative study aimed to explore challenges and opportunities of clinical pharmacy services offered in UOG hospital through health practitioners' perspectives.

METHODS

Study design

Qualitative in-depth interviews were conducted from September 16 to October 1, 2016 in UOGRTH. This hospital is one of the oldest pioneer teaching hospitals located in Northwest Ethiopia. University of Gondar Referral and Teaching Hospital (UOGRTH) is equipped with 550 beds to provide both inpatient and outpatient services for a population of 500,000 living in Northwest Ethiopia. It has a range of specialties and a teaching center including pediatrics, surgery, gynecology, psychiatry, HIV (human immunodeficiency virus) care, oncology, and outpatient clinics. Recently, clinical pharmacy services were launched in various clinical sites such as ambulatory, psychiatry, internal medicine, surgery, pediatrics, emergency medicine, and the drug information center.

Participants were recruited through personal contacts and convenience sampling technique. The identified participants were contacted in person or by phone to fix interview appointments. A total of 15 health care professionals (an equal number of five participants from physicians, pharmacists and nurses) working in UOGRTH were selected for the interview and attempts were made to ensure representation of each ward where clinical pharmacy services are provided.

Data collection

In-depth interviews were used for data collection. The in-depth interview guide was adopted from existing literature with similar topic[13,14] and open-ended questions were used to explore the challenges and opportunities of clinical pharmacy services.

The content validity of the interview guide was confirmed by a team of experts including a senior clinical pharmacist, internal medicine specialist and senior nurse professionals. The selected health care professionals were interviewed in depth based on the structured interview and data were both noted and audio recorded. To ensure the quality of interviews, all the participants were interviewed by a single researcher (the principal investigator). Confidentiality of the information was maintained throughout the study in order to obtain honest and accurate responses from each health practitioner. The interview took approximately 15-30 minutes. All interviews took place in a private setting at the respondent's office during working hours where the process was unlikely to be interrupted or overheard. Data were collected until a point of saturation was reached. Responses were recorded by both note-taking and audio taping.

Table 1. Identified themes among health care practitioners interviewed (coding scheme)

Codes	Themes
Code-1	General Overview over the newly established clinical pharmacy services in GUH
Code-2	Scope of CPS Competencies as perceived by health practitioners
Code-3	Opportunities of clinical pharmacy service
Code-4	Challenges of clinical pharmacy service

Data management and analysis

Audio recorded Amharic versions of the interviews were translated to English and complete transcripts of all interviews were prepared. After reading and annotating the transcripts, themes and subthemes were identified. These initial themes were assembled in order to develop a coding scheme that was subsequently used for identification of theme patterns (Table 1). The patterns and relationships found under the themes were used to build the result. Quotes for the content of the theme were given. Quotes were designated as 'Cpharm' for clinical pharmacists, 'NUR' for nurses and 'MD' for medical doctors. In reporting the findings, codes were used to maintain anonymity of participants to ensure confidentiality. Four major themes were identified: General overview and personal experiences of the newly-established clinical pharmacy services; Scope of clinical pharmacy services; Challenges of clinical pharmacy service; and Opportunities of clinical pharmacy service. The analysis was assisted by OpenCode 3.6 software.

Ethical considerations

Ethical clearance was obtained from Ethical Review committee of School of Pharmacy, University of Gondar and a signed written informed consent was obtained from each respondent.

RESULTS

Study presented here depicts an in-depth analysis of the challenges and opportunities of clinical pharmacy services from the health care professionals' perspective. A total of 15 health practitioners (nurses, medical doctors and clinical pharmacists) were interviewed, 2 of which were women (a senior staff nurse and a medical doctor). Three of the medical doctors were senior (residents); two of the nurses were senior staff nurses (MSc) and five clinical pharmacists interviewed all held MSc degrees. Four main themes identifies are described as follows.

Table 2. Health professionals' views and experiences over newly implemented clinical pharmacy services in UOGRTH

Code 1	General Overview over the newly established clinical pharmacy services in GUH
NUR 3	Clinical pharmacists have played a great role in avoiding medication errors. I have seen some changes in patient care so far e.g. changing drug regimen by communicating with medical interns; deciding when to stop medication, monitoring of side effects and identifying drug-drug interactions…
MD 2	In internist noticed that clinical pharmacists were involved in ward rounds, and actively participated in morning sessions. They have given some drug-related suggestions such as dosing and regimen adjustments…
Cpharm 3	Clinical pharmacy is now in a good rate of progress from the time of its implementation. It's quite better today than yesterday…
NUR 5	Previously pharmacists were not following-up on medications in wards. Recently, they have been observing patient's charts and checking the prescribed drugs …
MD 1	It is seldom practiced here as far as my experience is concerned especially in Pediatrics and ICU where I am working, even though the services are thought to be very important and helpful…
MD 4	In my opinion these services are not helping at this time. I see some clinical pharmacists while rounding but they are not participating regularly…
NUR 2	It (the services) lacks continuity, I see them practicing one time and they disappear later on…
MD 2	When I have been in internal medicine ward attachments, there was involvement of clinical pharmacists but after that I never see them in other wards for example in surgery and OPD wards…

Key: NUR-Nurse, MD-Physician, Cpharm-Clinical pharmacist

Theme 1: General overview and personal experiences of the newly-established clinical pharmacy services

A wide range of views from interviewees' were reflected ranging from attitude towards the importance of the service to the level of satisfaction of the service being provided. A list of responses is provided in Table 2.

The majority of the respondents stated that the clinical pharmacy services are continually and noticeably improving. They have also stated that clinical pharmacy services are very helpful and important. Nonetheless, they are not satisfied with the services currently given at GUH. They expressed a need to overcome some problems including shortage of professionals to fulfill the needs of various wards in the hospital sooner rather than later, and were concerned that it will not be easy to render quality clinical pharmacy services in various wards with the limited number of clinical pharmacists currently available (Cpharm 3, NUR 5, MD 1, and MD 2).

The majority of the interviewees observed that the services are not being delivered continuously and that clinical pharmacists should work hard to deliver pharmaceutical care regularly without interruptions (NUR 2, MD 2).

Theme 2: Scope of clinical pharmacy competencies as perceived by health practitioners

All of the interviewed respondents described the role, responsibilities, and scope of clinical pharmacy services based on their perception regardless of the established job description (Table 3). The respondents explained the scope of practice broadly in which clinical pharmacists can serve patients, health practitioners and the community at large. Regarding patient care, some respondents described that the scope of clinical pharmacy services can encompass both diagnosis of illnesses and prescribing of drugs (NUR 1, MD 1).

Most of the respondents emphasized the need for pharmacy services in the area of drug therapy which, they believe, is the most neglected and not addressed by other health practitioners. Thus, their notion was that the scope of practice should be confined to drug therapy (MD 2, Cpharm 1, and Cpharm 3).

Some viewed the role of clinical pharmacists more broadly from the patient's perspective. They described that clinical pharmacists should focus on cost effective approaches of illness management and should understand patient's

Table 3. Scope of clinical pharmacy competencies as perceived by UOGRTH health care practitioners

Code 2	Scope of clinical pharmacy competencies as perceived by health care practitioners
NUR 1	It suits me if clinical pharmacists do prescribe as specialty pharmacists are much better updated with latest drug information…
MD 1	Clinical Pharmacists' role can range from the diagnosis to treatment as long as there is a smooth and a friendly relationship with physicians without conflict of interest. Our ultimate target is the patient…
MD 2	Physicians may tell the patient not to discontinue the drugs but clinical pharmacists can provide patient counseling more pertaining to their medications such as the consequence of drug discontinuation like drugs resistance, and drug ineffectiveness if alcohol is taken…
Cpharm 1	If someone (patient) took medicine and face problem associated with it, then assessing what is wrong behind is not common. Even patients do not know about their medicines other than when to take it…
Cpharm 3	There are the four ultimate goals clinical pharmacists need to achieve. Those are ensuring appropriateness, efficacy, safety and convenience of the medication…
NUR 3	They (clinical pharmacists) have to consider other things like psychology of a patient, affordability of drugs, its impact on social interaction as some drugs causes change to mouth odor "bad one"; changes to urine color, as this may cause psychological problem…
Cpharm 2	Especially developing countries like Ethiopia in a resource limited setting, the role of clinical pharmacist need to be aimed at reducing drug cost associated problems …
NUR 3	They (clinical pharmacists) have a great role in preventing antibiotics drug resistance ….
NUR 5	I believe they (clinical pharmacists) can provide health practitioners including nurses with updated drug information and can be a source of information regarding drug administration, particularly on how to prepare IV drugs prior to administration…

Scope is defined as: The extent of the area in which clinical pharmacists can do professional responsibility.
Key: NUR-Nurse, MD- Physician , Cpharm-Clinical pharmacist

Table 4. Opportunities of clinical pharmacy services in UOGRTH

Code 3	Opportunities of clinical pharmacy services
MD 1	There is no any doubt that clinical pharmacy is so much important…
MD 3	In my opinion clinical pharmacy services are very necessary because it add something for patients on drug related issues like drug-drug interaction, side effects…
NUR 3	I believe it will bring lots of changes especially in our ward "internal medicine"...
MD 1	Conflict of interest will not arise as long as all health practitioners act according to their job descriptions. …
NUR 3	GUH has welcomed the implementation of the services unlike before… they (clinical pharmacists) are cooperatively working as a team with other clinicians in wards and morning sessions …
NUR 5	We all staffs welcome clinical pharmacy services. These services also got consent from the hospital management …
MD 5	I hope some physicians are benefiting a bit more from these service. Previously physicians used to prescribe drugs by referring from books. It was not patient oriented…
Cpharm 4	The curriculum is clinically oriented unlike before. It also enabled students to practice in the community…
Cpharm 5	Physicians pay more attention to the disease status. As a result there is a gap about medications. Thus, Pharmacists are best suited to work in this area as some profession must fill this gap. Moreover, Nurses are the one who are administering drugs to the patient though their knowledge about drugs is apparently not adequate enough. So it's essential to put one health professional in charge of such medication related stuffs…
MD1	The high patient burden is a good opportunity for clinical pharmacists to enrich their skills and lessen the burden of physicians for the better outcome of the patient care...
MD 3	I think drug related problem is higher in oncology than any other wards. This ward needs clinical pharmacists' involvement since chemotherapies need high level of drug therapy knowledge...
Cpharm 3	The presence of well-equipped DIC with materials and database; Adequacy of stuffs; and presence of clinical pharmacy department all these are also considered as an opportunity…
Cpharm 3	Luckily the current hospital reform guidelines encourages these services……When we see it from the national level, the policy is receptive…We used to have our own local job descriptions in the hospital which was not national. But now the scope of practice has already been prepared by: food medicine and health authority control agency (FMHACA) and there will not be any confusion….
Cpharm 4	Currently, the government is also recruiting and employing clinical pharmacists in all hospitals unlike before when the government used to hesitate to implement any new services…

Opportunity is defined as: A set of circumstances that makes clinical pharmacists exercise their professional work.
Key: NUR-Nurse, MD- Physician , Cpharm-Clinical pharmacist

psychology during counseling for best patient care outcome (NUR 3, Cpharm 2).

Another area of scope of practice mentioned by most of the respondents is the role of clinical pharmacists as supporters of other health practitioners and of the community. The participants described that the services also benefit the health workers and community at large in addition to direct patient care through holistic and collaborative services (NUR 3, NUR 5).

Theme 3: Opportunities for clinical pharmacy services

The interviewees were asked to describe the potential opportunities that can enable clinical pharmacy services to carry on successfully (Table 4). One of the opportunities most frequently described by the respondents reflects the presence of good attitude towards clinical pharmacy services (MD 1, MD 3, NUR 3).

Other health practitioners (nurses and physicians) mentioned that willingness and acceptance of the services by health practitioners, the management and high patient burden for healthcare providers are good opportunities. Moreover, they also stressed that cooperation among health practitioners helps team work and prevent unnecessary conflicts among health care providers with respect to job overlap (MD 1, NUR 3, NUR 5).

Respondents also expressed that there were preexisting problems in which health practitioners used to engage in wide range of responsibilities. Clinical pharmacists can then intervene this to lessen unnecessary health practitioners' burden (MD 5, Cpharm 4, Cpharm 5).

Most respondents mentioned the high patient burden as a unique opportunity since clinical pharmacists can encounter many cases and rare medical conditions which they may not find anywhere else. Therefore, this enables the clinical pharmacists to be exposed to a variety of diseases and thus broaden their competency with better experiences (MD 1).

The respondents mentioned that the presence of some infrastructure, such as Drug Information Centre (DIC), human resources and the initiation of new programs, has offered a better chance to practically involve and to render clinical pharmacy services (MD 3, Cpharm3).

Some of the respondents described that the government policy and presence of national guidelines play a profound role, not only in the implementation but also on the sustainability of the program, which enabled the services to be implemented (Cpharm 3, Cpharm 4).

Theme 4: Challenges of clinical pharmacy services

All interviewees were asked if there are potential barriers which hinder provision of the services and they tried to list all the perceived challenges (Table 5). The challenges described by most of the respondents emanate from the pharmacist, other health practitioners, hospital's administration issues and its infrastructure, academic policies and availability of working guidelines.

The challenges related to the pharmacist include, inadequacy of service promotion, absence of service continuity, poor DIC service and lack of commitment, communication and confidence among clinical pharmacists (MD1, NUR 5, Cpharm 3)

Most respondents declared that poor attitude towards the services, conflict of interest due to unclear scope of practice and absence of cooperation are the challenges which radiate from health practitioners such as nurses and physicians (MD 3, NUR 4, NUR 5).

Table 5. Challenges of clinical pharmacy services in UOGRTH

Code 4	Challenges of clinical pharmacy services
MD 1	They (clinical pharmacists) are not promoting DIC well to other health practitioners. I was trying to see what they posted inside wards but it' not enough. Moreover the service lacks continuity. Honestly speaking, I see them practicing one time and they disappear afterward...
NUR 5	It is not common to see clinical pharmacist working as a regularly staff. They come to hospital ward only to precept students during their ward attachment...
Cpharm 3	Though we (clinical pharmacists) tried to introduce and promote DIC service, health practitioners are reluctant to use the service. The first reason is fear of bureaucracy. So free call service should be there. The other reason is they do not focus on evidence based medicine practice rather they tend to rely on their personal experiences…
MD 3	Sometimes, the enthusiasm of physicians to work with clinical pharmacists is under question…
NUR 4	In my opinion the primary challenge in having this service is the matter of autonomy. In our setup prescribing is the power of physicians and if the clinical pharmacist thinks the drug should be changed, there might not be acceptance by the physicians….
NUR 5	They (Physicians) may hesitate to accept pharmacist's drug therapy recommendation as most physicians believe pharmacist role is only confined to dispensing of the prescription…
NUR 2	The main pharmacy is always closed at weekends. Patients are then forced to buy drugs outside from private pharmacy…
Cpharm 1	No trainings have been given so far targeting clinical pharmacy despite upon iterative request. There is also shortage of hospital clinical pharmacists…
Cpharm 3	We have got a problem in integrating the academic and hospital clinical pharmacists. Lack of infrastructure for clinical pharmacists such as room inside wards to have a rest and to prepare and place documentations; and lack of incentives are the major challenges…
MD 3	the curriculum of clinical pharmacy does not consider the ward practice courses …
Cpharm 2	Clinical pharmacists are exposed to ward activities only when they reach graduating class. There is no prior exposure and absence of manual on how to perform our task is also a challenge. …
Cpharm 3	In my opinion absence of documentation was the biggest challenge for us. We got a problem in deciding what type of document model should be there…

Challenges is defined as: any situation that hinders the effective implementation of clinical pharmacy.
Key: NUR-Nurse, MD-Doctor, Cpharm-Clinical pharmacist

Some respondents also described challenges that are arise from the hospital management and its' set-up. The challenges they mentioned include lack of training, shortage of skilled man power, lack of incentives, absence of facilities in the ward for clinical pharmacists and collaboration between academics and hospital clinical pharmacists (NUR 2, Cpharm 1, Cpharm 3).

The other challenges stated by the respondents were due to the academic policy and the curriculum itself. This encompasses some gaps of the curriculum; absence of clear job description and working guidelines; and documentation system (MD 3, Cpharm 2, Cpharm 3)

DISCUSSION

This study describes the personal experiences of health practitioners towards clinical pharmacy services provided in UOGRTH, thereby extracting opportunities and challenges which will be used as a means to strengthen the services. In addition, participants were also asked to describe how they perceive the scope of practice in clinical pharmacy services from which challenges and opportunities were also identified. The perception of scope of pharmacy practice among health practitioners reflects whether there is conflict of interest and resistance to cooperation. Interviewees also suggested possible solutions for utilization of potential opportunities and tackling of challenges by the responsible parties.

One of our key findings was that health practitioners believed the services are very important and have already brought some changes to the usual patient care, they believed it will inevitably have a positive impact on patient health outcomes. Several studies have shown that clinical pharmacy services have contributed to good clinical, economic and humanistic outcomes.[15-18] The interviewees also indicated that the service is improving as compared to the time of implementation but has not yet reached the level of health practitioners' expectation. The respondents attributed the poor health practitioners' satisfaction to the lack of continuity of the services.

The scope of practice varies between countries as determined by the governing board of pharmacy.[19] Many countries allow the pharmacist to play a part only within certain areas of the medication use process, while in other countries the scope of practice is so wide-ranging and inclusive that, it encompasses the entire medication use process. Some of the respondents in this study thought that the scope of practice should be limited to drug therapy. However, others suggested that the scope can range from diagnosis to prescribing of drugs. The respondents explained that this can be achievable only if we get rid of conflict with other practitioners as their job description and authorities are not well delineated.

As clinical pharmacy services are at their infancy, the respondents suggested that services should focus more on key areas that are less considered by other practitioners. They believed this would increase acceptability of clinical pharmacy services by other health providers. One study reported that clinical pharmacists are experts in therapeutic knowledge, experience and skills which are used to ensure desired patient outcomes utilizing the best available clinical evidence and intervention in collaboration with the health care team.[20]

Available opportunities help to integrate clinical pharmacy services into the hospital. We conducted our study after the hospital staff had some time to experience clinical pharmacy services, in the hope that it will help to collect important information to utilize and tailor opportunities for service improvement. The respondents interviewed identified some of the key opportunities for services improvement. Previous studies, conducted in other health

care centers, have also identified similar opportunities for clinical pharmacy services. For instance, Kherin *et al.*[21] showed that for the development of hospital pharmacy services, the curriculum and national strategy for health plans and leadership are considered as good opportunities. Eman *et al.*[22] identified very good medical students' perception towards clinical pharmacy services as an opportunity. A qualitative study performed in Canada also concluded that positive patient outcomes, better team decision making around drug therapy, improved continuity of care and improved patient safety were achieved through the integration of pharmacists into core health care teams.[23] Another study performed in Ethiopia revealed that there is a high demand for clinical pharmacy service among health-care workers.[24]

Some of the opportunities listed in this study also have some drawbacks which may be a source of challenge unless they are improved. For instance, the new clinically-oriented curriculum is much better than the previous product-oriented one, but still the curriculum is not as competent as a Pharm.D program.[25] In addition, poor DIC service is another area of practice in need of improvement to satisfy the health practitioners.

Clinical pharmacy services in hospitals face different challenges which may arise from other health practitioners' willingness, practice setups, and clinical pharmacists' attitudes. In Qatar, a qualitative study highlighted work load, low salary and lack of interest of pharmacists as main challenges for clinical pharmacy services.[21] Further, another study conducted in Nigeria revealed sets of challenges that limit pharmaceutical care practice, such as lack of time and need of effort, insufficient remuneration, no team work among health care workers and deficiency in staff strengths.[26] Our finding reflect that challenges may originate from the pharmacists themselves, other health practitioners, hospital's administration issues and its infrastructure, academic policies and availability of working guidelines. The interviewees listed many potential and actual challenges. One major challenge emphasised by the interviewees was the lack of continuity of services. Although the academic staff providing indirect services through tutoring students, it is also important to note that the number of hospital clinical pharmacists included in clinical settings is very minimal and that may be a reason for absence of service continuity. However, The School of Pharmacy and the UOGRTH should take the initiative to integrate, empower and employ hospital clinical pharmacists or provide incentives for the academic staff to improve the continuity of services.

Limitations of the study

This qualitative study explored the service at one of the oldest hospital in Ethiopia where there is lack of documented data. Yet, the present study has some limitations that should be noted while interpreting the results. Since the study was conducted in a single Hospital, caution should be noted when generalizing to other Hospitals and healthcare settings in Ethiopia.

CONCLUSIONS

This study has revealed potential barriers in the delivery of clinical pharmacy services, and opportunities available to foster their provision. Although health practitioners are receptive to clinical pharmacy services, there have been potential challenges identified to tackle so that the clinical pharmacy services can be strengthened and promoted further. Appropriate measures should be taken considering the finding of the study as an input to astutely boost the service.

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CONFLICT OF INTEREST

None.

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Original Research

Nigerian pharmacists' self-perceived competence and confidence to plan and conduct pharmacy practice research

Usman ABUBAKAR, Syed A. SULAIMAN, Mohammad N. USMAN, Muhammad D. UMAR.
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Abstract

Background: Recent studies have revealed that pharmacists have interest in conducting research. However, lack of confidence is a major barrier.

Objective: This study evaluated pharmacists' self-perceived competence and confidence to plan and conduct health-related research.

Method: This cross sectional study was conducted during the 89th Annual National Conference of the Pharmaceutical Society of Nigeria in November 2016. An adapted questionnaire was validated and administered to 200 pharmacist delegates during the conference.

Result: Overall, 127 questionnaires were included in the analysis. At least 80% of the pharmacists had previous health-related research experience. Pharmacist's competence and confidence scores were lowest for research skills such as: using software for statistical analysis, choosing and applying appropriate inferential statistical test and method, and outlining detailed statistical plan to be used in data analysis. Highest competence and confidence scores were observed for conception of research idea, literature search and critical appraisal of literature. Pharmacists with previous research experience had higher competence and confidence scores than those with no previous research experience ($p<0.05$). The only predictor of moderate-to-extreme self-competence and confidence was having at least one journal article publication during the last 5 years.

Conclusion: Nigerian pharmacists indicated interest to participate in health-related research. However, self-competence and confidence to plan and conduct research were low. This was particularly so for skills related to statistical analysis. Training programs and building of Pharmacy Practice Research Network are recommended to enhance pharmacist's research capacity.

Keywords

Pharmacists; Clinical Competence; Pharmacy Research; Pharmaceutical Services; Attitude of Health Personnel; Cross-Sectional Studies; Nigeria

INTRODUCTION

In the last century, pharmacy profession has undergone transformation from the traditional system of compounding and dispensing medicine through drug information services to patient care oriented services that focus on achieving maximum therapeutic benefit with minimal or no harmful effect(s).[1-4] As a result, the concept of "Seven-star pharmacist" was introduced two decades ago to recommend the minimum skills required by pharmacist to meet the expanding and dynamic role of pharmaceutical services in the healthcare system. The 'Seven-star pharmacist' was described as a care giver, a decision maker, a communicator, a leader, a manager, a life-long learner, and an educator.[5] The concept of 'Seven-star pharmacist' was revised and expanded to accommodate two additional roles (researcher and entrepreneur). This led to the introduction of the concept of 'Nine-star pharmacist'.[6] As a researcher, pharmacists are expected to undertake research to improve patient care. In addition, pharmacist must be able to appraise evidence in literature to provide relevant health information to patients and other healthcare providers.

Pharmacy practice research was critical to the advancement of pharmacy profession in the last few decades.[7,8] Research has shown the impact of pharmacists in improving medication adherence and therapeutic outcomes.[1,8] Regardless of area of specialization, pharmacists need to conduct research to synthesize new knowledge and integrate research outcomes into patient care.[2,9,10] Thus, pharmacist participation in high-quality, practice-based research is strongly encouraged. Undergraduate training provides the basic skills for research. This is further enhanced through postgraduate and continuing education programs.[10] Sound knowledge of research design and biostatistics are needed to facilitate pharmacist participation and implementation of research outcomes into patient care. However, there is lack of curricular and standard in both undergraduate and postgraduate training to emphasize the development of such skills.[10]

Training pharmacy students and pharmacists regarding various components of research and undertaking research projects will enhance research skills. Research experience during training provokes critical thinking and stimulates interest in future research. In addition, it increase time and research project management skills, and promotes

Usman ABUBAKAR. MPharm (Clinical Pharmacy). Department of Clinical Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia. Penang (Malaysia). pharmumma2@gmail.com
Syed Azhar Syed SULAIMAN. PharmD. Professor of Clinical Pharmacy. Department of Clinical Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia. Penang (Malaysia). sazhar@usm.my
Mohammad Ndagi USMAN. M. Pharm, Principal Pharmacist, Pharmacy Department, IBB Specialist Hospital. Minna (Nigeria). mohndagi@gmail.com
Muhammad Danjuma UMAR. B. Pharm. Principal Pharmacist. Pharmacy Department, IBB Specialist Hospital. Minna (Nigeria). rxdanjumar@gmail.com

collaboration and team work.[10] Recent studies have shown that pharmacists recognize the importance of practice-based research. There is growing interest to participate in practice-based research among pharmacists.[11-13] However, interest to participate in research is not enough and does not necessarily translates into ability to design and conduct research. This theory is supported by studies that demonstrated inadequate knowledge of research design[8,9,14] and low publication rate among practicing pharmacists.[9,13,15]

There are several barriers to Pharmacist's participation in research and scientific publication. These include: lack of time and job support[2,7-9,12,14], lack of research experience[2,12], lack of adequate training/inadequate knowledge[9,13], financial constraints[9,13], lack of curricular and postgraduate training standard, and lack of mentorship.[10] Addressing these challenges will improve pharmacist's participation in research and ultimately increase the synthesis and dissemination of new knowledge.[10] However, it is important to understand the nature and the magnitude of the problem in different settings. This will guide the design and implementation of suitable interventions. A recent study found that pharmacists in Nigeria are willing to participate in pharmacy practice research. The authors revealed that inadequate knowledge was a major barrier and the respondents indicated the need for additional training in research design and biostatistics.[13] This study explores pharmacists' self-competence and confidence to design and conduct pharmacy practice research. The objectives of this study are (1) to explore the research background and publication rate of pharmacists in Nigeria; (2) to determine and rank the self-reported competence and confidence scores of pharmacists; (3) to compare the competence and confidence scores between pharmacists with previous research experience and those with no research experience; (4) to examine pharmacist's preferences for postgraduate training programs to build their research capacities.

METHODS

Study design

This was a cross sectional study conducted among Nigerian pharmacists. The study was conducted during the 89th Annual National Conference of the Pharmaceutical Society of Nigeria in November 2016.

Study population

Pharmaceutical Society of Nigeria (PSN) is the umbrella association of all registered pharmacists in Nigeria. PSN organizes annual national conference to gather pharmacists from all fields of practice (hospital, community, academia, administration and industry) across the country to discuss issues related to the profession. The 89th Annual National Conference was held between 7th and 12th November 2016. The conference was attended by about 1,000 delegates. All pharmacist delegates attending the conference were considered for inclusion. Pharmacists who decline to participate were excluded from the study. A convenient sampling method was used. A total of two hundred (200) questionnaires were distributed to delegates during the conference.

Instrument for data collection

The questionnaire used for the study was developed by Awaisu *et al*.[9] Permission to use the survey was obtained from the corresponding author. The demographic information section was adjusted to suit Nigerian setting. The adapted questionnaire was validated by five Pharmacists. In the end, the questionnaire consists of 64-item and six sections (demographic, research background and interest, barriers to participation, self-assessment of competence and confidence to conduct research, and postgraduate training interest and preference).

Data collection

Two hundred questionnaires were distributed to pharmacists during the conference. The Principal investigator approached the pharmacists and explained the objectives of the study. The survey was administered to pharmacists who gave consent for participation. Respondents were informed that their participation was voluntary and their response will remain confidential and anonymous. Participants were given the choice to fill the questionnaire at the time they were administered or return later by hand. Completed questionnaire were retrieved from the participants before the end of the conference.

Data analysis

The data were analyzed using IBM SPSS version 24. Categorical variables were presented as frequency and percentage. Continuous variables were presented as mean and standard deviation. A 5-point semantic-differential scale was used to determine self-perceived competence and confidence of pharmacists to plan and conduct research. The responses were transformed into scores as follow: 5, 4, 3, 2 and 1 point was assigned to participants who indicated "extremely competent", "very competent",

Table 1. Demographic characteristics of the pharmacists

Variable	Frequency	Percentage
Gender[c]		
Male	90	70.9
Female	34	26.8
Age[b]		
21 – 30	35	27.6
31 – 40	28	22.0
41 – 50	34	26.8
> 50	28	22.0
Highest degree[a]		
Bachelor of Pharmacy	79	62.2
Doctor of Pharmacy	7	5.5
Masters	34	26.8
PhD	6	4.7
Area of practice		
Hospital	64	46.7
Community	28	20.4
Academic	16	11.7
Administration	19	13.9
Industry	10	7.3
Years of experience		
1 - 5 years	52	40.9
6 - 10 years	20	15.7
11 - 15 years	16	12.6
> 15 years	39	30.7

a = 1 missing data, b = 2 missing data, c = 3 missing data

Table 2. Research background and interest of Nigerian pharmacist in conducting health-related research

Variable	Frequency	Percentage
Previous research experience [c]		
Yes	101	79.5
No	23	18.1
Previous research related training		
No training	32	24.4
Workshop	28	21.4
Seminar	42	32.1
Short course	18	13.7
Undergraduate training	6	4.6
Postgraduate training	5	3.8
Interest in conducting health-related research[a]		
Not interested at all	1	0.8
Not very interested	3	2.4
Somewhat interested	19	15.0
Very interested	81	63.8
Extremely interested	22	17.3
Interest in learning about conducting health-related research		
Somewhat interested	13	10.2
Very interested	82	64.6
Extremely interested	32	25.2
Overall ability to design and conduct health-related research[a]		
Poor	8	6.3
Fair	31	24.4
Good	61	48.0
Very good	18	14.2
Excellent	8	6.3
Involvement in research as a subject or a respondent[a]		
Never	14	11.0
Sometimes	52	40.9
Often	29	22.8
Usually	20	15.7
Always	11	8.7
Involvement in research as a principal investigator or co-investigator[f]		
Never	34	26.8
Sometimes	45	35.4
Often	18	14.2
Usually	11	8.7
Always	10	7.9
Number of peer-reviewed journal articles published within the last 5 years[e]		
0	77	60.6
1 – 3	34	26.8
>4	11	8.7
Number of peer-reviewed posters and/or abstracts in local/regional conference since last 5 years[c]		
0	84	66.1
1 – 3	32	25.2
>4	8	6.3
Number of peer-reviewed posters and/or abstracts in international conference since last 5 years[d]		
0	101	79.5
1 – 3	16	12.6
> 4	6	4.7

a = 1 missing datum, c = 3 missing data, d = 4 missing data, e = 5 missing data, f = 9 missing data

"moderately competent", "not very competent" and "not competent at all" respectively. The same scoring system was used to transform responses in the confidence domain.

The scores were used to compute the mean score for each item in the competence and confidence domain. The overall competence and confidence scores were calculated as the average of the scores of the items in each domain. Student t-test was used to compare the mean scores between pharmacists with and those without previous research experience. Normality of the continuous data was tested using Kolmogorov-Smirnov test. The mean score of items in the research competence and confidence domains were ranked to determine the lowest and the highest scores. This was used to identify specific research skills participants were most and least competent or confident to undertake, respectively. P-values lower than 0.05 were considered statistically significant.

Logistic regression analysis was used to determine factors that predict moderate-to-extreme self-competence and confidence scores. First the overall competence and confidence scores were categorized into two groups: 3 – 5 points were labelled as moderate-to-extreme self-competence and confidence while scores below 3 were defined as not competent and confident. The independent variables were transformed into dichotomous variables as follows; 1 and 0 for presence and absence of characteristics of interest respectively.

Table 3. Barriers to pharmacist participation in health-related research

Barrier	Frequency	Percentage
Lack of funds	82	36.4
Lack of job support	53	23.6
Lack of time	48	21.3
Inadequate knowledge	25	11.1
Lack of interest	6	2.7
No barrier	5	2.2
Others	6	2.7

RESULTS

A total of 144 pharmacists returned the survey (72% response rate). However, 17 questionnaires were excluded from analysis because respondents did not answer more than 30% of the questions [8]. In the end 127 questionnaires were included in the analysis and the majority was male (70.9%) respondents. Only 40 pharmacists (31.5%) had a postgraduate degree (Masters and Doctor of Philosophy). Table 1 illustrates the demographic characteristics of the participants.

Table 2 shows that 79.5% of the pharmacists had previous research experience. In addition, 96.1% indicated interest to design and conduct health-related research. All the participants indicated interest to learn about health-related research. About 68.5% of the pharmacists rated their ability to design and conduct research as good to excellent. The publication rate of pharmacist was low; 60.6% had no article published in a peer review journal in the last 5 years. Table 2 shows the research background and interest of Nigerian pharmacists in conducting health-related research.

Several barriers to pharmacist participation in health-related research were identified. Lack of fund was the most common barrier (36.4%). This was followed by lack of job support (23.6%), lack of time (21.3%) and inadequate knowledge (11.1%). Table 3 shows the barriers to pharmacist participation in health-related research.

At least 70% of the pharmacists rated themselves as moderately to extremely competent and confident to plan and conduct health-related research (i.e. from conception of idea to writing a manuscript for publication in a journal). It is important to note that less than 10% of the pharmacists rated themselves as extremely competent and confident to undertake research. Overall, high competence scores were observed for ability to search literature efficiently (3.5; SD=0.9); prepare poster or oral presentation (3.4; SD=1.0); and conceive research idea (3.3; SD=0.8). In contrast, pharmacist's competence scores in the following skills were low: perform statistical analysis using software (2.6; SD=1.0); choose and apply appropriate inferential statistical test and method (2.6; SD=0.9); and outline detailed statistical plan for data analysis (2.8; SD=0.8). (Online supplementary material).

Pharmacists with Previous Research Experience (PRE) had significantly higher competence score in the following skills: conception of research idea, literature search and review, formulate research hypothesis and research question, compared to pharmacists with No Previous Research Experience (NPRE) ($p<0.05$). In addition, pharmacists in the PRE group had significantly higher overall competence score than those in the NPRE group (3.2; SD=0.7 versus 2.6; SD=0.7; p=0.001). Table 4 illustrates the competence scores for all the pharmacists, and comparison of competence score between PRE and NPRE groups. Multiple logistic regression analysis showed that publication of article in peer review journal during the last five years was the only predictor of moderate-to-extreme self-competence (OR: 6.8; 95%CI: 1.977 – 23.537; p=0.002). Gender, years of experience, previous research experience, previous research related training, having an abstract in local/regional or international conference were not significant predictors of moderate-to-extreme self-competence score (online supplementary material).

Table 4. Competence scores of Pharmacists for components of research

Competence domain	Mean competence score (SD)			p-value
	All participants	PRE group	NPRE group	
Conception of research idea	3.3 (0.8)	3.5 (0.7)	2.6 (1.0)	0.001
Searching the literature efficiently	3.5 (0.9)	3.7 (0.6)	2.7 (1.3)	0.002
Critically reviewing research literature	3.1 (1.0)	3.3 (0.8)	2.6 (1.2)	0.002
Formulating research hypotheses and research questions	2.9 (1.0)	3.1 (0.9)	2.3 (0.9)	0.002
Proposing appropriate study designs/methods	3.0 (0.8)	3.0 (0.8)	2.5 (0.7)	0.008
Writing research proposal or developing a protocol	2.9 (1.0)	3.0 (1.0)	2.5 (1.2)	0.049
Defining target population, sample and eligibility criteria	3.2 (0.8)	3.4 (0.7)	2.6 (1.0)	<0.0001
Determine appropriate sample size	3.2 (0.8)	3.3 (0.8)	2.6 (0.8)	0.001
Choosing an appropriate sampling technique (e.g. random sampling)	3.1 (0.9)	3.2 (0.8)	2.8 (0.9)	0.070
Determining outcome measures (variables to measure)	3.0 (0.9)	3.1 (0.9)	2.6 (1.1)	0.046
Ethical considerations	3.0 (1.0)	3.1 (1.0)	2.7 (1.1)	0.144
Outlining detailed statistical plans to be used in data analyses	2.8 (0.8)	2.9 (1.0)	2.7 (0.7)	0.523
Designing a data collection form	3.0 (1.0)	3.2 (0.9)	2.5 (1.0)	0.002
Developing and validating a study instrument (e.g. questionnaire)	3.1 (0.9)	3.2 (0.9)	2.6 (0.9)	0.011
Collecting relevant data using pre-planned data collection forms	3.1 (0.9)	3.2 (0.9)	2.6 (0.8)	0.009
Managing and storing data including data entry into a database	3.1 (1.0)	3.2 (1.0)	2.8 (0.9)	0.072
Statistical analyses using software (e.g. STATA, SPSS, Epi Info)	2.6 (1.0)	2.7 (1.0)	2.3 (1.1)	0.159
Choosing and applying appropriate inferential statistical tests and methods	2.6 (0.9)	2.7 (0.9)	2.6 (0.9)	0.754
Summarizing data in tables or charts	3.2 (1.1)	3.4 (1.1)	2.9 (0.9)	0.045
Interpretation of the findings and determining the significance of obtained results	3.2 (0.9)	3.3 (0.9)	2.9 (0.8)	0.063
Preparing a presentation (oral or poster)	3.4 (1.0)	3.6 (0.9)	2.6 (1.1)	<0.0001
Writing a manuscript for publication in a scientific journal	2.9 (1.0)	3.0 (0.8)	2.6 (0.8)	0.096
Overall competence score	3.1 (0.7)	3.2 (0.7)	2.6 (0.7)	0.001

Table 5. Confidence scores of pharmacists for components of research

Confidence domain	Mean score (SD)			p-value
	All participants	PRE group	NPRE group	
Conception of research idea	3.5 (0.8)	3.6 (0.7)	2.9 (0.9)	<0.0001
Searching the literature efficiently	3.6 (0.9)	3.7(0.7)	3.1 (1.3)	0.063
Critically reviewing research literature	3.4 (0.8)	3.5 (0.9)	3.2 (0.8)	0.166
Formulating research hypotheses and research questions	3.2 (0.9)	3.3 (0.9)	2.8 (1.0)	0.027
Proposing appropriate study designs/methods	3.1 (1.0)	3.1 (1.0)	2.8 (0.9)	0.186
Writing research proposal or developing a protocol	3.2 (0.9)	3.2 (0.9)	3.0 (0.7)	0.186
Defining target population, sample and eligibility criteria	3.3 (0.9)	3.4 (0.8)	2.8 (1.0)	0.008
Determine appropriate sample size	3.2 (0.9)	3.3 (0.9)	2.8 (0.9)	0.031
Choosing an appropriate sampling technique (e.g. random sampling)	3.2 (0.9)	3.2 (0.9)	2.8 (1.0)	0.062
Determining outcome measures (variables to measure)	3.1 (0.9)	3.2 (1.0)	2.9 (0.8)	0.145
Ethical considerations	3.2 (1.0)	3.3 (1.0)	3.0 (1.1)	0.193
Outlining detailed statistical plans to be used in data analyses	2.9 (1.1)	3.0 (1.1)	2.7 (1.0)	0.347
Designing a data collection form	3.2 (1.0)	3.3 (0.9)	2.6 (1.0)	0.004
Developing and validating a study instrument (e.g. questionnaire)	3.2 (1.0)	3.2 (1.0)	2.9 (0.8)	0.153
Collecting relevant data using pre-planned data collection forms	3.3 (0.9)	3.5 (0.8)	2.7 (1.0)	0.001
Managing and storing data including data entry into a database	3.2 (1.0)	3.3 (0.9)	2.7 (0.9)	0.022
Statistical analyses using software (e.g. STATA, SPSS, Epi Info)	2.8 (1.0)	2.9 (1.0)	2.6 (1.0)	0.190
Choosing and applying appropriate inferential statistical tests and methods	2.9 (1.0)	3.0 (1.0)	2.5 (1.0)	0.073
Summarizing data in tables or charts	3.4 (0.9)	3.5 (0.9)	3.0 (0.7)	0.060
Interpretation of the finding and determining the significance of obtained results	3.3 (1.1)	3.4 (1.1)	3.0 (0.8)	0.105
Preparing a presentation (oral or poster)	3.4 (1.0)	3.5 (1.1)	3.0 (0.9)	0.031
Writing a manuscript for publication in a scientific journal	3.0 (1.1)	3.1 (1.0)	2.7 (0.9)	0.225
Overall confidence score	3.2 (0.7)	3.3 (0.7)	2.8 (0.8)	0.012

The confidence scores were observed to mirror the results in the competence domain. Confidence score for the following skills were high: ability to search literature efficiently (3.6; SD=0.9); conceive research idea (3.5; SD=0.8); critical review of literature (3.4; SD=0.8); summarize data in tables or charts (3.4; SD=0.9); and prepare a presentation (oral or poster) (3.4; SD=1.0). Ability to perform statistical analysis using software (2.8; SD=1.0); choose and apply appropriate inferential statistical test and method (2.9; SD=1.0); and outline detailed statistical plan to be used in data analysis (2.9; SD=1.1) were observed to have low confidence score (online supplementary material).

Pharmacists in the PRE group had significantly higher confidence scores for conception of research idea (3.6; SD=0.7 versus 2.9; SD=0.9, p<0.0001); formulation of research hypothesis and research question (3.3; SD=0.9 versus 2.8; SD=1.0, p=0.027); and definition of target population, sample and eligibility criteria (3.4; SD=0.8 versus 2.8; SD=1.0, p=0.008), than those in NPRE group. The PRE group had higher overall confidence score (3.3; SD=0.7) than those in the NPRE group (2.8; SD=0.8). Table 5 shows the confidence scores for all the pharmacists and the comparison of the scores between the PRE and NPRE groups. Logistic regression analysis revealed that the only predictor of moderate-to-extreme self-confidence score was publication of at least one article in peer review journal during the last five years (OR:5.0; 95%CI: 1.336 – 18.811; p=0.017) Gender, years of experience, previous research experience, previous research related training, having an abstract in local/regional or international conference were not significant predictors of moderate-to-extreme self-confidence score (online supplementary material).

Most of the pharmacists indicated interest in postgraduate training. About 40% of the pharmacists was interested in pursuing Doctor of Philosophy (PhD). In addition, 33.8% and 21.1% of the pharmacists wish to enroll in fellowship/residency and Masters respectively. Within the discipline of clinical pharmacy and practice, interest was high for pharmacotherapeutic (35.7%), and pharmacoepidemiology and drug safety (15.9%) research. Table 6 shows pharmacist's area of interest in postgraduate training.

DISCUSSION

The proportion of Nigerian pharmacists with self-reported previous research experience (79.5%) was higher than those reported in previous studies (33 - 59%).[9,12,14] This could be explained by the mandatory research project conducted by inal year pharmacy undergraduate students in most schools in Nigeria. Despite previous research

Table 6. Pharmacist's area of interest in post graduate training

Variable	N	%
Interest in postgraduate studies[a]		
Not interested	7	5.3
Masters	28	21.1
Residency/fellowship	45	33.8
PhD	53	39.8
Area of interest in clinical pharmacy and practice		
Pharmacoepidemiology and drug safety	25	15.9
Pharmacotherapeutics research	56	35.7
Pharmacoeconomics	18	11.5
Social and behavioural aspects of life	19	12.1
Clinical outcome research	21	13.4
Direct patient care	18	11.5
Area of interest		
Clinical pharmacy	73	55.3
Pharmaceutics	16	12.1
Pharmacology	16	12.1
Pharmacognosy	7	5.3
Pharmacokinetics	7	5.3
Pharmaceutical chemistry	5	3.8
Public health	4	3.0
Pharmacogenomics	3	2.3
Pharmaceutical microbiology	1	0.8

a = 2 missing data

experience, publication rate was low. This is consistent with publication rate reported in Qatar.[9] Low publication rate is attributed to lack of time, lack of novelty, poor mentoring, and low self-esteem i.e. approaching research with the thought that it is not publishable.[16]

The high level of interest to participate in research demonstrated by Nigerian pharmacist is consistent with previous studies.[8,9,14] However, interest does not translate into increase in research productivity. There are several barriers to pharmacist's participation in research. In our study, lack of funds was the most common challenge. This was followed by lack of job support, lack of time, and inadequate knowledge. This is not in conformity with previous studies. Lack of time is the major barrier to pharmacist's participation in practice based research.[7-9,12] Other barriers include: lack of training/inadequate knowledge, lack of job support, financial restrictions, and lack of awareness regarding opportunities in research.[7-9,12-14]

Nigerian pharmacists have inadequate skills to plan and conduct pharmacy practice research. This was reflected in the low percentage of pharmacists with extreme self-competence and confidence to design and conduct research. In addition, only 20.5% of the pharmacists rated themselves to have either very good or excellent ability to plan and conduct research. Previous studies have shown that pharmacists lack confidence to undertake research.[7,9,12] Lack of confidence is linked to inadequate knowledge of research methodology and statistics.[8,13] Pharmacy Practice Research Network (PPRN) and intensive training of pharmacists are effective strategies used to address low confidence among pharmacists.[3,17] While intensive training courses improve research related knowledge and skills, PPRN empower and educate pharmacists to participate in research. This promotes the implementation of research outcomes in patient care.[3] In addition, research training course for pharmacy students increases confidence to undertake research-related task and publication rate.[18]

Pharmacists with PRE had higher competence and confidence scores than those with NPRE. This is consistent with a previous study, which concluded that pharmacists with PRE were more confident in their research skills, and ability to read and evaluate research papers.[13] In addition, pharmacists with PRE are more likely to participate in research with minimal supervision and are more influential in convincing colleagues to change practice based on sound research evidence.[12,14] This underlines the need to train and expose undergraduate and postgraduate pharmacy students to research. Such action would stimulate interest in research, and prepare students to become independent researchers and evidence based practitioners. Moreover, research participation provokes critical thinking, improve problem-solving skills and decision making during pharmacotherapy.[4]

Pharmacists had low competence and confidence scores for ability to undertake statistical analysis using software packages such as STATA, SPSS and Epi Info; and choosing appropriate statistical test and method. High competence and confidence scores were observed for research skills related to design such as conception of idea, literature review and critical appraisal. This is in consonant with Perreault *et al*., which found that pharmacists had better knowledge of research methodology than biostatistics.[8] All the pharmacists in our study indicated interest in learning about health-related research. This coupled with the low competence and confidence in research related capabilities highlight the need for training programs. To buttress this point, a recent study conducted in Nigeria found that 87% of the pharmacists believed they need research oriented training to effectively conduct pharmacy practice research.[13] Training programs should focus on biostatistics, data analysis and interpretation.

Limitations

The major limitations of this study are the lack of sample size calculation and use of convenient sampling technique. Although, pharmacists were recruited during the annual national conference that attracts delegates from all states of the federation, our findings are not generalizable because of the small sample size and convenient sampling method. In addition, subjective assessment of competence and confidence is liable to self-reporting bias. Furthermore, many surveys were not retrieved and some were returned with incomplete response. Therefore, there is attrition bias in the study. Another limitation of the study is recall bias. Some questions required the pharmacists to recall historical data which they may not recall correctly. Despite these limitations, there are some positives in this study. To the best of our knowledge, this is the first study to evaluate the self-competence and confidence to plan and conduct research among pharmacists in Nigeria. In addition, this study has representative pharmacists from different area of practice and states of the federation. Again, this is the first study to rank and determine the research skills pharmacists are most and least self-competent or confident to perform.

CONCLUSIONS

The proportion of Nigerian pharmacists with self-reported previous research experience was high. However, publication rate among the pharmacists was low. Pharmacist's self-reported competence and confidence to perform statistical analysis and write manuscript for publication were low. Over 90% of the pharmacists are interested in pursuing postgraduate studies. Research training with hands-on session in the short term and building of a pharmacy practice research network in the long term are recommended.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests to disclose.

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