

Effectiveness of a videoconference training course on implementing pharmacy services

Elena Dualde · Maria J. Faus · Francisco J. Santonja · Fernando Fernandez-Llimos

Received: 4 January 2009 / Accepted: 22 July 2009 / Published online: 6 August 2009
© Springer Science+Business Media B.V. 2009

Abstract *Objective* The aim of this research was to assess the effects of a series of four training courses comprised of 13 synchronous videoconferences on the implementation of cognitive services in Spanish community pharmacies. *Setting* A phone survey to continuing training course attendants. *Methods* A random sample of 225 pharmacists registered in a 2004 videoconference course was selected. The phone-survey questionnaire included quality perception elements rated on a 5-point Likert scale, and a series of questions used to identify position in the Rogers 5-step innovation–decision model. An algorithm was used to translate the questions into Rogers' categories. To discover determinants of attendants position in these categories, bivariate analysis, simple correspondence analysis, and logistic regressions were performed. *Main outcome measure* Position in Rogers' diffusion of innovation steps regarding the adoption of pharmacotherapy follow-up. *Results* The perception of the

course quality rated between good and very good for the majority of respondents. A significant association between having attended two or more of these four courses and the Persuasion/Decision step in Rogers's model appeared. No association was found between course attendance and the Implementation/Confirmation step of patient follow-up. Fifty percent of those who indicated they implemented the service reported following-up with less than 10 patients, and only 25% reported following up with more than 20 patients. *Conclusions* Although participation in these courses was associated with higher steps in Rogers' model, significant association appeared only with Persuasion/Decision steps and not with the Implementation/Confirmation step, reflecting an attitude but not a performance change.

Keywords Clinical competence · Continuing education, pharmacy · Implementation · Pharmacists · Practice change

E. Dualde
Department of Toxicology, Faculty of Pharmacy, University of Valencia, Valencia, Spain

M. J. Faus
Pharmaceutical Care Research Group, University of Granada, Granada, Spain

F. J. Santonja
Instituto de Matemática Multidisciplinar Universidad Politécnica de Valencia, Valencia, Spain

F. Fernandez-Llimos (✉)
Institute for Medicines and Pharmaceutical Sciences (iMed.UL), Department of Social Pharmacy, Faculty of Pharmacy, University of Lisbon, Avda. Prof. Gama Pinto, 1649-019 Lisbon, Portugal
e-mail: f-llimos@ff.ul.pt

Impact of findings on practice

- A well-organized and highly scored training course does not improve pharmaceutical care practice for attending pharmacists.
- Improving knowledge and attitudes does not guarantee improved cognitive services.
- Clinical competence and implications for patient care should be assessed after a continuing training course.

Introduction

After more than 20 years of pharmaceutical care, a new role for pharmacists in patient medication outcomes has

been promoted [1]. However, adoption of this new philosophy of practice has been slow in many countries [2]. Although considerable literature has been published in this field [3], Spain shows a very slow implementation rate of cognitive pharmacy services, be it pharmacotherapy follow-up services or other [4].

Factors associated with practice changes for providing pharmaceutical care have been established early [5]. Issues related to lack of education and training appear in many of the barrier studies as elements hampering the implementation of these cognitive services [6–8]. Spain is not different in this respect [9, 10]. Additionally, recent studies on service provision facilitators consider “clinical education” as the most “important” and the second-most “applicable” facilitator for practice change in Spain [11].

Continuing training (CT) is required to respond to the scientific and technological evolution in health care. CT has allowed professionals to adopt new ideas and innovations, and produce new areas of competence. Traditional CT systems are being questioned, and new approaches based on individualized requirements have emerged, such as the continuing professional development (CPD) [12]. Recent innovations in information technologies, such as synchronous videoconferences, showed results similar to those achieved with face-to-face conferences [13–15].

To improve training efficiency, the long-term impact on clinical practice must be measured. Increasing a participant’s knowledge and skills without producing changes in clinical practice is inefficient in this context [16]. Quite a few years have passed since Miller first described the framework for clinical assessment [17]. Quality assurance in education is closely related to ongoing quality assessment. Both process and outcome can be evaluated. A recent systematic review showed the effectiveness of some educational activities on practice change. However, when educational meetings alone were assessed, authors conclude that they were “not likely to be effective for changing complex behaviours” [18].

Several models have been described to explain the change of performance/practice [19], being Rogers’ Diffusion of Innovations one of the most commonly used. Diffusion of Innovations model asserts that adoption of new ideas occurs over time in several predictable stages [20]. Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. A tenet of the Rogers model is that innovation decisions are neither authoritative nor collective, but each member of the system faces his/her own innovation–decision that follows a 5-step process: Knowledge, Persuasion, Decision, Implementation, and Confirmation (see Table 1).

A consensus promoted by the Spanish Ministry of Health defined these primary services in pharmaceutical

Table 1 Rogers’ innovation–decision that follows a 5-step process [20]

Step	Meaning
Pre-knowledge ^a	Person is not aware of the innovation or misinterprets what innovation is.
Knowledge	Person becomes aware of an innovation and has some idea of how it functions.
Persuasion	Person forms a favorable or unfavorable attitude toward the innovation.
Decision	Person engages in activities that lead to a choice to adopt or reject the innovation.
Implementation	Person puts an innovation into use.
Confirmation	Person evaluates the results of an innovation–decision already made.

^a Pre-knowledge step was added by Aguas et al. [22]

care: active dispensing, symptoms advice, and pharmacotherapy follow-up [21]. The latter could be defined as pharmacist intervention in order to assessing drug-therapy outcomes and improve patient’s health. Thus, the assessment of outcomes achieved with the medication, and the identification of negative clinical outcomes are the key elements of this service. Pharmacotherapy follow-up can fit into the 5 steps of the Rogers model [22]. Thus, data analysis with the Rogers model can reveal where gaps occur in the process of adopting innovations in pharmaceutical practice.

Since 2001, the Pharmaceutical Care Research Group from the University of Granada in Spain has been organising training courses on a synchronous videoconference basis. These courses were sponsored by the generics industry, Stada, and aimed to promote pharmaceutical care services, specifically pharmacotherapy follow-up. Courses were broadcasted from a professional television studio and received simultaneously via satellite in 56 different sites throughout Spain. Over the years 2001–2004, the courses consisted of 4, 4, 3, or 2 synchronous videoconferences, respectively. Each videoconference was 4 h long and consisted of a case discussion with emphasis on operational aspects of pharmacotherapy follow-up. The four courses were accredited by the Spanish Board for Continuing Training in Healthcare Professions from the Ministry of Health. The number of pharmacists registered to attend these courses increased markedly from 2001 (3,987) to 2002 (5,387), and again from 2003 (5,713) to 2004 (5,977).

Aim of the study

The aim of our study was to evaluate the effectiveness of these videoconference courses by assessing their impact on the implementation of the pharmacotherapy follow-up

service, measured by the progression in Rogers's diffusion of innovations steps.

Methods

A phone survey with a randomized sample of pharmacists registered in the 2004 videoconference course was performed by a single researcher (ED) from November, 2006 to February, 2007. Registration and attendance data were obtained from the course database. A 2-part questionnaire was designed and then administered during this phone survey. The first part rated the participant's opinion of the course on a 5-point Likert scale, based on perceptions of the proportion theory/practice, materials provided, acquired knowledge, and frequency/duration. The second part of the questionnaire consisted of a set of questions used to establish a person's position in the Rogers Diffusion of Innovation steps [20]. The answers to these questions were transformed into a Rogers step category with an algorithm designed and validated by Aguas et al. [22], who had added a sixth one: the Pre-Knowledge step (Table 1). This algorithm contains 7 questions: Do you know what pharmacotherapy follow-up is?; Do you think that pharmacotherapy follow-up is feasible in your daily practice?; Have you ever considered providing pharmacotherapy follow-up in your pharmacy?; Have you started doing pharmacotherapy follow-up with any patient?; Do you think that pharmacotherapy follow-up has already been implemented in your pharmacy?; Do you document or record this activity?; and Have you assessed this activity? Answering yes or no to these questions places the respondent in one of these 5 Rogers steps: Knowledge, Persuasion, Decision, Implementation, and Confirmation, or in the additional step, Pre-knowledge. For respondents placed into the implementation or confirmation steps, some additional questions regarding their current number of patients under follow-up and their opinions on how much the course had helped them in initiating/consolidating the pharmacotherapy follow-up service was done. We piloted the complete questionnaire in a small group of course participants not included in the study sample, asking them to provide comments after answering the questionnaire by phone.

Sample size was calculated assuming a standard deviation of 0.75 and accepting an alpha error of 0.05. An initial sample of 225 pharmacists registered at the 2004 course was selected using a randomized list of numbers generated at www.randomizer.org. Data were analyzed with SPSS v14. Pearson chi-square analysis was used for categorical associations, and a simple correspondence analysis was used to assess factors influencing the Rogers step status of the respondents. This association was further analyzed through a logistic regression model.

Results

Of the 225 pharmacists selected, 202 agreed to answer the phone questionnaire. Only the 192 of those who were currently practicing as community pharmacists were surveyed. Two questionnaires were discarded due to some apparent inconsistencies. Thus, the final sample consisted of 190 pharmacists registered in the 2004 course. Of those surveyed, 77.4% were female and 64.7% were pharmacy owners. Twenty-five percent received their degree before 1982, 50% between 1982 and 1997, and only 25% received their degree after 1997.

The sample contained participants from all four courses (2001–2004). Fifty-one (26.8%) of those surveyed had attended 1 year, 38 (20.0%) attended 2 years, 50 (26.3%) attended three, 39 (20.5%) attended the 4 years, and 12 (6.3%) had not yet attended a course but were registered for the 2004 course. Table 2 presents the quartile distribution of respondents' opinions about the course aspects that underlie their perception of course quality.

Surveyed pharmacists were distributed over the six steps (5 Rogers plus one additional) as follows: Pre-knowledge = 7 (3.7%); Knowledge = 16 (8.4%); Persuasion = 39 (20.5%); Decision = 112 (58.9%); Implementation = 1 (0.5%); and Confirmation = 15 (7.9%), resulting in a typical Rogers' S-shaped curve (Fig. 1). Fifty percent of those in the Implementation or Confirmation steps reported following-up with less than 10 patients, and only 25% reported following up with more than 20 patients. No association between the number of courses attended and the number of patients in follow-up was found (Kruskal-Wallis = 0.215, $P = 0.643$). Sixteen pharmacists who reported having implemented pharmacotherapy follow-up were asked about the influence of the courses on service implementation, and they responded as follows; 1 answered "not at all", 7 stated there was "initiation", and 8 answered that the courses "consolidated the service provision". No association was found between the number of courses (years) attended and their reported influence on Implementation (chi-square = 2.626, $P = 0.622$).

Table 2 Perception of course quality

Course characteristics	Mean (SD)	Quartiles		
		25%	Median	75%
Depth of aspects	4.20 (0.66)	4	4	5
Knowledge acquisition	4.06 (0.78)	4	4	5
Proportion theory/practice	3.73 (0.79)	3	4	4
Materials provided	4.43 (0.65)	4	5	5
Duration/frequency	3.73 (0.88)	3	4	4

1 Extremely poor, 2 below average, 3 average, 4 above average, 5 excellent

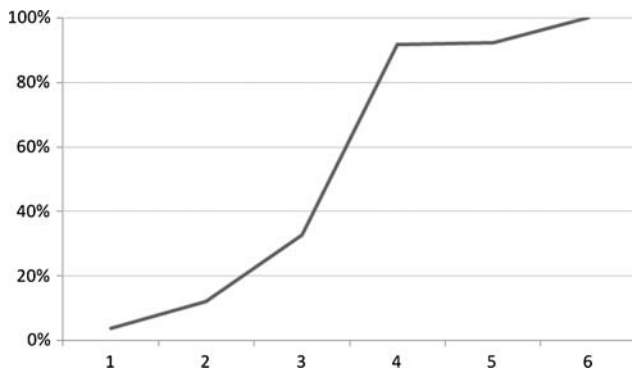


Fig. 1 Aggregated distribution of respondents in Rogers' innovation-decision 5 steps (plus Aguas pre-knowledge). 1 Pre-knowledge, 2 knowledge, 3 persuasion, 4 decision, 5 implementation, 6 confirmation

With bivariate analysis (chi-square), a statistical association between the number of courses attended and Rogers' step was found ($P < 0.001$). After grouping the Rogers (plus Aguas) steps from 6 to 3, and considering two courses attended as a cut-off, a cross-tabulation of Rogers steps and courses attended showed a significant association ($P = 0.007$). Figure 2 presents a map of the correspondence analysis showing a clear association between the Persuasion/Decision steps and two or more courses attended, but no association with the Implementation/Confirmation steps. The lack of significant association between attending two or more courses and the last two steps in the Rogers

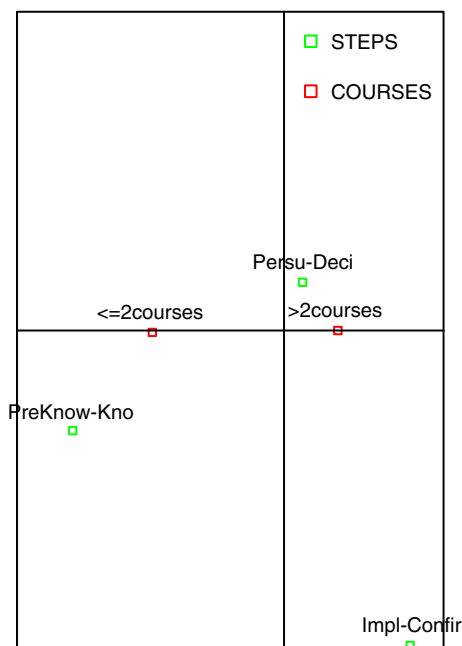


Fig. 2 Correspondence analysis map. Rogers's 5 steps were combined and reduced to three groups, and were analyzed with the number of courses attended using two courses as cut-off. *PreKnow-Kno* preknowledge/knowledge steps, *Persu-Deci* persuasion/decision step, *Impl-Confir* implementation/confirmation steps

model is also demonstrated by a chi-square analysis ($P = 0.201$).

A logistic regression model was constructed while defining Persuasion/Decision steps as the dependent variable and attending two or more courses as the independent variable (Wald $P = 0.006$, beta = 1.267). To validate this logistic model, a Hosmer–Lemeshow goodness-of-fit statistic was performed, with a $P > 0.01$ and the total accuracy of the model outcome was 86.8% (chi-square = 7.736, $P = 0.005$). No association was found between the Rogers' steps and scores of course quality perception or respondent demographic characteristics.

Discussion

Low implementation rates of community pharmacy services, at least in Spain, but probably also in other countries, is caused by the existence of different barriers and the lack of some facilitators. We hypothesized that the lack of clinical training may not be a significant barrier, and that providing clinical training is not a sufficient facilitator for implementing cognitive pharmacy services, and specially pharmacotherapy follow-up. We assumed that assessing practitioners during their independent function in clinical practice corresponds to Miller's "does" in education quality assessment [17].

The validity of measuring the actual pharmacotherapy follow-up implementation using the Rogers model has been previously demonstrated [22]. In order to facilitate the analysis, the five steps in Rogers' model plus the pre-knowledge added by Aguas et al., were resumed into three groups. The rationale for these three groups was:

- Pre-knowledge/knowledge: no decision making process has started yet.
- Persuasion/decision: On-going decision making process, but no actual implementation.
- Implementation/confirmation: Actual implementation has already started.

Our data on the proportion of pharmacists in Implementation/Confirmation steps in Spain are similar to those from prior studies (near 10%) [22]. Assessing the implementation rate 2 years after attending the courses, gave the participants time to implement the service. Thus, participants in our sample had had ample time to adapt their structure to providing the services. But these 2 years should not be crucial in terms of sustainability.

The surveyed pharmacists in our study received extensive training, as about 50% have attended two of these videoconference courses, and each of those courses was comprised of multiple sessions. Moreover, the perception of course quality fell between "good" and "very good" for the majority of the attendants. Despite this large, quality

educational effort, insufficient service implementation was achieved as demonstrated by the lack of significant association between attending two or more courses and categorization in the Implementation/Confirmation steps.

However, there was a significant association between attending two or more courses and Persuasion/Decision steps (Fig. 2). Therefore, we have measured a clear effect of these courses on shifting attitudes toward the provision of pharmacotherapy follow-up. The gap between a pro-implementation attitude and the lack of actual implementation casts doubt on the role of continuing training as a facilitator for the ultimate provision of new services. Although competence is a prerequisite for good performance, other determinants of performance exist [23]. Therefore, continuing training seems to be a necessary, but not sufficient, condition for service implementation, at least for pharmacotherapy follow-up.

Studies on barriers and facilitators for cognitive pharmacy services were performed through questionnaires, in depth interviews, or focus group techniques, using practicing pharmacists as information providers. A new analysis of these barriers and facilitators should be done based on more objective data.

Conclusion

We evaluated a series of good-quality continuing training courses for pharmacists, designed to promote the implementation of some new patient-focused services. These courses were associated with changes in attitudes towards service provision but were not sufficient to alter attendants' performance toward implementation of these services.

Acknowledgments We acknowledge Write Science Right for their English editing services. No external funding was received for this study.

Conflict of interests Authors declare not having any kind of conflict of interest related with this study.

References

- Berenguer B, La Casa C, de la Matta MJ, Martín-Calero MJ. Pharmaceutical care: past, present and future. *Curr Pharm Des.* 2004;10(31):3931–46.
- Martin-Calero MJ, Machuca M, Murillo MD, Cansino J, Gastelurrutia MA, Faus MJ. Structural process and implementation programs of pharmaceutical care in different countries. *Curr Pharm Des.* 2004;10:3969–85.
- Andres Iglesias JC, Andres Rodriguez NF, Fornos Perez JA. Community pharmacy-based research in Spain (1995–2005): a bibliometric study. *Pharm Pract (Internet).* 2007;5(1):21–30.
- Gastelurrutia MA, Faus MJ, Fernandez-Llimos F. Providing patient care in community pharmacies in Spain. *Ann Pharmacother.* 2005;39:2105–10.
- Odedina FT, Segal R, Hepler CD, Lipowski E, Kimberlin C. Changing pharmacists' practice pattern: pharmacists' implementation of pharmaceutical care factors. *J Soc Adm Pharm.* 1996;13:74–88.
- van Mil JWF, de Boer WO, Tromp ThFJ. European barriers to implementation of pharmaceutical care. *Int J Pharm Pract.* 2001; 9:163–8.
- Rossing C, Hansen EH, Krass I. Barriers and facilitators in pharmaceutical care: perceptions and experiences among Danish community pharmacies. *J Soc Adm Pharm.* 2001;19:55–64.
- Roberts AS, Hopp T, Sørensen EW, Benrimoj SI, Chen TF, Herborg H, et al. Understanding practice change in community pharmacy: a qualitative research instrument based on organisational theory. *Pharm World Sci.* 2003;25(5):227–34.
- Gastelurrutia MA, Fernandez-Llimos F, Garcia Delgado P, Gastelurrutia P, Faus MJ, Benrimoj SI. Barriers and facilitators to the dissemination and implementation of cognitive services in Spanish community pharmacies. *Seguimiento Farmacoterapeutico.* 2005;3(2):65–77.
- Gastelurrutia MA, Fernandez-Llimos F, Benrimoj SI, Castrillon CC, Faus MJ. Barriers for the implementation of cognitive services in Spanish community pharmacies. *Aten Primaria.* 2007;39(9):465–70.
- Gastelurrutia MA, Benrimoj SI, Castrillon CC, Casado de Amezua MJ, Fernandez-Llimos F, Faus MJ. Facilitators for practice change in Spanish community pharmacy. *Pharm World Sci.* 2009;31(1):32–9.
- Driesen A, Verbeke K, Simoens S, Laekeman G. International trends in lifelong learning for pharmacists. *Am J Pharm Educ.* 2007;71(3):52.
- MacLaughlin EJ, Supernaw RB, Howard KA. Impact of distance learning using videoconferencing technology on student performance. *Am J Pharm Educ.* 2004;68(3):58.
- De Muth J, Bruskiwitz R. A comparison of the acceptability and effectiveness of two methods of distance education: CD-ROM and audio teleconferencing. *Am J Pharm Educ.* 2006;70(1):11.
- Moridani M, Chem DC. Asynchronous video streaming vs. synchronous videoconferencing for teaching a pharmacogenetic pharmacotherapy course. *Am J Pharm Educ.* 2007;71(1):16.
- Fjortoft NF, Schwartz AH. Evaluation of a pharmacy continuing education program: long-term learning outcomes and changes in practice behaviors. *Am J Pharm Educ.* 2003;67(2):35.
- Miller GE. The assessment of clinical skills/competence/performance. *Acad Med.* 1990;65:s63–7.
- Forsetlund L, Bjørndal A, Rashidian A, Jamtvedt G, O'Brien MA, Wolf F, Davis D, Odgaard-Jensen J, Oxman AD. Continuing education meetings and workshops: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2009;2:CD003030.
- Nimmo CM, Holland RW. Transitions in pharmacy practice, part 5: walking the tightrope of change. *Am J Health Syst Pharm.* 2000;57(1):64–72.
- Rogers EM. *Diffusion of innovations.* 5th ed. New York: Free Press; 2003. ISBN: 0-7432-2209-1.
- General Directorate of Pharmacy. Consensus on pharmaceutical care. *Ars Pharm.* 2001;42(3–4):221–41.
- Aguas Y, De Miguel E, Fernandez-Llimos F. El seguimiento farmacoterapéutico como innovación en las farmacias comunitarias de Badajoz (España) [Pharmacotherapy follow-up as an innovation in community pharmacies of Badajoz (Spain)]. *Seguimiento Farmacoterapeutico.* 2005;3(1):10–6.
- Rethans JJ, van Leeuwen Y, Drop R, van der Vleuten C, Sturmans F. Competence and performance: two different concepts in the assessment of quality of medical care. *Fam Pract.* 1990;7(3): 168–74.