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Development of a Survey to Assess the Acceptability of an Innovative Contraception Practice among Rural Pharmacists

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Abstract: Improved access to effective contraceptive methods is needed in Canada, particularly in rural areas, where unintended pregnancy rates are high and specific sexual health services may be further away. A rural pharmacist may be the most accessible health care professional. Pharmacy practice increasingly incorporates cognitive services. In Canada many provinces allow pharmacists to independently prescribe for some indications, but not for hormonal contraception. To assess the acceptability for the implementation of this innovative practice in Canada, we developed and piloted a survey instrument. We chose questions to address the components for adoption and change described in Rogers' "diffusion of innovations" theory. The proposed instrument was iteratively reviewed by 12 experts, then focus group tested among eight pharmacists or students to improve the instrument for face validity, readability, consistency and relevancy to community pharmacists in the Canadian context. We then pilot tested the survey among urban and rural pharmacies. 4% of urban and 35% of rural pharmacies returned pilot surveys. Internal consistency on repeated re-phrased questions was high (Cronbach's Alpha = 0.901). We present our process for the development of a survey instrument to assess the acceptability and feasibility

among Canadian community pharmacists for the innovative practice of the independent prescribing of hormonal contraception.

Keywords: pharmacists; rural practice; contraception; diffusion of innovation; quantitative evaluation; health human resources; questionnaires; survey

1. Introduction

Contraception use and access remain an important concern for women wanting to prevent unintended pregnancies [1–6]. Canadian surveys on contraception completed from 1993–2002 have found that oral contraception and condoms are the most common contraception methods used to prevent unintended pregnancies [2–6]. Urban respondents of a national contraception study conducted by Black *et al.* in 2002 were more likely to use hormonal contraception than rural respondents [1]. Rural access to effective methods of contraception remains an important issue to address.

Pharmacists are often the most accessible healthcare provider in rural areas [7] and are widely regarded and trusted [8,9]. In a 2010 survey of Canadian pharmacists' perceptions on the future of pharmacy, over 62% of respondents believed that pharmacists need to accept new roles and responsibilities within the healthcare system [10]. In addition, over 75% of respondents would like to have prescribing and monitoring authority within the next five years [10]. Legislative changes across Canada are granting pharmacists more authority and responsibility to expand clinical duties [10]. As of June, 2013, pharmacists in six provinces across Canada are able to initiate certain medications with restrictions [11,12]. In British Columbia (BC), pharmacists have the authority to renew or adapt medications; however, they are not yet eligible to initiate prescriptions other than for emergency contraceptive pills (ECP) [11]. BC was the first province in Canada to allow pharmacists to prescribe ECP without a physician's prescription in 2000 [13], and ECP utilization more than doubled within two years [14]. ECPs have been available over-the-counter in BC since May, 2007 [13].

Several jurisdictions across North America have begun testing the feasibility of contraception task-sharing among health professionals [15–24].

The Direct Access study enrolled 214 women in a protocol where 26 trained community pharmacists in Seattle, Washington, USA, prescribed hormonal contraception from June 2003, to December 2005 [15]. Questionnaires were utilized to screen patients for the appropriateness of hormonal contraception initiation or continuation [15]. Both participants of the study and the prescribing pharmacists reported satisfaction with the program, with over 96% of women surveyed at 12 months indicating willingness to continue receiving hormonal contraception from their pharmacists [15].

In Quebec, Canada, pharmacists, nurses and physicians in specific family medicine groups within the province entered a collaborative agreement on hormonal contraception (CAHC), starting in 2007 [16]. Nurses were trained to provide an assessment of a woman's health and indication for a hormonal contraception product, and pharmacists were trained to provide counselling for the patient [17,18]. Nurses and pharmacists can prescribe for patients for a one year period before having to refer the patient to a physician for further prescriptions [19].

Landau *et al.* [20] administered an American nation-wide pharmacist survey to assess interest and perceived advantages and barriers for pharmacist-prescribed hormonal contraception. Pharmacists (n = 2,725) responded to the survey, which took place from November, 2004, to January, 2005. A majority of pharmacist respondents were interested in initiating hormonal contraception at the pharmacy [20]. Perceived barriers to independent contraception provision included the need for regular Pap smears to identify the presence of pre-cancerous or cancerous lesions [20]. The Canadian Task Force on Preventive Health Care recently released their 2013 “Recommendations on screening for cervical cancer” indicating a recommendation to begin Pap smears at age 25 and then to undertake screening only once every three years [25]. Thus, current recommendations in Canada do not support the need to link the provision of contraception specifically to a pelvic examination and Pap smear.

Similarly in 2009, the College of Registered Nurses in BC began a program to certify qualified registered nurses allowing them to independently dispense or administer hormonal contraception [21]. As noted on their web site:

“Registered nurses who complete CRNBC (College of Registered Nurses of BC) certification in Reproductive Health: Contraceptive Management (CM) can independently provide (dispense and/or administer) hormonal contraception to eligible women as set out in CRNBC-approved CM decision support tools (DSTs)” [21].

Interestingly, in the decision support tools and protocols, the only physical examination required in the screening to consider the provision of contraception is the measurement of blood pressure [22–24].

This study was undertaken to develop and pilot test a survey instrument appropriate for determining the feasibility and acceptability of pharmacist-initiated hormonal contraception among community pharmacists in Canada. Subsequent to the development and testing described here, our intention is to utilize the instrument to survey rural and urban Canadian pharmacists.

To ensure a comprehensive evaluation of the appropriate parameters to determine the potential for the uptake of this innovative healthcare model, Everett Rogers’ diffusion of innovations was selected as a theoretical framework for the survey instrument [26]. The diffusion model consists of four constructs, which assess an innovation and its potential for adoption within a population group [26–28]. See Table 1. These constructs include: the attributes of innovation, the characteristics of adopters, communication channels and diffusion networks [26]. Within each of these four constructs, there are several dimensions.

Table 1. Rogers’ theory of the diffusion of innovation: constructs and their dimensions.

Attributes of Innovation	Characteristics of Adopters	Communication Channels	Diffusion Networks
Relative Advantage	Age	Homophily ¹	Opinion Leaders
Compatibility	Education	Heterophily ¹	Champions
Complexity	Career Status		Social Networks
Trialability	Socio-economic Status		Organizations
Observability	Laggard vs. Innovator		Communications

¹ Rogers defines homophily as “the degree to which pairs of individuals who interact are similar in certain attributes, such as beliefs, education, social status, and the like”. The opposite is heterophily [26].

Within each dimension there are also several factors (e.g., the dimension of relative advantage includes the factors of relative advantages for the pharmacist, relative advantages for the women who consult the pharmacist and the relative advantages for society). Similarly, within each of these factors, there may be one or more aspects to explore as items, or questions within the questionnaire.

According to this model, an innovation will undergo a five-step process of diffusion into practice: knowledge, persuasion, decision, implementation and confirmation [26]. Innovation adopters may be classified into five categories describing their propensity to adopt innovations: innovators, early adopters, early majority, late majority and laggards. [26].

Rogers' "diffusion of innovations" model allows for an assessment of the acceptability of pharmacist-initiated hormonal contraception task-sharing among Canadian pharmacists. The objectives of the current study to create a questionnaire that will assess whether pharmacists are likely to adopt the specific innovation of independent initiation of hormonal contraception (also termed "hormonal contraception task-sharing") are:

- (a) To develop a questionnaire based on the theory of diffusion of innovation;
- (b) To explore the content-related validity of this questionnaire;
- (c) To assess the feasibility of the implementation of the survey among pharmacies in BC.

2. Methods

Ethics approval for the study was obtained from the University of British Columbia Children's and Women's Research Ethics Board (H12-01569). No financial incentive was provided for participation.

2.1. Questionnaire Development

We used questions from validated surveys [15,16,20], where available and appropriate to the purpose of this survey. We created new questions as required to complete the chosen framework. Expert review, focus group testing and pilot administration were subsequently undertaken to develop and assess this survey instrument.

The questionnaire was divided into two parts: (1) innovation construct questions starting with a demographics section (characteristics of adopters), then including innovation process questions and adopter category questions; and (2) contact information. The demographics section prompted pharmacists to provide information regarding their location of pharmacy practice, their pharmacy staff position and demographics and their pharmacy education and additional training. The innovation construct questions consisted of a variety of dichotomous, nominal-polytomous and ordinal-polytomous type questions. Likert-scale questions were also utilized throughout the questionnaire; the scale ranged from 1 to 5, with 1 being strongly disagree and 5 being strongly agree. The contact information section was included to facilitate the implementation of this survey as part of a mixed methods study. Thus, we invited pharmacists completing the survey to participate in semi-structured interviews and, if they chose to do so, to provide their contact information.

Constructs from the diffusion model [26–28] guided both the selection and modification of questions from previously validated surveys, as well as the creation of new questions. Table 2 illustrates how the questions on this survey map to the theoretical framework of the diffusion of innovations.

Table 2. Mapping the components in Rogers' theory of diffusion of innovations to the related question items in the ACT-Pharm (Acceptability of Contraception Task-sharing among Pharmacists) questionnaire.

Rogers's Diffusion of Innovations	Factor	# of Items	# of Sub-items
<i>Constructs and Their Dimensions</i>			
<i>Attributes of Innovation</i>			
Relative advantage	Advantage for women Advantage for pharmacists Advantage for society	3	7
Compatibility		9	32
Complexity	Related to required skills Related to the collaboration of pharmacists Related to the responsibility of physicians	6	22
Trialability		3	16
Observability	Related to the contraceptive behaviour of women	1	1
<i>Diffusion Networks</i>			
Opinion leaders	Related to external communication, accessibility, status and the innovativeness of the innovation adopter (e.g., opinion leaders may fit under early adopters and innovator adopter categories and have considerable influence in diffusing innovation among those who follow the opinion leaders)	3	3
<i>Characteristics of Adopters</i>			
Sociodemographic characteristics	Related to education and social status (e.g., earlier adopters are likely to be more educated, literate and have a higher social status than late adopters)	11	11
<i>5-Step Process of the Diffusion of the Innovation</i>			
Knowledge	How-to knowledge Awareness knowledge Principles knowledge	2	20
Persuasion		3	7
Decision	Adoption Rejection	4	14
Implementation	Reinvention	1	2
Confirmation	Dissonance or discontinuance	1	4
<i>Adopter Type</i>			
Type of adopters	Innovators Early adopters Early majority Late majority Laggards	2	10

The final pilot questionnaire consisted of:

Part I:

- Section A: Innovation Construct Questions: Characteristics of Adopters' Demographics: 11 questions;
- Section B: Innovation Construct Questions (Attributes of Innovation, Diffusions Channels, Innovation Networks, Process of Diffusion and Adopter Categories): 13 questions.

Part II: Contact Identification (related to potential interview participation): 2 questions.

Among the Innovation Construct Questions, seven were adapted from previously validated instruments [15–17] and six were created to ensure complete testing within the theoretical framework chosen. The draft questionnaires were reviewed by all team investigators, as well as by a range of expert volunteers.

The focus group participants completed a paper-based questionnaire and, following a structured interview framework, were asked for their understanding of the survey questions and for their suggestions to improve readability and comprehension (see Table 3).

Table 3. Structured focus group instructions for question analysis.

Each survey item from the questionnaire will be read aloud, with time for specific feedback regarding the survey question from the focus group participants.
Prompts for individual items in the questionnaire:
(1) How did you find the wording of the question?
(2) What are your thoughts on the purpose of the question? Elaborate if necessary: “purpose” as in “what is the question trying to ask?”
(3) What are your thoughts on the correlation between the question and the options listed for that question?
(4) Were there any options that you would like to have responded with not listed in the question? If so, what were these options?
(5) Were there any options that you feel were unnecessary? If so, what were these options?
After all items from the questionnaire have been completed, the participants will engage in a general feedback section, comprised of the following questions.
Prompts for general feedback for the questionnaire
(1) What were the strengths of the questionnaire? What were the weaknesses of the questionnaire?
(2) Was the questionnaire presented in a logical manner? If not, what would be a more logical progression for the questionnaire?
(3) Were there any missing topics or questions that you feel may be beneficial for our study? Please elaborate.
(4) If you were requested to complete this survey in the community as a pharmacist, are there any barriers that would prevent you from completing the survey?
(5) Other comments?

To facilitate the distribution and to adapt to different participant preferences, the pilot questionnaire was transcribed onto the web-based survey tool supported through Information Technology at the University of British Columbia. Enterprise Feedback Management [29] is an online survey-hosting platform that is compliant with the BC Freedom of Information and Protection of Privacy Act.

2.2. Distribution of Pilot Survey

Community pharmacies in British Columbia were divided into two categories: non-CMA (census metropolitan area) and CMA. CMA pharmacies were categorized as pharmacies located within a CMA as defined by Statistics Canada [30]. The four CMAs in BC include Vancouver, Victoria, Kelowna and Abbotsford [31]. Non-CMA pharmacies were categorized as pharmacies located in all other communities and regions of BC outside of the four CMAs. All community pharmacies in BC were identified as being either non-CMA (N = 368) or CMA (N = 752). As our team plans to utilize this survey among the population of pharmacies in BC, we restricted our sample for pilot testing to under 7% of all pharmacies. In prior work with similar surveys among other health professional groups our team had achieved response rates of 85% [32]. Thus, we used these assumptions to *a priori* set a sample size for this pilot testing that would meet the objectives of this study.

To test the internal reliability and the feasibility of implementation of the survey, 20 randomly selected non-CMA pharmacies were invited to partake in the pilot study. An address-and-fax list of community pharmacies was accessed from the College of Pharmacists of British Columbia (CPhBC), the provincial regulatory body for the pharmacy profession [33]. Communities located outside of a CMA were ordered in descending population along with its pharmacies, and every eighteenth pharmacy was selected to be part of the pilot study. A cover letter with a link to an internet-based questionnaire, along with a paper version of the questionnaire, were delivered by Canada Post to the selected non-CMA pharmacies. Each pharmacy had the option to complete and mail the paper version or to complete the online version via the Internet. Both on the Internet-based questionnaire and in the paper-based cover letter and questionnaire, we included instructions for each pharmacy to arrange for only a single questionnaire (either by Internet or on paper) to be completed. The Vancouver CMA was selected as the representative CMA region for the pilot study, and 100 pharmacies were chosen to participate within the CMA. All 21 communities within the Vancouver CMA were listed in descending population order, and a list of the pharmacies within each community was created based on information provided by the CPhBC. Within each list, every fifth pharmacy was chosen until a sufficient number was selected to fulfill the requirements for proportional allocation. A cover letter with a link to the Internet-based questionnaire was sent by fax. Mailed paper versions were not sent to this cohort of 100 pharmacies, as a budget for this expense was not available. Follow-up was conducted using a faxed reminder letter to both the non-CMA and CMA pharmacies at 1- and 3-weeks following the initial survey distribution. The pilot study was open for responses for four weeks and concluded in October, 2012.

2.3. Analysis

Expert and focus group feedback was transcribed and recursively examined to determine and iteratively re-test appropriate re-phrasing, re-ordering or improved approaches to capture each of the essential constructs within the theoretical framework.

Pilot survey responses and comments added by participants were similarly examined to determine consistency among and between responses and to detect internal consistency. Responses to two identically intended questions addressing innovation uptake, one offering a scale of five description

style sentences and the other, later in the survey, offering the corresponding five adopter-type-scaled labels, were compared using Cronbach's test for reliability.

The feasibility of implementing this survey among rural and urban pharmacies was determined through both the response rate achieved overall and any incremental response achieved among either urban or rural pharmacies, with the two fax delivered reminders.

3. Results

3.1. Expert Review and Focus Group Testing

The questionnaire drafts were iteratively distributed for expert opinion and reviewed during focus group testing throughout July and August, 2012. Focus group tasks centered on better understanding of how each question was perceived by respondents and utilized a structured approach (see Table 3).

The draft questionnaires were reviewed by all team investigators, as well as by 12 expert volunteers from a wide variety of fields, including physicians, medical students, nurses, pharmacists and university and hospital-based researchers.

Expert reviewers provided detailed and extensive comments and suggestions for revision. Although among over 120 suggestions, about a quarter related to formatting, word choices or grammar, at least half dealt with either construct-validity improvements (for example: "This question may not be specific enough. The way it is phrased may lead to answers on the high side of the scale, I would suggest...") or content-validity improvements (for example: "This sentence (although it's true) may influence responses. Some may hesitate to mark the last two choices (areas that are not private) within the context of these choices. Perhaps you could consider..."). The remaining comments aimed to either improve the readability or to improve the reliability of respondent answers (for example, to include options meaningful to the respondent and to offer an exhaustive and non-overlapping set of options).

Two focus group sessions were held: three community pharmacists and one pharmacy student participated in the first session, and two community pharmacists participated in the second. Focus group reviewers supported changes suggested by the expert review. In addition, they had a few additional comments for improved readability and improving the content related validity.

3.2. Pilot Survey

Pilot phase implementation of the survey was completed during a four-week period between September and October, 2012. Seven pharmacies from the non-CMA category returned completed paper questionnaires for a response rate of 35%. (See Table 4) Four pharmacies from the CMA category completed online questionnaires for a response rate of 4%. Nine of the eleven responses occurred within a week after our initial survey distribution, with only two additional responses resulting from the two fax reminders at 1 and 3 weeks.

Table 4. Demographics of pilot study respondents. CMA, census metropolitan area.

	Non-CMA	CMA
Total respondents	7	4
Male	3/7 (43%)	2/4 (50%)
Pharmacy manager	3/7 (43%)	2/4 (50%)
Years in community practice	2 to 21 years (median 7)	3 to 26 years (median 11.5)

3.3. Diffusion of Innovations Framework

Three items ($n = 3$) in the pilot questionnaire tested the perceived relative advantages and disadvantages for women, pharmacists and society if pharmacists were authorized to prescribe hormonal contraception (Table 1). Other items in the questionnaire tested additional factors that affect innovation adoption. These factors include compatibility ($n = 9$), complexity ($n = 6$), trialability ($n = 2$) and observability ($n = 1$).

The questionnaire also tested stages of the innovation adoption process, which include knowledge ($n = 2$), persuasion ($n = 5$), decision ($n = 1$), implementation ($n = 1$) and confirmation ($n = 1$). Pharmacists were asked to classify themselves as one of five adopter types, then were later asked a similar question in order to determine internal consistency in assessment of this parameter. Comparison of the responses on these identically themed questions from different parts of the survey yielded a Cronbach's Alpha of 0.901, indicating a high degree of internal reliability.

4. Discussion

This survey development and pilot study provided insight into the feasibility of sampling among urban compared to rural pharmacists, as well as demonstrating the internal reliability of the questions, reflecting self-assessed readiness to adopt an innovation within this survey instrument.

Diffusion of innovations has served as a model for many healthcare innovations. Guilbert *et al.* [16] studied contraception task-sharing among nurses, pharmacists and physicians in Quebec using the diffusion model. The authors focused primarily on nurses and found that one-third of nurses did not prescribe hormonal contraceptives, despite completing the necessary training [17]. The diffusion model suggests that not every person within an organization will adapt an innovation right away and that some participants may not adapt at all [24]. Various factors that would affect innovation adoption include the relative advantage, compatibility and complexity of an innovation [26].

Through expert review and opinion, focus group testing and pilot testing, the questionnaire was refined in anticipation of province-wide distribution in British Columbia to identify whether hormonal contraception task-sharing among pharmacists is feasible, as well as to highlight potential facilitators and barriers for implementation. Diffusion of innovations served as the framework to structure the questionnaire and to correlate the factors that affect adoption relative to a pharmacist's interest in the independent prescription of hormonal contraception.

The limitations encountered included an inability to locate previously validated questions to address all of the constructs within our theoretical framework, although most had been validated in similar populations. Thus, some questions required primary development. Not surprisingly, these questions were the most often revised, through feedback from experts and focus group testing and later in response to results in the pilot testing phase.

The largest limitation encountered was the low response rate of 9% overall, including only 4% among the urban pharmacies. This is in contrast to an 85% response rate to similar studies by our team among health professionals in this province [32]. However, it is consistent with lower overall responses by pharmacists in BC to well-executed survey studies, such as that by Marra, with fewer than 10% of BC pharmacists responding [34]. The methodologies for improving survey response rates are detailed in excellent works, such as Hoddinott [35] and Jensen [36]. The low response rate indicates a need for both methodological changes for survey distribution and for follow up reminders, as well as consideration for the provision of an incentive to participate. For the CMA sample of 100 pharmacies, fax-only invitations and reminders were implemented as a cost-saving measure. Among these fax-only pharmacies, the response rate was very low. However, among the 20 non-CMA pharmacies, who received a link to the internet-based version and paper surveys, in addition to fax reminders, we had a nearly nine-fold better response, with all participants choosing to complete the paper-based survey instrument. In this way the feasibility of the implementation of our planned province-wide survey among pharmacists has been greatly aided by the findings of this pilot study.

5. Conclusions

Access to effective contraception, particularly in rural and remote areas, is a significant problem across Canada. As easily accessible and trusted healthcare professionals, pharmacists play an important healthcare provider role in both rural and urban communities. Throughout the country, authorization is increasing for pharmacists to independently prescribe medications. The ability for pharmacists to prescribe hormonal contraception may greatly improve the access to family planning methods for women across Canada. This study developed a survey instrument, based on the theoretical framework of “Diffusion of innovations”, that is suitable for implementation. The pilot implementation and testing described has allowed us to identify the feasibility for the implementation of this instrument and to assess the internal reliability of questions reflecting the readiness to adopt an innovation for use among Canadian community pharmacists to assess the independent provision of hormonal contraception.

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Author Contributions

Michael Wong created the survey and implemented the testing with guidance from Wendy V. Norman and Judith A. Soon. Judith A. Soon and Peter J. Zed provided expert advice and direction. Wendy V. Norman developed the idea for the research, and all authors contributed to the study design. Michael Wong

wrote the first draft of the manuscript. Wendy V. Norman led all subsequent versions, and all authors approved the content of the final version.

Conflicts of Interest

All authors declare we have no conflict of interest with respect to this research.

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