Original Research

Perspectives and experiences with telepharmacy among pharmacists in Canada: A cross-sectional survey

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Abstract

Objective: This study aims to understand Canadian pharmacists' use, experiences, and perspectives of telepharmacy. **Methods:** We conducted a cross-sectional online survey. Individuals were eligible to participate if they were currently a registered, licensed pharmacist practicing in Canada. We collected perspectives of both telepharmacy users and non-users by creating a survey logic that asked specific and shared questions between the two groups. Data was analyzed using descriptive statistics including means and standard deviations (SD) for continuous variables and proportions for categorical variables. **Results:** Between October and December 2020, 136 pharmacists completed the survey, including 61 (52.6%) telepharmacy users and 55 (47.4%) non-users. Among those who use telepharmacy, the majority of participants (39, 72.2%) expressed that telepharmacy augmented their clinical practice and feel comfortable managing minor ailments using telepharmacy (41, 80.4%). Among non-users, 45 (84.9%) indicated that telepharmacy will augment their clinical practice and 48 (90.6%) would feel comfortable managing minor ailments using telepharmacy. Important considerations for successful implementation of telepharmacy for those who use telepharmacy included easier system implementation (29, 19.3%), better privacy & data protection (28, 18.7%) and simple to learn technology (23, 15.3%). **Conclusion:** Despite the growing recognition of benefits of telepharmacy, our findings suggest that utilization among pharmacists in Canada is still quite low. Nonetheless, our study identified areas of consideration for better integration of telepharmacy in pharmacy practice including optimizing workflow, addressing barriers, and providing training to pharmacy students.

Keywords: Telemedicine; Pharmaceutical Services; Pharmacists; Pharmacy

INTRODUCTION

Over the past 5 years, the use of telemedicine in health care has been increasing.[1,2] Telemedicine encompasses health care services such as web applications (e.g. teleconsultations, conferences via the Internet), mobile applications and remote patient monitoring.[3] With the advancement of technology, telemedicine has offered greater accessibility, cost-effectiveness and continuity of care to patients.[4] With the COVID-19 pandemic, there have been rapid implementation of telemedicine services, particularly in the fields of medicine and nursing as well as ongoing advocacy for continued optimization in order to safely connect patients to their health care providers.[5-7]

Many pharmacies, in both community and institutional settings, currently utilize technology to process prescriptions, manage their inventories, deliver medications and communicate with patients and their health care team.[8] In 2018, the Canadian Society of Hospital Pharmacists has defined telepharmacy as "the use of telecommunications technology to facilitate or enable the delivery of high-quality pharmacy services in situations where the patient or healthcare team does not have direct (in-person) contact with pharmacy staff."[9]

There is a wide variety of the types of telepharmacy interventions that are available and they demonstrate an overall positive impact on health outcomes. Niznik et al. (2018) conducted a systematic review to investigate the impact of clinical pharmacist telepharmacy interventions in outpatient or ambulatory settings on three types of clinical outcomes (clinical disease management, patient self-management, adherence).[10] 34 studies that compared clinical outcomes against a comparator were identified. Types of interventions included pharmacist-led telephonic clinics, post-discharge follow-up, medication counselling, and monitoring lab values and vital signs. Over half of the interventions (23/34, 67.6%) resulted in an overall positive outcome based on one of three types of clinical outcomes reported (clinical disease management: 19/28, 67.8%; patient self-management: 2/2, 100%; adherence: 5/8, 62.5%). As the need to better understand utilization of telepharmacy continues, this study's objective was to understand Canadian pharmacists' use, experiences, and perspectives of telepharmacy.

METHODS

Participants

Individuals were eligible to participate if they were currently a registered, licensed pharmacist working in any type of practice setting in Canada (e.g., community, hospital). We recruited participants using four methods adapted from

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previous studies: **1)** posting in investigators' and organizations' social media channels (e.g. Twitter, Facebook); **2)** posting in online pharmacy communities; **3)** advertising on pharmacy associations' online newsletters; **4)** emailing pharmacists from our past studies who had previously agreed to be contacted to participate in future research studies.[2,11]

Study design

We conducted a cross-sectional study. We designed an online survey, in English and French, to gather information about the participants' experiences and perspectives regarding telepharmacy (Supplemental File 1). We consulted a clinical expert in pharmacy practice throughout the survey development process and also conducted a pilot testing of the survey with our colleagues in the Faculty. The survey comprised two sections. The first section captured information on demographic characteristics with 10 questions altogether including those on age, gender, and workplace. The second section gathered information on whether participants currently use telepharmacy in their practice; with survey logic providing the opportunity to ask specific and shared questions between two groups. Specifically, participants who indicated that they use telepharmacy were asked 22 questions regarding their direct experiences including types of technology tool(s) used, clinical services that utilizes telepharmacy and the logistics of telepharmacy in their practice. For participants who do not use telepharmacy, we were interested in their perspectives and as such, 9 questions, which were also asked to the telepharmacy users, were asked. These questions included the potential impact on their clinical practice, ability/barriers to communicating effectively with telepharmacy, and important considerations for successful implementation of telepharmacy.

Data analysis

Survey data was analyzed using descriptive statistics including means and standard deviations (SD) for continuous variables and proportions for categorical variables. We categorized participants according to reported use of telepharmacy and compared characteristics and experiences using Chi-square tests. Microsoft Excel, Qualtrics XM Stats, and SPSS software programs were used to support the analyses.

Ethical approval and consent

Ethical approval was granted by the University of British Columbia Research Ethics Board (H20-02988). UBC's Survey Tool provided by Qualtrics was used to gather and store data as well as obtain the participant's informed consent. Participant confidentiality was maintained, and data access restricted to the research team.

RESULTS

Between October 29, 2020 to December 10, 2020, 136 pharmacists completed the survey including 61 (52.6%) who indicated that they use telepharmacy and 55 (47.4%) who do not use telepharmacy. The average time to complete the survey was 6.6 minutes. Altogether, 68.0% of the participants were female and the mean (SD) age was 38.3 (11.6) (**Table 1**).

Table 1. Participant characteristics				
	Total	**Use telepharmacy (N = 61)**	**Do not use telepharmacy (N = 55)**	**P Value**
Gender				
M	37 (29.6%)	18 (30.0%)	14 (25.9%)	
F	85 (68.0%)	41 (68.3%)	38 (70.4%)	0.38
Prefer not to disclose	3 (2.4%)	1 (1.7%)	2 (3.7%)	
Age (Mean, SD)	38.3 (11.6)	38.3 (11.6)	38.5 (11.6)	0.84
Undergraduate pharmacy graduation year				0.08
Before 2000	32 (26.9%)	13 (22.0%)	16 (30.2%)	
2000-2005	10 (8.4%)	8 (13.6%)	1 (1.9%)	
2006-2010	25 (21.0%)	15 (25.4%)	8 (15.1%)	
2011-2015	26 (21.8%)	7 (11.9%)	19 (35.8%)	
2016 and above	26 (21.8%)	16 (27.1%)	9 (17.0%)	
Additional formal training after undergraduate pharmacy degree[1]				
Yes	53 (44.5%)	33 (55%)	20 (37.0%)	0.48
No	66 (55.5%)	27 (45%)	34 (63.0%)	
Years working as a registered pharmacist				
Less than 5 years	28 (23.9%)	17 (28.3%)	11 (20.4%)	
5 to 10 years	29 (24.8%)	8 (13.3%)	19 (35.2%)	
11 to 15 years	22 (18.8%)	15 (25.0%)	6 (11.1%)	**0.04**
16 to 20 years	13 (11.1%)	8 (13.3%)	5 (9.3%)	
More than 20 years	25 (21.4%)	12 (20.0%)	13 (24.1%)	

Geographical location of current practice				
British Columbia	79 (68.1%)	38 (63.3%)	40 (72.7%)	0.07
Ontario	12 (10.3%)	10 (16.7%)	2 (3.6%)	
Québec	11 (9.5%)	6 (10.0%)	5 (9.1%)	
Alberta	5 (4.3%)	2 (3.3%)	3 (5.5%)	
Manitoba	4 (3.5%)	2 (3.3%)	4 (7.3%)	
Saskatchewan	3 (2.6%)	0 (0.0%)	1 (1.8%))	
Nova Scotia	2 (1.7%)	2 (3.3%)	0 (0.0%)	
Current employment status				
Full time staff (40 or more hours per week)	55 (47.8%)	32 (53.3%)	23 (41.8%)	0.88
Part time staff (less than 40 hours per week)	24 (20.9%)	11 (18.3%)	13 (23.6%)	
Freelance/relief	10 (8.7%)	5 (8.3%)	5 (9.1%)	
Manager	12 (10.4%)	5 (8.3%)	7 (12.7%)	
Owner/Associate	10 (8.7%)	5 (8.3%)	5 (9.1%)	
Other	4 (3.5%)	2 (3.3%)	2 (3.6%)	
Current practice setting[2]				
Community pharmacy	71 (44.7%)	26 (30.6%)	45 (62.5%)	0.28
Chain (More than 6 stores with on owner, e.g. Rexall, PharmaPlus)[1]	19 (22.6%)	7 (33.3%)	5 (19.2%)	0.57
Banner (e.g. IDA, Guardian, Pharmasave)[1]	17 (20.2%)	2 (9.5%)	3 (11.5%)	0.19
Franchise (e.g. Shoppers Drug Mart, Medicine Shoppe)[1]	16 (19.1%)	4 (19.0%)	7 (26.9%)	0.78
Independent (One owner up to 6 stores)[1]	15 (17.9%)	5 (23.8%)	5 (19.2%)	0.45
Mass merchandise/food store (e.g. Loblaws, Walmart)[1]	13 (15.5%)	3 (14.3%)	5 (19.2%)	0.99
Other practice (e.g. consultant)[1]	4 (4.8%)	0 (0.0%)	1 (3.8%)	0.67
Hospital pharmacy	31 (19.5%)	22 (25.9%)	9 (12.5%)	0.91
Academia	19 (12.0%)	10 (11.8%)	9 (12.5%)	0.96
Other[3]	12 (7.6%)	7 (8.2%)	5 (6.9%)	0.32
Ambulatory care clinic pharmacy	11 (6.9%)	9 (10.6%)	1 (1.4%)	0.16
Family health team	7 (4.4%)	6 (7.1%)	0 (0.0%)	0.55
Long-term care pharmacy	5 (3.1%)	2 (2.4%)	3 (4.2%)	0.84
Industry	2 (1.3%)	2 (2.4%)	0 (0.0%)	0.88
Government	1 (0.6%)	1 (1.2%)	0 (0.0%)	0.37
Size of population centre of where primary practice is located				
Small (population between 1,000 and 29,999)	17 (14.7%)	8 (13.3%)	9 (16.4%)	0.17
Medium (population between 30,000 and 99,999)	20 (17.2%)	7 (11.7%)	13 (23.6%)	
Large (population of 100,000 and over)	79 (68.1%)	45 (75.0%)	33 (60.0%)	

[1] e.g. Graduate PharmD, Master's, PhD, Hospital/Industry/Community residency.
[2] Participants can indicate more than one option as appropriate.
[3] Primary Care Network, Pharmacy informatics, Health technology, Biotechnology, HealthLink British Columbia, Regulatory, Inquiry committee member with college of pharmacists, Association management, Academic detailing, Community health centre, Consultant.

Most (77, 64.6%) of the participants graduated after 2006 and 66 (55.5%) did not receive additional formal training after their undergraduate pharmacy degree. 79 (67.5%) have been working as a registered pharmacist ranging from 0 to 15 years and 55 (47.8%) are working as full-time staff. The majority (79, 68.1%) of the participants are currently practicing in British Columbia, 12 (10.3%) in Ontario, 11 (9.5%) in Québec, 5 (4.3%) in Alberta, 4 (3.5%) in Manitoba, 3 (2.6%) in Saskatchewan and 2 (1.7%) in Nova Scotia. 79 (68.1%) of the participants practiced in large population centres and they practiced in various settings such as community pharmacy (71, 44.7%), hospital pharmacy (31, 19.5%), academia (19, 12.0%) and ambulatory care clinic pharmacy (11, 6.9%). Chi-square tests do not suggest characteristics that differed between participants who used telepharmacy with those who did not.

Of particular interest are the experiences of participants who indicated their use of telepharmacy in current practice (as summarized in **Table 2**). The most frequently utilized

Table 2. Experiences of participants who use telepharmacy in current practice (N = 61)	
	N (%)
TOOLS	
Phones	52 (61.9%)
Videos	26, (31.0%)
Other	6 (7.1%)
PLATFORM	
Platform used to deliver telepharmacy services[1]	
Zoom	20 (28.6%)
Skype	6 (8.6%)
Microsoft Teams	2 (2.9%)
Other[2]	29 (41.4%)
Not Applicable	13 (18.6%)
Ease of use of telepharmacy platform	
Very easy	12 (22.6%)
Easy	25 (47.2%)
Neither Easy or Difficult	14 (26.4%)
Difficult	2 (3.8%)
Very Difficult	0 (0.0%)
ACCESS AND FEES	
How patients learn about the telepharmacy[1]	
Referral from physician	20 (26.7%)
Referral from friends/family	14 (18.7%)
Advertisement (e.g. posters, flyers, pamphlets, online advertisements)	12 (16.0%)
Other[3]	29 (38.7%)
Registration/enrollment fee for telepharmacy	
Yes	1 (1.8%)
No	54 (98.2%)
Fee for the telepharmacy	
Yes, if is not covered under medical services insurance	1 (1.8%)
	Fee[4]: $25
No	54 (98.2%)
Reimbursement of telepharmacy services[1]	
Patient out-of-pocket	1 (33.3%)
Government	1 (33.3%)
Third party insurance	1 (33.3%)
PRACTICE IMPLICATIONS	
Collaboration with another health care party/clinic[1]	
Yes	22 (40.7%)
Medical Clinic	8 (28.6%)
Community pharmacy	1 (3.6%)
Hospital	10 (35.7%)
Health Authority	6 (21.4%)
Government	1 (3.6%)
Other (e.g. cardiac rehab program, community health centre)	2 (7.14%)
No	32 (59.3%)
Impact of COVID-19 on implementation of telepharmacy in current practice	
Yes	40 (71.4%)
No	16 (28.6%)

[1] Participants can indicate more than one option as appropriate.
[2] iPads, ScriptPro, FaceTime, WhatsApp Video, Ask your pharmacist, Webex, Doxy.me, email, OTN, PSS/Telus Platform, Medeo.
[3] Program standards due to COVID-19 logistics, built-in program structure, in-person invitations, referrals from nurses, Google, self-referral, influencers, social networks, word of mouth, clinic reception/staff/admin, pharmacy staff/pharmacist, none.
[4] Round up to nearest dollar.

tools are phones as reported by 52 (61.9%) of participants, followed by videos (26, 31.0%), and other (6, 7.1%) which include secure messaging. With respect to platforms, Zoom was frequently used (20, 28.6%); though a larger proportion of participants (41.4%) indicated that they use "Other" platforms (e.g. ScriptPro, FaceTime, WhatsApp, Ask your pharmacist, Webex) to deliver telepharmacy services. The majority of participants (37, 69.8%) expressed that their experiences with theses platforms have been easy/very easy to use. 20 (26.7%) indicated that patients learned about the telepharmacy service through referral from physician and 29 (38.7%) mentioned "Other" methods such as word of mouth, built-in program structure, social media/search networks and in-person invitations. 54 (98.2%) shared that there is no fee to receive the service. 32 (59.3%) of the participants indicated that they do not collaborate with another health care party/clinic for these services and for those who do, they collaborated with medical clinics (8, 28.6%), hospitals (10, 35.7%) and health authorities (6, 21.4%). 40 (71.4%) participants expressed that the COVID-19 pandemic contributed to the incorporation of telepharmacy services in current practice. **Figure 1** provides an overview of telepharmacy clinical services according to technology tools used to deliver them; compared to video and "other" technology tools, phones are mostly used to deliver clinical services such as medication review and counselling.

We contrasted experiences of participants who reported using telepharmacy with perspectives of those who did not (**Figure 2**). The majority of participants utilizing telepharmacy (39, 72.2%) expressed that telepharmacy augmented their clinical practice; among those who do not use telepharmacy, 45 (84.9%) indicated that they think telepharmacy would augment their clinical practice. In addition, 50 (94.3%) telepharmacy users indicated that they are able to communicate effectively with the patient, 38 (74.5%) are comfortable assessing minor ailments, and 41 (80.4%) are comfortable making recommendations for managing minor ailments using telepharmacy. When asked similar questions on their perspectives, most of the non-users indicated that they think they will be able to communicate effectively with the patient (48, 90.6%), would feel comfortable assessing minor ailments (45, 84.9%) and would feel comfortable making recommendations for managing minor
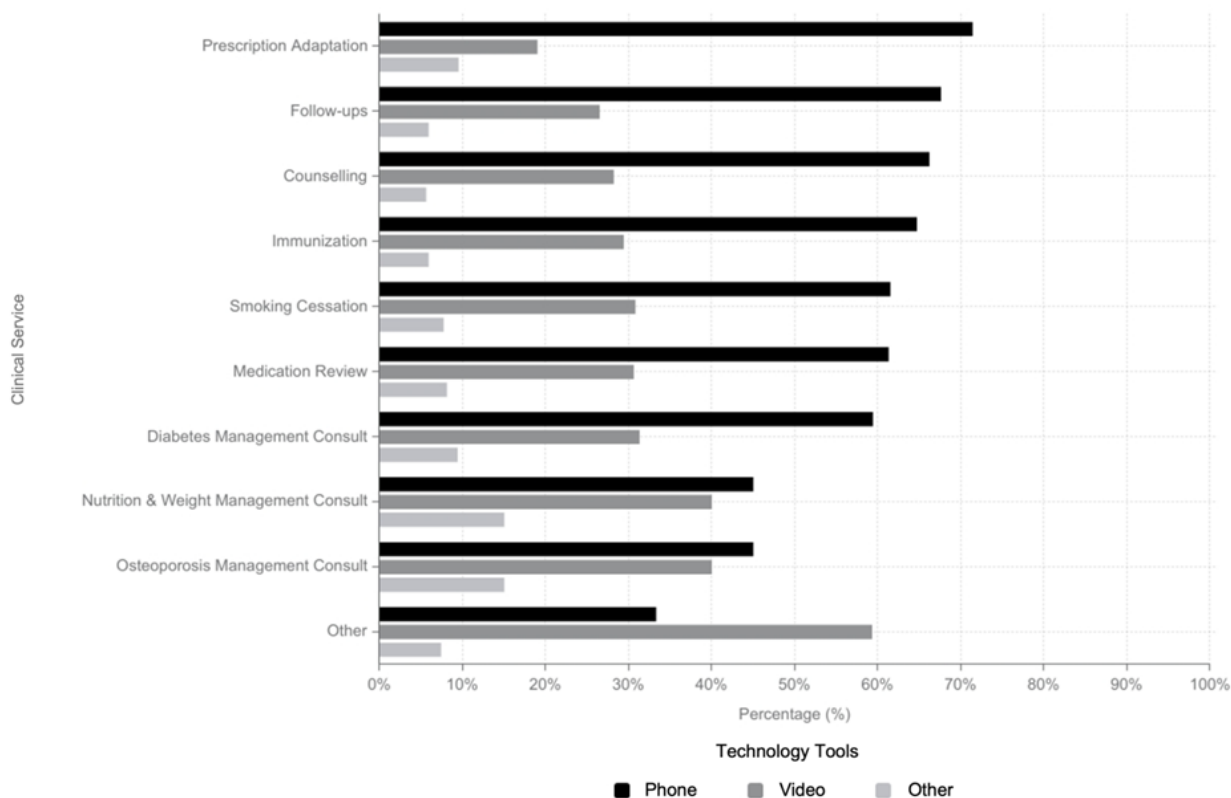
Figure 1. Clinical services according to technology tools used for delivery by pharmacists in Canada who use telepharmacy
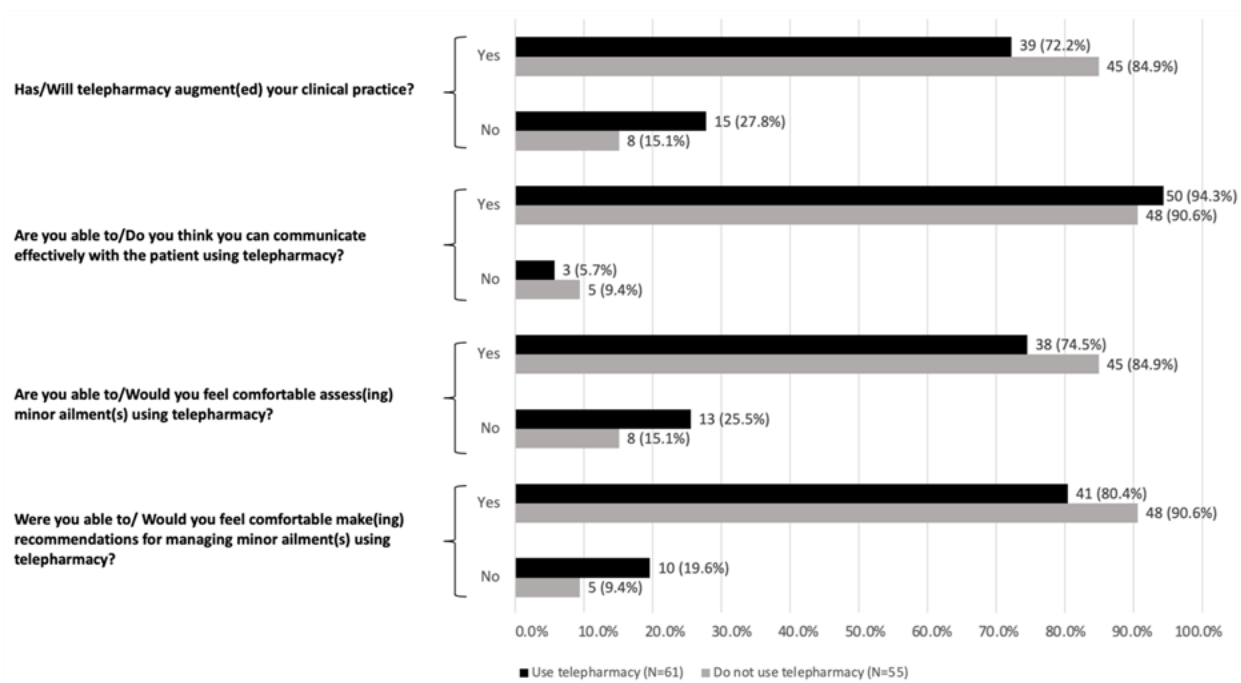

Figure 2. Experiences of participants who reported using telepharmacy with perspectives of those who did not
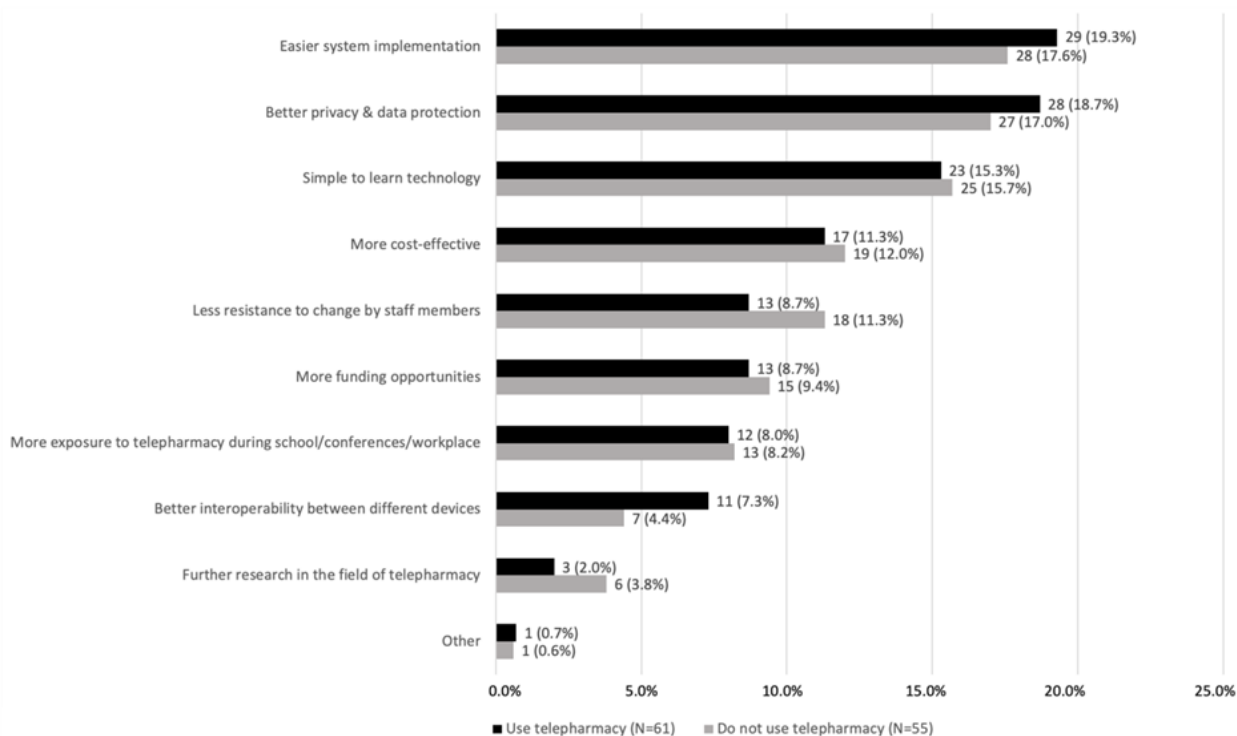
Figure 3. Factors for successful implementation of telepharmacy reported by users and non-users[1]

ailments using telepharmacy (48, 90.6%).

Finally, we asked questions to inform successful implementation of telepharmacy (**Figure 3**). Among users, the most frequent considerations are: easier system implementation (29, 19.3%), better privacy & data protection (28, 18.7%) and simple to learn technology (23, 15.3%). The most important considerations for successful implementation of telepharmacy included easier system implementation (28, 17.6%), simple to learn technology (27, 17.0%) and being more cost-effective (25, 15.7%).

DISCUSSION

To our knowledge, this survey is the first of its kind to explore pharmacists' use and experiences with telepharmacy in Canada. The participants practiced in a wide range of pharmacy practice, including community, hospital, family health team, ambulatory care clinic, long-term care pharmacy, government, academia, and industry. Just over half of the participants indicated that they use telepharmacy in their practice, mainly through phone and video calls. Participants who utilize telepharmacy indicated that telepharmacy augmented their clinical practice and feel comfortable making recommendations for managing minor ailment(s) using telepharmacy. When asked about their perspectives, participants who did not currently use telepharmacy expressed feeling that their clinical practice would be augmented by telepharmacy and that they would feel comfortable making recommendations for managing minor ailment(s) using telepharmacy. Key considerations for implementing telepharmacy among users were easier system implementation, better privacy & data protection, and simple

to learn the technology; while for non-users these were easier system implementation, better privacy & data protection, and being more cost-effective. Altogether, along with providing a description of current experiences with telepharmacy in Canada, our study identified areas to support better integration and optimization of current and future telepharmacy interventions.

With 52.6% of participants indicating use of telepharmacy to provide clinical services, our study suggests that in Canada, uptake of telepharmacy is still quite low despite previous evidence on the frequent use of other digital health tools (e.g., provincial drug information systems (DIS), laboratory information systems, and electronic clinical decision-making tools) in pharmacy practice. In 2016, Leung et al. evaluated the access and use of these afore mentioned digital health technologies used in community pharmacy practice in Canada.[2] Altogether, 447 community pharmacists responded to their study survey with 86% of the participants indicating that they practiced in a hybrid (paper and electronic) environment. The majority of the participants utilized electronic reminders (99%) and the CPhA e-Therapeutics/ eCPS electronic clinical decision support tool (88%). Both Leung et al. (2016) and our study similarly reported the positive impacts that technology can bring when caring for patients. In our study, the majority of telepharmacy users (72.2%) expressed that telepharmacy augmented their clinical practice. Leung et al. (2016) shared that with the availability of a DIS, 61% of the participants indicated an increase in their productivity and 92% indicated an increase in the quality of care they are able to provide to their patients. It is important to note that Leung et al.

evaluated pharmacists' use of DIS, laboratory information systems, and electronic clinical decision-making tools; They did not specifically evaluate use of telepharmacy, as we did in our current study.

To allow for better implementation of telepharmacy in pharmacy practice, it is important to utilize the end-users' feedback and address potential barriers. In our study, key considerations for successful implementation of telepharmacy for users (easier system implementation, better privacy & data protection, simple to learn technology) were slightly different from non-users (easier system implementation, simple to learn technology, more cost-effective) of telepharmacy. These differences may be due to the fact that responses from users reflect actual experiences with telepharmacy while those from non-users reflect their perspectives. Nonetheless, these considerations were consistent with potential barriers of implementing telepharmacy reported by Ameri et al. in their study of barriers of implementing telepharmacy of 40 randomly selected pharmacists working in Iran.[11] The pharmacists were presented with 20 questions regarding challenges with telepharmacy implementation and they answered using a 5-point Likert-type scale. The main barriers identified were challenges in insurance/reimbursement (Mean: 4.17, SD: 0.81), lack of access to technology infrastructure (Mean: 4.15, SD: 0.94), and lack of coordination between different health sectors (Mean: 4.17, SD: 0.94). In addition, there was no statistically significant relationship between the participants' demographic characteristics (e.g. gender, geographical location of current practice, current practice setting) and the barriers to telepharmacy implementation. Finally, the study does not indicate whether the participants have prior experience with telepharmacy and so, we do not know if the barriers would have been different if they were users/non-users of telepharmacy. With limited evaluations of telepharmacy in the literature to date, it is important to consider experiences in other jurisdictions but also acknowledge that due to the differences healthcare systems, comparisons should be done with caution.

In our study, one of the important considerations for successful implementation of telepharmacy indicated by both users and non-users of telepharmacy included more exposure to telepharmacy during school/conferences/workplace. Providing sufficient training about telepharmacy to pharmacy students can help them prepare for their clinical practicums and later as a pharmacist. Park et al. (2020) conducted a mixed-method study to explore the current state of pharmacy students' self-rated digital health literacy in British Columbia.[12] Some students found it challenging to learn the technology tools at their practicum site due to their limited role as a pharmacy student and was stressful to learn on the spot. Students shared that they mainly learned the technologies during their practicum from the pharmacy

manager/staff members and one student consulted a manual. 40% (2/5) of the participants who took part in the interview mentioned that they would like to learn how to navigate various pharmacy management and EMR systems.

Limitations of this study include having a smaller sample compared to previous studies, which could be attributed to the short recruitment period (October to December 2020) and the busyness of pharmacists due to the start of the flu season overlapping with the COVID-19 pandemic. In addition, since we mainly utilized email and social media platforms to recruit participants, there could be participant bias of having more of tech-savvy pharmacists. Due to our recruitment methods, we were also unable to calculate the survey response rate. It is important to also acknowledge that our findings may be difficult to generalize to pharmacists globally due to the differences in scope of practice and access to technological tools.

CONCLUSION

Despite the growing recognition of telepharmacy, its implementation and utilization of telepharmacy by pharmacists is still quite low. Our study provides a current landscape of telepharmacy, which will aid the next steps of telepharmacy advancement and implementation for pharmacists, professional associations, and government officials. Future areas of research include cost evaluations of telepharmacy and comparing the effectiveness of different technology platforms used to deliver telepharmacy.

AUTHOR CONTRIBUTIONS

Jamie Y Park: Conceptualization, Methodology, Formal Analysis, Investigation, Writing- Original Draft, Writing- Review& Editing, Visualization; **Peter J Zed:** Conceptualization, Methodology, Writing- Review& Editing; **Mary A De Vera:** Conceptualization, Methodology, Formal Analysis, Investigation, Writing- Original Draft, Writing- Review& Editing, Visualization, Supervision

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Authors declare no conflicts of interest.

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