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Pharmacist and clinician attitudes toward use of a web-application to support co-management of post-exposure prophylaxis patients

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Abstract

Objectives—To qualitatively explore clinician and pharmacist attitudes toward use of a web-application virtual pharmacist-clinician partnership (VPCP) to assist with co-managed care of illicit drug-using patients prescribed post-exposure prophylaxis (PEP).

Design—Qualitative, descriptive, non-experimental study.

Setting—New York City (NYC) from February 2011 to March 2012.

Participants—4 pharmacists and 9 clinicians.

Main outcome measure—Prior to VPCP implementation in selected study pharmacies in NYC, we qualitatively explored: 1) the potential impact of the VPCP on pharmacist-clinician communication, and 2) potential barriers to use of the VPCP when co-managing PEP patients among pharmacists and clinicians.

Results—Pharmacists and clinicians were supportive of an interactive web-application that would expand the role of pharmacists to include assistance with PEP access and patient management. Participants noted that the VPCP would facilitate communication between pharmacists and clinicians and have potential to support adherence among patients. Pharmacists and clinicians were concerned about not having time to use the VPCP and security of patient information on the site. Pharmacist and clinician concerns informed final development of the VPCP including creation of a user-friendly interface, linkage to users' email accounts for timeline notification, and attention to security.

Conclusion—Use of web-based technology to support communication between pharmacists and clinicians was seen as being a potentially feasible method for improving patient care, particularly in the delivery of PEP to drug users and other high risk groups. These findings highlight the need

for further study of a technology-supported partnership, particularly for co-management of patients who face challenges with adherence.

INTRODUCTION

Pharmacists in community settings are beginning to emerge as a viable resource in the prevention and treatment of HIV in the US and abroad. Pharmacists provide HIV education and prevention services through risk reduction counseling and antiretroviral therapy drug monitoring and compliance counseling.^{1,2} Pharmacies are highly visible and easily accessible³, making pharmacies an ideal location to reach high-risk and underserved populations who are most in need of HIV prevention and treatment, such as illicit drug using populations. In the US, pharmacists have been on the frontline of HIV prevention efforts among illicit drug users, namely through participation in needle-exchange programs⁴ and non-prescription syringe sales through pharmacies.^{5,6} Nonprescription hypodermic needles are currently available for sale in many pharmacies in states across the U.S. with the goal of increasing access to sterile syringes to help curb the spread of HIV among injection drug users (IDUs). Pharmacists' roles have further expanded to provide HIV testing with the purpose of making HIV testing affordable and easily accessible in communities with high HIV prevalence.⁷

Post exposure prophylaxis (PEP) is an effective means of preventing HIV for needle-related or sexual exposures⁸⁻¹³ that has been available for over a decade, however a small percentage of those at highest risk HIV infection have knowledge of or access to PEP for non-occupational exposures.¹⁴ The treatment regimen consists of a combination of 3 antiretroviral HIV medications that are prescribed for daily use over the course of 28 days and must be initiated within 72 hours of exposure for best efficacy.¹⁵⁻¹⁷ This 28-day regimen of antiretroviral medication must not only be strictly adhered to, but also requires clinical follow-up over the course of the regimen. PEP efficacy trials have reported effectiveness in preventing HIV infection even in cases with less than 100% adherence.¹⁰⁻¹² Studies suggest that PEP is a cost effective HIV prevention method following sexual or drug use-related exposures^{18,19} and does not lead to increases in high risk behavior.^{12,20,21} Federal and state guidelines have been created by the CDC¹⁵ and state health departments²² recommending PEP use within 1-2 days (not to exceed 72 hours) of exposure from high risk sexual or injection behavior when the HIV status of the source person is HIV positive or unknown. In cities like New York City (NYC), San Francisco, Boston, and Atlanta, there have been several initiatives to educate risk groups about PEP availability (e.g. pep411.com) such as men who have sex with men (MSM) resulting in increased awareness of PEP.²³⁻²⁵ However, less effort has been directed to encourage PEP use and education among other high risk populations such as injection drug users (IDUs), who are at increased risk of HIV infection through both sexual and injection behaviors.^{26,27}

Pharmacists in community settings provide a unique opportunity to provide PEP education and increase PEP availability in underserved communities, especially among illicit drug using populations. Given challenges many marginalized populations face in accessing healthcare, we implemented a research study (iPEPcare) that would make PEP available directly from pharmacies as opposed to an initial clinic visit to obtain a prescription for PEP. To support this strategy, a pharmacist-clinician partnership would be fostered to enhance adherence and retention in care. Formal and informal pharmacist and clinician partnerships are a long standing hallmark of patient care in the US^{28,29} and have been shown to improve clinical outcomes among HIV patients.³⁰ However, pharmacist-clinician communication is often hampered by use of outdated and inefficient means of communication (i.e. telephone and fax). Although, electronic means of communication (e.g. via ePrescribing systems) are gaining popularity³¹, these electronic prescription systems are unidirectional and only allow

for communication from the clinician to the pharmacist and not vice versa. Such single channels of communication create limitations in how information is transmitted and create barriers to communication of important patient information between clinicians and pharmacists.

To increase efficiency and quality of communication and subsequently patient care in the management of PEP patients, we set forth to develop and pilot test a web-application that serves as a patient and clinical monitoring system which we refer to as the “virtual pharmacist-clinician partnership” (VPCP). This VPCP application was initially modeled after the iPLEDGE[®] interactive website.³² iPLEDGE[®] has been used by many clinicians and pharmacists when prescribing isotretinoin and per FDA reports, has been widely adopted and successful in creating a secure, efficient method of pharmacist-clinician communication and drug toxicity monitoring which can be translated for use with other medications requiring toxicity and/or adherence monitoring such as PEP.³³ This VPCP web-application, like iPLEDGE[®], requires that pharmacists access timely patient information such as whether to allow or discontinue PEP medication due to toxicity levels.

In this study, the VPCP was created to facilitate a secure, web-based application for a pharmacist-clinician team approach in managing PEP patients. A key highlight of the VPCP application is its focus on integrated, two-way communication. It also contains secure, web-based forms and an online dashboard where a participant’s clinician or pharmacist can track patient progress and update a patient’s status. Herein, prior to final VPCP implementation in selected community pharmacies in NYC, we qualitatively report on clinician and pharmacist attitudes on: 1) the potential impact of the VPCP on pharmacist-clinician communication, and 2) potential barriers to use of the VPCP when managing PEP patients.

METHODS

Study Overview

These data originate from the iPEPcare study, a study investigating the use of PEP among drug users and their peers, and the utility of a pharmacist-clinician partnership to help increase availability and access to PEP. The first phase of iPEPcare included a qualitative component to gather in-depth information to help refine the second phase of the study, a pilot intervention that made PEP available to IDUs and other high risk individuals in the target community through direct pharmacy access to a “PEP starter dose” prescribed by a clinician over the phone. One year prior to study start-up and during the first phase of the study, the design, structure and functionality of VPCP modeled from iPLEDGE[®] began with input from pharmacists, clinicians, researchers, health department officials, community-based organization members who serve the target community, and web application/software developers. In this paper, we report on the results of the in-depth interviews conducted among clinicians and pharmacists which assessed attitudes toward a hypothetical web-application to support a formal pharmacist-clinician partnership to co-manage PEP patients and the potential utility of the VPCP. Since the goal of the qualitative component was to inform refinement and finalization of the pilot intervention, the VPCP was not completed and available for viewing or testing during the interview.

Purpose and Description of VPCP

The purpose of the VPCP in the pilot intervention is twofold: 1) to monitor PEP toxicity in patients so that medication can be discontinued if need be, and 2) to have a system for pharmacists and clinicians to track PEP patients to increase retention in care, and support adherence. The VPCP is similar to the iPLEDGE[®] site in that it is password protected and encrypted. VPCP includes alerts about (1) patient eligibility to continue PEP or not, (2) need

to contact or visit the clinician, (3) clinic visit reminders, and (4) communication notes between pharmacists and clinicians. In brief, whenever a pharmacist's study patient who is on a PEP regimen comes in to the pharmacy (to fill a prescription or purchase other non-prescription products), the pharmacist is able to log in to the VPCP database and ascertain if they should discontinue their regimen (as per physician recommendations) and/or if they need to visit the study physician because of a missed appointment. The pharmacist can also use this opportunity to engage in adherence counseling and ask the patient if he/she has had any issues or side effects with the PEP regimen since their last clinical visit. The pharmacist can then relay this information to the study physician via the VPCP. Due to confidentiality requirements, pharmacists do not have access to specific lab results but specific actions to be taken can be securely relayed (e.g., discontinue PEP, need for clinic visit, etc). In terms of final VPCP design, it is important to note that while study funds partially supported the development of the VPCP, the application was developed on an open source CMS platform and will be made publicly available for research and practice upon request with minimal customization. Only modest fees would be required to provide technical support for initial set-up, training, and required maintenance. This represents a modest breakthrough from the private healthcare model where most applications used for pharmacist and clinician communication are built using proprietary applications, which can only be used for their initially intended purpose and limit the amount of security that can be built into the application. In the open source model, the VPCP security levels can be customized and adjusted in a shorter period of time and, as a whole the application is more easily adaptable to other pharmacy-clinician partnerships and patient care settings.

Recruitment

In-depth interviews were conducted with two types of key informants: 1) pharmacists, and 2) clinicians. Pharmacists were recruited from a list of pharmacists who had participated in our previous pharmacy-based intervention studies that have explored expanding pharmacy services to include public health practice in NYC.³⁴ Eligibility included participation in the New York State Expanded Syringe Access Program (ESAP) allowing pharmacy syringe sales without a prescription. Pharmacists were contacted by phone about participation in the study. Interested participants were scheduled an appointment to complete a 30-minute in-person in-depth interview at their pharmacy.

To be eligible for the study, clinicians either specialized in infectious disease/HIV and/or worked directly with patients from high risk populations that were MSM, Black or Latino, and/or illicit drug users. We also aimed to interview at least one clinician familiar with the development of PEP guidelines by the New York State Department of Health (NYS DOH) and the impact of these guidelines on PEP prescription by clinicians. Clinicians were recruited through referral by health professionals at the NYS DOH and AIDS service organizations (ASOs) in NYC. We asked our community network of HIV/AIDS administrators, clinicians, and health professionals in NYC via email, phone, and in-person meetings to identify clinicians from ASOs, large hospitals, and community clinics that met our eligibility criteria⁶. We also recruited clinicians through internet searches on the NYS DOH website and pep411.org (a website that lists clinic locations that offer PEP) to locate clinicians in NYC that worked in hospitals or community clinics that targeted HIV prevention services and PEP to IDUs or were involved in the creation of NYS DOH PEP guidelines. After a list of potential participants was obtained from these two methods (i.e. referral and online search), clinicians were informed about the study and asked to participate via phone and/or email. Clinicians who expressed interest in participating in the study were scheduled for an in-person 60-minute in-depth interview at their office for their convenience.

Data Collection

In-depth interviews were conducted with clinicians and pharmacists using semi-structured interview guides specifically tailored to the informant type and varied according to their knowledge and experience. The clinician and pharmacist topic guide covered attitudes toward use of VPCP to increase communication between clinicians and pharmacists for PEP patients enrolled in the iPEPcare study and any perceived challenges to using VPCP to manage these patients. Specific questions included: *(i)* how could VPCP be helpful in managing your PEP patients, *(ii)* how could VPCP be an improvement over your existing means of communication between pharmacists and clinicians, *(iii)* are there any challenges that would impede your ability to use VPCP effectively, and *(iv)* do you have any concerns with using the VPCP to co-manage PEP patients. All interviews were audio recorded. Pharmacists and clinicians were compensated \$40 for their time after completion of the interview. All interviews were conducted between February 2011 and March 2012. This study was approved by the Institutional Review Board at Columbia University Medical Center and funded by grant#R01DA030253-03 from the National Institute on Drug Abuse (NIDA).

Analysis

All pharmacist and clinician interviews were transcribed verbatim and uploaded into ATLAS.ti (v6.2.27). All pharmacist (n=4) and clinician (n=9) interviews were included in the analysis. Following a narrative approach, two members of the research team conducted within-case analysis involving coding each transcript for content and themes in order to identify emergent patterns within each interview. As the domains were defined a priori, coding began with the construction of a preliminary codebook and coding scheme. Transcripts were then coded with open codes to identify broad themes or patterns related to the domains. Following open coding and broad thematic analysis, transcripts were coded with axial codes, or more interpretive codes that were used in order to construct the participants' beliefs, perceptions, and experiences regarding use of VPCP to expand pharmacy services to increase PEP access. Next, we performed across-case analyses by informant type, where we identified patterns in informants' responses by searching for similarities between interview transcripts in search for meaningful patterns. Lastly, we selected interview excerpts that best illustrated these across-case domains by informant type. To ensure reliability of the analytic processes, we engaged in inter-rater reliability activities as we created and applied codes, re-examined full transcripts to ensure validity in the assigned codes according to the context of the interview, and maintained detailed notes about our analytic decision making through methodological memos. What follows is a description of results generated from this vigorous analytical approach beginning with a description of the sample.

RESULTS

Pharmacists

Sample Characteristics—Of the 4 pharmacists interviewed, 2 were men, 3 worked at independent pharmacies, and 1 worked at a chain community pharmacy. One pharmacist was African-American, 1 was White, 1 was Middle Eastern, and 1 was Asian. Three pharmacists worked at pharmacies in Brooklyn and 1 worked at a pharmacy in Harlem.

Attitudes toward VPCP—The pharmacists all agreed that PEP dispensation in a community-based pharmacy setting had positive implications for those at risk for HIV. In particular, pharmacists noted the benefits of their role compared to other health care providers in providing increased access for patient-clients. Pharmacists acknowledged the need to build capacity in order to accomplish these expanded roles and viewed more

effective communication strategies with clinicians as a means by which to achieve this objective.

Pharmacists in our study were receptive to a virtual interactive communication option such as the VPCP model to more effectively communicate with physicians. Each pharmacist reported currently using an electronic system for prescriptions. However, they consistently described the nature of communication with clinicians as being one-sided whereby the doctor prescribed electronically, but all follow-up communication was limited to phone conversations.

“Currently the doctor can electronically send us prescriptions, but for us to send it back we have to call. No other method.”

– male pharmacist #3

Pharmacists consistently reported that they did not have a means to contact doctors electronically. Instead, pharmacists regularly communicated with doctors via phone and fax despite willingness to communicate electronically to save time.

“I think it's critical because we spend a lot of time in phone tag and I'm a very big email type of person. So, I think that system is very good for facilitating communication.”

– male pharmacist #1

The improvement that VPCP would provide over the current communication method was elaborated on by male pharmacist #1:

“It will be helpful because if I have problems, he[the clinician] can contact me and I can contact him, like about the dosages, the patient—make sure the patient is compliant and if you have problems with the drugs and the side effects, so it's a very good idea.”

– male pharmacist #1

The pharmacists noted that electronic communication with clinicians would save time, be more efficient, convenient and ensure compliance among patients. Male pharmacist #2 commented on the value of communicating using a more time efficient method.

“[This] can save time also because sometime you wait on hold with the phone longer. I think it would be easy 'cuz it's less time 'since we're doing it through the Internet. And I'll be able to keep the records and everything safe, confidential.”

– male pharmacist #2

Pharmacists also recognized how improved communication through VPCP could improve patient care and patient compliance.

“I think if there's a way that a program could be integrated where we could track compliance. Where we could say technically, today this patient is due for—say for argument sake, we're gonna dispense for seven days or for fourteen days. If that program could be streamlined so that a pharmacy could kind of print up or just put up on the screen, these are the patients that are due theoretically for today. This could predicate, that by the end of that business day, we don't hear anything from that patient, then we can notify via that system that you indicate and saying hey, patient X...hasn't shown up... Somebody needs to do some outreach, contact them with their numbers, or go out there, if necessary. I think that's something that would be a very robust system because that's the most critical thing...”

– male pharmacist #2

In spite of agreement by all pharmacists that VPCP would improve communication with physicians, pharmacists expressed concerns about VPCP with respect to security, confidentiality, and time.

“It must be secure, right? Confidential. This is the main thing.

– female pharmacist #2

“If the patient comes in a busy hour or something. That's it. That's the only challenge.

– male pharmacist #3

As far as logistics in accommodating this technology-supported model, the pharmacists all reported having reliable high speed internet already in place and currently in use for the electronic prescription process. However, they also raised concerns regarding the need for computer upgrades, technical assistance, and further training in order to effectively navigate a new online system.

Clinicians

Sample Characteristics—Of the 9 clinicians interviewed, 8 were medical doctors and 1 was a nurse practitioner. All clinicians regularly saw patients and worked out of a clinic or private medical office and one clinician also worked for the health department. Six were men and 3 were women and 3 were Black, and 6 were White. Only 1 clinician in our sample was referred by our community partners. The remaining 8 clinicians were identified through our online search.

Attitudes toward VPCP—All clinicians were in support of using pharmacies to increase PEP access to high-risk populations and of an increased pharmacist role in the management of PEP patients. All clinicians felt the VPCP would be useful in improving patient care and communication between pharmacists and clinicians for PEP patients. VPCP was seen as being a more efficient means of communicating with pharmacists than the telephone, which was reported as a commonly used method of contact. VPCP was noted to possibly facilitate increased patient follow-up and medication adherence.

“I would think it could help knowing that if the patient is adhering to the program or not, and either the clinician or the pharmacist could then call that patient and find out where that patient is or if the patient is no longer interested”

– male physician #6

“Because we have got to, in the 21st century, figure out how to make information flow much more easily, and so I think web-based communication is probably the fastest way in today's world.”

– female physician#2

In spite of the potential usefulness of VPCP noted by many clinicians, several clinicians anticipated challenges to their ability to effectively use VPCP, most notably having the time to log-in to check the system. Clinicians were also concerned about the possible legal ramifications to them and adverse health or social impact to the patient if there is an emergency situation that is noted in VPCP that is not urgently checked by the physician or if the site is not secure.

“...some certain weeks are chaotic, like this week. A lot of the log in has been basically done at home, not at work, because there just isn't time... in an emergency I'd be concerned because I'm not—I don't have the capacity to go on my phone and go online and click on things.”

– male physician #5

However, several clinicians suggested having VPCP linked to their email account such that whenever an update is made in the system they receive an email alert advising them to check VPCP.

“We have that, like in our system of tasking, if we don't complete a task within a set amount of time like we get a reminder or the person who sent the task sends you an email. So you probably would need something built in, because people get busy...”

Additionally, clinicians felt that there was a need to have a third party monitor VPCP functioning and oversee pharmacist and clinician use of the system. This monitor could also ensure a timely response by clinicians or pharmacists to more urgent patient care issues.

“Either an assigned provider or an assigned staff member, nurse—you'd have to have committed—whose job it would be to oversee it I think”

– female physician #2

DISCUSSION

These qualitative reports not only provide evidence of support for a web-application to enhance pharmacist-clinician communication, but also support co-management of patient care among those most marginalized and high risk for HIV. Clinicians expressed positive views toward use of VPCP to expand the pharmacists' role in HIV prevention and felt that pharmacists had adequate training, experience, and skill, particularly as it relates to monitoring medications with high potential for toxicity and side effects.

All pharmacists believed the VPCP would streamline pharmacist-clinician communication and be more efficient than the current commonly used means of communication with clinicians. Use of a two-way, interactive web application that considers clinician time and effort was strongly supported by all pharmacists. Both pharmacists and clinicians believed that use of an interactive web application to allow communication between them would enhance patient compliance and adherence in a hypothetical scenario where PEP is delivered to patients by parsing out the 28-day regimen of antiretroviral medication in a “starter” dose. In such a scenario, PEP is given to the patient directly by the pharmacist after a physician calls in the “starter” dose and after completing a clinic visit, the patient would be given the remainder of the dose if clinical and toxicology results are amenable to continued use. As a result, the VPCP addressed critical concerns in providing PEP to drug users who face challenges accessing care and being adherent to prescribed medications.

The VPCP is at the end-stage of development and currently being pilot tested in the field with a small group of pharmacists and clinicians. The study results helped inform our pilot intervention study protocols and procedures related to pharmacist and clinician use of the VPCP to manage PEP patients enrolled in the iPEPcare study. For example, based on our findings, the VPCP was adjusted to allow for easy and quick log-on to the application, a clean and uncluttered application interface, confidentiality of patient information, and exclusion of laboratory data. The web-application will be tablet ready and user-friendly with the most commonly used fields prominently located on webpage, easy drop-down boxes for quick data entry, and shortcuts available for easy access of patient information. In terms of timely notification of patient needs, alerts have been linked to pharmacist and clinician email addresses notifying them to log-on to the VPCP to obtain newly added information, for example, when a new participant has been added or to check a prescription regimen for a patient who has started PEP.

In terms of logistics, our data suggest that high speed connections are available to support increased use of technology in pharmacy practice, and some training would be required. However, the need for training did not impact level of support. An important issue raised among clinicians was the importance of security of the web application, namely for legal reasons, and time to login to check patient information on a regular basis. Interestingly, as the issues were identified, study participants “problem solved” and actually identified potential solutions. For example, having a third party to oversee the web applications such as a nurse, having email alerts when patient information is entered, and ability to access the web application from home or elsewhere outside the clinical setting were provided as possible solutions.

In response to the need for enhanced security of the VPCP, the web application is only accessible through a secure domain using the secure https protocol. In addition, rather than using a third-party hosting service, a hospital and/or university’s network was used thereby maintaining access to internal expertise on similar projects that require secure connections, responsive applications and systems, and knowledge of how to handle data collected and stored on patient databases. A major limitation to use of the system noted by pharmacists and clinicians was time and this will be evaluated in the pilot phase of the study which will be completed August 2015.

Limitations

There are a few limitations of this study that warrant mention. First, the pharmacists in our study were accustomed to research and potentially more public health minded. As a result, our study did not include those who had never considered expanded public health services in practice. While a potential drawback, this population was advantageous in that they were equipped to identify potential challenges of using the VPCP to manage participants in the iPEPcare study. Second, we have no prior knowledge of such a web-application being used within corporate chain community pharmacies. Participating pharmacies are independent pharmacies where approval for study participation was only needed from the supervising pharmacist and/or store owner. However, we believe these data and forthcoming pilot data results will provide evidence for the feasibility of VPCP use in both independent and chain pharmacies for a range of diseases (if pilot results are positive), especially given that many pharmacy chains have expanded pharmacy services to include clinical services such as vaccinations, blood pressure screenings, and a on-site clinician. Thus, the climate for an expanded role of pharmacists that not only includes a pharmacist-clinician partnership to manage patient care, but also the support of technology to enhance this partnership, is likely optimal at this time. However, more research is needed to get more detailed information on translating the VPCP into practice in large chain community pharmacies. Finally, while the VPCP will be made publicly available at the completion of the study, there will be a cost to get the application securely hosted on the web, to train pharmacy personnel, and to provide ongoing site maintenance. However, these costs are modest, training will likely be brief (to be determined from pilot results), and maintenance begins at a cost as low as \$50 per month which may be all that is required pending results of the pilot (i.e., no need for more expensive maintenance fees). These fees are likely to be more cost effective compared with healthcare costs amassed when patients are not properly managed and medication adherence is low. VPCP can be used for the co-management of HIV and other diseases which could benefit from more practical screening services and treatment management, especially within more readily available and accessible venues like pharmacies.

CONCLUSION

In summary, these data provide positive evidence of provider interest in technology-supported patient co-management, and for further quantitative study on the use of

technology to support a pharmacist-clinician partnership. New CDC-recommended biologic approaches to HIV prevention are underway for some high risk groups, namely prophylactic use of antiretroviral medication in the event of potential exposure to HIV. However, using pharmacies to increase rapid access to prophylaxis is a creative and innovative strategy to make these medications available to those typically disconnected to regular medical care. These data highlight the potential of a specially tailored web-application to enhance communication between pharmacists and clinicians, and as result, patient care management and patient medication compliance. These data also support use of electronic record and information sharing technology for pharmacists and clinicians to support co-management of other diseases that require regular patient care and management, particularly diseases where health disparities exist in access to quality health care, including diabetes, heart disease, and hypertension.

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