

Improving Adherence to Cervical Cancer Screening Guidelines in Women Living with HIV:

A Quality Improvement Initiative

By

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Abstract

Background: Women Living with HIV (WLHIV) are at increased risk for cervical cancer and acquisition of this disease is an Acquired Immunodeficiency Syndrome (AIDS)-defining malignancy; however, screening rates for this vulnerable population remain low.

Purpose: This project aimed to identify factors associated with inadequate screening in WLHIV and implement a pilot intervention tailored to address these issues in an urban, academic, HIV-clinic.

Method: A two-phase, multicomponent quality improvement study was conducted. The first phase identified factors associated with inadequate screening through a cross-sectional survey. In phase two of the study, a quasi-experimental, one-group pre/posttest design pilot intervention was implemented. The number of Pap tests completed pre- and post- implementation were analyzed to examine the clinical impact of the intervention.

Results: In the pre-implementation period, three women (1.7%) underwent cervical cancer screening in the form of Papanicolaou (Pap) testing. In the post implementation period, six women (3.4%) underwent screening. WLHIV eligible for screening most commonly reported forgetting to schedule an appointment (33%) as a barrier to screening.

Significance: A multicomponent quality improvement intervention was successful in overcoming barriers and increasing cervical cancer screening rates in an urban, academic HIV-clinic and may offer a low-cost intervention to improve health of WLHIV.

Keywords: *cervical cancer, screening, health promotion intervention, health maintenance, HIV/AIDS*

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Improving Adherence to Cervical Cancer Screening Guidelines in Women Living with HIV: A Quality Improvement Initiative

Human Papillomavirus (HPV) is the most common sexually transmitted infection in the United States and the cause of nearly all cases of cervical cancer (Chapman & Harris, 2016). Persons with human immunodeficiency virus (HIV) are even more susceptible to HPV infection due to their immunocompromised state. The incidence of cervical cancer in women living with HIV (WLHIV) is higher than the general population of women; however, it is comparable for those who follow routine cervical cancer screening (Du, 2019). WLHIV are five times as likely to develop cervical cancer compared to uninfected women (U.S. Department of Health and Human Services [DHHS], 2013). Women who are more informed about cervical cancer screening are more likely to adhere to the recommended guidelines and follow up (Reid et al., 2017). Thus, it is necessary to increase awareness around cervical cancer screening in WLHIV to improve adherence to guidelines and prevent cervical cancer (Du, 2019).

Background

HPV and Cervical Cancer

HPV infection occurs primarily through sexual transmission via skin to skin contact (National Institute of Health [NIH], 2019). Sexually transmitted HPV infections fall into two groups, low-risk or high-risk. Low-risk HPV infections can cause warts on or around the genitals, anus, mouth, or throat (National Cancer Institute [NCI], 2020). High-risk types HPV-16 and HPV-18 are responsible for most HPV-related cancers, including cervical cancer (National Cancer Institute, 2020). Tobacco use, being immunocompromised, multiparity, chronic inflammation caused by infection with chlamydia, and long-term oral contraceptive use increase the risk of developing cervical cancer (National Cancer Institute, 2020). After HPV infection,

cells gradually develop into precancerous cells and, when left untreated, the cells have the potential to develop into cancer (American Cancer Society [ACS], 2014; NCI, 2020). Not all women infected with HPV develop cervical cancer; for many women, the precancerous cells are self-limiting and will resolve without treatment (American Cancer Society, 2014; National Cancer Institute, 2020).

Cervical cancer is usually asymptomatic in the early stages but can be easily detected with screening in the pre-malignant phase (Wright Jr et al., 2002). Two screening tests are utilized, the Papanicolaou (Pap) test and HPV test. The Pap test is used to assess for cervical dysplasia that might become cervical cancer if not treated appropriately, and the high-risk HPV (hrHPV) test screens for hrHPV that can cause dysplastic changes (Centers for Disease Control and Prevention [CDC], 2019b). When both tests are completed simultaneously this is called co-testing (CDC, 2019b). These tests are collected during a pelvic exam and are the most effective method for early detection of cervical cancer (Ashtarian et al., 2017).

HIV and Cancer Risk

HIV is a virus transmitted through certain body fluids and attacks the body's immune system by destroying cluster of differentiation 4 (CD4) T lymphocyte (CD4) cells (Centers for Disease Control and Prevention [CDC], 2019a). Over time, HIV prevents the body from fighting off infections and can lead to acquired immunodeficiency syndrome (AIDS) (CDC, 2019a). To combat this, persons with HIV must take lifelong antiretroviral therapy (ART). Over the past three decades, advances in ART regimens have dramatically decreased morbidity and mortality from HIV/AIDS (Chapman & Harris, 2016). The life expectancy of those with HIV now approaches that of the general population (Van Sighem et al., 2010). Despite the improvement in life expectancy, the incidence of cervical cancer in this vulnerable population has not decreased

(Chapman & Harris, 2016; Department of Health and Human Services, 2020). Furthermore, studies have found an increased incidence of invasive cervical cancer rates among women with lower CD4 cell counts (Abraham et al., 2013; Chapman & Harris, 2016). WLHIV, in particular, have a significantly elevated incidence of cervical cancer relative to the general population of women at risk for cervical cancer (National Institute of Health, 2019).

Cervical Cancer Screening Guidelines

Effective screening with Pap tests and managing precancerous lesions are significant in preventing cervical cancer (Thomas & Holland, 2018). Since the introduction of widespread cervical screening, the incidence of cervical cancer has dropped significantly (Curry et al., 2018). For the general population, the 2012 U.S. Preventive Services Task Force (USPSTF) recommends screening women aged 21-29 years every three years with Pap testing. In women aged 30-65 years, the USPSTF recommends screening every three years with Pap alone, every five years with hrHPV testing alone, or every five years with co-testing of Pap and hrHPV. Screening women older than 65 years who have had adequate prior screening and women younger than 21 years does not provide significant benefit (Curry et al., 2018).

For WLHIV, the diagnosis of cervical cancer has a significant impact on morbidity and mortality and is recognized by the National Center for Infectious Diseases as an AIDS-defining malignancy (Levine, 1993). Due to the aggressive nature of the cervical neoplastic process in WLHIV, the initial screening interval is more frequent than the triennial screening recommended for the general population (Basu et al., 2018). The Panel on Opportunistic Infections in HIV recommends screening for WLHIV occurs immediately after HIV diagnosis and then again at 6 and 12 months (National Institute of Health, 2019). After three consecutive normal Pap test results, further diagnostic testing and screening for WLHIV can extend out to three-year intervals

and should continue throughout a women's lifetime (National Institute of Health, 2019). Pap testing is preferred for women less than 30 years because this population has a relatively high prevalence of HPV (National Institute of Health, 2019). For women 30 years and older, Pap testing or co-testing is acceptable for screening (National Institute of Health, 2019)

Significance

The 2012 USPSTF report to congress identified insufficient screening for cervical cancer as a barrier to effective prevention and control (Moyer et al., 2011). Among women diagnosed with cervical cancer in the United States, women who were enrolled and regularly accessing healthcare services, 50% were never screened and 10% were under-screened prior to diagnosis (Spence et al., 2007). Despite the recommendation for frequent Pap testing for WLHIV, 25%-55% of WLHIV had not received an annual Pap test during the previous year (Baranoski et al., 2011; Oster et al., 2009; Simonsen et al., 2014; Tello et al., 2010) and approximately 75% had not received the second recommended Pap test during their first year in care (Logan et al., 2010).

There are currently over 1.2 million people living with HIV or AIDS and more than 48,000 new diagnoses of HIV in the United States each year (CDC, 2011). Women are one of the fastest-growing populations with HIV (Lambert et al., 2015). Between 1980 and 2007, the incidence of cervical cancer among HIV-positive increased approximately 60% (Shiels et al., 2011) and was specifically greater among severely immunosuppressed WLHIV (Abraham et al., 2013). Additionally, in developed countries, approximately 4,000 women die annually as a result of cervical cancer (Lambert et al., 2015). Cervical cancer screening rates among WLHIV are suboptimal, and the reasons for suboptimal screening are complex and multilayered. To combat these disparities, healthcare leaders must focus on effective ways to increase cervical cancer screening rates among vulnerable populations, such as WLHIV.

Purpose & Aims

The purpose of this project was to identify barriers to adherence of cervical cancer screening recommendations in WLHIV in an urban, academic HIV-clinic and implement a pilot intervention tailored to address modifiable issues. Donabedian Model of Care and the Health Belief Model (HBM) were used as the theoretical framework for this project to better understand the barriers to cervical cancer screening and guide intervention implementation (Donabedian, 2005; Hochbaum et al., 1952). The goal of this project was to answer the following question: Can identification of barriers to cervical cancer screening guide intervention implementation to increase adherence with cervical cancer screening guidelines? The project began with a review of the current literature, followed by development of a pilot intervention based on survey results. Finally, after analysis of this intervention was completed, modification and recommendations for future use of this pilot study are discussed.

Literature Review

A review of the literature was conducted to gain a better understanding of the reason WLHIV are not being screened for cervical cancer. The online databases CINAHL Complete and PubMed were searched using the terms: “HIV”, “human immunodeficiency virus”, “HIV positive”, “HIV infected”, “AIDS”, “acquired immunodeficiency virus”, “women”, “intervention”, “Pap test”, “Pap smear”, “Papanicolaou”, “cervical cancer screening”, “cervical smears”, “uterine cervical neoplasm prevention and control”, “health promotion”, “health disparities”, “health belief model”, “barriers”, “motivators”, “knowledge”, and “perception”. Inclusion criteria for this literature review consisted of English-language articles available in full-text, from peer-reviewed journals, published within the last five years. Results were screened by title. Abstracts were reviewed and those that were deemed relevant to the desired topic were

included. The reference lists from each of the selected articles were evaluated and included as needed.

Two major themes were present in the literature regarding the reason WLHIV are not being screened for cervical cancer: barriers to cervical cancer screening and interventions aimed to increase the uptake of screening. Two studies were cited frequently and served as landmark studies for the purposes of this paper (Agide et al., 2018; Devarapalli et al., 2018). In a systematic review, Devarapalli et al. (2018) identified barriers to cervical cancer screening that were cited across the literature at large. Secondly, Agide et al. (2018) conducted a systematic review of the effectiveness of interventions to increase cervical cancer screening uptake. Both of these studies provide a good foundation for this topic and will be discussed in more detail below.

Reasons for Poor Cervical Cancer Screening

There are several overarching themes in the literature as barriers to cervical cancer screening: lack of knowledge and education (Agide et al., 2018; Akinlotan et al., 2017; Ashtarian et al., 2017; Assefa, Astawesegn, & Eshetu, 2019; Baranoski et al., 2011; Bukirwa et al., 2015; Bynum et al., 2016; Chapman & Harris, 2016; Cross et al., 2014; Devarapalli et al., 2018; Lambert et al., 2015; Stuart et al., 2019; Tello et al., 2010), psychological factors (Baranoski et al., 2011; Devarapalli et al., 2018; Fletcher et al., 2014; Stuart et al., 2019; Tello et al., 2010), systematic factors (Agide et al., 2018; Akinlotan et al., 2017; Ashtarian et al., 2017; Assefa et al., 2019; Baranoski et al., 2011; Cross et al., 2014; Chapman & Harris, 2016; Devarapalli et al., 2018; Fletcher et al., 2014), personal factors (Agide et al., 2018; Baranoski et al., 2011; Chapman & Harris, 2016; Devarapalli et al., 2018; Fletcher et al., 2014; Musa et al., 2017), socio-cultural and religious beliefs (Agide et al., 2018; Akinlotan et al., 2017; Ashtarian et al., 2017; Assefa et al., 2019; Baranoski et al., 2011; Chapman & Harris, 2016; Devarapalli et al.,

2018; Fletcher et al., 2014; Foley et al., 2015; Musselwhite et al., 2016), and complex care plans (Audet, McGowan, Wallston, & Kipp, 2013; Chapman & Harris, 2016). In general, a patient's lack of knowledge and understanding of cervical cancer screening is the most common barrier cited in the literature (Devarapalli et al., 2018). This idea is discussed in several ways: misunderstanding of Pap guidelines, a lack of awareness for preventive health, risk factors and risk perception, absence of symptoms, low education levels and lastly, low health literacy levels (Agide et al., 2018; Akinlotan et al., 2017; Ashtarian et al., 2017; Assefa et al., 2019; Baranoski et al., 2011; Bukirwa et al., 2015; Bynum et al., 2016; Chapman & Harris, 2016; Cross et al., 2014; Devarapalli et al., 2018; Lambert et al., 2015; Stuart et al., 2019; Tello et al., 2010).

Lack of Knowledge

Across the literature, a lack of knowledge influenced participation in screening. A patient's understanding of screening is evaluated in numerous ways across the literature. Devarapalli et al. (2018) reviewed 31 studies and in 27 reported a relationship between a lack of knowledge and awareness and reduced participation in screening (87.09%). Assefa et al. (2019) conducted an institution-based cross-sectional study to assess the level and factors affecting utilization of cervical cancer screening among WLHIV. The authors found that women with a post-primary education were five times more likely to receive screening (Assefa et al., 2019). Better-educated women had higher levels of comprehension as well as higher levels of self-efficacy, confidence and motivation when in search of health interventions.

Additionally, those with good knowledge about risk factors of cervical cancer were more than three times likely to be screened than those with poor knowledge about risk factors of cervical cancer (Assefa et al., 2019). Educating women on the cervical cancer screening has shown to have meaningful results. In a cross-sectional study in women with unknown HIV

status, educating women on cervical cancer screening had the highest predictive power for screening uptake, further demonstrating that a women's knowledge and perception of the risk of cervical cancer is vital to screening adherence (Ashtarian et al., 2017). Each of these studies signifies the vast lack of knowledge surrounding cervical cancer screening and the impact that education has on perceived risk and uptake of screening. A women's knowledge and perception of risk is vital to cervical cancer screening compliance.

Psychological Barriers

Fear of pain and embarrassment, as well as depression, have been cited as major barriers to screening (Baranoski et al., 2011; Devarapalli et al., 2018; Fletcher et al., 2014; Stuart et al., 2019; Tello et al., 2010). Devarapalli et al. (2018) found that most studies reported embarrassment or shyness (45.16%) as a barrier to screening, along with painful procedures (41.93%), fear of getting diagnosed with cervical cancer (35.48%), and anxiety or fear (38.7%) in cervical cancer screening procedure. Researchers at the Johns Hopkins HIV clinic examined barriers to adherence to gynecologic care among 200 WLHIV. In this study, moderate and severe depression was associated with missing gynecology appointments and a lack of a documented Pap test (Tello et al., 2010). Likewise, in Boston, Baranoski et al. (2011) assessed risk factors for inadequate Pap testing. These results showed that depression was associated with poor Pap test adherence in a diverse sample of WLHIV. Mental wellbeing is superlative to one's overall health and reflects on self-care behaviors.

Complex Care Plans

Patients with complex care plans, as in WLHIV, have additional barriers to cervical cancer screening (Audet, McGowan, Wallston, & Kipp, 2013; Chapman & Harris, 2016). This population requires complex management with multiple clinicians including infectious disease,

primary care practitioners and women's health practitioners (Chapman & Harris, 2016). It is easy to lose sight of routine and preventative care needs when the focus is on more urgent healthcare needs (Chapman & Harris, 2016). Likewise, WLHIV fear disclosing their status to additional healthcare practitioners (Audet et al., 2013). HIV care can be complex and burdensome. Interventions aimed at improving health awareness and the significance of screening are lacking (Chapman & Harris, 2016).

Social Factors

There is an inextricable link between health and social fabric of life. Systematic factors, such as health care access issues, lack of health care or insurance, and transportation are cited in multiple studies as barriers to cervical cancer screening (Agide et al., 2018; Akinlotan et al., 2017; Ashtarian et al., 2017; Assefa et al., 2019; Baranoski et al., 2011; Cross et al., 2014; Chapman & Harris, 2016; Devarapalli et al., 2018; Fletcher et al., 2014). Additionally, personal factors, such as childcare issues, immigration status, lack of physician recommendation and fatalistic attitudes have also been identified as barriers to cervical cancer screening (Agide et al., 2018; Baranoski et al., 2011; Chapman & Harris, 2016; Devarapalli et al., 2018; Fletcher et al., 2014; Musa et al., 2017). Lastly, the socio-cultural, ethnic and religious beliefs have been shown mixed influence on cervical screening adherence (Agide et al., 2018; Chapman & Harris, 2016; Devarapalli et al., 2018; Musselwhite et al., 2016). These constructs often leave patients no choice when it comes receiving preventative healthcare and continue to stand as a major barrier to care.

Cervical Cancer Interventions

There are a vast range of interventions cited in the literature that have been shown to encourage screening uptake (Agide et al., 2018; Chigbu et al., 2017; Documet et al., 2015; Erwin

et al., 2007; Hawkins et al., 2013; Howard et al., 2015; Interis et al., 2015; Katz et al., 2007; Ledo et al., 2014; Love et al., 2009; Nega et al., 2018; Ogunwale et al., 2016; Roland et al., 2016; Thompson et al., 2017; Valdez et al., 2018; Wang et al., 2010). Various methods have been shown to be effective at the individual, community and institutional levels as well as in the healthcare setting and within public schools (Agide et al., 2018).

Interventions at the individual level have demonstrated varying results. Chigbu et al. (2017) used community health volunteers for house-to-house cancer prevention education in four randomly selected rural communities in southeast Nigeria. The study found a significant increase in the uptake of cervical cancer screening. Before the intervention 3.2% of women had undergone cervical cancer screening; afterward, 67.6% of women had received screening. Conversely, Katz et al. (2007) used three lay health advisors for one-on-one interactive programs. Their results showed no significant increase in cervical cancer screening in women at low risk for cervical cancer; although, there was a significant increase among women at high risk for cervical cancer in the follow-up survey. Women categorized as high risk for cervical cancer were less likely to be screened within risk-appropriate guidelines at the baseline survey (48.7%) compared with women at low risk for cervical cancer (73.0%). These results signify that high-risk women may not be aware of the need to be screened annually, were less adherent to healthy behaviors, did not have the time, or might not have been able to complete the annual tests due to financial constraints (Katz et al., 2007). Lastly, content posted over a cloud-based messaging app over the course of a month was shown to positively affect a women's belief and behavior regarding Pap tests compared to a control group (Khademolhosseini et al., 2017).

Community health education has also shown to be effective in increasing screening. In a study among Chinese American women residing in New York City, health education was given

to 15 participants per session, educating over 130 women in total (Wang et al., 2010). The educational sessions covered topics on general health, cancer education, and cancer screening. Additionally, participants had access to a Chinese physician and navigation assistance, including help in identifying and access free or low-cost screening services. In the 12-month interval following the program, screening rates were significantly higher in the intervention group (70%) compared to the control group (11.1%). Another example of a study that successfully implemented education at the community level was conducted by Ledo et al. (2014). Lay health advisors educated Ohio Appalachian women in need of screening. Their interventions showed some improvement in Pap tests. These studies are consistent with many other studies conducted at the community level (Abiodun et al., 2014; Agide et al., 2018; Foley et al., 2015; Interis et al., 2015; Lambert et al., 2015; Shakya et al., 2016; Shojaeizadeh et al., 2011).

Noar et al. (2007) found that culturally tailored interventions compared to nontailored showed greater effects on health behaviors. Conversely, a study conducted by Valdez et al. (2018) using an interactive bilingual multimedia kiosk targeted at Latina women increased knowledge, attitude and self-efficacy but did not show a statistically significant increase on the portion who had obtained or made an appointment for a Pap test at follow up. These results were measured through a structured, language concordant, telephone interview conducted by bilingual-bicultural, female interviewer. This study seems to demonstrate that greater knowledge and self-efficacy does not always translate into greater preventative measures. As previously discussed, Wang et al. (2010) demonstrated significant success in implementing an culturally tailored educational program to Chinese American women in New York City.

Lastly, interventions targeted at the healthcare staff have shown promising results in the general population. Computerized reminders to providers resulted in a 3% increase in screening

among women overdue for cervical cancer screening (McDowell et al., 1989). Additionally, regular feedback to providers has resulted in increased screening rates in studies among HIV-negative women (McDowell et al., 1989; McPhee et al., 1989). Fleming and Lawrence (1983) conducted an audit as part of continuing medical education and found the need for improvement in areas such as cervical cancer screening and tobacco use education. The results were then presented to physicians resulting in a significant increase in cervical cancer screening (Fleming & Lawrence, 1983).

Summary

Overall, the primary goal of these interventions was to increase the uptake of screening through a variety of health promotion techniques. Many interventions demonstrated success. Reasons for poor screening adherence are multifactorial and often highly variable based on resource availability. To better understanding the existing situation and dynamic nature of WLHIV, further studies need to identify barriers that can help boost adherence to screening guidelines in this vulnerable population.

Framework

Two frameworks were utilized for the purposes of this project. Donabedian's Model of Care was the conceptual framework used to connect the various project components and define concepts related to structure, process and outcome. Next, the Health Belief Model (HBM) was used as the theoretical framework to better understand WLHIV's perceptions and actions.

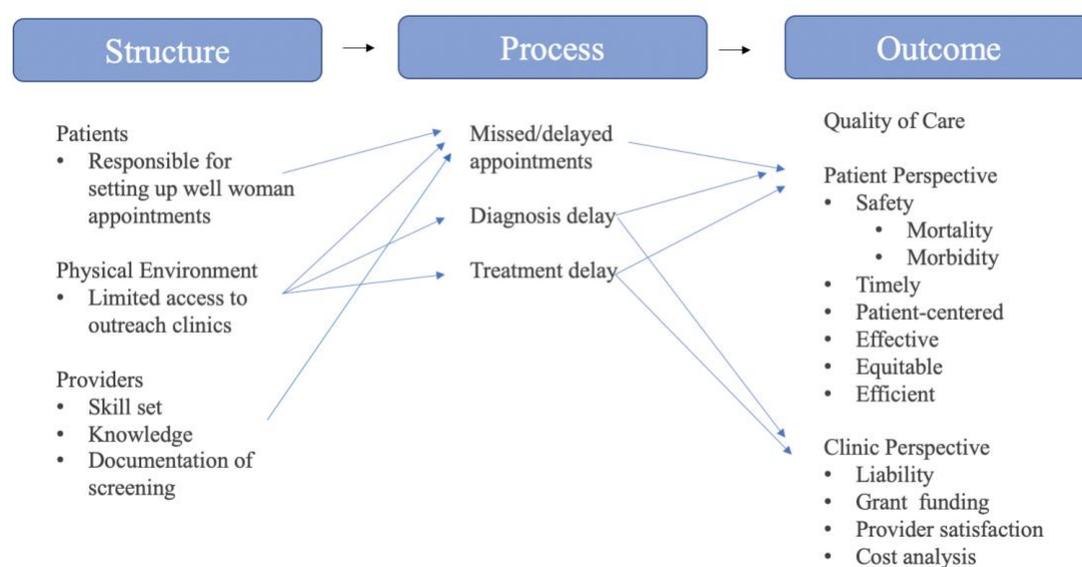
Donabedian's Model of Care

Donabedian's Model of Care (1998) provides a conceptual framework for examining health care services and evaluating quality of health care (see Figure 1). According to this model, information about quality of care can be divided into three categories: structure, process and

outcomes. Structural metrics include the setting in which the project will be implemented and denotes who will be involved (Donabedian, 1988). Process refers to what will be done and how it will be delivered (Donabedian, 1988). Outcomes measure the effects of healthcare on the health status of patients and populations (Donabedian, 1988). For the purposes of this paper, outcomes were defined by the Institute of Medicine's (IOMs) six components of quality care.

Figure 1

Donabedian's Model of Care – Structure, Process, Outcome



Structure

According to Donabedian (1988), structure can be thought of as the physical setting in which the care takes place, and also the organization of care and the qualifications of the care practitioners. The clinic where the project was implemented is a 501(c) 3, not-for-profit organization established to provide medical education, research, and medical care through its faculty. The clinic provides care and early intervention services to all HIV-positive individuals in the state, regardless of ability to pay. The HIV program seeks to provide quality community-

based medical care, education, and research throughout city, as well as the rest of the state. Outreach clinics are held at three locations around the state every 6-8 weeks. The HIV program is federally funded by Ryan White Parts B, C, and D.

Ryan White Part D Program Coordinator, along with Quality Coordinator, and Ryan White Part D Case Manager for Women, Infants, Children and Youth, all play an integral role in coordinating care for WLHIV.

Process

Donabedian (1988) defined process as what is done in the giving and receiving of care. At the clinic, WLHIV are responsible for scheduling their annual well women exams. Entry of Pap testing completed at outside facilities are scanned into the system and can be manually entered to the Clinical Decision Support System (CDSS) by practitioners when test results are reviewed. Cervical cancer screening documentation adherence is periodically pulled by the quality coordinator to measure compliance to recommended guidelines. Women who need screening are then followed up with by case managers and patient's practitioners are notified. To meet regulations with the Ryan White Grant Funding, these rates must be reported annually.

Outcomes

Donabedian's Model of Care (1988) suggests that quality can be measured both at the patient and system level. Quality outcomes are defined at the patient level according to the IOMs six components of quality care including safety, timeliness, patient-centeredness, effectiveness, equitability, and efficiency (Corrigan, 2005). Errors or delays in diagnosis and treatment compromise all six components of quality care. The effects of poor screening and delays in routine healthcare compromise patient safety. Delays in diagnosis and therapy reflect a lack of patient-centeredness. Quality outcomes related to inequity are rooted in data confirms that

patients who are HIV-negative have better cervical cancer screening adherence rates than those who are HIV-positive (Du, 2019). Lastly, well women appointments that are missed or canceled compromise efficiency.

There are several quality outcomes that were assessed at the system level. Minimizing errors and delays in diagnosis and therapy, aside from improving quality of care, minimize liability for the clinic and staff. Additionally, decrease staff satisfaction, burnout and attrition can occur when practitioners are working with limited skill sets or a lack of resources. Lastly, poor screening rates jeopardize Ryan White Group D Grant funding.

Health Belief Model

The HBM has been historically used to explain preventative health behaviors such as the actions taken to prevent, screen for, and control illness (Lambert et al., 2015). This theoretical framework examines the patient motivation for adopting health-related behaviors and assesses the uptake of health-behavior interventions. The model suggests that a person's beliefs, attitudes, and perceptions about a disease determine their actions to seek methods to prevent disease (Rosenstock, 1974).

The HBM includes six key domains that influence health behaviors: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy. Perceived susceptibility addresses a patient's beliefs about their likelihood of getting a disease or condition; whereas perceived severity relates to the patient's belief about the seriousness of a condition or illness and the consequences of leaving it untreated. Perceived benefits are related to the outcomes of behavior to reduce susceptibility to or severity of illness, including the efficacy of the behavior for reducing the risk or serious consequence. Perceived barriers identify patient's concerns or possible obstacles including tangible and psychological

costs of adopting a healthy behavior. Cues to action are internal or external factors that promote the adoption of a behavior. Self-efficacy measures the patient's confidence to perform the recommended health behavior. Furthermore, it is believed that intrapersonal factors modify an individual's perceptions of susceptibility to disease, seriousness of disease, benefits to prevention, barriers to prevention, and self-efficacy, which ultimately influence an individual's health promotion and disease prevention behaviors (Lambert et al., 2015; Rosenstock, 1974; Skinner et al., 2015).

Multiple studies have been conducted applying the concepts of the HBM to cervical cancer screening. Lambert et al. (2015) and Solomon et al. (2019) used the HBM framework to assess predictors of cervical cancer screening practice among WLHIV. Each found that participants who reported low levels of knowledge regarding risk factors for cervical cancer perceived lower personal risk for cervical cancer; while women with higher perceived self-efficacy and lower perceived barrier scores reported better Pap test adherence (Lambert et al., 2015; Solomon et al., 2019). Their findings indicate that HIV-infected women are not aware of the risk of cervical cancer and may not take preventive actions. Thus, these studies demonstrate that by understanding a women's perceptions and knowledge about cervical cancer screening, an intervention can be aimed at increasing Pap test adherence (Lambert et al., 2015; Solomon et al., 2019).

By combining these two frameworks, a two-phase quality improvement initiative was developed to target barriers to screening adherence specific to WLHIV. The HBM will be used to identify a patient's beliefs, attitudes, and perceptions that influence their health behaviors and Donabedian's Model of Care was used to facilitate implementation of a quality improvement intervention. Together, these frameworks create the infrastructure for this project.

Methods

Project Design

This project was a two-phase quality improvement study. The first phase was a cross-sectional survey that was followed by a quasi-experimental, one-group pre/posttest design pilot intervention. Quality improvement was defined as a systematic data-guided process that monitors, evaluates, and improves processes and outcomes of health services for targeted groups (Health Resources and Services Administration, 2011). Participation in the activity was voluntary. In phase one, a needs assessment was conducted based on participants self-identified roles in care and aimed to assess for barriers to cervical cancer screening adherence and preferences regarding avenues for receiving health information. Workflow logistics were evaluated in this survey based on Donabedian's Model of Care (Donabedian, 1988). In phase two, a pilot intervention was formulated based on the results of the needs assessment which served as the "cue to action" from the Health Belief Model (Hochbaum et al., 1952).

Setting

The clinic provides specialized care to all individuals living with HIV in a midwestern urban community with outreach across the state. Since the early 1990s, the HIV program has received federal funding through the Federal Ryan White CARE Act Program. This funding, and funding through other Ryan White grantees, allows for care, early intervention and case management services for current patients. The clinic offers services including primary care and early intervention services, case management services, health education/risk reduction, nutritional services, referrals for clinical research, transportation services and treatment adherence counseling.

Sample

This project utilized purposeful sampling for both survey participation and pilot intervention implementation. In phase one, a needs assessment was completed with two groups. One survey was distributed to all WLHIV at the clinic for appointments during the survey implementation window (see Appendix A). There was a total of 229 WLHIV who receive care at the clinic and 176 women without a documented hysterectomy. A second survey was completed by healthcare staff (see Appendix B). There was a total of 24 staff members recruited as key informants for survey participation. Practitioners at the clinic all have HIV-specialized certifications and include four physicians, two nurse practitioners and one physician assistant. A licensed practical nurse works as the office manager. Three case managers and one outreach coordinator are actively involved in care management for this patient population. Lastly, there are 12 medical assistants and axillary staff who help with various clinic functions.

In phase two, a multicomponent pilot intervention was developed and implemented based on modifiable barriers captured in survey results. WLHIV who were due for cervical cancer screening and consented to receiving electronic communication (n = 56) received a text message or computer-generated voice message. The message sent to WLHIV included those WLHIV who typically receive care at outreach clinics and those women who receive their care at the clinic. Women who had a hysterectomy documented in their electronic health record (n = 53) were excluded from participation in this portion of the study. Practitioners at the clinic received electronic correspondence during the pilot intervention implementation window to provide feedback and encourage cervical cancer screening adherence.

Needs Assessment Tools

In phase one, the instrumentation for this project included the needs assessment tools used to assess barriers to screening adherence and preferences for receiving health information. These two surveys were developed by the investigator. Surveys were based on nursing theory and questions found in the literature previously used to assess for barriers to cervical cancer screening adherence and encourage uptake of Pap testing (Akinlotan et al., 2017; Aldohaian et al., 2019; Almobarak et al., 2016; Assefa et al., 2019; Assoumou et al., 2015; Donabedian, 1988; Hochbaum et al., 1952).

The survey for WLHIV has three categories: patient characteristics, cervical cancer screening practices and preferences for receiving health information. These questions are based on the themes present in the Health Belief Model. The survey for healthcare staff is based on the Donabedian's Model of Care (1998) and addresses logistics of care as well as healthcare staff perception of patient motivators and barriers to screening adherence. The surveys scored at a 7th grade reading level based on the Flesch Kincaid readability test, which should be easily understood by those 12-13 years and older. In phase two, the electronic health record system, EClinicalWorks, was used to determine the number of patients who received cervical cancer screening in the form of Papanicolaou (Pap) testing.

Implementation Plan

Phase One

The project facilitator met with the Medical Director to receive approval for project. Next, project facilitator met with the clinic's office manager and head medical assistant to discuss project implementation. An electronic message was sent out to the clinic staff to explain phase one of project implementation (see Appendix C). This correspondence included a link to

an electronic REDCap healthcare staff survey. Additionally, the purposes of this project, who is eligible for survey participation, and project logistics was explained. The project facilitator was available in clinic on implementation day to answer any questions regarding survey implementation and encourage participation from staff. Electronic reminders with a link to the healthcare staff survey were sent out on a weekly basis during the month that the survey was live.

The procedure for dissemination of surveys proceeded as described: While rooming patients, medical assistants gave all WLHIV their survey on a clipboard with a pen attached. After allowing the patient to review instructions, the medical assistant asked the patient if they any questions about the survey. Surveys were completed by patients while waiting for the practitioners to enter the room. When the visit was complete, practitioner's instructed patients where to turn in completed surveys. Practitioners were responsible for returning pen and clipboard to nurses' station. A drop box was kept in at the main nurse's station for completed surveys. For telehealth visits, a QR code or hyperlink to the electronic vision of the survey was shared by medical assistants when the virtual patient was checked in. Data collection for both surveys occurred over the course of one month.

Phase Two

A multicomponent pilot intervention was created based on areas that demonstrated the greatest need. The first component of the pilot intervention targeted WLHIV. A total of 56 text messages or computer-generated voice messages were sent out through the electronic health record by the quality coordinator. WLHIV who received the message were due for cervical cancer screening and had consented to receive electronic messages. Message-type was based on preferences saved in the electronic health record. The message script read as follows, "You are

due for a well women exam. Please call the clinic at xxx-xxx-xxxx to schedule your appointment today”. The number provided was the direct line to the front desk. Schedulers at the front desk were notified when the well women messages were sent out so that they could appropriately manage potential inquiries and increase in call volume.

The second component of the pilot intervention was targeted toward practitioners. A total of three electronic messages were sent out to encourage cervical cancer screening adherence (see Appendix D). The first was sent on the same day that the phone messages were sent to WLHIV in need of screening to notify practitioners of the survey results and the potential for an increase in volume of well women appointments scheduled. The second electronic message was sent one month following the messages to provide feedback and encouragement. The third was sent at the end of the second month of data collection to share final results and lessons learned.

Cost-Benefit Analysis

The cost to implement the project was minimal, which was important to consider since funding for HIV-related care may lack financial resources. The project facilitator spent time implementing the project that was not billable. The quality coordinator spent salary dollars to send out the messages within the electronic health record. The exact salary dollars spent by the clinic was not made available to the project facilitator. An additional cost was the time that the staff spent receiving training on survey implementation which was negligible because it occurred during routine clinic hours. It cost \$5.60 (10 cents per message) to send out the phone messages; this cost was covered by the Ryan White Group D Funding.

Data Collection

In phase one, two needs assessments were developed. For healthcare staff, the survey was created in REDCap and disseminated using electronic messages. For patients, a paper copy of the

patient needs assessment was administered during office visits and a REDCap survey was created and provided using a hyperlink or QR code during virtual visits. At the end of the data collection period, the paper results were manually entered into REDCap. Data verification was completed by printing out all data set values and comparing the numbers visually to the original data. The data was then downloaded into Microsoft Excel for analysis.

In phase two, the quality coordinator of the clinic determined patients eligible for cervical cancer screening who consented to receive electronic communication and sent this information to the project facilitator. This information was available within the electronic health record and was accessed by the quality coordinator. Cervical cancer screening in the form of Pap tests was retrospectively collected in 2019 using the electronic health record and again in 2020 after implementation of the pilot intervention. A project log was kept to document decisions that were made as the project progressed. In phase two of the study, data was retrospectively collected through the electronic health record for the 176 WLHIV without documentation of a hysterectomy.

Data Analysis

Phase one data were analyzed using descriptive statistics, including frequencies and percent agreement. Phase II data were analyzed by comparing the number of Pap tests completed July 20 – September 20, 2019 compared to the number completed July 20 – September 20, 2020. The multicomponent pilot intervention was compared to routine care.

Ethical Code of Conduct

Prior to any data collection, the proposal for this project was reviewed by the Kansas University Medical Center Human Subjects Committee. The project was designation as “Quality Improvement”. The Human Subjects Committee issued IRB approval in order to ensure the

rights, safety and welfare of all subjects who are included in the project were maintained. There was no collection of identifiable personal health information to ensure protection of this vulnerable population.

Results

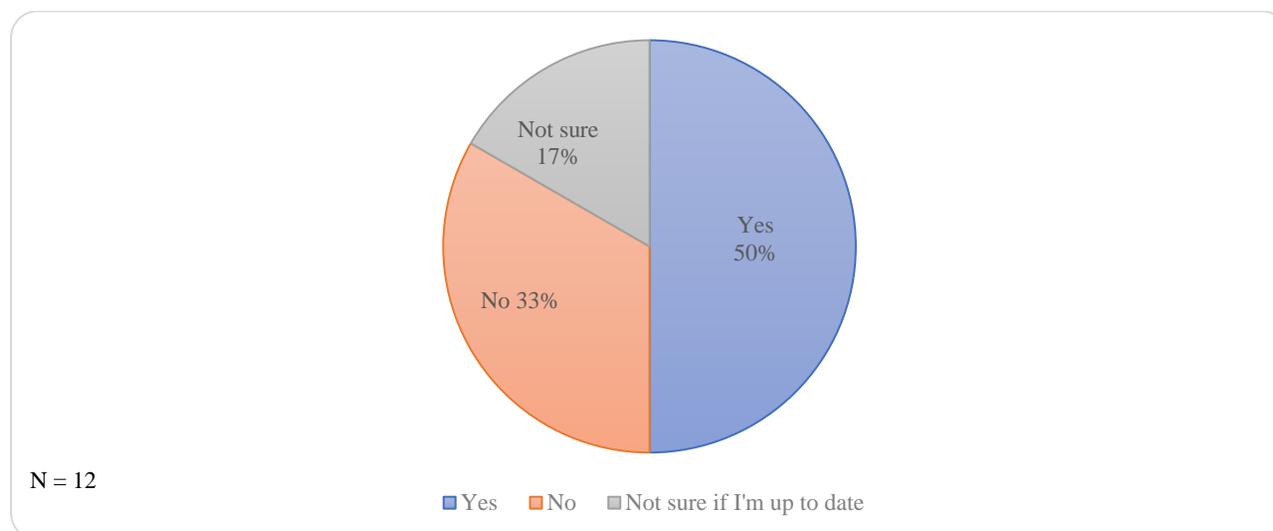
Phase One

A total of 17 WLHIV completed the cervical cancer screening survey. Women most commonly reported being in the 30-39-year age range (35%) and the 50-59-year age range (35%) (see Table 1). Twelve of the 17 women surveyed had not had hysterectomies and were eligible for cervical cancer screening (71%). Of these women, a total of six women (50%) reported being up to date on their cervical cancer screening, four women (33%) reported not having a Pap test within the last three years and two women (16%) were unaware of the date of their last pap test (see Figure 1).

Table 1

Surveyed WLHIV

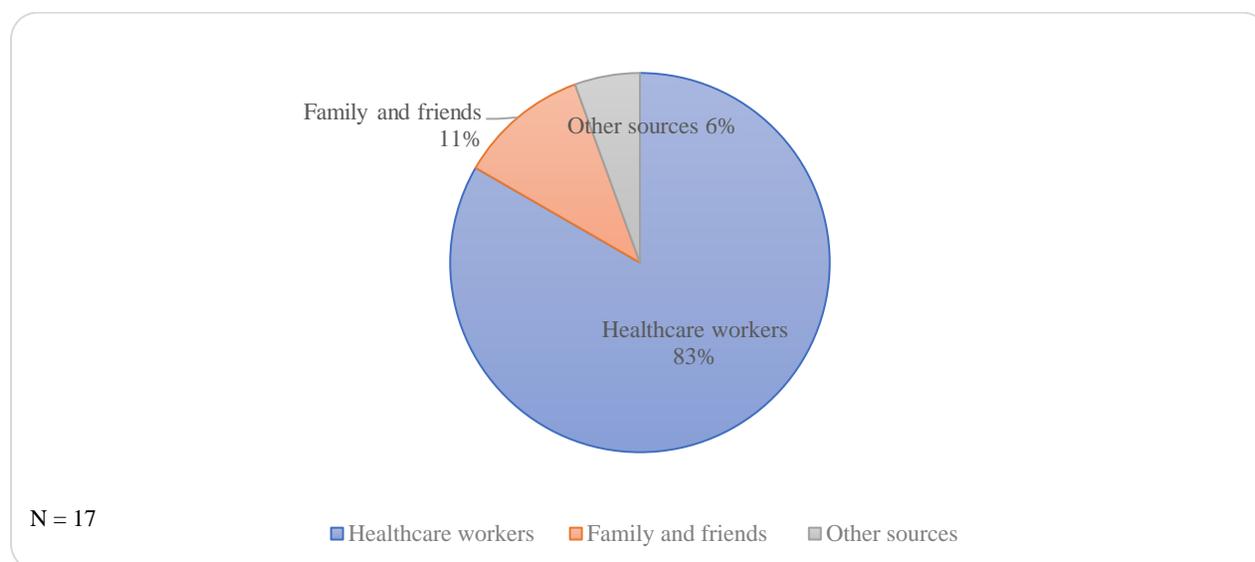
Age	n = 17	%
Age 20-29	2	11.76%
Age 30-39	6	35.29%
Age 40-49	2	11.76%
Age 50-59	6	35.29%
Age 60-69	1	5.88%
Hysterectomy	n = 17	%
Yes	5	29.41%
No	12	70.59%

Figure 1*Participant Adherence to Cervical Cancer Screening in Those Eligible for Pap Testing*

No barriers to cervical cancer screening were selected for any the six women who were up to date with their cervical cancer screening. Of the six women due or unsure of their last cervical cancer screening, WLHIV most frequently listed forgetting to schedule an appointment (33%) as a barrier to screening (see Table 2). Additionally, fear of finding cancer, embarrassment, anticipation of pain, and practitioner does ask were each selected once (17%). Motivators to screening included self-protection (69%), history of abnormal results (23%) and family history of cancer (7%). Of the 17 WLHIV who completed the survey, 15 women (83%) receive their health information from their healthcare workers, two received information from family and friends (11%), and one woman selected other sources (6%) (see Figure 2).

Table 2*WLHIV Barriers and Motivators to Cervical Cancer Screening*

Barriers to Screening	n = 6	%
Fear of finding cancer	1	16.67%
Embarrassment	1	16.67%
Anticipation of pain	1	16.67%
Practitioner doesn't ask	1	16.67%
Forget to schedule appointment	2	33.33%
Motivators to Screening	n = 12	%
To protect myself	9	69.23%
I've had past abnormal results in the past	3	23.08%
Cancer runs in my family	1	7.69%

Figure 2*Surveyed WLHIV Preferences for Receiving Health Information*

For the healthcare staff survey, 13 of the 24 staff members (54%) in the office completed the survey including four practitioners (31%), four case managers (31%), one office manager (7%) and four medical assistants (31%) (see Figure 3). A variety of methods are used to identifying women who are due for cervical cancer screening. Healthcare staff most frequently

review labs and scanned documents within the electronic health record (35%) but also rely on patients to schedule well women exams (23%) and utilize the case managers to help track when screening is due (18%) (see Table 3).

Figure 3

Healthcare staff's role in care and determining screening status

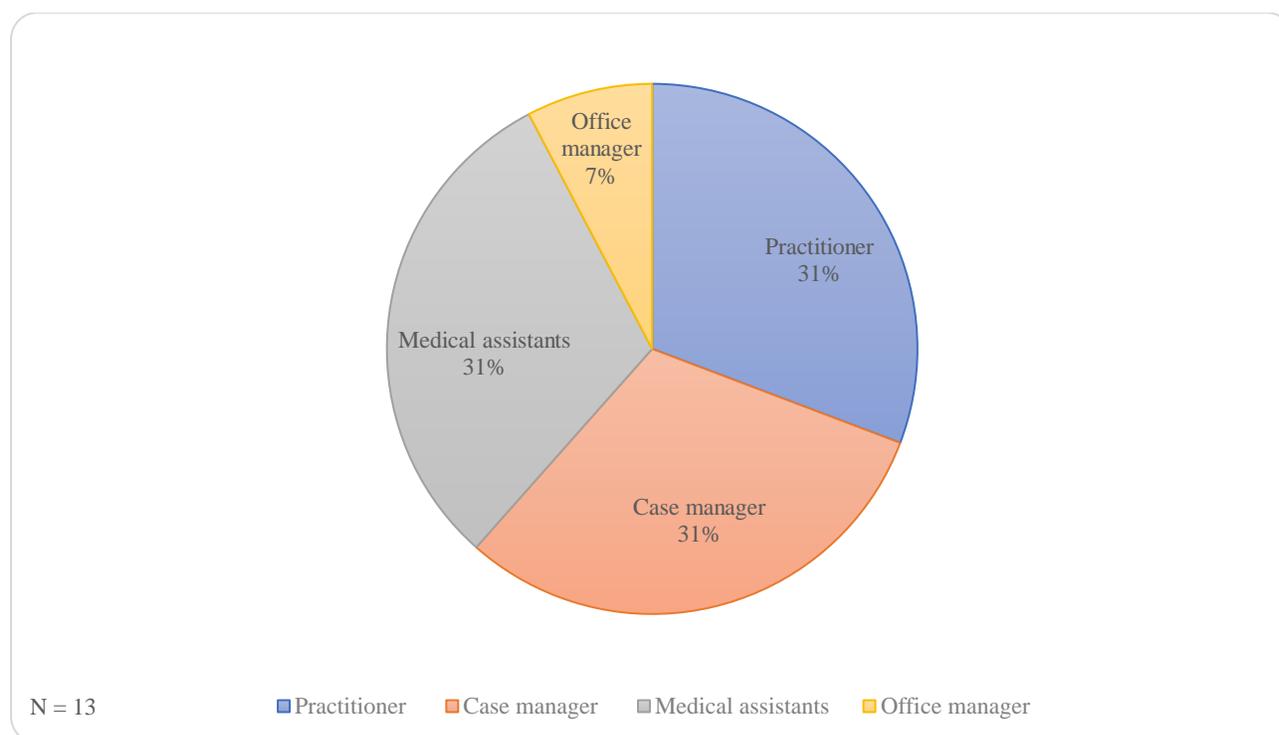


Table 3

How healthcare staff determine cervical cancer screening status

Determining Screening Status	n = 13	%
Other: "I ask the patient when her last Pap test was."	1	6%
Clinical Decision Support System in EClinicalWorks	1	6%
Patient reminds me	2	12%
Case manager investigates this issue and follows up with me	3	18%
Patient schedules a well women exam	4	24%
I look back through previous labs or scanned documents	6	35%

Nearly half of healthcare staff (46%) felt that practitioner recommendation was the most likely reason that patients received cervical cancer screening and the second most likely reason was due to abnormal results in the past (23%) (see Table 4). Lastly, there was a variety of answers selected relating to patients' barriers to cervical cancer screening. The top three most commonly selected included they had conflicting priorities (17%), that patients were anxious about the procedure (15%) and/or that patients are were embarrassed to receive Pap testing (12%). See table two for a complete list of the results.

Table 4

Healthcare staff perception of motivators and barriers to cervical cancer screening

Motivators to Screening	n = 13	%
My provider encourages it	6	46%
I've had abnormal results in the past	3	23%
Other: "Not within my scope of practice to determine this."	2	15%
To continue to get my birth control	1	8%
To protect myself	1	8%
Barriers to Screening	n = 13	%
There are other things that are more important	7	18%
Anxious about procedure	6	15%
Embarrassed	5	13%
Provider doesn't ask	4	10%
Anticipation of pain	3	8%
Lack of time	3	8%
Other: "Menstrual cycle."	2	5%
Feel that they are "too old" for regular Pap testing	2	5%
Feel exposed during procedure	2	5%
Fear of finding cancer	2	5%
Feel that the exam is unnecessary	2	5%
Financial concerns	1	3%
Forget to schedule appointment	1	3%

Phase Two

From July 20, 2019 to September 2019 there were a total of 3 Pap tests completed. From July 20, 2020 to September 2020 there were six cervical screening tests completed. This demonstrates a 50% increase in Pap testing in the intervention window. The clinic staff was not able to track the reason why patients scheduled their well women exam or completed Pap testing, thus there are challenges to directly correlating the data to the pilot intervention.

Discussion

This multicomponent pilot intervention targeted both WLHIV and practitioners caring for these women in an urban, academic HIV-clinic. The intervention included sending a text message or computer-generated voice message to WLHIV who were due for cervical cancer screening. Practitioners at the clinic received electronic correspondence during the pilot intervention implementation window to provide feedback and encourage cervical cancer screening adherence. The results of this pilot intervention did meet the goal of the project, which was to increase cervical cancer screening rates in WLHIV.

Impact on Practice

Cervical cancer screening is crucial to detect cervical cancer in the early stages and reduce the mortality of this cancer. Unfortunately, cervical cancer screening rates continue to be low in all women, particularly in vulnerable, high-risk populations such as WLHIV (Baranoski et al., 2011; Oster et al., 2009; Simonsen et al., 2014; Tello et al., 2010). In a complex and dynamic healthcare system, it is important for healthcare leaders to determine ways in which systems and processes can be put into place to avoid missed opportunities for this life-saving screening. Healthcare leaders are urged to consider ways in which evidence-based interventions can be used improve screening rates in vulnerable populations with a lack of resources.

Rationale for Development of Phase Two Pilot Intervention

The phase two pilot intervention was based on the results of the needs assessment collected in phase one of this project. The project facilitator determined that targeting both the healthcare providers and patients would be best suited in the pilot intervention based on the results of the needs assessment. Forgetting to schedule a well women appointment (33%) was found to be the most common barrier to screening adherence for WLHIV survey participants due for cervical cancer screening. Additionally, 31% of healthcare staff surveyed selected that the scheduling of a well woman exam was how they determined if a woman was due for screening. To address these findings, a phone message reminder was sent out to women who were due for cervical cancer screening.

Healthcare staff recommendation and input was another theme identified in the survey results for both staff and WLHIV. Healthcare staff felt that the greatest motivator for cervical cancer screening in WLHIV was practitioner recommendation (46%). Interestingly enough, none of the 12 WLHIV who were eligible for screening selected this as a motivator. Despite this, 83% of the 17 WLHIV surveyed said that they receive their health information from healthcare workers and a barrier to screening selected by one WLHIV due for cervical cancer screening was that her practitioner doesn't inquire about the need for screening (17%). To target this need, a total of three electronic messages were sent out to practitioner during the pilot intervention implementation window to provide feedback and encourage cervical cancer screening adherence.

Strengths and Limitations

This project does support the current body of literature on this topic, which reveals that a quality improvement intervention can be successful in overcoming barriers and increasing cervical cancer screening rates in an urban, academic HIV clinic. Reasons for poor screening

adherence are multifactorial and often highly variable based on resource availability. Evidence-based interventions should be implemented and evaluated as a way to improve screening adherence among patients seen in primary health care clinics specializing in care for HIV patients.

While the pilot intervention focused on two major themes identified in the needs assessment, reasons for inadequate cervical cancer screening are complex and multifactorial. Several needs identified still remain unaddressed. For example, one WLHIV selected that cancer runs in her family. Since cervical cancer is not hereditary in nature, education is needed to address this finding. It is also important to consider that some women that are due for screening elected not to receive electronic communication (n = 120); an intervention to address this population is also necessary.

This project is also limited by the ability to directly relate the number of Pap tests performed to the intervention. The clinic staff did not identify if patients who called to schedule a screening were prompted by the phone message. Because of this limitation, it is not possible to determine if the increase in screening seen post-intervention was directly related to the intervention. Future research is needed to determine how to reliably track outcome data in a setting with limited resources. Additionally, with two strategies concurrently implemented it is impossible to determine if one activity was more instrumental in increasing screening over another activity. It is important to note that these interventions were low-cost and minimally time-consuming. Lack of cervical cancer screening is likely multifactorial and involves patient-, practitioner-, staff- and system-related factors. A multicomponent approach may be the catalyst in achieving success.

Lastly, it is important to consider that this project was conducted in the midst of the SARS-CoV-2 pandemic. This may have served as an unforeseen barrier to care. During this time, outreach clinics were suspended temporarily. For these patients to receive care during the pandemic, reimbursement for transportation to come to the clinic was offered to all HIV-positive patients through Ryan White Grant Funding.

Future Implications for Practice

Cervical cancer in an WLHIV is recognized by the National Center for Infectious Diseases as an AIDS-defining malignancy and has a significant impact on morbidity and mortality (Levine, 1993). Thus, it is necessary to increase awareness around cervical cancer screening in WLHIV to improve adherence to guidelines and prevent cervical cancer. The results of this project indicate that this low-cost multicomponent pilot intervention can be used to increase cervical cancer screening adherence in WLHIV. The improvement demonstrates the ability for healthcare leaders to implement an intervention that will have the ability to impact screening in this vulnerable population.

Further research should investigate the impact of this multicomponent intervention for periods longer than two months to fully realize the impact of this type of intervention. Additionally, more research is needed to clearly connect the intervention to the outcome data to fully understand the implications of this intervention.

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Appendix A

Patient Survey

Instructions: Please fill out the questions below to the best of your abilities. There are no personal benefits or risks to participating in this survey. The goal of this survey is to gather information for quality improvement purposes. Participation is voluntary, and you can stop taking the survey at any time. Participation or declining will have no impact on your involvement at the Clinic.

Personal Information

1. How old are you?

2. Have you had a hysterectomy?
 - Yes
 - No
 - I'm not sure if I've had a hysterectomy

Cervical Cancer Screening

3. In the last three years, have you had a Pap test or cervical cancer screening?
 - Yes
 - No
 - Not sure if I am up to date.
4. If you have not had a Pap test or cervical cancer screening, what is/are the most significant reason(s) for the delay? Select up to three responses:
 - Fear of finding cancer
 - Anxious about procedure
 - Embarrassment
 - Anticipation of pain
 - Feel exposed during procedure
 - Feel that exam is unnecessary
 - Forget to schedule appointment
 - Lack of time for procedure
 - Feel that they are too old to have pap tests regularly
 - There are other problems in my life that are more important than having a pap test
 - Financial concerns (i.e. not being able to pay a copay for the office visit or lab charges)
 - Not able to take off from work during clinic hours
 - Practitioner doesn't ask

5. What is the most likely reason you would consider completing a Pap test or cervical cancer screening?
- To protect myself
 - To protect others
 - To continue to get my birth control
 - My practitioner encourages it
 - I've had past abnormal results in the past
 - Cancer runs in my family
 - I'm not interested in screening

Health Information

6. I receive most of my health information from:
- Health workers (midwives, physicians, nurse practitioners, physician assistants)
 - Family and friends
 - TV
 - Radio
 - Newspapers and magazine
 - Social media sites (Facebook, Instagram, Twitter etc.)
 - Health websites (WebMD, CDC, Medline Plus, Cancer.gov)
 - Other sources

Note: This tool was adapted by the project facilitator based on a synthesis of evidence-based literature which focused on determining favorable modes of communication for survey participants, identifying common barriers to cervical cancer screening adherence and the Health Belief Model (Akinlotan et al., 2017; Aldohaian et al., 2019; Almobarak et al., 2016; Assefa et al., 2019; Assoumou et al., 2015; Hochbaum et al., 1952).

Appendix B

Healthcare Staff Survey

Instructions: Please fill out the questions below to the best of your abilities. There are no personal benefits or risks to participating in this survey. The goal of this survey is to gather information for quality improvement purposes. Participation is voluntary, and you can stop taking the survey at any time. Participation or declining will have no impact on your involvement at the clinic.

Job Title

1. What is your role in care?
 - Practitioner (physician, nurse practitioner, physician assistant)
 - Office manager
 - Case manager
 - Care coordinator
 - Medical assistant
 - Other

Logistics of Care

2. How are you most likely to know when a HIV-positive woman is due for cervical cancer screening? Select all that apply.
 - Patient reminds me
 - Patient schedules a well women exam
 - I look back through previous labs or scanned documents
 - Case manager investigates this issue and follows up with me
 - Clinical Decision Support System (CDSS) in eClinicalWorks
 - Other: _____

Motivators to Screening

3. In the last year, when discussing cervical cancer screening needs with WLHIV that have accepted screening, what are the top three reasons why?
 - To protect myself
 - To protect others
 - To continue to get my birth control
 - My practitioner encourages it
 - I've had past abnormal results
 - Other: _____

Barriers to Screening

4. In the last year, when discussing cervical cancer screening needs with WLHIV that have declined screening, what are the top three reasons cited?

Select up to three responses:

- Fear of finding cancer
- Anxious about procedure
- Embarrassment
- Anticipation of pain
- Feel exposed during procedure
- Feel that exam is unnecessary
- Forget to schedule appointment
- Lack of time for procedure
- Feel that they are too old to have pap tests regularly
- There are other problems in my life that are more important than having a pap test
- Financial concerns (i.e. not being able to pay a copay for the office visit or lab charges)
- Not able to take off from work during clinic hours
- Practitioner doesn't ask
- Other: _____

Note: This tool was adapted by the project facilitator based on a synthesis of evidence-based literature which focused on the addressing healthcare workers perception of patient motivators and barriers to screening adherence using the Health Belief Model (Akinlotan et al., 2017; Aldohaian et al., 2019; Almobarak et al., 2016; Assefa et al., 2019; Assoumou et al., 2015; Hochbaum et al., 1952). Additionally, workflow logistics specific to the clinic will be evaluated with this survey based on Donebian's Model of Care (Donabedian, 1988).

Appendix C

Electronic Message to Healthcare Staff

Did you know?

WLHIV are five times as likely to develop cervical cancer compared to the general population. Furthermore, acquisition of cervical cancer in an HIV-positive woman is recognized as an AIDS-defining malignancy and has a significant impact on morbidity and mortality.

There is hope!

Incidence of cervical cancer in WLHIV who follow routine cervical cancer screening is comparable to the general population.

WLHIV have poor cervical cancer screening rates.

At the clinic, current cervical cancer screening adherence is low. In order to better understand barriers to screening adherence and preferences for receiving health information, a short survey will be administered to both staff AND WLHIV. The approximate time needed for completion is less than five minutes. No identifiable information will be collected about you and the survey is anonymous.

You can help:

If you have received this electronic message, please fill out the survey for health care practitioners, attached [here](#).

- Medial Assistants: Paper copies of surveys for WLHIV will be located at the nurse's station and should be given to WLHIV when roomed and electronic version is also available [here](#) for telehealth visits.
- Practitioners: Please reminding patients to turn in their surveys at the nurse's station after their appointments.

Questions?

If you have any questions regarding this study and survey completion, please feel free to contact me at kzwick@kumc.edu. For questions about the rights of research participants, you may contact the KUMC Institutional Review Board (IRB) at (913) 588-1240 or humansubjects@kumc.edu.

Thank you for your help in this quality improvement initiative!

Sincerely,

Katie Fee, RN, BSN, CCRN

Appendix D

Electronic Correspondence with Practitioners during Pilot Intervention Implementation

First Electronic Correspondence sent on July 20, 2020

Below is a quick update on my QI initiative: Improving Cervical Cancer Screening Adherence in WLHIV.

First of all, I would like to thank each of you for your help and participation in the surveys collected in May. Based on the results of these surveys (attached), a text message and/or computer-generated phone message is being sent out today to all WLHIV who are due for cervical cancer screening. Over the next two months (July 20th – September 20th), Pap completion rates will be followed to observe the effectiveness of this intervention.

Thanks again for your help in my QI project. Please reach out with any questions or concerns.

Sincerely,
Katie Fee

Second Electronic Correspondence sent on August 20, 2020

I wanted to update you on the quality improvement project that I am conducting in HIV-positive women due for Pap testing. We are off to a great start! So far, a total of three pap tests have been completed in my data collection window.

There will be one more month of data collection to see if the phone messages sent to HIV-positive women due for Pap testing impact the number of Pap tests completed.

Thanks for your help encouraging women to get up to date on their cervical cancer screening!

Please let me know if you have any questions.

Sincerely,
Katie Fee

Third Electronic Correspondence sent on October 5, 2020

I wanted to share a final recap of my quality improvement initiative aimed to increase cervical cancer screening rates in WLHIV.

In phase one, survey results of WLHIV eligible for screening most commonly reported forgetting to schedule an appointment (33%) as a barrier to screening (detailed survey results attached).

In phase two, a multicomponent pilot intervention was developed and implemented based on modifiable barriers captured in survey results. WLHIV due for cervical cancer screening who consented to receive electronic communication (n = 56) received a text message or computer-generated voice message. The message sent to WLHIV included those WLHIV who typically receive care at outreach clinics and those women who receive their care at the clinic. Women who had a hysterectomy documented in their electronic health record (n = 53) were excluded from participation in this portion of the study. Additionally, Practitioners at the clinic received electronic communication during the pilot intervention implementation window to provide feedback and encourage cervical cancer screening adherence.

In the pre-implementation period, three women (1.7%) underwent cervical cancer screening in the form of Papanicolaou testing. In the post-implementation period, six women (3.4 %) underwent screening. This demonstrates a 50% increase in Pap testing in the intervention window.

This project suggests that a multicomponent quality improvement intervention (including sending text messages and electronic communication with practitioners) was successful in overcoming barriers and increasing cervical cancer screening rates and may offer a low-cost intervention to improve the health of WLHIV.

I have attached the abstract for my project and the phase one survey results for anyone interested.

Lastly, I want to thank all for you for your efforts in making my QI project possible and for being such a welcoming site for my project. The clinic will always hold a special place in my heart for its contribution to my DNP journey. I couldn't have done it without your help.

With my deepest gratitude, thank you.

Please let me know what questions you have.

Sincerely,
Katie Fee