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A DNP PROJECT

Nurse Practitioner (NP) Student Knowledge of PrEP in Preventing Human Immunodeficiency Virus (HIV) in High-Risk Women

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Abstract

Purpose: The purpose of this pilot study was to assess knowledge and awareness of pre-exposure prophylaxis (PrEP) in senior nurse practitioner (NP) students and compare the effectiveness of the education interventions in increasing knowledge of PrEP to high-risk women among NP students. In 2012, the Food and Drug Administration (FDA) approved PrEP for use in preventing human immunodeficiency virus (HIV) in high-risk individuals, but uptake remains low in women.

Methodology: The study was conducted using a pre-test, post-test design, and a 2-weeks follow-up post-test evaluation. Senior NP students enrolled in an adult-gerontology primary care 3 clinical course in a university in Northern New Jersey were recruited for the study. The target population represents nurse practitioner students training to become providers in clinical settings that heavily rely on prescribing medication as an essential part of the practice. After completing the pre-test, the NP students received a PrEP PowerPoint educational intervention; following the teaching intervention, students completed a post-test. Two weeks later, they completed another 2-weeks follow-up post-test evaluation to assess retention and determine utility of the information in the clinical setting.

Results: Thirty-two volunteered senior students participated in the study. After an educational intervention, significant increases in knowledge of PrEP were noted from pre-test ($M = 7.25$) to post-test ($M = 8.75$) based on both the paired t test ($t[31] = 7.12$, $p = .001$) and from pre-test ($M = 7.25$) to follow-up ($M = 9.63$) based on both the paired t test ($t[31] = 10.23$, $p = .001$) and the Wilcoxon matched pairs test ($z[31] = 4.73$, $p = .001$). Also, significant increases in knowledge were also noted from post-test ($M = 8.75$) to follow-up ($M = 9.63$) based on both the paired t test ($t[31] = 3.51$, $p = .001$) and the Wilcoxon matched pairs test ($z[31] = 2.91$, $p = .004$).

Implications for Practice: Are clinical practice, healthcare policy, quality & safety, education, and economics.

Conclusion: NP students' knowledge and acceptance of PrEP and their likelihood to prescribe PrEP as HIV prevention improved after an educational intervention.

Keywords: HIV, pre-exposure prophylaxis, healthcare providers, nurse practitioner, high-risk women, awareness, guide to PrEP prescribing.

Introduction

Even though HIV incidence remains a health issue worldwide, the rate of the infection has been decreasing. The Joint United Nations Programme on HIV and AIDS report more than 36.9 million people living with HIV (PLWH) and 2.4 million new infections worldwide in 2017 (UNAIDS, 2018). In 2017, approximately 40,000 new diagnoses were reported in the United States (Centers for Disease Control and Prevention [CDC], 2018b). While the diagnoses of HIV infection in women has been declining for the past few years, more than 19% of all diagnosed with HIV in the United States are women (CDC, 2019). Despite the current developments in biomedical preventive strategies, women continue to be disproportionately at risk of getting HIV (CDC, 2019). Emtricitabine and tenofovir disoproxil fumarate (Truvada®) is the only drug currently approved for use as pre-exposure prophylaxis (PrEP) to prevent HIV infection and was approved by the FDA in 2012 (CDC, 2019). However, PrEP commitment among women has been low when compared with the significant increases noted in men (Bush et al., 2016). Studies on low PrEP uptake in women report inadequate healthcare provider awareness (Krakower & Mayer, 2016; Gunn et al., 2019). This gap in knowledge probably stems from professional training, which offers inadequate content regarding HIV risk factors and prevention strategies (Kumar, Patil, & Munoli, 2015). This inadequacy is a significant issue in healthcare professionals' education and lack of content overall regarding HIV prevention.

Two different healthcare professional surveys (Bush et al., 2015; Smith et al., 2016) report that PrEP awareness, acceptance, and commitment is growing but is not yet adequate to have a significant impact on eliminating HIV incidence. PrEP knowledge and awareness is connected with increased prescriptions; therefore, it is essential for healthcare providers, especially those working in a primary care setting, to know about PrEP. Kumar, Patil, and

Munoli (2015) report that education of students is suggested, but the extent of PrEP education in schools is unknown. For high-risk women to gain access to PrEP, they need to involve their healthcare providers, and this is another important reason providers need to be knowledgeable about PrEP; they need to be able to discuss, prescribe, or refer patients as appropriate. Therefore, this project evaluated NP students' knowledge, beliefs, and experiences about PrEP in preventing HIV using a series of surveys.

Approximately 87% of women living with diagnosed HIV acquired the disease through heterosexual contact and 22% by injection drug use (CDC, 2018b). Several factors can affect a woman's risk of HIV infection. In general, women engage in receptive sex, which is the riskier behavior for getting HIV when compared to insertive sex (CDC, 2018a). As such, women have a higher risk of acquiring HIV during vaginal or anal sex (CDC, 2018a). Studies have found that women who reside in HIV high-risk neighborhood, with a high incidence of non-adherence to treatment, unknown HIV status, and those with multiple sexual partnerships are at increased risk of acquiring HIV (CDC, 2017; Morris et al., 2009; Adimora et al., 2013). In addition to having multiple sexual partners, some women might be unaware that they are at high risk of contracting HIV infection if their sexual partners do not reveal their HIV status or their high-risk behaviors. Nevertheless, Prevention of HIV infections can be accomplished in high-risk women by having their HIV positive sexual partners adhere to prescribed antiretroviral treatment, achieving viral suppression, using condoms consistently, and taking pre-exposure prophylaxis (PrEP) (HIV.gov, 2018; Jin, 2019).

Women who are HIV-negative and are at high risk for HIV infection can take PrEP daily to prevent HIV. PrEP is a single regimen pill that is a combination of two HIV medications, emtricitabine and tenofovir disoproxil fumarate, and is sold under the brand name Truvada®

(CDC, 2019). PrEP is approved for daily use by people at high risk for HIV to reduce their probability of getting infected (CDC, 2019). When PrEP is continuously taken as prescribed, it can reduce the risk of getting HIV from sex by more than 90% (CDC, 2019). However, PrEP is not very effective when it is not taken consistently.

This pilot study was conducted to assess NP student perceptions and attitudes about PrEP. The NP students are enrolled in an adult-gerontology primary care 3 course in a university in northern New Jersey. The study also evaluated the NP students' knowledge in identifying HIV high-risk women, the likelihood of prescribing PrEP to high-risk women, and concerns about PrEP. As PrEP is being presented into clinical settings and its accessibility is being expanded, it will be imperative to continue to assess future providers' knowledge, attitudes, and practices for PrEP as an HIV prevention intervention. This will facilitate creating educational resources for NP students that will increase awareness of PrEP prescribing and support for the adherence necessary to achieve significant HIV reductions.

Background and Significance

PrEP has been shown to be safe and effective in reducing the risk of HIV infection by more than 90% (CDC, 2019). The U.S. Public Health Service updated clinical guidelines recommend considering PrEP for HIV-negative men who have sex with men (MSM), those who are not in a monogamous relationship, those engaged in no condom anal sex, or those who recently had a bacterial sexually transmitted infection (STI) (2017). The guidelines also indicate PrEP for people at risk for HIV due to being in heterosexual relationships, such as HIV-discordant couples, as one of several options to protect the uninfected partner, and in the case of injection drug use and pregnancy (U.S. Public Health Service, 2017). Current U.S. federal guidelines also suggest that PrEP is intended for concurrent use with condoms and that PrEP

patients should be counseled accordingly (U.S. Public Health Service, 2017). Despite the clinical guidelines and evidence that support the implementation of PrEP, many providers have not prescribed it, and many future providers are unaware of it (Smith et al., 2016). Knowledge and experiences regarding PrEP for HIV infection are increasing among existing providers, but a report shows NP providers still lack adequate knowledge of PrEP (Calabrese et al., 2017). This gap in knowledge among NP providers could result from inadequate education regarding HIV risk factors and prevention strategies. Bradley and Hoover (2019) suggest research is needed to develop educational and training materials for providers to better educate them about high-risk women and concerns or other barriers to PrEP use, and to identify policies, best practices, and successful models for PrEP implementation. Therefore, a series of surveys, which include a pre-test, educational module, post-test, and a 2-weeks follow-up evaluation, was conducted to determine NP students' knowledge and awareness of PrEP. The study was conducted among senior NP students enrolled in an adult-gerontology primary care 3 course in a university in northern New Jersey to examine knowledge and attitudes towards PrEP.

Human Immunodeficiency Virus (HIV)

More than thirty years after the HIV/AIDS epidemic was first acknowledged, effective treatments have dramatically reduced the number of deaths from HIV/AIDS (Brooks et al., 2017). Although life anticipation and quality of life have improved noticeably for people living with HIV (PLWH), the truth remains that if HIV it is not treated it can lead to serious health issues such as cardiovascular disease, cancers that attack the immune system, and even death (Haissman, 2017). Additionally, PLWH who are not on treatment can potentially spread the infection to others through sexual intimacy and shared injection drug equipment (CDC, 2018a). Therefore, it is essential that anyone living with HIV take their medication as prescribed to

prevent complications of HIV infection as the disease does not affect the health of individuals alone but also households, communities, and the progress and economic growth of nations (HIV.gov, 2018; Jin, 2019).

Antiretroviral Therapies (ART)

Antiretroviral drugs are medications used to treat HIV infection. Most ART contains a combination of HIV drugs to effectively suppress the virus, prevent transmission and stop it from developing into AIDS (WHO, 2015a). ART is recommended for all individuals who are HIV positive (WHO, 2015a). Studies confirmed that ART is highly effective in preventing HIV infection (Cohen et al., 2016; Brooks et al., 2017). Large reductions in HIV related death and infections has been noted when ART is use consistency, particularly in initial phases of the disease (WHO 2015a). ART works by blocking the virus's life cycle and making it difficult to duplicate and multiply itself thereby suppressing the viral (WHO, 2015a). There is no cure or vaccine for HIV, but ART can help people who are HIV positive live long lives and reduce HIV transmission (Cohen et al., 2016; Deeks, Lewin, & Havlir, 2013; CDC, 2018b). While reports frequently identify MSM, injection drug users, and sex workers as high risk for HIV infection, it is essential to understand that anyone could be exposed to HIV infection. Therefore, PLWH needs to adhere to prescribed therapy as much as possible to help prevent HIV infection.

Concerns

While outcomes from studies have shown PrEP to be safe and effective in preventing HIV, many providers are concerned about the long-term adverse effects of PrEP (Jin, 2019; Maki, 2016; Owens et al., 2019). Specifically, the chemical ingredients (emtricitabine and tenofovir disoproxil fumarate) in PrEP medication can decrease renal function and bone mineral density (BMD) (McCallister, 2016). Although the results from a BMD sub-study in the

iPrEx cohort comprising 498 patients showed a small decrease in hip and spine BMD in the emtricitabine and tenofovir disoproxil fumarate group at 24 weeks (Mulligan et al., 2015), a meta-analysis of randomized PrEP studies by McCallister (2016) proved that the risk of adverse events was not statistically significantly different in the PrEP ingredient when compared with placebo. The result also shows no increased risk of fracture, and BMD was confirmed to return to normal within six months when the PrEP medication was no longer prescribed. In addition, PrEP is intended for use during a period of high risk to prevent HIV transmission. Therefore, it is not anticipated to be a lifetime remedy for many high-risk individuals.

Impact on Economic Growth

The impact of the HIV epidemic on a nation's economic growth is a significant concern. The United Nations Department of Economic and Social Affairs/Population Division (n.d.) reports that the HIV/AIDS epidemic is accountable for slowing the growth of the gross national product in many nations. The report also explains that the economic impact of the HIV epidemic can vary according to the sector of the economy and the degree to which it affects individuals who have specialized skills, training, knowledge, and are hard to replace. Shongkour, (2014) report that HIV infection negatively affects the gross domestic product of a nation and affects the savings and standard of living of infected individual. When people are unable to work and require significant medical care, their expertise and productivity are reduced, which in turn weakens the mechanism that generates human capital (Shongkour, 2014; Greener, 2002). It is therefore crucial for NP students to be aware of the impact of HIV and to gain prevention knowledge such as the use of PrEP in high-risk women for preventing HIV infection.

Pre-Exposure Prophylaxis (PrEP)

The approval of PrEP in 2012 by the Food and Drug Administration (FDA) for use in preventing HIV infection has given women the power to protect themselves from becoming infected (CDC, 2019). However, PrEP commitment among women has been low and has not improved when compared with the significant increases noted in men (Bush et al., 2016). Two different surveys (Bush et al., 2015; Smith et al., 2016) report that PrEP acceptance and commitment is growing but is not yet adequate to have a significant impact on eliminating HIV incidence. For high-risk women to gain access to PrEP, they need to involve their healthcare providers. Therefore, healthcare providers need to be knowledgeable about PrEP to be able to discuss, prescribe, or refer patients to an appropriate place to receive it.

Problem Statement

HIV incidence remains unacceptably high, with the Joint United Nations Programme on HIV and AIDS reporting more than 36.9 million PLWH and 2.4 million new infections worldwide in 2017 (UNAIDS, 2018). PrEP is an essential prevention approach for women who are at high risk of acquiring HIV. Many clinical trials have demonstrated PrEP is safe and efficacious in preventing HIV acquisition in MSM and in men and women who are heterosexual HIV-discordant couples (McCormack et al., 2016; Molina et al., 2015; Maki, 2016). Many providers, however, may lack the knowledge needed to communicate with high-risk women about PrEP to increase their awareness (Bradley & Hoover, 2019). The Institute of Medicine (IOM) and the Patient Protection and Affordable Care Act have stressed the importance of patient-centered healthcare (IOM, 2011a; Washington & Lipstein, 2011). Within this framework, the decision to utilize clinically proven interventions for HIV should be made by healthcare providers by educating high-risk women about PrEP. This project intervention focuses on

answering the question: "Among senior NP students enrolled in an adult-gerontology primary care 3 course in a university in northern New Jersey (P), how effective is education (I), compared to no education (C), in increasing knowledge of HIV PrEP (O)?"

Needs Assessment

The CDC estimates that 1.1 million individuals are living with HIV in the United States, with 1 in 7 unaware of their HIV status (CDC, 2019). More than 19% of the new diagnoses of HIV in the United States in 2015 were women (CDC, 2019). UNAIDS (2018) reported that globally around 7,000 women become infected with HIV every week. Women make up more than half of the people living with HIV (PLWH) worldwide and almost 25% of PLWH in the United States (CDC, 2018b; UNAIDS/AIDSinfo, 2017). Although the number of deaths in the United States in women with diagnosed HIV declined by approximately 11% from 2011-2015, in 2015 there were 3,816 deaths in women who had diagnosed HIV infections, and, in general, more than 6,000 people died from HIV-related illnesses in 2014 (CDC, 2017; CDC, 2019). In an interview, a program director and HIV specialist at the site of this pilot study, specifically, an HIV clinic in Essex County, New Jersey, estimated that 69% of patients who visit the clinic acquired HIV through high-risk behaviors. Moreover, more than 63% had considerable risk for acquiring HIV through serodiscordant relationships, intravenous drug use, or unsafe safe sex practices (Program Director HIV Specialist, personal communication, March 28, 2019).

In a narrative analysis, Silapaswan et al. (2016) indicated low PrEP implementation nationwide due to healthcare providers' attitudes and lack of knowledge and qualified skills to provide PrEP. While there is an assumption that high-risk women would learn about PrEP from their healthcare providers, a study by Goparaju et al. (2017) found that despite the availability of PrEP, women stated that their healthcare providers hardly ever ask about risk behaviors related

to HIV acquisition or PrEP awareness. Some women report being worried that disclosing their risk behaviors may result in stigma and harsh treatment (Goparaju et al., 2017). If women have increased access to PrEP and support to overcome barriers to PrEP adherence, this prevention approach can impact the HIV infection rate among women in the United States and globally. Therefore, addressing this barrier requires increased access by women to PrEP and an increase in healthcare providers' knowledge and attitudes about PrEP. Once again, the first step to addressing the barriers was a survey of senior NP students using pre-test, then educational module, post-test, and a 2-week follow-up evaluation to support PrEP among NP students enrolled in the clinical course.

SWOT Analysis.

The following SWOT analysis describes this pilot study's strengths, weaknesses, opportunities, and threats that have the potential to affect the NP students' knowledge of PrEP in preventing HIV in high-risk women (see Appendix A).

Strengths. The most important strength of this pilot study is that the benefits of PrEP in preventing HIV far outweigh the risks (CDC, 2019b). Another strength is that PrEP offers a vital prevention strategy for HIV negative women who are at high risk of getting HIV (McCormack et al., 2016). Thirdly, federal guidance supports the PrEP provision (U.S. Public Health Service, 2017).

Weaknesses. One weakness of this pilot study is that the right of the individual outweighs the general needs of the community. Every individual has a constitutional right to freedom of speech, religion, press, and all the others. Therefore, each individual has the right to choose to take PrEP or not to take. Another weakness is the lack of trust for providers and government among women (Aaron et al., 2018; Auerbach, et al., 2015). Other weaknesses

include poor communication with providers and patients, lack of knowledge, difficulty assessing sexual and HIV risk, lack of perception of risk for HIV acquisition, and HIV-related health literacy (Krakower et al., 2015; Gunn et al., 2019; Collier, Colarossi, & Sanders, 2017).

Opportunities. The opportunities of this pilot study increase HIV prevention in high-risk women 18 to 65 years of age through the use of PrEP and increase knowledge among senior NP students about PrEP and the identification of women with high-risk for HIV infection who will benefit from PrEP. This opportunity will build media literacy among providers and women on the knowledge of PrEP, counter the HIV stigma, and save high-risk women from disease and even death.

Threats. The key threats to this pilot study are distrust of the medical system, HIV stigma, the financial cost of PrEP medication, and long-term adverse effects of PrEP (Auerbach, Kinsky, Brown, & Charles, 2015). Another threat to this project is the public perception that the use of PrEP will cause many women to engage in risky behavior. Other threats include patient refusal of PrEP/non-adherence, drug resistance, and HIV infection.

Aims and Objectives

The primary aim of the project was to increase knowledge about PrEP among senior NP students enrolled in an adult-gerontology primary care #3 course in a university in northern New Jersey. The secondary aim of the project was to increase knowledge of identification of HIV high-risk women 18 to 65 years of age (see Tool for Assessing HIV In High-Risk Women. This tool was used to identify those women at high risk for HIV).

The three primary objectives of this project were to:

1. Collect baseline information regarding PrEP knowledge and awareness among NP students and use as a guide for education to support PrEP.

2. Assess NP student knowledge, attitudes, and barriers to adoption of PrEP.
3. Assess NP student willingness to prescribe PrEP in the future.

Review of Literature

A literature review was conducted to investigate four critical considerations: 1) best-practices guideline for PrEP; 2) efficacy of PrEP in preventing in HIV prevention; 3) application of PrEP education and identification of HIV high-risk women; 4) necessary tests before and during PrEP use. Initial inquiries returned results in blogs, business and education literature, foreign language, library science literature, and interviews. A database search was then conducted for all English-language studies published from 2015 to the present on PrEP using PubMed, CINAHL, Embase, and Cochrane Library databases. The search strategy used the following criteria in the title, abstract, keyword heading, and subject heading fields: “(prep) OR ("Pre-Exposure Prophylaxis" AND "last 5 years" AND English AND AIDS)” “Pre-Exposure Prophylaxis/OR PrEP,” “HIV OR human immunodeficiency virus prevention,” AND “Truvada® OR tenofovir OR emtricitabine.” The search strategy also used the criteria providers, nurse practitioners, students and residents AND ("perception" OR "perception" AND ("HIV" OR "HIV") AND PrEP combined with the keyword “Women.” The search yielded 2455 studies, combined with the keyword “Women.” After applying the inclusion criteria, 98 studies remained. Inclusion criteria were original research studies or systematic reviews in peer-reviewed journals that examined PrEP in adult women (18 to 65 years). Exclusion criteria were also applied; these were studies that had a narrow focus, such as pregnant women, younger than 18 years old, editorials, reviews, and news reports. Of the 45 studies remaining, 30 were quantitative, eight were qualitative, three were ethnographic, and four were mixed methods studies.

Introduction

HIV is a virus spread through body fluids that weakens the immune system, specifically the CD4 cells known as T cells, and reduces the body's ability to fight infections (Jin, 2019). CD4 cells are the body's natural protection system against pathogens, infections, and illnesses. If not treated, HIV can destroy those cells and make it difficult to fight off infection, which can lead to acquired immunodeficiency syndrome (AIDS) (CDC, 2019b). The diagnosis of AIDS is made when a person with HIV has a CD4 count of fewer than 200 cells/mm3 or develops an AIDS-defining condition (CDC, 2019b). AIDS was first recognized among homosexual men in the United States in 1981when cases of Pneumocystis carinii pneumonia were found in five gay men in Los Angeles, and a strange cancer called Kaposi's Sarcoma was also reported in a group of men in New York and California (Hymes et al., 1981).

There is no cure at present for HIV but there is a treatment that helps to manage the disease. To reduce the risk of HIV complications such as AIDS, other opportunistic illnesses and mortality, the United States Department of Health and Human Services established antiretroviral therapies (ART) as the standard of care for all individuals with HIV infection, regardless of viral load or CD4 count at the time of diagnosis (DHHS, 2017). ART must be taken daily to suppress HIV duplication in infected cells and to lower the plasma viral load (DHHS, 2017). ART, however, does not kill or cure the virus, but when taken as prescribed, ART can prevent the virus from duplicating (DHHS, 2017). Since the Food and Drug Administration (FDA) approved PrEP in 2012 for use in preventing HIV (CDC, 2019), studies report primary care nurse practitioners (NPs) have not incorporated PrEP for the prevention of HIV infection (Cotler, Yingling, & Broholm, 2018). As reported by Krakower and Mayer (2016) and Cotler, Yingling, and Broholm (2018), there are many different barriers that can prevent NPs from prescribing PrEP such as lack

of knowledge and the perception that it will increase high-risk behavior or discourage safer sex practices.

PrEP Overview

Since HIV transmission continues to grow among women, effective HIV prevention plans are crucial, especially ones that a woman can control. One approach that gives women control in preventing HIV transmission is the use of PrEP. PrEP offers a vital prevention strategy for HIV negative women who are at high risk of getting HIV (McCormack et al., 2016). Numerous clinical trials indicate the safety and efficacy of PrEP in preventing HIV acquisition in men who have sex with men (MSM) and in men and women in heterosexual HIV-discordant couples (McCormack et al., 2016; Molina et al., 2015; Maki, 2016). PrEP is an important HIV preventive measure as it can be used privately without the need for negotiation with the partner and it is an additional protective measure for women in the event of condom breakage or inconsistent use during receptive sex (Owens et al., 2019). Heffron et al. (2018) also found PrEP can protect women who are planning to conceive a baby with an HIV-positive partner; PrEP is safe to use during and after pregnancy and has no known effect on fertility. In 2015, the World Health Organization released guidelines recommending PrEP as a preventive choice for HIV and recommending that it be offered to individuals at substantial risk for HIV (WHO, 2015a).

In spite of the evidence PrEP offers in preventing HIV infection and federal guidance supporting its provision, acceptance of PrEP has been inadequate (U.S. Public Health Service, 2017). Less than 100,000 individuals in the United States are estimated to be taking PrEP even though over 1.2 million are at significant risk for HIV and indicated for PrEP (Mera, McCallister, Palmer, et al., 2016; Calabrese et al., 2017). Healthcare providers play an important role in determining PrEP uptake since it is a prescription-based medication. Healthcare

providers, especially those in primary care settings likely to encounter high-risk women, should take control to identify individuals who might benefit from PrEP (Calabrese et al., 2017). Since many NPs work in primary care and community settings (Nelson et al., 2019), it is important for them to have knowledge of PrEP. Although awareness and prescription of PrEP are both on the rise, in 2015, a national sample surveyed showed 66% of primary care providers were aware of PrEP but only 7% had prescribed it (Smith, Mendoza, Stryker, & Rose, 2016).

Another survey of healthcare providers showed moderate-to-high awareness of PrEP but low levels of PrEP prescription (Krakower & Mayer, 2016; Gunn et al., 2019). These findings indicate the need for educational efforts to raise more awareness about PrEP among future NP providers that are likely to serve women at risk for HIV infection. It is also essential to understand and address barriers to prescribing that account for the gap between awareness and uptake into clinical practice to ensure PrEP access for people at risk for HIV (Bradley & Hoover, 2019).

The Role of the NP in Reducing HIV Risk

Importance of PrEP Awareness in Future NPs

Public health approaches for the prevention of HIV infection require NP knowledge about PrEP, since emtricitabine and tenofovir disoproxil fumarate is the only daily oral medication approved to reduce HIV infection (Nelson et al., 2019). NPs provide high-quality, patient-centered healthcare to a wide range of individuals across the country (Henry, 2015). They provide treatment, diagnose diseases, and prescribe medication to different populations (Henry, 2015). The core element of NPs is the principle of patient advocacy and the provision of care (Cotler, Yingling, & Broholm, 2018). Therefore, to support the provision of the IOM (2011a) which stressed the importance of patient-centered healthcare, NP students should be

knowledgeable in gathering a sexual history and identification of women at risk for HIV infection that will require PrEP. The majority of NPs work in community care and primary care settings where they are likely to encounter high-risk women to provide care through a unique, holistic approach (Nelson et al., 2019). It is therefore essential to have knowledge of PrEP. It is also vital for the NP to consider PrEP not just as a drug but as an HIV prevention tool. In addition, NPs needs to be aware that PrEP medication requires regular visits to monitor therapy, provide education, screen for sexually transmitted infections, and discuss other concerns (Cotler, Yingling, & Broholm, 2018). Because studies report lack of knowledge of PrEP with NPs (Krakower & Mayer, 2016), and given the substantial need to optimize PrEP, future NPs should be trained to achieve satisfactory knowledge and comfort levels to prescribe PrEP (Nelson et al., 2019).

Barriers and Facilitators to PrEP Adoption

Implementation

Implementation of PrEP will depend on healthcare providers' willingness to prescribe it as a biomedical prevention approach (Silapaswan et al., 2016; Smith, Mendoza, Stryker, & Rose, 2016). Therefore, identifying barriers to PrEP is very important as most high-risk women are likely to receive care in healthcare facilities where providers may have limited experience with prescribing PrEP. Findings from the literature on barriers to PrEP for high risk women include lack of knowledge/awareness, difficulty assessing sexual and HIV risk, lack of perception of risk for HIV acquisition, HIV-related health literacy, cost of PrEP, and stigma (Krakower et al., 2015; Gunn et al., 2019; Collier, Colarossi, & Sanders, 2017).

Lack of Knowledge/Awareness

A systematic review by Aaron et al. (2018) reports most American women lack knowledge of PrEP, creating a significant barrier for self-referral to PrEP services. In a narrative analysis, Silapaswan et al. (2016) also found low PrEP implementation nationwide due to healthcare providers' lack of knowledge and qualified skills to provide PrEP. HIV high-risk women may not be aware of the existence of PrEP as an HIV prevention option to consider (Bradley & Hoover, 2019; Aaron et al., 2018). The report also indicated that once women were informed about PrEP, they expressed a willingness to use it, especially African American women (Aaron et al., 2018). A survey by Krakower and Mayer (2016) found low levels of PrEP awareness and prescribing among NPs. Warren et al. (2018) also report low knowledge of HIV care among NP students prior to providing education and increased knowledge after education was provided. These findings demonstrate PrEP educational training among NP students may lead to an increased knowledge of PrEP, which will present an opportunity to increase prevention of new HIV infections (Warren et al., 2018).

Marketing of PrEP, however, may be problematic. PrEP marketing materials do not always display images of women, and many HIV high-risk women perceived PrEP was not for them (Bradley & Hoover, 2019). There is, therefore, a need for personalized messages from leading health agencies and organizations to increase women's PrEP awareness (Bradley & Hoover, 2019). This is particularly true for Black women and Latinas, especially in geographic areas with a high prevalence of HIV where women are important priority populations to inform about PrEP.

A study by Auerbach**,** Kinsky, Brown, and Charles (2015) with 144 women (aged 18–60) in six different U.S. cities found that only about 10 out of 144 women had heard of PrEP, and the

ten women who had heard of it did not know it was offered to women. These findings indicate the need for interventions to address PrEP concerns and knowledge, as well as raise awareness of PrEP among women through marketing materials, personalized messages and healthcare providers (Bradley & Hoover, 2019). As stated earlier, women comprise more than 19% of individuals diagnosed with HIV in the United States each year (CDC, 2019). Because PrEP is an important HIV preventive measure, NP students should be aware of its availability to all high-risk women who are sexually active and provide education about it to those women.

Communication: Difficulty Assessing Sexual and HIV Risk

NPs are in a unique position to assess women at risk for acquiring HIV, including taking a sexual history that asks about sexual and high-risk behavior and carrying out testing to identify women who might benefit from PrEP in preventing HIV (Nelson et al., 2019; Warren et al., 2018). Provider difficulty in assessing HIV high-risk women can be a significant barrier to PrEP. A survey conducted by Gunn et al. (2019) found that many providers specified that they rarely ask patients about their sexual activity. Another recent report by Kingsberg et al. (2019) also found that many providers do not initiate a conversation regarding sexual health with their patients due to lack of confidence, difficulty addressing sexual issues, or the patient's personal discomfort. Kingsberg et al. (2019) report the gap might be the time limitations of the visits and provider assumptions, especially with older women, that their sexual health is less relevant after reproductive years. Several surveys highlight that women generally expect their healthcare provider to initiate conversations related to sexual health and high-risk behavior (Aaron et al., 2018; Gunn et al., 2019; Kingsberg et al., 2019). The report also pointed out that sexual health should be incorporated in all patient encounters when possible and conducted in an atmosphere of sensitivity, compassion, understanding, and respect (Aaron et al., 2018; Gunn et al., 2019;

Kingsberg et al., 2019). To address this topic successfully, Aaron et al. (2018) suggested beginning with careful history taking about sexual health with an understanding of social determinants of health. Effective communication can be facilitated through open-ended questions and by approaches that help a woman to recognize and realize her risk for HIV infection based on her circumstances. An open discussion will provide an opportunity to identify women at risk for HIV infection and then discuss HIV prevention options such as PrEP. Gunn et al. (2019) also suggested using language that conveys a positive attitude and addressing the risk of acquiring HIV infection across a woman's lifespan. NP student training will need to address the communication gap in assessing high-risk women, knowledge, and practice regarding the provision of PrEP.

Cost

The cost can be a challenging barrier to PrEP use in women. The high cost of PrEP may hinder a woman’s PrEP initiation or adherence and has been identified as a barrier in HIV prevention (Bradley & Hoover, 2019). Although the cost of PrEP seems challenging, it has been shown to be a cost-effective strategy to prevent HIV infections among MSM in Thailand and can also be a cost-effective strategy in preventing HIV in high-risk women (Suraratdecha et al., 2018). A cost analysis by Suraratdecha et al. (2018) found that the cost to implement the PrEP program in MSM ranges from US$222.89 to US$310.99 per person per year versus a lifetime treatment of US$3.99 million if prevention has not been used and HIV has been contracted (Suraratdecha et al., 2018).

Cáceres, Borquez, Klausner, Baggaley, and Beyrer (2016) report that the incremental cost-effectiveness of PrEP may range from $5000 and $10,000 per life year when used for a short time for HIV prevention. Although PrEP is much more expensive than other HIV

prevention methods such as condom use, studies found that every one dollar spent in preventing HIV could save more than $21.00 on future treatment costs, hence making HIV prevention a cost-effective investment (Cáceres et al., 2016; Suraratdecha et al., 2018; WHO, 2015b). HIV treatments are more expensive than PrEP, both by the dose and by the period of use, because PrEP is to be used only when at risk of HIV, whereas a person who acquires HIV will need to be on ART for a lifetime in order to stay healthy (Cáceres et al., 2016; WHO, 2015b).

PrEP emtricitabine and tenofovir disoproxil fumarate medication is estimated to cost roughly $1,676 in the U.S. for a 30-day supply without health insurance (U.S. Department of Health and Human Services, 2018). However, both private and public health insurance plans cover PrEP, and many state health departments offer PrEP medication assistance programs to support access for uninsured individuals (Bradley & Hoover, 2019; Krakower et al., 2015). The company who manufactures PrEP emtricitabine and tenofovir disoproxil fumarate (Truvada®) has a medication assistance program (Gilead, n.d). Persons who qualify for the medication assistance are eligible for 12 months of free medication, making it easier for them to enroll and remain in the program (Gilead, n.d). In addition, some public clinics and federally qualified health centers can help uninsured women access clinical PrEP services (Bradley & Hoover, 2019). Short-term financial investments in providing PrEP will result in significant cost-savings in the long term, especially since PrEP is predicted to result in substantial reductions of HIV infections. Therefore, women who identify as PrEP candidates can benefit from education about options for paying for PrEP as well as from having a PrEP coordinator to assist in completing an application process for medication assistance. This pilot study also provided NP students with resources that can help lower the cost of PrEP. NP students should be aware that HIV treatments

are more expensive than PrEP, both by the dose and by the period of use, so that they can provide adequate education to their high-risk women patients.

Stigma

Stigma related to HIV continues to cause some harmful effects to the care, treatment, and wellbeing of people living with HIV (PLWH) (Chambers et al., 2015). Chambers et al. (2015) found that PLWH face discrimination in some ways including negative attitudes and humiliating treatment. A Chambers et al. (2015) qualitative review found that HIV stigma can affect mental health factors such as anxiety, depression, suicidal ideation, emotional health, psychological wellbeing, life satisfaction, and quality of life. Stigma has also been linked to nonadherence to ART and remains a major barrier to HIV prevention (Calabrese et al., 2018).

For women in particular, the stigma around female sexuality and the use of PrEP persists in the US, and as a result, many women avoid discussing their sexual health with their healthcare provider (Calabrese et al., 2018). A cross-sectional survey conducted by Calabrese et al. (2018) found that stigma is a huge barrier and affects women's awareness in seeking information about PrEP, having the intention to use PrEP, and comfortable requesting PrEP from their provider. Another study by Bradley and Hoover (2019) found that stigmatization can also hinder health providers from discussing and offering PrEP, or even prevent effective communication about PrEP with patients at high risk for HIV. Other findings from the literature found that women report that accessing PrEP in neighborhood pharmacies can signal either high-risk behavior and/or bring about HIV stigma; these studies propose a need to increase the reach of PrEP messaging to women and include message content that oppose PrEP stigma (Bradley & Hoover, 2019; Calabrese et al., 2018).

Stigma stems from HIV. Expected stigma from friends and family members related to PrEP use can interfere with providers identifying at-risk for HIV women. Although the stigma surrounding HIV today is not as prevalent as in the earlier years of the epidemic, it will continue to exist until people become aware of the effectiveness of PrEP in preventing HIV (Franks et al., 2017). Findings from a study by Franks et al. (2017) report that perceived HIV related stigma is a barrier to PrEP adherence and prevention among high-risk women. Stigma can affect individual health outcomes, and as ways to increase PrEP commitment among women continue to improve, the need for provisions for effective use becomes more crucial. Integrating HIV prevention into PrEP strategies requires efforts to counter PrEP-related stigma. In the earlier days of the HIV epidemic, Holzemer and Uys (2004) suggested strategies for reducing HIV stigma through assessing, diagnosing, managing, and evaluating. These strategies can still be used to address the issue of stigma, and PrEP education should also include knowledge about the stigma of HIV.

Theoretical Framework

The diffusion of innovation (DOI) theory was used to explore healthcare providers' knowledge, attitudes, and perceived facilitators and barriers to adoption of PrEP in preventing HIV in high-risk women. This knowledge translation theory defines the method of change at various levels over time, while integrating other theories such as social system and communications theory to suggest a strong understanding of the diffusion phenomenon. According to Rogers (2003), DOI "seeks to explain how, why, and at what rate new ideas and technology spread" (p. 9). The purpose of using DOI theory for this study is to explore knowledge of PrEP among NP students in preventing HIV using a pre-test and post-test to evaluate five factors of innovations whether to adopt or to reject an innovation. The five factors

are relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003) (see Appendix C). The relative advantage examines an innovation and determines whether to adopt or reject it based on whether it is better than the existing standard ideas (Rogers, 2003). Compatibility examines the similarity of the views with current norms for better chances of adoption (Rogers, 2003). Complexity analyzes how easy the invention is for people to recognize the innovation, and trialability examines how willing an audience is to try a new idea (Rogers, 2003). Finally, observability examines how the results of the innovations are available for others to share (Rogers, 2003).

The DOI model fits this project because dissemination research refers to a study designed to assess the success of intervention among individuals and in a community (Dearing & Cox, 2018; Mitchell et al., 2010). The DOI model also determines the method of shifting the information, talent, and systems support required to bring an intervention to a target audience such as NP students. The five DOI knowledge translation theory stages were used to assess future providers' knowledge about PrEP, a relative advantage that further examined previous practice and discovered what worked and what did not, such as abstinence, condoms, and the efficacy of PrEP in preventing HIV**.** Trialability examined the literature for previous PrEP report evidence. Complexity examined the complexity of PrEP for ease of use and awareness to future providers. Compatibility corresponds with aligning CDC guidelines**,** and observability confirmed adoption through outcomes and prevention of HIV among high-risk women. Because fears of disclosure of HIV high-risk due to expected stigma, internalized humiliation, and experiences of discrimination among family and friends can influence PrEP adaptation, the DOI five-stage model addressed each PrEP barrier and guides the science about future decision-making to utilize it with HIV prevention. Through dissemination research, empirical knowledge is used to

determine the effectiveness of an intervention with widespread application. This model also fits this project because it increases awareness of research findings by identifying the best implementation methods which helped target NP students to accept and use evidence and interventions that might apply to the practices (Dearing & Cox, 2018).

Methodology

The proposed pilot study assessed the effectiveness of the PrEP education on NP students using pre-test and post-test (Appendix F). After securing Institutional Review Board (IRB) approval, senior NP students enrolled in an adult-gerontology primary care 3 clinical course in a university in northern New Jersey were recruited for the study. In the Fall semester, NP students in the adult-gerontology primary care 3 course who volunteered completed a series of surveys and forms including a consent form and pre-test to assess their knowledge about PrEP in preventing HIV. Immediately after completing the pre-test, the NP students received a PowerPoint teaching intervention (see Appendix G). Following the teaching intervention, students completed a post-test. Two weeks later they completed another follow-up post-test evaluation to assess retention and determine utility of the information in the clinical setting (see Appendix H). All three surveys took approximately 10 minutes to complete. Each question took about one minute to answer.

Setting

The setting of the project was in a classroom of the senior NP students in an adult-gerontology primary care clinical course #3 in a university in northern New Jersey.

Study Population

In the fall semester of 2019, the maximum enrollment in an adult-gerontology primary care #3 graduate clinical course was 44, and a total of 32 students volunteered for this project,

which represented 73% (32 out of 44) of the total students in the course. Student volunteers were recruited by word of mouth from the principal investigator (see oral script) and a recruitment flyer (see DNP recruitment flyer). The purposeful selection of the target population represents nurse practitioner students training to become providers in clinical settings that heavily rely on prescribing medication as an essential part of the practice. The study participants included senior family nurse practitioner and adult-gerontology students. The goal was to include as many students as feasible to provide the most detailed results since this is a pilot study.

Inclusion Criteria

To be included, the students had to be 18 years old, enrolled in the adult-gerontology primary care 3 clinical course, and then volunteer to participate.

Exclusion Criteria

Exclusion criteria are students in the psychiatric mental health nurse practitioner track, graduate students not enrolled in clinical courses, family nurse practitioner master's degree track, and students currently enrolled in the acute care practitioner track course.

Study Interventions

The study was conducted through an anonymous self-administered questionnaire. The pre-test and post-test (see Appendix F) were designed using the WHO and CDC guidelines and literature review as content. The intervention began with ten pre-test questions assessing NP students' knowledge of PrEP, CDC and WHO guidelines, how to obtain PrEP, necessary tests, education before and during PrEP, safety and efficacy of PrEP, identification of high-risk women, and knowledge of who should prescribe PrEP. Following the pre-test, the NP students received a PowerPoint teaching intervention. Immediately following the teaching intervention, students completed a post-test, and two weeks later, students completed a follow-up post-test

evaluation. Participants received a PrEP resources website link as a support tool for more information in the clinical setting. (see Tools). The intervention was delivered during the week and after class time by the principal investigator. All activity for the intervention was completed on the same university campus. Handouts of the material were printed in the event of technical difficulty. The two-week follow-up intervention evaluation (see Appendix H) evaluated the NP students' awareness of the CDC's guidelines in use of PrEP in high-risk adults 18 and older. Knowledge, management, and concern about PrEP, such as the side effects or women engaging in high-risk conduct, was also be evaluated. The last evaluation questionnaire assessed the NP students' personal willingness to prescribe PrEP to HIV high-risk female patients.

Outcome Measure

The outcome measured the ten questions that assessed NP students' knowledge, attitudes, apparent facilitators, and possible barriers to the embracing of PrEP in preventing HIV in high-risk women. The questionnaire and educational module used to measure the outcome of this project was developed by the principal investigator based on CDC and WHO guideline, and multiple literature review findings that indicated low PrEP prescription among healthcare providers. The questionnaire included PrEP knowledge, indication, and experience with HIV PrEP; identification of HIV high risk women, test before and during PrEP use; perceptions, and attitudes towards HIV PrEP by senior NP students, and the likelihood of prescribing PrEP after graduation. All questionnaires, educational intervention module and tools used to extract information for this project are in the Appendix section of this paper.

The outcome of the study, which is a self-administered anonymous questionnaire, contained no student names, organization name, or identification number. The survey was entirely voluntary and responses was described with no identifying features of the individuals.

No personal identifying information about the students were required. All information obtained were kept confidential. The names of the participants and the name of the school did not appear in any project or publications. Following the project defense, surveys and data collected during the process pertaining to the study will be deleted and destroyed per Rutgers State University protocol

Risks or Harms

No participants in the study was exposed to any dangers or harms as a result of their involvement in this project. The minimal anticipated risk or harm for this project was the time to complete the survey, which may interfere with school or personal time. However, to mitigate this concern, a time most convenient for the participants was arranged.

Subject Recruitment

In the fall semester of 2019, 44 senior NP students were enrolled in the adult-gerontology primary care 3 clinical course at a university school of nursing in northern NJ, and a total of 73 percent of the students participated. Using this convenience population, student volunteers were recruited by word of mouth from the principal investigator (see oral script) and a recruitment flyer (see Appendix D). After approval was received from the faculty support team and Institutional Review Board (IRB), volunteer senior students were recruited in the fall semester of 2019. The principal investigator met the volunteer students before or at the end of their scheduled class time for a recruitment meeting and to complete an anonymous questionnaire.

Consent Procedure

The consent form was created using the Rutgers IRB suggested template and was customized to fit the objectives of this project. The consent does not include participant names or any identifying information regarding the participants or the facility. Informed consent was

obtained in writing in accordance with IRB requirements from Rutgers University (see Appendix E). The principal investigator explained the aim and objectives of the project and answered questions. Students choose to participate or not to participate. Those who volunteered to participate were assured that they can withdraw from participating before filling out the survey and that their academic standing will not be affected in any way.

Subject Costs and Compensation

There is no cost or compensation to subjects to participate in this project. After the pre-test and post-test were completed, light refreshments were provided to the participants. For participation in the study, students received PrEP resources website link as a support tool for more information in the clinical setting (See Tools).

Project Timeline

1. Meet with Chair and Team members – 12/13/2018
2. Question development – 01/22/2019
3. Theoretical Framework Models - 01/2019 to 03/2019
4. Review of PrEP Prescribing Guideline and Literature - 01/2019 to 03/2019
5. Tables of Evidence – 01/2019 to 03/2019
6. Exploring and Designing Project modules – 03/23/2019
7. Began Draft of Project Proposal – 03/23/2019
8. Project Proposal Presented – 05/22/2019
9. Approval by Committee and Scientific Review – 07/15/19
10. Proposal sent to IRB – 7/18/2019
11. IRB approval – 08/21/2019
12. Recruitment and Intervention - 09/04/19 to 09/13/19

13. Data collection – 09/13/19 to 11/27/19
14. Data analysis – 11/27/19 to 12/10/2019
15. Analysis of the result and discussion -12/14/19
16. Meetings and analysis – 12/2019 to 01/2020
17. Finalizing of the presentation date with the chair and the team member - 12/26/19
18. PowerPoint Presentation finalized – 01/06/2020
19. Project presentation (Final defense) – 01/09/2020 (Appendix I)

Resources Needed/Economic Consideration

It took three months to complete this project (see Appendix I). The estimated total cost for this project is approximately $265.98. It includes $59.99 to print color materials at Staples and $100.00 for poster printing. It also includes $105.99 for light refreshment for participants (see Appendix J).

Evaluation Plan

Data Maintenance/Security

No personal or identifying information was collected for this project. Only de-identified data was used throughout the study and shared between the principal investigator and co-investigator. Written consents were stored in a locked safe in SSB- Room 1135 at Rutgers State University of New Jersey, 65 Bergen Street, Newark, New Jersey 087101. The office and locked safe are accessible only to the principal investigator and co-investigator. After the project defense, consent and surveys will be deleted and destroyed per Rutgers State University protocol.

Data Analysis

The pilot study assessed the effectiveness of the PrEP educational intervention on senior NP student knowledge of PrEP using pre-test and post-test, and a 2-weeks follow-up evaluation.

Data collection was completed on November 27, 2019. The study duration was three months and the differences in the pre- and post-test scores were measured with paired t-test and Wilcoxon Signed Rank Sum. All data analysis was completed using SPSS Version 22 software provided by Rutgers School of Nursing. All written consents were stored in a secure office on the Rutgers School of Nursing campus. After the project defense, surveys and other raw information will be deleted and destroyed according to Rutgers policy.

Findings

A total of 32 students volunteered for this project, which represented 73% (32 out of 44) of the total senior NP students enrolled in an adult-gerontology primary care 3 clinical course in northern New Jersey. The findings of the project Pre-Test, Post-Test, and 2-Week Follow-Up are shown and discussed in table 1, table 2, and table 3. The recruitment and data-collecting phase of the project began September 13 2019, and continued until November 27th, 2019. At the conclusion, all survey information was transferred into Microsoft Excel prior to analyzing with Paired t Test and Wilcoxon Matched Pairs Test. A codebook was developed for each item and the information was transferred to *SPSS Version 22*.

Results *Pre-Test, Post-Test,* and *2-Week Follow-Up*

The data collected for all surveys in this study has no identifiable information, and it was not possible to track a single student's responses directly across all the surveys. This design was to protect students' privacy and remove any concern they might have that this pilot study could reflect upon them as an individual.

The PICO question for this project is, "Among senior NP students enrolled in an adult-gerontology primary care 3 course in a university in northern New Jersey (P), how effective is education (I), compared to no education (C), in increasing knowledge of HIV PrEP (O)?" To

answer this question, Table 1 displays the paired *t* test and Wilcoxon test comparisons for the student's pre-test and post-test knowledge of HIV PrEP. Significant increases in knowledge were noted from pre-test ($M = 7.25$) to post-test ($M = 8.75$) based on both the paired *t* test ($t[31] = 7.12$, $p = .001$) and the Wilcoxon matched pairs test ($z[31] = 4.34$, $p = .001$). Significant increases in knowledge were also noted from pre-test ($M = 7.25$) to follow-up ($M = 9.63$) based on both the paired *t* test ($t[31] = 10.23$, $p = .001$) and the Wilcoxon matched pairs test ($z[31] = 4.73$, $p = .001$). Also, significant increases in knowledge were also noted from post-test ($M = 8.75$) to follow-up ($M = 9.63$) based on both the paired *t* test ($t[31] = 3.51$, $p = .001$) and the Wilcoxon matched pairs test ($z[31] = 2.91$, $p = .004$) (Table 1).

The pre-test, post-test, and 2-week follow-up evaluation all had a response rate of 32 students. There were ten questions designed to assess NP student knowledge and awareness of PrEP in preventing HIV in high-risk women. The results of the pre-test successfully demonstrated that 100% of the 32 volunteer NP Students have the knowledge of what PrEP is, what PrEP is indicated for, medication approved by the FDA for use in preventing HIV infection. Of the 32 volunteer students, results also demonstrated that 96.88% have the knowledge that PrEP medication is effective in preventing HIV, and aware of who can prescribe PrEP. 93.75% of the volunteer NP students are aware that PrEP cannot be purchased without a prescription. However, only 12.5% of volunteer NP students reported accurate identification of women being at risk for HIV infection that may require PrEP; and only 9.38% know the necessary tests before and during PrEP use (Table 2).

Prior to providing education, student confidence regarding accurate identification of women at risk for HIV infection that may require PrEP was very low. Also, knowledge of the necessary tests before and during PrEP use was low. However, once education was provided,

student confidence improved and knowledge of accurate identification for at-risk women for HIV went from 12.5% to 78.13%. The knowledge of the necessary tests before and during PrEP use went from 9.38% to 84,38% and 81.25%, validating the PICO question answer that effective education increases knowledge of HIV PrEP.

Discussion

The primary aim of this pilot study is to increase the use of PrEP in HIV prevention in high-risk women 18 to 65 years of age. The secondary aim of the project is to increase knowledge about PrEP among senior NP students enrolled in an adult-gerontology primary care 3 course in a northern New Jersey university.

PrEP education for senior NP students enrolled in an adult-gerontology primary care 3 course needed to be refocused and strengthened. PrEP education is necessary to ensure future NP provider confidence in their ability to prescribe PrEP and prevent new HIV infections (Warren et al., 2018). Schools could take many actions to incorporate PrEP education for women into the curriculum. Aaron et al. (2018) report that increasing PrEP uptake for women involves identifying women at risk who may benefit from it. This identification requires paying detailed attention to personal and social background and any barriers to PrEP (Aaron et al., 2018). Schools can provide PrEP education and training to health care providers, identifying possible barriers, and evidence-based practices for PrEP implementation for women (Bradley & Hoover, 2019). When providers have knowledge of PrEP, they are more likely to educate their female patients about the availability of PrEP as an effective HIV prevention option for women (Bradley & Hoover, 2019). Consistent with this study and other findings in the literature showed moderate-to-high awareness of PrEP but low levels of PrEP prescription (Bush et al., 2016; Krakower & Mayer, 2016). Significant increases in knowledge was noted from pre-test (M =

7.25) to post-test (M = 8.75), it is clear when based on both the paired t test (t[31] = 7.12, p = .001) and the Wilcoxon matched pairs test (z[31] = 4.34, p = .001) (Appendix I). Significant increases in knowledge were also noted from pre-test (M = 7.25) to follow-up (M = 9.63) based on both the paired t test (t[31] = 10.23, p = .001) and the Wilcoxon matched pairs test (z[31] = 4.73, p = .001). (Appendix I). Once students were provided with education, their confidence regarding knowledge of identification of HIV high-risk women and the knowledge of necessary tests before and during PrEP use was improved. The 2-weeks following the education the confidence level for student increased in knowledge from post-test (M = 8.75) to follow-up (M = 9.63) based on both the paired t test (t[31] = 3.51, p = .001) and the Wilcoxon matched pairs test (z[31] = 2.91, p = .004) (Appendix I).

This pilot study provided an increased body of knowledge about HIV prevention using PrEP. Although this study was not completed in a clinical setting, students learned about HIV, risk factors for HIV and identification of women who might benefit from PrEP. The educational module and result of post-test and 2-week evaluation indicate that the NP students involved in the study will commit to HIV prevention as shown in table 1. This commitment will lead to a lower incidence of HIV infection. As a result of this study, senior NP students were influenced into seeking additional information regarding PrEP and utilization of it. The most shocking finding for this project was the discovery of many students eager to learn more about PrEP and being included in the project.

Implications

The theoretical foundation of this project is the diffusion of innovation model. Using the model's framework, results from a quality improvement project should be included in a plan to

hold the knowledge for an extended period. The project's implications are discussed regarding clinical practice, healthcare policy, quality & safety, education, and economics.

Clinical practice

The Institute of Medicine (IOM) describes clinical practice strategies as "a recommendation statement proposed to improve patient care, that are evidence based by a systematic review and evaluate the benefits and harms of alternative care options" (IOM, 2011b). As a result of this IOM statement, the recommendation for clinical practice for preexposure prophylaxis (PrEP) in the prevention of human immunodeficiency virus (HIV) infection is a net benefit for patient-oriented health outcomes. Primary care providers have been known as those who have the potential to make a comprehensive assessment of HIV high-risk women with the goal of detecting and decreasing new HIV infection. One way to achieve the IOM clinical practice of optimizing patient care, which has the benefit of an evidence-based systematic review, is through the uptake of PrEP to reduce HIV infection. PrEP initiation and management involve clinical evaluation, prescription, routine blood testing, and follow-ups. Therefore, both the users and providers need to maintain constituent contact. From this study, it was noted that specific challenge that may vary among providers could be accurately identifying women at risk for HIV infection that may require PrEP. Again, this study was not conducted in a clinical setting, and it lacked the scope to examine the clinical practice in detail. However, students involved in the study learned about HIV prevention and management of PrEP. When providers have an in-depth knowledge of HIV prevention, it will lead to a lower incident of HIV infection

Healthcare policy

Healthcare policy recommendations for HIV PrEP changes are institutional and national. Rutgers School of Nursing currently offers HIV care specialization. Many NP students interested

in HIV care specialization certification are obligated to take all the three HIV courses to expand their knowledge of HIV care. The School of Nursing should encourage all students and faculty to complete educational courses on PrEP and HIV preventions, to ensure future providers have the knowledge and foundation for teaching. The PrEP recommended guideline and HIV prevention should also become the conventional ideal in all clinical courses, which might require curricular adjustment to ensure that it is used.

From a nationwide viewpoint, the American Academy of Nurse Practitioners (AANP) and the American Nurses Credentialing Center (ANCC) should also consider requiring nurse practitioners to have knowledge of PrEP and HIV prevention competency. Policy changes for these requirements are uncertain since each state provides the legal authority for nurse practitioner licensing. However, AANP and ANCC certification should be constructed to encounter the altering landscape of health care which should include preparing the future workforce with the information and aids needed to prevent HIV. In addition, policymakers should continue to identify evidence-based practice meant to improve the welfare, health and well-being of diverse citizens and populations. The Government and policymakers should also continue to engage in research to explore multiple ways to treat and prevent HIV infection and its several health-related conditions in women, and to also find a cure.

Quality & Safety

The quality and safety efforts of this project focus on how future providers can meet established professional standards and PrEP users' expectations. The most important quality and safety of this pilot study is that the benefits of PrEP in preventing HIV far outweigh the risks (CDC, 2019). The results of this project demonstrated an improvement in PrEP knowledge among NP students. This project can be expanded to a wide-based community and organizational

outreach program, beyond NP students. Ensuring high-quality primary care is important in the prevention of HIV. This project is committed to improving the prevention of HIV through the use of PrEP. PrEP is the only effective HIV prevention method available to women that are completely within their control. However, due to a lack of awareness of PrEP by high-risk women, and inadequate knowledge of PrEP by healthcare providers, PrEP uptake remains low. If future NP providers continue to stay committed to PrEP, it will result in lower HIV infection. To achieve the quality and safety goal, providers should identify women at risk for HIV, explain in detail how PrEP works, its effectiveness, safety, and available resource to lower the cost, respond to any questions, and then initiate PrEP care if the person is interested.

Education

The Rutgers School of Nursing has been among the lead of the DNP education program and also among the first school to develop a sub-specialty in HIV-focused DNP program (Willard, Nelson, Reyes, & Linn, 2016). Therefore, information obtained from this project should be shared with the nursing faculty members. Based on the findings from the literature search, there are no designated models of NP-based PrEP care. Cotler, Yingling, & Broholm (2018) published an article on barriers that may exist and prevent many primary care NPs from recommending PrEP for patients who needs it. The article reports few barriers for NPs in integrating PrEP in their clinical practice and suggested NPs view PrEP not just as a drug, but rather an overall treatment and prevention program for HIV risk reduction. Rutgers School of Nursing is devoted to the pursuit of quality in education, research, evidence-based health care distribution, and the promotion of community health. As one of the nation's comprehensive academic nursing programs, if PrEP education is incorporated in the curriculum, it will contribute to the goal of making new HIV infections rare in women.

Economic

It is expected that the 32 volunteers senior NP students for this project will understand that HIV prevention is a cost-effective investment. Through the knowledge gained from this study, they can ultimately lower the healthcare costs of their high-risk female patients and improve quality healthcare outcomes by preventing HIV infection when practicing as a provider.

Failure to improve HIV prevention can lead to an HIV epidemic, high treatment costs, and even death. To modify the course of the HIV epidemic strategies, prevention is the key as HIV screening and Antiretrovirals therapy (ART) adherence alone may not be adequate, even though there are effective interventions. However, improving prevention with PrEP may have a more transformative impact on ending the HIV epidemic. PrEP is the right tool to end HIV infection; therefore, lawmakers should consider expanding the availability of PrEP to individuals at risk for acquiring HIV. Lawmakers should make provisions for PrEP to be obtained at no or very low cost to women at risk for HIV. They should also create local teams committed to the success of the Initiating and expanding PrEP in HIV prevention. A study by Cambiano et al. (2018) reports that PrEP is cost-saving among men who have sex with men (MSM) in the UK when compared to the treatment of HIV. The study concludes that PrEP use among MSM led to a lower incident of HIV among MSM, therefore, the same principle can be used to conclude that PrEP use among high-risk women will also lead to a health benefit and a considerable reduction in HIV incidence.

Sustainability

The sustainability of the project will be maintained through continued education of the NP students and the use of the information generated from the project. The NP Students involved in the project demonstrated sustainable knowledge of PrEP in preventing HIV in high-risk

women as seen in the 2-week follow-up evaluation. PrEP is an effective HIV prevention investment in reducing the number of new HIV infections. Those NP students involved in the project can use the knowledge gained from this project to increase the uptake of PrEP in women in their work places. Future research will also be needed in order to achieve sustainable change for this pilot study. This future research can focus on increasing population size of NP students by including other universities as well as including practicing providers. Provider PrEP knowledge and awareness is linked with increased prescriptions; therefore, it is essential for healthcare providers, especially those working in a primary care setting, to know about PrEP for ensuring sustainability. Future interventions for sustainability of this project should continue to evaluate healthcare providers' knowledge, attitudes, and perceived facilitators and barriers to the adoption of PrEP in preventing HIV in high-risk women.

Translation

Data will be presented to the stakeholders and professors of the university in northern New Jersey during project presentation and during Poster Day.

Plans for Dissemination

The dissemination will be completed by using illustrations and graphics to make results additionally accessible and to make the document more appealing. Participants will be aware of the results through the DNP presentation, during the final semester in the classroom, and have access to paper through the university online repository. The results of the project will also be presented as part of the DNP requirement. The project will be published through the online repository provided by the school.

Professional Reporting

The project will be shared to the public and professionals through publications and poster presentations.

Future Scholarship

The first step of future scholarship is to publish the findings. This project, nurse practitioner (NP) student knowledge of PrEP in preventing human immunodeficiency virus (HIV) in high-risk women, will be published internally and externally through publications and poster presentations. The second step will be through manuscript submission. The National League for Nursing and AIDS Patient Care and STDs Journal publicized a demand for submissions of a writing workshop to help beginner authors develop a manuscript for publication. An application will be submitted for this workshop since it will be a perfect match for project dissemination.

This project is a pilot study and will serve mainly as a foundation for future research, investigation, refence and also the life work of the primary investigator. The limit for this project findings includes the fact that it cannot precisely be generalized to all NP students since it was only conducted on AGPC 3 students only. Relatively, this project uses interpreted evidence-based knowledge to focused attention on the patient safety issues, health professional's education, and initial phases in addressing a clinical problem which has an important impact on the patient safety outcome (AACN, 2015). This project meets a form of quality improvement for nurse practitioner education on a local, national, and global level.

Conclusion

This pilot study was conducted to increase knowledge of PrEP and the identification of high-risk women among senior NP students. Findings from the study suggested students are not

getting enough knowledge about initiation and management of PrEP in the clinical and lack the skill of identifying high-risk women who may benefit from it. Study findings also suggest a need for PrEP education in NP courses and clinical guidelines to support PrEP provision to high-risk women. To ensure best preparation, faculty should incorporate CDC guidelines regarding the use of PrEP to guarantee adequate knowledge before graduation. This adequate knowledge will build media literacy among providers and women on the knowledge of PrEP, counter the stigma, and save high-risk women from disease and death.

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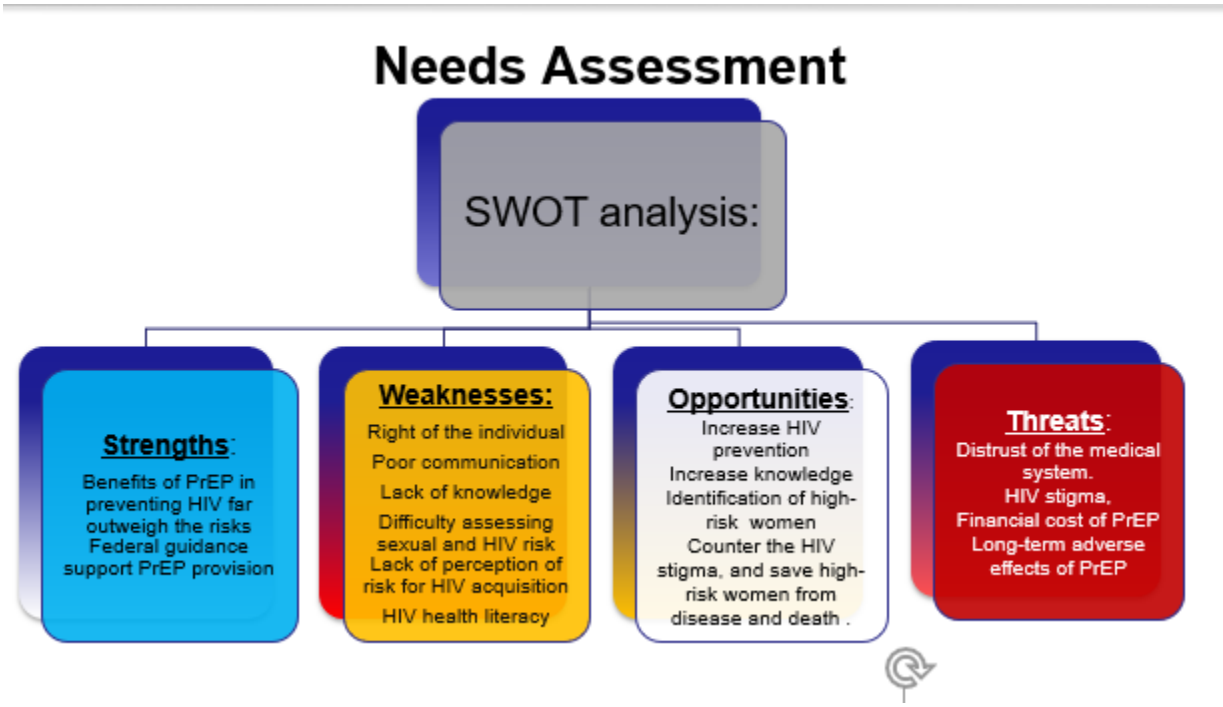
Appendix A

SWOT Analysis



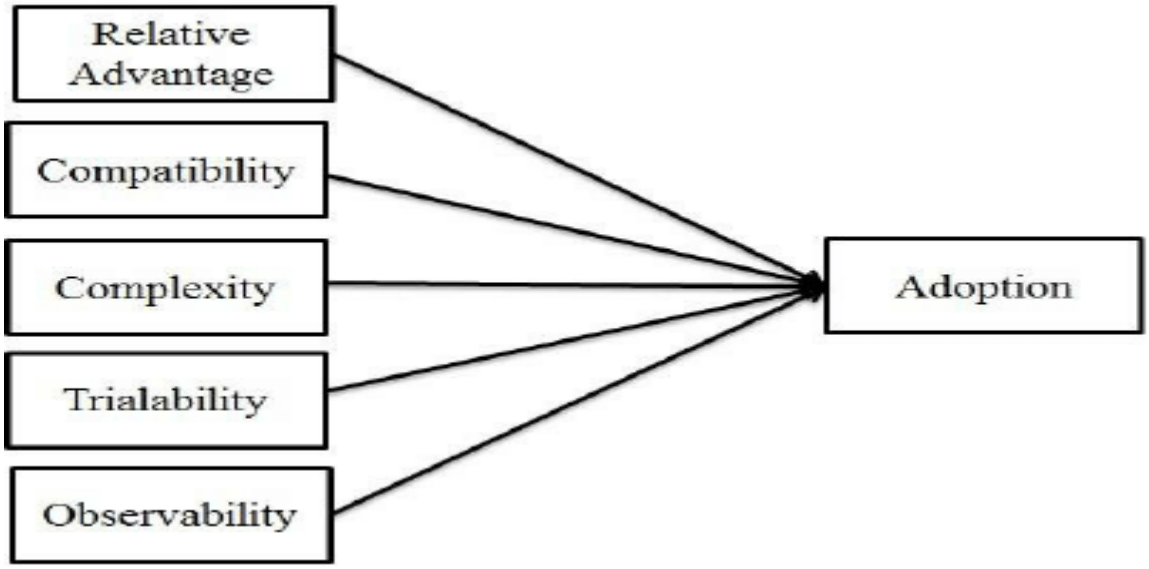
Appendix B

Tools for Assessing HIV In High-Risk Women

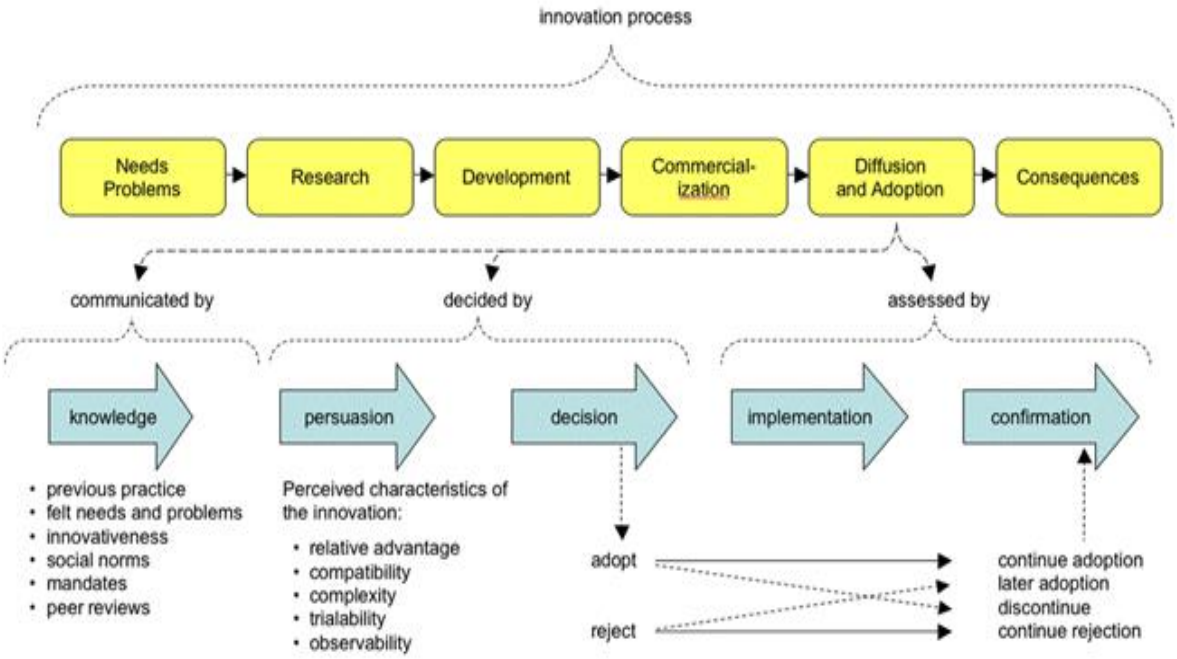
Women		
In the last 6 months, have you had vaginal/anal sex with a man? **If NO, stop here!**	Yes	No
In the last 6 months, have you had vaginal/anal sex without a condom with a partner whose HIV status is positive or you are unsure?	Yes	No
In the last 6 months, have you had sex without a condom with a partner who injects drugs and whose HIV status is positive or you are unsure?	Yes	No
In the last 6 months, have you exchanged sex for resources?	Yes	No
In the last 6 months, have you had an STD?	Yes	No
Add the number of Yes responses – if the number is ≥ 2, refer for PrEP Counseling		

Note: copied from New Jersey Department of Health HIV Test Counselor PrEP Risk Assessment

Appendix C



Note: Copied from https://www.researchgate.net/figure/Diffusion-of-Innovation-Theory-Roger-1983_fig4_286777535



Note: Copied from https://hl250group5.weebly.com/core-constructs.html

Appendix D

Recruitment Flyer

Script for Oral Recruitment

The proposed pilot study is to assess the knowledge of senior NP students about PrEP in preventing HIV among high-risk women and provide education. The proposed study will use a methodology involving questions to assess the senior NP students enrolled in an adult-gerontology primary care #3 course [redacted] in northern New Jersey. The survey will be delivered using a pre-test, then educational module, and a post-test.

The same series of questions will be asked on Pre-Test and Post-Test. Two weeks later, the students will complete another evaluation follow-up similar but different post-test to assess retention and determine the utility of the information in the clinical setting.

Time Commitment: All three surveys and educational module will take approximately 10 minutes to complete each. Each question will take about one minute to answer.

Location:

The location will be in a classroom for the senior NP students enrolled in the adult-gerontology primary care #3 clinical course [redacted] in northern NJ

Principal Investigator: Gerti E. Heider, PhD, MSN, GNP-BC, ANP.

Contact information:[redacted]

Appendix E

CONSENT TO TAKE PART IN A RESEARCH STUDY

TITLE OF STUDY: Nurse Practitioner (NP) Student Knowledge of PrEP in Preventing Human Immunodeficiency Virus (HIV) in High-Risk Women

Principal Investigator: Gerti E. Heider, PhD, MSN, GNP-BC, ANP.
Co-investigator: Regina Inokon, RN, BSN, DNP Candidate

This consent form is part of an informed consent process for a research study and it will provide information that will help you decide if you want to take part in this study. After all of your questions have been answered in the research study, you will be asked to sign this consent form. You will be given a copy of the signed form to keep.

You are being asked to take part in this project because you will be a future health care provider. The purpose of this pilot study is to assess NP students' knowledge and awareness of PrEP in preventing HIV in high-risk women and provide education for prescribing PrEP.

What will I be asked to do if I take part?

After completing the informed consent, you will complete a 10-question pre-test to get a baseline of knowledge and awareness about PrEP in preventing HIV. After a brief educational module, you will be given a 10-question post-test, again to assess knowledge and awareness. PrEP resources information will be provided after the post-test as a support tool for students who need more information. Finally, two weeks later, you will complete another 10-question post-test to assess retention of knowledge as well as your ability to recommend PrEP to high-risk women. Each test and education module will take 10 minutes to complete. The content of this educational presentation will only be included in the pre/post-test questions and post-evaluation survey test. It is not included in your course exams. Pre and post-test will be administered in the [redacted]. The

maximum enrollment in an adult-gerontology primary care #3 graduate clinical course is 48, and a high percentage of the students are expected to participate. You can choose not to complete the module. You can also choose to exit the module at any time. You must be at least 18 years old to participate, if you are younger than 18 years old, please stop now.

Participation in this study is voluntary.

What are the risks and/or discomforts I might experience if I take part in the study?

It is unlikely that any participants will be exposed to any dangers or harms as a result of their involvement in this project. The minimal anticipated risk or harm for this project is the time to complete the survey, which may interfere with work hours. Your scores from the pre/post-test will not impact any of your grades. Breach of confidentiality is a risk of harm but a data security plan is in place to minimize such a risk. Also, some questions may make you feel uncomfortable. If that happens, you can skip those questions or withdraw from the study altogether. If you decide to quit at any time before you have finished the questionnaire your answers will NOT be recorded.

Are there any benefits to me if I choose to take part in this study?

There are no direct benefits to you for taking part in this research. You will be contributing to knowledge about future providers knowledge, awareness, willingness to prescribe PrEP in preventing HIV in high-risk women. PrEP is the only medication approved by FDA as an effective HIV prevention approach reduction risk by 90-99% if taken as prescribed and is recommended for both men and women who are at high risk for HIV infection.

Will I be paid to take part in this study?

You will not be paid to take part in this study.

How will information about me be kept private or confidential?

All efforts will be made to keep your responses confidential, but total confidentiality cannot be guaranteed. We will not collect any information that can identify you or other subjects. Completed forms will be stored in a locked cabinet controlled by the investigator. Responses may be converted to digital format and stored on a password-protected computer that can only be accessed by the study team. Paper copies will then be destroyed. We plan to delete the data following the analysis and interpretation. No information that can identify you will appear in any professional presentation or publication.

What will happen to information I provide in the research after the study is over?

The information collected about you for this research will not be used by or distributed to investigators for other research.

What will happen if I do not want to take part or decide later not to stay in the study?

Your participation is voluntary. If you choose to take part now, you may change your mind and withdraw later. You may leave without turning in a completed form or by turning in a blank or incomplete form. However, once you turn in the form, you can no longer withdraw your responses as we will not know which ones are yours. Your decision to participate or not participate will not affect your relationship with [redacted].

Who can I call if I have questions?

If you have questions about taking part in this study, you can contact the Co- Investigator: Regina Inokon at [redacted] or via email at [redacted]. You can also contact my faculty advisor Dr. Heider at [redacted]

If you have questions about your rights as a research subject, you can call the IRB Director at:

the IRB reviewing your research. Newark HealthSci (973)-972-3608 or the Rutgers Human Subjects Protection Program at (973) 972-1149.

Please keep this consent form if you would like a copy of it for your files.

By beginning this research, you acknowledge that you have read the information and agree to take part in the research, with the knowledge that you are free to withdraw your participation without penalty.

AGREEMENT TO PARTICIPATE

Subject Consent:

I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form and this study have been answered. I agree to take part in this study.

Subject Name (printed): _____

Subject Signature:_____Date: _____

Signature of Investigator/Individual Obtaining Consent:

To the best of my ability, I have explained and discussed all the important details about the study including all of the information contained in this consent form.

Investigator/Person Obtaining Consent (printed): _____

Signature:_____ Date: _____

Appendix F

PRE/POST TEST QUESTIONS

#1. What is PrEP?

a. pre-exposure prophylaxis

b. prep school

c. Preps are people who live a preppy lifestyle

d. To prepare for procedure

#2. What is PrEP indicated for?

a. HIV-negative individual at risk for HIV infection to reduce their risk of becoming infected

b. HIV positive men who have sex with other HIV positive men

c. sexually transmitted infection such as gonorrhea, chlamydia and syphilis

d. Injection Drug Users

#3. PrEP is a daily medicine that can be used to prevent which of the following

A. Sexually transmitted infections

B. HIV

C. Cancer

D. Pregnancy

#4: PrEP can be purchased over-the-counter, without a prescription.

a. True

b. false

#5. Before starting PrEP, what are the necessary tests. (Select all that applies)

a. HIV test (antibody test and HIV RNA test)

b. creatinine,

c. Sexually transmitted infections

d. pregnancy test

e. Hepatitis B surface antigen

#6 During PrEP use what test and education should be done? (Select all that applies)

a. Regular doctor visits every 2 to 3 months to assess blood work.

b. Assess side effects, adherence and risky activity.

c. Routine HIV antibody tests at each visit to ensure continued HIV-negative status.

d. Sexually transmitted infections tests done every 3 to 6 months.

#7. How effective is PrEP in preventing HIV in high risk women infection

a. PrEP reduces the risk of getting HIV from sex by more than 90% and from injection drug use by more than 70%.

b. less *effective* when taken consistently

c. Only effective in Infants and Children lest than 16 years of age

d. Very effective in reducing Sexually transmitted infections but not effective in preventing HIV

#8. Which of the following women is at risk for HIV infection and may require PrEP? (Select all that applies)

a. A woman who had vaginal or anal sex with a man in the last 6 months

b. A woman who had vaginal or anal sex without a condom with a partner whose HIV status is positive or unknown in the last 6 months

c. A woman who had sex without a condom with a partner who injects drugs and whose HIV status is positive or unknown in the last 6 months

d. A woman who sex in exchanged of money or resources in the last 6 months,

e. A woman who had an STD in the last 6 months

#9. What medication was approved by FDA for use in preventing HIV infection

a) emtricitabine / tenofovir (Truvada)

b) Dovato (dolutegravir + lamivudine)

c) Kaletra (lopinavir + ritonovir)

d) Triumeq (dolutegravir + abacavir + lamivudine)

#10. Who should prescribe PrEP to the HIV high-risk female patient*?*

a. Health care providers licensed to prescribed medications such as primary care physicians, HIV specialists, and Nurse practitioners.

b. HIV specialist and HIV workers only

c. OB/GYN doctors only

d. Social worker and Case manager who work with HIV women.

Appendix G

PrEP Education

Regina Inokon

DNP Chair: Gerti E. Heider, PhD, MSN, GNP-BC, ANP

DNP Team Member(s): Dr. Thomas J. Loveless, CRNP, Ph.D., AAHIVS

What is PrEP?

- PrEP means Pre-exposure prophylaxis (PrEP).
- PrEP is a daily medicine that can be used to prevent HIV infection.
- PrEP is a combination of two human immunodeficiency virus (HIV) medications named tenofovir and emtricitabine in a single pill known as Truvada.
- PrEP is the only medication approved by the Food and Drug Administration (FDA) for use in preventing HIV in high-risk individuals.
- PrEP is recommended along with other prevention methods, such as using condoms.
- PrEP does not prevent pregnancy or other sexually transmitted infections

(CDC, 2019; Jin, 2019).

Benefits of PrEP:

- Reduce the risk of HIV transmission from sex by 90%.
- Reduce the risk of HIV transmission for people who inject drugs by 70%.
- Reduce community and state HIV epidemics.
- Save lives and help people live a quality life.

(CDC, 2019).

What is PrEP indicated for?

- PrEP is indicated for use by an HIV-negative individual at risk for HIV infection to reduce their risk of becoming infected.
- Healthcare providers play an important role in identifying potential high-risk women. The identification begins with taking a look at sexual and drug use history.
- It is very effective for preventing HIV infection if used as prescribed.
- Can reduce the risk of getting HIV from sex by more than 90% and from injection drug use by more than 70% if used daily.
- It not used to treat sexually transmitted infection such as gonorrhea, chlamydia, and syphilis.
- It is not an injected drug but a pill.

(CDC, 2019; Jin, 2018; Cotler, Yingling, & Broholm, 2018).

What is CDC Guidelines for use of PrEP

- The Centers for Disease Control and Prevention (CDC) 2017 guideline recommend that PrEP be considered for the following HIV negative individuals:

✓ Individuals in a sexual relationship with a partner who is HIV positive

✓ Individuals who do not regularly use condoms and who do not know the HIV status of their sexual partner

✓ Individuals with a high number of sexual partners

✓ Individuals engaged in commercial sex work

✓ Individuals who have had a recent bacterial sexually transmitted disease

✓ Individuals who use injection drugs, share drug equipment, or have an injecting partner who is HIV positive.

(US Public Health Service, 2017).

Can I purchase PrEP over-the-counter without a prescription?

- PrEP is a prescription-based medication and cannot be purchased over the counter.
- Only a healthcare provider licensed to prescribe medication can prescribe PrEP after the necessary test is completed.
- PrEP must be used with the support of a health care provider.
- Healthcare providers play an important role in determining PrEP uptake.

(Cotler, Yingling, & Broholm, 2018; CDC, 2017).

Before starting PrEP what are the necessary tests?

- HIV test: Rapid HIV Ab test, OR 4th generation OR HIV RNA PCR. Test for acute HIV infection in all individual before initiating PrEP with either an individual HIV RNA, a pooled HIV RNA or a 4th generation combined HIV Ag/Ab assay, especially if the individual has had a high-risk exposure in the recent month.
- Creatinine: creatinine clearance should be ≥ 60 ml/min to use tenofovir safely.
- Hepatitis B surface antigen: Tenofovir and emtricitabine (Truvada) are active against hepatitis B virus (HBV). Patients with chronic HBV can use PrEP but should have liver function tests regularly monitored during PrEP use and after discontinuing PrEP. Cautioned that hepatitis could flare if Truvada continued. Patients who are HBsAg negative should be immunized HBV vaccination if not previously done.

(CDC. 2017; Jin, 2019).

Before starting PrEP what are the necessary tests?, continued

- Sexually transmitted infections: High-risk women should be tested for syphilis, genital and Pharyngeal Gonorrhea, and Chlamydia
- Pregnancy test: Although in PrEP clinical trials, no health problems have been associated with PrEP use by women in early pregnancy or for their offspring. However, the long-term safety of PrEP used in women during pregnancy or breastfeeding is not yet determined.
- PrEP should be coordinated with pre-natal care. HIV-negative pregnant women in serodiscordant relationships who want to get pregnant can use PrEP to assist with safe conception.
- A provider who prescribe PrEP to a woman while pregnant, you are encouraged to submit a prospectively and anonymously information regarding the pregnancy to the Antiretroviral Use in Pregnancy Registry (http://www.apregistry.com/).

(CDC; 2019)

During PrEP, use what test and education that should be done?

WOMEN WHO USE PREP SHOULD BE EDUCATED ON:

- Regular doctor visits every 2 to 3 months to assess blood work, side effects, and medication adherence.
- Sexually transmitted infections and HIV prevention such as condom use and risk reduction.
- Safer drug injection use practices.

TEST THAT SHOULD BE DONE WHILE ON PREP INCLUDE:

- Routine HIV antibody at each visit to ensure continued HIV-negative status.
- Sexually transmitted infections tests done every 3 to 6 months.
- Creatinine, pregnancy, and hepatitis B surface antigen every 3 to 6 months.

(CDC; 2017).

How effective is PrEP in preventing HIV in high risk women infection?

- PrEP is highly effective for preventing HIV if used as prescribed.
- PrEP reduces the risk of getting HIV from sex by more than 90% and from injection drug use by more than 70%.
- PrEP is less effective when it is not taken consistently.
- If PrEP is missed, drug levels in the body may be too low to prevent HIV infection.
- Taking PrEP does not reduce sexually transmitted infections.

(CDC, 2019; Jin, 2019).

How can a woman who is at risk for HIV infection be identified?

- According to the New Jersey Department of Health HIV Test Counselor PrEP Risk Assessment, any women who have had 2 of the following are considered high risk for HIV:
- Any woman who had vaginal or anal sex with a man in the last 6 months
- Any woman had vaginal or anal sex without a condom with a partner whose HIV status is positive or unknown in the last 6 months
- Any woman had sex without a condom with a partner who injects drugs and whose HIV status is positive or unknown in the last 6 months
- Any woman who had sex in exchange for money or resources in the previous 6 months
- Any woman had an STD in the previous 6 months

(New Jersey Department of Health HIV Test Counselor PrEP Risk Assessment, 2016)

Who should prescribe PrEP to HIV high-risk female patient?

- Health care providers licensed to prescribed medications such as primary care physicians, HIV specialists, and Nurse practitioners.
- Primary care providers are more likely to see eligible PrEP patients, but generalists may lack the training and skills necessary to prescribe it.
- Many nurse practitioners work in a primary care setting, the preferred PrEP provider, mainly because they're more available and accessible, and are more likely to encounter women who are eligible for PrEP. Therefore, NP students needs the training and skills necessary to prescribe it to high-risk women.
- Interested PrEP women who do not have a primary care provider to discuss PrEP with can contact their local health department's HIV or STD program for further assistance.

(CDC, 2017)

References

- Centers for Disease Control and Prevention (2019). HIV Basic. Retrieved from https://www.cdc.gov/hiv/basics/prep.html
- Centers for Disease Control and Prevention (2017). Prescribe PrEP - Pre-Exposure Prophylaxis FAQs for the Health Care Professional. Retrieved from https://www.cdc.gov/actagainstaids/pdf/campaigns/prescribe-hiv-prevention/aaa-php-prep-faq.pdf
- Cotler K., Yingling C., & Broholm C. (2018). Preventing New Human Immunodeficiency Virus Infections with Pre-exposure Prophylaxis. *Journal for Nurse Practitioners*, 14(5), pp. 376-382. https://doi.org/10.1016/j.nurpra.2017.12.021
- Jin, J. (2019). Can HIV Infection Be Prevented with Medication? *JAMA: Journal of the American Medical Association*, *321*(22), 2252. https://doi-org.proxy.libraries.rutgers.edu/10.1001/jama.2019.7149
- New Jersey Department of Health HIV Test Counselor PrEP Risk Assessment. (2016). Retrieved from http://hiv.rutgers.edu/wp-content/uploads/2017/01/HIV-Test-Counselor-Risk-Assessment-June-28-2016.pdf

Resources and information on Pre-Exposure Prophylaxis (PrEP)

- Information on PrEP https://www.projectinform.org/prep/
- My PrEP Experience http://myprepexperience.blogspot.com/
- PrEP Facts http://prepfacts.org/ Truvada for PrEP (company website) https://start.truvada.com/#
- Truvada for PrEP (company REMS website) https://www.ftc-tdf-preprems.com/#
- Medication Assistance Program (for uninsured people to cover the cost of Truvada) https://www.truvada.com/how-to-get-truvada-for-prep/truvada-cost

Websites for Providers:

- Truvada for a PrEP Indication https://start.truvada.com/
- Clinical Studies Resources https://www.avac.org/prevention-option/prep
- Resources for Clinicians https://www.cdc.gov/actagainstaids/campaigns/prescribe-hiv-prevention/clinician-resources/index.html
- CDC Interim Guidance on HIV PrEP for Men Who Have Sex with Men https://www.cdc.gov/nchhstp/newsroom/2011/prepmsmguidancegraphic.html
- US Public Health Service. Preexposure Prophylaxis For The Prevention Of HIV Infection In The United States – 2017 Update A Clinical Practice Guideline https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf

Appendix H

POST EVALUATION SURVEY TEST (2-week follow-up)

1. **I am aware of the CDC guideline regarding the use of PrEP in high-risk adults 18 and above**

   a) Strongly Agree --------- ☐

   b) Not Sure ---------- ☐

   c) Strongly disagree ----- ☐

2. **I am comfortable discussing condom use or methods of HIV prevention other than offering PrEP to my high-risk women patients.**

   a) Strongly Agree -------- ☐

   b) Not Sure ---------- ☐

   c) Strongly disagree ----- ☐

3. **I understand the requirements for PrEP initiation and management.**

   a) Strongly Agree -------- ☐

   b) Not Sure ---------- ☐

   c) Strongly disagree ----- ☐

4. **I can identify women who are at risk for HIV and determine if PrEP is indicated.**

   a) Strongly Agree -------- ☐

   b) Not Sure ---------- ☐

   c) Strongly disagree ----- ☐

5. **PrEP is effective in preventing HIV in high risk women**

   a) Strongly Agree -------- ☐

   b) Not Sure ---------- ☐

c) Strongly disagree ----- ☐

6. **PrEP may empower women who are unable to negotiate condom use**

a) Strongly Agree --------☐

b) Not Sure ----------☐

c) Strongly disagree -----☐

7. **I am concerned about the side effects of PrEP to my female patients**

a) Strongly Agree --------☐

b) Not Sure ----------☐

c) Strongly disagree -----☐

8. **The use of PrEP will cause a lot of women to engage in risk behavior**

a) Strongly Agree -------- ☐

b) Not Sure ---------- ☐

c) Strongly disagree ----- ☐

9. **The majority of my female patients are not high-risk for HIV**

a) Strongly Agree -------- ☐

b) Not Sure ---------- ☐

c) Strongly disagree ----- ☐

10. ***I am willing to prescribe PrEP to my HIV high-risk female patient***

a) Strongly Agree -------- ☐

b) Not Sure ---------- ☐

c) Strongly disagree ----- ☐

Thank you for completing the survey.

Appendix I

Project Timeline

Completion:	Pre-Design	Design	Implementation	Evaluation
December 13 2018	Met with the Chair and also Team Member: Project Support secured from Chair and Team Member			
January 22nd	1) PICO Question developed			
January to March 20th 2019	1) Theoretical Framework Models. 2) Review of PrEP Prescribing Guideline and Literature 3) Tables of Evidence.			
March 23th 2019		1) Exploring and Designing Project Modules 2) Began Draft of Project Proposal		
May 22nd 2019		Project Proposal Presented:		

July 15th 2019		Approved by Committee and Scientific Review.		
July 18th 2019		Proposal Sent to IRB		
August 18th 2019		IRB Approved.		
Sept – 4th to Sept 13th 2019			Recruitment. Intervention	
Sept 13th to November 27th 2019			Data collection	
November 27th 2019 to December 10th 2019			Data Analysis	
December 14th 2019			Analysis of the result and discussion	
December 15 to 24th 2019			Meetings and analysis	

December 26th 2019			Finalizing presentation date	
January 6th 2019			PowerPoint Presentation finalized	
January 9th 2020			Project presentation	Final Defense Graduation

Appendix J

Budget

Item	**Budget**	**Actual Cost**
Printed Materials	$59.99	**$59.99**
Light refreshment	$105.99	**$105.99**
Poster Printing	$100.00	
Total Cost:	$265.98	**Unknown yet**

Appendix I

T-Test

Notes

Output Created		27-NOV-2019 12:59:20
Comments		
Input	Data	C:\Users\tomgr\Desktop\old hard drive\Thesis and Dissertation Projects\Regina I 112719 SPSS File.sav
	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	32
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax		T-TEST PAIRS=pre pre post WITH post followup followup (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.01

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre	7.2500	32	1.10716	.19572
	post	8.7500	32	1.21814	.21534
Pair 2	pre	7.2500	32	1.10716	.19572
	followup	9.6250	32	.83280	.14722
Pair 3	post	8.7500	32	1.21814	.21534
	followup	9.6250	32	.83280	.14722

Paired Samples Test

		Paired Differences					t	df
					95% Confidence Interval of the Difference			
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper		
Pair 1	pre - post	-1.50000	1.19137	.21061	-1.92953	-1.07047	-7.122	31
Pair 2	pre - followup	-2.37500	1.31370	.23223	-2.84864	-1.90136	-10.227	31
Pair 3	post - followup	-.87500	1.40850	.24899	-1.38282	-.36718	-3.514	31

Paired Samples Test

		Sig. (2-tailed)
Pair 1	pre - post	.000
Pair 2	pre - followup	.000
Pair 3	post - followup	.001

NPar Tests

Notes

Output Created		27-NOV-2019 13:00:23
Comments		
Input	Data	C:\Users\tomgr\Desktop\old hard drive\Thesis and Dissertation Projects\Regina I 112719 SPSS File.sav
	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	32
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable (s) used in that test.

Notes

Syntax		NPAR TESTS /WILCOXON=pre pre post WITH post followup followup (PAIRED) /MISSING ANALYSIS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	393216

a. Based on availability of workspace memory.

Wilcoxon Signed Ranks Test

Test Statistics[a]

	post - pre	followup - pre	followup - post
Z	-4.337[b]	-4.732[b]	-2.905[b]
Asymp. Sig. (2-tailed)	.000	.000	.004

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Tools

PrEP Resources

If interested in more information about PrEP, please check out these websites:

a) Centers for Disease Control and Prevention: https://www.cdc.gov/hiv/basics/prep.html
b) HIV.gov: https://www.hiv.gov/hiv-basics/hiv-prevention/using-hiv-medication-to-reduce-risk/pre-exposure-prophylaxis
c) PrEP facts: https://prepfacts.org/
d) National HIV Curriculum: https://www.hiv.uw.edu/go/key-populations/pediatric-adolescents-young-adults-hiv/core-concept/all#preexposure-prophylaxis-prep
e) Information on PrEP Pre-Exposure Prophylaxis www.projectinform.org/prep/
f) My PrEP Experience http://myprepexperience.blogspot.com/
g) PrEP Facts http://prepfacts.org/ Truvada for PrEP (company website) https://start.truvada.com/#
h) Truvada for PrEP (company REMS website) https://www.ftc-tdf-preprems.com/#

Websites for Providers:

a. Truvada for a PrEP Indication https://start.truvada.com/
b. Clinical Studies Resources https://www.avac.org/prevention-option/prep
c. Resources for Clinicians https://www.cdc.gov/actagainstaids/campaigns/prescribe-hiv-prevention/clinician-resources/index.html
d. CDC Interim Guidance on HIV PrEP for Men Who Have Sex with Men https://www.cdc.gov/nchhstp/newsroom/2011/prepmsmguidancegraphic.html

e. US Public Health Service. Preexposure Prophylaxis For The Prevention Of HIV Infection In The United States – 2017 Update A Clinical Practice Guideline https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf

Application Form

Medication Assistance Program (for uninsured people to cover the cost of Truvada)

https://start.truvada.com/ Content/pdf/Medication_Assistance_Program.pdf or

https://www.truvada.com/how-to-get-truvada-for-prep/truvada-cost

Tables 1

Paired t Test and Wilcoxon Matched Pairs Test Comparisons from Pre-test, Post-test and Follow-Up for Knowledge of HIV PrEP (N = 32)

Time Period	*M*	*SD*
Pre-test	7.25	1.11
Post-test	8.75	1.22
Follow-up	9.63	0.83

Note. Pre-test versus post-test: $t(31) = 7.12$, $p = .001$; $z(31) = 4.34$, $p = .001$.

Note. Pre-test versus follow-up: $t(31) = 10.23$, $p = .001$; $z(31) = 4.73$, $p = .001$.

Note. Post-test versus follow-up: $t(31) = 3.51$, $p = .001$; $z(31) = 2.91$, $p = .004$.

Table 2

Pre/Post Test Questions	Number of Students	Pre-Test	Post Test
What is PrEP	32	32	32
What is PrEP indicated for	32	32	32
PrEP is a daily medicine that can be used to prevent which of the following	32	31	32
PrEP can be purchased over-the-counter, without a prescription	32	30	32
Before starting PrEP, what are the necessary tests	32	3	27
During PrEP use what test and education should be done	32	3	26
How effective is PrEP in preventing HIV in high risk women infection	32	31	32
Which of the following women is at risk for HIV infection and may require PrEP	32	4	25
What medication was approved by FDA for use in preventing HIV infection	32	32	32
Who should prescribe PrEP to the HIV high-risk female patient	32	31	32

Table 3

Post Evaluation Survey Test (2-Week Follow-Up)	Post Evaluation	Results
Aware of the CDC guideline regarding the use of PrEP	32	32
Comfortable discussing condom use or methods than offering PrEP	32	31
Understand the requirements for PrEP initiation and management	32	30
Can identify women who are at risk for HIV and determine if PrEP	32	30
PrEP is effective in preventing HIV	32	32
PrEP may empower women who are unable to negotiate condom use	32	30
Concerned about the side effects of PrEP	32	29
Use of PrEP will cause a lot of women to engage in risk behavior	32	30
Majority of my female patients are not high-risk for HIV	32	32
Willing to prescribe PrEP to my HIV high-risk female patient	32	30

Evidence Table

EBP Question: "Among senior NP students enrolled in an adult-gerontology primary care 3 course in a university in northern New Jersey (P), how effective is education (I), compared to no education (C), in increasing knowledge of HIV PrEP (O)?"

Article #	Author & Date	Evidence Type	Sample, Sample Size & Setting	Study findings that help answer the EBP question	Limitations	Evidence Level & Quality
1	Aaron et al., (2018)	Systematic Reviews of a combination of RCTs and quasi-experimental	Systematic Review– PrEP, risk of HIV and sexually transmitted infections (STIs) specifically for women.	The article describes individual and systemic barriers for women related to the uptake of PrEP services; explains how providers can recognize women at risk for HIV; analyses how to offer PrEP to women; and summaries individual-centered models for HIV prevention services	Not identified. Article reviewed by two scientists	II A

2	Auerbach, Kinsky, Brown, & Charles 2015	Quasi Experimental	A total of 154 women participated in focus groups from different ethnicity	findings from this study are that women in the study had not heard about PrEP before the focus group discussion. Women expressed willingness to turn to their healthcare provider for PrEP information and services. Supported the use of PrEP for the prevention of HIV.	Community participatory project 91% of the participants were black/African American women. Focus group discussions	II B
3	Bradley & Hoover (2019).	Quasi-experimental	web-based discussion series	Several essential information obtained were facilitators and barriers to PrEP implementation for women and the possible strategies and activities to overcome the obstacles. The study also examined women's knowledge and awareness about HIV and PrEP, inadequate infrastructure or resources, and patient-provider interactions.	Not identified. web-based discussion series	III A

4	Calabrese et al., 2017	Qualitative research	Online survey with 597 women	PrEP stigma is a recognized barrier to commitment. Report indicate that participant perceived negative stereotypes with PrEP users. Participant were less comfort discussing PrEP with a provider due to stigmatization.	Data were self-reported online survey. Only women Conducted on 3 cities in Connecticut	II B
5	Collier, Colarossi & Sanders, (2017).	Qualitative Study	Staff (n = 21) and black and Latina female clients 18 - 50 (n = 23), all from four different organizations providing health and social services.	Findings indicate the need for educational efforts to raise awareness about PrEP among social service and healthcare providers that serve women at risk for HIV infection.	Study conducted on black women and Latinas in the Bronx, NY only	IV B

6	Cotler Yingling & Broholm (2018).	System atic Review s with meta-analysis	Based on multiple studies	Article discussed prevention of HIV with PrEP explains present recommendations for HIV PrEP and offers practical guidance for primary care NPs to integrate PrEP into routine practice.	Based on evident and multiple randomized s tudies.	II B
7	Gunn et al., 2019	Quasi Experi mental study	A web-based survey of healthcare providers in DeLand, Florida. 12 providers responded	Results the need for collaboration between providers and the Department of Health to enhance knowledge and willingness for routine HIV testing and PrEP prescription	Data were self-reported. Small participant Only 12 providers responded	III B
8	Krakow er & Mayer, 2016	Qualitat ive study	Based on several studies assessing the preparedness	Studies report that many providers are aware of PrEP, but acceptance is low. The report recommends health dept and healthcare training commit sufficient resources to train future providers and to develop innovative approaches that	Study did not generate a new statistic	II A

				support PrEP prescription in healthcare settings. Then healthcare practitioners could play an essential role in promoting more extensive PrEP use.		
9	Nelson et al., 2019	System atic review	Based on current literature	Discusses factors that position NPs to lead the implementation of HIV PrEP	Inadequate number of studies. Arguments current literature on HIV PrEP and the American Association of Colleges of Nursing.	III B
10	Silapas wan, Krakow er &	Narrati ve review	Multiple studies. Exact number nor specified.	Assessed prescriber behavior regarding the provision of PrEP, and offers recommendations on how to optimize PrEP	lack of a control group	II B

	Mayer, (2016)			implementation in primary care settings		
11	Smith, Mendoza, Stryker, & Rose, 2016	Qualitative study	Six years annual web-based surveys with primary care MDs and NPs. 2009: 1,250 MDs & 250 NPs. 2010: 1,250 MDs & 254 NPs. 2012: 1,251 MDs & 252 NPs. 2013: 1,257 MDs & 252 NPs. 2014: 1,281 MDs & 250 NPs.	The report indicates primary care NP were unaware of PrEP, but high willingness to prescribe once they were aware of it, and also interested in education. Across six survey years (2009, 2010, 2012, 2013, 2014, 2015), 10% had prescribed PrEP. In 2015, of those who had prescribed PrEP, 73% had done so for MSM, 22% for PWID, 22% for uninfected men and 27% for uninfected women in HIV discordant couples during conception attempts, 45% for uninfected women in an HIV discordant couple not planning conception and 30% for uninfected men in this situation	Use of docStyles national survey Survey did not assess the proportion of the respondent's patients who have risk factors that are likely to indications for PrEP use.	II A

			2017: 1,500 MDs & 251 NPs participated			
12	Suraratdecha et al., 2018	Cohort Study	366 participants in a facility-based setting	Study of retrospective cost analysis of testing, treating and prevent HIV infection from 1 June 2015 to May 31 2016. Findings show that prevention of HIV with PrEP to be cost-effective than treatment.	Several limitations to the study. Laboratory testing requirements Did not collect data on cost to clients, which would be useful to determine the potential financial barriers and copayment	II B