

# **Investigating biomedical HIV prevention approach for HIV negative patients**

Oral PrEP (Pre-exposure Prophylaxis) from a nursing  
perspective

Anh Quan Le

DEGREE THESIS	
Arcada	
Degree Programme:	Nursing
Identification number:	18644
Author:	Anh Quan le
Title:	Investigating biomedical HIV prevention approach for HIV negative patients Oral PrEP (Pre-exposure prophylaxis) from a nursing perspective
Supervisor (Arcada):	Denise Villikka
Commissioned by:	
<p><b>Abstract:</b></p> <p>This research study aims to shed light on the biomedical approach to HIV prevention and in particular PrEP is investigated. Three research questions sought to answer the role of PrEP plays in HIV prevention, the challenges regarding PrEP that a nurse faces when encountering patients of high risk of HIV and how those problems can be solved.</p> <p>The study adopts the HIV prevention continuum model by Horn T et al. (2016). Only half of the model for HIV negative patients was used which was the primary HIV prevention process that focuses on HIV testing, risk and needs assessment; linkage to prevention services as well as retention, engagement and adherence.</p> <p>A literature review based on secondary data was carried out for investigating the research questions. By adopting inclusion and exclusion criteria for the keywords chosen for data collection, 10 articles were selected from 235 items across a variety of scientific databases. The keywords used for selection criteria are PrEP, HIV, HIV prevention, Oral pre-exposure Prophylaxis, Nursing, Healthcare Providers, and Transgender. All articles were filtered to be after 2012 since that was the year the FDA approved PrEP. After data collection, inductive approach of qualitative content analysis by Graneheim &amp; Lundman (2004) was used for data analysis.</p> <p>The findings manifest that PrEP is effective in HIV prevention for those vulnerable to the infection which, to name a few, are MSM, Transgender, heterosexual women, IDUs, sex workers and those in discordant relationships. Moreover, there were challenges regarding PrEP faced by both the patients and the HCPs. The typically identified challenges were adherence, cost, mistrust, drug resistance, risk compensation, etc. The measures taken to counteract these obstacles that nurses should adopt as discussed, are thorough need &amp; risks assessment, referring the patients to HIV prevention services like mental health</p>	

services, STI clinics, specific community, etc. In addition, nurses are recommended to build trust with the patients, provide accurate information about PrEP, set reminders such as phone calls and text messages for pill taking and follow up, provide feedback and counseling as well as cooperating with social workers.

One of the limitations of this study is that HIV prevention methods are predicted to change in the future which may supercede some concepts described in this paper. More research is recommended to look at the model by Horn T et al. (2016) as a whole and/or incorporate the concepts of behavioral interventions, biomedical interventions and structural interventions into the study.

Keywords:	Oral PrEP, Pre-exposure Prophylaxis, HIV prevention, Biomedical approach, Biomedical interventions
Number of pages:	65
Language:	English
Date of acceptance:	

# Table of CONTENTS

<b>Abbreviations.....</b>	<b>6</b>
<b>1 Introduction.....</b>	<b>7</b>
<b>2 Background.....</b>	<b>9</b>
2.1 HIV prevention methods .....	9
2.1.1 Behavioral interventions .....	10
2.1.2 Biomedical interventions.....	11
2.1.3 Structural interventions.....	13
<b>3 Theoretical framework.....</b>	<b>14</b>
3.1 The HIV prevention continuum model.....	14
3.2 HIV testing and retesting .....	15
3.3 Risk and needs assessment .....	15
3.4 Linkage to prevention services.....	16
3.5 Engagement, retention and adherence .....	16
3.6 Summary .....	16
<b>4 Limiting the scope of the study .....</b>	<b>17</b>
<b>5 Aim and research questions .....</b>	<b>18</b>
<b>6 Methodology .....</b>	<b>19</b>
6.1 Data collection .....	19
6.1.1 Implementation of inclusion and exclusion criteria .....	21
6.2 List of articles chosen for the study .....	22
6.3 Content analysis .....	24
6.3.1 Step 1: reading and coding.....	25
6.3.2 Step 2: listing and categorising the codes.....	25
6.3.3 Sub-themes and theme .....	26
6.4 Ethical aspects of the research study.....	26
<b>7 Findings.....</b>	<b>28</b>
7.1 Risks associated with HIV .....	28
7.2 Information about PrEP .....	29
7.3 Challenges faced by patients .....	30
7.4 Challenges faced by HCPs .....	32
7.5 Recommendations for HCPs.....	34
<b>8 Discussion .....</b>	<b>38</b>

8.1	Risk & needs assessment: implying nurse's role through HIV prevention model.....	38
8.2	Challenges: implying nurse's role through HIV prevention model .....	40
<b>9</b>	<b>Conclusion and critical discussion .....</b>	<b>44</b>
9.1	Limitations and recommendations.....	46
<b>References .....</b>		<b>47</b>
<b>Appendices .....</b>		<b>53</b>

## Figures

Figure 1 Primary HIV prevention (reduction of acquisition risk) of the HIV prevention continuum model.....	14
Figure 2 Comprehensive HIV prevention processes by Horn T, et al (2016) .....	53

## Tables

Table 1 Data collection processes and implication of inclusion & exclusion criteria....	21
Table 2 Common categories and themes derived from 10 unit of analysis.....	26
Table 3 An example of inductive qualitative content analysis of PrEP in HIV prevention and the roles of HCPs: Eaton L, et al., 2015, Minimal Awareness and Stalled Uptake of Pre-Exposure Prophylaxis (PrEP) Among at Risk, HIV-Negative, Black Men Who Have Sex with Men.....	54
Table 4 Formulation of major and minor categories of 10 unit of analysis .....	57
Table 5 Answers to each research questions by each article .....	60
Table 6 Brief findings of 10 unit of analysis .....	63

## FOREWORD

I would like to express my gratitude towards Denise Villikka and Pamela Gray who guided me through the process of writing this dissertation as well as put me on the right track. Moreover, I cannot thank David Adamson enough for helping me write academically.

I would not have written about PrEP if it wasn't for the facebook group "PrEP Facts: Rethinking HIV Prevention and Sex". The members of the group have been supportive in keeping everyone updated about the news regarding the topic of PrEP. I was inspired to write this thesis by reading the stories of group members who shared a passion for protecting themselves as well as our community from the HIV epidemic. I believe that the vitality of such an online community contributes a lot of evidence-based information that has the power to combat the stigma towards HIV positive people as well as empowering HIV negative individuals to take the matter of staying negative into their own hands.

## **ABBREVIATIONS**

PrEP: Pre-exposure prophylaxis

PEP: Post-exposure prophylaxis

TasP: Treatment as Prevention

HIV: Human immunodeficiency

FDA: Food and Drug Admission

CDC: Centers for Disease Control and Prevention

WHO: World Health Organization

IDUs: Injection drug users

MMT: Methadone maintenance treatment

ART: Antiretroviral Treatment

CBO: Community based organization

LGBTQ: Lesbian Gay Bisexual Transgender and Queer

MSM: Men who have sex with men

HCPs: Healthcare providers

TSW: Transgender women

NSPs: Needle and syringe programmes

OST: Opioid substitution therapy

HCPs: Healthcare providers

# 1 INTRODUCTION

WHO (2016) estimated a figure for the year of 2015 that 36.7 million people were living with HIV/AIDS while 2.1 million people were recently diagnosed with the disease and 1.1 million of mortality incidences derived from HIV infection. The WHO also recommends PrEP (Pre-exposure Prophylaxis) which is the method of taking anti-retroviral drugs for HIV prevention. Would HIV prevention have been more effective if there was adequate research on this HIV prevention method from a nursing perspective?

This study aims to shed light on the topics of PrEP in HIV prevention and the relevant role of the nurses. Nurses play an essential role in promoting sexual health and wellbeing; however, most aspects are not addressed adequately in classroom learning and clinical practice (Evans DT, 2013). HIV prevention is an indispensable concept of sexual health promotion to be mentioned in this study. Brown JL et al., (2014), addressed three biomedical approaches to HIV prevention which are microbicides, vaccination, and Pre-exposure Prophylaxis. However, PrEP (Pre-exposure Prophylaxis) is the only biomedical approved method for HIV prevention by the FDA and CDC. Therefore, this study exclusively focuses on PrEP for HIV prevention from a nursing perspective. Le AQ (2017) has noticed that this HIV prevention medication has caught a lot of attention in the press recently. PrEP contains tenofovir and emtricitabine (TDF/FTC) and has gained approval from the FDA as well as it is supported by the Centers for Disease Control (Rowniak S, 2015). Le AQ (2017) also mentioned that although PrEP has been legitimately approved, many patients of high risk for HIV infections are yet to be informed about the option. He wrote that according to Parsons JT et al. (2017) “only fewer than 1 out of 10 eligible for PrEP, according to CDC guidelines, were using and adhering to the medicine”.

Until this point, there is not enough scientific nursing research and articles that address adopting PrEP for HIV prevention. This study will investigate the roles of PrEP in HIV prevention in nursing practice.

This thesis consists of 9 sections. After the first chapter introducing the topic of the research study, the second part sheds light on the background HIV as well as different strategies for HIV prevention. Thirdly, a theoretical framework is selected and justified



in detail for its suitability for the research. Section 4 reveals the limitations of this study whilst section 5 states the aims and the research questions. How the data was collected and analyzed as well as what method was adopted is included in section 6 on methodology. Section 7 and 8 are respectively the findings from 10 articles and the discussion articulated from the findings, background, and theoretical framework. Last but not least, section 9 consists of the conclusion and critical discussion which outlines the strengths, limitations of this dissertation and recommendations for further nursing research in the field HIV prevention. References and Appendixes can be found at the end of the text.

## **2 BACKGROUND**

HIV is a virus that gradually attacks the immune system, which is our body's natural defence against illnesses. A person who becomes infected with HIV finds it harder to fight off infections and diseases. The virus destroys a type of white blood cell called a T-helper cell and makes copies of itself inside the cell. T-helper cells are also referred to as CD4 cells (WebMD, HIV).

The World Health Organisation published an astounding trend showing 70 million people have contracted the virus worldwide of which 35 million have died from it. A general figure shows that roughly 0.8% of adults aged 15–49 years are living with HIV. However, the extent and the severity of the burden varies from region to region, demographic to demographic (WHO, 2016).

### **2.1 HIV prevention methods**

HIV prevention programs aim to protect individuals and communities from HIV transmission by using singular or a combination of behavioral, biomedical and structural strategies. These strategies are best implemented in places with a high prevalence of HIV where the needs of high-risk groups are met. At first, HIV prevention was approached from a behavioral change point of view, in which ABC (Abstinence, Be Faithful, Use a Condom) was critically emphasized. However, it was not until the mid-2000s that it was realized that a combination approach to tackle the epidemic was needed. The trend of decline in new HIV acquisition between 2010 and 2015 had not been optimistic (about 1.9 million new infections each year). The figure depicts a slow decline to static numbers of new infections. This trend is ambitiously targeted by UNAIDS aiming for below 50,000 new infections by 2020 (Avert, HIV prevention programmes overview).

Carrying out a combination of HIV prevention programmes would require the community and HCPs to understand their epidemic for the appropriate response. Strong community empowerment should be emphasized to address policy barriers, gender inequality, stigma, and discrimination. As an example, MSM should be provided with a

combination of easy access to condoms, lubricant, PrEP, and programs tackling homophobia; whereas IDUs would benefit from NSPs and OST (Avert, HIV prevention programmes overview).

Multiple HIV prevention interventions should be practiced by nurses. Firstly, AIDS risk reduction education should be given which includes providing the patients with evidence-based information about HIV transmission, HIV testing, Safer Sex practices, safe injecting drug use (IDU), and an overview of HIV disease. Moreover, nurses are bound to correct any misunderstands or misconceptions the patients have regarding HIV disease. Secondly, skills building that can be manifested by nurses showing and teaching the patients about safer sex practices such as providing information condoms and sex negotiation. Thirdly, condom use skills building. This will be by using demonstrations by nurses on how to use condoms correctly. Finally, community awareness can be strengthened by nurses in the community of patients at high risk for HIV. In this way, patients of similar interests, backgrounds and stories can come together and support one another (Porche Demetrius J, et al., 2003).

Moreover, Rowniak S (2015) claimed that nurse practitioners are best suited for disseminating information about access to PrEP. The work is to abide by the strict protocol of assessing the risk level, sexual history, and drug use as well as current medical conditions.

### **2.1.1 Behavioral interventions**

Behavioral intervention is achieved when risky sexual behavior is influenced positively in order to seek to reduce the chances of contracting HIV. Such behavioral changes are a reduction in the number of sexual partners, an increase in the correct and consistent use of condoms as well as an increase in the use of clean needles. This is accomplished by information provided in the form of sex education, psycho-social support, stigma and discrimination reduction programmes, etc. To date, these interventions have accounted for most of the success (Coates, T.J et al., 2008).

Moreover, it has been proven that sex education that took place in the school environment is deemed as being most effective (IPPF, 2016). Despite the fact that these

behavioral interventions have been confirmed as providing a positive impact on the outcome of HIV transmission, many countries have not been successfully implementing such programmes in recent years. Consequently, in 2015, young people in and outside of sub-Saharan Africa still lack essential knowledge to keep HIV transmission at bay. On the side note, programmes promoting abstinence and faithfulness have been documented to be subjected to failure in many countries in spite of continuous investment (UNAIDS, 2016).

### **2.1.2 Biomedical interventions**

Biomedical strategies can be implemented in three phases that are before, during and after HIV infection. Male circumcision, vaccination, topical and oral PrEP are said to be used before the infection whereas PEP is used during the acute phase of the infection and the use of ART as TasP is for after the immediate post-infection stage. At the “before the infection phase”, male circumcision has not yet been proven to play any critical role in preventing HIV transmission among MSM as well as males who have sex with females. Vaccination has failed in many clinical trials phases. Topical PrEP or so-called microbicide was unable to prove its effectiveness in preventing HIV infection during the large-scale trial of 5029 women in South Africa. On the contrary, oral PrEP was reported to achieve approximately 96% effectiveness when 4 doses a week were adhered in the iPrEX study of 2499 MSM (Chan R, 2012).

During the immediate acute phase of HIV infection, PEP has been used even before the CDC’s approval. It has been evidently effective when used for 28 days starting within 48-72 hours after the possible exposure to HIV. Similar to PrEP, PEP uptake requires repeated HIV testing as well as other relevant blood tests (Chan R, 2012).

TasP, used after the immediate post-infection phase, can lower the risk of new infection for those who come into sexual contact with the HIV positive partner who is on ART (Chan R, 2012).

By focusing mainly on the stage of before HIV infection, these facts act as precursors to why only the proven and promising oral PrEP would take center stage of this study.

### **PrEP (Pre-exposure prophylaxis)**

What is PrEP?

PrEP can be considered to prevent contracting HIV for those at high risk of HIV acquisition. The brand name Truvada as PrEP is the original medication. The drug consists of a combination of two active ingredients which are Tenofovir and Emtricitabine. Le AQ (2017) cited from the CDC that “these two active ingredients have been used in treating HIV but are also used for HIV prevention. The drug is effective in preventing HIV from sexual intercourse or injecting-drug-using partner who is HIV positive”. It is evidenced that PrEP is effective in combating the risks of contracting HIV if the dosage taken is adhered to strictly. Le wrote “PrEP’s effectiveness can be diminished if dose usage is not consistent. The medicine has been approved by the FDA and recommended by WHO” (Centers for Disease Control and Prevention, PrEP).

How does PrEP work?

Le AQ (2017) wrote “Pebody R (2015) compares PrEP action mechanism as similar to that of malaria prevention. Antiretrovirals (ARVs) of high levels in the bloodstream can form a protective barrier against HIV when PrEP is taken. Consequently, the virus is stopped from entering the cells and replicating by the ARVs at the point of transmission, thus the person remains HIV negative”.

How effective is PrEP?

Le AQ (2017) mentioned that “according to IPrEP OLE study, no individual has been found to seroconvert HIV if they adhere to the dosage of 4 times per week (recommended daily dosage). Hence the efficacy of PrEP is proven. The study suggests 99% effectiveness. (Celum C, 2012; Anderson PL et al., 2012)”. The CDC recommends taking PrEP daily for maximum effectiveness against HIV-1 infection in MSM, heterosexual men and women, IUDs and HIV-1-negative partners in serodiscordant couples. However, the IPERGAY study presented by Molina Jean Michel et al., (2015) introduced the “on-demand” method of taking PrEP for MSM. The method involves dosing PrEP 2-24 hours before sex followed by one pill per day during the consecutive episodes of sex and then 2 pills after the last sexual exposure. The study reveals that “on-demand” can provide protection as effective as the daily regime given that the participants take about 15 pills per month.

Despite the efficacy of the drug, David Knox (2016) reported the first case of PrEP failure. The culprit was multi-drug resistant strain. It was documented that the person adhered to the correct Truvada dose regardless of the drug failure.

In October 2016, Howard Grossman, an HIV specialist from Cleveland Clinic illustrated the second case of PrEP failure. By testing his hair and blood, the patient was found to have adhered to the daily dosage. The HIV strain the patient contracted was rare and resistant to both of the active ingredients in PrEP (Hiv plus mag, 2016).

Le AQ (2017) wrote “the third case of PrEP failure was presented by Elske Hoornenborg, MD, an infectious disease specialist in Seattle at the Conference on Retroviruses and Opportunistic Infection (CROI) in 2017. This case of failure was not found to be due to drug resistance. Instead, it was hypothesized that the object was exposed continuously to the virus due to high-risk sex lifestyle. Professor Robert M. stated that the third case failure is only one of very few cases”. Considering the fact that PrEP protects many people PrEP, the ratio of failure is small and PrEP is still effective. There is no 100% effective protection method including condoms (Ryan B, 2017)

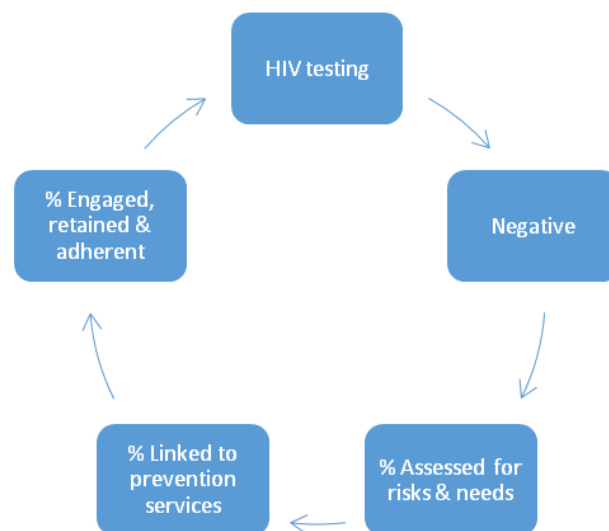
### **2.1.3 Structural interventions**

It is evident that inequalities and prejudices are catalysts for HIV related vulnerabilities (UNAIDS, 2016). For instance, firstly, MSM find it harder to access condoms in a place where same-sex relationship is criminalised. Secondly, the unequal negotiating power of condom use has been documented to be derived from the subordination of women. Thirdly, poor infrastructure acts as a precursor to difficulty in accessing health clinics. Individuals can better access HIV prevention services when these structural barriers are appropriately tackled (Rao G et al., 2008). The suggested interventions for combating such obstacles are strengthening the laws to end violence in partnership, increased access to education for girls, decriminalising same-sex relationships as well as cross-dressing and sex work, community empowerment to reduce stigma and discrimination especially in healthcare settings. However, structural barriers are much harder to combat since they are presented in the form of deep-rooted socio-economic matter such as social marginalisation, gender inequality, and poverty (Avert, HIV prevention programmes overview).

### 3 THEORETICAL FRAMEWORK

#### 3.1 The HIV prevention continuum model

It is said that every potential HIV infection is preventable with the proper approach. The HIV prevention continuum model presented by Horn T et al. (2016) is arguably pragmatic with the aim of this research. The model is comprehensive with two parts, primary and secondary that is applicable for HIV prevention and HIV treatment respectively. There may be some limitations to the research for not being able to use the second part of the model, but the scope of the study only focuses on preventative approaches, so just the primary part of the model is applied despite prevention and treatment being closely related. Moreover, the practicality of PrEP is also addressed in the proposed model which makes no other models more suitable than this one. The framework has recently been accepted in 2016; therefore it is presently relevant to the topic of PrEP. It is evidenced that protecting those uninfected but vulnerable to HIV is as important as treating and suppressing viral load of those HIV infected patients. The model has been proven to be reproducible and particularly relevant to PrEP. (Horn T et al., 2016). While half of the model represented below only concerns those who are uninfected but vulnerable to HIV, the whole model is placed in the index section.



*Figure 1 Primary HIV prevention (reduction of acquisition risk) of the HIV prevention continuum model*

The HIV prevention continuum model is said to be useful to identify best biomedical, behavioral approaches and connect support from health promotion, primary care, and reproductive services. It also helps pinpoint the gaps to allocate the best possible resources for HIV prevention. The individualized preventative needs can be met with the help of the model. Implementing the model could potentially result in a reduction of HIV acquisition within the whole population. (Horn T et al., 2016)

### **3.2 HIV testing and retesting**

The key player in this prevention cycle is repeated HIV testing. The vulnerable would be continuously tested for 2 case scenarios. The point of testing acts as a critical point of contact for both the patients and the service providers. If the patient remains HIV negative, they would be subjected to a suitable preventative plan and retest until the patient is not susceptible to virus acquisition anymore. However, a confirmed positive result will be dealt with by proper treatment. The integrity of the model only works if testing is performed frequently enough to exclude those who seroconvert from the primary preventative measures so they can move onto secondary HIV prevention (as seen from the whole model in the index). (Horn T et al., 2016)

### **3.3 Risk and needs assessment**

Following a negative test result, those vulnerable to HIV are recommended to receive thorough risk and needs assessment to stay negative. Identifying the potential risk based on the patient's individual circumstance is essential when determining the evidenced-based interventions and social services for the given the assessed risks. One's situation can change, and therefore, this procedure needs to be repeatedly performed in response to ever-changing HIV prevention requirements. For example, if a patient is tested in an acute care or non-healthcare settings, a set of risk and needs assessment must be performed before referring them to other appropriate HIV healthcare settings for HIV preventative approaches such as screening for STIs, drug abuse, mental health disorders, violence or trauma, etc. There are risks and needs assessment tools that are simple to use in which one can get access to online. PrEP can be recommended as one of preventative needs for those at high risk of HIV acquisition. (Horn T et al., 2016)



### **3.4 Linkage to prevention services**

Risks and needs assessments can be done either in primary care settings or acute and non-primary care settings. Following a comprehensive risk and needs assessment in a primary care setting, an individual is referred to a suitable facility that caters for their personal HIV preventative needs. Such facilities can be in the field of substance abuse, mental health, medical, psychosocial and ancillary services provided by CBO. Those who were served in an acute or non-primary healthcare setting can be referred to appropriate primary settings with medical expertise in HIV prevention for sexual health, reproductive, transgender as well as those clinics that provide PrEP for high-risk patients. If the patient is a candidate for PrEP and some services, linkage to medical coverage or/and other suitable aiding programs should be advised. (Horn T et al., 2016)

### **3.5 Engagement, retention and adherence**

Finally, the effectiveness of primary prevention cycle is determined by how well the patients engage and adhere to HIV prevention interventions. Among other approaches such as Post-exposure prophylaxis (PEP); substance abuse treatment; mental health services; syringe exchange programmes (SEPs); PrEP is to be considered seriously with competent client-centered services. (Horn T et al., 2016)

### **3.6 Summary**

This chapter sheds light on the theoretical framework used to prevent primary HIV infection. The section demonstrates that the primary HIV prevention part of the HIV prevention continuum model, depicting in a continuous process, contains 4 phases of HIV testing namely: HIV testing; risk and needs assessment; linkage to prevention services; engagement, retention and adherence.

The 4 steps are to be repeated in order until the patient is no longer susceptible to the risk of HIV acquisition. The theoretical framework provides linkage between HIV prevention, PrEP and nursing theories. In other words, the model by Horn T is suitable for nursing's implementation of delivering HIV preventative services in general and PrEP in particular.

## **4 LIMITING THE SCOPE OF THE STUDY**

Given the scope of 10 articles to analyse, it would be impossible to cover all aspects of HIV prevention in a bachelor thesis. Therefore, this dissertation only focuses on HIV biomedical interventions in which PrEP is the only approved method out of microbicides, vaccines and PrEP. Although PEP is approved, it is preferably an emergency and during immediate infection approach to possible HIV exposure which disqualifies it from this study's scope that emphasizes on regular basis intervention. Therefore, the following aims and analysis would only delve into the topic of PrEP and the relevant roles of the nurses.

## **5 AIM AND RESEARCH QUESTIONS**

This study has the purpose of making sense of the complex relationship between PrEP and HIV prevention. Furthermore, the nursing role is to be examined in PrEP and HIV prevention.

Through a process of critical evaluation, the author aims to find answers to the two following research questions:

1. What roles does PrEP play in HIV prevention?
2. What are the challenges regarding PrEP, that nurses face when encountering patients with high risk for HIV acquisition?
3. What are the recommendations to combat the challenges regarding PrEP, that nurses face during care encounter?

## **6 METHODOLOGY**

Literature review seeks to establish a tool for one's own research through the previous work demonstrated by others (University of Sydney, 2016). Al-busaidi (2008) noted that one of the common resources of literature review is published academic journals and it is a justified method used in health-related study as well as phenomenology. Therefore, literature review is best suited for this study. Once academic data is collected, inductive content analysis is deployed for this literature review. Firstly, the chapter represents the methods and process of how the data was collected. Secondly, qualitative content analysis of data after collection is based on the method of Graneheim and Lundman (2004). Despite having a well-grounded theoretical framework to hang on to and clear research questions to start off with, the inductive content analysis was chosen instead of deductive counterpart because the author wanted to read the whole texts of the selected articles open-mindedly. Inductive approach allows the author to find more relevant information without being confined in the boundaries of the research model. Although this method had cost more time, it is believed that the resultant findings are more detailed compared to what a deductive approach could have offered.

### **6.1 Data collection**

The author made use of the search engines available for nursing students at Arcada University of Applied Sciences. The search for articles was done through Academic Search Elite (EBSCO), Cinahl (EBSCO), Cochrane Library, PubMed, Sage, and ScienceDirect. The timeframe for all search engines is filtered from 2012 to present since PrEP was only approved by the FDA in 2012. The author made a plausible assumption those articles about PrEP before 2012 would not be as updated about the topic as articles produced after that date. Search in all search engines was done with "Advanced Search".

Firstly, Academic Search Elite (EBSCO) was used with search keywords of "PrEP" AND "HIV prevention" AND "Nurse". All keywords were in "Optional field". The search was limited to peer-reviewed which resulted in 10 hits. After that, after the titles and abstracts of 10 articles were read, the author applied pre-inclusion and exclusion

criteria to eliminate those that are not clearly relevant to the research questions and those without relevant keywords. Finally, 3 articles were chosen for further scrutiny. To widen the results of the search, the author performed the same search on the same engine again without the keyword “Nurse” and replaced “PrEP” with “oral Pre-exposure Prophylaxis”. The search was set to full text. The rationale behind this is that the author wants to research PrEP from a variety of perspectives, the keyword “nurse” or “nursing might limit the scope of the results. “Oral Pre-exposure Prophylaxis” is another synonym for PrEP. After the second search of the same database, 24 hits came up. Again applying pre-inclusion and exclusion criteria would result in 4 articles being chosen for the next round of scrutiny.

Secondly, Cinahl (EBSCO) was used. The keywords were “PrEP” AND “HIV prevention”. The search was confined to linked full text, academic journals, and English language. Pre-inclusion and exclusion criteria were applied, and out of 32 results, 4 were selected.

Thirdly, the search through Cochrane Library was conducted similarly to the second search engine which yielded only 1 result. The article was chosen.

Fourthly, the search through PubMed included keywords in “All Fields” such as “PrEP” AND “HIV prevention” AND “Nursing”. The search was confined to review and free full text which yielded only 3 results. No article was chosen after pre-inclusion and exclusion criteria. The author tried again with keywords “PrEP” AND “HIV prevention” AND “Healthcare providers”. The reason for this is that nurses are also included in the healthcare providers group. This would give a wider range of results. 11 hits appeared in which 2 were chosen. To widen the scope more, only keywords “PrEP” AND “HIV prevention” were entered. Out of 86 results, 4 were chosen.

Next, the search through Sage Journal for review articles only yielded 9 results for keywords “PrEP” AND “HIV prevention”. The search was limited to 2012 – 2017 and review article. None of the articles were chosen.

Science direct was the final attempt at data retrieval. Journals and review articles were selected, and keywords were searched in “All Fields”. Since many of the articles included nursing elements already, only keywords “PrEP” AND “HIV” were entered with limitation to “PrEP” and “HIV prevention”. 3 articles were chosen from 34 hits.

After looking through all the short-listed articles, none had content about transgender which is one of the groups at risk for HIV acquisition. The author made one last attempt with Science Direct with keywords “PrEP” AND “Transgender”. Out of 25 articles, only 1 was short-listed derived from the application of pre-inclusion and exclusion criteria.

### 6.1.1 Implementation of inclusion and exclusion criteria

22 articles made a shortlist to the second round of selection for the inclusion and exclusion process. In this phase, all articles were read, and those not in line with the inclusion and exclusion criteria were disqualified. 10 articles were chosen which means 12 were eliminated. The inclusion criteria are as follow:

1. How relevant the article is to the research questions.
2. The article ought to be related to at least 2 out of 3 research questions.
3. To what extent the article is consistent with the HIV prevention model that can be interpretable to nursing practice.

The data process depicted in table 1 consists of a selection of search engines, keywords as well as the implementation of inclusion and exclusion criteria.

*Table 1 Data collection processes and implication of inclusion & exclusion criteria*

	Search Engine	Keywords	Limitation	Hits	Short-listed
1	Academic Search Elite EBSCO	“PrEP” AND “HIV prevention” AND “Nurse” in “Optional field”	Peer reviewed 2012 - present	10	3
		“Oral Pre-exposure Prophylaxis” AND “HIV prevention”	Peer reviewed Full text 2012 - present	24	4
2	Cinahl (EBSCO)	“PrEP” AND “HIV prevention” in “Optional field”	Linked full text Academic Journals English language 2012 - present	32	4
3	Cochrane Library	“PrEP” AND “HIV prevention” in “Title,	None	1	1

		abstract”			
4	PubMed	“PrEP” AND “HIV prevention” AND “Nursing”  In “All Fields”	Review Free full text 5 year	3	0
		“PrEP” AND “HIV prevention” AND “Healthcare providers”  In “All Fields”	Review Free full text 5 year	11	2
		“PrEP” AND “HIV prevention”  In “All Fields”	Review Free full text 5 year	86	4
5	Sage Journal	keywords “PrEP” AND “HIV prevention”	Review article 2012-2017	9	0
6	Science Direct	“PrEP” AND “HIV” in “All Fields”	Journals Review articles “PrEP” “HIV prevention” 2012 – present	34	3
		“PrEP” AND “Transgender” in “All Fields”	Journals Review articles	25	1
Total				235	22
Process order and Rationale	1 Pick the search engines are available for nursing students at Arcada UAS.	2 The author tried to increase the results by entering different keyword synonyms and combinations	3 All articles should be recent and peer-reviewed.	4 Applying the pre-inclusion and exclusion criteria by reading titles and abstracts	5 From the short-listed articles, Implementing the inclusion and exclusion criteria to pick out 10 last articles.

## 6.2 List of articles chosen for the study

1. Auerbach, J, Kinsky, S, Brown, G, & Charles, V 2015, 'Knowledge, Attitudes, and Likelihood of Pre-Exposure Prophylaxis (PrEP) Use Among US Women at

- Risk of Acquiring HIV', *AIDS Patient Care & Stds*, 29, 2, pp. 102-110, Academic Search Elite, EBSCOhost, viewed 4 April 2017.
2. Poteat, T, Wirtz, A, Radix, A, Borquez, A, Silva-Santisteban, A, Deutsch, M, Khan, S, Winter, S, & Operario, D 2015, 'HIV risk and preventive interventions in transgender women sex workers', *Lancet*, 385 North American Edition, 9964, pp. 274-286, CINAHL, EBSCOhost, viewed 3 April 2017.
  3. McMahon, J, Myers, J, Kurth, A, Cohen, S, Mannheimer, S, Simmons, J, Pouget, E, Trabold, N, & Haberer, J 2014, 'Oral Pre-Exposure Prophylaxis (PrEP) for Prevention of HIV in Serodiscordant Heterosexual Couples in the United States: Opportunities and Challenges', *AIDS Patient Care & Stds*, 28, 9, pp. 462-474, Academic Search Elite, EBSCOhost, viewed 3 April 2017.
  4. Alistar, S, Owens, D, & Brandeau, M 2014, 'Effectiveness and Cost Effectiveness of Oral Pre-Exposure Prophylaxis in a Portfolio of Prevention Programs for Injection Drug Users in Mixed HIV Epidemics', *Plos ONE*, 9, 1, pp. 1-11, Academic Search Elite, EBSCOhost, viewed 5 April 2017.
  5. Sybil G. Hosek, HIV Pre-Exposure Prophylaxis Diffusion and Implementation Issues in Nonclinical Settings, *American Journal of Preventive Medicine* 2013, Volume 44 , Issue 1 , S129 - S132
  6. Rowniak, S 2015, 'PrEP: A case study', *Journal Of The American Association Of Nurse Practitioners*, 27, 6, pp. 296-299, Academic Search Elite, EBSCOhost, viewed 7 April 2017.
  7. Krakower DS, Mayer KH. The Role of Healthcare Providers in the Roll-Out of PrEP. *Current opinion in HIV and AIDS*. 2016;11(1):41-48. doi:10.1097/COH.0000000000000206.
  8. Eaton L, Driffin D, Bauermeister J, Smith H, Conway-Washington C. Minimal Awareness and Stalled Uptake of Pre-Exposure Prophylaxis (PrEP) Among at Risk, HIV-Negative, Black Men Who Have Sex with Men. *AIDS Patient Care & Stds* [serial online]. August 2015;29(8):423-429. Available from: Academic Search Elite, Ipswich, MA. Accessed April 2, 2017.
  9. Haire BG., Preexposure prophylaxis-related stigma: strategies to improve uptake and adherence – a narrative review. *HIV/AIDS (Auckland, NZ)*. 2015;7:241-249. doi:10.2147/HIV.S72419.



10. Marcus, J, Buisker, T, Horvath, T, Amico, K, Fuchs, J, Buchbinder, S, Grant, R, & Liu, A 2014, 'Helping our patients take HIV pre-exposure prophylaxis (PrEP): a systematic review of adherence interventions', *HIV Medicine*, 15, 7, pp. 385-395, Academic Search Elite, EBSCOhost, viewed 8 April 2017.

### **6.3 Content analysis**

Hsui-Fang & Shannon (2005) and Graneheim & Lundman (2004) both offer a few different choices for qualitative content analysis. According to Hsui-Fang & Shannon (2005), the conventional content analysis is inductive whereas directed content analysis follows deductive approach. The third method of the author is summative content analysis which seeks to deep analyse by identifying and assessing the quality of specific words or phrases within the text.

The qualitative content analysis proposed by Graneheim & Lundman (2004) is adopted in this study due to its relevance in nursing research and caring by nature. This method is conducted inductively by reading the whole article several times to comprehend the big picture. The process of the analysis is followed by condensing, coding and classifying the meaning units to group them into categories. The categories resemble the main points of the unit of analysis (the text of the article) in which its content is depicted.

Graneheim & Lundman (2004) claimed that the content of qualitative data should be classified, evaluated and objectively tested in organised processes. The terms used in this approach are of following:

Manifest content represents the apparent and obvious meaning of the text while latent meaning is the interpreted and underlying meaning of the passage. Unit of analysis is the equivalent to that of the whole text in an article. Meaning units are the content of related words, sentences, and paragraphs. Condensation involves briefing of meaning units without jeopardizing the main points while abstraction is used for describing, interpreting and creating codes, categories, and themes. When pointing out specific parts of the transcript, one would be referring to the content area. Code plays an essential role in labeling a meaning unit. A category is formed when several codes of

similar content are placed together. Two or more sub-categories (minor categories) may be present in the main category (major category). Finally, the formation of themes and sub-themes is the result of interpretation and underlying meaning as well as describing the latent meaning of the unit of analysis.

### **6.3.1 Step 1: reading and coding**

10 articles were chosen after some thorough reading and applying inclusion as well as exclusion criteria for 22 articles. Thereafter, more careful reading of the 10 articles was carried out where highlights and notes of relevant information were marked on the papers. Within a content area, keywords as labeling codes were used in conjunction with aiding highlighting, underlining, stars or signs for the ease of dissecting the text. The modifications marked on papers manifested the parts that were important and relevant to this research which helped the author prepare for step 2.

### **6.3.2 Step 2: listing and categorising the codes**

First, the information marked on the margin was listed in a table for further analysis of its meaning. Then, after comprehension, the data information was coded and placed in relevant categories in which no code was found in more than one category.

An example of coding and categorizing is represented in which each step of precedence takes place from left to right (Meaning unit, Condensed meaning unit, Latent meaning, Codes, and Categories) in table 3 in Appendix 2. As can be seen, 3 categories have resulted from 11 meaning units. The meaning unit was transcribed precisely from the text and then condensed so that it appears as briefly as possible without losing the central meaning of the manifest content. When interpretation took place, latent content depicted the underlying meaning of the whole context. Finally, each meaning unit was coded based on the latent meaning. Categories were formed based on the codes of similar characteristics.

Take note that table 3 in Appendix 2 shows how inductive qualitative content analysis was carried out in this research while table 4 in Appendix 3 manifests how major and minor categories were derived from 10 chosen units of analysis.

### 6.3.3 Sub-themes and theme

The table below briefly represents the theme, sub-themes, major categories, and unit of analysis of the analysis of the chosen articles. A more in-depth of minor categories and their findings can be found in table 6 appendix 5.

*Table 2 Common categories and themes derived from 10 unit of analysis*

Theme	PrEP in HIV prevention and the role of HCPs				
Sub-themes	Risk & needs assessment		Challenges		Recommendation for HCPs
Major categories	HIV risk	Information about PrEP	Challenge faced by patients	Challenge faced by HCPs	
Unit of Analysis	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 2, 3, 4, 6, 7, 9	3, 6, 7, 9	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

## 6.4 Ethical aspects of the research study

As stated by Angelica et al. (2000) every piece of research can encounter some ethical issues and there are two ethical aspects to be mentioned in this section. First is the unravelling of how well standards were followed concerning copyrights, writing and data analysis. Fry & Johnstone (2012) noted that nursing ethics are overseen by a system of standards and principles in which actions and function are guided based on the sort of allowed, compulsory and forbidden behaviors as well as conducts. Second is the clarification about the independence between the author and the Gilead, the pharmaceutical company that originally produces PrEP.

The materials used in this research are from open sources database and paid database for the students of Arcada University of applied sciences in which the author has access to. As a result, no violation of copyrights or falsified materials was ensured. Moreover, original content was produced to the extent that most sources were adequately

paraphrased (except for the meaning unit of inductive qualitative content analysis where the sentences had to be kept exactly as the original), correctly cited and referenced according to Harvard referencing style. The quotations used in some of the passages are cited from the bachelor thesis of the same Author that wrote this paper. Furthermore, the data used for analysis were extracted from credible sources like WHO, UNAIDS, CDC and peer-reviewed articles. This establishes a sense of credibility of the research's quality and the author's bias was minimized to a great extent. No personal information from any studies or materials were brought to light except for those from open public sources like the video found on Youtube that is mentioned later in the discussion part.

The study carries a disclaimer about the author being sponsored by any commercials or companies. In other words, this research is entirely independent of financial or any promotional incentives. The reason why oral PrEP was chosen as the case study is because this medicine is the only approved and proven biological method regarding effectiveness to prevent HIV acquisition. Other biological methods like vaccine and microbicides are either not supported nor of proven effectiveness. Moreover, the scope of the study does not allow the author to investigate more into other biological approaches in different stages of HIV infection like PEP and TasP because the focus is on the before infection phase of how HIV acquisition can be kept at bay.

## 7 FINDINGS

### 7.1 Risks associated with HIV

This section highlights the major category of HIV risks found in the 10 analyzed articles.

Gender and sexuality: Women, MSM and transgender are statistically proven to be at high risk of HIV. The result of the degree of risk can vary depending on where and when the study was done. Auerbach J et al., (2015) noted that roughly 25% of HIV positive people in the US are women and they accounted for 20% of new infection in 2011, in which the majority of them practiced heterosexual sex. The statistics are not much better for transgender women. Worldwide, nearly 1 in 5 (19.1%) TSW live with HIV which accounts for 27.3% of HIV prevalence. The HIV risk factors of a transgender person consists of a combination of many things such as biological factor (hormone treatment, silicone injection), having high-risk male partners, discrimination, violence, etc. (Poteat T et al., 2015). The number is astounding in men who have sex with men. Nearly half (48%) of HIV positive individuals are MSM, and they account for 53% of new transmissions. Despite the large prevalence of HIV in MSM, they comprise only about 3% of the male gender. It was noted that MSM are 44 times more likely to be diagnosed with HIV compared to other men. These statistics were mentioned in Eaton L et al., (2015)'s study regarding MSM in the USA. Similarly, the group at risk for HIV is MSM which is documented in the study of Krakower DS & Mayer KH (2016). [1, 2, 3, 5, 7, 8, 9].

Race: Despite only 13% of black women representing the American female population, 64% of new infections among women are found in black/African women. That makes black women 20 times more prone to HIV infection compared to white women in America. The statistic for Hispanic/Latina women is slightly better with a 4 times higher infection rate compared to white American women (Auerbach J et al., 2015). In another paper, African and Latina women account for 81% of HIV positive women while they only represent 27% of the female population in the US. This paper also referenced a study from Wilson et al., (2003) that Latina women in California are 6 times more likely

to contract HIV with a primary partner compared to those with non-primary partners (McMahon J et al., 2014). Rowniak S, 2015 also noted that the demographic of young MSM of color is showing a trend of increasing HIV infection in the US. Regarding the demographic of MSM, Black MSM (BMSM) are 6 times more likely to be diagnosed with HIV compared to white MSM. In other words, BMSM are the most at risk of HIV in the US (Eaton L et al., 2015). [1, 3, 6, 8].

**Risky Behaviors:** Prostitution is represented by an estimation of 24 to 75% of the transgender population in the USA. The number is slightly higher for Asian transgender women with 54 – 80% of history with prostitution. Moreover, data has shown that partners of TSW involved in high-risk drug activities such as drug injection, drug purchasing, etc. TSW were found to engage in sex without condoms with partners more than sex with clients. This could also put them at other risks like substance misuse (Poteat T et al., 2015). HIV – negative partners within serodiscordant couples are one of the high-risk groups for HIV according to McMahon J et al., (2014). Another group at high risk for HIV is IDUs. The act of injecting drugs does not provide HIV protective measure when condoms and clean needles are not an option. In addition, needle sharing was prevalently found in IDUs with high-risk behaviors which act as a precursor to HIV infection (Alistar S et al., 2014). IDUs are also mentioned in the group at high risk for HIV in the journal of Krakower DS & Mayer KH (2016). Rowniak S, 2015 stated that high-risk behaviors were also abundantly documented in MSM, many admit that condoms are not an option for them despite having frequent multiple changes of sexual partner. Another study of his in 2009 observed individuals who developed a fatalism attitude towards HIV, in which wearing condoms is out of their equation of sexual practice (Rowniak S, 2009). [2, 3, 4, 6, 7, 9, 10].

## **7.2 Information about PrEP**

In this section, the findings of information about PrEP from 10 articles are presented.

**PrEP benefits:** All 10 articles mention about the benefits of PrEP being effective at HIV prevention based on evidence from FDA approval, CDC guidelines and WHO's recommendation. [1, 2, 3, 4, 5, 6, 7, 8, 9, 10].

**PrEP knowledge from patients:** Low according to article 1, 5 and 8. Auerbach J et al.,

2015 conducted a focus group interview about PrEP knowledge among US women who are at high risk of acquiring HIV and yielded a shocking result of less than 10% had ever heard of PrEP. Many of them were displeased for not having known nor learned about the option. It is also mentioned that knowledge about PrEP among communities prone to HIV is very low (Sybil G. Hosek, 2013). The awareness of PrEP in the Black MSM community is shallow (Eaton L et al., 2015). [1, 5, 8].

PrEP knowledge from HCPs: Low to medium. Articles 1, 5, 6, 8 presented the findings as low, and article 7 presented it as medium to high. As an example, Auerbach J et al., (2015) noted that most women at risk of HIV were not told about PrEP from their primary doctors and OB-GYNs whom they have a close patient-doctor relationship with. The community staff are recommended to be trained about PrEP to improve their competency regarding the topic (Sybil G. Hosek, 2013). Rowniak S, 2015 also mentioned that PrEP was a new concept to many healthcare practitioners in the US. [1, 5, 6, 7, 8].

PrEP uptake: Because of low knowledge about PrEP from both patients and the HCPs, the uptake of PrEP is also low. As proven by Haire BG, 2015, most of PrEP consumption 3 years after FDA approval was through demonstration website or research purposes. [1, 3, 5, 7, 8, 9].

PrEP demand: Despite all that, demand for PrEP from the patients has been documented to be high. Female patients in the high risk of HIV groups were voicing their opinions to demand PrEP to be available for them, such groups are, namely sex workers, drug-users, serodiscordant couples, black women (Auerbach J et al., 2015). [1, 3, 9].

### **7.3 Challenges faced by patients**

A critical subtheme worth mentioning is the aspect of challenges associated with PrEP. Firstly, challenges faced by the patients are discussed before challenges faced by HCPs. Cost: cost is a major challenge that PrEP users face, in which it depends on their demographic and geographic circumstances. Despite HIV being an epidemic for those most vulnerable to HIV infection, PrEP in the US is only accessible depending on one's insurance scheme (Auerbach J et al., 2015). For those in the high-risk groups like transgender, sex workers, MSM, etc., accessing PrEP through the government scheme can be an option, but it is also limited. For example, transgender women are

documented to benefit from PrEP on an individual level. However, on a large public scale, it is still vague whether PrEP is cost-effective for this group which would make it harder for them to access PrEP through a public scheme (Poteat T et al., 2015). The same scenario is considered in serodiscordant heterosexual couples, IDU, whether PrEP would be cost-effective on a larger scale (McMahon J et al., 2014; Alistar S et al., 2014). However, cheaper generic version of PrEP will be available in the future when the patent runs out (McMahon J et al., 2014). [1, 2, 3, 4].

Long-term effect: The possible long-term effect of PrEP is a significant concern to be faced by the patients. The combination of PrEP and certain progesterone-based hormonal contraceptives were found to deliver possible exacerbation of bone loss and fractures in women. Older age can have an impact on continuous PrEP usages such as renal toxicity and bone loss (McMahon J et al., 2014). However, Rowniak S (2015) stated that the long-term side effects for those with specific diseases are unknown. [3, 6].

Peer influence: Peer influence manifests itself as much of a challenge faced by many patients. PrEP uptake could be mitigated against due to negative reaction from peers, friends, and family (Haire BG, 2015). [3, 9].

Mistrust: Patient's mistrust in the healthcare establishments, healthcare professionals and the drug itself is also a hurdle to PrEP uptake (Auerbach J et al., 2015; Haire BG, 2015). In the interview, some women voiced their concerns about being 'guinea pigs' for PrEP. They often misunderstand that PrEP is a new drug when in fact the drug itself has been around for many years for HIV treatment. What is new is the approval of the drug for HIV prevention (Haire BG, 2015). [1, 9].

Stigma: One great hurdle impacting the uptake of PrEP is the stigma associated with the medicine and the person taking it. Firstly, the person taking it might be misperceived as HIV positive by their partners (Auerbach J et al., 2015). This is especially transgender women who face a lot of stigma in the clinical settings as well as in their social life which could also impact on PrEP uptake in this group (Poteat T et al., 2015). Secondly, the person taking PrEP can also be stigmatised to have sexual risk-taking behaviours such as being homosexual, being promiscuous, sex work, inconsistent with condom



usage, sex out of relationship and IDU. In the gay community, PrEP takers can be branded as ‘Truvada whore’ which can sound derogatory (Haire BG, 2015). [1, 2, 3, 9].

Side effects: Despite being an approved drug, PrEP can still have possible side effects which vary from person to person. These possible side effects act as precursors to the obstacle of PrEP uptake. Short term possible side effects are diarrhea, vomiting, nausea, renal problems, such as drug-drug interaction. Therefore, side effect monitoring is necessary (Auerbach J et al., 2015; McMahon J et al., 2014; Rowniak S, 2015). [1, 3, 6].

Adherence: Adherence is the biggest obstacle faced by the patients when taking PrEP. All of the stigmas mentioned above are catalysts to obstacles of adherence to PrEP. For example, the PrEP user would find it hard to take a pill daily if they are scared of their partner mistaking them for being HIV positive (Auerbach J et al., 2015). The stigma of being labeled as someone having high risk-taking behaviors, being called “Truvada whore”, has a negative impact on adherence. Lower drug adherence is found in Black and mixed-race men. The stigma of being branded homosexual can also impact adherence (Haire BG, 2015). However, the case is reversed in serodiscordant couples when the HIV negative partner is supported by their positive partner to adhere to the daily regime (McMahon J et al., 2014). It was found that poor adherence is linked to no reduction in risk of HIV acquisition (Alistar S et al., 2014). From the HCPs’ point of view, lack of confidence in adherence from the patients also plays a major role in the reluctance of prescribing the medication (Krakower DS & Mayer KH, 2016). Follow-up can be a great challenge faced by many patients when taking PrEP. Personal circumstances like poverty, mental health, substance abuse and homelessness can hinder a patient from coming to follow-up medical appointment, testing and monitoring of PrEP (Haire BG, 2015). [1, 3, 4, 7, 9].

## **7.4 Challenges faced by HCPs**

Secondly, the challenges derived from PrEP that the HCPs face play an essential role in PrEP uptake.

Drug resistance: Many HCPs express the fear of drug resistance. Many patients in the acute phase of HIV do not know that they are being infected. If PrEP is used in the acute phase of HIV, it could potentially lead to ARV-resistance HIV strain (McMahon J

et al., 2014). HIV seroconverting of acute HIV phase is likely to be higher in those who do not adhere to the daily dosage, and as mentioned above, adherence is one of the biggest challenges in PrEP uptake. Therefore, it is recommended PrEP users get HIV test every three months to rule out the case of seroconverting. However, adhering to the follow-up tests is not always abided by, by the patients due to personal circumstances (Rowniak S, 2015). The fear of resistant viral strains acts as a precursor to reluctance to prescribe PrEP (Krakower DS & Mayer KH, 2016). [3, 6, 7].

**Risk compensation:** The next major challenge of PrEP faced by HCPs is the fear of risk compensation. PrEP could lead to decrease in use of condoms which acts as a precursor to a potentially higher risk of STIs including HIV (Haire BG, 2015). McMahon J et al., (2014) noted that PrEP encourages behavioral risk compensation when the rate of condom use is compromised in serodiscordant couples. In fact, many MSM admit openly that they are not planning to use condoms when they are on PrEP (Rowniak S, 2015). Despite the fact that there is no clear data suggesting evidence of PrEP leading to higher risk of HIV and STIs acquisition, risk compensation is still a concern expressed by many HCPs (Krakower DS & Mayer KH, 2016; Haire BG, 2015). Unconscious bias attitude from HCPs was found in another study regarding racial stereotype of the patient. The study showed that PrEP was less willing to be prescribed for HIV negative black partner in HIV discordant couples due to the perceived 'increased' unprotected sex which could lead to risk compensation risk (Haire BG, 2015). [3, 6, 7, 9].

**Attitude:** The attitude of the HCPs is also a contributing factor to the reluctance of PrEP prescription leading to low PrEP uptake. In a study done by McMahon J et al., 2014, many surveyed HCPs mentioned that PrEP is out of their scope of practice because they only treat HIV positive patients. Another attitude documented in many HCPs is their lack of confidence in real-world effectiveness and patient adherence as well as feeling inadequate to prescribe PrEP for IUDs (Krakower DS & Mayer KH, 2016). [3, 7].

**Guidance:** Despite FDA approval as well as endorsement by the CDC and WHO, some countries still lack local guidance that hinders local HCPs from prescribing and providing PrEP. For example, there is a lack of local guidelines regarding PrEP outside of the U.S. However, it is predicted that many countries will issue guidelines in the

future (Krakower DS & Mayer KH, 2016). Moreover, some HCPs think of CDC's guidelines as being ambiguous (Haire BG, 2015). [7, 9].

## **7.5 Recommendations for HCPs**

Information delivery and patient education: In the study of Auerbach J et al., (2015), interviewed patients thought that sufficient information about PrEP should be provided to those with a need for it. In other words, HCPs ought to be responsible for being the information gateway between PrEP and patients in need. Patients have the right to know about PrEP and its relevant information. For example, HCPs should make it clear to patients that PrEP is not a new, drug; it is only newly approved as an HIV prevention method. McMahon J et al., (2014) stated that discordant couples are ideally served at primary care, family planning and STD clinics where the settings are fit to serve, delivery information and treatment planning, as well as provision of PrEP, are carried out. Communication and engagement with the PrEP users and their HIV-positive partners are key to success. [1, 3, 5, 6, 8, 9, 10].

Build a trusting relationship with the patients: HCPs can deliver the information efficiently as well as increase the uptake of PrEP for women in need by building trusting relationships with the patients. For example, enough time needs to be given for the session to be able to talk about not just PrEP but sexual health in general (Auerbach J et al., 2015). [1].

Community empowerment: It was found that effective HIV prevention and intervention for TSW comes from community empowerment, supportive network and health services with emphases on mental and behavioral culture (Poteat T et al., 2015). It was evidenced that HIV prevention strategies are extremely effective when carried out in non-clinical settings at community levels. Therefore, CBOs play a critical role in educating and engaging the targeted high-risk groups for HIV. The staff can achieve this by receiving sufficient training and education about PrEP to deliver accurate and trusted information regarding HIV prevention. Opinion leaders are a key information gateway (Sybil G. Hosek, 2013). The issue is raised when most of HIV prevention efforts and outcomes in the US are implemented and achieved by HIV CBOs. However, CBOs are

often disadvantaged in the infrastructure department to identify, engage and provide ongoing care for PrEP users and its candidates (Eaton L et al., 2015). [2, 5, 8].

Adherence and follow-up support: According to the trials' results, adherence and adherence support is the key factor contributing to the effectiveness of PrEP (Alistar S et al., 2014). Every 3-month follow-up should be carried out with PrEP users which include HIV and STI testing as well as counseling about adherence (Rowniak S, 2015). Marcus J, et al. (2014) reviewed various adherence support methods that an HCP could use for PrEP users. First of all, the patients should be educated about the importance of adherence in taking the daily dosage. Different recommendations for higher adherence rate could be incorporating pill-taking into the daily routine like eating, brushing teeth, waking up or going to sleep. However, remembering daily dosage can be challenging when traveling so developing skills to remember should also be included in counseling. Phone calls to check up on adherence and follow-up visits were found to be effective. Printed materials and discussion about the medication that includes risk of infection, adherence, side effects and signs of acute HIV infection should be provided by HCPs. Possible effective methods to promote PrEP adherence that were demonstrated in some projects are handouts about PrEP information and adherence guidance, phone calls and SMS to promote adherence, drug concentration feedback as well as adherence counseling. [4, 6, 10].

Risk evaluation: It is evidenced that many individuals at high risk of HIV are not aware of PrEP. Thus, HCPs such as nurses ought to be the gatekeepers of PrEP for high-risk individuals. It is our job to set criteria to identify individuals at risk who would benefit from PrEP (Rowniak S, 2015). HCPs are suggested to reach out and recommend PrEP to the most at-risk groups. They do not just have to consider the health benefits of the patients but also to assign resources in the most cost-effective way. For example, public HCPs are recommended to target PrEP to IDUs at high risk for HIV instead of IDUs with low risk due to cost-effective budgeting. If PrEP, MMT and ART programs can cater the high-risk IDU groups that are involved in needle and sexual sharing, the outcome and cost will be estimated to be very effective (Alistar S et al., 2014). HCPs need to receive adequate training about HIV risk evaluation. Healthcare professionals should be given the right resources like time for in-depth conversation with the patients. Using a ready risk prediction tool that is computer-based is recommended (Krakower

DS & Mayer KH, 2016). CBOs at non-clinical settings were documented to have repeatedly encountered individuals at high risk for HIV, who usually do not seek for testing and help from conventional clinical settings. Hence, it is observed that CBOs are at an ideal position to introduce PrEP to these high-risk individuals (Sybil G. Hosek, 2013). [4, 5, 6, 7].

**Social justice:** Since follow-up appointments are part of the official PrEP regime and guidelines, those who can keep up with this are often favored by HCPs. However, should those who cannot keep up with follow-up appointments be given a chance with PrEP considering PrEP could be a life changer for many? Social justice principles should be considered by HCPs. Moreover, the cost of PrEP can be covered for those who have proper insurance which leaves many individuals with no appropriate coverage, out of the equation. For this reason, nurses are recommended to exercise social justice principles on those marginalised and stigmatised in society since many of them are the ones most at risk (Rowniak S, 2015). There is also a hypothesis that many HCPs think PrEP takers are taking resources away from HIV-positive people. It was found that HCPs have racial biases when making decision to prescribe PrEP for certain racial minorities. By acknowledging this, HCPs can make more socially justified decisions when providing PrEP (Krakower DS & Mayer KH, 2016). [6, 7].

**PrEP education for HCPs:** It is observed that services provided by HIV/AIDS medical providers could have been improved if primary care providers received training about PrEP such as sexual health assessment and CDC guidelines (Eaton L et al., 2015). HCPs ought to receive adequate training and education about PrEP, risk assessment like patient interview, sexual health training, using risk predictor tools, etc. (Krakower DS & Mayer KH, 2016). [7, 8].

**HIV testing and PrEP:** As mentioned above, drug resistance poses a fear faced by many HCPs when providing PrEP. Therefore, the only way to combat drug ART drug resistance is providing quarterly HIV testing for PrEP takers according to the CDC's guidelines. However, frequent HIV testing remains a challenge for many patients and HCPs (McMahon J et al., 2014; Sybil G. Hosek, 2013). CBOs at non-clinical settings can also carry out HIV testing for high-risk individuals to share the burden with traditional clinical settings (Sybil G. Hosek, 2013). It is also recommended that HCPs

talk about PrEP with high-risk individuals at HIV testing and counseling (Eaton L et al., 2015). HCPs should recommend to the patients the FDA approved method of home-based rapid HIV self-testing, which was found to have a positive impact on PrEP adherence (Marcus J, et al., 2014). [3, 5, 8, 10].

All minor and major categories formulate into 3 sub-themes which are Risk assessment & needs, Challenges and Recommendation for HCPS. 3 sub-themes contribute to making the theme PrEP in HIV prevention and the role of HCPs.

## **8 DISCUSSION**

According to the findings of the 10 articles, it is evidenced that PrEP plays an important role in HIV preventive methods for those at high risk. The groups prone to HIV that might benefit from PrEP includes MSM, black MSM, women, Black and Latina women, IDUs, discordant couples and transgender. Those with high-risk behaviors such as frequent change of partners, needle sharing, sex workers and people who do not use condoms for sex would also benefit from PrEP. Despite PrEP being approved by the FDA, recommended by CDC and WHO, there are still many challenges faced by the patients and HCPs in the uptake of PrEP. Cost, adherence, and stigma greatly hinder patients from starting and maintaining PrEP uptake. Drug resistance and risk compensation are most feared by many HCPs when prescribing PrEP. 4 out of 10 articles (3, 6, 8, 10) have content of nursing elements. However, all 10 articles give recommendations to HCPs in general in which nurses are also included in the HCPs group. Therefore, discussion about recommendations for a nurses' role will be similar to the recommendations for HCPs found in all 10 articles as long as these recommendations are within the scope of nurses' roles and duties. Given the needs as well as the obstacles relevant to PrEP, nurses, they are recommended to evaluate and identify individuals at most risk of HIV, provide and educate them with accurate information about PrEP, support adherence and follow-up appointments as well as integrate PrEP into HIV testing. Table 5 appendix 4 delves into how each article answers the author's 3 research questions.

### **8.1 Risk & needs assessment: implying nurse's role through HIV prevention model**

According to the HIV prevention model, HIV risk & needs assessment should only be performed when an individual is tested negative for HIV. An evidence-based HIV prevention method like PrEP should be considered for those at high risk. Following a test result, nurses, as well as other HCPs, are recommended to identify patients who belong to the high-risk groups. According to the results of this study, MSM and black MSM have the highest rate of HIV infection compared to other high-risk groups. These are followed by transgender, IDUs, women including Black and Latina women. In real

life situations, the statistics may differ depending on geographical locations. Besides identifying the race and gender at high risk for HIV, nurses should also identify patients that have high-risk behaviors like sex work, needle sharing, in a discordant relationship, practice sex without condoms, and frequent change of partners. It is suggested that the nurse should engage with the patients by building a trusting relationship by allowing enough time for open communication in the counseling session. Risk assessment should also be based on evidence-based CDC guidelines. For instance, when identifying sexual risk for HIV acquisition, it is very important to obtain an overall picture by asking questions. The CDC has already published sample questions to ask both MSM and heterosexual men & women. Such question would reveal roughly how many sexual partners the patients have, genders of the sexual partners, HIV status of the sexual partners, whether condoms are used during penetrative sex and whether the sex involves anal intercourse. The nurse might also want to obtain information about past STIs infection that the patients have such as chlamydia, syphilis, and gonorrhea because STIs increase the chance of acquiring HIV. Most importantly, the nurse should be familiar with sexual practices that put the patients at higher risk of HIV like sex without condoms anal sex, substance abuse, drug injection and needle sharing. Inconsistent use of condoms in casual sex is also a red flag for HIV risk (CDC, 2014c). Nurses should keep in mind that patients in a committed monogamous relationship are not subjected to zero risks of HIV acquisition. In fact, according to the results of this study, McMahon J, et al., (2014) noted that Latin women in California with primary partners were at higher risk of HIV compared to those with non-primary partners. This might sound contradictory to many but the author hypothesises that men can have unprotected sex outside of the main relationship which puts many women at risk of HIV and other STIs. In reality, this phenomenon has been self-depicted by a Youtuber called Jennifer Vaughan who publishes videos about her life living with HIV and how she acquired it. In one of her videos, she told that she acquired the virus through her ex whom she thought was monogamous with her (Jennifer Vaughan, 2017). Once the evidence is clearly assessed that patient is at high risk of HIV, PrEP and condoms are both recommended. Krakower DS & Mayer KH, (2016) suggests HCPs be educated and trained on how to assess patients for HIV risk who can be candidates for PrEP. The study also recommends a prediction tool on a computer tablet for standardised HIV risk assessment. Patient's electronic health record is also a good start to screen for HIV risk.



At this point, the nurse should work together with the physicians to provide accurate and evidence-based information about PrEP such as how the drug works, possible side effects, how effective the drug is, adherence and follow-up requirement while on PrEP. It is very important for the patients to understand that PrEP is not a substitute for condoms but rather an additional protective tool in the case of condom failure or situations when condoms are not an option like drug injection. Moreover, nurses should explain to the patients that PrEP only protects against HIV, which means that they would still be prone to STIs without protection from condoms. The result of this study also revealed that many patients would not use condoms even before and after knowing about PrEP. Despite being an additional tool, PrEP is still more than 95% effective when used with consistent adherence. Many people have developed a non-fatalistic attitude towards HIV thinking that the virus can now be managed. This can lead to complacency. For people who refuse to use condoms, it is plausible to think that protection from PrEP is better than no protection.

## **8.2 Challenges: implying nurse's role through HIV prevention model**

Once the risk and need for PrEP is identified. The first challenge to mention is the cost of accessing the medicine. Access and prices of PrEP differ depending on the geographical locations. In the US, most PrEP takers are properly insured. The HIV prevention model recommends that the patients should be provided with linkage to prevention services. The scope of this study does not delve into how insurance for PrEP coverage in the US works and how to get access to PrEP by any other means. The rules and regulations are different in different countries and regions. The borderline can be thin between marketing for the drug and helping patients. Marketing and selling drugs is definitely not included in the scope of a nurses' role and therefore, the topic of access to PrEP is not discussed in depth here. However, besides connecting patients with STI clinics and services, nurses can generally link the patients to different suitable insurance that covers PrEP. If insurance is not an option, there are some equality programs like 'Truvada for PrEP medication assistance program' that aid patients in financing PrEP's cost (Gilead, Truvada for PrEP medication assistance program). As mentioned in the results, public HCPs have to consider the aspect of cost-effectiveness when providing

PrEP for free. The general rule is that it is more cost effective if PrEP is introduced to those at higher risk of HIV. In other words, nurses could jeopardize the cost-effectiveness if patients who are not at high risk for HIV, are told about PrEP. This leads to an ethical dilemma whether to provide PrEP and information about PrEP to those with little to medium risk of HIV, who would still benefit from PrEP if the medication was provided for free through National Health Service. It is hypothesized that resources for the medicine are finite for regions that provide PrEP for free, which is one of the reasons to explain why uptake for PrEP is low in contrast to high demand for the drug. Many HCPs argue that an antiretroviral drug for PrEP is taking away resources from HIV-positive individuals. Despite the complex laws and regulations, nurses are to follow the local guidelines. Furthermore, the results of the study manifest that nurses should exercise the principle of social justice by helping those minority groups who are usually mistreated by the healthcare system. This can be done by linking them to CBOs where they can get helped with PrEP cost as well as mental and social support.

As for now, according to prepwatch, PrEP is only officially available in places which, to name a few, are Australia, Belgium, Canada, France, Germany, Netherlands, Norway, United Kingdom, United States, etc. Finland has yet to approve the use of Tenofovir and Emtricitabine drug as PrEP and there is yet to be any national law and guidelines regarding this topic. Nevertheless, it is probable that Finland would follow the Nordic neighbor Norway in approving and providing PrEP for free to those at high risk of HIV acquisition. Nurses from Finland could find this study helpful when the country approves PrEP. In Europe, PrEP is offered for free through National Health Service in France, Belgium, Scotland and Norway (PrEP in Europe). However, it is known that many people have found their way around buying PrEP unofficially because they live in countries where access to PrEP is not easy. According to the scope of this study, the author does not go into any depth about PrEP access and the danger as well as benefits of unofficial PrEP purchases. The laws for accessing the medication are country-specific and that is speculated to change over time.

Engagement, retention and adherence is a part of the HIV prevention model. This part of the process can be implemented through nursing intervention. The process can be obstructed by the challenges that the patients face like mistrust in the healthcare system,

adherence, peer influence, and stigma. As mentioned above, building a trusting relationship with the patients through communication is evidenced in disputing mistrustful attitude. Nurses ought to self-educate about the topic of PrEP in order to provide the patients with accurate information. CBOs can be an environment for the patients to connect with other patients with the help of CBO staffs and community nurses. Behavioral social intervention offered by CBOs play an essential role in relieving stigmas and negative peer influence about PrEP and PrEP takers. Nurses are recommended to provide feedback, counseling, mental health services for the patients for maximum adherence rate. SMS and phone calls for PrEP adherence reminder were found to be effective in helping the patients taking sufficient doses.

The struggle to adhere to follow-up appointments while on PrEP was demonstrated in the results of this study. In accordance with the HIV prevention model, HIV testing and re-testing remains a critical point in which serves the purpose of follow-up appointments. Patients with personal circumstances like poverty and mental health were found to neglect their responsibility to keep up with follow-up appointments. Nurses can cooperate with social workers to help these patients with their personal circumstances. At the initial point of HIV testing, HIV negative individuals who are at high risk of HIV should be told about PrEP. The decision to go on PrEP or not will depend on the autonomous choice that the individual makes, nurses and other HCPs are only information gatekeepers at this point. By the time of the PrEP follow-up appointment, HIV testing plays a crucial role in determining whether PrEP is still suitable. If the person is found to be seroconverting, a plan for HIV treatment is to be considered. Thus, HIV testing and retesting is a gateway between HIV prevention and HIV treatment.

Another fear about PrEP faced by the HCPs is risk compensation. In the results, it was found that many HCPs are reluctant in providing PrEP thinking that condom use would be compensated in PrEP takers and that STIs rate would be increased. However, there was speculation in Australia stating that PrEP reduces STI rate. Doctor Roth, a sexual health doctor in Melbourne explained that quarterly routine HIV and STI check-ups for PrEP takers are a lot more often compared to those who are not using PrEP. Therefore, STIs would be detected and treated early enough before it is passed on (Emily Woods

and Rania Spooner, 2017). Nurses and other HCPs might be more convinced and assured about the benefits of PrEP knowing this fact.

## 9 CONCLUSION AND CRITICAL DISCUSSION

The findings of the research have answered the three proposed research questions (Appendix 4 table 5) and the discussion section made sense of the relationship between the findings, research questions, and the theoretical framework.

Firstly, thorough information about PrEP was included in the background as well as the findings. To emphasize the role PrEP plays in HIV prevention, facts about HIV risks categorized in gender, sexuality, race and risky behaviors were included in the findings.

In response to question 1, the findings provided sufficient evidence that PrEP is beneficial for those at high risk of HIV acquisition. In the discussion section, the role of the nurse regarding providing care of PrEP is recommended according to the findings and the theoretical framework. In this case, nurses are suggested to provide needs and risk assessment for the patients following a negative HIV test result.

Secondly, after the challenges faced by the patients and the HCPs are identified from the findings, possible measures to combat these barriers were presented in the findings as well as the discussion sections. It was discussed that the recommendations for HCPs were linked with the theoretical framework and nursing roles. For example, in order to provide linkage to prevention services, nurses can introduce high-risk patients to healthcare facilities that provide sexual health services like STI testing, PrEP and condom provision. Moreover, other communities to be recommended are those that advocate and support the patients like the LGBT community, sex-worker community, drug rehabilitation programme, etc. Lastly, the findings showed that there is much nurses can do to retain and engage the patient as well as help them adhere to the recommended PrEP dosage in conjunction with other prevention methods, as suggested in the theoretical framework. It is crucial to build a trusting relationship with the patients as many may have lost faith in the healthcare system. In order to achieve such goal, nurses ought to educate themselves about the facts of PrEP to provide reliable sources of information to the patients. Other documented effective measures to boost the rate of PrEP adherence is providing counseling, feedback, phone calls and SMS reminder.

As mentioned in the discussion section, the regulations regarding PrEP is regionally specific. PrEP may be subsidized by the national healthcare in some countries but not in

others. For example, those vulnerable to HIV can already access PrEP for free in Norway but not yet in Finland. Having said that, it is hypothesized that regulations regarding PrEP can be subjected to change in response to the prevalence of new infections and high demand for the drug as mentioned in one of the findings.

Credibility, dependability, and transferability are the three elements used to measure the level of trustworthiness of a research study whether it's qualitative or quantitative. As for evaluating the quality of the thesis, the findings are to be scrutinized in the process of which those findings were derived from. Graneheim & Lundman (2004)

To evaluate whether a research study is credible, one would have to look at its data and assess to what degree the data and its process is confident in the scope of focus of the study. Olivia from Statistics Solutions argues that the researcher needs to draw a link between the study's findings and the reality to shed light on the truth of the findings. She also suggested the triangulation methods to strengthen one's research. This research study implements the method of triangulation of sources for this purpose. The findings were derived from different data sources (as seen in the table of data collection) to fetch for articles using inclusion and exclusion criteria. This ensures that the chosen articles can provide data greatly relevant to the research questions and serve the aim of the study. Moreover, the author incorporated a diversity of genders and sexuality (MSM, transgender, heterosexual) on the topic of oral PrEP and HIV prevention.

The trustworthiness of research study also relies on to what extent the data depends on factors of instability and factors of phenomenological changes. Since PrEP was only approved by the FDA in 2012, all articles were filtered for from 2012 and onwards and only the most recent and relevant ones were chosen. This somewhat deflects the time impact of factors of instability on the integrity of the data. In addition, WebMD (2016) noted that HIV and its treatment were discovered in 1981 and 1996 respectively, the approval of oral PrEP in 2012 is still arguably considered a new phenomenon that many people are not aware of. The significance of PrEP is hypothesized to be subject to changes in the future may it be new drugs for pre-exposure prophylaxis, the approval of microbicides or even a breakthrough in HIV vaccine. It is uncertain if more failure cases of PrEP would occur due to resistant virus besides the 3 existing ones represented in the

background of this study. Any innovations or changes in the field of HIV prevention can place this research study out of reality's relevance. For instance, if a vaccine for HIV is successfully made in the future, PrEP could become a thing of the past and this research study may become dated. Having said that, it is important for nurses and other medical professionals to keep track and self-educate about new evidence-based innovations as well as changes regarding this field. As for the date of this study, the phenomenon of PrEP is relevant as proven in the section "information about PrEP" in the findings.

In the light of transferability, as seen in the section of methodology, the author tried to explain as clearly as possible the processes of unit selection, data collection, and analysis processes. The study can only be as trustworthy as its data being able to be replicated in other studies of different contexts using a transparent process.

## **9.1 Limitations and recommendations**

There are two major limitations of this dissertation. Firstly, only half of the research model is used. As stated in the theoretical framework section that the scope of the study only focuses on HIV negative patients who are at high risks. The other half of the research model is for patients who have already been found to be infected with HIV and that TasP can be used to prevent them from spreading the virus to others in the early stage of the infection. However, the whole model should be investigated in further research because only the linkage between primary and secondary HIV prevention can provide a big and complete picture of effective prevention process. Secondly, the scope of this study is limited in the biomedical approach of HIV prevention which excludes behavioral and structural approaches. Further investigation to interlink all three intervention approaches for nursing roles in HIV prevention should be carried out. One may find more limitations to the thesis besides the major 2 mentioned here. In summary, because the topic of HIV prevention is broad, further nursing research should be carried out to fill the academic gap in response to innovation and changes in this field.

## REFERENCES

- Al-Busaidi Q Zakiya (2008) Qualitative Research and its Uses in Health Care, Sultan Qaboos University Medical Journal. Available at:  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3087733/> ( Accessed 15 November 2017).
- Alistar, S, Owens, D, & Brandeau, M 2014, 'Effectiveness and Cost Effectiveness of Oral Pre-Exposure Prophylaxis in a Portfolio of Prevention Programs for Injection Drug Users in Mixed HIV Epidemics', Plos ONE, 9, 1, pp. 1-11, Academic Search Elite, EBSCOhost, viewed 5 April 2017.
- Anderson PL, Glidden DV, Liu A, et al. Emtricitabine-tenofovir exposure and preexposure prophylaxis efficacy in men who have sex with men. *Science translational medicine*. 2012;4(151):151ra125. doi:10.1126/scitranslmed.3004006.
- Angelica Orb, Laurel Eisenhauer, Dianne Wynaden (2000) Ethgics in Qualitative Research. *Journal of Nursing Scholarship*. v.33(1/2000). Pp. 93-96.
- Auerbach, J, Kinsky, S, Brown, G, & Charles, V 2015, 'Knowledge, Attitudes, and Likelihood of Pre-Exposure Prophylaxis (PrEP) Use Among US Women at Risk of Acquiring HIV', *AIDS Patient Care & Stds*, 29, 2, pp. 102-110, Academic Search Elite, EBSCOhost, viewed 4 April 2017.
- Avert, HIV prevention programmes overview, retrieved from:  
<https://www.avert.org/professionals/hiv-programming/prevention/overview>; Accessed 04.11.2017
- Brown JL, Sales JM, DiClemente RJ. Combination HIV Prevention Interventions: The Potential of Integrated Behavioral and Biomedical Approaches. *Current HIV/AIDS reports*. 2014;11(4):363-375. doi:10.1007/s11904-014-0228-6.
- Celum c, baeten j. Tenofovir-based pre-exposure prophylaxis for hiv prevention: evidence and evolving questions. *Current opinion in infectious diseases*. 2012;25(1):5157. Doi:10.1097/qco.0b013e32834ef5ef. Retrieved from:  
<http://www.ncbi.nlm.nih.gov/pmc/articles/pmc3266126/>



Centers for Disease Control and Prevention (CDC). (2014c). Preexposure prophylaxis for the prevention of HIV infection in the United States—2014: A clinical practice guideline. Retrieved from [ww.cdc.gov/hiv/pdf/PrEPguidelines204.pdf](http://www.cdc.gov/hiv/pdf/PrEPguidelines204.pdf)

Chan R, Biomedical strategies for human immunodeficiency virus (HIV) prevention? A new paradigm, *Ann Acad Med Singapore*, 2012 Dec; Vol 41(12):595-601; PMID: 23303118

Coates, T.J. et al (2008) 'Behavioural strategies to reduce HIV transmission: how to make them work better' *The Lancet* 372(9639):669-684

David Knox, MD, an HIV specialist at the Maple Leaf Medical Clinic and the lead author of the case study, presented findings at the 2016 conference on retroviruses and opportunistic infections (CROI) in Boston. Retrieved from:

<https://www.poz.com/article/prep-fails-gay-man-adhering-daily-truvada-contractsdrugresistant-hiv>

Eaton L, Driffin D, Bauermeister J, Smith H, Conway-Washington C. Minimal Awareness and Stalled Uptake of Pre-Exposure Prophylaxis (PrEP) Among at Risk, HIV-Negative, Black Men Who Have Sex with Men. *AIDS Patient Care & STDs* [serial online]. August 2015;29(8):423-429. Available from: Academic Search Elite, Ipswich, MA. Accessed April 2, 2017.

Emily Woods and Rania Spooner, HIV drug PrEP praised for helping prevent other sexually transmitted diseases, *The Age Victoria*, May 23<sup>rd</sup> 2017, retrieved from: <http://www.theage.com.au/victoria/hiv-drug-prep-praised-for-helping-prevent-other-sexually-transmitted-diseases-20170523-gwb2n3.html> Accessed: 30.07.2017

Evans David, Promoting sexual health and well-being: the role of the nurse, 2013, *Nursing Standard*. 28. 53-57.

Fry. S. T. & Johnston M. J. (2012) *Ethics in Nursing Practice*. 3th Ed. Oxford: Blackwell publishing.

Gilead, Truvada for PrEP Medication Assistance Program, U.S. Patient Access, retrieved from: <http://www.gilead.com/responsibility/us-patient->

access/truvada%20for%20prep%20medication%20assistance%20program accessed 30.07.2017

Graneheim, U. H. & Lundman B. (2004) Qualitative Content Analysis in Nursing Research: Concepts, Procedures and Measures to Achieve Trustworthiness. Nurse Education Today. Vol. 24(2004). Pp. 105-112

Haire BG., Preexposure prophylaxis-related stigma: strategies to improve uptake and adherence – a narrative review. HIV/AIDS (Auckland, NZ). 2015;7:241-249. doi:10.2147/HIV.S72419.

Hiv plus mag, October 19 2016, Second case of HIV infection on PrEP, retrieved from: <http://www.hivplusmag.com/2016/10/19/breaking-second-case-hiv-infection-prep> accessed: 28.2.2017

Horn, T., Sherwood, J., Remien, R. H., Nash, D., Auerbach, J. D., & for the Treatment Action Group and Foundation for Aids Research HIV Prevention Continuum Working Group. (2016). Towards an integrated primary and secondary HIV prevention continuum for the United States: a cyclical process model. Journal of the International AIDS Society, 19(1), 21263. <http://doi.org/10.7448/IAS.19.1.21263>

Hsiu-Fang, H. & Shannon, S. E. (2005) Three Approaches to Qualitative Content Analysis. Qualitative Health Research, Vol. 15 (9/ November 2005). Pp. 1277-1288

IPPF, Putting sexuality back into comprehensive sexuality education, 2016, retrieved from: [https://www.ippf.org/sites/default/files/2016-10/Putting%20Sexuality%20back%20into%20Comprehensive%20Sexuality%20Education\\_0.pdf](https://www.ippf.org/sites/default/files/2016-10/Putting%20Sexuality%20back%20into%20Comprehensive%20Sexuality%20Education_0.pdf) Accessed 04.11.2017

Jennifer Vaughan, My HIV/AIDS Story (in Pictures), Feb 20 2017, Retrieved from: <https://www.youtube.com/watch?v=NgtaU9GKNHg&t=513s> Accessed 29.07.2017

Krakower DS, Mayer KH. The Role of Healthcare Providers in the Roll-Out of PrEP. Current opinion in HIV and AIDS. 2016;11(1):41-48. doi:10.1097/COH.0000000000000206.

Le AQ, Word-of-Mouth influence in prescription medication, bachelor thesis in International Business, 2017, Arcada University of Applied Sciences

Marcus, J, Buisker, T, Horvath, T, Amico, K, Fuchs, J, Buchbinder, S, Grant, R, & Liu, A 2014, 'Helping our patients take HIV pre-exposure prophylaxis (PrEP): a systematic review of adherence interventions', *HIV Medicine*, 15, 7, pp. 385-395, Academic Search Elite, EBSCOhost, viewed 8 April 2017.

McMahon, J, Myers, J, Kurth, A, Cohen, S, Mannheimer, S, Simmons, J, Pouget, E, Trabold, N, & Haberer, J 2014, 'Oral Pre-Exposure Prophylaxis (PrEP) for Prevention of HIV in Serodiscordant Heterosexual Couples in the United States: Opportunities and Challenges', *AIDS Patient Care & Stds*, 28, 9, pp. 462-474, Academic Search Elite, EBSCOhost, viewed 3 April 2017.

Molina Jean Michel, et al., On-Demand Preexposure Prophylaxis in Men at High risk for HIV-1 Infection, ANRS IPERGAY Study Group\* *N Engl J Med* 2015; 373:2237-2246, December 3, 2015, DOI: 10.1056/NEJMoa1506273

Olivia, What is credibility in qualitative research and how do we establish it?, StatisticsSolutions, retrieved from: <http://www.statisticssolutions.com/what-is-credibility-in-qualitative-research-and-how-do-we-establish-it/> Accessed 07.11.2017

Parsons JT1, Rendina HJ, Lassiter JM, Whitfield TH, Starks TJ, Grov C, Uptake of HIV Pre-Exposure Prophylaxis (PrEP) in a National Cohort of Gay and Bisexual Men in the United States, *J Acquir Immune Defic Syndr*. 2017 Mar 1;74(3):285-292. doi: 10.1097/QAI.0000000000001251.

Pebody R, PrEP, 2015 nam aidsmap, retrieved from: [https://www.aidsmap.com/v635723833203470000/file/1187955/PrEP\\_briefing\\_paper.pdf](https://www.aidsmap.com/v635723833203470000/file/1187955/PrEP_briefing_paper.pdf) Access: 12.11.2017

Porche Demetrius J., III Robert Swayzer, HIV Prevention: A Review of Interventions, *Journal of the Association of Nurses in AIDS Care* , Volume 14 , Issue 1 , 79 – 81

Poteat, T, Wirtz, A, Radix, A, Borquez, A, Silva-Santisteban, A, Deutsch, M, Khan, S, Winter, S, & Operario, D 2015, 'HIV risk and preventive interventions in transgender women sex workers', *Lancet*, 385 North American Edition, 9964, pp. 274-286, CINAHL, EBSCOhost, viewed 3 April 2017.

PrEP in Europe, How do I get PrEP through your National Health Service, Retrieved from: <http://www.prepineurope.org/en/get-prep/how-do-i-get-prep-through-your-national-health-service/> Accessed 30.07.2017

PrEP Watch, Country Updates, retrieved from: <http://www.prepwatch.org/scaling-up/country-updates/> Accessed 30.07.2017

Rao, G. et al (2008) 'Structural approaches to HIV prevention' *The Lancet* 372(9640):764-775

Rowniak, S 2015, 'PrEP: A case study', *Journal Of The American Association Of Nurse Practitioners*, 27, 6, pp. 296-299, Academic Search Elite, EBSCOhost, viewed 7 April 2017.

Rowniak, S. (2009). Safe sex fatigue, treatment optimism, and serosorting: New challenges to HIV prevention among men who have sex with men. *Journal of the Association of Nurses in AIDS Care*, 20(1), 31–38. doi:10.1016/j.jana.2008.09.006

Ryan B, PrEP Fails in a Third Man, But This Time HIV Drug Resistance Is Not to Blame, *Poz*, Feb 16 2017, Retrieved from: <https://www.poz.com/article/prep-fails-thirdman-time-hiv-drug-resistance-blame> Accessed 15.3.2017

Sybil G. Hosek, HIV Pre-Exposure Prophylaxis Diffusion and Implementation Issues in Nonclinical Settings, *American Journal of Preventive Medicine* 2013, Volume 44, Issue 1, S129 - S132

The University of Sydney (2016) How do I write a literature review?, Head, Learning Centre. Available at: [http://sydney.edu.au/stuserv/learning\\_centre/help/thesis/th\\_litReview.shtml](http://sydney.edu.au/stuserv/learning_centre/help/thesis/th_litReview.shtml) (Accessed: 11 October 2017).

UNAIDS, Prevention gap report, 2016, retrieved from: [http://www.unaids.org/sites/default/files/media\\_asset/2016-prevention-gap-report\\_en.pdf](http://www.unaids.org/sites/default/files/media_asset/2016-prevention-gap-report_en.pdf) Accessed 04.11.2017

WebMD, AIDS Retrospective Slideshow: A Pictorial Timeline of the HIV/AIDS Pandemic, retrieved from: <https://www.webmd.com/hiv-aids/ss/slideshow-aids-retrospective> Accessed 07.11.2017

WHO, HIV/AIDS, Online Q&A, Nov 2016, retrieved from:  
<http://www.who.int/features/qa/71/en/> Accessed 11.8.2017

Wilson SR, Lavori PW, Brown NL, Kao Y-M. Correlates of sexual risk for HIV infection in female members of heterosexual California Latino couples: An application of a Bernoulli process model. *AIDS Behav* 2003;7:273–290.

## APPENDICES

### Appendix 1

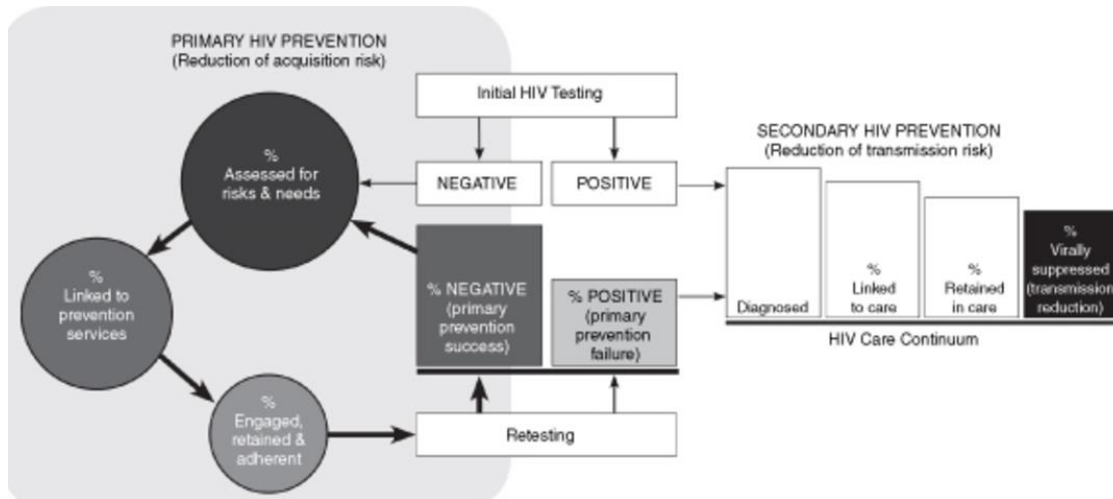


Figure 2 Comprehensive HIV prevention processes by Horn T et al. (2016)

## Appendix 2

*Table 3 An example of inductive qualitative content analysis of PrEP in HIV prevention and the roles of HCPs: Eaton L, et al., 2015, Minimal Awareness and Stalled Uptake of Pre-Exposure Prophylaxis (PrEP) Among at Risk, HIV-Negative, Black Men Who Have Sex with Men*

Meaning unit	Condensed meaning unit, using the words from text	Condensed meaning unit's latent meaning	Codes	Categories
In the USA, men who have sex with men (MSM) account for 48% of people living with HIV and 53% of incident HIV infections; however, they comprise only about 3% of the male population. As such, the rate of HIV diagnosis among MSM is 44 times that of other men	Research has shown that MSM are in the group of high prevalence of HIV	MSM are at high risk of HIV	Gender and sexuality	HIV risk
Black MSM (BMSM) in particular are the most affected by HIV in the United States. BMSM are diagnosed with HIV at a rate 6.0 times higher than white MSM and are 3.8 times more likely to be living with HIV than white MSM	Black MSM is shown to be in the group of highest HIV prevalence in the USA	Black MSM are at high risk of HIV	Race	
In addition to HIV testing, engaging in transactional sex was associated with being unaware of PrEP in our multivariate model. Given the power imbalance that exists for negotiating safer sex practices during transactional sex, it is likely that these men are at elevated risk for HIV transmission compared with men not engaging in these behaviors.	Men who engage in sex work have less negotiating power in safer sex practices	Sex workers are at high risk of HIV	Risky behavior	
Pre-exposure prophylaxis (PrEP) strategy holds tremendous promise, yet our ability to implement a wide-spread, scale-up of PrEP for those at-risk for exposure to HIV in the US has been slow	There is a gap between number of people at risk and those who know about PrEP	PrEP are not known to the many of those at risk in the US.	PrEP knowledge from patients	Information about PrEP
Black MSM awareness is still low after FDA approval	Low level of awareness about PrEP from BMSM	BSMS – low PrEP awareness	PrEP knowledge from patients	
Namely, PrEP was approved by the US Food and Drug Administration (FDA) in July 2012, and as of March 2013, an estimate of 1774 people in the US have been prescribed the drug, with 48% of those	Huge gap between new infections and people on PrEP that needs to be addressed	People at high risk are not prescribed PrEP	PrEP low uptake	

prescriptions being written for women. However, with 50,000 annual HIV infections, scale-up of PrEP will necessitate greater population uptake than what we currently observe				
Although improvements have been made in biomedical HIV prevention tools, these advances do not help improve the lives of those at-risk for HIV if they are not disseminated and readily accessible	Information about new HIV prevention methods are not spread, hence lives are still at-risk	Healthcare providers do not provide information about PrEP	PrEP knowledge from healthcare providers	
Public health agencies must evaluate their current approaches to PrEP, as without considerable changes in the current status quo, PrEP may remain largely underutilized. Public health agencies and primary care providers need to develop stronger ties in order to identify and link to ongoing care individuals who are at elevated risk for HIV. We must now prioritize working towards reducing barriers to accessing care for HIV negative men and developing novel ways to reach and engage men who are unaware of prevention services.	Patients at high risk need to be identified and given information about PrEP from local healthcare providers	Healthcare providers need to inform high-risk individuals about PrEP	Information delivery, patient education	Recommendation for HCPs
Although historically much of the HIV prevention and treatment efforts in the US have been carried out by community-based HIV/ AIDS organizations, many of these agencies are likely unequipped within their currently existing infrastructure to not only raise awareness of PrEP, but seek out, engage, and provide ongoing care for individuals who are on PrEP or candidates for PrEP	Promoting PrEP needs effort from healthcare workers in the community	Healthcare workers are at perfect position to promote PrEP in local community	Community empowerment	
Open the need to either enhance and improve services provided by HIV/AIDS medical providers, or to train primary care providers in sexual health assessments and CDC guidelines on PrEP use, and invigorate efforts to promote PrEP	Healthcare workers need training about PrEP	PrEP education for healthcare workers	PrEP education for nurses	
Having an awareness of PrEP is also linked to greater connection with an understanding of HIV prevention services. These findings	Healthcare providers need to talk to high-risks	High-risk patients should be informed	HIV testing and PrEP	



underscore the importance of integrating conversations about PrEP within HIV test counseling.	patients about PrEP at HIV testing	about PrEP during HIV testing		
---	------------------------------------	-------------------------------	--	--

## Appendix 3

Table 4 Formulation of major and minor categories of 10 unit of analysis

Article Number	Categorised condensed meaning units in accordance with Graneheim and Lundman (2004)  (Names of the categories are in underlined characters)
1	<p><u>HIV risk</u>: Heterosexual, Black and young women are at high risk of contracting HIV.</p> <p><u>Information about PrEP</u>: PrEP to prevent HIV transmission is approved by the FDA. However, the <b>knowledge</b> and awareness of PrEP among patients and healthcare providers are still low. The demand for PrEP is higher than supply while <b>uptake</b> is still low.</p> <p><u>Challenge</u>: usage of PrEP is faced by the patients with various challenges namely <b>costs</b>, side-effects, mistrust in the system, stigma as well as adherence.</p> <p><u>HCPs' role</u>: Nurses should spread accurate information about PrEP to high-risk patients while building trust with the patients.</p>
2	<p><u>HIV risk</u>: Transgender are at higher risk of HIV due to biological, psychological and environmental factors. Sex work in transgender is also a risky behavior.</p> <p><u>Information about PrEP</u>: the argument of PrEP being beneficial in the large scale in the transgender community is still debatable.</p> <p><u>Challenge</u>: <b>faced by the patients</b> - Transgender faces high stigma and discrimination. They also have a harder time accessing medical aids like insurance issues. <b>Faced by healthcare providers</b> - Public health is still considering if it is <b>cost-effective</b> to recommend PrEP to the trans community which poses a <b>moral issue</b>.</p> <p><u>HCPs' role</u>: Nurses need to recommend condoms, PrEP, stable partners as well as HIV treatment for positives partners. Nurses should connect trans patients to the community and appropriate medical services.</p>
3	<p><u>HIV risk</u>: HIV negative partners with serodiscordant heterosexual couples are at high risk for HIV. African and Latino women are at higher risk of HIV. Transmission is higher for women with a primary male partner.</p> <p><u>Information about PrEP</u>: PrEP for HIV prevention is approved and recommended by the FDA and CDC. PrEP is proven to be effective to those who adhere to the medication. PrEP offers extra protection when ART fails</p> <p><u>Challenge</u>: <b>Faced by healthcare providers</b> - Uptake for PrEP in this group is low due to the operating healthcare system. Other barriers are fear of <b>drug resistance</b>, <b>adherence</b> and decreased condom usage (<b>risk compensation</b>). Many healthcare providers only treat HIV positive patients. <b>Faced by the patients</b>: concerns about side effects, stigma and biological factors like renal diseases or taking nephrotoxic drugs. Higher acceptance and adherence is shown in HIV serodiscordant couples. Other <b>personal barriers</b> to poverty, mental health and homelessness also affect PrEP usage. Costs and coverage also play as big hindrance.</p> <p><u>HCPs' role</u>: provide information about PrEP in the clinical setting when treating the HIV positive partner.</p>
4	<p><u>HIV risk</u>: injection drug users are at high risk of HIV.</p> <p><u>Information about PrEP</u>: PrEP for HIV prevention is recommended by the CDC for IDU when condoms and clean needles are not available.</p> <p><u>Challenge</u>: <b>faced by the patients</b> – <b>adherence</b> is the key to effectiveness. <b>Faced by healthcare providers</b> – <b>cost-effectiveness</b> is still debatable in this group. Combination of MMT and PrEP is still a challenge.</p> <p><u>HCPs' role</u>: it is proposed to only recommend PrEP to IDUs at certain high risk of HIV like IDUs of risky sexual behaviors, needle sharing, and drug mixing. Nurses should be aware of the cooperation between MMT, PrEP and ART programs. The issue of <b>cost-effectiveness</b> makes nurses face a <b>dilemma</b> when the public budget does not allow them to recommend PrEP to every IDUs despite</p>

	the fact that PrEP might be of help to the patients.
5	<p><u>HIV risk:</u> Men who have sex with men are at high risk of HIV.</p> <p><u>Information about PrEP:</u> PrEP for HIV prevention is approved by the FDA. <b>PrEP uptake</b> is low. <b>Knowledge of PrEP</b> in the community remains minimum and community healthcare workers are not well trained regarding the topic.</p> <p><u>HCPs' role:</u> HIV testing, condom education, and risk reduction counseling. The role of <b>community empowerment</b> is emphasised, therefore community nurses play a big role in PrEP. Nurses need to receive education about PrEP. It is important for nurses to identify individuals at high risk for HIV. Behavioral intervention can be used such as maintaining the relationship with the patients and assisting them with adhering to the medicine as well as HIV and STIs testing. Referring the patients to safe space community like LGBTQ organisations where PrEP can be promoted for high-risk individuals.</p>
6	<p><u>HIV risk:</u> Use of needle stick or having unprotected condomless sex. MSM and young MSM of color are at higher risk of HIV.</p> <p><u>Information about PrEP:</u> FDA approved PrEP use for HIV prevention. <b>Low knowledge of PrEP</b> for healthcare providers</p> <p>Challenge: <b>Faced by the patients:</b> PrEP has short-term <b>side effects</b>. Long-time side effects are unknown. <b>Cost:</b> Many individuals are not covered by insurance or their insurance doesn't cover PrEP. <b>Faced by healthcare providers:</b> behavioral changes when on PrEP, patients feel invincible to HIV. <b>Risk compensation</b> when condom usage decreases that leads to a rise in STDs. Afraid that compliance and adherence is not achieved</p> <p><u>HCPs' role:</u> Understand when and how to provide PrEP. Understand that PrEP is only an additional tool for condoms. Recommend PrEP to people with fatalism regarding HIV and that they would not use condoms anyway. <b>Ethical dilemma</b> of nurses whether or not to recommend PrEP, a relatively expensive medication to the population. Moreover, principles of <b>social justice</b> take place when nurses need to consider whether to only recommendation PrEP to those who can <b>adhere</b> and follow-up with treatment while neglecting the ones who can't, in which PrEP might still be of benefit to them. Nurses must decide to whom we should recommend PrEP to and based on what evidence based criteria. It is recommended to reach out to those most in need and most mistreated by the system. For example, help out those whose insurance doesn't cover PrEP by introducing them to aiding programs. Nurses need to get the sexual anamneses of the patients. <b>Patient education</b> and follow-up is a compulsory for PrEP. It is important to know that not only gay men who are at risk of HIV, many heterosexuals are as well.</p>
7	<p><u>HIV risk:</u> MSM are more likely to acquire HIV. Risky behavior: IDUs.</p> <p><u>Information about PrEP:</u> Approved by FDA for HIV prevention tool. <b>PrEP knowledge</b> of HCPs is high to medium. <b>Uptake of PrEP</b> is low</p> <p>Challenge: <b>Faced by HCPs:</b> lack of guidance, cost, lack of confidence in real-world effectiveness, patient's adherence, risk compensation and drug resistance. <b>Social justice:</b> PrEP diverts resources away from HIV positive people. <b>Faced by patients: Adherence</b></p> <p><u>HCPs' role:</u> HCPs play an important role in the implementation and provision of PrEP.</p>
8	<p><u>HIV risk:</u> MSM, black MSM and sex workers are at high risk of HIV.</p> <p><u>Information about PrEP:</u> <b>PrEP knowledge</b> and <b>uptake</b> is low from those at risk. HCPs are not aware nor provide information about PrEP.</p> <p><u>HCPs' role:</u> Provide patients at high risk <b>information</b> about PrEP. <b>Community</b> nurses are in a perfect position to promote PrEP. Nurses need education about PrEP. Incorporate the topic of PrEP during <b>HIV testing</b> for high-risk patients.</p>
9	<p><u>HIV risk:</u> MSM, HIV negative sex partners of HIV positive people, transgendered are at high risk of HIV.</p> <p><u>Information about PrEP:</u> FDA approved PrEP and recommended by WHO. <b>Uptake</b> of PrEP is low</p> <p>Challenge: <b>faced by the patients: adherence</b>, stigma (whore, peers, homosexual, sex work, assume HIV positive, non-disclosure,</p>

	<p>sex outside relationship, <b>mistrust</b> in HCPs etc.), no stigma in discordant couples. <b>Face by HCPs</b> – Risk compensation, drug resistance, real-world efficacy, adherence, moral issues, and guidelines.</p> <p><u>HCPs' role</u>: frequent monitoring for PrEP users. PrEP should be recommended to help people remain HIV – negative.</p>
10	<p><u>HIV risk</u>: MSM, transgender, heterosexual serodiscordant couples are at higher risk of HIV</p> <p><u>Information about PrEP</u>: Approved by FDA and recommended by CDC.</p> <p><u>Challenge</u>: <b>adherence</b> to the dosage.</p> <p><u>HCPs' role</u>: Adherence intervention by education (printed materials, discussion, signs, and symptoms, etc.), counseling, home-based rapid HIV testing, feedback (follow-up: phone calls, SMS).</p>

## Appendix 4

Table 5 Answers to each research questions by each article

Articles	1. What role does PrEP play in HIV prevention?	2. What are the challenges nurses face when encountering patients with high risk for HIV acquisition?	3. What are the recommendations to combat the challenges nurses face during care encounter?
1	Considering the fact that heterosexual, Black and young women are at high risk of contracting HIV, PrEP approved by FDA can effectively help these target groups avoiding HIV transmission.		Spread accurate information about PrEP to high-risk patients while building trust with the patients.
2	Transgender are at higher risk of HIV due to biological, psychological and environmental factors. Sex work in transgender is also a risky behavior. However, it is still debatable whether the FDA approved PrEP would be beneficial for this community on the large scale.		Recommend condoms, PrEP, stable partners as well as HIV treatment for positives partners. Nurses should connect trans patients to the community and appropriate medical services.
3	PrEP approved by FDA and recommended by CDC should be promoted to HIV negative partners with serodiscordant heterosexual couples who are at high risk for HIV as well as African and Latino. Surprisingly, Transmission is higher for women with a primary male partner.	Fear of drug <b>resistance</b> in the case of acute HIV patients who are not aware of their infection. PrEP encourages fewer condoms use in serodiscordant couples. Many HCPs only treat HIV positive patients and they lack confidence in PrEP real-world effectiveness.	Provide information about PrEP to HIV neg patient in the clinical setting when treating the HIV positive partner.
4	The CDC recommends PrEP for IDUs when condoms and clean needles are not available to prevent HIV transmission.		It is proposed to only recommend PrEP to IDUs at certain high risk of HIV like IDUs of risky sexual behaviors, needle sharing, and drug mixing. Nurses should be aware of the cooperation between MMT, PrEP and ART programs. The issue of <b>cost-effectiveness</b> makes nurses face <b>dilemma</b> when public budget does

			not allow them to recommend PrEP to every IDUs despite the fact that PrEP might be of help to these patients
5	PrEP promotion is essential for MSM that are at high risk of HIV. PrEP knowledge from both patients and HCPs is low, hence promotion regarding this topic is to be emphasized.		HIV testing, condom education, and risk reduction counseling. The role of <b>community empowerment</b> is emphasized, therefore community nurses play a big role in PrEP. Nurses need to receive education about PrEP. It is important for nurses to identify individuals at high risk for HIV. Behavioral intervention can be used such as maintaining the relationship with the patients and assisting them with adhering to the medicine as well as HIV and STIs testing. Referring the patients to safe space community like LGBTQ organisations where PrEP can be promoted for high-risk individuals.
6	PrEP approved by FDA, should be promoted to those who use needle stick or having unprotected condomless sex as well as MSM and young MSM of color who are at higher risk of HIV.	Patients who do not <b>adhere</b> to the daily dosage as well as frequent check-up which can potentially lead to medication failure and drug <b>resistance</b> . Many MSM admit that they are not planning to use condoms while on PrEP.	Understand when and how to provide PrEP. Understand that PrEP is only an additional tool for condoms. Recommend PrEP to people with fatalism regarding HIV and that they would not use condoms anyway. <b>Ethical dilemma</b> of nurses whether or not to recommend PrEP, a relatively expensive medication to the population. Moreover, principles of <b>social justice</b> takes place when nurses need to consider whether to only recommend PrEP to those who can <b>adhere</b> and follow-up with treatment while neglecting the ones who can't, in which PrEP might still be of benefit to them. Nurses must decide to whom we should recommend PrEP to and based on what evidence-based criteria. It is recommended to reach out to those most in need and most mistreated by the system. For example, help out those whose insurance doesn't cover PrEP by introducing them to aiding programs. Nurses need to get the sexual anamneses of the patients. <b>Patient education</b> and follow-up is compulsory for PrEP. It is important to know that not only gay men who are at risk of HIV, many

			heterosexuals are as well.
7	PrEP approved by FDA and recommended by the CDC, should be provided to those at high risks like MSM and IDUs. It is found that patients who are interested in PrEP are likely to have high drug adherence.	Doctors are reluctant to prescribe the med due to fear of <b>drug resistance</b> . The increase of STIs derived from PrEP is a concern for many HCPs. Many HCPs only treat HIV positive patients and they lack confidence in PrEP real world effectiveness. Moreover, there is lack of local guidance on the topic.	HCPs play an important role in the implementation, promotion, and provision of PrEP.
8	PrEP should be promoted to MSM, black MSM and sex workers who are at high risk of HIV but whose knowledge and uptake of PrEP is still low.		Provide patients at high risk <b>information</b> about PrEP. <b>Community</b> nurses are at perfect position to promote PrEP. Nurses need education about PrEP. Incorporate the topic of PrEP in <b>HIV testing</b> for high-risk patients.
9	PrEP should be recommended for MSM, HIV negative sex partners of HIV positive people, transgendered are at high risk of HIV. Uptake of PrEP is still low.	Many HCPs are concerned about PrEP leads to risk compensation such as a decrease in condom use and increase in STIs. <b>Risk compensation</b> stereotype manifests in many HCPs' opinion about Black HIV negative partners. Some HCPs perceive CDC's guidelines to be ambiguous.	Frequent monitoring of PrEP users. PrEP should be recommended to help people remain HIV – negative.
10	PrEP should be recommended for transgender, heterosexual serodiscordant couples who are at higher risk of HIV. PrEP is approved by FDA and recommended by CDC		Adherence intervention by education (printed materials, discussion, signs, and symptoms, etc.), counseling, home/based rapid HIV testing, feedback (follow-up: phone calls, SMS).

## Appendix 5

Table 6 Brief findings of 10 unit of analysis

Major category	HIV Risk		
Minor categories	Gender and sexuality	Race	Risky behaviors
Findings	Women, MSM, Transgender	Black, Hispanic	IDUs, substance misuse, drugs, sex work, HIV-discordant couples, receptive anal condomless sex, frequent change of partner, etc
Unit of analysis	1, 2, 3, 5, 7, 8, 9, 10	1, 3, 6, 8	2, 3, 4, 6, 7, 9, 10

Major category	Information about PrEP				
Minor categories	PrEP benefit	PrEP knowledge from patients	PrEP knowledge from HCPs	PrEP demand	PrEP uptake
Findings	FDA approved, CDC guidelines, WHO recommended, HIV prevention	Low	Low, medium to high	High	low
Unit of analysis	1, 2 (open question for transgender), 3, 4, 5, 6, 7, 8, 9, 10	1, 5, 8	Low: 1, 5, 6, 8 High in the US: 7 Medium outside U.S: 7	1, 3, 7,9	1, 3, 5, 7, 8, 9

Major category	Challenge faced by the patients (part 1)				
Minor categories	Cost	Long-term effects	Peer influence	Mistrust	Stigma
Findings	High, depending on where the patients are, America needs insurance, free in some countries	Renal disease, bone disease, bone density	partners, friends	Mistrust in healthcare professional and the medicine	Misperceive of HIV positive, discrimination, depression, promiscuous, risky behaviors
Unit of analysis	1, 2, 3, 4	3, 6	3, 9	1, 9	1, 2, 3, 9



--	--	--	--	--	--

Major category	Challenge faced by the patients (part 2)		
Minor categories	Side effects	Adherence	Follow up
Findings	drug-drug interaction (nephrotoxic drugs, contraceptives), nausea, abdominal cramping, vomiting, dizziness, headache, etc.	A great challenge for many PrEP users, all challenges discussed could play as potential barriers to adherence	Personal circumstances like poverty, mental health, etc
Unit of analysis	1, 3, 6	1, 3, 4, 7, 9	3

Major category	Challenge faced by HCPs			
Minor categories	Drug resistance	Risk compensation	Attitude	Guidance
Findings	Fear of drug resistance	decrease condom use, increase STIs	PrEP not relevant to their care, lack of confidence in real-world effectiveness, not supportive	lack of guidance
Unit of analysis	3, 6, 7,	3, 6, 7, 9 (unconscious bias)	3, 7	7, 9

Major category	Recommendation for HPCs (part 1)			
Minor categories	Information delivery and patient education	Build a trusting relationship with the patients	Community empowerment	Adherence and follow up support
Findings	Patients need to know about all possible options including PrEP and other interventions, rich out for those at high risk	open communication with the patients about their sexual activities, risk evaluation and possible for PrEP	HCPs can connect high-risk patients to advocacy communities with a support network. This is effective for HIV prevention and PrEP uptake	key to the effectiveness of the prevention, counseling, feedback, phone calls

Unit of analysis	1 3 5 6 8, 9, 10	1, 7	2 5 8	4 6 10
------------------	------------------	------	-------	--------

Major category	Recommendation for HPCs (part 2)			
Minor categories	Risk evaluation	Social justice	PrEP education for HCPs	HIV testing and PrEP
Findings	HCPs should evaluate the risk of contracting HIV of the patients to consider suggesting PrEP	Support those who are mistreated by the healthcare system, not covered by insurance, those subjected to prejudices	HCPs need training about this alternative HIV prevention method in addition to condoms	Integrate PrEP with HIV testing (talk about PrEP at HIV testing and HIV testing while taking PrEP)
Unit of analysis	4, 5, 6, 7	6, 7	7, 8	3, 5, 8, 10