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Utility of Social Support and Social Networks Theory in the PrEP Continuum of Care for Adolescents: A Review of the Literature

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Abstract

This literature review explores the potential of social support and social network theories in improving enrollment and retention in HIV pre-exposure prophylaxis (PrEP) care for at-risk adolescents aged 10-24. Seven peer-reviewed articles were analyzed to identify the critical role of social support and networks in providing informational, instrumental, emotional, and appraisal support. While biological family members are often the primary support figures, some studies acknowledge the importance of friend networks in promoting PrEP use. Families are generally willing to support their children's use of PrEP, especially if they have prior knowledge of PrEP. Communication between parents and their children about HIV and PrEP is crucial in promoting PrEP awareness and use. Future studies should focus on developing and testing interventions that leverage the influence of families, partners, online support strategies, social identity support, and policy analysis to improve access to sexual health services for at-risk adolescents. In conclusion, social support and networks can potentially enhance the PrEP continuum of care among adolescents at risk for HIV. Future research should explore the effectiveness of interventions targeting these factors.

Chapter 1 - Introduction

HIV is a major global public health concern, with approximately 38 million people living with HIV/AIDS worldwide (WHO, 2023). Most of these infections were found in Sub-Saharan Africa, with an estimated 25.7 million people with HIV in 2021 (WHO, 2023). Looking at population characteristics, new HIV infections among adolescents 10-24 years old reached approximately 410,000 globally in 2020 (UNICEF, 2021), with nine of ten infections among adolescents still occurring in sub-Saharan Africa based on data from 2017 (UNICEF, 2018).

In the U.S., HIV remains a persistent problem, too, with an estimated 1,189,700 people having HIV at the end of 2019 (CDC, 2022). Adolescents 13-24 years old accounted for at least 20% of 30,635 new HIV diagnoses (CDC, 2021).

While adolescents' data represents a relatively small share of the overall HIV burden worldwide, disparities exist in HIV incidence among different subpopulations of adolescents. For example, in 2020, among all adolescents 13-24 years old diagnosed with HIV, young gay and bisexual men accounted for 84% of all new diagnoses (CDC, 2022). Additionally, among these new HIV diagnoses, young Black/African American gay and bisexual men represented 53% of positive diagnoses (CDC, 2022). Furthermore, while adolescents between 15-24 years old represent only 13% of the U.S. population, they are responsible for half of all new cases of sexually transmitted infections (STIs), underscoring their heightened vulnerability to contracting and spreading HIV (National Academies of Sciences, Engineering, and Medicine, 2021). As of 2021 in Africa, adolescents, especially girls aged 15-24, remain at significant risk of contracting HIV, accounting for 63% of all new HIV infections (Murewanhema et al., 2022).

Social support and social networks theory utility in the PrEP continuum of care for Adolescents

In recent years, progress has been made in reducing HIV infections globally. There has been a significant decrease in new HIV infections among adolescents globally since 2010 (UNICEF,2021). In Africa, countries have reported a varying decrease, in new HIV infections, including South Africa, which has shown a 41% decline in new HIV infections among adolescents (UNICEF, 2021). Similarly, in the United States, there has been a reduction of 15% in new HIV infections among adolescents and young adults 13-24 years old between 2015 and 2019 (CDC, 2021). These figures are encouraging and suggest that prevention measures and HIV treatment efforts are making a positive impact. However, there is still much to be done to ensure that adolescents continue to receive the necessary care and support to prevent and manage HIV/AIDS.

In a 2019 study, Hosek and Pettifor examining HIV prevention interventions for adolescents highlights various strategies to reduce HIV risk effectively, such as addressing social and economic factors like poverty and stigma, promoting condom use, reducing the number of sexual partners, implementing pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP), but also emphasize on the importance of integrated approaches to achieve the greatest effectiveness (Hosek & Pettifor, 2019). By implementing these approaches, HIV incidence can be reduced significantly, and prevention efforts can be more effective. However, it is crucial to note that each intervention approach should be tailored to the specific context and needs of the target population to ensure maximum impact.

The disproportionate impact of HIV on adolescents can be directly addressed through accessible HIV prevention tools, such as PrEP, which is an HIV prevention medication available as pills and shots, approved since 2012 and indicated for adults 18 and older or at-risk minors weighing at least 77 lb., safe and effective in reducing the risk of HIV acquisition by over 90%

Social support and social networks theory utility in the PrEP continuum of care for Adolescents (Tanner et al., 2020). Despite its proven effectiveness, PrEP remains underutilized by adolescents in the United States (CDC, 2021) and Africa (Skovdal et al., 2022). To maximize the benefits of PrEP, it is crucial to increase its accessibility and availability to those who need it the most. However, it is essential to point out that PrEP ought not to supplant or rival the effectiveness of established and comprehensive HIV prevention strategies, such as condom distribution programs for sex workers and men who have sex with men, as well as harm reduction approaches for individuals who inject drugs (World Health Organization, 2018).

It is acknowledged that adolescents face significant challenges in accessing and adhering to PrEP compared to older individuals (Allen et al., 2017). This disparity can be attributed to various barriers, including HIV- and sex-related stigma, concerns from them, their parents and healthcare providers, confidentiality issues, insufficient knowledge of PrEP, the need for parental consent (in states or countries where minors cannot access PrEP independently), medication costs, and difficulties in adhering to daily medication (Allen et al., 2017). Adolescents may face additional challenges in accessing PrEP due to their caregivers' lack of knowledge or support, limited autonomy and agency, and socio-economic disadvantages (Allen et al., 2017). Based on these facts, addressing these barriers will likely require a multifaceted approach, including PrEP awareness campaigns targeted at adolescents and parents, training and education for healthcare providers on PrEP provision, cost reduction strategies, and novel PrEP uptake and adherence support approaches. Besides, in a study among young men and transgender women of color, the results of modeling studies suggested that achieving the desired reduction in HIV can be facilitated by improving uptake and adherence within dense networks (Jenness et al., 2016).

Social support and social network theories are crucial strategies for various health behaviors and outcomes. More specifically, it promotes access to care, medication adherence,

Social support and social networks theory utility in the PrEP continuum of care for Adolescents respect of follow-up visits, and feeling supported (DiMatteo, 2004; Hunter et al., 2019). They can also help address the barriers to PrEP uptake and adherence among adolescents, particularly those related to social and structural factors. Studies have shown that informational support provided by parents can help adolescents adhere to daily medication regimens for chronic conditions such as HIV and diabetes mellitus (Goethals et al., 2017; Williams et al., 2006). Furthermore, research suggests that social networks and support can increase PrEP uptake and counteract adherence barriers (Clark et al., 2021; Johnson et al., 2020; Kelly et al., 2020). Moreover, social network characteristics like size and density have been associated with increased PrEP uptake (Veinot et al., 2016). Social support can also counteract adherence barriers by decreasing negative appraisal of stressful life events, reinforcing normative adherence behavior, buffering against stigma, and improving structural barriers (Wood et al., 2020).

Despite the potential of social support and social networks to improve the PrEP continuum of care for adolescents, there has been limited research on this topic. Thus, this literature review draws upon years of research to assess how these concepts can be integrated to enhance PrEP use among adolescents. Specifically, this review will define social support and social networks as they relate to HIV PrEP interventions for adolescents, examine how these theories have been employed to enhance the PrEP continuum of care, and identify which areas of the HIV PrEP continuum of care have benefited most from the use of social support and social network theories.

Chapter 2 – Background

Definitions.

Adolescence

The Lancet Commission on Adolescent Health and Well-being has defined adolescence as the period between 10 and 24 years of age to better capture the unique health needs and experiences of young people in this age range (Patton et al., 2016). These unique experiences related to health and well-being (sexual and reproductive health, mental health, and substance use, for example) are comparable to those faced by younger adolescents (10-19), which is why public health experts and organizations have expanded the definition of adolescence from 10-19 as defined by the World Health Organization (WHO, n.d.) to include individuals up to the age of 24. I will consider the Lancet Commission on Adolescent Health age for this review.

Definition and conceptualization of social networks and social support

Social support is an essential aspect of an individual's well-being and health, and it is a key component in facilitating positive health behaviors. Social support provides individuals with a sense of belonging and acceptance, and it can help reduce stressors' impact on physical and mental health(Ozbay et al., 2007). Examples of social support include emotional support, which involves providing comfort, empathy, and caring; tangible support, which involves providing material assistance, such as financial support or help with tasks; informational support, which involves providing advice, guidance, and information; and appraisal support, which involves providing feedback, validation, and encouragement (Heaney & Israel, 2008).

In contrast, social network theory focuses on the patterns of social relationships within a given community or population. This theory emphasizes the importance of social ties and the

Social support and social networks theory utility in the PrEP continuum of care for Adolescents role that social norms and social influence play in shaping individual behavior (Latkin & Knowlton, 2015). In other words, social network theory suggests that social networks comprise individuals connected by various relationships, including family ties, friendships, work relationships, and other social connections. These relationships can influence behavior and affect health outcomes, both positively and negatively (Umberson & Montez, 2010).

Measuring social support and social networks can be challenging due to their complex structural characteristics, subjective nature, and contextual factors influencing their availability and quality (Glanz et al., 2008; Vangelisti, 2009). Hence, despite the difficulties, creating more sophisticated and standardized methods of assessing social networks and support is vital to enhance our understanding of their impact on health outcomes, particularly in the context of PrEP for at-risk adolescents.

Overall, social support and social network theories are crucial in comprehending how an individual's social environment can impact their health and health behaviors. Researchers and healthcare providers can use these theories to design interventions and programs to enhance health outcomes by reinforcing social support systems and encouraging healthy social networks.

HIV Epidemiology and risk factors for adolescents

A rising number of adolescents and young adults are living with HIV. Globally, in 2020, 410,000 young people between 10 and 24 years old were newly infected with HIV, of which 150,000 were adolescents aged 10 to 19 years old (UNICEF, 2021). While most new HIV infections among adolescents occur in low- and middle-income countries (Arora, 2018), the

Social support and social networks theory utility in the PrEP continuum of care for Adolescents United States recorded 30,635 new HIV cases, with adolescents 13-24 years old accounting for at least 20% of all new HIV diagnoses (CDC, 2021).

The HIV epidemic disproportionately impacts certain groups of adolescents, particularly those from racial and ethnic minorities and those who identify as lesbian, gay, bisexual, transgender, queer, or questioning (LGBTQ). In the United States, for instance, young black gay and bisexual men accounted for 52% of new HIV diagnoses among all gay and bisexuals aged 13 to 24 years (KFF, 2020). Similarly, adolescent girls and young women (AGYW) in sub-Saharan Africa aged 15-24 years old have a high risk of contracting HIV, with 63% of all new infections in 2021 attributed to them (Murewanhema et al., 2022).

Despite statistics showing that most young people become HIV positive by engaging in sexual intercourse, the Centers for Disease Control (CDC) reports also indicated that among those aged 18 to 24 years old diagnosed with HIV, other factors like low rate of condom use, the continually increasing rates of sexually transmitted infections, and alcohol or drug use were incriminated (CDC, 2022). Furthermore, among youth with undiagnosed HIV infection, 18% reported that they did not use any HIV prevention strategies, such as harm reduction (needle exchange programs) (CDC, 2022). For instance, 48% of youth without HIV who inject drugs reported using a syringe after someone else used it, and 72% reported using any injection equipment after someone else used it in the previous 12 months (CDC, 2022). Additionally, adolescents and adolescent girls, particularly in Africa, are at high risk of HIV infection due to poverty, gender inequality, cultural beliefs and practices, substance abuse, and lack of comprehensive sex education (Lewis et al., 2022).

Social support and social networks theory utility in the PrEP continuum of care for Adolescents

HIV Preexposure prophylaxis and challenges

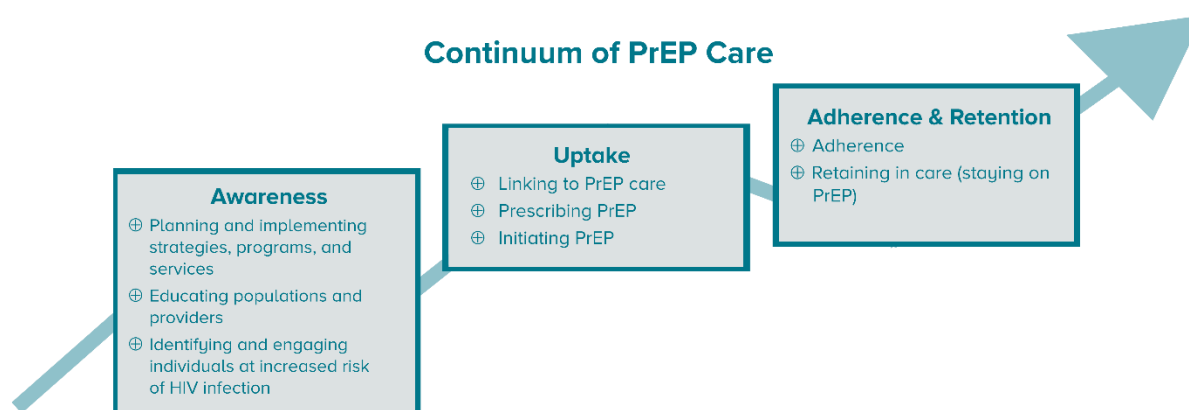
PrEP was approved as safe and effective for HIV prevention in 2012 in adults 18 and older and was approved in May 2018 for at-risk minors weighing at least 77lb (Tanner et al., 2020). Available as pills (Truvada®, Descovy®) and shots (Apretude), studies found that PrEP demonstrated a reduction in contracting HIV by over 90% when taken consistently (McCormack et al., 2016). Healthcare providers discuss with eligible patients and determine the suitable regimen for PrEP. These regimens can range from one pill daily to a shot every other month by a healthcare provider (CDC, 2021). The World Health Organization recommends prevention choices, such as Tenofovir Disoproxil Fumarate-based oral PrEP, the Dapivirine ring to women, and long-acting injectable Cabotegravir, as part of comprehensive prevention programs for people at substantial risk of HIV infection (WHO, n.d.). PrEP specifically is indicated for individuals diagnosed with an STI in the past six months, who do not use condoms consistently, or who have an HIV-positive partner with an unknown or detectable viral load. PrEP is also advised for people who inject drugs (CDC, 2021).

The global implementation of PrEP has been successful due to its established effectiveness, as evidenced by the high number of PrEP initiations in sub-Saharan African countries and the United States, which has seen the highest cumulative PrEP initiation (Tailor et al., 2022). In the United States, uptake of PrEP is due in part to the fact that PrEP is often available for free (CDC, 2022), as it is included in most insurance plans and state Medicaid programs; the Affordable Care Act makes PrEP prescriptions and associated doctors' visits and lab tests available for free through practically all health insurance plans (CDC, 2022).

In other countries, like in the African region, the cost of PrEP varies. PrEP is generally accessible in health facilities at an out-of-pocket cost or free of charge in sites working with

Social support and social networks theory utility in the PrEP continuum of care for Adolescents high-risk groups such as MSM or female sex workers (FSW) (Muhumuza et al., 2021). Moreover, In 2018, it was estimated that 44% of the resources for HIV in low- and middle-income countries (LMICs) were from external sources, indicating a continued dependence on donor funding for their HIV response (Wanga et al., 2021). The cost of PrEP can pose a significant challenge for individuals from low socio-economic status living in sub-Saharan Africa or other countries, hindering their access to effective HIV prevention strategies.

A continuum of care for PrEP to measure its implementation and patients' participation was proposed to evaluate PrEP awareness, uptake, adherence, and retention (Nunn et al., 2017). The continuum involves (1) identifying the people most at risk for contracting HIV, (2) raising the group's awareness of their own risk, (3) boosting PrEP awareness, (4) facilitating access to PrEP, (5) connecting to PrEP care, (6) prescribing PrEP, (7) starting PrEP (8) adhering to PrEP, and (9) keeping people in PrEP care.



*Modified from Nunn, et al. Defining the HIV pre-exposure prophylaxis care continuum. *AIDS* 2017; 31(5):731-734.

Figure 1: Continuum of PrEP care (Nunn et al., 2017)

Several barriers exist, preventing those needing PrEP the most from accessing it. These barriers can be the same everywhere, except for some variations depending on the setting (country) and cultural and contextual factors (Lewis et al., 2022). Barriers to PrEP use among

Social support and social networks theory utility in the PrEP continuum of care for Adolescents adolescents and young people in African countries, identified by Muhumuza et al. (2021), include various individual, interpersonal, community, institutional, and structural-level factors.

Individual-level barriers included PrEP-related stigma, doubts about PrEP efficacy, the complexity of the PrEP regimen, and pill burden. Interpersonal barriers included parental influence and the absence of sexual partners, while community-level barriers included myths and misconceptions. Institutional-level barriers included medicine stockouts, long waiting times at clinics, and the attitude and behavior of health workers. Structural-level barriers included the cost of PrEP, mode of administration, and accessibility concerns.

In the U.S. context, studies identified a lack of awareness and knowledge from adolescents, their families, or healthcare providers (Calabrese et al., 2017; Santos et al., 2018), low perception of HIV risk, social stigma, provider bias (e.g., risk compensation, or the idea that individuals may engage in riskier behavior when using PrEP because they feel protected from HIV) (Calabrese et al., 2017), mistrust of healthcare providers, lack of access to medical care, and financial burden as barriers to PrEP use among adolescents and young people (Allen et al., 2017; Yusuf et al., 2020; Mayer et al., 2020).

As a result, the CDC reported that only about 16% of adolescents and young adults eligible to take PrEP received a prescription in 2020 (CDC, 2021). Also, PrEP adherence among adolescents and young adults in the United States is low, highlighting adherence challenges (Santos et al., 2018; Thoma & Huebner, 2018). For example, only 22% of 15-17 years old reported adhering to PrEP over 48 weeks, and similarly, poor adherence rates have been observed among 18-22 years old in the U.S. (Hosek et al., 2017). These challenges were exemplified by a case involving a young black MSM who was able to access PrEP but ultimately acquired HIV due to poor adherence and lack of participation in care, underscoring the need for

Social support and social networks theory utility in the PrEP continuum of care for Adolescents strategies to increase access to and adherence to critical HIV prevention tools (Marsh & Rothenberger, 2019).

Social support, social networks, and PrEP care

Several interventions have been developed to improve awareness, uptake, adherence, and retention, with mixed results (Liu et al., 2019; Rolle et al., 2019; Wheeler et al., 2019).

However, despite significant achievements in PrEP rollout, PrEP uptake, and adherence remain challenging for key populations such as adolescents and young adults (Hosek et al., 2016).

One potential intervention strategy to improve adolescent PrEP uptake and adherence could be social support and social network interventions. Social networks refer to "the linkages between people that may or may not provide social support and may serve functions other than providing support" (Heaney & Israel, 2008, p. 190). Social support can provide informational support (e.g., reminders of medications), instrumental support (e.g., assistance with paying for medications or transportation to visits), and emotional support (e.g., encouragement) that can improve health and health-related behaviors (Hill et al., 2021). For instance, research has demonstrated that parents providing informational support can help adolescents adhere to daily medication regimens for chronic conditions such as HIV and diabetes mellitus (Goethals et al., 2017; Williams et al., 2006). Additionally, data showed that Black men who have sex with men (BMSM) and transgender women (TW) who were part of the Partner Services PrEP pilot randomized control trial, which employed social network services strategies to improve linkage to PrEP care, had a more significant proportion of patients linked to PrEP care compared to the control participants (Teixeira da Silva et al., 2021). Another study by Clark et al. (2021) found that the *TransPrEP* intervention, which involved providing PrEP education and support to

Social support and social networks theory utility in the PrEP continuum of care for Adolescents participants and their social networks, effectively improved PrEP adherence among transgender women.

Additional study pilot testing a social network-level intervention designed to increase PrEP awareness, benefit perception, and norms among Black MSM found not only an improvement in knowledge, attitudes, and willingness to use PrEP but also an increase in the percentage of participants who reported using PrEP from 3% at baseline to 11% at follow-up (Kelly et al., 2020). These findings highlight the potential utility of social support and social network theories as potential health promotion strategies to help adolescents stay in the PrEP continuum of care.

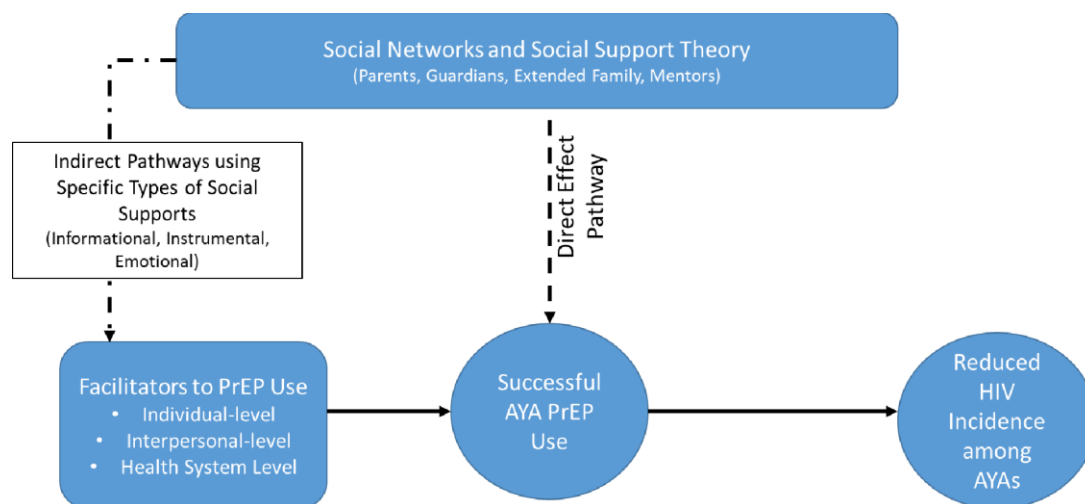


Figure 2: Social networks and social support theory direct and indirect pathways (Hill et al., 2021).

To develop and improve social support and social network-based PrEP interventions, it would be essential to understand the characteristics of social networks and the functions of social support for adolescents eligible for or receiving PrEP. No study has been conducted to

Social support and social networks theory utility in the PrEP continuum of care for Adolescents summarize how social support and social network strategies could be leveraged to improve adolescents' PrEP continuum (awareness, uptake, adherence, and retention). Through this literature review, I aim to draw on years of research and promising results to highlight areas of interest that could increase PrEP awareness, increase HIV risk perception, initiate PrEP, adhere to PrEP, and retain adolescents in PrEP care.

Chapter 3 – Data sources

Literature search strategy

This literature review was conducted by searching multiple databases: PubMed (MEDLINE), PsycINFO, CINAHL, Cochrane Central Register of Controlled Trials, and Embase. Articles were included in the initial search if they were published in English between January 2012 and December 2022 and focused on adolescents aged 10 to 24 years old, PrEP, social networks, social support theory, and PrEP Continuum of care. The search strategies were based on key terms (i.e., HIV Pre-exposure Prophylaxis, PrEP, Adolescents, Social support, and social network), controlled vocabulary, and Medical Subject Headings. Additional references from seminal articles were reviewed to ensure that essential contributions were not excluded.

The final keywords/ terms included were: ("Social network*" OR Peer* OR "social support*") AND (Affect* OR Impact* OR influenc* OR effect*) AND ("pre-exposure prophylaxis" [MeSH Terms] OR "pre-exposure prophylaxi*" OR PrEP OR "Pre-exposure Prophylaxi*") (Table 1).

After running the initial research query across the identified databases, using the key terms and Boolean terms, the different databases gave the results as follows:

Table 2: Extraction table

Databases	Results
PubMed	411
CINAHL	1
PsycINFO	35,124
Embase:	23
Cochrane	1
Total	35,560

The initial query brought up a total of 35,560 results. Once the initial phases of excluding articles were completed (articles published before 2012, articles not in English, age of participants less than ten and greater than 24), the remaining articles were reviewed in more detail based on their titles and abstracts. Duplicates were removed, and the articles that would be reviewed in complete detail and included in the review and analysis were selected. Finally, seven articles met our criteria. All final articles were saved, classified, and organized using Zotero reference management software (figure 4).

After completing the literature review, the findings were used to discuss the implications of public health and suggest how social support and social networks can be incorporated and implemented in public health interventions.

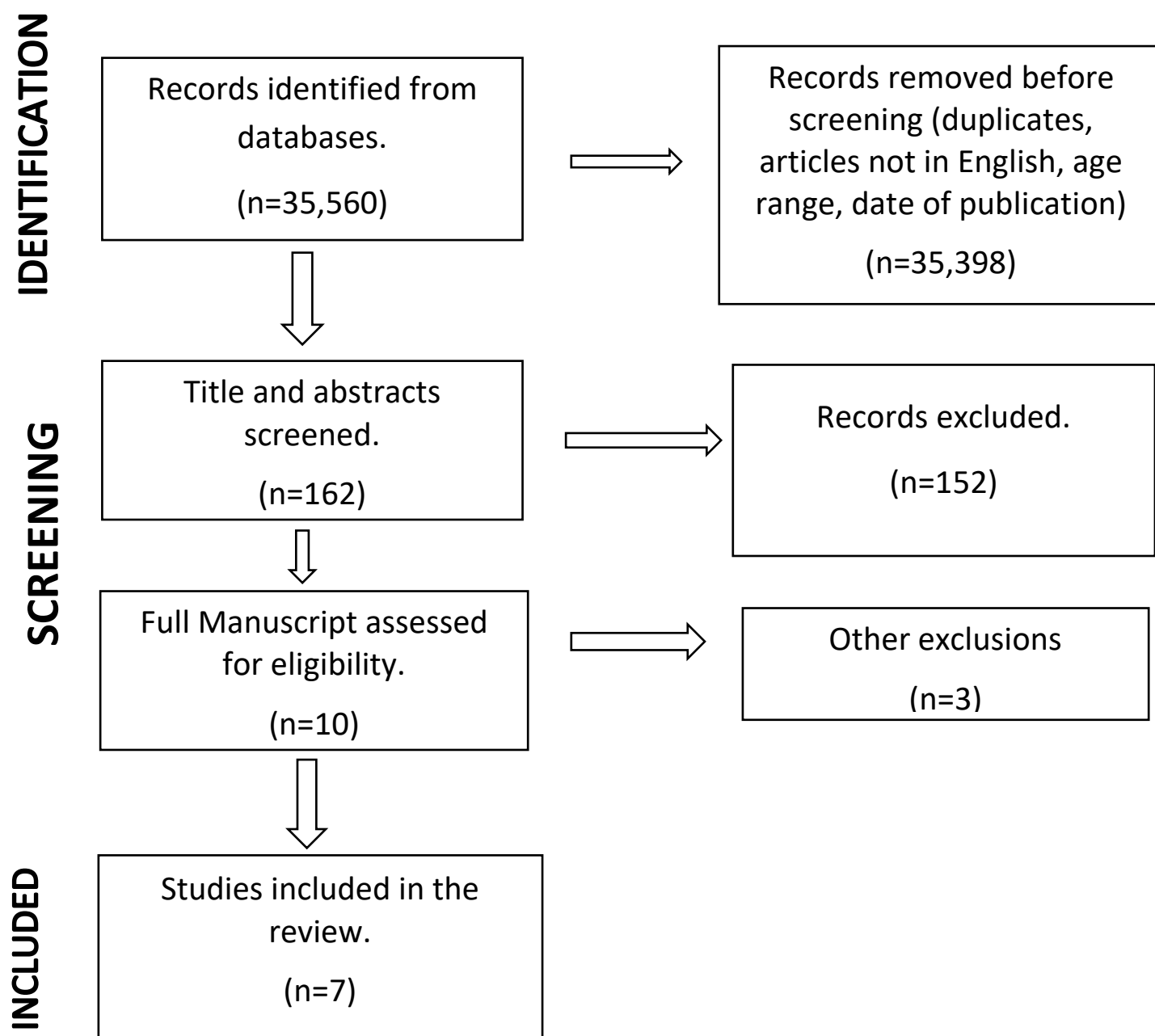


Figure 4: Flow diagram of the study selection process and included studies.

Chapter 4 – Results

This study includes seven peer-reviewed articles, which vary in terms of study type, focus, and country of study. The reviewed articles examine the potential impact of social support and social networks on different aspects of the PrEP Continuum of care, including awareness, uptake adherence, and retention. However, the reviewed articles did not directly measure the hypothesized impact of the theory.

Table 3: Articles retrieved and included for the review.

Study authors	Year of publication	Type of study	Study focus	Country of study
Hill and collaborators	2021	Cross-sectional study	Uptake and adherence	United States
Wood and collaborators	2020	Mixed-methods cohort study	Adherence	United States
Atujuna and collaborators	2021	Qualitative interview	Uptake, adherence, retention.	South Africa
Flores and collaborators	2020	Cross-sectional study.	Uptake	United States
Giovenco and collaborators	2022	Cross-sectional survey	Uptake	South Africa
Thoma & Huebner	2018	Cross-sectional online survey	Awareness and adherence	United States
Katz and collaborators	2023	Qualitative analysis	Adherence	South Africa and Kenya

Theory and conceptualization

Two of the seven articles reviewed utilized social support and social network concepts in their research design. In contrast, Katz and collaborators (2023) utilized social mapping to visually represent individuals' social networks and relationships. This method typically includes information about the people in the network, their relationships, and the nature and extent of their interactions (Katz et al., 2023).

Next, contextualizing social support and social network into common meaning, the seven articles for the review defined social support and social network differently. Hill et al. (2021)

Social support and social networks theory utility in the PrEP continuum of care for Adolescents operationalized social support as "individuals who self-reported supplying informational (e.g., providing information on how to remain safe), emotional (e.g., encouraging), and/or tangible support (e.g., providing money, transportation) to adolescents and included parents, guardians, adult siblings, extended family, and adult support figures" (p. 3). Relatedly, Atujuna et al. (2021) described family support as concrete strategies supporting PrEP use, such as a reminder to take a pill, encouragement to take it, or bringing it to the adolescent in case they forgot it. On the other hand, Wood et al. (2020) hypothesized that "perceived social support may counteract the adherence barriers by decreasing the negative appraisal of stressful life events, reinforcing normative adherence behavior, buffering against stigma, and ameliorating structural barriers." (p. 269). Finally, Katz and collaborators (2023) used the term "social influencers" (p. 46), to characterize the group made of family, peers, and health care workers, whom can all exerts an influence on adolescent girls and young women.

Study Design

None of the studies in the review explicitly examined the implementation and outcomes of social support and social network interventions for adolescents' PrEP care. Four out of seven were cross-sectional studies: (Flores et al., 2020; Giovenco et al., 2022; Hill et al., 2021; Thoma & Huebner, 2018). Thoma & Huebner (2018) examined the role of parent-adolescent sex communication on PrEP awareness and adherence. Hill et al. (2021) examined caregivers' knowledge of HIV risk, prevention, and PrEP and their ability to assist adolescents with adherence to PrEP Giovenco et al. (2022) used a survey to explore the association between perceived parental/caregiver support and interest in PrEP among adolescents and stigma and interest in supporting PrEP use among parents/caregivers. Flores et al. (2020) tested whether

Social support and social networks theory utility in the PrEP continuum of care for Adolescents participants' comfort with parent-sex communication was associated with PrEP uptake among emerging adult MSM. Wood et al. (2020) used a mixed-method approach to investigate the relationships between social support, network structure, and adherence to PrEP among young men and transgender women of color. Atujuna et al. (2021) and Katz and collaborators (2023) used a qualitative approach to explore how families or influencers may influence adolescents' use of PrEP.

Also, of the studies included, four had an emphasis on sexual minority adolescents (LGBTQ, racial minorities) (Flores et al., 2020; Hill et al., 2021; Thoma & Huebner, 2018; Wood et al., 2020), while the three remaining focused on adolescent in general and adolescent girls and young women in South Africa and Kenya (Atujuna et al., 2021; Giovenco et al., 2022; Katz et al., 2023).

Table 4: Study characteristics

Study authors	Type of study	Population	Aim(s)
Hill and collaborators, 2021	Cross-sectional study	Predominantly Black American adolescents' caregivers	Assessed adolescents' caregiver knowledge of HIV risk, HIV prevention, and PrEP and ways in which adolescents' caregivers believe they might be able to assist adolescents with PrEP adherence.
Wood and collaborators, 2020	Mixed-methods cohort study	Young men, transgender women of color	Explored relationships between social support, network structure, and adherence to PrEP.
Atujuna and collaborators, 2021	Qualitative study	South African adolescents 18-24	Explored family environments in which adolescents develop and refine their attitudes and beliefs about sex, HIV, and HIV prevention and how families may be engaged in implementing prevention.
Flores and collaborators, 2020	Cross-sectional study.	Emerging adults 18-25 Men who have sex with men	Test whether participants' comfort with parent-sex communication was associated with PrEP uptake in a diverse sample of emerging adult MSM.
Giovenco and collaborators, 2022	Cross-sectional survey	South African adolescents 14-16 and parents/caregivers	Examined the associations between (1) perceived parental/caregiver support and PrEP.interest among adolescents and (2) level of PrEP stigma and interest in/support for adolescent PrEP use among adolescents and parents/caregivers, respectively.
Thoma & Huebner, 2018	Cross-sectional online survey	Adolescent men who have sex with men 14-18	Examined PrEP awareness and adherence among AMSM related to parent-adolescent communication about sex.
Katz and collaborators	Qualitative study used Focus group discussions	Adolescent girls and young Women 16-25	Explored adolescents' and young women's views on the impact of social influencers on their PrEP use and AGYW's perception of those influencers' PrEP knowledge and support.

Social support and social networks theory utility in the PrEP continuum of care for Adolescents

Impact of social support and social networks on the continuum of care

The studies included in the review had different levels of potential effect throughout the PrEP continuum of care, from PrEP awareness to uptake, adherence, and retention in care. Most studies focused on the parent-adolescent dynamic (Atujuna et al., 2021; Flores et al., 2020; Giovenco et al., 2022; Hill et al., 2021; Thoma & Huebner, 2018), with three explicitly focusing on communication between parents and adolescents from sexual minorities (Flores et al., 2020; Thoma & Huebner, 2018; Wood et al., 2020).

Hill et al. (2021) focused their research on the hypothetical impact on uptake and adherence. They found that 94% of primary support persons believed that an adolescent at risk for HIV should take PrEP, with 98% reporting willingness to support an adolescent with PrEP if the adolescent asked them for support. The most common support types included reminders to take medication (90%) and encouragement (83%)

Atujuna et al. (2021) focused their research on uptake, adherence, and retention in the PrEP continuum. Interested in the influence of families on adolescents' PrEP use, they reported that families were interested in their adolescents taking PrEP and found that 37 out of 50 participants received various degrees of support. Family support was accorded in the form of emotional support, practical support, and informational support.

Giovenco et al. (2022) had a focus on the uptake and found that among parents, 85% reported that they would "definitely" or "probably" want their child to use PrEP. Furthermore, parental support for PrEP use was higher among parents who had ever heard of PrEP (88%).

Thoma & Huebner (2018), assessing PrEP awareness and adherence among adolescent men who have sex with men related to parent-adolescent communication about sex and HIV,

Social support and social networks theory utility in the PrEP continuum of care for Adolescents found that a higher frequency of parents-adolescents communication was linked to higher odds of PrEP awareness, hinting to interventions targeting parents-adolescents PrEP communication to prevent HIV.

Wood et al. (2020) focused on PrEP adherence, characterized perceived social support for young men and transgender women of color who have sex with men, and identified diversity in support network composition. The authors reported that participants identified at least one figure who provided support, with family members most commonly (75%), more specifically mothers. However, friends (48%) of cases, as opposed to family (36%), provided adherence support. Critical characteristics of PrEP support figures included closeness, dependability, and homophily (alikehood), for instance, in the case of sexual orientation-based homophily. Participants characterized support as instrumental and emotional, and most network members were aware and supportive of the participants' PrEP use.

Flores et al. (2020) in their study emphasized PrEP uptake. They found an association between comfort with parent-child sex communication with current PrEP use, highlighting that interventions should facilitate parents' efficacy in fostering affirming, non-judgmental environments and discussions about their child's sexuality and attractions/relationships.

Broadly, of all the social influencers identified by adolescent girls and young women (family, friends, healthcare workers, sex partners, religious leaders), mothers appeared highly influential and provided positive support for PrEP use. However, Katz and collaborators (2023) found that clinic counselors and best friends were identified as key supporters.

Table 5: Studies' focus on the PrEP continuum and outcomes

Study authors	Study focus	Outcomes of the studies
Hill and Collaborators, 2021	Uptake and adherence	98% of primary support persons reported willingness to support adolescents with PrEP if the adolescents asked them for support.
Wood and Collaborators, 2020	Adherence	The biological family was the most common support figure, reported by 75% of participants; 98% of participants identified at least one figure who provided adherence support, more often friends (48%) than family (36%).
Atujuna and collaborators, 2021	Uptake, adherence, retention.	Most youths reported receiving varying degrees of support following disclosure.
Flores and Collaborators, 2020	Uptake	The multivariable model demonstrated an association between comfort with parent-child sex communication with current PrEP use.
Giovenco and collaborators, 2022	Uptake	Among parents, 85% said they would "definitely" or "probably" want their child to use PrEP. Parental support for adolescent PrEP use was higher among parents who had ever heard about PrEP (88%) than among parents who had not (84%).
Thoma & Huebner, 2018	Awareness and adherence	A higher frequency of parent HIV communication was associated with higher odds of PrEP awareness.
Katz and Collaborators, 2023	Adherence	Mothers and counselors were identified as positive influencers and most influential by greater than 50% of participants, sex partners were labeled negative influencers or both positive and negative, and best friends mainly were positive influencers.

Chapter 5 – Discussion

Summary

After utilizing various search strategies and a selection process, seven articles across five databases were included in the final review for this study. As indicated by the number and type of studies retrieved and included in this review, research that has evaluated the effectiveness of social support and social network interventions in improving the PrEP Continuum of care for adolescents is rare.

Looking at the articles retained for the review, Katz et al. (2023) and Hill et al. (2021) explicitly integrated components of the theory of social support and social network in their

Social support and social networks theory utility in the PrEP continuum of care for Adolescents research design, namely the direct and indirect effect pathway and social mapping; with all the studies contextualizing social support and social networks differently but generally referred to them as the emotional, informational, and practical assistance individuals or groups are provided in one's social network. Studies found that support was generally provided as a reminder to take a pill and attend follow-up visits, driving adolescents to visit and providing information on the benefits of taking and staying on PrEP and encouragement.

The studies included in the review focused on examining the potential or current impact of social support on adolescents' PrEP use. The studies focused on different components of the PrEP continuum, from awareness to retention in care, with various types of social support identified (informational, emotional, and practical support) and provided, leading to different outcomes.

Primary support persons, namely family members, were interested in adolescents taking PrEP (Atujuna et al., 2021; Hill et al., 2021; Wood et al., 2020) and were either willing to support or were currently supportive of adolescents using PrEP. However, for some parents, support was conditioned by adolescents first asking for support (Hill et al., 2021), and for others, support was associated with prior awareness of PrEP (Giovenco et al., 2022). This result suggests that awareness of PrEP is crucial for adolescents and potentially even more critical for their parents. Increasing parents' knowledge about the benefits of PrEP could ensure that they are essential allies for adolescents for increased uptake, adherence, and retention. For instance, results from Katz and collaborators noted that participants were keen to have their social networks educated about PrEP by someone other than adolescents, such as clinic staff, and to receive support for their PrEP use from them (Katz et al., 2023).

Social support and social networks theory utility in the PrEP continuum of care for Adolescents

It is acknowledged that social support can come from various sources, including family, friends, and healthcare providers (Heaney & Israel, 2008). Similarly, the studies reviewed in this review identified various sources of social support, such as parents, caregivers, friends, and healthcare providers. Some, mainly studying the parent-adolescent dynamic and its influence on adolescents' preventive behaviors, found that families were the most identified source of social support (Atujuna et al., 2021; Flores et al., 2020; Giovenco et al., 2022; Hill et al., 2021; Thoma & Huebner, 2018; Wood et al., 2020). For instance, Wood and collaborators (2020) found that mothers were the primary support providers. Another study highlighted mothers' strong and positive influence on PrEP adherence for adolescent girls and young women (Katz et al., 2023). Additionally, while families were the most identified providers of support, Wood and collaborators (2020) found that 48% of adolescents MSM and transgender youth of color identified their friends as the main providers of adherence support, which could be explained by social network characteristics such as closeness and homophily (sexual orientation based homophily).

Two studies examined parent-child communication about sex and HIV and parent-child comfort with sex communication. They discovered that a high frequency and quality of parent-child sex/HIV communication was associated with PrEP awareness and higher odds of current PrEP use among adolescents (Flores et al., 2020; Thoma & Huebner, 2018). This suggests that open communication between parents and children about sexual health may be necessary for increasing awareness and uptake of HIV prevention tools, especially PrEP.

Public Health Implications

Firstly, the literature on social support and social network utility in the PrEP Continuum of care for adolescents is not exhaustive, with most studies examining the use of PrEP, social support, and social networks focusing on various social groups and settings and few specifically targeting adolescents (Felsher et al., 2021; Johnson et al., 2020; Phillips et al., 2019). This is concerning, given the increasing importance of PrEP in HIV prevention and the need to ensure its effective implementation among adolescents at a high risk of acquiring HIV. Furthermore, on the practical side of designing interventions and evaluating their outcomes, social support and social network approaches are yet to be implemented in interventions that add to existing structural, behavioral, and biomedical strategies against HIV. Several typologies of social networks and social support interventions have been suggested, including improving existing network linkages, developing new social network linkages, enhancing networks using indigenous natural helpers and community health workers, and enhancing networks through community capacity building and problem-solving (Glanz et al., 2008). Designing interventions that leverage social relationships to promote healthy behaviors, PrEP uptake, and adherence would be recommended in this case.

Moreover, in public health research, a theory is important as it provides a framework for ensuring the studied concepts are well-defined and understood, identifying causal pathways, evaluating interventions, and communicating research findings to different audiences (Gauffin & Dunlavy, 2021). In other words, by using theoretical concepts, researchers in the field of public health can ensure that their investigations address crucial inquiries, generate significant findings, and hold the potential to influence public health outcomes. For example, only Hill and

Social support and social networks theory utility in the PrEP continuum of care for Adolescents collaborators (2021) and Katz and collaborators (2023) used social support and social network concepts, such as social mapping or the direct and indirect effect pathway.

Secondly, while the studies confirm that parents/caregivers are interested in their adolescents accessing HIV prevention tools such as PrEP, they also underline the importance of parent's PrEP awareness and adolescent's PrEP use disclosure to caregivers as a condition to receive support (Hill et al., 2021; Katz et al., 2023). Many adolescents and their families are still unaware of PrEP as an HIV-prevention option. Moreover, those aware may have negative attitudes toward PrEP or not understand its purpose. For example, in a research on adolescents' knowledge of PrEP, two-thirds of adolescents reported not knowing that PrEP existed, and 86% of those eligible for PrEP reported never having received information on PrEP from their medical professionals (Santos et al., 2018). In addition, in a different setting, Giovenco et al. (2021) found that it was challenging for some adolescent girls in South Africa to explain PrEP to their mothers, who believed that PrEP was HIV treatment or would lead to HIV infection. Families must be aware of PrEP to promote HIV prevention, reduce stigma, and support informed decision-making for adolescents' sexual health.

Moreover, stigma and fear of disclosure of PrEP use and sexual orientation have been key barriers to PrEP use among various populations, particularly those from marginalized communities (LGBTQ, racial/ethnic minorities, and youth in multiple groups, e.g., Black MSM) (Giovenco et al., 2021; Phillips et al., 2019). Sexual orientation disclosure is still challenging for many adolescents who fear stigma, rejection, and discrimination from family members, peers, or healthcare providers. A study exploring the perspectives of gay and bisexual men on social support and stigma in pre-exposure prophylaxis found that social support was crucial in PrEP-

Social support and social networks theory utility in the PrEP continuum of care for Adolescents related care and promoted adaptive behavioral responses, such as adherence to PrEP-related medical care and enhancing resilience to stress (Zapata et al., 2020). Social support and social network intervention exploring PrEP disclosure, sexual orientation disclosure, stigma, and use of PrEP can potentially address disparities among adolescents, especially sexual minorities. For instance, in a population of women who inject drugs, disclosure has been associated with higher PrEP adherence through social support buffering against PrEP stigma in their social network (Felsher et al., 2021). Another study also found that individuals who reported disclosing their PrEP status had high support rates among friends and relatives (Phillips et al., 2019).

Thirdly, the studies highlighted variability in support persons among adolescents' social networks. Overall, families were identified as the main support providers, with mothers having a more influential impact on adolescents' PrEP use. However, for adolescents from sexual minorities, support persons were primarily found outside of the family unit through friends (Wood et al., 2020). Additionally, sexual orientation disclosure is significant for adolescents' social support networks, such as family members, in providing emotional, informational, and practical support to overcome barriers to PrEP use. Targeting supportive adults, especially parents and caregivers, can effectively promote PrEP use among adolescents and young adults at high risk of HIV infection. Family-based PrEP interventions can reduce stigma and improve knowledge about HIV prevention, including PrEP. Moreover, understanding the characteristics of friendship conducive to seeking PrEP support among adolescents through research should be considered.

Social support and social networks theory utility in the PrEP continuum of care for Adolescents

Finally, while the studies explored adolescents' social support figures and their potential influence on the PrEP continuum of care, they also highlighted the role of parent-adolescent communication about sex and HIV. The findings that comfort with and higher frequency and quality of parents-adolescents communication about sex and HIV can positively impact PrEP awareness and use underlined the impact of family closeness, cohesion, and a conducive environment needed for adolescents to express themselves safely. Interventions that facilitate parents' efficacy in fostering affirming, non-judgmental environments and discussions about their child's sexuality and attractions/relationships can yield a positive impact. Public health practitioners should further research interventions that promote communication about sexual health between parents and adolescents.

Strength and limitations

Strengths

This study represents a step forward in summarizing existing evidence on social support and social network utility for adolescents' PrEP care. By reviewing and analyzing the existing literature, the study provides a comprehensive and up-to-date understanding of the current research on social support and social networks with PrEP care for adolescents. The study may serve as a foundation for future research, as it has identified gaps and areas where further investigation is needed.

The findings of this study are a first step in understanding the impact of social support on PrEP use among adolescents and in developing effective strategies to support adolescent PrEP

Social support and social networks theory utility in the PrEP continuum of care for Adolescents use. Promoting communication about sex and sexual health within families can help improve HIV prevention efforts and identify the barriers to PrEP use among adolescents.

The diversity of the sample in this study is a significant strength. Including adolescents from different geographic areas, gender identities, sexual orientations, and different experiences of the HIV epidemic provides a more comprehensive understanding of the impact of social support and social networks on PrEP use among adolescents. For instance, adolescents from areas with high rates of HIV incidence may face different barriers to PrEP use or receive more or less support than those with lower rates. Additionally, social support networks may function differently for adolescents of different races, sexual orientations, and genders due to varying cultural norms and expectations. Therefore, including a diverse sample in this study allows for a more nuanced understanding of the role of social support and social networks in promoting PrEP use among adolescents. The study was able to gather valuable feedback from both adolescents and their caregivers on their perceptions of PrEP and the types of social support they provide or receive in real-world settings.

Limitations

The reliance on self-reported data in most studies may be subject to social desirability bias, which can affect the accuracy of research findings. Researchers must consider potential biases and implement strategies to minimize their effects, such as anonymity, confidentiality, or other methods to encourage participants to provide honest and accurate responses.

Social support and social networks theory utility in the PrEP continuum of care for Adolescents

Although this study found a correlation between the provision of social support and improvements in the PrEP continuum of care, it could not establish causality. Other factors may contribute to the observed relationship, and further research may be necessary to establish a causal relationship between these variables.

This study did not measure other factors that could influence the provision of social support for PrEP care, such as parental consent, access to healthcare, healthcare provider attitudes towards PrEP, or stigma related to PrEP use. Future research should consider these factors to provide a complete understanding of the impact of social support on PrEP use among adolescents.

Gaps in evidence

While previous studies have made significant contributions to our understanding of social support and social networks and their importance in PrEP care for adolescents, several gaps in the literature still require attention. Some recommendations for potential areas of future research include:

Developing interventions with measurable outcomes.

To leverage the potential of social support and social networks to improve access to PrEP among adolescents, developing interventions with measurable outcomes that target specific areas of the PrEP continuum of care is necessary. Such interventions should be designed to increase PrEP awareness, uptake, adherence, and retention in care. For example, by conducting randomized controlled trials (RCTs) on these topics, we can better understand how social networks and social support can be harnessed to improve adolescent PrEP outcomes. This

Social support and social networks theory utility in the PrEP continuum of care for Adolescents information will be invaluable for healthcare providers, policymakers, and researchers in developing effective interventions and programs that can help address this population's unique needs and challenges.

Further research on the importance of families

Adolescents regularly indicate that their parents are the most influential, especially in their sexual decision-making and conduct (Muhumuza et al., 2021). Parental communication about sex and parental monitoring and supervision have been shown to shape adolescent sexual behavior and outcomes (Vermund et al., 2021). Additionally, for adolescents to access medical services, especially sexual and reproductive health services like PrEP, parental consent is frequently required (UNICEF, 2021). Additionally, families can be essential in providing social support to improve adolescent PrEP access. All the studies included in the review underscored the importance of family support, with an emphasis on parent-adolescent communication, and in promoting HIV prevention efforts, especially PrEP among adolescents (Atujuna et al., 2021; Flores et al., 2020; Giovenco et al., 2022; Hill et al., 2021; Thoma & Huebner, 2018; Wood et al., 2020). Families can provide emotional support, help adolescents navigate the healthcare system, and foster open and honest communication about sexual health, including discussing sexual orientation, gender identity, PrEP, and other prevention methods, to help their adolescents make informed decisions. Families should educate themselves and their adolescents about PrEP, its benefits, and the importance of HIV prevention. A study by Giovenco et al. (2021) exploring experiences disclosing PrEP use and the perceived impact of disclosure on adherence among South African adolescent girls taking PrEP found that parents and partners provided the most support to respondents after disclosure. Moreover, one study found that parent-adolescent communication about sex was positively associated with PrEP engagement among adolescent

Social support and social networks theory utility in the PrEP continuum of care for Adolescents men who have sex with men (Thoma & Huebner, 2018). Another study found that family comfort in communicating about sex was associated with current PrEP use among young MSM (Flores et al., 2020). Therefore, engaging families in social support and social network interventions is important while addressing any potential barriers they may present.

Research on partners' importance

Further studies are needed to investigate the influence of romantic relationships during adolescence on PrEP uptake and adherence. Adolescence is a time when romantic relationships start (Collins et al., 2009). Promoting gender equity and challenging harmful gender norms in a romantic relationship can foster a positive environment to help make the right choices in HIV prevention. In the African context, where HIV most impact adolescent girls more than male, gender norms and gender equity are still challenges to accessing PrEP. In Kenya, for instance, Agot et al. (2022) found that inadequate knowledge and understanding of PrEP was a significant barrier to male partner support for their female partner taking PrEP. In another study examining the relationship dynamics of same-sex male couples in the U.S. and perceived partner support, Kahle et al. (2020) found that 73.3% thought their partner would support their PrEP use, highlighting the need for tailored dyadic interventions. Moreover, Mehrotra et al. (2018), examining the role of social relationships among same-sex individuals, found that disclosure to partners was associated with a higher probability of having protective PrEP concentration, justifying the necessity to explore informing partners about PrEP to foster support.

Social support and social networks theory utility in the PrEP continuum of care for Adolescents

Leverage social identity support.

Adolescents, particularly those from marginalized communities, LGBTQ, racial/ethnic minorities, and youth in multiple groups (e.g., Black MSM) may face the fear of disclosure, stigma, and discrimination from healthcare providers or family members when accessing PrEP services, which can prevent them from seeking care (Quinn et al., 2022). In addition, they experience a range of health disparities, such as depression and anxiety, higher rates of suicide and self-harm, substance use and abuse, and STI/HIV, compared to their heterosexual counterparts (Saewyc, 2011). However, despite these challenges, many adolescents from the LGBTQ+ community exhibit resilience and a strong sense of community (Saewyc, 2011). Bonett et al. (2022), examining how social identity support was associated with PrEP engagement among MSM, found that social identity support, or the extent to which individuals feel supported and validated in their identity as an MSM, was positively associated with PrEP engagement. Additional study is needed to understand better the experiences of LGBTQ+ adolescents, including the role of social identity support in the PrEP continuum, to inform the development of an intervention that promotes resilience while supporting PrEP uptake and adherence.

Explore technology-based support.

Technology-based solutions such as mobile apps and online forums can connect adolescents and their families with peers and providers, providing social support and resources for PrEP use (Patel et al., 2022). These solutions can also facilitate remote monitoring of PrEP adherence, providing real-time feedback to patients and healthcare providers. Additionally, technology-based interventions may help address barriers to PrEP uptake and adherence, such as stigma and lack of access to healthcare services. For instance, the Community Preventive Services Task Force (CPSTF) recommends digital health interventions to increase adherence to

Social support and social networks theory utility in the PrEP continuum of care for Adolescents HIV PrEP, citing sufficient evidence of their effectiveness (The Community Guide, 2022). These interventions improve daily medication adherence and retention in PrEP care, especially for populations facing barriers to traditional healthcare access.

Policy level

Providing PrEP to minors without parental consent is complex. Mullins (2019) found that although no state expressly forbids the prescription of PrEP to minors, the state regulations surrounding their access to services for treating and preventing sexually transmitted infections differ, which can increase the unawareness of adolescents and their healthcare providers. The laws and regulations surrounding it vary widely depending on the country and state (Culp & Caucci, 2013). In some places, minors may have the right to consent to certain healthcare services, including PrEP, without parental involvement or notification (Culp & Caucci, 2013). However, in other places, minors may require parental consent to access PrEP. While the issue of minors' access to PrEP without parental consent raises several ethical and legal questions, further analysis and research are needed to understand better the legal and ethical frameworks surrounding minors' access to PrEP without parental consent and the potential benefits and risks of such access.

Conclusion

In conclusion, social support and social network interventions can potentially improve PrEP access among adolescents, but many challenges must be addressed. Adolescents represent a vulnerable population to HIV due to various co-occurring changes (both biological and psychological) and developmental activities (such as forming identity) that occur throughout this

Social support and social networks theory utility in the PrEP continuum of care for Adolescents phase of life. Moreover, going through that phase, adolescents build/strengthen relationships that can positively impact their overall well-being. Social support and social network interventions must be developed with measurable outcomes and targeted to specific areas of the PrEP continuum of care. Families can play an essential role in social support and social network interventions, but other stakeholders such as peers, partners, providers, community, and policy actors should also be explored. Future research should focus on developing and testing effective interventions with results that can be disseminated and translated into practice.

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Appendix

Table 1: Literature Search Terms

Database	Keywords	Search terms adjusted to the specific indexing of each database
PubMed	("social support" OR "social networks" OR "social capital") AND ("PrEP" OR "pre-exposure prophylaxis") AND ("continuum of care" OR "healthcare cascade" OR "care cascade") AND ("adolescents" OR "youth") AND ("HIV prevention" OR "antiretroviral therapy" OR "ART")	("Social network*" OR Peer* OR "social support*") AND (Affect* OR Impact* OR influenc* OR effect*) AND ("pre-exposure prophylaxis"[MeSH Terms] OR "pre-exposure prophylaxi*" OR PrEP OR "Pre Exposure Prophylaxi*")
Embase	('social support'/exp OR 'social network'/exp OR 'social capital'/exp) AND ('PrEP'/exp OR 'pre-exposure prophylaxis'/exp) AND ('continuum of care'/exp OR 'healthcare cascade'/exp OR 'care cascade'/exp) AND ('adolescent'/exp OR 'youth'/exp) AND ('HIV prevention'/exp OR 'antiretroviral therapy'/exp OR 'ART'/exp)	('social support'/exp OR 'social support') AND ('social network'/exp OR 'social network') AND ('pre-exposure prophylaxis'/exp OR 'pre-exposure prophylaxis' OR (pre-exposure AND ('prophylaxis'/exp OR prophylaxis)))
PsycINFO	(Social support OR social network OR social capital) AND (PrEP OR "pre-exposure prophylaxis") AND (continuum of care OR healthcare cascade OR care cascade) AND (adolescents OR youth) AND (HIV prevention OR antiretroviral therapy OR ART)	D.E. "Social Network*" OR DE "Interpersonal Interaction*" OR DE "Social Network Analysis" OR DE "Social Support*") AND (D.E. "Pre-exposure Prophylaxis" OR "pre-exposure prophylaxi*" OR PrEP OR "Pre Exposure Prophylaxi*") AND (Affect* OR Impact* OR influenc* OR effect*) AND (D.E. "Interpersonal Influences" OR Affect*

		OR Impact* OR influenc* OR effect).
CINAHL	("social support" OR "social network" OR "social capital") AND ("PrEP" OR "pre-exposure prophylaxis") AND ("continuum of care" OR "healthcare cascade" OR "care cascade") AND ("adolescents" OR "youth") AND ("HIV prevention" OR "antiretroviral therapy" OR "ART")	("social support*" OR peer* OR "social network*" OR "social norm*" OR MH "Social Networks" OR MH "Social Norms" OR MH "Support, Psychosocial+") AND (M.H. "Pre-exposure Prophylaxis" OR "pre-exposure prophylaxi*" OR PrEP OR "Pre Exposure Prophylaxi*") AND (M.H. "Health Impact Assessment" OR Affect* OR impact* OR influenc* OR effect*)
Cochrane	("social support" AND "social networks" AND "PrEP" AND "continuum of care" AND "adolescents")	("social support" AND "social networks" AND "PrEP" AND "adolescents")