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Review Article

Growing Up with Perinatally-Acquired HIV Infection: Psychosocial, Behavioral, and Reproductive Issues

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Abstract

Due to the improved management of Human Immunodeficiency Virus (HIV), children with Perinatally-acquired HIV (PHIV) infection have been surviving into adolescence and adulthood. This generation of children and adolescents must deal with a number of different psychosocial, behavioral, and medical issues. Our aim is to discuss these issues that affect PHIV youth in the United States in greater detail.

First, we will discuss the social and behavioral aspects of perinatal HIV infection, including effects on mental health, the potential for substance abuse, and the challenges involved in transitioning from the pediatric to the adult healthcare system. Next, we will delve into the reproductive choices, contraceptive practices, parenting intentions, and tendencies to disclose HIV status to potential partners. Lastly, we will describe obstetrical outcomes of these PHIV-infected adolescents and young adults. Throughout the article, we will highlight issues that are important for physicians caring for these patients, as well as areas where further studies are needed.

Background

There are an estimated 3.2 million children living with Human Immunodeficiency Virus (HIV) globally [1]. A majority of these children acquire HIV from their mother during pregnancy, birth, or breastfeeding [2]. With the success of newer HIV drug therapies, the number of children surviving into adolescence and adulthood has increased drastically in the last decade, especially in resource-rich developed countries [1]. In the United States, the population of children with Perinatally-acquired HIV (PHIV) consists of approximately 8,500 patients [3]. As these children enter adolescence and adulthood, they are encountering a number of different psychosocial, behavioral, and medical issues that present a challenge to both the patients and their medical practitioners, who must also learn to manage the complexities of the patients' care.

The psychosocial implications of PHIV include mental illness and potential for substance abuse [3-5]. Mental health problems are common in HIV-infected youth and adolescents. This is not necessarily due to their diagnosis of HIV but is most likely a multifactorial result of environmental, familial, genetic, and biomedical factors [5]. The presence of a chronic illness-namely a stigmatized, transmittable disease-creates a number of stressors for youth and adolescents with HIV, including frequent hospitalizations and doctor's visits, exposure to painful ailments or treatments, and sheltered life experiences. Many of these patients live in impoverished communities with abundant violence and substance abuse [6]. Furthermore, it is not uncommon for these youths to live in stressful familial and social environments due to parental psychiatric disorders, substance abuse, or death from illness [7]. These issues contribute to the increased incidence of mental illness and risk for substance abuse in these patients [8,9].

Behavioral issues that youths with PHIV face include disclosure of their HIV status to their partners, contraceptive practices, reproductive choices, and parenting intentions. Those youths with PHIV make different choices with regards to their sexual onset and disclosure of HIV status to their partners depending on the HIV status of their caregivers and peer norms [10,11]. Studies have shown that those youths who were told of their diagnosis sooner were more likely to have the intention of telling their potential sex partners about their HIV status [12,13]. Additionally, they may face numerous fearsand misconceptions about sex [14]. Nonetheless, they are sexually active and have strong desires to have children [1]. Youths with PHIV are found to have a slower rate of onset of penetrative sex, especially if their caregivers are HIV positive [10,11]. Furthermore, pregnancy in this population has been described and limited available data suggested that these PHIV youths are at increased risk for cesarean delivery secondary to high viral load [15] and possibly premature delivery.

The significant decline in mortality in PHIV-infected children has led to unprecedented challenges in this population, as they are the first generation with perinatally acquired HIV to live to adolescence and young adulthood [1]. Because this is a new phenomenon, the obstacles have not yet been fully studied. Further research will provide knowledge regarding the various issues surrounding these patients and assure adequate management of this patient population in the future.

Social and Behavioral Aspects of Perinatal HIV Infection

In the United States, youths with PHIV are disproportionately more likely to be from urban ethnic minorities [4]. In addition to the burden of fighting a chronic illness, they are exposed to other daily stressors that increase their likelihood of mental health disorders and substance abuse, which also must be addressed by clinicians [4,5,16]. The increase in psychiatric disorders is likely multifactorial, resulting

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from neurological effects of both HIV itself and the medications used to treat the disease, the stigma associated with having HIV, as well as social factors-poverty, urban violence, racism, and death of family members from HIV. These children are often exposed to chaotic environments with multiple caretaking transitions as well as high rates of substance abuse and psychiatric disorders in family members [5]. The combination of decreased adherence to medication regimens with an increased prevalence of psychiatric disorders, substance abuse, and high-risk sexual behaviors in adolescents with PHIV may have detrimental effects on these patients, as well as potentially lead to an increased risk of disease transmission to others [17].

Mental Health Disorders

As the population of children with PHIV has reached adolescence, several studies have looked at various aspects of mental health disorders in this group. Mellins et al., published a study that evaluated the prevalence of psychiatric disorders and substance abuse in this population [17]. This study included youths with PHIV aged 9 to 16 years living in New York City as well as their caregivers. In this study, 55 percent of the youth met DSM-IV criteria for one psychiatric disorder, while twenty-six percent met criteria for multiple disorders. Anxiety disorders were most prevalent at 40 percent, followed by behavior disorders at 23 percent [17]. The authors noted that the rate of psychiatric disorders, while higher than in age-matched community youths, was similar to other high-risk African American and Latino adolescent populations and adolescents with chronic diseases.

Another study by Gadow et al., compared rates of mental disorders in youths with PHIV with a peer population comprised of perinatally-exposed, HIV-negative youths and youths living in the same household who were HIV negative [16]. This study found that approximately 70 percent of the youth in both study groups met the symptom criteria for a mental disorder (Attention Deficit Hyperactivity Disorder (ADHD), disruptive behavior, anxiety, or depression). In addition, 43 percent of youths with PHIV compared to 37 percent of their peers met clinical criteria for psychiatric diseases, which included social impairment in addition to the presence of symptoms. These findings were reproduced in another study by Mellins, which found a prevalence of any psychiatric disorder of nearly 70 percent [5]. The similarity in prevalence of disease in the youths with PHIV and their peers likely reflects the stressful environment to which they are exposed, which results in a much higher disease rate compared to other age-matched peers in the community [16].

While the prevalence of mental disorders in the PHIV-infected group is high, they tend to have higher rates of treatment for these disorders compared to control group peers [18]. In a study by Chernoff et al., which compared youths with PHIV with those who were either perinatally-exposed, HIV-negative or were living in the same household and were HIV-negative, 37 percent of HIV-positive youths were treated with a psychiatric medication (including antidepressants and stimulants) or behavioral therapy, compared to 22 percent of their peers. This likely reflects better access to other healthcare resources as a result of their HIV, which requires close monitoring in a clinical setting, and thus more opportunity for simultaneous identification and treatment of other diseases.

Substance Abuse and Other Risky Behaviors

As previously noted, those children with PHIV are at high risk for substance abuse problems. This results from high rates of mental disorders in addition to increased access to illicit drugs in their communities [9,19]. A study by Alperen et al., showed that for both youths with PHIV and their perinatally-exposed, HIV-negative peers, factors including substance use by caregivers or others in the home and the presence of a psychiatric disorder increased the risk for substance abuse [9]. However, the presence of HIV infection had no impact on rates of substance abuse in the two groups [9].

While often having co-existing psychiatric disorders, those youths who engage in substance abuse are also more likely to engage in other high-risk behaviors, including early sexual debut, having multiple sexual partners, and having unprotected intercourse [19,20]. Furthermore, as these youths reach adolescence they are less likely to adequately adhere to prescribed treatment regimens for HIV, leading to increased viral load, development of antiretroviral medication resistance, and increased risk of transmission to others [20]. A study by Mellins et al., comparing youths with PHIV to their perinatally-exposed, HIV negative counterparts, found that 18 percent of youths with HIV and 14 percent of youths without HIV reported recent substance use, most commonly alcohol and marijuana. In addition, the rate of sexual activity in both groups was 16 percent. While this rate was relatively small, the age of sexual debut in these youths was about 13 years of age. Moreover, 65 percent of youths with PHIV reported unprotected intercourse, compared to 50 percent of their HIV-negative peers [20]. These findings are especially concerning as this group is at risk for medication noncompliance, further increasing the risk for disease transmission.

The above studies underscore the importance of addressing high-risk behaviors when caring for this adolescent population in the clinic. As youths with PHIV enter adolescence, screening for psychiatric disorders, substance use, sexual activity, and medication regimen compliance is imperative to optimize the health of these individuals as well as to decrease the risk for transmission of HIV to others.

Transition from Pediatric to Adult Healthcare System

As the population of individuals with PHIV progresses from adolescence to adulthood, a new challenge in their treatment has emerged-transitioning from care in a pediatric to an adult setting. A study by Sharma et al., consisted of interviews with youths aged 15 to 24 living in Miami and their caregivers. Participants were asked questions relating to the transition to an adult clinical setting from a pediatric one. Three main findings were identified in the study: the first was a self-perceived lack of preparedness for transition; the second was anxiety about changing providers and health systems associated with adult care, and the third was an acknowledgement of increased personal responsibility of the youths associated with aging [21].

Challenges in the transition period are numerous. Often, the services provided in the pediatric office allow medical and psychosocial needs to be met in one setting. By contrast, adult settings are often fragmented, and obtaining access to appropriate mental health services may be difficult for patients [22]. In addition, many patients and caregivers view the pediatric team as a part of their family, as they have been involved in their treatment for long periods of time, often for their entire lifetime [21,22]. This strong bond with the pediatric medical team can make the transition to an adult provider difficult.

In the past few years, protocols for transitioning from the pediatric to adult clinical setting have emerged as adolescents with

PHIV have reached adulthood. Strategies have included the introduction of adult providers in the pediatric setting as well as linking a patient with an adult caseworker to make the transition more successful [22]. The United States Department of Health and Human Services has also provided recommendations to improve transition of care [23]. These include optimization of communication between pediatric and adult care providers, addressing areas of concern for the patient and caregivers, and emphasizing life development skills for the patients. While the transitions for many patients occur early in the third decade of life, preparations for the changeover may begin years in advance, allowing for a more successful transition for the patient and caregivers [22,23]. As this transition process into the realm of adult medicine occurs, multiple fields of practice, including infections disease, psychiatry, and obstetrics and gynecology should be included to focus on the medical, psychiatric, and reproductive challenges that these patients face.

Reproductive Choices in the Perinatally-Acquired HIV Adolescent

As youths with PHIV age into adolescence and adulthood, they are confronted with complex decisions regarding sexual behavior. This includes the fears and misconceptions regarding sexual activity, reproductive choices, use of contraception, disclosure of HIV status to partners, and potential child bearing. Curiosity and interest in sexual relationships is a natural part of adolescence and puberty; however, youths with PHIV face a more complicated entry into sexual maturity, as their disease and its treatment affects their health and can penetrate the central nervous system causing both neurodevelopmental and cognitive delay [10]. Additionally, youths with PHIV tend to exhibit greater social and emotional immaturity when compared to their HIV-negative counterparts [10]. The importance of understanding and contextualizing the Entrance into sexual activity of adolescents with PHIV has numerous public health implications, including targeted prevention intervention programs. This objective has prompted numerous inquiries into the sexual choices that adolescents with PHIV make, as well as examining their influences, such as societal peers and the caregivers at home.

For all children, entry into adolescent years is highly influenced by relationships with peers. However, social interaction and assimilation of those with PHIV can be more difficult due to the nature of their chronic illness, medical complications, and the fact that they are living with a highly stigmatized disease [11]. Analysis of data from urban New York medical centers providing health care to families affected by HIV provided insight on how peer relations and norms have an influence on the sexual behavior of youths with PHIV between 9 to 16 years of age [11]. Youths with PHIV were less likely to be sexually active (defined as kissing, touching and penetrative sex) than their HIV-negative counterparts. Of those who were sexually active, adolescents with PHIV were less likely to have penetrative sex and more likely to engage in touching behavior, suggesting that avoidance of penetration may be used as a strategy to reduce harm or risk to partners. Additionally, it was found that youths were more likely to be sexually active if they felt that doing so was perceived as popular among their peers, even after accounting for HIV status [11].

Further studies centering on the same patient population have looked at the influence of caregiver HIV status on the onset of sexual activity in adolescents [10]. Youths with PHIV whose caregivers were also HIV positive had the slowest onset of both penetrative sex and unprotected intercourse. Youths without HIV infection with HIV-negative caregivers had the highest rate of onset of sexual activity and unprotected sexual activity [10]. As previously noted, HIV positive status therefore seems to be associated with a delayed entry into sexual activity. This protective effect is likely due in part to the very nature of chronic illness and the negative side effects of antiretroviral treatment, as well as the notion that youths with HIV may potentially delay penetrative sexual behavior in an effort to avoid infecting their partner, in addition to avoiding the pressures of disclosing their own HIV positive status. Additionally, seropositive caregiver status was associated with delayed entry into sexual activity and lower rates of unprotected sex in all adolescents regardless of HIV status, supporting the idea that HIV-positive caregiver status is also protective with respect to youth outcomes [10]. One possible reason for this could be an increased importance placed on HIV prevention as the caregiver feels the responsibility to minimize potential high-risk behavior in their children. Another possibility is that due to their caregivers' chronic illness, the children of HIV-positive caregivers assume more responsibility over their family earlier in life, helping in the care and treatment of their caregivers, which fosters their own sense of responsibility and maturity.

With the evidence demonstrating that adolescents infected with PHIV approach entry into sexual activity differently than their HIV-negative counterparts, it is imperative to tailor intervention programs to this specific population. These programs should educate and foster safe sex practices and reproductive health while addressing the psychosocial aspect of living with a stigmatized disease. Qualitative population studies centering on HIV-positive youth populations in sub-Saharan Africa highlighted the lack of support coupled with increased need, especially with respect to psychological counseling and education for these groups. Interviews conducted with youths with PHIV highlight the numerous fears and misconceptions regarding sex [14]. In a set of adolescentsfrom15 to 19 years of age, many upon questioning felt unprepared and avoided discussing sexual topics, while their caregivers were uncertain about when and how to engage the youth on the topic of sexuality. In certain cultures, sexual activity is frowned upon and therefore discouraged as dangerous, with some even postulating that the physical activity itself can hasten the disease progression into AIDS. The need for increased psychosocial support and access to contraception and condoms is crucial; the lack of education and reluctance to breach the topic among caregivers of those with PHIV perpetuates societal misconceptions and further deteriorates how youth with PHIV view themselves both physically and psychologically, which blunts their chances of achieving a fulfilling, healthy future.

For adolescents with PHIV who do decide to engage in sexual activity, it is of paramount importance to provide public health service education with respect to contraception, reproductive health, and potential future childbearing. While many intervention programs have been developed with the goal of reducing high risk behavior and promoting education, access and applicability to Africa's high risk population is limited [1]. Studies from Uganda's PHIV youth population showed a low level of condom use: while 63 percent of youths were aware that condom use was necessary to prevent transmission of HIV as well as other sexually transmitted infections, only 30 percent reported actual usage [1]. Additionally, while hormonal contraception should also be emphasized, adolescent adherence to daily medication is poor. Therefore, long-acting options such as injections and implants should be considered.

Female reproductive health is a specific concern due to the high risk of cervical dysplasia in HIV-positive patients as well as the risk of pregnancy and vertical transmission of HIV. The Pediatric AIDS Clinical Trials Group (PACTG) investigated the incidence of pregnancy, genital infections and abnormal cervical cytology in females with PHIV aged 13 to 25 years old [24]. High rates of sexually transmitted infections in subjects prior to the age of 19 were reported, with genital condyloma being the most common. Of the 638 enrolled subjects in the study, 27 percent were sexually active. Those who were sexually active were also more likely to not be on ART, have higher HIV viral loads, and lower CD4 counts. Additionally, 17 percent experienced their first pregnancy by 19 years old. Only half of those who were sexually active had pap smears performed, of which 50 percent were abnormal [24].

The innate drive and desire to procreate an area that has received little attention with respect to those with PHIV. One study looking at adolescents with PHIV between 13 and 24 years old who enrolled through a clinic specializing in adolescent HIV care found that 70 percent of study subjects intended to have children [25]. There was increased intent to procreate in study subjects that perceived the risk for vertical transmission to be low. Additionally, a study based out of London looking at parental considerations of those with PHIV elicited four common themes: the pressure children will have on relationships with respect to disclosing HIV status to partners; the impact of culture, family, and societal norms on their intentions to have children; disclosure of their HIV status to their children in the future; and the effect of reproductive intentions and possible vertical transmission [26]. Altogether, adolescents with PHIV do have a strong desire to become parents and do consider the impact their disease will have with respect to all aspects of child bearing. Proper education and communication that starts at an early age is necessary for adolescents and young adults with PHIV to make informed decisions, facilitate open communication with their partners, and take the proper measures to minimize vertical transmission.

Pregnancy Outcomes Among Perinatally-Acquired HIV-Infected Women

Our current knowledge of pregnancy outcomes of women with PHIV in developed countries is limited. Since the first case report in 1998 detailing a 14 year old with PHIV who had a vaginal birth of a term HIV-negative infant, a number of studies on pregnancy outcomes in women who are perinatally infected with HIV were published [27]. However, given the rarity and the nature of the disease process, it is expected that most reports would only include a small number of patients, with most data collected retrospectively. It is our intent to abstract from the currently available data the pregnancy outcomes of those with PHIV infection.

Compliance with Antiretroviral Therapy

Munjal et al., retrospectively reviewed pregnancy outcomes of 30 women with PHIV who delivered in New York, USA from 2000 to 2011 [28]. These were compared with HIV-positive women (non-perinatally acquired) who delivered at the same hospital during the same period. The authors noted that their cohort of women with PHIV had lower median CD4 counts before, during and after delivery. Their median viral load was also significantly more elevated. Of note, although their viral load decreased during pregnancy, they returned to the high pre-pregnancy level following delivery. One child delivered from a perinatally-infected woman was vertically infected with HIV. Four perinatally-infected women died over a course of follow-up of 4 years compared to none in the control group. Compliance with medication played a significant role in their deaths, as there was documentation of their decision to stop taking the antiretroviral medication after delivery. Their poorer outcomes and worsening of disease status might not be due to treatment failure. Optimizing their viral load suppression is possible with available antiretroviral treatment since the genotype sensitivity scores were comparable to their age-matched, non-perinatally acquired HIV-infected women. The authors suggested that perinatally-infected women are at higher risk for disease progression and death postpartum, possibly due to non-compliance with treatment and difficulty obtaining accessible resources. They proposed that more research is indicated to determine whether psychosocial burdens that are common these women such as social ostracism, stress and depression could play a role in their worse disease progression [27].

Elective Pregnancy Termination

Another concern is the high rate of pregnancy termination in the cohorts of women with PHIV. Beckerman et al., reported a notable rate of elective pregnancy termination (48%) in a group of young women infected with PHIV aged 15 to 25 years old and living in New York City [29]. The above data demonstrate the need to provide appropriate education and counseling on reproductive health and contraception in this adolescent time period when risk taking behaviors are high.

Low Birth Weight Infants

Conflicting data exist with regard to the prevalence of low birth weight among those women with PHIV. Data from developing countries, particularly Brazil and India, reported normal range birth weights for infants of these women [30,31]. In contrast, most studies from developed countries reported that women with PHIV are at increased risk for small-for gestational age birth outcomes [32-34]. When the known risk factors for fetal growth restriction were controlled, the higher risk for low birth-weight still persists. Therefore, these findings suggested that fetal growth might be affected by the unfavorable uterine environment that is unique to the pregnant woman affected with PHIV-possibly a chronically suppressed immune status [35]. However, the small sample sizes and difference in findings between these studies support the need for further investigation into the connection between PHIV and low birth weight, as well as whether other variables might be influencing the findings.

Preterm Births

Currently available data suggests there may be an increased risk of preterm delivery in the cohort of women with PHIV. According to Williams et al., in a small series of ten females with PHIV, 31 percent had preterm premature rupture of membranes resulting in preterm birth [32]. Thorn et al., also reported a premature birth rate of 44 percent among nine women with PHIV in Europe [34]. Beckerman et al., performed a comparison between women with PHIV and women with behaviorally-infected HIV. They noted that the women with PHIV were more likely to deliver at a premature gestation. The mean gestation at delivery was 33.7 weeks for the perinatally-infected women and 38.8 weeks for the behaviorally-infected women [29]. Again, the etiology for premature birth was unclear. Although it is understood that adolescent pregnancy is a risk factor for premature birth, this significantly increased rate (31 to 44 percent) of preterm birth reported in these

studies is more than twice the risk of premature birth in adolescent pregnancy, currently reported to be between 13 to 18 percent [36,37]. More research is indicated into the association between preterm birth and PHIV, as existing literature on the topic is limited by sample size.

Rate of Cesarean Delivery

In the 1990s, studies began to demonstrate a decreased risk for vertical transmission of HIV with elective cesarean delivery performed prior to onset of labor [38-40]. This was followed by a recommendation from ACOG in 2000 that, in addition to use of antiretroviral medications, cesarean delivery should be offered to women with viral loads of greater than 1,000 copies per milliliter to decrease the rate of vertical transmission of HIV [41]. Such studies and recommendations resulted in an increased rate of cesarean delivery among patients with HIV in the United States, with cesarean delivery rates increasing from about 20 percent prior to 1998 to 45 to 58 percent after 1998 [40]. A study from Kourtis et al., demonstrated a cesarean delivery rate of 58.5 percent among all HIV-infected women in 2010, compared to a rate of 33 percent among uninfected women [38].

Similar to those trends seen in all patients with HIV, the rate of cesarean delivery appears to be quite high among those with patients with PHIV, compared to the 23 percent reported rate of cesarean delivery among women less than 20 years of age in the United States in 2007 [42]. Williams et al., reported a 62 percent rate of cesarean delivery in their cohort of 13 pregnancies in New Jersey, United States; 75 percent of the cesarean deliveries were performed due to elevated HIV viral load [32]. These statistics bolster the argument that education and counseling are imperative in this young population to improve adherence to medical therapy to suppress viral load, and thus potentially avoid cesarean delivery with its inherent risks of morbidities in an immune-suppressed cohort. Another European study reported a remarkable rate of cesarean delivery in 8 out 9 pregnancies (89 percent) [34]. The indications for cesarean delivery in this small series were not specified except that 6 were reported as elective and 2 were emergent. Yet, viral load at delivery was undetectable in 2 of the 6 women who underwent elective cesarean section [34]. This could imply that in addition to education of patients with PHIV regarding the importance of compliance with their medications to decrease the rate of cesarean delivery associated with an elevated viral load, physicians must also be educated regarding recommendations for cesarean delivery in patients with HIV, to decrease the overall number of cesarean deliveries performed in this population.

Notably, this young cohort with immunocompromised status is at a further disadvantage when they undergo cesarean delivery when compared to their immunocompetent counterparts. Louis et al., reported that women with HIV infection are more likely to sustain infectious morbidities (postpartum endometritis, sepsis, and pneumonia), and to require blood transfusion. Most importantly, maternal death was at 0.8 percent in this cohort of 378 women infected with HIV; it was 0.1 percent in HIV-negative women [43]. In addition, having had a cesarean delivery may put future pregnancy at risk for morbidities, and these women are more likely to become pregnant again due to their young age.

Similar Risk of Mother-to-Child-Transmission of HIV

With the combination of antiretroviral therapy, obstetrical intervention, and avoidance of breastfeeding, the risk of mother-to-child transmission of HIV is estimated to be less than 2 percent in developed countries. It appears that PHIV women have the same risk of vertically transmitting the HIV infection as their behaviorally acquired HIV counterparts. In 32 live births from a cohort of pregnant PHIV adolescents enrolled in the Pediatrics AIDS Clinical Trials protocol 219, the rate of vertical transmission of HIV infection was calculated to be 3.3 percent [44]. Other study sites reported comparable low rates of vertical transmission of HIV: no cases of vertical transmission of HIV in 19 infants in New York and 6 infants in Puerto Rico [45,46].

Of interest, in contrast to the above adverse pregnancy outcomes collected retrospectively in the United States, prospective data from 1997 to 2001 in India reported a low rate of preterm birth (3 percent) and cesarean delivery (3 percent) in a cohort of 30 pregnant PHIV women [31]. However, this study excluded women with clinical manifestations of HIV disease. It included a group of well-nourished, asymptomatic women with PHIV. Seventy percent were married, 75 percent had secondary school education, and no patient had a history of sexually transmitted disease or multiple sexual partners per their report. Ninety-five percent had prenatal care, and more than 90 percent of patients took antiretroviral therapy consistently during pregnancy. It appears that with adequate medical care, overall good health, and compliance with antiretroviral therapy good pregnancy outcomes are possible. However, it is not certain whether these successful outcomes can be assumed in other populations of pregnant women with PHIV [47]. Given the paucity of data on pregnancy outcomes in women with PHIV, more research and reporting of such pregnancies are needed.

Conclusion

As youths with PHIV age into adolescence and adulthood, they face a number of challenges that must be addressed by healthcare professionals. In addition to continued treatment of HIV, these patients may require treatment for psychiatric mood disorders and substance abuse, as well as discussion of their reproductive plans and likely pregnancy outcomes. This care requires coordination among the various teams that will care for the patients with PHIV as they transition from the pediatric to the adult clinic setting. Further research into these areas will allow challenges in this transition to be addressed so that optimal care can be provided to patients with PHIV.

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