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Structural Determinants of Teenage Pregnancy and HIV Mortality among Adolescents in South Africa

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ABSTRACT: South Africa's adolescents confront disproportionate burdens of teenage pregnancy and HIV-related mortality, especially in regions like KwaZulu-Natal. This research conceptualizes the problem through a structural determinants framework, analyzing how macro-level factors, such as socioeconomic inequality, educational disparities, and health system gaps, shape vulnerability to both teenage pregnancy and HIV mortality. Drawing on social determinants of health theory, the paper posits that structural inequities, including poverty, unemployment, and gendered power relations, create contexts where adolescents are more likely to engage in risky sexual behaviors, have limited access to preventive services, and delay or avoid care. Through this lens, teenage pregnancy is not merely a behavioral issue but is deeply rooted in social stratification and intergenerational disadvantage. The paper also examines how health system weaknesses, such as inadequate adolescent-friendly services, fragmented HIV testing and treatment programmes, and stigma, contribute to delayed diagnosis, suboptimal treatment adherence, and higher HIV mortality among pregnant adolescents. By integrating frameworks from public health, sociology, and human rights, this study highlights the need for policies that address underlying social inequalities, strengthen health systems, and promote gender-transformative education. It underscores the importance of multisectoral collaboration between education, health, social development, and community stakeholders to transform conditions that perpetuate risk. The paper advocates empirical research and interventions that operationalize structural change to reduce both teenage pregnancy and HIV mortality.

1. INTRODUCTION

Teenage pregnancy and HIV remain critical public health challenges in South Africa, with KwaZulu-Natal (KZN) bearing a disproportionate share of adolescent maternal morbidity, HIV prevalence, and mortality (Duby *et al.* 2021). According to Lewis *et al.* (2022), the province continues to record some of the highest rates of teenage fertility and HIV infection among adolescents, reflecting persistent structural and social inequities. HIV incidence remains alarmingly high at 3.92 per 100 person-years among AGYW aged 15-24 (Lewis *et al.* 2022). Adolescents, particularly girls and young women, experience intersecting biological, social, and economic vulnerabilities that increase their susceptibility to early pregnancy and HIV infection (Mabaso *et al.* 2021). Biological immaturity heightens obstetric risks, while gender power imbalances limit young women's ability to negotiate safe sex or access contraception (Govender, Naidoo and Taylor 2020). These risks are further intensified by poverty, food insecurity, unemployment, and limited educational opportunities, which shape early sexual debut and risky sexual behaviours (Govender, Naidoo and Taylor 2020; Zuma *et al.* 2020).

Despite the existence of extensive and progressive sexual and reproductive health (SRH) policies in South Africa, substantial implementation gaps persist, contributing to persistently high rates of adolescent pregnancy and ongoing HIV transmission (Davids *et al.* 2020). Sub-Saharan Africa remains the epicentre of the global HIV epidemic, with AIDS continuing to be the

leading cause of death among adolescents, underscoring the scale and urgency of the challenge (Shaikh *et al.* 2021). Profound inequalities across gender, educational attainment, urban–rural residence, and socioeconomic status further exacerbate adolescent vulnerability, with adolescent girls disproportionately affected by early sexual debut, delayed marriage, and limited negotiating power within relationships (Melesse *et al.* 2020). In South Africa, teenage pregnancy and HIV-related morbidity and mortality continue to undermine national and global health targets, including the Sustainable Development Goals and the UNAIDS 95–95–95 commitments (HIV/AIDS 2023; UNAIDS 2025). The burden is particularly acute in KwaZulu-Natal, where entrenched poverty, gender inequality, school dropout, and uneven access to adolescent-friendly health services, especially in rural and peri-urban areas, compound risk and constrain timely care (Johnson and Dorrington 2023). While integrated school-based SRHR and HIV programmes have demonstrated promise by increasing service uptake, improving HIV knowledge, and reducing teenage pregnancy rates, their reach and sustainability remain uneven (Shaikh *et al.* 2021).

Early sexual debut, inconsistent contraceptive use, and age-disparate and transactional relationships significantly increase vulnerability to both unintended pregnancy and HIV infection (Bajunirwe, Semakula and Izudi 2020). According to Bajunirwe, Semakula and Izudi (2020), teenage pregnancy often leads to school interruption or permanent dropout, limiting future employment prospects and reinforcing intergenerational cycles of poverty and dependency. Pregnant adolescents are also at increased risk of poor maternal outcomes, delayed antenatal care, and HIV-related complications, especially when diagnosis and treatment are delayed (Pons-Duran *et al.* 2021). These overlapping risks highlight the complex relationship between pregnancy, HIV infection, and adolescent mortality.

Although substantial investments have been made in sexual and reproductive health, HIV prevention, and maternal health programmes, outcomes for adolescents in KZN remain suboptimal (Zuma *et al.* 2020). According to Chimbindi *et al.* (2020), many interventions continue to operate in silos, addressing pregnancy prevention, HIV prevention, or maternal health independently, without sufficient integration. This fragmented approach fails to account for the compounded vulnerabilities faced by pregnant adolescents living with or at risk of HIV (Chimbindi *et al.* 2020; Erasmus, Knight and Dutton 2020). Socio-cultural norms, stigma, fear of disclosure, and judgmental attitudes within health facilities further limit adolescents' access to timely and appropriate care, contributing to preventable morbidity and mortality (Meyer *et al.* 2023).

There remains a critical gap in conceptual and theoretical frameworks that holistically examine how teenage pregnancy and HIV interact within broader social, structural, and developmental contexts to influence adolescent mortality. This study aims to conceptually explore the interrelationship between teenage pregnancy, HIV infection, and adolescent mortality in KwaZulu-Natal, South Africa. By interrogating the role of social determinants, health systems, and policy environments, the paper seeks to propose an integrated framework capable of informing more responsive policies, coordinated programmes, and future empirical research aimed at reducing adolescent pregnancy, HIV transmission, and preventable deaths among young people.

2. LITERATURE REVIEW

2.1 Teenage Pregnancy and Adolescent Maternal Health Outcomes

Extensive evidence indicates that teenage pregnancy is associated with elevated risks of adverse maternal and neonatal outcomes, including hypertensive disorders of pregnancy, anaemia, postpartum complications, low birth weight, preterm delivery, and increased neonatal mortality (World Health Organization (Althabe *et al.* 2015; Amoadu, Hagan and Ansah 2022) . Adolescents face distinct biological vulnerabilities due to ongoing physical development, which can compromise obstetric outcomes, particularly during labour and the postpartum period (Amoadu, Hagan and Ansah 2022). These biological risks are further intensified by social and structural factors, especially in low-resource settings where access to timely, high-quality antenatal, intrapartum, and emergency obstetric care is inconsistent (Nili, Rahmati and Sharifi 2002). In South Africa, teenage pregnancy remains highly prevalent, with disproportionate rates observed in rural and peri-urban communities characterized by poverty, limited educational opportunities, and constrained health services (Fodo and Hariram 2023).

Delayed initiation of antenatal care is common among pregnant adolescents, often driven by fear of stigma, lack of confidentiality, and limited knowledge of available services (Erasmus, Knight and Dutton 2020). According to (Erasmus, Knight and Dutton 2020), late booking reduces opportunities for early detection and management of pregnancy-related complications, including HIV infection and anaemia, thereby increasing maternal and neonatal risk. Inconsistent engagement with maternal health services further undermines continuity of care, particularly during the postpartum period when adolescents may face heightened vulnerability and limited social support (Envuladu *et al.* 2023). Collectively, these factors contribute to

intergenerational cycles of poor health and socioeconomic disadvantage, reinforcing the need for adolescent-responsive maternal health systems.

2.2 HIV Burden and Mortality Among Adolescent Girls and Young Women

South Africa continues to bear one of the highest HIV burdens globally, with adolescent girls and young women (AGYW) experiencing a disproportionate share of new infections and HIV-related mortality (Cassim *et al.* 2023). Epidemiological data consistently demonstrate higher HIV incidence, prevalence, and mortality rates among female adolescents compared to their male counterparts, reflecting deeply entrenched gender and social inequities (Duby *et al.* 2021; UNAIDS 2025). Biological susceptibility to HIV infection, particularly during adolescence, is compounded by social vulnerabilities such as age-disparate sexual relationships, transactional sex, and exposure to gender-based violence, all of which heighten the risk of HIV acquisition (Duby *et al.* 2021). These risks are especially pronounced in socioeconomically marginalized communities where poverty and limited educational opportunities constrain adolescents' autonomy and negotiating power within sexual relationships.

Despite the expansion of HIV testing and treatment services, HIV-related mortality among adolescents remains unacceptably high (Lewis *et al.* 2022). Late diagnosis is common, with many adolescents entering care at advanced stages of disease due to fear of disclosure, stigma, and limited access to adolescent-friendly services (Gabre *et al.* 2024). Treatment interruptions and poor viral suppression are further exacerbated by psychosocial stressors, mobility, and inadequate continuity of care (Cassim *et al.* 2023). According to Cassim *et al.* (2023), pregnant adolescents living with HIV face compounded vulnerabilities, including heightened stigma, fragmented service delivery, and increased clinical complexity, which together undermine treatment adherence and contribute to elevated mortality risk. These patterns underscore the need for integrated, adolescent-responsive HIV and maternal health services that address both biomedical and structural determinants of vulnerability (Julaihi 2025).

2.3 Intersection of Teenage Pregnancy and HIV Vulnerability

The intersection of teenage pregnancy and HIV infection creates a synergistic risk environment that significantly amplifies adverse health outcomes among adolescent girls and young women (Embleton *et al.* 2023). Pregnancy often precipitates school interruption or permanent dropout, which reduces access to health information, peer support, and future economic opportunities, thereby increasing dependence on partners and limiting autonomy in health-related decision-making (Duby *et al.* 2021). For adolescents living with HIV, pregnancy introduces additional clinical and psychosocial complexity, including increased care demands, heightened stigma, and fear of disclosure to family members, partners, and healthcare providers (Groves *et al.* 2022). These challenges frequently result in delayed antenatal attendance and inconsistent engagement with HIV treatment services.

Evidence from South Africa indicates that pregnant adolescents living with HIV are more likely than adult women to initiate antenatal care late, start antiretroviral therapy at advanced disease stages, and experience interruptions in treatment, all of which elevate the risk of maternal morbidity and HIV-related mortality (Clouse *et al.* 2020; Alhassan *et al.* 2022). Structural barriers such as transport costs, fragmented service delivery, and judgmental provider attitudes further exacerbate disengagement from care (Clouse *et al.* 2020). The convergence of pregnancy and HIV thus represents not merely co-occurring conditions, but interconnected outcomes of structural vulnerability, underscoring the need for integrated models of care that address both reproductive and HIV health within a broader social determinants framework.

2.4 Structural Determinants of Adolescent Sexual and Reproductive Health in South Africa

Adolescent sexual and reproductive health outcomes in South Africa are profoundly shaped by structural determinants that extend beyond individual knowledge or behavior. Socioeconomic inequality, persistent poverty, and high youth unemployment create environments in which adolescents experience limited future prospects, increasing vulnerability to early sexual debut, transactional relationships, and unintended pregnancy (Chersich et al., 2018). Educational disruption—whether due to household poverty, caregiving responsibilities, or school-based stigma toward pregnant learners—reduces adolescents' exposure to comprehensive sexuality education and weakens protective social networks. Gendered power relations further constrain adolescents' agency, particularly for girls, by limiting their ability to negotiate condom use or refuse unsafe sexual practices.

Health system factors also operate as critical structural determinants. Many public health facilities lack adolescent-friendly services, resulting in breaches of confidentiality, long waiting times, and judgmental provider attitudes that discourage service

utilization (Mchunu et al., 2012). Structural stigma surrounding adolescent sexuality and HIV reinforces fear of disclosure and avoidance of testing and treatment services. Geographic inequities, especially in rural provinces such as KwaZulu-Natal, exacerbate these barriers through transport costs and limited service availability. Collectively, these structural determinants produce patterned inequities in teenage pregnancy and HIV outcomes, underscoring the necessity of interventions that target upstream social and institutional conditions rather than focusing solely on individual behavior change.

2.5 Health System Barriers to Adolescent-Friendly Care

Health system weaknesses significantly contribute to both teenage pregnancy and HIV-related mortality among adolescents in South Africa. Evidence consistently shows that the availability of adolescent-friendly services within the public health system remains limited, particularly in rural and peri-urban settings where facilities are overstretched and understaffed (Mchunu et al., 2021). Adolescents frequently encounter long waiting times, a lack of privacy, and clinic environments that are not designed to meet their specific developmental and psychosocial needs (Kamau 2019; Sanyang *et al.* 2025). According to Sanyang *et al.* (2025), these structural constraints are often compounded by judgmental or moralizing attitudes from healthcare providers toward sexually active or pregnant adolescents, which undermine trust and discourage timely health-seeking behaviour.

Fragmentation of service delivery further exacerbates barriers to care (Haskins *et al.* 2016). Sexual and reproductive health services, antenatal care, and HIV testing and treatment are often provided through separate, poorly coordinated pathways, resulting in missed opportunities for early HIV diagnosis and integrated care (Haskins *et al.* 2016; Mayer *et al.* 2025). Adolescents may be required to attend multiple appointments across different service points, increasing the risk of disengagement from care due to transport costs and competing responsibilities (Agostino and Toulany 2023). According to Agostino and Toulany (2023), concerns about confidentiality and fear of involuntary disclosure remain particularly salient, deterring adolescents from accessing services and adhering to treatment, especially during pregnancy. Collectively, these barriers transform preventable conditions into adverse health outcomes, highlighting the need for integrated, adolescent-responsive health systems.

2.6 Policy, Human Rights, and Multisectoral Responses

Policy and human rights frameworks play a critical role in shaping adolescent sexual and reproductive health outcomes, including teenage pregnancy and HIV-related mortality (Davids *et al.* 2020; Ketye, Babatunde and Akintola 2024). According to Ketye, Babatunde and Akintola (2024), international and national policy instruments, including the World Health Organization's adolescent health guidelines and South Africa's National Adolescent and Youth Health Policy, emphasize adolescents' rights to accessible, confidential, and non-judgmental health services (WHO, 2022). However, persistent implementation gaps undermine the translation of these commitments into routine practice, particularly in under-resourced settings (Gruskin *et al.* 2021). Adolescents often experience services that fall short of rights-based standards, reinforcing inequities rather than alleviating them.

Emerging evidence highlights the importance of multisectoral approaches that extend beyond the health sector to address the structural determinants of adolescent vulnerability (Sutarsa *et al.* 2024). Integrated interventions linking education, social protection, gender equality, and health system strengthening have demonstrated greater effectiveness in reducing teenage pregnancy and improving HIV outcomes than siloed programmes (Sutarsa *et al.* 2024; UNAIDS 2025). School retention initiatives, comprehensive sexuality education, and economic empowerment programmes for adolescent girls are particularly protective (Chimbindi *et al.* 2020). At the same time, meaningful community engagement and adolescents' involvement in programme design enhance acceptability and sustainability (Ramponi *et al.* 2024). These findings underscore the necessity of coordinated, multisectoral strategies that operationalize human rights principles while addressing the social and structural conditions that perpetuate risk.

2.7 Gaps in the Literature and Study Justification

Despite a growing body of research on teenage pregnancy and HIV among adolescents in South Africa, significant gaps persist in how these phenomena are conceptualized and addressed (Duby *et al.* 2021). Most existing studies examine teenage pregnancy, HIV risk, and HIV-related mortality as discrete outcomes, rather than as interconnected manifestations of shared structural and health system vulnerabilities (Christofides *et al.* 2014; Duby *et al.* 2021). This fragmentation limits understanding of how social inequalities, gender dynamics, and health system barriers converge to shape compounded risks for pregnant adolescents living with or vulnerable to HIV (Akinsolu *et al.* 2024).

Furthermore, while quantitative studies have documented prevalence and risk factors, fewer studies integrate structural determinants with health system processes to explain why adverse outcomes persist despite extensive policy frameworks and clinical guidelines (Ngwenya *et al.* 2020; Rammela and Makhado 2025). There is also limited empirical work that foregrounds adolescents' lived experiences of navigating education, healthcare, and social services, particularly in high-burden provinces such as KwaZulu-Natal (Ntombela *et al.* 2022; Rammela and Makhado 2025). Existing research often inadequately captures how stigma, provider attitudes, and service fragmentation interact to delay care-seeking, disrupt treatment adherence, and increase mortality risk among pregnant adolescents.

Additionally, evaluations of adolescent-friendly health services tend to focus on service availability rather than quality, integration, and continuity of care across the reproductive and HIV care continuum. Evidence on multisectoral interventions remains uneven, with few studies assessing how education, social protection, and community-based initiatives can be coherently aligned to reduce both teenage pregnancy and HIV-related mortality (Obeagu and Obeagu 2025).

3 CONCEPTUAL FRAMEWORK: STRUCTURAL DETERMINANTS OF TEENAGE PREGNANCY AND HIV MORTALITY AMONG ADOLESCENTS IN SOUTH AFRICA

This study is guided by a structural determinants of health framework, grounded in the Social Determinants of Health (SDH) theory and informed by intersectionality and health systems-strengthening perspectives. The framework conceptualizes teenage pregnancy and HIV-related mortality among adolescents not as isolated or purely behavioral outcomes, but as interlinked consequences of upstream structural, social, and institutional forces operating across the life course (De Checchi, Tenani and Sumiya 2024).

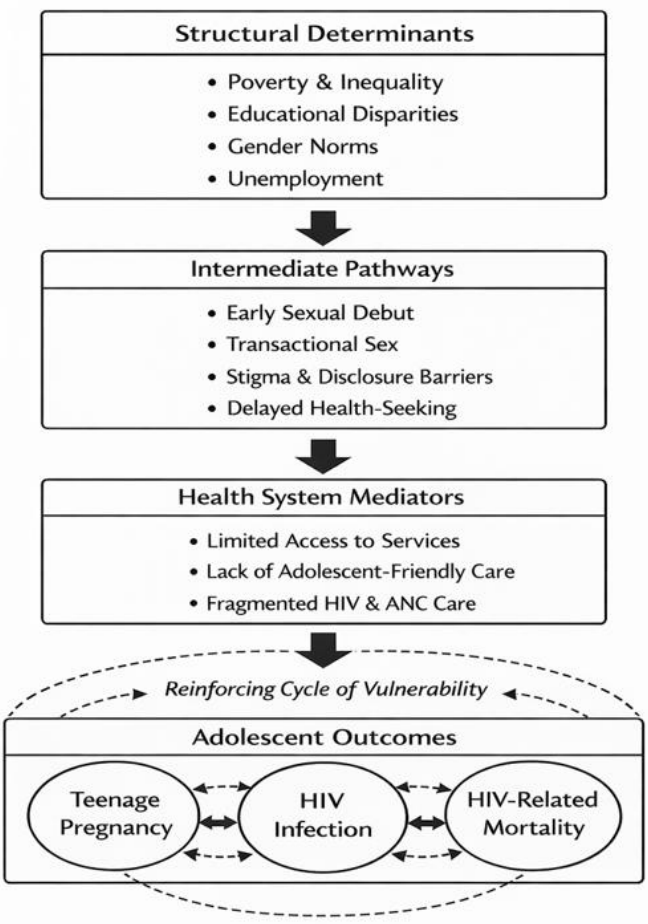

Figure 1: Structural Determinants of Teenage Pregnancy and HIV Mortality Among Adolescents in South Africa

Source: Self-generated by author

At the macro-structural level, socioeconomic inequality, poverty, unemployment, and educational disparities shape adolescents' exposure to risk. Structural poverty limits household resources, increases food insecurity, and heightens adolescents' reliance on transactional or age-disparate sexual relationships, which are strongly associated with both unintended pregnancy and HIV acquisition (Rudgard *et al.* 2023). Educational inequality, including school dropout and poor access to comprehensive sexuality education, reduces adolescents' health literacy and weakens protective social environments (Hevesi, Downey and Harvey 2024). Gender norms and unequal power relations further constrain adolescent girls' sexual autonomy, limiting their ability to negotiate condom use and increasing vulnerability to sexual coercion and gender-based violence (Nydegger *et al.* 2017; Mfeka-Nkabinde, Moletsane and Voce 2024).

These structural determinants operate through intermediate social and behavioural pathways. Adolescents exposed to socioeconomic stressors are more likely to experience early sexual debut, inconsistent contraceptive use, and delayed health-seeking behaviour (Rudgard *et al.* 2023). Social stigma surrounding adolescent sexuality, pregnancy, and HIV discourages disclosure and undermines engagement with preventive and curative services (Miller *et al.* 2021). According to (Miller *et al.* 2021), for pregnant adolescents, compounded stigma intensifies disengagement from both antenatal care and HIV services, amplifying health risks for both mother and child.

At the health system level, structural weaknesses mediate the relationship between vulnerability and mortality (Mashamba *et al.* 2024). Limited availability of adolescent-friendly services, breaches of confidentiality, negative provider attitudes, and fragmented service delivery reduce access to timely HIV testing, antiretroviral therapy initiation, and sustained viral suppression (Mashamba *et al.* 2024; Embleton *et al.* 2025). In rural and under-resourced settings, additional barriers such as transport costs, staffing shortages, and inconsistent service integration further delay diagnosis and continuity of care (Hopkins 2021). These systemic failures contribute directly to preventable HIV-related mortality among adolescents, particularly those who are pregnant or postpartum.

The framework positions teenage pregnancy as both an outcome and a reinforcing mechanism within this system. Pregnancy can accelerate school dropout, deepen economic dependence, and increase exposure to stigma, thereby exacerbating HIV vulnerability and weakening treatment adherence (Kabunga *et al.* 2024; UNAIDS 2025). HIV infection, in turn, heightens obstetric risk and mortality among adolescents, creating a syndemic interaction between pregnancy and HIV within structurally constrained contexts (Kabunga *et al.* 2024). Finally, the framework highlights intervention points at multiple levels. Structural interventions, including poverty alleviation, gender-transformative education, and school retention policies, address upstream drivers of risk (Odama ; Bose *et al.* 2023). Health system strengthening interventions, such as adolescent-friendly service models, integrated HIV maternal care, and stigma-reduction training for providers, target intermediate pathways (Bose *et al.* 2023). Multisectoral collaboration across health, education, and social development sectors is therefore essential to disrupt the cycle linking structural inequity, teenage pregnancy, and HIV mortality.

4. DISCUSSION

Poverty and economic inequality emerged as central drivers shaping adolescent vulnerability. Economic deprivation increases reliance on transactional and age-disparate sexual relationships, which heighten both pregnancy and HIV risk (Gichane *et al.* 2020; Duby *et al.* 2021). Adolescents from low-income households are also more likely to delay health-seeking due to financial, transport, and opportunity costs, thereby increasing the risk of late HIV diagnosis and poor pregnancy outcomes (Gichane *et al.* 2020). Poverty intersects with food insecurity and household instability, further constraining adolescents' ability to negotiate safer sexual practices or adhere to HIV treatment and antenatal care, reinforcing cycles of vulnerability and poor health outcomes (Duby *et al.* 2021; Gruskin *et al.* 2021).

Gender norms and power imbalances further intensify adolescent vulnerability. Patriarchal social structures that normalize male dominance and limit female sexual autonomy undermine adolescents' capacity to negotiate condom use, refuse unwanted sex, or seek timely reproductive health services (Nesamoney *et al.* 2022). For pregnant adolescents living with HIV, these dynamics are compounded by stigma and fear of disclosure, which delay entry into care and compromise treatment adherence (Ngwenya *et al.* 2020). These findings reinforce the argument that teenage pregnancy and HIV mortality are not solely biomedical issues but manifestations of entrenched gender inequality requiring structural and normative change.

Educational exclusion plays a critical mediating role in this structural pathway. School dropout, whether due to poverty, pregnancy, or caregiving responsibilities, reduces access to sexuality education, health information, and protective peer networks

(Rudgard *et al.* 2023). Evidence consistently shows that remaining in school significantly reduces the likelihood of early pregnancy and HIV acquisition by improving health literacy, delaying sexual debut, and enhancing future economic prospects (George *et al.* 2022). However, stigma, inadequate re-entry policies for pregnant learners, and financial barriers undermine the protective role of education, perpetuating intergenerational cycles of disadvantage (Rudgard *et al.* 2023).

Within the health system, the findings reveal that fragmented and non-adolescent-friendly services exacerbate adverse outcomes. Limited access to confidential, respectful, and integrated care discourages adolescents from seeking sexual and reproductive health services, HIV testing, and antenatal care (Janighorban *et al.* 2022). According to (Janighorban *et al.* 2022), negative provider attitudes, breaches of confidentiality, and fear of judgment further erode trust and contribute to delayed care-seeking . The absence of integrated service delivery, linking HIV prevention, treatment, and antenatal care, results in missed opportunities to reduce HIV-related maternal mortality among adolescents (UNAIDS 2025).

Taken together, these findings underscore the inadequacy of siloed, behaviour-focused interventions and point to the necessity of integrated, multisectoral policy responses. Education policies must prioritize school retention, flexible re-entry for pregnant adolescents, and comprehensive, gender-transformative sexuality education (Davids *et al.* 2020). Social protection mechanisms, including child support grants and targeted economic empowerment programmes, are critical for reducing poverty-driven risk and dependence on transactional relationships (Hertzog *et al.* 2024). Within the health sector, policy must institutionalize adolescent-friendly, integrated service models that link sexual and reproductive health, antenatal care, HIV prevention, treatment, and psychosocial support (Sanyang *et al.* 2025). Strengthening provider training in non-judgmental, youth-sensitive care and enforcing confidentiality standards are essential to improve service uptake and retention. Furthermore, embedding community-based and youth-led initiatives within policy frameworks is vital for addressing stigma, transforming harmful gender norms, and enhancing accountability at the community level (Haskins *et al.* 2016).

This study reinforces the argument that reducing teenage pregnancy and HIV-related mortality among adolescents in South Africa requires structural transformation rather than isolated behavioural interventions. Addressing the intersecting influences of poverty, gender inequality, educational exclusion, and health system limitations offers a more sustainable pathway to improving adolescent health outcomes and breaking intergenerational cycles of vulnerability.

5. CONCLUSION

Teenage pregnancy, HIV infection, and adolescent mortality in KwaZulu-Natal represent deeply interconnected public health challenges that are rooted in structural inequality, gendered power relations, and persistent health system gaps. This conceptual paper demonstrates that these outcomes cannot be effectively addressed through fragmented or behaviour-focused interventions alone. Instead, applying structural determinants, syndemic, and life-course perspectives reveals how social, economic, and institutional forces interact over time to shape adolescent vulnerability and health trajectories.

The analysis highlights the urgent need for integrated, multisectoral responses that extend beyond the health sector to include education, social protection, and community-based interventions. Strengthening adolescent-friendly, integrated health services—particularly the linkage between sexual and reproductive health, antenatal care, and HIV prevention and treatment—is critical for improving early diagnosis, treatment continuity, and survival among pregnant adolescents. Equally important is the transformation of provider attitudes, reduction of stigma, and meaningful inclusion of adolescents in programme design and evaluation.

Despite growing policy attention, substantial research gaps remain. There is limited empirical evidence on how integrated service models function in real-world, resource-constrained settings, particularly in rural and peri-urban districts with high HIV burden. Few studies longitudinally examine how early-life structural exposures, such as poverty, school disruption, and gender-based violence, accumulate to influence both pregnancy and HIV-related mortality across the adolescent life course. Additionally, there is a lack of robust implementation research evaluating the sustainability, cost-effectiveness, and scalability of multisectoral interventions within existing health and education systems.

Future research should prioritize mixed-methods and longitudinal designs that capture adolescents lived experiences while rigorously assessing system-level interventions. Evaluations of policy implementation fidelity, service integration quality, and community-led strategies are particularly needed to inform sustainable change. Addressing these gaps will be essential for

translating conceptual insights into effective action, reducing preventable adolescent deaths, and supporting equitable, healthy transitions to adulthood in South Africa and similar high-burden contexts.

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