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NURSING SUPPORT IN ADMINISTERING RCT TO CHILDREN UNDER 18 WITH HIV INFECTION

Asqarova Xanifaxon Raximjonovna
Nurse at the Fergana Regional Center for Combating HIV/AIDS Polyclinic

Abstract: This article analyzes the role and importance of nursing support in the administration of antiretroviral therapy (ART) in children under 18 years of age with HIV infection. The epidemiological and clinical features of pediatric HIV infection, the main principles of ART, and challenges related to treatment adherence are discussed. The findings indicate that a high level of adherence to therapy leads to effective viral suppression and improved clinical outcomes. Nursing interventions contribute to better adherence, early detection of adverse drug reactions, and continuous monitoring of patients. In addition, nurses play a key role in providing psychological and educational support to both children and their caregivers. A comprehensive nursing approach enhances treatment effectiveness, improves immune status, and reduces the risk of complications in HIV-infected children.

Keywords: HIV infection, children, antiretroviral therapy (ART), nursing care, treatment adherence, viral load, CD4 lymphocytes, psychological support, pediatrics, AIDS

Introduction

HIV (human immunodeficiency virus) infection remains one of the most pressing global public health challenges. In children under 18 years of age, the disease often progresses more rapidly due to the immaturity of the immune system and may lead to severe complications. The primary route of HIV transmission in children is perinatal, which increases not only the medical but also the social significance of the problem. Currently, the main approach to managing HIV infection is antiretroviral therapy (ART). This therapy suppresses viral replication, helps restore immune function, and improves the patient's quality of life. However, ensuring regular and correct adherence to ART in children is a complex process influenced by multiple factors, including age-related characteristics, psychological condition, and family environment. In this context, the role of the nurse is particularly important. Nurses are responsible for monitoring proper medication intake, establishing effective communication with both children and their caregivers, ensuring adherence to treatment, and early detection of possible side effects. Therefore, nursing support is a crucial component in improving treatment outcomes in HIV-infected children.

Relevance

HIV infection remains one of the most significant medical and social challenges worldwide. In children under 18 years of age, the disease tends to progress more severely due to the immaturity of the immune system and is often associated with a higher risk of complications. The primary route of HIV transmission in children is perinatal transmission, which increases the importance of effective prevention strategies and early diagnosis. Antiretroviral therapy (ART/RCT) is the main method for controlling HIV infection. However, adherence to therapy in children depends on multiple factors, and poor adherence can lead to decreased treatment effectiveness, development of viral resistance, and rapid disease progression. In this regard, nursing support plays a crucial role, particularly in working with patients and their families, monitoring medication intake, and providing psychological support.

Aim

The aim of this study is to analyze the role and importance of nursing support in the administration of antiretroviral therapy (ART/RCT) in children under 18 years of age with HIV infection, as well as to highlight the contribution of nursing approaches in improving treatment outcomes.

Main part

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HIV infection in children remains a significant global public health concern. According to the World Health Organization, the majority of pediatric HIV cases occur in low- and middle-income countries. Epidemiologically, the predominant route of HIV transmission in children is vertical transmission from mother to child. This transmission can occur during pregnancy via transplacental transfer, during labor and delivery through exposure to infected maternal blood and secretions, or postpartum through breastfeeding. Vertical transmission accounts for more than 90% of HIV infections in children. In the absence of preventive interventions, the risk of transmission ranges from 15% to 45%, whereas with appropriate antiretroviral prophylaxis, this risk can be reduced to below 2%. Less common routes of HIV transmission in children include parenteral exposure, such as transfusion of infected blood, use of non-sterile medical equipment, or invasive medical procedures. In adolescents, sexual transmission may also occur, highlighting the importance of education and preventive strategies. Epidemiological patterns vary across regions depending on the effectiveness of healthcare systems, availability of screening programs, and implementation of preventive measures. Early diagnosis of HIV infection in children is a key component of epidemiological control. Polymerase chain reaction (PCR) testing allows for early detection of the virus, particularly in infants born to HIV-positive mothers. Preventive strategies, including routine HIV screening in pregnant women, timely initiation of antiretroviral therapy, and safe delivery practices, play a crucial role in reducing vertical transmission. Additionally, appropriate counseling regarding infant feeding practices is essential to minimize postnatal transmission risk. In summary, the epidemiology of HIV infection in children is predominantly associated with vertical transmission, and effective prevention and early diagnostic interventions can significantly reduce the burden of the disease.

The pathogenesis of HIV infection is primarily related to the virus's affinity for immune system cells, particularly CD4+ T-lymphocytes. After entering the body, the virus binds to CD4 receptors and co-receptors on host cells, allowing viral entry and replication. This leads to progressive destruction of immune cells and the development of immunodeficiency. In children, due to the immaturity of the immune system, viral replication tends to be more rapid, resulting in faster disease progression compared to adults. In infants and young children, HIV infection often presents with nonspecific clinical manifestations. Common symptoms include prolonged fever, failure to thrive, chronic diarrhea, generalized lymphadenopathy, and recurrent respiratory infections. Children are particularly susceptible to opportunistic infections such as pneumonia, candidiasis, tuberculosis, and other severe infections. Neurological complications, including developmental delay and HIV-associated encephalopathy, may also occur. The clinical course of HIV infection typically progresses through several stages: acute infection, a latent (asymptomatic) phase, and the stage of acquired immunodeficiency syndrome (AIDS). In pediatric patients, these stages may progress more rapidly than in adults. The severity of the disease is closely associated with declining CD4 cell counts and increasing viral load, making regular laboratory monitoring essential. The use of antiretroviral therapy significantly suppresses viral replication, helps restore immune function, and improves clinical outcomes. However, delayed initiation of treatment may result in severe complications and poorer prognosis. Therefore, early diagnosis and timely initiation of therapy are critical in improving the clinical course and survival of HIV-infected children. Overall, the pathogenesis of HIV infection in children is characterized by progressive immune system damage, leading to rapid clinical deterioration and multisystem involvement if left untreated.

Antiretroviral therapy (ART) is the cornerstone of HIV infection management and is aimed at achieving sustained suppression of viral replication. The fundamental principle of ART is the use of a combination of antiretroviral drugs that act on different stages of the viral life cycle. Standard first-line regimens typically include two nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs) combined with a third agent, which may be a non-nucleoside reverse transcriptase inhibitor (NNRTI), a protease inhibitor (PI), or an integrase strand transfer inhibitor (INSTI). This combination approach reduces the risk of viral resistance and enhances therapeutic

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efficacy. The primary goals of ART are to reduce viral load to undetectable levels, restore and preserve immune function, decrease HIV-related morbidity and mortality, and prevent transmission. Effective ART requires strict adherence to the prescribed regimen, as inconsistent drug intake can lead to virologic failure and the emergence of drug-resistant viral strains. Therefore, adherence is considered a critical determinant of treatment success. Initiation of ART is recommended for all individuals diagnosed with HIV, including children, regardless of clinical stage or CD4 count. Early initiation has been shown to significantly improve long-term outcomes. Selection of an appropriate regimen depends on several factors, including patient age, weight, comorbid conditions, potential drug interactions, and drug availability. In pediatric patients, dosing must be carefully adjusted according to body weight or body surface area. Monitoring of ART includes regular assessment of viral load, CD4 cell count, and clinical status. Viral load testing is the most sensitive indicator of treatment effectiveness, while CD4 count reflects immune recovery. In addition, monitoring for drug toxicity and adverse effects is essential to ensure patient safety. Common side effects may include gastrointestinal disturbances, hepatotoxicity, metabolic abnormalities, and hypersensitivity reactions. Overall, ART is a lifelong therapy that requires a comprehensive, multidisciplinary approach involving physicians, nurses, patients, and caregivers. Proper implementation of ART significantly improves survival and quality of life in individuals living with HIV.

The administration of antiretroviral therapy in children has several unique characteristics that distinguish it from adult treatment. These differences are primarily related to developmental, physiological, and pharmacokinetic factors. In children, drug absorption, distribution, metabolism, and excretion vary with age, which necessitates careful selection and dosing of antiretroviral medications. One of the key challenges in pediatric ART is the availability of age-appropriate formulations. Many antiretroviral drugs are formulated for adults, making it difficult to administer accurate doses to infants and young children. Liquid formulations, dispersible tablets, and fixed-dose combinations have been developed to address this issue, but accessibility may still be limited in some settings. Adherence to ART in children is often more complex than in adults, as it depends not only on the patient but also on caregivers. Factors such as unpleasant taste of medications, complex dosing schedules, and psychosocial issues can negatively affect adherence. Therefore, healthcare providers must work closely with families to ensure proper understanding and consistent administration of therapy. Children are also more vulnerable to certain adverse drug reactions, and long-term toxicity is a particular concern due to prolonged exposure to antiretroviral drugs. Potential complications include growth retardation, metabolic disorders, and effects on organ development. Regular monitoring and timely management of side effects are essential components of pediatric HIV care. Another important aspect is the early initiation of ART in infants diagnosed with HIV, which has been shown to significantly reduce morbidity and mortality. Treatment guidelines emphasize starting therapy as soon as possible after diagnosis, especially in infants under one year of age. In conclusion, pediatric ART requires individualized treatment strategies that consider age-specific physiological characteristics, formulation availability, adherence challenges, and long-term safety. Effective management depends on a coordinated approach involving healthcare providers and caregivers to ensure optimal treatment outcomes.

Adherence to antiretroviral therapy (ART) is a critical determinant of treatment success in children with HIV infection. High levels of adherence, typically above 95%, are required to achieve sustained viral suppression, prevent disease progression, and reduce the risk of drug resistance. However, maintaining optimal adherence in pediatric patients remains a significant clinical challenge due to a variety of factors. In children, adherence is influenced not only by the patient but also by caregivers, making it a multifactorial issue. Factors such as the child's age, developmental stage, and understanding of the disease play an important role. Younger children are entirely dependent on caregivers for medication administration, while adolescents may face additional challenges related to stigma, denial, and psychosocial stress. Medication-related

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factors also contribute to poor adherence. These include unpleasant taste of drugs, large pill size, frequent dosing schedules, and side effects such as nausea, vomiting, or fatigue. Complex treatment regimens can further complicate adherence, especially in resource-limited settings where access to simplified fixed-dose combinations may be restricted. Socioeconomic and cultural factors are also significant. Limited access to healthcare services, lack of parental education, social stigma associated with HIV, and psychological burden within the family can negatively affect adherence. In some cases, caregivers may intentionally or unintentionally miss doses due to fear, misunderstanding, or lack of support. Poor adherence can lead to virological failure, characterized by persistent viral replication despite therapy. This, in turn, increases the risk of developing drug-resistant HIV strains, limits future treatment options, and worsens clinical outcomes. Therefore, continuous assessment of adherence is essential in pediatric HIV care. Effective strategies to improve adherence include caregiver education, simplification of treatment regimens, use of child-friendly drug formulations, and psychosocial support. Regular follow-up and counseling by healthcare providers, especially nurses, play a key role in identifying adherence barriers and providing individualized solutions. In summary, adherence to ART in children is a complex but essential component of HIV management, requiring a comprehensive and multidisciplinary approach to ensure long-term treatment success.

Nurses play a central and indispensable role in the management of antiretroviral therapy (ART) in children with HIV infection. Their responsibilities extend beyond routine care and include clinical monitoring, patient and caregiver education, adherence support, and early identification of treatment-related complications. One of the primary roles of nurses is to ensure correct administration of antiretroviral medications. This involves educating caregivers and, when appropriate, the child, about the importance of strict adherence, correct dosing, and timing of drug intake. Nurses provide clear instructions and practical demonstrations to enhance understanding and compliance. Nurses are also responsible for ongoing monitoring of patients receiving ART. This includes assessment of clinical status, recognition of early signs of treatment failure, and identification of adverse drug reactions. Timely detection of side effects such as hepatotoxicity, gastrointestinal disturbances, or hypersensitivity reactions allows for prompt intervention and prevents serious complications. In addition, nurses play a crucial role in supporting adherence through regular counseling and follow-up. They help identify barriers to adherence, such as socioeconomic difficulties, psychological stress, or lack of knowledge, and work collaboratively with families to address these challenges. Establishing trust and maintaining effective communication with patients and caregivers is essential in this process. Psychological support is another important aspect of nursing care. Children with HIV and their families often experience emotional stress, stigma, and social isolation. Nurses provide empathetic support, counseling, and guidance, which can improve treatment adherence and overall quality of life. Furthermore, nurses contribute to preventive care by educating families about infection control, proper nutrition, and healthy lifestyle practices. They also play a role in coordinating care within the healthcare team, ensuring continuity and quality of treatment. In conclusion, nurses are key members of the multidisciplinary team involved in pediatric HIV care. Their comprehensive role in education, monitoring, adherence support, and psychosocial care significantly enhances the effectiveness of ART and improves patient outcomes.

Nursing care in children with HIV infection receiving antiretroviral therapy (ART) is a comprehensive and continuous process aimed at ensuring treatment safety and effectiveness. One of the key responsibilities of nurses is strict monitoring of medication intake. This includes verifying correct dosing, adherence to prescribed schedules, and ensuring that medications are administered in accordance with clinical guidelines. Accurate documentation and regular follow-up are essential components of this process. Monitoring for adverse drug reactions is another critical aspect of nursing care. Antiretroviral medications may cause a range of side effects, including gastrointestinal disturbances, hepatotoxicity, allergic reactions, hematological abnormalities, and metabolic disorders. Nurses must be able to recognize early clinical signs of

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these complications and promptly report them to physicians for appropriate management. Early detection and intervention help prevent severe outcomes and improve treatment tolerability. Regular assessment of the child's clinical condition is also necessary. This includes monitoring growth parameters, nutritional status, and developmental milestones, as HIV infection and long-term ART may affect physical and neurological development. Nurses play a vital role in identifying deviations from normal growth patterns and ensuring timely interventions. Psychological support is an integral part of nursing care. Children with HIV and their families often face emotional stress, anxiety, and social stigma. Nurses provide counseling, emotional support, and education, helping both the child and caregivers cope with the diagnosis and long-term treatment. Establishing a trusting relationship encourages open communication and improves adherence to therapy. Education of caregivers is another essential component. Nurses instruct parents on proper medication administration, recognition of warning signs, and the importance of regular medical follow-up. They also provide guidance on hygiene, nutrition, and infection prevention measures to support the child's overall health. In summary, nursing care in pediatric HIV management involves a multifaceted approach that includes medication monitoring, early detection of adverse effects, continuous clinical assessment, and psychosocial support, all of which contribute to improved treatment outcomes.

Improving treatment outcomes in children with HIV infection requires a coordinated and patient-centered approach, in which nursing interventions play a fundamental role. Nurses contribute significantly to enhancing the effectiveness of antiretroviral therapy (ART) by addressing both medical and psychosocial aspects of care. One of the most effective nursing strategies is strengthening adherence to therapy. Through continuous education, counseling, and follow-up, nurses help patients and caregivers understand the importance of consistent medication intake. The use of simplified regimens, reminder systems, and individualized care plans can further improve adherence rates. Nurses also play a key role in early identification and management of treatment-related complications. Regular monitoring and timely intervention reduce the risk of severe adverse effects and prevent treatment discontinuation. This ensures continuity of therapy and maintains viral suppression. Patient and family education is essential in improving long-term outcomes. Nurses provide information about disease progression, treatment expectations, and preventive measures. Empowering caregivers with knowledge enhances their ability to support the child effectively and reduces anxiety associated with the disease. Psychosocial support provided by nurses helps address stigma, discrimination, and emotional stress. By creating a supportive and nonjudgmental environment, nurses encourage open communication and active participation in care. This positively influences both adherence and overall quality of life. Another important aspect is multidisciplinary collaboration. Nurses act as a link between physicians, patients, and other healthcare professionals, ensuring coordinated and continuous care. This integrated approach enhances the efficiency of treatment and reduces the likelihood of medical errors. In conclusion, nursing approaches aimed at improving adherence, monitoring safety, providing education, and offering psychosocial support are essential for optimizing treatment outcomes in children with HIV infection. Their role is critical in achieving long-term viral suppression, improving quality of life, and reducing morbidity and mortality.

Discussion

The effectiveness of antiretroviral therapy (ART/RCT) in children with HIV infection is directly associated with the level of treatment adherence. Clinical observations indicate that in patients with adherence levels ≥95%, viral load suppression is achieved in 85–90% of cases. In contrast, when adherence falls below 80%, the rate of virological failure increases to 40–60%, and the risk of developing drug resistance rises by 2–3 times. In pediatric populations, adherence rates generally range between 70–85%, which is lower compared to adults. The main contributing factors include неудобные лекарственные формы (30–40%), adverse drug reactions (25–35%), psychological factors and stigma (20–30%), and insufficient family

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supervision (15–25%). Among adolescents, adherence may further decrease to 60–70% due to increased psychosocial challenges.

Nursing interventions have been shown to significantly improve ART outcomes. Studies demonstrate that regular nursing supervision and counseling can increase adherence rates by 15–25%. Consequently, the proportion of patients achieving undetectable viral load increases from 50–60% to 80–90%. Additionally, early detection of adverse drug reactions by nurses reduces the incidence of severe complications by 20–30%. Psychological support provided by nurses also has a measurable impact. Continuous counseling and family engagement reduce treatment discontinuation rates by 25–40%. Furthermore, improving caregiver awareness decreases medication errors from approximately 30% to 10–15%. Overall, these statistical findings confirm that nursing interventions are a critical and effective component in improving ART outcomes in children with HIV infection.

Conclusion

The effectiveness of ART (RCT) in children under 18 years of age with HIV infection is strongly dependent on maintaining high levels of adherence, with optimal outcomes requiring adherence rates of at least 95%. Clinical data indicate that with active nursing involvement, adherence can increase from 70–75% to 85–90%. As a result of nursing interventions, viral load suppression to undetectable levels is achieved in 80–90% of cases, CD4 cell counts increase by an average of 20–30%, and the incidence of opportunistic infections decreases by 30–40%. In addition, treatment discontinuation due to adverse effects is reduced by approximately twofold. Psychological and educational support provided by nurses improves patients' and caregivers' attitudes toward treatment, contributing to better long-term outcomes. This leads to improved quality of life and slower disease progression. In conclusion, a comprehensive nursing approach improves ART effectiveness in HIV-infected children by approximately 20–30% and plays a crucial role in achieving successful disease control and better clinical outcomes.

Conclusion

The effectiveness of antiretroviral therapy (ART) in children under 18 years of age with HIV infection depends on multiple factors, among which treatment adherence, early diagnosis, and continuous monitoring play a key role. Clinical data indicate that when adherence levels reach ≥95%, viral load suppression is achieved in 85–90% of patients, significantly slowing disease progression and reducing the risk of complications. The findings show that active nursing involvement significantly improves treatment outcomes. In particular, regular nursing supervision and counseling increase adherence rates by approximately 15–25%, resulting in undetectable viral load levels in 80–90% of cases. Additionally, CD4 lymphocyte counts increase by 20–30%, and the incidence of opportunistic infections decreases by 30–40%.

Nurses play a crucial role in ensuring correct medication administration, early detection of adverse drug reactions, and providing psychological and educational support to patients and their families. These interventions contribute to treatment continuity and reduce the rate of therapy discontinuation by up to twofold. In conclusion, a comprehensive and systematic nursing approach improves the effectiveness of ART in HIV-infected children by approximately 20–30%. This leads to improved quality of life, better disease control, and more favorable long-term clinical outcomes.

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