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COVID-19 Ignited a Successful Growth Spurt in Pediatric HIV Differentiated Service Delivery Programming

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Abstract

Purpose of Review Pediatric HIV differentiated service delivery (DSD) programming has historically lagged behind adult care despite WHO recommendations to include family-friendly alternatives for children and caregivers. This review explores the status of Pediatric DSD programming before the COVID-19 pandemic and then reviews published differentiated approaches that developed during the pandemic.

Recent Findings Differentiated service delivery programming for adults living with HIV has increased worldwide, and patient outcomes from these programs have been positive. Pediatric DSD programming has lagged, with many children ineligible for multi-month refills. Despite WHO recommendations to space ART visits for children, limited access to viral load monitoring and a lack of viral suppression among children have left them out of this more convenient care option. Community ART groups historically were not structured to include children. Furthermore, after-hours clinics and teen clubs with ART dispensing have not reached the majority of CLHIV.

Summary This review highlights programs that developed out of necessity during the lockdowns of the pandemic. Ingenuity and creativity forced programmers to provide care to their patients with less patient-clinician interaction. Children became eligible for multi-month dispensing as programs loosened eligibility criteria. Technology helped provide virtual psychological support, and unique ART delivery methods were developed. This rapid expansion or growth spurt, of pediatric DSD programming sped up the inclusion of children into care options that were less burdensome to the family. As we move away from the pandemic and adjust to a new standard, we will remain diligent in ensuring that CLHIV outcomes remain stable or perhaps, improve.

Keywords COVID-19 · Pediatric · AIDS

Introduction

The clinical management of children living with HIV (CLHIV) has made tremendous progress over the last 20 years. The introduction of antiretroviral therapy (ART) at greatly discounted rates for low- and middle-income countries, coupled with very significant international funding initiatives, such as PEPFAR, has meant that ART has been made available to large numbers of people living with HIV (PLHIV). By 2014, 12.9 million PLHIV were receiving ART globally, 11.7 million of whom were in low- and middle-income countries [1]. The largest group of people receiving ART was in the WHO African Region, where 9.1 million people were being treated at the end of 2013 [1]. This was equivalent to 37% of all people living with HIV in Africa. Despite that success, treatment for children lagged, with only 23% of those aged 10–14 years receiving ART. Many adolescents were not accessing ART, and HIV has emerged as the second-largest cause of death among adolescents globally.

Building on this success, in 2014, the Joint United Nations Program on HIV/AIDS established ambitious 90–90-90 targets for 2020: 90% of all PLHIV should know their HIV status (1st 90), 90% of those diagnosed should be receiving sustained antiretroviral therapy (ART) (2nd 90), and 90% of those receiving ART should have achieved viral

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suppression (3rd 90) [2]. To cite UNAIDS, "Modelling suggested that achieving these targets by 2020 would enable the world to end the AIDS epidemic by 2030, which in turn will generate profound health and economic benefits." [3]

By 2020, global progress towards these targets was estimated at 84% for the 1st 90, 87% for the 2nd 90, and 90% for the 3rd 90 [4]. Once again, progress was less apparent in children and adolescents. Currently, 54% of children living with HIV (CALHIV) are receiving ART, with data on viral suppression ranging from 30 to 68% and the considerable disparity between countries [5–7]. In Eastern and Southern Africa, with the greatest HIV burden, CALHIV has lower rates compared to adults of both ART coverage (57% versus 71%) and viral suppression (40% versus 65%) [8].

By 2020, UNAIDS had also set newer targets known as the 95–95-95 targets to end the AIDS epidemic by 2030 [9]. Unfortunately, in early 2020, the COVID pandemic was unleashed on the world. This resulted in a significant redirection of healthcare resources to mitigate the pandemic and staff shortages due to personnel needing to self-isolate when testing positive for COVID. At the same time, by April 2021, the pandemic had resulted in more than 1.5 million children experiencing the death of at least one caregiver [10]. This may have severe consequences on children until age 18 [11].

The abovementioned COVID-related challenges might have constituted a perfect storm with regard to ensuring continued and improved care for CALHIV. However, the HIV programming community in SSA was well-positioned to bring about rapid responses and adaptation to COVID, with a nimble ability to task-shift and adopt various forms of differentiated service delivery (DSD). In addition, much that had been learned over the preceding years about providing care for CALHIV yielded essential lessons for caring for children and adolescents with COVID.

This review explores how the COVID pandemic has spurred innovative DSD models to manage CALHIV better and potentially children and adolescents in general in resource-limited settings.

Differentiated Service Delivery: Pediatric Programming Before COVID-19

Differentiated service delivery is rooted in understanding the particular needs of each patient. DSD includes models such as multi-month dispensing, after-hours clinics, teen clubs, and family models of care After "walking a mile" in the shoes of an HIV patient, one will understand the barriers that lead to missed appointments, defaults, and the seemingly bewildering persistent viremia despite repetitive and standardized adherence counseling. The DSD ethos encourages health systems to adapt themselves, rather than adapting the patient, to ease the barriers unique to each patient. A need for change had become widely apparent, even before COVID, as overcrowding at health facilities was associated with decreased patient satisfaction due to long waiting times [12]. Also, high patient volumes compromised the quality of care offered because of the limited time health care providers had for each encounter [12]. As programs strived to reach UNAIDS targets, increased ART clinic attendance led to the birth of DSD models of care [13]. For these novel DSD models of care, patients were classified as stable or unstable. CALHIV were originally all considered unstable and could only receive services from the health care facilities and not in the community [14]. In contrast, before 2020, clinical and psychosocial services for adults were already being provided in both the community and at health care facilities. The overall implementation of DSD models for CALHIV lagged behind adults because most pediatric programs were based in health facilities and not in their communities [14].

From the clinician's view, providing individualized care to children and adolescents after hours, on weekends, or outside the traditional and seemingly secure confines of a clinic setting can be jarring. Furthermore, a lack of published experience with pediatric DSD models and a lack of impetus resulted in an innovation delay in pediatric DSD programming. Many had advocated bringing pediatric care into line with the available options for stable adults living with HIV [15–17]. The adult literature provides evidence that DSD programming can be non-inferior and, at times, superior to standard clinic-based care [18]. With the strong backing of the WHO in 2018, there was a palpable shift in focus to DSD programming within pediatric HIV treatment programs. Teen clubs had already been an entry point for many countries to provide a successful and engaging care option to their adolescents outside of regular clinic hours. Despite teen clubs' acceptability and documented success in improving ART adherence, these clubs remain out of reach for most teens in sub-Saharan Africa (SSA) [19••]. Designing teen clubs with sessions that serve as clinical visits and social engagement proves challenging when considering the human resources required to staff a "one-stop" session with prescribers, counselors, and laboratory technicians after hours. Separating psychosocial support from clinical care may ease the burden on providers but increase the time teens are required to be away with associated transport costs and school days lost. On the other hand, to meet the needs of infants and their caregivers, a novel Baby Club one-stop DSD model in Eswatini resulted in improved viral suppression for both the caregiver and child [20]. Thus, pediatric DSD models inspired by teen club began to develop and highlighted the need to adapt to patient needs.

Coverage through additional DSD models within the SSA increased from 2017 to 2019 [19••]. In 2020, there remained wide variability of access to multi-month dispensing, after-hours clinics, teen clubs, and particularly low levels of family models of care (coverage rates of 3–58% of clinics surveyed) [19••].

Review of the Literature: Pediatric DSD Programming in the COVID Era

Multi-Month Drug (MMD) Dispensing

In 2018, the BIPAI network demonstrated improved adherence and decreased loss to follow-up with multi-month dispensing amongst their pediatric cohort [21]. In line with this finding, the 2018 WHO guidelines recommended 3-month dispensing for children greater than 2 years of age for those deemed stable [22]. Despite these findings and recommendations, some providers may have felt reluctant to introduce such MMD. More research was published supporting MMD within the adult population, yet experience within the pediatric realm remained scant [23]. In 2020, the SARS-CoV-2 pandemic shifted priorities to minimize patient interaction at healthcare centers and abide by lockdowns. MMD became the only option as each country moved through waves of COVID infections. In total, 56% of countries surveyed by UNAIDS adapted their MMD practices [24]. “Clinically stable” was redefined within each country’s MMD eligibility criteria [25]. Pregnant and lactating women also quickly became eligible for MMD in some programs. Similarly, younger children were allowed refills in some countries at three or even 6-month intervals. Overall, MMD uptake increased from 46 to 70% in PEPFAR-supported countries [26••]. For the first time, children were represented within that marked percentage increase.

The risk for acute clinical changes in younger children is a barrier to implementing MMD for the pediatric population. Indeed, all children less than 5 years of age are within the severe HIV disease category. Clinicians are sometimes rightfully protective and reticent to loosen the grasp of frequent clinical monitoring in children. A clinical visit only every 6 months may impair early recognition of treatment failure, malnutrition, opportunistic infections, and developmental delays. On the other hand, frequent and often uneventful visits come at a great expense to the children’ and families’ lives when considering time, cost, and lost wages.

Viral load measurements reassure the clinical team that the child is thriving outside the gaze of a clinical provider [27]. The availability of viral load monitoring assures success within pediatric MMD models. Unfortunately, viral load coverage and suppression for children remain glaringly inadequate in most countries. Efforts to scale-up Point of Care (POC) viral load testing, phlebotomy skills training, and laboratory capacitation were being instituted to overcome these barriers before the COVID pandemic. Solutions to these issues will continue to be a focus going forward.

MMD is also contingent on a stable supply chain. Heat-stable pediatric dolutegravir will hopefully lessen some of the supply chain issues of the past. It is imperative not to lose supply chain experts’ gains to facilitate this option and provide reliable ART for longer durations.

Innovative Service Delivery

COVID shook the health systems and washed away all the well-beaten service delivery paths. Now, we look back and see the world’s creative responses. The RISE program in Nigeria increased HIV-exposed infant diagnostic testing (EID) by testing HIV-exposed infants at home [28]. This differentiated program met both the needs of the patients and the program. It quickly identified newly infected HIV infants, where a few days sooner on ART can be lifesaving. In Brazil, teams invented adolescent-friendly telehealth platforms and delivered PREP directly to adolescents’ homes [29]. Groups in Lesotho created adolescent-specific WhatsApp, radio, and TV messaging directed to their adolescents, who were missing out on in-person psychosocial support [30]. Similarly, a UNAIDS-supported call center in Zimbabwe provides a reliable source of information for YALHIV [31].

Similar to the experience reported in Zimbabwe and Zambia in the Zvandiri and Yes programs, peer support is undeniably valuable to adolescent adherence [32, 33•]. During the COVID pandemic, and indeed, in the years ahead, pediatric-specific DSD models must reemphasize the fundamental value of treatment supporters outside of the clinic [34].

Technology

The USA adapted pediatric HIV treatment guidelines to include telehealth as a differentiated and convenient option for clinical and adherence monitoring [35]. Throughout the world, there are calls for the expansion of video-directly observed therapy in addition to telemedicine clinical visits. In Pakistan, providers caring for CALHIV have requested telemedicine to improve access to specialists for remote clinics [36]. With new medical products and technologies already deployed to support tuberculosis programs, the function of e-Laboratories has been scaled up to include viral load and COVID-19 results on equipment previously used for TB GeneXpert assays [37]. Youth developed innovations such as Zoom meetings which linked households and communities to discuss issues, especially in areas where digital information and telecommunication were already popular [38].

Moving to the Community

When country lockdowns were announced, populations were given a few days before the measures were implemented country-wide [39]. This led to an exodus of patients from urban to rural settings. In rural settings, patients envisioned a better livelihood since for many, their crowded, high SARS-CoV-2 transmission risk businesses in urban areas were closed [39].

ALHIV and youth expressed concern over how to acquire travel passes during the total lockdown because they needed to disclose their HIV status to local authorities before they could be issued the documents, and many shied away from doing so. Thus, community-based ART delivery models were well placed to meet their needs [40]. As a result of the successes of community approaches to PLHIV, including CALHIV, some settings adopted them at the national level [34, 41]. PLHIV was found to be more willing to accept community HIV services in the form of DSD models when delivered by health care workers or expert clients [39]. In some instances, the community-based DSD models did not place a financial constraint on the ART clinics because, for example, motorcycle riders providing service in the community were paid by the patients themselves [39]. In one customer satisfaction survey, including CALHIV, 76% of PLHIVs who received the community-based services gave an excellent rating [39].

Task-sharing amongst health workers increased the human resources offering direct care and was highly successful [40]. Adolescent peer leaders and youth participated in planning, monitoring, evaluating, and implementing HIV service delivery [40]. In some settings, PLHIVs were afraid to visit health facilities for fear of contracting COVID-19, and these were supported by peers and health care workers with multi-month ART dispensing in the community. In a meta-analysis by Kudakwashe C. Muchena et al., it was noted that stigma and discrimination prevented ALHIV from accessing services at their ART clinics [34]. Therefore, community peers and health workers were best placed to support such populations. When some facilities closed to be repurposed as COVID-19 treatment centers, some adolescents were afraid to go to another facility for fear that the new community there would know their status [34].

In Uganda, to support PLHIV who moved to rural areas and away from their ART clinics, peers and health care workers used motorcycles, and courier services, and telephone counseling services to support patients in their communities [39]. Clinics in both Uganda and South Africa developed site-specific DSD models to enable orderly and streamlined service delivery [39, 42]. SOPs for DSD models were modified to meet the demands created by lockdowns and other COVID-19 prevention, detection, and care processes. The lockdown restrictions called for flexible thinking around DSD models for CALHIV.

In Kenya, during the pandemic, community ART groups were scaled up in sites where previously there were family models and adolescents were encouraged to attend weekend clinics [42]. Some ART clinics in South Africa proactively called patients to encourage multi-month dispensing refills, unlike in the pre-COVID-19 era, where telephonic reminders were focused mainly on those who missed appointments [43]. Repeatable scripts were developed to guide telephone callers, to ensure the appropriateness of the messaging and standardization of critical communications, such as consent [43]. Through phone calls, health care providers were able to assess patients' medical conditions and decide whether to modify treatment, allowing for active pharmacovigilance and client support [43].

Patients who did not pick up their phones were challenging to reach and offer telemedicine options [43]. Teams learned that physical addresses and phone contacts must be updated regularly. Accurate contact details are essential, particularly for patients with multi-month dispensing. Before visiting a public health facility, nurses engaged patients in COVID-19 electronic symptom assessment, and the health workers offered appropriate support and advice. This screening helped reduce the risk of social contact and thus the spread of COVID-19 [43].

BIPAI Best Practices

BIPAI Network

The Baylor College of Medicine International Pediatric AIDS Initiative (BIPAI) Network consists of independent, affiliated non-governmental organizations (NGOs) that provide comprehensive, patient-centered care and treatment to CALHIV through centers of excellence (COEs). Since 2001, the BIPAI Network of COEs has provided direct care to over 90,000 children, adolescents, and families and remains one of the largest networks of pediatric and adolescent HIV care and treatment providers worldwide. In 2003, the first COE opened in Botswana, and as of 2020, BIPAI COEs were providing direct care to CALHIV in six countries in Eastern and Southern Africa.

The BIPAI Centers of Excellence (COE) adopted multi-month ART dispensing throughout the network. Yet, the MMD eligibility criteria varied. Each site considered MMD case-by-case in the youngest patients and those with anticipated weight dose adjustments. Some sites used MMD up to 6 months for children older than 5 years yet required documented viral suppression for 1 year. Children older than 2 years of age were routinely seen in the clinic every 3 months, in line with WHO guidance.

Home delivery of ARVs Phone counseling Online prescription and lab orders

Fig. 1 Baylor Uganda DSD experience during the COVID-19 pandemic. The continuum of care was maintained with the use of innovative medical and psychosocial telephonic care and home delivery of medications

Baylor Boda-Boda Program DSD Experience

During the total lockdown in Uganda, when public transport was banned, staff members, who at times included non-medical staff, volunteered to pick up HIV drugs and cotrimoxazole prophylaxis and drop them off to PLHIVs with whom they had previously made friends and who lived along the routes to their homes. A PLHIV-led motorcycle community ART delivery program (code-named Baylor Boda Boda) was quickly pioneered and established by caregivers and older youth living with or affected by HIV. These people were trained on how to offer HIV treatment in the community to all recipients of care, irrespective of age and including HIV-exposed infants, because they could not report physically to the clinic. The Baylor Boda-Boda program rapidly became a popular community DSD model that served all CALHIV and adults irrespective of their health stability status and increased their access to HIV drug treatment. PLHIV at the Baylor Uganda COE clinic preferred their own patient-led motorcycle delivery system, citing it was their own initiative. They personally knew the riders as fellow peers. Thus, privacy and confidentiality were more assured than by the support offered by available, pre-existing public transportation models (Fig. 1).

Conclusion

In 2022, in the COVID era, pediatric DSD programming has evolved, and our review of the literature and new programming suggests that clinicians have more readily accepted the benefits of MMD, PLHIV-led initiatives, and virtual/telephone medicine HIV support, care, and treatment for children and adolescents living with HIV. COVID-19 has ignited a successful growth spurt in pediatric HIV differentiated service delivery programming.

Declarations

Conflict of Interest The authors declare no competing interests.

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- • Of importance
- •• Of major importance

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