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SUBSTANTIVE REVIEW

Barriers and Facilitators to the Successful Transition of Adolescents Living with HIV from Pediatric to Adult Care in Low and Middle-Income Countries: A Systematic Review and Policy Analysis

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Abstract

The purpose of this systematic review was twofold. First, we sought to summarize the literature on barriers and facilitators to successful healthcare transition for adolescents living with HIV from low- and middle-income countries (LMICs). Next, we assessed healthcare transition-related policies in countries from which we identified barriers and facilitators to determine the extent to which practice and policy meet to address the country-specific needs of adolescents living with HIV during healthcare transition. Ten studies met inclusion criteria. We identified four sub-themes of barriers to healthcare transition: emotional and psychological burden, effects of HIV disease, logistical and systemic impediments, and HIV stigma. We also identified five sub-themes of facilitators of healthcare transition: social support, skills development for adolescents and the adult treatment team, transition readiness, multidisciplinary teams, and transition coordination. Of the 12 countries from which we identified barriers and facilitators to healthcare transition among adolescents living with HIV, only five (Uganda, Kenya, Thailand, Brazil, and Cambodia) had healthcare transition-specific guidelines. Moreover, there was substantial variation across country-specific guidelines regarding the existence of protocols to monitor and enforce guidelines, and whether there were allocated funds to assist healthcare clinics with implementation. Our review has led to several recommendations to facilitate successful healthcare transition, including the development of surveillance systems to monitor and evaluate efforts to address adolescents' needs during healthcare transition, the development of guidelines specific to healthcare transition and based upon barrier and facilitators identified within target countries, and the incorporation of caregivers and training for the adult treatment team pre- and post-healthcare transition.

Keywords Adolescent · HIV · Transition · Healthcare · Policy

Introduction

Adolescents (aged 15–24 years) account for approximately 37% of new HIV infections worldwide [1–3]. Between 2005 and 2016, the total number of adolescents living with HIV (ALWH) increased by 30%, with 84% of these youth residing in sub-Saharan Africa [2]. While the vast majority (approximately 70%) of ALWH were infected via maternal-to-child transmission [4], there are significant concerns about the rising rates of behavioral infections among adolescents [5]. Despite the dramatic improvements in the lifespans of people living HIV due to the scale-up and effectiveness of antiretroviral therapy (ART), the mortality rate among ALWH has remained stable despite decreasing among children and adults [4, 5]. AIDS-related illnesses, for example, are the second leading cause of death among female adolescents, globally, despite an overall 48% decline

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in deaths from AIDS-related causes between 2005 and 2016 [6]. AIDS-related deaths among youth are closely linked to poor retention in HIV care and inadequate ART adherence, leading to low rates of viral suppression within the population and increased risk for HIV-related morbidity and mortality [7–9]. To improve treatment retention and adherence among ALWH, we must identify and address sociostructural factors that serve as barriers to positive health outcomes.

Previous research has suggested that the transition from pediatric to adult care, referred to as healthcare transition (HCT), is a critical process during which many ALWH are at high risk for poor HIV-related outcomes [10, 11]. HCT occurs when adolescents age out of pediatric care and engage in a planned transfer to adult care. This process often coincides with a developmental period during which many ALWH struggle with disease management and experience the onset of HIV-related complications and interruptions in care [12–15]. It is therefore critical that we identify and address barriers to HCT among ALWH to facilitate patient-centered support strategies that could help youth remain in care and adhere to ART during this key period of transition.

While there have been a number of published guidelines aimed at providing structure to the HCT process [16–19], most of the recommendations are strongly influenced by studies from high-income countries, particularly within the United States. This is problematic, as differences in care models, healthcare accessibility, and social resources often cause program components that are successful in high-income settings to be inappropriate for LMICs [11, 20]. Considering the importance of HCT to adolescent HIV outcomes [19], it is critical that we frequently update our knowledge of the challenges associated with HCT in LMICs, where the majority of ALWH reside [20]. To do this, a clear understanding of barriers and facilitators to HCT is necessary. Moreover, we must determine whether in-country healthcare policies adequately address known in-country barriers and bottlenecks that disrupt HCT, and promote systems and structures that facilitate HCT. Moreover, we must understand the extent to which current HCT programs in target countries address known barriers and incorporate intervention components that facilitate HCT.

The purpose of this study was to systematically review the available literature on barriers and facilitators to HCT in LMICs. Additionally, we conducted a policy review to determine whether country-specific HCT guidelines address previously reported barriers to and facilitators of successful HCT. To date, there have been no systematic reviews focused exclusively on HCT for ALWH in LMICs. Moreover, there are no reviews analyzing the alignment between country-specific HCT guidelines and HCT-related barriers and facilitators within a specified LMIC. As such, this review could inform future efforts to improve transition outcomes and allow HIV researchers, clinicians, and policymakers to employ evidence-based strategies when designing HCT interventions.

Methods

Inclusion Criteria

Articles were included in this review if they: (a) focused on ALWH between 10 and 21 years of age who had undergone HCT; (b) presented original data on barriers and facilitators of ALWH transitioning to adult care; (c) focused on world bank-defined LMICs; (d) were published in a peer-reviewed journal; and (e) were written in English. Barriers to transition were defined as those factors perceived by ALWH, caretakers, healthcare staff, or other stakeholders as reducing the likelihood that ALWH would engage in HIV care and/or adhere to ART immediately before, during, or after transitioning from pediatric to adult care. Conversely, facilitators were defined as factors that made it easier for ALWH to remain in care and/or adhere to ART immediately before, during, or after transitioning from pediatric to adult HIV care. Only those barriers and facilitators that were directly linked to the transition process for ALWH, rather than general adolescent HIV care, were included in this review.

Search Strategy

We used guidelines and reporting standards consistent with Lipsey and Wilson [21]'s suggestions and the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines [22]. We searched several electronic databases, including: PubMed, CINAHL, Web of Science, Global Health, and Embase. These databases were selected to cover a wide range of disciplines, including the social sciences, public health, nursing and medicine. While the lower limit of the date range was not specified, the upper limit end date was April 2018, which is when this review was completed. This search strategy identified articles whose titles or abstracts paired terms related to HIV with terms related to children, adolescents or pediatrics, and healthcare continuity or transition. Wild card terms, or terms ending in special characters, were used to obtain articles that included variations of the search terms. The search terms (where "*" indicates the use of a wild card) for adolescents were adolescent* OR child* OR youth* OR pediatric* OR young adult*. For HCT, the terms were continuity of patient care OR (continuity OR transition*) AND (services OR care) OR transition to adult*. In addition to searching electronic databases, the authors also reviewed the bibliographies of selected studies for other relevant citations. After removing duplicates, the initial search results were screened by two

of the study's authors to remove articles that did not meet the eligibility criteria. Next, study evaluators independently completed a second round of screening, and all discrepancies were resolved through consensus. Final decisions on inclusion of articles were made after full-text review by the two evaluators.

To identify the national HIV guidelines for each country from which data were extracted, we searched the websites of each country's Ministry of Health to determine if national guidelines governing HIV treatment and care, both general and adolescent-specific, were available. Next, we searched the USAID and WHO online publication databases for country-specific guidelines. Lastly, we searched various online databases, including Medline, WorldCat, and PubMed. The search strategy identified publications with titles combining HIV, guidelines and the specific country. The search terms used were selected to enable us to identify all national guidelines for HIV, which were then reviewed for content focused on the transition process.

Data Extraction and Analysis

Two of the study's authors independently reviewed each article to assess eligibility using a standardized data extraction table. We extracted the following information from each article: location and description of pre- and post-transition process; study design; sample size; mean age; participant sex; length of follow-up; transition outcome measures; and additional measures covered in the study. The evaluators discussed all discrepancies until agreement was reached. One evaluator conducted a quality assessment of each primary article using the Critical Appraisal Skills Programme (CASP) tool [23], which evaluated the degree of rigor for each study in the following areas: writing style; sampling and recruitment; data collection and analysis; and inclusion of ethics training in reported studies. This tool allows researchers to provide dichotomous responses using a checklist and assign a score to each study. Studies were scored on a 17-point scale. All studies receiving a score of < 10 were reassessed by a second evaluator and discrepancies were discussed and resolved. Only one of the studies included in this review received an initial score < 10 [23]. This study was a short article consisting primarily of a transition program description and preliminary completion results. It therefore lacked certain elements included in the quality score, including details on qualitative data collection or thematic analysis.

We categorized articles by their target population, country, study design (i.e., descriptive, mixed methods, quantitative) and whether the research presented barriers or facilitators of HCT. We did not conduct a meta-analysis due to variation in study designs and measured outcomes, which along with a small sample size, made cross-study comparison less meaningful.

Results

Figure 1 presents the results of our search strategy and data extraction in a PRISMA flowchart. The initial search generated 1783 titles/abstracts, which included duplicates and incomplete references. Following the removal of duplicates and unrelated references, 910 titles/abstracts were screened for potential inclusion. Of these, 794 records were excluded because they did not meet inclusion criteria. Of the remaining 116 studies, 62 articles focused on HCT for ALWH. We removed 18 literature reviews that summarized studies already included in the current review, along with any studies that did not focus on HCT in LMICs. Thus, a total of ten studies met inclusion criteria. We searched the reference lists of these studies for additional articles and determined that all studies had already been identified.

Study Characteristics and Participants

A total of 790 ALWH aged 15–29 years and 134 other participants, including healthcare providers, clinic staff, and expert clients were included in the eligible studies. As shown in Table 1, most of the qualitative studies (n = 4) included in this review highlighted the perspectives of recently-transitioned ALWH [24–27]. The remaining qualitative studies (n = 3) assessed stakeholder perceptions of challenges associated with HCT [28–30]. All other studies were quantitative (n = 3) and either evaluated the impact of an HCT program on various outcomes (n = 2) or characterized clinic service utilization among ALWH attending an HIV transition clinic [31–33]. Most studies were conducted in sub-Saharan Africa (n = 5), with the remainder spread across Asia and South America.

Barriers to Successful HCT

Six studies identified barriers to successful HCT and four sub-themes emerged: emotional and interpersonal burden, effects of HIV disease, logistical and systemic impediments, and HIV stigma. We describe each in detail below.

Emotional and Interpersonal Burden

A number of challenges pertained to the emotional and interpersonal burdens of moving from the familiar and supportive pediatric care environment to the unfamiliar and independent adult care setting [25–30]. Several studies specifically cited the reluctance of ALWH to leave their long-term pediatric providers with whom they have often formed strong emotional attachments [25, 27, 28, 30]. For example, in a study of 30 Ugandan ALWH, participants

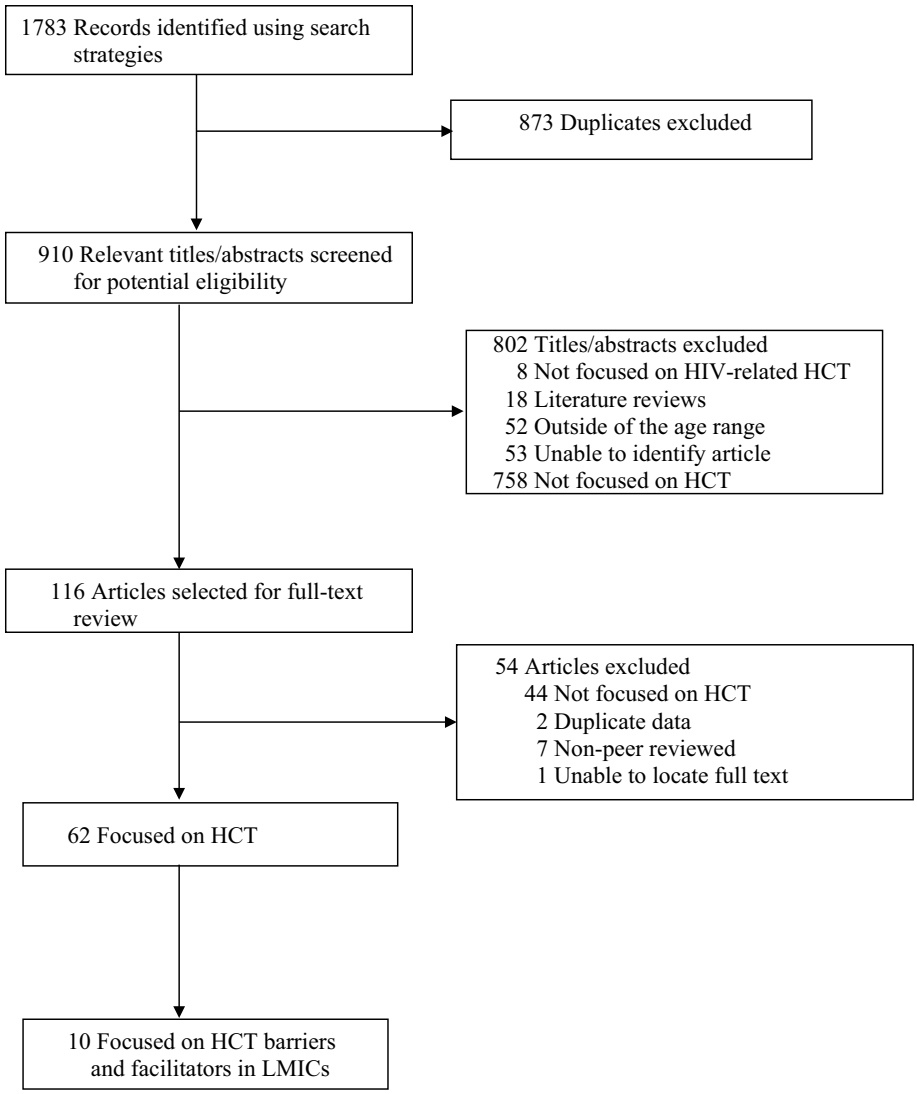

Fig. 1 Article selection flowchart

described the pediatric clinic as feeling like 'home,' and compared transition to a new treatment team to death or losing a family member [25]. In a study of pediatric healthcare workers in several countries across sub-Saharan Africa, the researchers found that healthcare workers also reported emotional distress associated with transitioning long-term patients to adult care [28]. One pediatric provider, for example, cited the clinic's oldest patient (age 23) as an example of a personal failure to transition a youth to adult care in a timely manner due to emotional ties [28]. Several studies also emphasized the emotional and psychological challenges of adjusting to the adult care atmosphere, where ALWH indicated they were expected to act like adults and no longer received individualized treatment and attention [25–30]. In a Brazilian study of 16 ALWH, the adult care setting was described as less caring and more rigid, where providers were less affectionate and focused only on the disease rather than the person [27].

Effects of HIV Disease

In addition to concerns stemming from the emotional and interpersonal burden of HCT, the neurocognitive effects of HIV disease were also identified as potential barriers to successful HCT. A South African study, for example, suggested that cognitive delays among ALWH could impact adolescents' ability to adopt key behaviors and learn self-management skills to help them be successful post-HCT [30]. The authors suggested that adult providers may be ill-equipped to address such challenges in their newly transitioned patients, potentially increasing ALWHs' risk of being lost to HIV care and defaulting on their treatment regimens [30].

Logistical and Systemic Impediments

Another theme that emerged among the identified barriers concerned the logistical and systemic impediments to HCT.

Table 1 Summary of studies identifying facilitators and barriers to HCT

Authors	Location/design	Descriptives	Transition facilitators	Transition barriers
Katusiime et al. (2013)	• Uganda • Thematic analysis of semi-structured interviews with adolescents who had transitioned out of an adolescent HIV clinic	• n = 30 • Race/ethnicity: not reported • Median age: not reported, range 25–29 • 1–5 years post-HCT • Sex: not reported	1. Peer support groups 2. Training for adult providers	1. Difficulty leaving the pediatric provider 2. Adjusting to adult care providers and atmosphere 3. Logistics of larger/busier adult care facilities 4. Stigma in adult care setting
Hansudew-echakul et al. (2014)	• Thailand • Retrospective cohort study of adolescents who completed a transition program	• n = 67 • Race/ethnicity: 100% Thai • Ages: not reported • 1–5 years post-HCT • Sex: not reported	1. Peer support groups 2. Introduction of youth to adult providers at pre-HCT camp 3. Skills development for ART management and navigating care	None specified
Machado et al. (2016)	• Brazil • Thematic analysis of semi-structured interviews with adolescents who completed a transition program	• n = 16 • Race/ethnicity: not reported • Median age: 17 (16-25) • 0–4 years post-HCT • Sex: 50% male	1. Early discussion of transition 2. Delaying transition until ALWH is ready 3. Referral from pediatric team and/or pre-HCT meeting amongst clinicians and ALWH prior to transition	1. Difficulty leaving the pediatric provider 2. Adjusting to adult care providers and atmosphere
Pettitt et al. (2013)	• Botswana, Uganda, Tanzania, Mozambique, Kenya, Rwanda, South Africa, Swaziland • Grounded theory analysis of semi-structured interviews with providers and peer educators	• n = 34 (26 program managers/providers; 8 peer educators) • Race/ethnicity: not reported • Mean age of peer educators: 21 (18–25) • Mean years of peer educator experience: 4.1 (3–6) • Race/ethnicity: • Sex: 53% male	1. Skills development for ART management and navigating care 2.Adolescent-friendly services 3. Training for adult providers 4. Including ALWH in HCT planning 5. Multidisciplinary team, including social workers or case managers	1. Difficulty leaving the pediatric provider 2. Reluctance of pediatric providers to transition youth 3. Increased cost for care, transportation, and/or supplementary services (e.g., counseling) in adult care setting
Nyabigambo et al. (2014)	• Uganda • Cross-sectional study assessing service utilization at an HIV transition clinic	• n = 379 • Race/ethnicity: not reported • Mean age: 22.5 (15–24) • Sex: 18% male	1. Receiving counseling services associated with increased service utilization	None specified
Inzaule et al. (2016)	• Uganda • Thematic analysis of semi-structured interviews and focus groups with health workers and peer-educators at three referral centers	• n = 33 (11 nurses, 9 counselors, 5 physicians, 5 expert clients, 3 pharmacists) • Race/ethnicity: not reported • Ages: not reported • Sex: not reported	1. Peer support groups	1. Adjusting to adult care providers and atmosphere 2. Longer wait times in adult care 3. Less individual attention 4. Lack of funding for adolescent activities and peer support groups

Table 1 (continued)

Authors	Location/design	Descriptives	Transition facilitators	Transition barriers
Kung et al. (2016)	• South Africa • Thematic analysis of semi-structured interviews and surveys with providers from five government HIV clinics	• n = 50 healthcare providers • Race/ethnicity: not reported • Ages: not reported • Sex: not reported	1. Peer support groups 2. Multidisciplinary team, including social workers or case managers 3. Pre-HCT meeting with both the pediatric and adult providers 4. Referral from pediatric team to adult provider 5. Early discussion of transition 6. Delaying transition until ALWH are ready 7. Training for adult providers 8. Integrated healthcare services for adolescents 9. Assistance with transportation to, or cost of, appointments	1. Difficulty leaving the pediatric provider 2. Adjusting to adult care providers and atmosphere 3. Longer wait times in adult care 4. Less individual attention 5. Delayed cognitive development 6. Lack of co-located mental health treatment 7. Communication breakdown between adolescents, adult providers, and pediatric providers 8. Stigma in adult care setting 9. Fear of involuntary disclosure 10. Reluctance of pediatric providers to transition youth
Yi et al. (2017)	• Cambodia • Cross-sectional study of ALWH assessing transition preparedness at 11 ART clinics	• n = 223 • Race/ethnicity: not eported • Mean age: 15.8 (15–17) • Sex: 55.2% male	1. HCT counseling 2. Multidisciplinary team, including social workers or case managers 3. Older ALWH age 4. ALWH knowledge of ART regimen 5. Social support for their health 6. Trusting friends/family enough to discuss HIV treatment	None specified
Pinzón-Iregui et al. (2017)	• Dominican Republic • Qualitative analysis of adolescent focus groups at an HIV clinic	• n = 29 (15 ALWH, 7 providers, 7 caregivers) • Race/ethnicity: not provided • ALWH mean age: 17.8 (13–23) • Sex: 20.7% male	1. Graduation ceremony from adolescent clinic and welcome to adult clinic 2. Delaying transition until ALWH are ready 3. Adolescent-friendly services 4. Training for adult providers 5. Use of text messaging for ongoing communication 6. Peer support groups 7. Pre-HCT meetings amongst clinicians and ALWH 8. Transition in groups/cohorts 9. Pre-HCT education and workshops 10. Actively involving caregivers in HCT 11. Shorter wait times 12. Improved confidentiality	1. Fear of involuntary disclosure 2. Stigma in adult care setting 3. Diminished support from family members/caregivers 4. Adjusting to adult care providers & atmosphere

Table 1 (continued)

Authors	Location/design	Descriptives	Transition facilitators	Transition barriers
Lolekha et al. (2017)	• Thailand • Transition program description and evaluation of change in ALWH knowledge scores	• n = 46 • Race/ethnicity: not reported • Median age: 17 (14–22) • Sex: 54% male	1. Skills development for ART management, transition navigation, communication, and reproductive health	None specified

One study found that ALWH struggled to navigate adult treatment settings, as the clinics tended to be larger, busier, and had longer wait times [25]. Participants in a Ugandan study of 33 providers and staff also pointed out that some supplementary services, such as counseling or social support groups, which may be provided to pediatric patients at no cost, were more likely to be unavailable or costly in adult care settings [28]. Participants also highlighted a lack of adequate communication between adult care providers and the pediatric treatment team prior to HCT, leading to confusion among ALWH and additional logistical challenges [30].

HIV Stigma

HIV-related stigma was also identified as a barrier to successful HCT. Several ALWH who were infected via mother-to-child transmission, for example, reported that adult patients in the HIV clinic often made assumptions about their sexual practices and the way in which they had acquired HIV, leaving them feeling unfairly judged [25, 30]. Additionally, in a retrospective, qualitative study in the Dominican Republic, ALWH reported concerns about the potential for involuntary or accidental HIV status disclosure in adult care settings due to their larger size, and lack of familiarity with and trust in clinic staff and providers [26]. In addition, participants also reported reciprocal stigmatization, as ALWH perceived their adult peers as much older and sicker than their adolescent peers, further contributing to their discomfort in the adult clinic [30].

Facilitators of HCT

All ten studies identified facilitators of successful HCT and five sub-themes emerged: social support, skills development for ALWH and the adult treatment team, transition readiness, multidisciplinary treatment teams, and transition coordination. We discuss each in detail below.

Social Support

The most frequently identified facilitator of HCT success was the perception of social support [24–26, 29, 30]. Peer support groups, the most commonly used approach to facilitate social support, were associated with improved treatment adherence and greater social capital, which were linked to greater resilience among ALWH [29]. Moreover, peer support groups enabled ALWH to make friends and connect with potential romantic partners with a shared understanding of the experience of living with HIV [29]. Transitioning ALWH in groups was also identified as a key facilitator of social support and HCT success [24, 26, 30]. A Thai study, for example, reported that the availability of peer support groups was a critical component of their hospital-based,

HCT program [24]. Moreover, ALWH in this program were transitioned to adult care in groups. They attended a multi-day transition camp with their group members to help them prepare for HCT, and all members of the group had the same initial appointment day and time at the adult clinic to increase their comfort level in the new setting [24]. Communication with caregivers was also cited as an important component of transition support, as their continued support was seen as crucial to HCT success. In a qualitative study from the Dominican Republic, diverse stakeholders, including ALWH, their caregivers, and healthcare providers, recommended that interventions engage caregivers not only pre-HCT, but also post-HCT, to reduce the likelihood to treatment interruption [26].

Skills Development for ALWH and Providers

Several studies identified the provision of psychoeducation to ALWH as a key facilitator of successful HCT [24, 28]. One study, for example, found that educating youth on sexual risk reduction, ART self-management, healthcare system navigation, stress reduction, and other life skills was linked to high scores on program satisfaction [33]. Psychoeducation, experiential learning, or training for adult clinic staff and providers that focused on adolescent health and development also facilitated successful HCT [25, 26, 28, 30]. In one study, several participants suggested that adult care providers spend time working in the adolescent clinic to better understand the needs of ALWH [25]. Another study suggested that adult care staff attend workshops focused on adolescent development to help them engage ALWH respectfully and without judgment [30].

Transition Readiness

Several studies suggested that delaying transition until ALWH are prepared facilitates successful HCT [19, 20, 23]. In a Brazilian study, for example, ALWH encouraged providers to allow time for ALWH to mentally adjust and prepare for transition in advance of transfer to adult care [20]. Moreover, they suggested that ALWH should be actively involved in HCT-related decisions, which would facilitate autonomy and assist them with becoming active agents in their own health [20]. Thus, it was suggested that conversations about HCT begin early in adolescence and that actual HCT be decided on an individual basis in collaboration between ALWH and their providers.

Multidisciplinary Treatment Teams

Healthcare models that included a multidisciplinary team approach to HCT were frequently cited as facilitators to successful HCT [28, 30, 32]. Specifically, healthcare models that integrated key services such as mental health treatment, sexual/reproductive health, family planning, dental care, and pharmaceutical services [28, 30, 31] were linked to greater retention in HIV care post-HCT.

Transition Coordination

Several articles suggested that greater coordination and communication between the pediatric and adult treatment teams pre-HCT could help ALWH feel more comfortable and thus engage in adult care post-HCT. The most frequently cited method for doing this was by means of scheduling an appointment with a specific adult provider pre-HCT to become oriented to the new clinic setting, expectations, and providers [24, 26, 27, 30]. In one study, for example, almost all participants believed that having a joint appointment with ALWH and their pediatric and adult providers would be helpful and most also believed that at least one follow-up appointment with the pediatric provider post-HCT could facilitate successful transition and reduce transition-related anxiety [30]. Additionally, participants in several studies also considered the possibility of a pre-transition meeting involving both pediatric and adult providers [24, 26, 27]. In a South African survey of adolescent healthcare providers and counselors, most respondents agreed that a pre-HCT handover meeting would be both helpful and feasible [30].

International and National Guidelines for HCT

The complete list of countries included in this review are presented in Table 1. We conducted a policy review to determine whether the examined countries had specific guidelines for transitioning ALWH from pediatric to adult care and if so, whether these guidelines incorporated the HCT facilitators and barriers identified above (Table 2). Of the 12 countries identified, only five (Uganda, Thailand, Brazil, Kenya, and Cambodia) had HCT-specific guidelines either in standalone form or encompassed within their national HIV treatment guidelines. There was substantial variation across guidelines with regard to the existence of protocols for monitoring and enforcement, and the presence of accompanying funding to support their implementation.

The guidelines sanctioned by the Ugandan Ministry of Health (MOH) directly addressed all five of the HCT facilitator sub-themes: social support, skills development for ALWH and providers, multidisciplinary teams, and transition readiness and coordination [34]. Regarding social support, the MOH suggests that clinics include caregivers, as well as peer mentors or supporters, in transition planning. Additionally, the guidelines suggested that a multidisciplinary team include a mental health provider. The guidelines do not call for specific training for either the ALWH or the provider, but they do express the need for continuous

Table 2 Alignment between in-country guidelines and country-specific, HCT-related barriers and facilitators

Country	Guidelines	Facilitators identified in previous research	Facilitators addressed in guidelines	Barriers identified in previous research	Barriers addressed in guidelines
Uganda	Consolidated Guidelines for Prevention and Treatment of HIV in Uganda	1. Peer support groups 2. Referral from pediatric team to adult provider 3. Pre-HCT meeting amongst clinicians and ALWH 4. Individualized transition plan 5. Delaying transition until ALWH are ready	1. Peer support groups 2. Referral from pediatric team to adult provider 3. Pre-HCT meeting amongst clinicians and ALWH 4. Individualized transition plan 5. Actively involving caregivers 6. Delaying transition until ALWH are ready 7. Multidisciplinary team, including social workers or case managers	1. Adjusting to adult care providers and atmosphere 2. Communication breakdown between adolescents, adult providers, and pediatric providers 3. Delayed cognitive development	1. Adjusting to adult care providers & atmosphere 2. Communication breakdown between adolescents, adult providers, and pediatric providers 3. Delayed cognitive development
Brazil	Recommendations for Comprehensive Care of Adolescents and Youth Living with HIV/AIDS	1. Early discussion of transition 2. Referral from pediatric team to adult provider 3. Pre-HCT meeting amongst clinicians and ALWH 4. Individualized transition plan Training for adult providers	1. Early discussion of transition 2. Referral from pediatric team to adult provider 3. Pre-HCT meeting amongst clinicians and ALWH 4. Individualized transition plan 5. Training for adult providers 6. Delaying transition until ALWH are ready	1. Difficulty leaving the pediatric provider 2. Reluctance of pediatric providers to transition youth 3. Adjusting to adult care providers & atmosphere 4. Communication breakdown between adolescents, adult providers, and pediatric providers	1. Difficulty leaving the pediatric provider 2. Reluctance of pediatric providers to transition youth 3. Adjusting to adult care providers & atmosphere 4. Communication breakdown between adolescents, adult providers, and pediatric providers
Thailand	Thailand National Guidelines on HIV/AIDS Treatment and Prevention	1. Skills development for ART management and navigating care 2. Referral from pediatric team to adult provider 3. Pre-HCT meetings amongst clinicians and ALWH 4. Early discussion of transition	1. Skills development for ART management and navigating care 2. Referral from pediatric team to adult provider 3. Pre-HCT meeting amongst clinicians and ALWH 4. Early discussion of transition 5. Training for adult providers 6. Multidisciplinary team, including social workers or case managers	1. Communication breakdown between ALWH, adult providers, and pediatric providers	1. Stigma in adult care setting 2. Lack of co-located mental health treatment 3. Communication breakdown between ALWH, adult providers, and pediatric providers

Table 2 (continued)

Country	Guidelines	Facilitators identified in previous research	Facilitators addressed in guidelines	Barriers identified in previous research	Barriers addressed in guidelines
Cambodia	National HIV Clinical Management Guidelines for Adults and Adolescents	1. N/A	1. Referral by pediatric team to adult provider 2. Peer support groups 3. Multidisciplinary team, including social workers or case managers 4. Individualized transition plan 5. Skills development for ART management and navigating care 6. Including adolescents in HCT planning 7. Integrated health services for adolescents 8. Assistance with transportation to, or cost of, appointments 9. Actively involving caregivers	1. N/A	1. Adjusting to adult care providers and atmosphere 2. Logistics of larger/busier adult care facilities 3. Longer wait times 4. Less individual attention 5. Lack of co-located mental health treatment 6. Communication breakdown between adolescents, adult providers, and pediatric providers 7. Increased cost for care and/or supplementary services (e.g., counseling) in adult care settings
Kenya	Guidelines on the use of antiretroviral drugs for treating and preventing HIV infections in Kenya	1. N/A	1. Peer support groups 2. Skills development for ART management and navigating care 3. Delaying transition until ALWH are ready	1. N/A	1. Lack of co-located mental health treatment

assessments of transition readiness beginning at age 18 and occurring over at least 2 years prior to HCT. Regarding transition coordination, the recommendations differed slightly for adolescents transitioning to adult care in integrated healthcare settings and those transitioning to care in a standalone adult clinic. In the former case, it was recommended that ALWH meet with the adult clinic staff and new providers during a single appointment, while in the latter setting, it was suggested that the adult treatment team be invited to meet ALWH at the adolescent clinic prior to scheduling an appointment in the adult clinic.

The Ugandan MOH HCT guidelines addressed HCT barriers associated with HIV disease. Specifically, the MOH recommends that HCT timing and strategy be dependent upon the neurocognitive development of the ALWH. By attempting to provide strategies for referral in different types of facilities, as referenced above, the guidelines also address certain logistical challenges and attempt to prevent communication breakdowns that may arise in HCT. The MOH HCT guidelines are part of the broader Ugandan National HIV and AIDS Strategic Plan 2015–2020 [35] and the AIDS Monitoring and Evaluation Plan 2015–2020 [36]. While these plans propose an organized framework for implementing and monitoring country-wide recommendations, neither include specific indicators for monitoring the HCT guidelines. In addition, both larger strategic plans identify potential funding sources for the initiatives recommended, but are not in themselves accompanied by specific funds. The government of Uganda is currently responsible for approximately 11% of the funding required for its national HIV response, according to the most recent estimates. The largest single contributor of external funding is the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) [34]. The Ugandan Country Operational Plan (COP) for PEPFAR funding for FY 2018—a document required of all countries receiving PEPFAR funding to describe domestic strategies for meeting stated PEPFAR goals—includes specific funding for increasing ALWH retention in HIV care. This document specifically addresses barriers within the sub-theme of logistical and systemic impediments through such interventions as linking ALWH to community services and sponsoring adolescent-friendly clinic spaces. Moreover, the COP provides suggestions that incorporate identified facilitators of successful HCT, including social support—via peer support groups—and multidisciplinary treatment teams that include peer counselors and a an adolescent HIV specialists/point-person at each facility [48].

The Thai Ministry of Health incorporated facilitators from four identified sub-themes: skill development for ALWH and providers, transition coordination, multidisciplinary teams, and social support [37]. Training for adult providers was one of the most frequently cited facilitators in reviewed studies. Though the Thai guidelines provided few details regarding the nature of such training, they recommended that the adult team be well-versed in adolescent care and psychology. The guidelines identify a number of procedures designed to improve coordination and communication during HCT, including having joint appointments between ALWH, and the pediatric and adult HIV care teams at the adult clinic during ALWH's first post-HCT appointment. The guidelines also stress the importance of direct communication between both treatment teams, and, like the Ugandan guidelines, differentiate between referral to an adult clinic within the same facility versus an adult provider at an external location. In the preparatory phase of transition, providers are specifically instructed to form a multidisciplinary team incorporating counseling services as well as a transition coordinator. The Thai guidelines also emphasize the importance of the caregiver's role in HCT and stipulates that the identification of at least one responsible caregiver is necessary before transition can occur, and both caregivers and ALWH should be offered the opportunity to develop life skills to increase the likelihood of desirable HIV-related outcomes post-HCT.

The guidelines also address two barrier sub-themes: logistical and systemic impediments and emotional and interpersonal burden. According to the guidelines, adult clinics should have adolescent-friendly services available, including flexible scheduling to encourage retention. The guidelines also highlight the importance of determining how ALWHs' cognitive abilities impact transition readiness and HCT success, and developing responsive interventions. Furthermore, the joint treatment team may ease ALWHs' anxiety related to leaving a familiar clinician or environment. The guidelines also list barriers to successful HCT, including missing multiple appointments, substance abuse or other risky behaviors, or school truancy. These guidelines are subsumed within the 2017–2030 National AIDS Strategy [38]. No specific monitoring or funding apparatus is tied specifically to ALWH under Thailand's current national program, though the government has made explicit pledges to target funding at other vulnerable populations such as sex workers, men who have sex with men (MSM), and IV drug users [39]. The majority of the funding for Thailand's HIV response is provided by the domestic government. The Global Fund to Fight AIDS, TB, and Malaria was previously the largest external donor, but it began phasing out contributions in Thailand in 2017. Certain provinces in Thailand receive PEPFAR funding as part of the organization's Asia Regional Program. The Asia Regional Operational Plan (ROP) for 2018 explicitly states that PEPFAR funding will be used to provide technical support for transitioning perinatally-infected ALWH to adult care [49]. However, the ROP neither addresses specific barriers/facilitators to HCT, nor does it explicitly allocate specific funds for this task. Regarding alignment with facilitators identified in the literature, the

ROP includes strategies consistent with the facilitator sub-themes of social support and skills development for ALWH and providers. The ROP, for example, describes efforts to develop and expand the use of online self-education modules and increase access to peer counselors through mobile applications and social media [49].

The national guidelines for HCT developed by Brazilian Ministry of Health addressed three of the facilitator sub-themes: social support, skills development for ALWH and providers, and transition coordination [40]. These guidelines outline a multi-step transition model in which ALWH: (1) are prepared for transition by the pediatric team, (2) attend a joint appointment with both adult and pediatric teams, (3) transition to the adult clinic, and (4) are monitored for up to 2 years post-HCT. The guidelines place heavy emphasis on skills development as a means to measure transition readiness. Moreover, the guidelines recommend that clinic providers encourage ALWH to utilize resources outside of the clinic, such as the National Network of Young People Living with HIV/AIDS for additional support. Social support from family or peers are also identified as facilitators of successful HCT, with the guidelines recommending that providers encourage ALWH to leverage the assistance of third-party organizations for additional assistance. According to these guidelines, HCT could take place over the course of several years.

In addition, the Brazilian health ministry's guidelines directly address two of the identified barrier sub-themes: emotional and interpersonal burden and logistical and systemic impediments. First, in discussing the context surrounding the HCT process, the guidelines acknowledge the challenges experienced by ALWH and the pediatric care team in ending a longstanding patient–provider relationship and moving onto an unfamiliar setting and team. The clinic model is thus designed to gradually introduce the concept of transition and allow stepwise progression. Additionally, the guidelines instruct providers to assess the logistics of attending the adult clinic to determine transition readiness. In Brazil, the guidelines appear to serve as recommendations and lack an accompanying apparatus to facilitate implementation monitoring among ALWH. It is unclear whether the government has committed financial resources to support the recommended care model. The Brazilian response to HIV is funded almost entirely by the domestic government with no reported direct funding from external donors such as PEPFAR or the Global Fund [39].

The Cambodian Ministry of Health guidelines for HCT address four facilitator sub-themes identified above: social support, multidisciplinary teams, skills development for ALWH and providers, and transition coordination [41]. Regarding social support, adult HIV clinics must provide psychosocial support to adolescents, and healthcare providers are expected to be respectful and non-judgmental. It is suggested that adult clinics provide ALWH with access to group counseling and that caregivers are engaged in HCT early in transition planning. To assist with medication management and life skills development, it is expected that psychoeducation will be provided during usual care. The guidelines call for cooperation between adult and pediatric care teams and also for a specific adult clinic staff member to serve as the HCT point person for ALWH. The guidelines also address all three barrier sub-themes: emotional and interpersonal burden, logistical and systemic impediments, and HIV stigma. The Cambodian guidelines address logistical and systemic impediments by providing recommendations aimed at eliminating the financial barriers to successful HCT, stating that adolescents should not be charged treatment-related fees if possible. Moreover, the guidelines suggest an orientation process to introduce ALWH to the adult care environment. It is unclear whether the Cambodian government has allocated specific funds to implement or monitor recommended services or if there are mechanisms in place designed to encourage their use by Cambodian providers. As of 2015, the Royal Government of Cambodia was responsible for approximately 17% of the spending for its HIV/AIDS response, with the remaining funding provided by foreign expenditures. The U.S. government is the largest bilateral contributor and the Global Fund provides the highest total amount to the country's HIV spending. PEPFAR is also a significant contributor in Cambodia, providing 29% of Cambodia's total HIV investment in 2015. Cambodia's COP for 2018 does not include specific language addressing strategies for ALWH or HCT. The key populations targeted for additional funding in Cambodia (i.e., men who have sex with men, high-risk sex workers, transgender women, and intravenous drug users) do not include ALWH. According to the 2018 PEPFAR budget codes in Cambodia, 0.28% of projected funding is allocated for pediatric care and support, 0.97% is allocated for pediatric treatment, and 0% is allocated for orphans and vulnerable children [42].

The Kenyan Ministry of Health guidelines address the following facilitator sub-themes: social support, transition coordination, and skills development for ALWH and providers. They were unique in that they distinguished between pediatric, adolescent, and adult HIV care [43]. The model proposed in the Kenyan guidelines calls for the initiation of an HCT process for children with HIV beginning at age 10. This model utlizes a goal-based approach that focuses on skills acquisition and medication adherence prior to age 19, which is when the HCT process would begin for ALWH. Ultimately, the determination of the timing of HCT is entrusted to the ALWH in this model. Kenya has also developed a HIV Prevention Revolution Road Map, which contains more concrete interventions and monitoring for testing, treatment initiation, and care retention for its broader population of individuals living with HIV [44]. However, no

specific funding commitments are made in either the Road Map or its guidelines for ALWH, and 75% of the funding for Kenya's HIV response and prevention programs comes from external sources [45]. PEPFAR is the largest individual contributor of funds, and the 2018 COP identified youth 15–24 years old as a targeted group for additional resources. Although the COP does not explicitly address HCT, it describes interventions for improving retention by addressing the barrier sub-themes of logistical and systemic impediments and emotional and interpersonal burdens of HCT, as well as the facilitator sub-theme of social support. For example, PEPFAR pledges to train and employ peer educators to engage ALWH in HIV care, and describes improved care delivery models that include psychosocial support, adolescent-friendly services, and stigma reduction in schools. Finally, its existing DREAMS Kenya Program initiative, which targets female ALWH ages 9–24 further addresses the social support sub-theme via parenting/caregiver programming, the sub-theme of skills development for ALWH via sex education and contraception training, and the sub-theme of logistical and systemic barriers via education subsidies and direct cash transfers.

Discussion

The purpose of this review was to systematically evaluate the current literature on barriers and facilitators to successful HCT among ALWH from LMICs. We also sought to identify HCT-related policies in targeted countries and determine the extent to which they addressed known HCT-related barriers and facilitators. To our knowledge, this is the first review to survey the literature on HCT barriers and facilitators for ALWH in LMICs and compare these factors to current country-specific national guidelines. Moreover, we identified the following three factors that are critical to advancing the literature on HCT in LMICs: (1) more rigorous studies examining the effectiveness of HCT programs and (2) the development and implementation of targeted guidelines or policies that address barriers and facilitators of HCT among ALWH.

We identified a number of facilitators and barriers to successful transition for ALWH in LMICs. The sub-themes that characterized facilitators were: social support, skills development for ALWH and providers, multidisciplinary treatment teams, transition readiness and transition coordination. However, these factors can only facilitate HCT success when challenges associated with provider-patient communication about the HCT process are addressed. As ALWH approach HCT, continuous dialogue between the ALWH, pediatric and adult providers, and caregivers could ensure that ALWH and their caregivers are: active agents in HCT-related decision making; aware of how care may shift during HCT; and able to meet with the transition team to address concerns about the quality of pre- and post-HCT care. Similar to other findings, our review showed that multidisciplinary clinic models, peer support groups, training for adult providers, and financial support programs are linked to successful transition [26, 30, 32]. Taken together, our findings suggest that the most promising HCT programs encourage early discussions about the HCT process, are patient-centered, and offer flexibility to delay transition if the ALWH has not developed the necessary skills to manage their care. We identified four sub-themes that characterized barriers to achieving successful transition, including: emotional and interpersonal burden, the effects of HIV disease, logistical and systemic impediments, and HIV-related stigma. Challenges stemming from failing to address these barriers pre- and post-HCT could be associated with being lost to follow-up care, increased disease progression, increased HIV transmission, and higher rates of morbidity and mortality [46].

Despite the growth of evidence on the facilitators and barriers to successful transition, our review of country-specific guidelines revealed that few countries have guidelines specific to HCT for ALWH. Among countries with such guidelines, most advocated for communication between providers and adolescents; peer support; multidisciplinary care teams; and the assessment of ALWHs' disease self-management skills. However, few guidelines addressed the role of caregivers in HCT, retention in care, or monitoring medication adherence. Further, few guidelines addressed the training needs of adult providers, many of whom have limited training and experience in treating adolescents. Additionally, the majority of guidelines do not distinguish between perinatally and behaviorally infected adolescents. Given the diverse needs of ALWH [47], more specific guidelines addressing their differences are needed. Only one of the guidelines addressed HIV-related stigma and few addressed socioeconomic factors (e.g., education or income) despite substantial evidence of their association with poor HCT and HIV outcomes [24, 25]. Finally, none of the guidelines addressed specific funding for HCT programs, nor did any of the guidelines include targets or monitoring mechanisms to assess existing or future HCT programs. PEPFAR's Country Operational Plan now includes a directive that participating nations demonstrate efforts to improve retention in pediatric patients through HCT. Given the importance of PEPFAR as a funding source in a number of nations with substantial populations of ALWH, these guidelines could provide an additional, powerful incentive for domestic governments to encourage and support HCT programs. While several of the LMICs included in this review have in-country guidelines that include strategies to improve ALWH retention in HIV care and treatment adherence

post-HCT and which address a number of the barriers and facilitators identified here, we lack evidence-based interventions focused on improving the HCT experience for ALWH.

There are several limitations that should be considered in light of the evidence presented in this review. Most of the studies included in our review are cross-sectional, qualitative, and use a small sample. These methodological limitations curtail the inferences that can be made regarding HCT barriers, facilitators, and outcomes and causality mechanisms. Most studies provided limited descriptions of their HCT programs. As such, caution should be used when interpreting findings on their alignment with current HCT guidelines and recommendations. Lastly, we included only studies that were published in peer-reviewed journals. As such, these findings may be subject to publication bias.

Conclusions

Our assessment of the literature on barriers and facilitators to successful HCT and guidelines in select LMICs has led us to provide several recommendations. Adult care settings are vastly different from adolescent care settings in terms of environment, space, patient expectations, and provider training. Additionally, adolescents attending adult clinics may fear HIV-status disclosure, stigma, or mistreatment from clinic staff or other patients. Adult clinic staff and providers should be trained on the needs of ALWH who are transitioning out of adolescent or pediatric care settings. While it may be difficult for clinics in LMICs to have an adolescent clinic day, they could have dedicated adolescent hours or encourage adolescents to participate in adherence clubs, which provide more flexibility in scheduling. Programs and guidelines that address HIV-related stigma within community and care settings such as increasing community-led research on stigma experienced by ALWH; more participatory programs that seek to develop and disseminate anti-stigma campaigns to shift community-level attitudes and social norms; and offer counseling, support, and coping skills for ALWH are also needed to support successful transition. As ALWH transition to adult care, they also face developmental challenges that are inherent to this developmental period. Comprehensive programs that consider the developmental and cognitive needs of adolescents transitioning to adult care settings and children transitioning to adolescent care settings are also needed.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interests.

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