

Orphanhood by AIDS-Related Causes and Child Mental Health: A Developmental Psychopathology Approach

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Abstract

While the number of new HIV infections has declined, the number of orphans as a result of AIDS-related deaths continues to increase. The aim of this paper was to systematically review empirical research on the mental health of children affected by HIV/AIDS in the developing world, specifically with an eye on developing a theoretical framework to guide intervention and research. Articles for review were gathered by following the Preferred Reporting Items for Systemic Reviews and Meta Analyses (PRISMA standards), reviewed and then organized and synthesized with a Developmental Psychopathology framework. Results showed that the immediate and longterm effects of AIDS orphanhood are moderated by a number of important risk and protective factors that may serve as strategic targets for intervention. Research and clinical implications are discussed.

Keywords: Orphanhood; Child mental health; Psychopathology; AIDS-related deaths

Introduction

In recent years, the incidence and prevalence of HIV have declined worldwide. The 2.1 million new HIV infections in 2013 was a 900,000 decrease from 2001 [1]. Progress has been attributed to the development and implementation of intervention and prevention strategies (e.g. male circumcision, antiretroviral therapy) that has not only contributed to the decline of the disease, but has increased the quality of life of people living with HIV. Even with such progress, however, the disproportionate impact of HIV on the developing world continues to pose significant challenges. One such challenge is the welfare of children who have lost one or both parents to AIDS-related death.

The number of children under 18 years old orphaned by the AIDS epidemic has continued to increase. Between 2001 and 2012, the global number of children who had lost one or both parents to AIDS-related causes increased from 10 million to 17.8 million, 90% of whom live in sub-Saharan Africa [2]. As of 2012, five countries had one million or more AIDS-affected orphans (Kenya 1.0 million; Nigeria 2.2 million; South Africa 2.5 million; Uganda 1.0 million; the Republic of Tanzania 1.2 million). Thus, despite the progress made in decreasing the incidence and prevalence of HIV, AIDS-related orphanhood continues to be a significant problem for local communities, national governments, and international aids organizations.

The detrimental impact of orphanhood on child mental health has been well documented [3-5]. Likewise, the detrimental impact of AIDS-related orphanhood (AO) has been evidenced among several recent literature reviews. Early reviews [6-8] reported that AO was associated with internalizing, but not necessarily externalizing problems, and called for further research. Two other reviews have also examined social [9] and educational [10] consequences of HIV/AIDS and concluded that a majority of studies showed that AO exhibited significantly greater emotional, behavioral, social and educational problems compared to non-AIDS-affected children. These latter reviews also noted mechanisms (e.g. poverty, AIDS-related stigma) that have been shown to mediate AO status

and poor mental health outcomes [10,11]. All such reviews have noted limitations in the literature such as the lack of particular comparison groups (e.g. non-AIDS-affected children; non-AIDS-affected orphans), the predominance of cross-sectional studies, and varying definitions of "orphan" across studies, and the use of a variety of measures for any given mental health construct [7,8,10-13]. Notably, only one review examined the literature through a theoretical framework [7], while another reported that only two empirical studies out of 51 utilized a theoretical framework to guide their research [11]. These reviews have identified the need for the development of empirically informed theoretical models that may provide integrated frameworks to guide future research and intervention in this arena.

Against this background, the aim of the present paper was to systematically review empirical published research on the psychological well-being of children orphaned by HIV/AIDS in the developing world, specifically with an eye on developing a theoretical framework that may guide clinical intervention and future research. Since the last review to apply theory to the impact of AO on mental health, 84 new articles have been published. Moreover, the present review includes 21 studies that were excluded from the review by Chi and Li [9] and an additional 27 studies that have been published since then. Examining the quantitative studies published since the Cluver and Gardner [6] review, the present article reviewed 84 articles that include novel longitudinal findings and a variety of novel outcome-, mediator- and moderator- variables (e.g. sexual risk behaviors; perceived stigma). Moreover, to suggest an empirically-based integrated framework for future research, a Developmental Psychopathology (DP) framework was employed to organize and synthesize the effects of HIV/AIDS on children's mental health.

DP is scientific discipline that seeks to describe and understand the multiple, reciprocal and complex ways in which mental health problems develop over the lifespan. It is guided by several principles [14-17] that make it ideally suited for the study of the mental health sequelae in HIV/AIDS affected children. First, in the DP approach, typical and atypical developments are seen as mutually informative and studies of normal

development and pathological functioning are integrated into a true synthesis. Relatedly, person-centered designs are employed to examine moderators that may identify subgroups that evidence differential developmental pathways in psychopathology. The DP approach therefore fits well with research designs that typically recruit orphans and vulnerable children (OVC). Typical studies of OVC and typical studies utilizing a DP approach both use community and population-based samples of affected children in which subgroups can be identified in terms of mental health and other moderating variables as opposed to highly selected samples based on psychopathology.

Second, in the DP approach the longitudinal course of traits, behavior patterns, emotional responses, and disorders is characterized by developmental continuities and discontinuities and psychopathology is the result of reciprocal, transactional models of influence. Factors that may interact in these reciprocal ways include both risk and protective factors such that pathology and impairment are examined alongside competence, strength and resilience. Therefore, linear patterns of association and causation are replaced by probabilistic, dynamic, nonlinear, and complex conceptual models. The DP approach is therefore ideally suited for studying a complex problem like the mental health sequelae of children affected by HIV/AIDS, which due to its multi-factorial causal pathways, cannot be captured in simple linear models of causation.

Third, the DP approach takes a social-ecological approach to studying psychopathology. This means that all contextual settings are taken into account when understanding a problem, including the intermediate levels of individuals, families, schools, neighborhoods, and communities. It also means that the social and cultural context should be captured both in understanding the function and meaning of behavioral and emotional patterns and in interacting with biological predisposition to yield maladaptive functioning. Thus, the DP approach acknowledges that a developmental pathway that is related to adaptive outcomes in one setting may be associated with maladaptive outcomes in another setting. This principle is of crucial importance when examining the mental health impact of HIV/AIDS on children in the developing world because it emphasizes the fact that what is considered a risk pathway in developed countries may be considered a protective pathway in the context of the developing world and vice versa.

Fourth, the DP approach emphasizes that progress can only be made if problems are approached from a multidisciplinary point of view. Thus, the DP approach includes clinical and developmental psychology, child and adolescent psychiatry, genetics, neurology, public health, and philosophy of science, amongst others. Its multidisciplinary nature makes the DP approach highly relevant for the study of the mental health sequelae of HIV affected children because of the fact that psychology, psychiatry, public health and the biological sciences all play a part in understanding this complex question.

Together, the DP approach provides a highly relevant framework to organize and synthesize the effects of HIV/AIDS on children's mental health. Guided by this framework, we conducted a comprehensive review of the literature from January 2006 to July 2014 that reported quantitative results regarding the significance of AO for child mental health. We focused on this time period to prevent overlap with studies reviewed in previous reviews. Our goal was to synthesize the findings from this literature review into a DP formulation and discuss each of the components of the DP formulation as they would typically unfold chronologically for a child affected by HIV/AIDS—taking into account that many of the components reciprocally interact with one another. The typical components of the DP formulation include: Precipitating event (parental death), Immediate sequelae (immediate orphan-related stress), Medium term mental health effects of AO, distal and co-occurring Risk factors that may exacerbate the effects of parental death, distal and co-occurring Protective factors

that may protect against the effects of parental death, Long term effects, and National and international impact. We conclude with implications for future research and clinical intervention.

Methods

Search terms and definitions

Articles for review were gathered by following the Preferred Reporting Items for Systemic Reviews and Meta Analyses [18] via database searches through PsycInfo, PsycArticles, and PubMed using combinations of the following search terms: “AIDS-orphan,” “AIDS,” “orphan(s),” “HIV,” “children,” “developing world,” “sub-Saharan,” “China,” “South Africa,” names of other high prevalence countries (e.g., Botswana, Nigeria, Zimbabwe), and mental health terms such as “mental health,” “psychological,” “psychopathology,” “emotional disorders,” “behavioral disorders,” as well as specific major child/adolescent disorders (e.g., depression, anxiety, conduct disorder, etc.).

As noted in the previous reviews [6,8,13], several different definitions for an “orphan” exist within the literature. Most studies followed the UNAIDS definition of an orphan as “a child below the age of 18 who has lost one or both parents” [1]. However, several studies increased their age limits to anywhere from 19 to 24 years old to study the impact of AO on the early years of young adulthood.

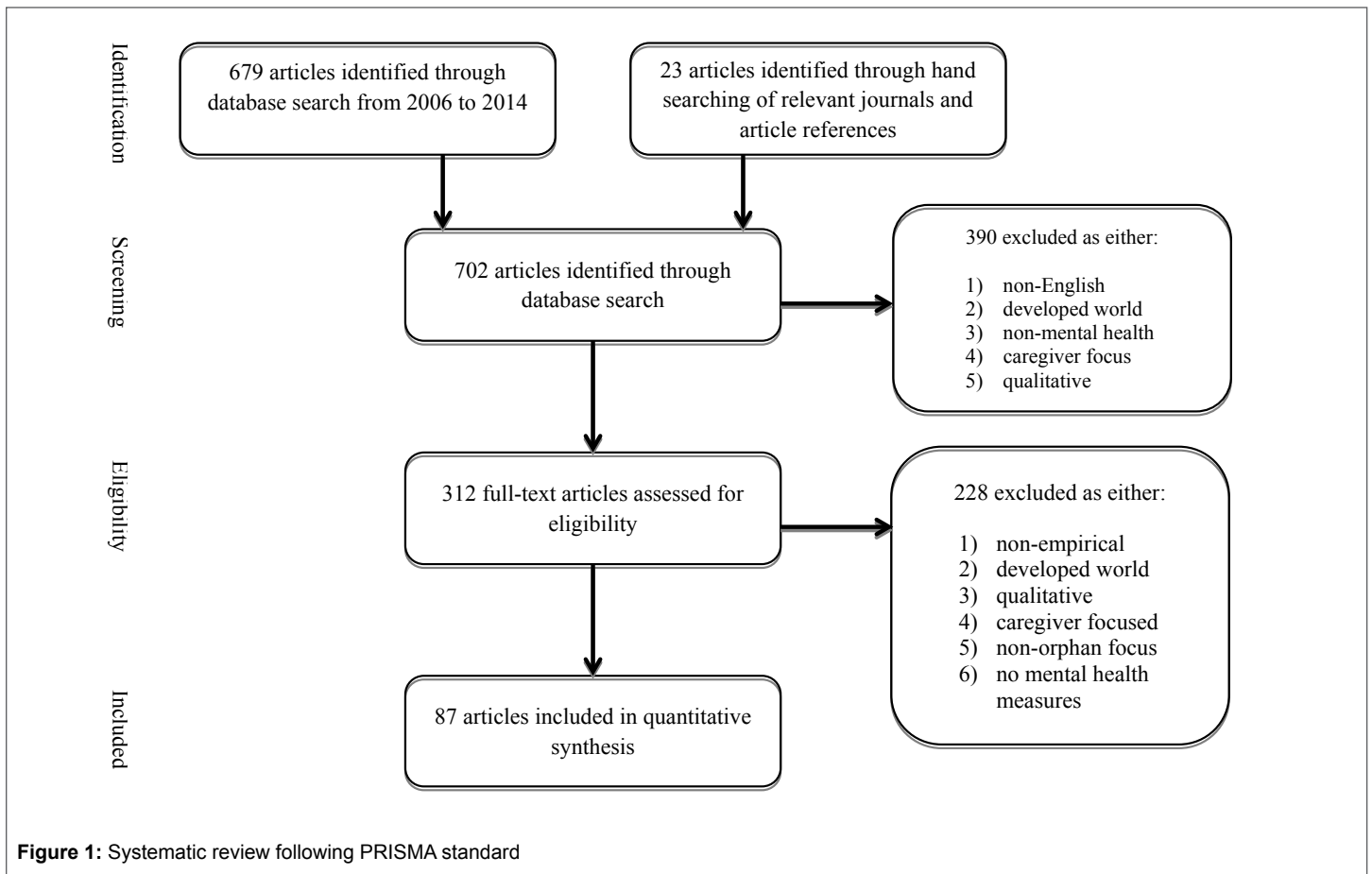
Children who had lost at least one parent to AIDS-related causes were most commonly referred to as either “AIDS orphans” or “AIDS-affected orphans.” While such terms seem straightforward, measuring the cause of parental death has been done via several methods. Direct participant report, caregiver/community report, inventorying parental symptoms prior to death (i.e. Verbal Autopsy), and assuming cause of death based on high HIV prevalence in the study area were methods of gauging cause of parental death. Of these, assuming cause of parental death based on community HIV prevalence risked confounding the effect orphanhood by other causes (hereby referred to as “other-orphanhood”) with that of AO. Therefore, the present review included only studies that verified cause of parental death and excluded studies that assumed AO based on community HIV prevalence. Rather, employing either other-orphans or AIDS-affected non-orphans was considered strength among the literature in order to determine whether there is a unique effect of AIDS-related parental death compared with the effect of other-orphanhood or living with an AIDS-ill caregiver.

Lastly, the search term “developing world” referred to countries with a lower living standard, underdeveloped industrial base, and low Human Development Index (HDI) relative to other countries. The studies meeting inclusion criteria for the present review occurred in sub-Saharan Africa, China, and Haiti and mental health problems was characterized by four general problem areas: internalizing, behavior, social functioning, and school functioning.

Literature search

The tables of contents of major peer-reviewed journals between January 2006 to July 2014 were also scanned for articles relating to HIV/AIDS and orphans. Lastly, additional articles were gathered from the references of articles already collected. Inclusion criteria included being (1) peer reviewed paper, (2) quantitative (not qualitative), (3) an examination of the impact of AO on mental health or a proxy measure (e.g. school attendance), (4) research conducted within the developing world, and (5) published after 2005 (affording one year of overlap with the 2007 review by Cluver and Gardner [6]). As a potential confounding factor, studies of HIV positive orphans were excluded [12].

Figure 1 presents the systematic review process. From the above search terms, 312 articles were retrieved, of which 87 articles met inclusion criteria.



Results

Table 1 provides an overview of studies included in the review. Figure 2 presents an integration of study findings into a DP formulation. We will refer to this figure throughout our discussion of the precipitating and maintaining risk and protective factors of AO, as well as its sequelae.

Precipitating event: Parental death by HIV/AIDS

Among the majority of studies, AO reported more paternal (ranging from 31-58%) than maternal bereavement (13-34%); and the frequency of double orphans (14-47%) was less than that of single orphans [19-30]. Compared to other-orphans, AO were more likely to be maternally or doubly bereaved [31]. Moreover, AIDS was the primary cause of parental death, in one study accounting for 51% with other illness (29%), accidents (9%), homicide (5%), and unknown or "bewitchment" (6%) accounting for the remainder [32].

Immediate orphan-related stress

Since AO often live in high-risk communities, they often experience the same stressors associated with other-orphans and non-orphans status. For example, AO do not differ from comparison children in their experiences of domestic violence or community violence [31,33]. However, certain stressors appear to be uniquely associated with AO status.

Poverty: With the loss of caregivers often comes the loss of household income. In the literature, poverty was characterized as both a risk factor and an immediate orphanhood-related consequence and was often operationalized as either an index of household assets or degree of access to basic necessities. Indices of assets showed that AO were not more economically disadvantaged than non-orphans [30,34] or other-orphans

[32]. However, compared with other children, AO reported less access to food [22,31,35,36], school fees [29,31,36,37], and medical treatment when sick [19,35]. Other operationalizations showed that AO were more likely than other orphans to engage in economic activities outside of the home [22,34] and to be sick, and were less likely to be receiving welfare grants for which they were eligible and to live in a household with adult employment [22,31,34,36].

Household factors: Among household factors, living with a chronically ill or disabled caregiver was a prominent AO-related stressor [31,34,38,39]. Other stressors more common for AO were care giver mental health problems [40,41], less communication with caregivers [42], children engaging in excessive housework [31,38,43], and sibling separation [34,44]. Two studies reported AO were more likely to experience household relocation [31,34], while two others reported no differences based on orphan status [36,45]. Household dependency ratio was not associated with AO [12,22].

Social and community factors: Social and community factors that contributed to immediate orphanhood-related stresses for AO were trauma exposure [44], experienced stigma [19,31,33] and perceived stigma [46]. The impact of AIDS-related stigma upon AO has been of increasing interest. Not only has stigma been shown to be a source of psychosocial distress [33,34,47-51], but, as mentioned above, it has also been shown to be a significant cross-cutting factor that mediates the relations of AO with all four outcome domains [31,33]. Moreover, different types of stigma (e.g. perceived stigma, personalized stigma, enacted stigma) have been shown to associate independently with indicators of internalizing and school adjustment problems [51], and longitudinal models have shown

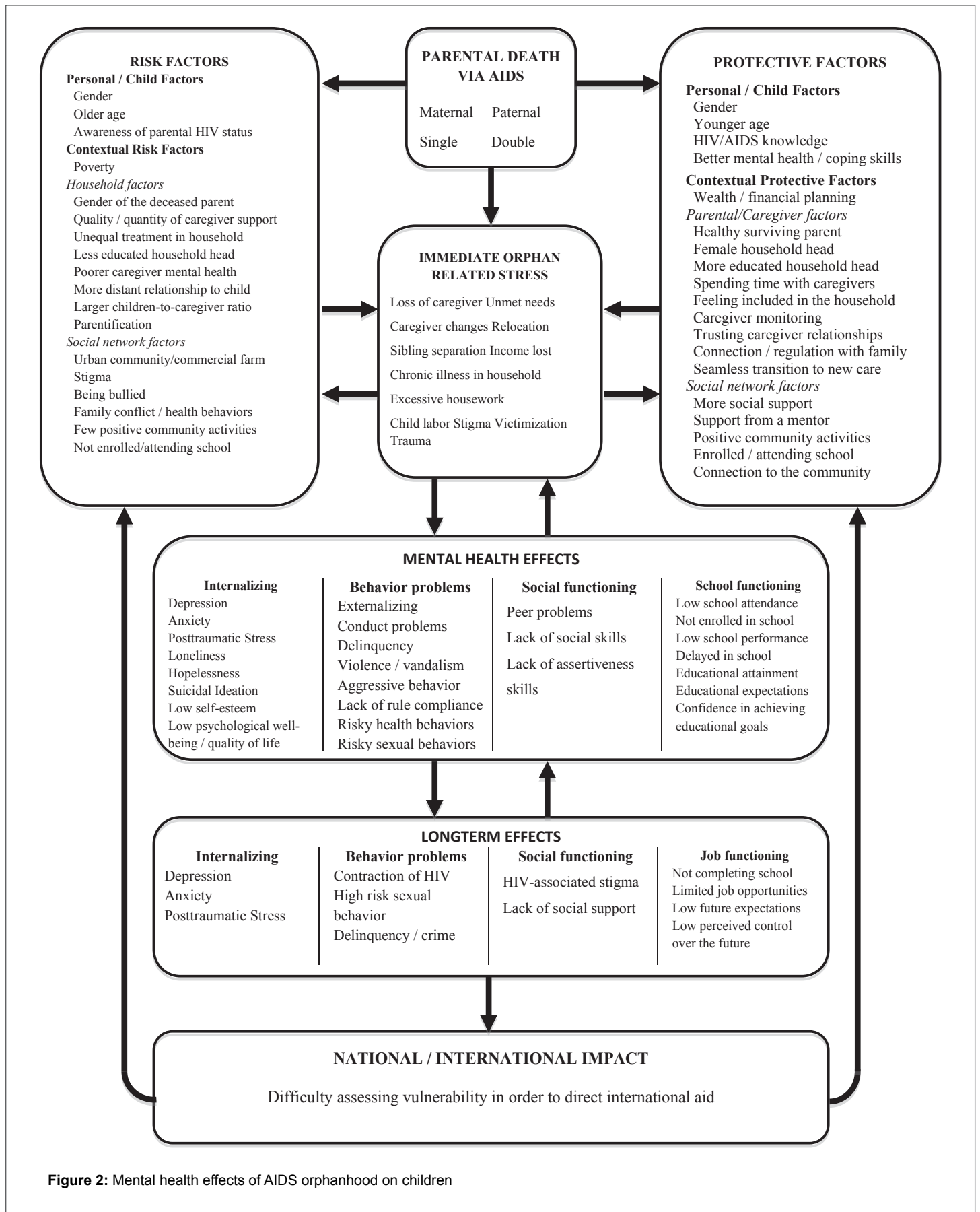


Figure 2: Mental health effects of AIDS orphanhood on children

Authors	Sample Statistics	Outcomes	Findings
Cluver, Gardner & Operario [12]	N=1025 10-19 years old South Africa self-report	depression, anxiety, PTSD, suicidal ideation, peer problems, conduct problems, delinquency	AIDS-orphans reported worst depression, PTSD, delinquency, conduct and peer problems, despite high distress levels across all groups due to prevalence of poverty and community violence.
Cluver, Gardner & Operario [33]	N=1025 10-19 years old South Africa self-report	depression, anxiety, PTSD, peer problems, conduct problems, delinquency	AIDS-orphans reported more experiences of stigma, but not of being bullied or community violence. Experienced stigma mediated the effect of AIDS-orphanhood on depression, PTSD, delinquency and conduct problems.
Cluver, Fincham & Seedat [21]	N = 1025 10-19 years old South Africa self-report	PTSD	Social support moderated the effect of trauma exposure on PTSD symptoms. Orphans who did not change homes reported worse PTSD compared to those who had moved.
Cluver, Gardner & Operario [36]	N = 1025 10-19 years old South Africa self-report	depression, anxiety, PTSD, peer problems, conduct problems, delinquency	AIDS-orphans reported worst poverty indicators. Poverty fully mediated effect of AIDS-orphanhood on depression, delinquency, and conduct problems; and partially mediated PTSD and peer problems.
Cluver, Operario & Gardner [38]	N = 1025 10-19 years old South Africa self-report	depression, anxiety, PTSD, peer problems, conduct problems, delinquency	AIDS-orphans were most likely to have an ill caregiver. Caregiver illness and excessive housework (i.e. 3+ hours per day) were associated with one another and together fully mediated effect of AIDS-orphanhood on depression, delinquency, and conduct problems.
Cluver & Orkin [97]	N = 1025 10-19 years old South Africa self-report	depression, anxiety, PTSD	Two-way interactions were lower quality of care with likelihood of clinical-level internalizing disorder; orphanhood with food insecurity; AIDS-orphanhood with stigma; stigma with bullying; and orphanhood with better quality of care. Three-way interactions were internalizing disorder, stigma, and food insecurity; and AIDS-orphanhood, bullying and disorder.
Cluver, Bowes & Gardner [53]	N = 1050 10-19 years old South Africa self-report	depression, anxiety, PTSD, peer problems, conduct problems, delinquency	Being bullied was associated with worse depression, anxiety, and PTSD. Experiencing abuse, violence, or stigma was associated with greater likelihood of being bullied; AIDS-orphanhood was not associated with being bullied.
Cluver, Orkin, Boyes, Gardner & Meinck [54]	N = 723 11-25 years old South Africa self-report	sexual risk behaviors	Food insecurity and child abuse fully mediated the relationship between AIDS-orphanhood and transactional sex and partially mediated the relationship between having an AIDS-ill caregiver and transactional sex. Transactional sex and being dually affected was partially mediated by abuse and fully mediated by food insecurity.
Cluver, Orkin, Boyes, Gardner & Nikelo [39]	N = 723 11-25 years old South Africa self-report	depression, anxiety, PTSD	Being AIDS-affected predicted greater depression, anxiety, and PTSD at longitudinal follow-up; being dually AIDS-affected further compounded distress.
Cluver, Orkin, Gardner & Boyes [28]	N=723 11-25 years old South Africa self-report	depression, anxiety, PTSD	AIDS-orphanhood and age, independently and via interaction effect, contributed to worse depression, anxiety, and PTSD at longitudinal follow-up.
Boyes & Cluver [96]	N=723 11-25 years old South Africa self-report	depression, anxiety	AIDS-orphanhood did not directly affect psychological outcomes, but exerted an indirect effect on depression and anxiety through its impact on experienced stigma at baseline and at follow-up.
Boyes, Mason, Cluver [48]	N=723 11-25 years old South Africa self-report	HIV/AIDS-related stigma	The brief stigma-by-association scale showed good reliability and validity. It successfully differentiated between HIV/AIDS-affected households and was associated with measures of depression and anxiety symptoms, as well as stigma-by-association and bullying.
Cluver, Orkin, Boyes, Sherr, Makasi & Nikelo [31]	N=6002 10-17 years old South Africa self-report	depression, anxiety, PTSD, suicidality, risky sexual behavior, school performance	AIDS-orphanhood did not directly affected outcomes, but had an indirect effect through direct associations with AIDS-related stigma and poverty. Indirect effects of AIDS-orphanhood most impacted internalizing, which itself served as an intervening variable upon sexual and educational outcomes.
Boyes, Cluver [111]	N=3515, 3401 (y1) 10-17 years old South Africa self-report	depression, anxiety	AIDS-affected children (orphans and non-orphans) were more likely than non-AIDS-affected children to have experienced bullying, 4 or more types of bullying, and HIV/AIDS-related stigma. Multiple mediation analyses showed that being AIDS-affected had no direct effect on depression or anxiety scores at 1 year follow-up, but indirectly effected both through multiple bullying experiences, HIV/AIDS-related stigma, and baseline depression or anxiety, respectively.

Orkin, Boyes, Cluver, Zhang [66]	N=723 11-25 years old South Africa self-report	depression, anxiety, PTSD, school performance (non-enrollment, non-attendance, grade progress, concentration problems)	Path Analyses showed AIDS-orphanhood did not directly relate to educational outcomes. However, it related indirectly related through poverty to non-attendance; through the combination of poverty and internalizing problems to concentration problems; and through concentration problems to poorer grade progression. AIDS-affected non-orphans showed similar indirect relations to education outcomes.
Fang, Li, Stanton, Hong, Zhang, Zhao, Zhao, Lin, Lin [56]	N=1625 6-18 years old China self-report	depression, loneliness, self-esteem, future expectations, hopefulness, perceived control over the future	AIDS-orphans reported worst depression; AIDS-affected children reported worse mental health than non-affected children. Group home care afforded better outcomes than orphanage or kinship care. Single and double orphans did not differ.
Gong, Li, Fang, Zhao, Lv, Zhao, Lin, Zhang, Chen, Stanton [112]	N=155 6-17 years old China self-report teacher report	trauma symptoms, school functioning	Sibling separation was associated with worse depression, anxiety, anger, and dissociation and is a significant stressor over and above the experience of being orphaned.
Li, Barnett, Fang, Lin, Zhao, Zhao, Hong, Zhang, Naar-King, Stanton [7]	N=1625 6-18 years old China self-report	depression, loneliness, self-esteem, future expectations, hopefulness, perceived control over the future, anxiety, post-traumatic stress, anger, dissociation, sexual concerns	Occurrence, density, duration, initial impact, and lasting impact of traumas were all positively associated with depression, anxiety, and PTSD. AIDS-affected children reported more traumatic experiences and worse mental health outcomes.
Li, Fang, Stanton, Zhao, Lin, Zhao, Zhang, Hong, Chen [44]	N=1221 6-18 years old China self-report	depression, loneliness, self-esteem, future expectations, hopefulness, perceived control over the future	Positive correlation was shown between trauma exposure and TSCC score. Age was negatively associated with TSCC. Females reported worse anxiety than males; males worse sexual concerns. Orphans more likely to report 5 or more traumatic events.
Tu, Lv, Li, Fang, Zhao, Lin, Hong, Zhang, Stanton [57]	N=1625 6-18 years old China teacher report	school functioning	Child and teacher reports both showed being AIDS-affected was associated with worse school behavior and competency. Orphans reported worst grades and more aggressive behavior.
Zhang, Zhao, Li, Hong, Fang, Barnett, Lin, Zhao, Zhang [80]	N=1221 6-18 years old China self-report	depression, loneliness, self-esteem, future expectations, hopefulness, perceived control over the future	AIDS-orphans reported worse depression, but otherwise better mental health. Future orientation mediated effect of trauma exposure on mental health. AIDS-orphans had more trauma exposure to death and illness, but did not differ overall.
Zhao, Li, Lin, Fang, Zhao, Zhao [98]	N=755 6-18 years old China self-report	trauma symptoms	AIDS-orphans who knew peers who were infected with HIV or had died of AIDS-related causes reported worse depression, anxiety, PTSD, dissociation, anger (peer death), and sexual concerns (peer infection and death). Family SES was negatively associated with peer infection/death.
Zhao, Li, Fang, Stanton, Zhao, Zhao, Zhang [26]	N=296 6-18 years old China self-report	life improvement; life satisfaction	Group home care led to better outcomes for mood, living condition, and peer relationships compared to orphanages; plus better schooling, life satisfaction, and overall quality compared to kinship care.
Hong, Li, Fang, Zhao, Lin, Zhang, Zhao, Zhang [85]	N=1625 6-18 years old China self-report	depression, loneliness, self-esteem, future expectations, hopefulness, perceived control over the future, school functioning	AIDS-orphans reported the most perceived social support. Perceived social support was positively associated with self-esteem and future orientation, and negatively associated with depression, loneliness, and school adjustment.
Lin, Zhao, Li, Stanton, Zhang, Hong, Zhao, Fang [49]	N=1625 6-18 years old China self-report	depression, loneliness, self-esteem, future expectations, hopefulness, perceived control over the future, school functioning, social support	AIDS-affected children reported greater perceived public stigma, but there were no group differences for personally held stigma. Both stigma scales were positively associated with psychopathology and negatively associated with psychosocial well-being.
Zhao, Zhao, Li, Fang, Zhao, Zhang, [50]	N=176 6-18 years old China self-report	depression, loneliness, trauma symptoms	Evaluating caregivers prior to placement in orphanage, surviving parents and grandparents yielded best mental health outcomes, followed by other relatives. Care by non-relatives led to the worst outcomes. In GLM, type of caregiver was associated with depression and sexual concerns.
Zhao, J., Li, Fang, Hong, Zhao, Lin, Zhang, Stanton [46]	N=1625 6-18 years old China self-report	depression, loneliness, self-esteem, future expectations, hopefulness, perceived control over the future	AIDS-orphans reported significantly more perceived stigma against children affected by AIDS than comparison children. Stigma against children affected by AIDS was associated with worse depression, loneliness, self-esteem, and future expectations.
Zhao, Li, Fang, Zhao, Zhao, Lin, Stanton [27]	N=459 6-18 years old China self-report	depression, loneliness, trauma symptoms, school functioning, social support	Paternal orphans reported more trusting relationships with caregivers but lower school grades; otherwise they did not differ from maternal orphans. Having a healthy surviving parent was associated with less depression, loneliness, and PTSD and greater perceived social support, showing caregiver illness contributed to psychosocial distress.

Hong, Li, Fang, Zhao, Zhao, Lin, Zhang, Stanton [113]	N=296 6-18 years old China self-report	trauma symptoms	Orphans in group home care reported less depression, anxiety, PTSD, and dissociation and better health and school outcomes; orphans in kinship care reported the worst outcomes.
Zhao, Li, Fang, Zhao, Hong, Lin, Stanton [58]	N=1299 6-18 years old China self-report	depression, loneliness, problem behavior, social support	Female, older, AIDS-orphaned, and comparison children all reported more perceived social support. Perceived social support was associated positively with school resilience and negatively with loneliness. AIDS-orphans reported worst depression. Tangible and family support were both associated negatively with depression and externalizing.
Zhao, Li, Barnett, Lin, Fang, Zhao, Naar-King, Stanton [63]	N=1625 6-18 years old China self-report	depression, loneliness, self-esteem, future expectations, hopefulness, perceived control over the future, school functioning	AIDS-affected children reported less trusting relationships with caregivers and worse mental health outcomes. Trusting relationships were associated with better future orientation, self-esteem, and school functioning, but were not associated with depression.
Zhao, Li, Zhao, Zhao, Fang, Lin, Stanton [70]	N=1019 8-19 years old China self-report	HIV/AIDS knowledge; personal stigma toward PLWHA	AIDS-affected children reported less HIV/AIDS knowledge and greater personal stigma toward PLWHA. Age and academic performance were associated positively with HIV/AIDS knowledge and negatively with personal stigma.
Zhao, Zhao, Li, Zhao, Fang, Lin, Lin, Stanton [55]	N=1019 8-19 years old China self-report	trauma symptoms; quality of life; child abuse; problem behavior	AIDS-affected children did not differ significantly from comparison children in likelihood of being sexually abused. Worse trauma symptoms, problem behavior and quality of life were associated with total sexual abuse, as well as contact and non-contact sexual abuse.
Zhao, Zhao, Li, Fang, Zhao, Lin, Zhang [45]	N=1015 6-18 years old China self-report	suicidal ideation; health risk behaviors; problem behaviors	Frequency, not duration, of household displacements was associated with more property destruction and suicide risk. AIDS-orphanhood was associated with duration, but not frequency, of displacement and greater suicide risk.
Qiao, Li, Zhao, G., Zhao, Stanton [114]	N=962 6-18 years old China self-report	depression, loneliness, self-esteem	AIDS-affected children have low intentions to disclose parental HIV status to others and negative feelings about disclosure. Secrecy about parental status was associated with worse depression and perceived or experienced HIV-related stigma, but better perceived social support and higher self-esteem.
Wang, Li, Barnett, Zhao, Zhao, Stanton [79]	N=1221 6-18 years old China self-report	depression, future expectations, hopefulness, perceived control over the future, school functioning	The associations of traumatic events and HIV-related stigma with depression were independently partially mediated by trusting caregiver relationships; HIV-related stigma and depression was also partially mediated by perceived social support and future orientation.
Zhao, G., Li, Zhao, Zhang, Stanton [51]	N=1625 6-18 years old China self-report	depression, school functioning	AIDS-orphans reported more depression and perceived public stigma against PLWHA and HIV-affected children. Older age, AIDS-orphanhood, and greater perceived public stigma predicted depression, while male gender, being AIDS-affected, and greater perceived and personal stigma scores predicted poor adjustment.
Chi, Li, Barnett, Zhao, Zhao [11]	N=1625, 1288 (y2), 1019 (y3) 6-18 years (y1) China self-report	depression	AIDS-orphans reported higher levels of depression across all three annual assessments. Growth curve analyses showed significant differences in score trajectories, with the greatest decrease among AIDS-orphans (25%), followed by AIDS-affected (19%) and comparison (15%) children.
Yu, Li, Zhang, Zhao, Zhao, Zheng, Stanton [43]	N=1449 6-18 years old China self-report	depression	AIDS-affected children reported more depression symptoms, a greater number of domestic tasks and worked longer daily hours on household responsibilities compared to non-AIDS-affected children. Increased levels of both domestic tasks and work hours were independently associated with increased likelihood of reporting depression symptoms.
Zhao, Li, Zhao, Zhao, Stanton [73]	N=1221, 953 (y2), 743 (y3) 6-18 years old China self-report	depression	AIDS-orphans reported greater depression scores than AIDS-affected non-orphans at baseline and year 1, but not at year 2. Depression scores at year 1 were associated negatively with future orientation (expectations, hopefulness, control) and health status, but positively with age, baseline depression scores and trusting caregiver relationships. For year 2 depression scores, only age and baseline depression scores were associated positively and health status was associated negatively.
Chi, Li, Zhao, Zhao [52]	N=521 6-12 years China self-report	depression	Depressive symptoms showed transactional effects with enacted stigma and perceived stigma, such that enacted stigma led to depressive symptoms, which led to perceived stigma, which led back into enacted stigma.
Han, Li, Chi, Zhao, Zhao [67]	N=1625 6-18 years old China self-report	cognitive ability: verbal comprehension & perceptual reasoning skills	Study showed that AIDS-orphans reported the lowest verbal comprehension, while comparison children had the highest scores. AIDS-affected children (both orphan and non-orphan) exhibited worse perceptual reasoning scores than comparison children. Among double orphans, those in kinship care scored the highest in verbal comprehension, but no differences were observed for perceptual reasoning.

Zhao, Chi, Li, Tam, Zhao [87]	N=1625 6-18 years old China self-report	depression, loneliness, self-esteem	More extracurricular interests (e.g. sports, music) were associated with decreased markers of internalizing problems, and suggest extracurricular interests may be an important protective factor against internalizing among AIDS-orphans.
Ssewamala, Alicea, Bannon, Ismayilova [91]	N=96 11-17 years old Uganda self-report	HIV prevention attitudes	Microfinance intervention led to improved HIV prevention attitudes and increase in educational plans compared to control group.
Ssewamala, Han, Neilands [25]	N=286 11-17 years old Uganda self-report	self-esteem	Microfinance intervention led to improved self-esteem and self-rated health compared to control group. Self-esteem was positively associated with female gender and family homeownership.
Ssewamala & Ismayilova [76]	N=277 11-17 years old Uganda self-report	school performance; educational plans; attitudes toward risky sexual behavior	Microfinance intervention provided matched savings account, mentor support, and financial planning classes. Compared to controls, the treatment group had better scores on the Primary Leaving Examination, higher educational expectations, and less positive attitudes toward risky sexual behavior, but did not differ in school attendance.
Curley, Ssewamala, Han [77]	N=274 11-17 years old Uganda self-report	school performance; educational plans; confidence in achieving educational goals	Microfinance intervention provided matched savings account, mentor support, and financial planning classes. Treatment group had better scores on the Primary Leaving Examination and more positive change, between baseline and 10-month follow-up, in both educational expectations and confidence in achieving educational goals.
Ssewamala, Ismayilova, McKay, Sperber, Bannon, Alicea [72]	N=286 11-17 years old Uganda self-report	sexual risk taking attitudes	At follow-up, microfinance treatment group showed less positive attitudes toward risky sexual behavior among boys and unchanged attitudes among girls; control group showed more positive attitudes toward risky sex for both genders. Intervention was effective to decrease likelihood of engaging in risky sex, but should be contextualized to gender.
Ssewamala, Karimli, Han, Ismayilova [117]	N=286 11-17 years old Uganda self-report	social capital measures, school functioning	Greater social capital (i.e. perceived support from adult, knowing caregiver was saving money on child's behalf, and participating in a youth group) was associated with better school outcomes and goals.
Ismayilova, Ssewamala, Karimli [118]	N=283 11-17 years old Uganda self-report	attitudes toward sexual risk behaviors, family support	Microfinance treatment effectively increased perceived caregiver support at one-year follow-up; increased caregiver support at ten-month follow-up partially mediated decreased positive attitudes toward sexual risk behaviors at twenty-month follow-up.
Karimli, Ssewamala, Ismayilova [82]	N=283 AIDS-orphans 11-17 years old Uganda self-report	perceived caregiver support	Female orphans reported greater perceived caregiver support. Female caregivers who lived with or financially supported a participant were associated with greater perceived caregiver support.
Ssewamala, Neilands, Waldfoegel, Ismayilova [90]	N=286 11-17 years old Uganda self-report	depression	After one year, depression scores for the microfinance treatment group declined significantly; no change observed for control group. Microfinance intervention effectively decreased depression scores for AIDS-orphans.
Han, Ssewamala, Wang [89]	N=297 / 270 12-14 years old Uganda self-report	depression, hopelessness	At follow-up, microfinance treatment group reported greater decrease in depression and hopelessness compared to control group. Females reported more hopelessness; having a female or older caregiver was associated with worse depression at follow-up.
Østergaard & Meyrowitsch [35]	N=2043 10-16 years old Benin self-report	internalizing, school dropout	AIDS-affected orphans and non-orphans, compared to non-AIDS-affected children, reported more internalizing problems and higher school dropout rates, as well as greater food insecurity. Group differences in school dropout became non-significant after controlling for child age and sex, urban/rural community, and wealth indicators.
Ndzibidtu, Meyer, Tih [92]	N=200 Cameroon 5-19 self-report	school functioning outcomes (school enrollment, grade progression)	A treatment that provided home-based services, including payment of school fees, nutritional assistance, access to medical services, psychosocial support, and home visitation, was shown to improve grade progress and school enrollment relative to the control group.
Doku [60]	N=200 10-18 years old Ghana self-report	emotional functioning, conduct problems, social functioning, school functioning	Orphans and AIDS-affected non-orphans reported comparable internalizing that was worse than non-orphans. Orphans reported worst conduct problems; AIDS-orphans worse peer problems. Hyperactivity and pro-social behaviors did not differ across groups.
Doku [119]	N=200 10-18 years old Ghana self-report	emotional functioning, conduct problems, social functioning, school functioning	In the total sample and across all orphan status groups, males reported highest mean score for total difficulties and peer problems. No age effects were observed except that among other-orphans, older children reported worse peer problems.

Delva, Vercoetere, Loua, Lamah, Vansteelandt, De Koker, Claeys, Temmerman, Annemans [22]	N=397 10-18 years old Guinea self-report	internalizing	AIDS-orphans reported worst psychological well-being. Orphans experienced greater poverty than non-orphans. Households with 7 or more children were associated with worse child mental health.
Fawzi, Eustache, Oswald, Louis, Surkan, Scanlan, Hook, Mancuso, Mukherjee [41]	N=168 10-17 years old Haiti self-report caregiver-report	depression	Significant decreases in depression symptoms reported by HIV-affected adolescents and their HIV-positive caregivers were observed after a communication intervention. Caregivers also reported decreased perception of stigma.
Okawa, Yasuoka, Ishikawa, Poudel, Ragi, Jimba [86]	N=398 10-18 years old Kenya self-report	depression, self-esteem, social support	Perceived social support was associated positively with self-esteem and negatively with depression. Perceived social support was better when cohabitating with siblings and worse when living with a surviving parent.
Adejuwan & Oki [47]	N=100 7-18 years old Nigeria self-report	emotional well-being, sexual behavior, social discrimination, school enrollment	Among AIDS-orphans, initiation of sex and social discrimination were risk factors for emotional well-being. Emotional well-being was not related to school enrollment or the interaction between school enrollment and sexual behavior.
Olley [59]	Abstract only Nigeria caregiver-report	internalizing, externalizing, social functioning	AIDS-orphans exhibited more internalizing, externalizing, and peer relationship problems than non-orphans. Concerning themselves, caregivers of AIDS-orphans reported more mental health problems, more negative life events, and were less educated than caregivers of non-orphans. Caregiver mental health and negative life events predicted mental health problems in AIDS-orphans.
Mueller, Alie, Jonas, Brown, Sherr [93]	N=297 8-18 years South Africa self-report	depression, self-efficacy, self-esteem, behavior problems	A mental health intervention implemented among AIDS-orphans showed treatment effects for improved self-efficacy, but did not lead to changes in depression, self-esteem, or behavior problems.
Marais, Sharp, Pappin, Lenka, Cloete, Skinner, Serekoane [37]	N=609 7-11 years South Africa self-, caregiver-, & teacher-report	total difficulties (aggregate of emotional symptoms, conduct problems, social problems & inattention-hyperactivity)	Orphans, compared to vulnerable non-orphans, reported higher total difficulties scores on the teacher report. Among all participants (OVC), higher household dependency ratio was associated with higher total difficulties score on the teacher report and, unexpectedly, living in a formal settlement, having a flush toilet, and having indoor tap all were associated with higher total difficulties scores on the caregiver report.
Skinner, Sharp, Jooste, Mfecane, Simbayi [29]	N=27,711 0-18 years South Africa census survey	school attendance; poverty markers (birth certificate; meals/day; days without food; adequate clothes; access to water, electricity, television, radio, phone, car, medical services)	In both Kanana and Kopanong, paternal orphans reported the least access to food (e.g. meals per day, days without food) and adequate clothing, while maternal orphans were least likely to have a birth certificate. In Kanana, double orphans were least likely to attend school, while in Kopanong there were no group differences in school attendance.
Wild, Flisher, Robertson [32]	N=159 10-19 years old South Africa self-report	depression, anxiety, self-esteem	Emotional resilience was associated negatively with age, poverty, and cumulative stress; and positively with male gender, AIDS-orphanhood, and living with biological relatives. Other orphans reported worse resilience and community connection than AIDS-orphans.
Marais, Sharp, Pappin, Rani, Skinner, Lenka, Cloete, Serekoane [88]	N=607 7-11 years South Africa caregiver- & self-report	total difficulties (aggregate of emotional symptoms, conduct problems, social problems & inattention-hyperactivity)	Government and CBOs target poverty reduction and expect improvement of OVC mental health. Study showed that only access to medical services and (lower) percentage of total expenditure spent on food were associated with lower total difficulties score. Notably, receipt of foster care or child support grants showed no relation to total difficulties.
Sharp, Venta, Marais, Skinner, Lenka, Serekoane [61]	N=607 7-11 years South Africa self-report	total difficulties (aggregate of emotional symptoms, conduct problems, social problems & inattention-hyperactivity)	Among both orphans and vulnerable non-orphans, food security and access to medical care were both positively associated with better mental health (i.e. lower Total Difficulties scores).
Onuoha, Munakata, Serumaga-Zake, Nyonyintono, Borgere [24]	N=952 5-17 years old South Africa & Uganda self-report	depression, anxiety, self-esteem, social support, child abuse, social discrimination	AIDS-orphans reported worst anxiety, self-esteem, and social support; worse child abuse and depression than non-orphans; worse social discrimination than other-orphans. Having a non-relative adult mentor protected against distress, especially for AIDS-orphans.
Onuoha & Munakata [78]	N=952 5-17 years old South Africa & Uganda self-report	depression, anxiety, self-esteem, social support, child abuse, social discrimination	AIDS-orphans reported most child abuse and social discrimination and lowest self-esteem and perceived social support. Among AIDS-orphans, age was negatively associated with psychosocial distress. No gender differences were observed among AIDS-orphans.

Onuoha & Munakata [83]	N=952 5-17 years old South Africa & Uganda self-report	depression, anxiety, self-esteem, social support, child abuse, social discrimination	Except for depression, having a natural mentor was negatively associated with negative mental health outcomes for AIDS-orphans, but not for other- or non-orphans. Younger children reported more mentor support than older children. Having a natural mentor had not effect on social discrimination among double AIDS-orphans.
Kasirye & Hisali [65]	N=4220 6-17 years Uganda household survey	school enrollment, age-appropriate grade level	Results showed that AIDS-orphans were not more likely to drop out of school, but were more likely to fall behind their age-appropriate grade level. However, there was an interaction between AIDS-orphan status and household welfare status for 13-17 year-olds, such that poorer AIDS-orphans were less likely to be in school.
Kumakech, Cantor-Graae, Maling, Bajunirwe [23]	N=326 / 298 10-15 years old Uganda self-report	depression	Peer support intervention lowered depression, anxiety, and anger, but did not significantly effect self-concept, compared to control group.
Akwara, Noubary, Ken, Johnson, Yates, Winfrey, Chandan, Mulenga, Kolker, Luo [74]	60 national surveys 0-18 years old 36 countries household-head-report	early sexual debut, school attendance	Orphanhood and living with an AIDS-ill caregiver were not consistent signifiers of vulnerability. Household wealth predicted wasting and school outcomes; and education level of household head or eldest female predicted school outcomes.
He & Ji [19]	N=186 8-15 years old China self-report	depression, self-esteem, quality of life	AIDS-orphans reported more depression and lower self-esteem and quality of life. Males reported worse internalizing outcomes than females.
Sun, Li, Ji, Lin, Semaan [84]	N=154 6-18 years old China caregiver-report	delinquency	Age moderated the impact of caregiver's caregiving skills upon child delinquency so that younger children exhibited less delinquency as caregiving skills increased, while delinquency among older children did not respond much to changes in caregiving skills. Delinquency was negatively associated with years of caregiver education and caregiver's caregiving skills score.
Xu, Wu, Rou, Duan, Wang [42]	N=225 8-17 years old China self- & caregiver-report	quality of life, self-esteem	AIDS-affected children reported lower quality of life and lower psychosocial, emotional, and school functioning. Contributors to quality of life were child self-esteem, caregiver quality of life, and caregiver-child interaction factors.
Xu, Wu, Duan, Han, Rou [40]	N=116 8-17 years old China self- & caregiver-report	social functioning, school performance	AIDS-orphans were more likely to report worse peer relationships, teasing, and less communication with caregivers compared to AIDS-affected non-orphans. Orphans were also more likely to be informed about their parent's HIV status.
Kaufman, Zeng, Wang, Zhang [94]	N=39 11-17 China self-report	depression, anxiety	The research team trained community members to conduct group therapy with AIDS-orphaned adolescents with clinical levels of depression and anxiety. Results showed that the treatment group showed decreased anxiety relative to the control group, but no differences in depression.
Kaggwa & Hindin [68]	N=1309 12-29 years old Uganda self-report	depression, hopelessness	Males reported more depression and hopelessness than females. Among male paternal orphans, AIDS-orphans had highest depression and hopelessness scores; family factors mediated distress for male double orphans. Female orphans did not differ significantly from non-orphans.
Howard, Matinhure, McCurdy, Johnson [30]	N=395 6-19 years old Zimbabwe self-report	internalizing, social support	AIDS-orphans reported worse psychosocial well-being and were not prepared for parental death, nor supported adequately thereafter. Double orphans reported weaker perceived social support than single orphans.
Nyamukapa, Gregson, Lopman, Saito, Watts, Monasch, Jukes [20]	N=5295 12-17 years old Zimbabwe self-report	internalizing, risky sexual behavior	AIDS-orphans reported worse psychological distress and earlier sexual debut. Household, caregiver, and poverty factors mediated the association of orphanhood on mental health and sexual behavior.
Nyamukapa, Gregson, Wambe, Lopman, Mupambireyi, Nhungo, Jukes [34]	N=527 12-18 years old Zimbabwe self-report	internalizing, risky sexual behavior	Death or illness in the household, stigma, inadequate care, child labor, physical abuse, and not being in school made up the causal pathway between psychological distress and orphanhood. Maternal orphans showed greater resilience with increased time since parental death.
Robertson, Mushati, Eaton, Dumba, Mavise, Makoni, Schumacher, Crea, Monasch, Sherr, Garnett, Nyamukapa, Gregson [64]	N=27672 0-17 years old Zimbabwe household-head report	school attendance, birth certificate, vaccinations	Socio-demographic variables associated with being HIV-affected identified a larger number of vulnerable children, but targeting based on residence in lowest quintile of household wealth more efficiently identified vulnerable children.

Table 1: Summary of studies

transactional effects among enacted stigma, depression symptoms, and perceived stigma [52]. Importantly, two measures of AIDS-related stigma have recently been validated in China [50] and South Africa [48].

Related to stigma, mixed findings were reported for bullying (no association [53]; in contrast [30,42]). Certain types of abuse were associated with AO (overall abuse [24]; emotional abuse [54]), but other types were not (physical abuse [34,54]; sexual abuse [34,54,55]). However, a more recent study in a large sample reported an association between AO and sexual abuse, but none with emotional or physical abuse [31]. Finally, AO was often associated with trauma experiences [44], even after accounting for parental loss [7].

Clinical implications of immediate orphan-related stress: In the DP framework, these immediate sequelae of HIV-related parental death are important moderators for the long-term effects of orphanhood on mental health. For instance, a child may be orphaned by HIV/AIDS, but family income remains unaffected. As such, the long-term effects of AIDS orphanhood on mental health is modulated by maintained socio-economic status. This juncture also provides an important early point of intervention to ameliorate the long-term effects of AIDS orphanhood.

Mental health effects of AIDS orphanhood on children

The following papers report on the relations between AO and at least one area of mental health functioning. In total, these reports were based on 29 studies conducted in China, sub-Saharan Africa and Haiti; five studies accounted for 53 articles: 28 by Li et al. [7,44], 15 by Cluver et al. [6,12,21,28,31,33,36,38,39,53,54], and 10 by Ssewamala et al. [25]. Therefore, in reality, a relatively small number of actual studies have been

conducted in this area. Table 2 summarizes the rates of different disorders in the literature on AO based on these reports.

Internalizing problems: Across studies, AO was associated with greater levels of internalizing problems. Cross-sectional studies showed AO had greater symptom levels of depression [12,19,24,56], anxiety [12,24,44,57], and post-traumatic stress [12] than comparison non-orphans. Comparisons of AO with other-orphans were more mixed, with some studies showing increased depression [12], anxiety [24], and post-traumatic stress [12,31] among AO, but others showing no differences (depression [24]; anxiety [12]). Longitudinal analyses showed that AO internalizing scores increased over time [28,58] compared to other children of the same age. Using general measures of internalizing problems, studies consistently found that AO exhibited higher levels than non-orphan comparisons [22,30,34,35,59], but were not consistently worse off than other-orphans (AO worse [22]; no group differences [32,60]). Still, in all, these findings suggest that AO suffered from internalizing problems above and beyond that of non-orphans living in the same communities.

Externalizing problems: While AO was strongly associated with internalizing problems in the literature, its association with externalizing was less often examined and results were more varied. Concerning the former, AO were more likely than non-orphans to exhibit conduct problems [12,59,60], such as delinquency [12]; exception: [58], acting out and aggression [57], but not rule compliance [44]. Compared to other-orphans, results differed by country. AO showed more conduct and delinquency problems in South Africa [12], but were no different from other-orphans in Ghana [60]. In a rare study examining mental health problems among 7-11 year olds [61], exceptionally high rates of

Author, Year	Measures	Group	DEP	ANX	PTSD	CON	DEL	HYP	TD
Sharp et al. [61] Ages: 7-11	DISC	AO	46%	32%	-	19%	-	41%	-
Marais et al. [37] Ages: 7-11	SDQ	OVC	-	-	-	-	-	-	29% ¹ 34% ² 20% ³
Cluver et al. [28] Ages: 10-19	CDI	AO	23%	22%	54%	-	-	-	-
	RCMAS	OO	14%	14%	36%	-	-	-	-
	CPTSDC	NO	7%	10%	38%	-	-	-	-
Doku [60] Ages: 10-18	SDQ	AO	-	-	-	21%	-	8%	-
		OO	-	-	-	16%	-	3%	-
		NO	-	-	-	23%	-	3%	-
Ruiz-Casares et al. [115] ⁴ Ages: 8-21	CDI	O	22%	-	-	-	-	-	-
		NO	12%	-	-	-	-	-	-
		SO	18%	-	-	-	-	-	-
		DO	30%	-	-	-	-	-	-
Cluver et al. [12] Ages: 10-19	CDI	AO	17%	10%	50%	5%	8%	-	-
	RCMAS	OO	10%	8%	30%	3%	5%	-	-
	CPTSDC	NO	9%	8%	23%	4%	5%	-	-
Cluver et al. [116] ⁴ Ages: 6-19	IES-8	O	-	-	73%	-	-	-	-

Table 2: Rates of mental health problems

AO: AIDS-Orphans; OO: Other-Orphans (i.e. not-AIDS-affected orphans); O: Orphans (by any cause); SO: Single Orphans (i.e. maternal or paternally bereaved orphans); DO: Double Orphans (i.e. loss of both parents); OVC: Orphans and Other Vulnerable Children; NO: Non-Orphans; CDI: Children's Depression Inventory; RCMAS: Children's Manifest Anxiety Scale-Revised; CPTSDC: Children's PTSD Checklist; SDQ: Strengths and Difficulties Questionnaire; IES-8: Impact of Events Scale

¹Clinical cut-off based on Total Difficulties (TD) score on the SDQ-Teacher report

²Clinical cut-off based on Total Difficulties (TD) score on the SDQ-Caregiver report

³Clinical cut-off based on Total Difficulties (TD) score on the SDQ-Self report

⁴Cause of parental death was not measured in this study

externalizing problems, especially ADHD were noted for AO compared with non-AO. Moreover, certain risky sexual behaviors, such as sexual debut [20], unprotected sex [31], and transactional sex [31,54], were reported as higher among AO adolescents than other-orphans and non-orphans. Overall, mixed findings for the association between AO and externalizing behaviors suggests the impact of AO upon behavior problems may be indirect or developmentally mediated and requires further investigation. Specifically, it appears that externalizing problems may be more prevalent in pre-adolescent children, while internalizing problem are more evident in adolescents. In reflecting on such developmental shifts in psychopathology, it is also helpful to consider the DP construct of heterotypic continuity --that is, coherence in *underlying organization* or meaning of behaviors over time (as opposed to homotypic continuity where coherence is evident at the level of the behavioral phenotype; [62]).

Social functioning: Of the four outcome areas examined in the literature, social functioning was the least studied. When reported, AO exhibited more peer relationship problems [12,42,59,60] and social skills problems (e.g. peer social skills [63]; assertive social skills [57]) than comparison children.

School functioning: Often related to mental health, school functioning is the fourth domain examined in the sequelae of AO. Compared with non-orphans, AO were less likely to be attending school [22,36,64] and more likely to be delayed in school [28,31,63,65]. Among orphaned children, three studies reported AO were less likely than other-orphans to attend school [29,36,66], while another observed no group differences [22]. Cognitively, AO were also disadvantaged, showing greater concentration problems [57,66] and lower cognitive functioning [67]. Not surprisingly, AO were also less interest in school [19,63] and evidenced more school adjustment problems [51]. Teacher report confirmed self-reported results, as teachers had lower educational expectations for AO, compared to non-orphans, and rated AO as having more learning difficulties [57,63].

Risk factors that modify the effects of orphanhood on child mental health

That AO is associated with greater levels of mental health does not necessarily imply that AIDS-related parental death *causes* mental health problems among orphans. That several studies did not find a relation between AO and mental health problems (e.g. Wild et al., [32]) suggests that internalizing, externalizing, and problems with social and school functioning may be moderated by important individual and contextual risk factors. In the DP framework, a risk factor is a variable that may be fixed or unfixed, and may be present prior to the onset of the phenomenon of interest or may coincide with the phenomenon of interest. Addressing risk factors may help improve AO mental health and include: child factors and contextual factors (e.g., caregiver factors).

Child characteristics as risk factors: Several child characteristics have been identified as risk factors--the first being gender. Female AO were more likely than males to exhibit internalizing problems [12,31,34,44]; exception: [68], exchange sex for physical resources (e.g. transactional sex or much older sexual partners [31]), and not attend school regularly [22]. These results are in accord with research suggesting female AO are more pressured to stay home and care for sick parents or household adults [10], with some research showing a transactional effect of school performance such that better performing girls are less likely to drop out of school [69].

In contrast, male AO often exhibited more externalizing problems, generally [12,55] and in school settings [7,57], and more peer relationship problems [60]. They also engaged in more risky behavior (e.g. substance use, violence [70]) and risky sexual behavior (e.g. earlier debut or number of partners [31]; risky intentions [71]). However, an interaction between gender and AO status was observed in several studies such that, while

female AO did not differ from female non-orphans in internalizing problems, male AO reported more internalizing symptoms than male non-orphans [19,68]. Finally, male AO showed worse school outcomes, including being behind in school [31], poorer school adjustment [51], worse school functioning [40,57], lower educational aspirations [72], less school interest [44] (Li et al., 2009), and more concentration problems [66]. Thus, being orphaned by AIDS-related causes may exacerbate vulnerabilities already associated with male gender.

Child age emerged as another child-specific risk factor in the literature. While cross-sectional [12,21,56] and longitudinal [27,39] studies showed internalizing symptoms increased with age, one study showed that within person depression scores decreased between baseline and follow-up assessments [11,73]. In contrast to internalizing problems, the relations of externalizing, social functioning, and school functioning with age were varied within the literature.

Contextual risk factors: Within the literature, risk factors for mental health problems among AO spanned several contexts: poverty, caregiver, and community.

Poverty: Poverty was shown to be a risk factor for internalizing [12,31,32,34], externalizing [31,34,36,54], social functioning [36], and school functioning [34,64,74,75]. More specifically, poverty was shown to mediate the relations of AO with internalizing problems (e.g. depression, PTSD [31,36]), risky sexual behaviors (transactional sex [31,54]; younger sexual debut [20]), and indices of school difficulties (e.g. low attendance, concentration problems [31,66]). Importantly, a microfinance intervention that provided AO families with matched savings accounts, financial training, and mentorship led to better school performance, higher educational expectations, and more confidence in achieving educational plans compared to an AIDS-orphaned control group [76,77], suggesting that addressing poverty may ameliorate negative outcomes for AO.

Caregiver risk factors: Relationship factors, especially concerning caregivers, were shown to be significant risk factors for mental health problems among AO. Having an AIDS-ill surviving parent [27,39] or otherwise chronically-ill household adult [34,38,68] was associated with internalizing, externalizing, and peer problems. Increased housework, often a result of caregiver illness or death, was also associated with increased internalizing problems [43,68]. When combined, caregiver illness and excessive housework mediated the association of AO with internalizing and externalizing problems [38]. Similarly, the cumulative effect of less family connectedness, having an ill household adult, more housework, and perceived inferior treatment relative to other children mediated the relation of AO with internalizing [68].

The literature suggested the gender of the deceased parent impacts orphan functioning, but results differed by study. For example, separate studies reported that maternal orphans exhibited worse internalizing problems and school attendance [78], but better long-term resilience against psychological distress [34]. Therefore, the nature of that effect appeared transactional. Child gender prominently interacted with the gender of the deceased parent, such that male paternal AO reported the highest depression and hopelessness scores [68] and more high-risk sexual intercourse [20].

Community factors: A child's community context presented further risk factors. Residence in an urban area or commercial farm [20], community violence [33], trauma exposure [32,44,79,80], child abuse [38,45], and being bullied [33] were all associated with increased internalizing, externalizing, and school functioning problems regardless of orphan status. Among AO specifically, internalizing problems were caused in part (i.e. mediated) by abuse (psychological distress [34]) and bullying (depression and anxiety [84]). In fact, several studies have

reported that there are no direct effects of AO on mental health outcomes (e.g. Boyes et al., [111]), but that AO exerts indirect effects on indices of psychological distress, sexual risk behaviors, and educational difficulties through mediators such as community violence and abuse, as well as through poverty and AIDS-related stigma [31,66].

Protective factors mitigating the effects of mental health problems

Consistent with a DP framework, a review of the literature on the effect of AO on orphan mental health would be remiss to not address the growing interest in protective factors that foster resilience [81]. Research on such factors has grown out of the effort to understand why some AO do not experience negative mental health outcomes and the motivation to find new targets (e.g. social support) and methods (e.g. adult mentorship) for interventions among.

Child characteristics: As has been shown in previous research, male gender was often associated with less internalizing problems and female gender with less externalizing problems [12]. For example, female gender was associated with higher self-esteem [25,78], better peer social skills [44,57], increased perceived social support [82], and more trusting caregiver relationships [63]. Interestingly, one study reported being female decreased the reciprocal impact of depression and hopelessness [68].

While older age was often associated with increased internalizing problems (see above), other research showed older age was associated with better emotional [83] and school functioning [45], fewer problem behaviors [55], and better outcomes in factors protective against internalizing (e.g. self-esteem, positive future orientation, less loneliness [80]) and externalizing (e.g. HIV/AIDS knowledge [58]).

Contextual protective factors: Within the literature, protective factors for mental health problems among AO focused primarily on household, community, and socio-economic factors.

Household protective factors: Protective factors within the child's household were having a female caregiver [20,82], better caregiver mental health [40,41,59], and having a more closely-related relative as a caregiver [20,32,40,50], all of which were related to less internalizing, social, and school-related problems. Higher caregiver educational level was related to less delinquency [84] and better school attendance [74]. Better quality caregiver relationships were associated with less internalizing [20,32,38,68], externalizing [38,82,84], social and school-related problems [40,63]. Similarly, more family cohesion was associated with less hopelessness [68]; and living with two or more siblings protected against depression [43].

Community protective factors: Despite challenges at home, several community factors were shown to increase resilience among AO. Greater perceived social support associated with better outcomes on a variety of internalizing indicators (e.g. self-esteem [78,85,86]; depression symptoms: [85,86]), and school functioning measures [58,86]. For example, having a non-parent adult mentor was associated with better self-esteem among all children and less anxiety among AO [24,83]. Additionally, connection to the community [32] and more positive community or extracurricular activities [33,87] were associated with decreased internalizing and peer problems.

Addressing poverty to build resilience: Much effort has been made to address financial and health-related disparities among AO [88]. Microfinance interventions that provide cash transfers, as well as financial counseling and mentor support, to AO and their families have shown increasing promise in addressing depression [89,90], self-esteem [25], risky sexual behavior [71,76,82,91], and school performance [76,77]. Other interventions that provided for nutritional, educational, and social needs improved school performance among intervention AO relative

to controls [75,92]. However, research in South Africa has shown that, despite efforts by the government and community-based organizations targeting poverty among AO, only three of 10 such targets were associated with AO mental health; these results suggest the need for interventions targeting AO mental health [88]. Indeed, the few such interventions in the literature have shown some promise in increasing self-efficacy [93] and decreasing anxiety [94] and depression [41]. However, interventions targeting AO must be cautious about providing resources to some children and not others. One qualitative study has shown that a targeted intervention created social division between community members who received assistance and those who did not [95]. Such singling out could contribute to the stigma already experienced by AO, which may harm rather than ameliorate psychological well-being.

While the above studies showed an increased attention to protective factors against mental health problems among AO, the primary focus of previous research has negative outcomes and their associated causes. An increased emphasis on factors that promote resilience is needed in future research in order to more fully understand the connection between AO and mental health, as well as to develop more holistic interventions for at-risk youth.

Transactional effects

While the above studies suggest the impact of AIDS-orphanhood on mental health problems is mediated/moderated by risk and protective factors related to household wealth, caregiver factors, and social discrimination and victimization, few longitudinal studies have been conducted. In one such study, AIDS-orphan status was not directly associated with depression or anxiety at four-year follow-up, but exerted indirect effects via its association with experiencing HIV-related stigma-by-association at both baseline and at follow-up [96]. A second, more recent study by Cluver and et al. utilized Structural Equation Modeling to define the specific pathways through which AIDS-orphanhood impacted mental health. No direct effects were found between AIDS-orphanhood and mental health outcomes. Rather, AIDS-orphanhood was directly associated with stigma and poverty (contextual risk factors), which were in turn associated with more proximal risk factors—such as community violence, child abuse, or inability to pay school fees—whose cumulative effect led to internalizing problems, risky sexual behavior, and educational disadvantage [31]. A similar pathway has been shown to connect AIDS-orphanhood to poorer education outcomes (reduced school enrollment and attendance, increased concentration problems, and poorer grade progression) via the combined mediation effects of poverty and internalizing problems [66]. Thus, consistent with a DP approach where linear patterns of association and causation are replaced by probabilistic, dynamic, nonlinear, and complex conceptual models, AIDS orphanhood, while not the direct cause, is the initiating event in a series of interactions that progressively deteriorate child mental health.

While only a handful of studies have utilized advanced statistical analyses to define transactional and interactional effects, a variety of bivariate relations among risk and protective factors have been explored. These relations may suggest directions for future research in defining the causal pathways between AIDS-orphanhood and emotional, behavioral, and social outcomes.

Social support and related constructs were frequently explored in relation to mental health outcomes within the literature. While the degree of trusting relationship with one's caregiver was not associated independently with depression, as noted above, it was found to have a transactional effect with both HIV-related stigma and traumatic events: lower levels of trust increased the effects of both stigma and trauma on depression [79]. Factors that decreased trust in caregiver-child relations were maternal orphanhood and younger age [27], as well as AIDS-

orphanhood and higher SES [45]. Younger age was also associated with increased effectiveness of caregiving skills to decrease delinquency [84]. Similarly, perceived social support moderated the effect of stigma on depression [79] and trauma exposure on PTSD symptoms [21]. Younger children were more likely to have a natural mentor [83], while females reported more caregiver monitoring and connectedness [68]. Total perceived social support was negatively associated with living with chronically ill surviving parents [46]; and negatively associated with living with biological parent, child abuse, and family conflict, but positively associated with cohabitation with siblings [86]. Family social support was positively associated with average monthly food expenditure and age of caregivers [86]. Sibling support and friend support were protective against being bullied, which was associated with more internalizing problems [53]. Older age and female gender were both associated with greater perceived social support across various sources and functions of support [58]. The interaction of greater food insecurity and more experiences HIV-related stigma also increased the likelihood of a clinical internalizing disorder [97]. Moreover, household wealth was negatively associated with perceived caregiver support [82,86] and positively associated with knowing peers who were sick with or had died from AIDS-related causes [98]—factors that were significantly associated with internalizing.

Long-term system effects

At present, not many studies have examined the impact of parental AIDS-related death upon surviving adult offspring. One cross-sectional study reported that orphans with five or more years since maternal loss had less psychological distress than non-orphans [34], and similar trends have been seen among male orphans [68].

However, longitudinal research observed a different trajectory: depression, anxiety, and PTSD among AIDS-orphans, regardless of gender or orphan type, increased with time since parental death [28]. This increase of internalizing problems with time contradicts the assumption that time mitigates distress. Yet, interventions that target orphans often limit age requirements to children under age 18. None of the intervention studies reviewed included participants above age 19 [23,41,75,91,99]. With mental health of caregivers shown to be a risk factor for poorer mental health among adolescents [40,41], failure to treat the enduring mental health problems of young adult orphans may lead to generational mental health problems and lower quality of life.

National and international impact

AIDS-orphanhood across diverse local communities has a cumulative effect of national and international proportions. Increased rates of delinquency, property destruction, and violence shown among AIDS-orphans [12,70] reveal the burden of AIDS-orphanhood on local law enforcement and criminal justice systems. Moreover, increased risk of HIV infection due to risky sexual behavior among AIDS-orphans [31] contributes to already overburdened health systems within high prevalence areas in the developing world. Finally, greater school dropout rates among AIDS-orphans [35] suggest a lower educated future workforce, decreasing economic growth at the national level. With the number of AIDS-orphans continuing to grow, the increased strain upon social systems and decreased national productivity will inevitably absorb more national resources. Obviously, this impacts international burden. While systematic studies are lacking, the continued focus of the NIMH, NICHD and other funding agencies on reducing the impact of AO remains warranted.

Discussion

Taken together, the above findings concerning internalizing and behavior problems, as well as social and school functioning, suggest AIDS-orphans experience greater psychosocial distress compared to non-orphans. However, compared to other-orphans, AIDS-orphans

appear to exhibit more internalizing and social problems, but do not differ consistently regarding externalizing and school functioning problems. The association of AIDS-orphanhood with internalizing, but not externalizing problems, is the same conclusion reached by the two previous comprehensive literature reviews in the field [6,8]. Thus, there appears to be a spectrum of distress that begins with already high levels of disorders among non-orphans, sees an increase in externalizing among all orphans, and compounds further with greater internalizing among specifically AIDS-affected orphans, particularly during adolescence. Differences along this spectrum of psychopathology are likely the result of different precipitating factors associated with orphanhood generally and AIDS-orphanhood specifically. The consequences of AIDS orphanhood are clearly moderated by a range of risk and protective factors so that a complex picture of equifinality and multifinality emerges. That is, there are multiple pathways by which orphanhood will affect mental health outcomes; at the same time, orphanhood is a robust risk factor for the development of a range of mental health and psychosocial problems.

Implications for research

Despite the advances described in this review, much remains to be done in order to adequately fully understand the sequelae of parental death due to HIV/AIDS in the developing world. First, the complexity of interactions of multiple factors described in this paper point to the necessity of making use of a comprehensive framework, like a DP model, in guiding research. Research that employs simple linear designs will be inadequate to capture the complexity of person-context interactions over time. At present, studies do not typically employ a theoretical framework and the aim of this paper was ultimately to justify the use of the DP model for this purpose.

Second, more longitudinal studies using large community samples are also necessary. As shown in Table 1, the studies that have been carried out in this regard are really by a handful of research groups and cannot represent the problem fully. Because longitudinal studies are expensive, they will require continued commitment from funding bodies.

Third, the integration of a biological perspective is essential as no studies that we are aware of have attempted to measure or capture biological indices of functioning. In this regard, stress reactivity or reward sensitivity may be interesting constructs to examine as factors that may influence developmental trajectories. Especially for pre-school children who are not verbal, the use of psychophysiology measures to assess stress responses can be very informative.

Fourth, in order for future reviews to make use of more rigorous meta-analyses, future research should be conducted using validated and standardized measures that have already been employed in previous research. Similarly, studies routinely neglect to report whether children in studies were aware of the reason for their parents' death. Given the stigma of HIV/AIDS in many developing countries, research would be significantly advanced if more information around disclosure would be available.

Fifth, while this review focused specifically on the mental health effects of children who have lost either/both parents to HIV/AIDS, we acknowledge that the effects of living with a chronically ill parent are as deleterious to mental health. A greater understanding of the unique effects of these two adverse early rearing environments should be explored by future research. Similarly, studies do not routinely report whether children are HIV-positive. It is conceivable that this information is not available, or that it is difficult to obtain. However, research would do well in more carefully assessing HIV status in children affected by HIV/AIDS that will allow future reviews to draw comparisons between these groups.

Similarly, a major limitation of this review is lumping together studies from Sub-Saharan Africa with, for instance, China. Unique contextual

factors may be at play but can only be meaningfully assessed through more thoughtful study designs across multiple sites.

Lastly, an untapped area for future research that undoubtedly plays a role in the cascading effects of HIV/AIDS on children's mental health is resilience factors in children, such as self-efficacy, optimism and agreeableness. These factors may play important protective roles in buffering the effects of parental death due to HIV/AIDS.

Clinical implications

The clinical challenge posed by the mental health sequelae of HIV/AIDS for children orphaned by the epidemic is reflected in the global crisis in scarcity of mental health workers in the developing world [100,101]. For instance, in South Africa there is an estimated rate of 4 psychologists per 100,000 population compared with 26.4 psychologists per 100,000 in the USA [102] and an average of 0.3 psychiatrists per 100,000 [103]. Clearly, mental health services need to be delivered through primary care and community-based outreach. The need for community-based responses to mental health problems was recognized in the mid-1980s [104] due to its cost effectiveness and the benefits of locally-based responses [105,106]. Recent research suggests that community-based mental health can be addressed through community development [107], an emphasis on human care [108] and task shifting ("task sharing"), defined as "delegating tasks to existing or new cadres with either less training or narrowly tailored training" -- an essential response to shortages in human resources for mental health [101]. Although community-based health care has been slow to get off the ground, we now see a world-wide shift towards community-based care for orphans. For instance, in a post-Apartheid era SA (post-1994) there are currently approximately 60 000 community-care workers performing care functions to HIV/AIDS infected and affected individuals [109].

Despite the acknowledgement that community-based care and support services for HIV affected children are important [101], only 21 care/support intervention studies have been conducted [110] and much work need to be done to empower community-based care workers to effectively address the needs of orphans [37]. Compared to HIV prevention and cash transfer interventions, mental health care/support intervention studies are of significantly lower quality, with not a single randomized-controlled trial conducted. Evaluations are predominantly program-focused internal assessments, with methodologies reflecting a desire to generate immediate and context-specific lessons for program implementers, providing limited opportunities to generalize beyond the intervention.

In contrast to community-based care and support interventions, more effort has been made to address financial and health-related disparities among AO [88]. Some work suggests that providing financial assistance to AO and their families (e.g., cash transfers, financial counseling) may be effective in reducing internalizing psychopathology [89,90], as well as behavioral difficulties [71,76,77,82,91]. Similarly, interventions targeting the physical well-being of AO have demonstrated improvements in school performance [75,92]. Yet, other work suggests that targeting AO mental health indirectly through socioeconomic improvement may have more modest effects [88]. Therefore, more interventions directly targeting AO mental health are needed. The few that have been developed have shown promising results [68,93,94], calling for the need for greater emphasis on mental health treatment development for this population. Moreover, given the common underlying mechanisms driving mental health problems among AO and non-AO children (e.g., trauma exposure), and the increased stigma caused by singling out AO for intervention [95], future intervention development may be most effective by being inclusive of both AO and non-AO children.

In summary, the effects of HIV/AIDS on children's mental health in the developing world continue to be devastating. While the last 20 years have

seen a marked improvement in addressing this problem, efforts need to continue to both better understand and intervene effectively to reduce the generational impact on mental health of millions of children.

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