



Causes and consequences of psychological distress among orphans in eastern Zimbabwe

Journal:	<i>AIDS Care - Psychology, Health & Medicine - Vulnerable Children and Youth Studies</i>
Manuscript ID:	AC-2009-06-0284.R1
Journal Selection:	AIDS Care
Keywords:	OVC, Psychological distress, Zimbabwe, Theoretical framework, Determinants



Causes and consequences of psychological distress among orphans in eastern Zimbabwe

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Running header: *Psychological distress amongst orphans in eastern Zimbabwe*

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Word count: 2,997 (249)
December 2009

Abstract

Substantial resources are invested in psychological support for children orphaned or otherwise made vulnerable in the context HIV/AIDS (OVC). However, there is still only limited scientific evidence for greater psychological distress amongst orphans and even less evidence for the effectiveness of current support strategies. Furthermore, programmes that address established mechanisms through which orphanhood can lead to greater psychological distress should be more effective. We use quantitative and qualitative data from eastern Zimbabwe to measure the effects of orphanhood on psychological distress and to test mechanisms for greater distress amongst orphans suggested in a recently published theoretical framework.

Orphans were found to suffer greater psychological distress than non-orphans (sex- and age-adjusted co-efficient: 0.15; 95% CI 0.03-0.26; $P=0.013$). Effects of orphanhood contributing to their increased levels of distress included trauma, being out-of-school, being cared for by a non-parent, inadequate care, child labour, physical abuse, and stigma and discrimination. Increased mobility and separation from siblings did not contribute to greater psychological distress in this study. Over 40% of orphaned children in the sample lived in households receiving external assistance. However, receipt of assistance was not associated with reduced psychological distress.

These findings and the ideas put forward by children and caregivers in the focus group discussions suggest that community-based programmes that aim to improve caregiver selection, increase support for caregivers, and provide training in parenting responsibilities and skills might help to reduce psychological distress. These programmes should be under-

pinned by further efforts to reduce poverty, increase school attendance and support out-of-school youth.

Causes and consequences of psychological distress among orphans in eastern Zimbabwe

Introduction

HIV is causing enormous increases in adult mortality and orphanhood in sub-Saharan African countries with generalised epidemics (Barnett and Whiteside, 2002; Watts et al., 2005). There is great concern, therefore, for the psychological well-being of children orphaned or otherwise made vulnerable in the context of HIV/AIDS (OVC) (Barnett and Blaikie, 1992; Barbarin and Richter, 2007) and substantial funds are being channelled into programmes of psychological support (UNAIDS & UNICEF, 2004; Horizon Report, 2005).

There is increasing scientific evidence that OVC, in general, suffer increased psychological distress in sub-Saharan African settings (Makame et al., 2002; Atiwane et al., 2005; Basaza and Kaija, 2002; Chatterji et al., 2005; Foster et al., 1997; Oburu, 2004; Nampanya-Serpell, 2000; Cluver and Gardner, 2007). However, less is known about the consequences of psychological distress in these contexts and understanding about the effectiveness of interventions remains limited (King et al., 2007). There is growing recognition that not all OVC require external interventions (Evans, 2005; Masten, 2001; Nyamukapa et al., 2008), and that, in some instances, inappropriately targeted interventions can be harmful (Neimeyer, 2000) and may undermine resilience acquired through effective responses to adversity including access to community support (Summerfield, 2004). Therefore, a better understanding is needed of the characteristics and circumstances of children who require support (i.e. moderating factors) as well as the factors that lie on (i.e. mediating factors) the

causal pathway between orphanhood and psychological distress (Cluver and Gardner, 2007; Nyamukapa et al. 2008).

In this paper, we address this gap in understanding through an in-depth study conducted in Manicaland, eastern Zimbabwe. We use detailed quantitative and qualitative data to test a recently published theoretical framework describing factors that moderate and mediate psychological distress amongst OVC (Nyamukapa et al., 2008) and to describe local perceptions on how these factors might be addressed.

Methods

Theoretical framework

The theoretical framework used in the study is shown in Figure 1. A full description of the framework and its derivation has been published (Nyamukapa et al. 2008). In brief, the effect of orphanhood on psychosocial distress depends on the social context. Within a given social context, children may be more or less likely to suffer from psychological distress (or to develop resilience) depending on ‘moderating’ factors such as their sex, age, nature, social background and form and timing of parental loss. Orphanhood can result in immediate, possibly short-term, effects (e.g. trauma) as well as intermediate effects that develop over time and have a more gradual effect on psychological well-being (e.g. poor clothing). These ‘mediating’ factors can cause psychological distress and are more common in orphaned children. Psychological distress, in turn, can have a number of consequences including a greater propensity to engage in risky sexual behaviour.

A number of different forms of psychological distress can result from losing a parent or caregiver. However, in the current study, we focus on depression and anxiety.

Quantitative data

A sample of 1,469 children aged 0-18 years, stratified to give roughly equal numbers of paternal, maternal and double orphans and non-orphans, was drawn at random from the second round of a phased household survey in eight rural locations in Manicaland province, eastern Zimbabwe between February 2002 and March 2003. One thousand and

three (68.3%) of these children were traced and agreed to be interviewed approximately one year later in each location (December 2002 to March 2004). Interviews were conducted by qualified social workers and questions on psychological distress were asked to 551 children aged 12-18 years (272 male and 279 female); 527 (96%) children provided complete data - 185 double orphans, 109 maternal orphans, 150 paternal orphans and 83 non-orphans. The questions were adapted from the World Health Organisation Self-Report Questionnaire on depression and anxiety which has been validated in Zimbabwe and 12 other African countries (Beusenberg and Orley, 1994).

A psychological distress variable was constructed using factor analysis. Because the factor analysis suggested a single factor solution without great variability on factor loadings, an outcome score was created by summing all variables with factor loadings ≥ 0.3 . Seventeen items with factor loadings of ≥ 0.3 were obtained from the 20 questions asked to children relating to psychological distress (Table 1). Based on these 17 items, the Cronbach alpha reliability coefficient was 0.73.

Dichotomous variables were created for each moderating factor and immediate and intermediate effect of orphanhood. Moderating factors investigated were sex, age (12-15 years versus ≥ 16 years), form of orphanhood (double, maternal and paternal) and duration of parental loss (0-1 year, 2-4 years, 5-17 years, and ≥ 18 years). Immediate effects of orphanhood investigated were trauma from living in a household with a death in the last 3 years or a sick adult member, stigma and discrimination (being treated worse than other children in the household), frequent residence changes (> 1 move), and residence in a poorer household (poorest quintile of households based on ownership of assets). Intermediate effects examined were care by a less closely-related caregiver (non-parent), inadequate provision of basic needs (health care, school fees and clothing by carer), inconsistent parenting (> 1 change), child labour (waged labour outside the household or > 20 hours work per week on the family land), physical abuse (beaten by an adult household member in the last month), living apart from siblings, and not being enrolled in school. The effect of external support (targeted to the household or direct to the OVC) was investigated as a possible mitigating factor for the effect of orphanhood on psychological distress.

Finally, possible consequences of psychological distress were assessed using two variables describing risk behaviours for the 280 children aged 15 years and over - commencement of sexual activity and substance abuse (alcohol and other drugs).

The psychological distress scores were 'count' data and were therefore modelled using Poisson regression. Psychological distress scores were compared for orphans versus non-orphans and the possible moderating effects of sex and age on the relationship between orphanhood and psychological distress were evaluated. Multivariate models were developed to: (i) measure associations between the hypothesized moderating and mediating factors and psychological distress; and (ii) establish whether increased exposure to these determinants accounted for the greater psychological distress observed in orphaned children. Logistic regression was used to investigate associations between psychological distress and risky behaviours controlling for sex and age.

Qualitative methods

Qualitative investigations were conducted to identify locally-acceptable intervention strategies that addressed the mediating factors associated with psychological distress. Thirteen focus group discussions (FGDs) were held with children (n=4) and caregivers (n=4), local community members (n=2), adults orphaned during childhood (n=2), and survey interviewers (n=1). Village community workers recruited 8-13 participants for each FGD with roughly equal numbers of males and females. The FGDs were held within the community and were facilitated by CN with help from another qualified social worker. The discussions were held in the local language (*Shona*) and were recorded on tape and flipcharts. The topics covered in the FGDs included the local understandings of psychological distress, the relevance and suitability of the study methods, the evolution and adequacy of the extended family orphan care system, and measures that might reduce children's psychological distress. Only findings on the last of these topics are presented in this paper.

The data were translated from *Shona* into English and analysed manually (by CN) using content theme analysis. This involved coding recurring themes and interpreting the coded

data. Reports from the different groups were compared and differences and similarities were noted.

The study was approved by the St. Mary's Research Ethics Committee (reference number: 04/Q0403/130), the Biomedical Research and Training Institute (reference number AP65/05), and the Medical Research Council of Zimbabwe (reference number MRCZ/A/990).

Results

Associations between orphanhood and psychological distress

Girls reported more psychological distress than boys (Coeff: 0.22; 95% CI 0.15-0.31). Older children reported less psychological distress than younger children but the difference was only statistically significant for boys (Coeff: -0.27; 95% CI -0.50- -0.05). After controlling for sex and age, orphans showed greater psychological distress than non-orphans (Coeff: 0.15; 95% CI 0.03-0.26; $P=0.013$) (Figure 2a). This was also true for girls and boys separately. For girls, the heightened psychological distress was most evident in paternal orphans. In boys, paternal and double orphans were worst affected.

For paternal orphans, greater psychological distress was seen for all durations of parental loss (Figure 2b). Maternal orphans who lost their parents >4 years ago reported *less* psychological distress than those whose mothers were still alive, suggesting high levels of resilience.

Causal pathways between orphanhood and psychological distress

The frequencies of experiencing the effects of orphanhood hypothesized to lie on the causal pathway between orphanhood and greater psychological are shown in Table 2, for all children in the study sample. All categories of orphan were more likely than non-orphans to live in households with a recent death (69% for all orphans *vs.* 5% for non-orphans; $P<0.001$) and to be cared for by a non-parent (61% *vs.* 19%; $P<0.001$). Paternal orphans were the most likely to live with a seriously ill household member (57%) and to

experience child labour (36%). Maternal orphans were five times more likely to experience stigma than non-orphans (10% vs. 2%; $P=0.05$). More maternal and double orphans than non-orphans had experienced relocation (14% and 14% vs. 4%; $P<0.05$), changes in caregiver (23% and 28% vs. 4%; $P<0.01$), and separation from siblings (25% and 24% vs. 12%; $P<0.05$). Residence in a poorer household and child abuse were equally common in the orphan and non-orphan groups ($P>0.05$).

Tests for associations between immediate and intermediate effects of orphanhood and psychological distress showed strong positive associations for: (i) living in a household with a recent death, (ii) living in a household with a seriously ill adult member, (iii) suffering stigma, (iv) inadequate care, (v) child labour, (vi) physical abuse, and (vii) being out of school (Table 2). Multiple changes in residence and caregiver, residence in a poorer household, care by a non-parent, and sibling separation were not associated with greater psychological distress.

In the multivariate models of orphanhood and psychological distress, the effects of orphanhood (overall) and double orphanhood seen in the sex- and age-adjusted models became non-significant after controlling for the effects of orphanhood, suggesting that these factors do lie on the causal pathway (Table 3). For paternal orphans, the effect of orphanhood weakened but remained borderline statistically significant. Trauma, stigma, inadequate care, child labour, child abuse, and being out of school contributed to orphans' greater psychological distress.

Double (45%), maternal (41%) and paternal (40%) orphans were all more likely than non-orphans (12%) to live in households that received external support ($P<0.001$). However, whilst residence in a household receiving support had a (non-significant) protective effect against psychological distress for maternal orphans, this was associated with *higher* distress amongst double and paternal orphans and had no effect for orphans overall (Table 3).

Consequences of psychological distress for early sexual risk behaviour and substance abuse in adolescence

Relatively few children in the study had started sex (8%) or taken alcohol or other drugs (7%). Psychosocial distress is a standardized variable (Mean (M) = 0, Standard deviation

(SD) = 1) so the odds ratios in this analysis can be interpreted as increased odds of engaging in risk behaviour associated with a 1 SD increase in psychosocial distress. Psychosocial distress was not associated with having engaged in sex (OR: 1.05, 95% CI 0.88-1.26; $P=0.5$) or having drunk alcohol or smoked cigarettes (OR: 1.16, 0.97-1.39; $P=0.1$).

Measures to reduce children's psychological distress (qualitative research findings)

Most of the factors associated with psychological distress in the survey data related to the nature and quality of care. In the qualitative data, concerns were frequently expressed about the characteristics of caregivers and it was suggested that more careful selection of caregivers might help to address these problems.

“A carer should be someone who volunteers ... They should be sociable, not mean, and able to guide the child morally and provide food and clothes. Ideally, they should be a relative but ... they could be anybody with these qualities. Even among relatives, some do and some do not. Those who don't will ill-treat orphans by giving them hard chores or chores that are inappropriate for their age, refuse them food, or fail to send them to school or to buy them good clothes. Only those who can treat orphans well ... and do things that help the child forget the pain of the loss should take in children.”

Children's focus group discussion (mixed OVC and non-OVC), subsistence farming area

Adults agreed with these suggestions and, generally, grandparents were preferred as caregivers for orphaned children because of their maturity, wisdom in understanding children's emotional needs, experience with raising children, and fewer responsibilities. There was less agreement, however, about whether children themselves should be involved in selecting their caregivers.

The qualitative data also suggested that more support for caregivers might (indirectly) reduce orphans' psychological distress. Often, caregivers had also suffered the loss of close relatives and their own grief sometimes caused them to be withdrawn, irritable and insensitive.

“ ... They (caregivers) need to be trained on childcare issues to prevent them from ill-treating children in their care. They too are grieving and, like us, need help. They should get somebody to sit down with them and comfort them ... to help them understand the consequences of their loss ...and the implications of their being emotionally drained on the children they are looking after ...”

Female, paternal orphan, aged 16 years,
Children’s focus group discussion, forestry estate

Regular school attendance was seen as another way of minimising orphans’ psychological distress. Orphaned children viewed school as a safe haven for acquiring life skills (including handling emotional problems), for grieving (through sharing experiences with others in similar situations), and for creating social networks. The school environment offered children time to be children.

“If we don’t go to school, we miss the chance to learn a lot of knowledge about life and skills. You may not be good in school but just being in school opens your mind to a lot of things like how to make use of available resources (e.g. agriculture) and how to solve problems. Bible teaching and teacher instructions help mould behaviour and give direction.”

Male, paternal orphan, aged 17 years,
Children’s focus group discussion, subsistence farming area

Discussion

As in a number of studies now in sub-Saharan Africa, we found associations between orphanhood and psychological distress in populations in eastern Zimbabwe where HIV prevalence in adults exceeds 20% (Gregson et al., 2006) and orphan levels continue to rise

(Watts et al., 2005). However, unlike in a larger national study in Zimbabwe (Nyamukapa et al., 2008), we did not find evidence that greater psychological distress might contribute to the earlier sexual risk behaviour reported for orphans in this population (Gregson et al., 2005) and elsewhere (Birdthistle et al., 2008; Kang et al. 2008; Thurman et al. 2006).

On average, boys and girls experiencing all forms of orphanhood had higher levels of psychological distress than their non-orphaned counterparts. However, a substantial minority of orphans did not exhibit higher than average distress and maternal orphans whose mothers had died more than five years previously tended to have lower levels of psychological distress than non-orphans at any given age. This finding is consistent with suggestions that orphaned children may acquire resilience over time (Masten, 2001) although a similar result was not obtained for paternal orphans.

Being out of school was associated with greater psychological distress in childhood and was more common in orphans, as has been found in Zimbabwe nationally (Nyamukapa et al., 2008) and in South Africa (Cluver and Gardner, 2007). Inadequate care, in the form of basic needs not being met, was also associated with greater psychological distress; a finding which is consistent with data from a national survey in Zimbabwe showing a positive association between extreme poverty and psychological distress (Nyamukapa et al., 2008). In addition, being cared for by someone other than a parent, child labour, physical abuse, and (less commonly reported) stigma and discrimination were associated with psychological distress and more common in orphans. After adjusting for these experiences, the statistical associations between orphanhood and psychological distress disappeared or weakened, suggesting that they contribute to the higher levels of distress observed in orphans.

The study is limited by its relatively small sample size and use of cross-sectional data. Associations found in the data, such as those between psychological distress and risky behaviours, may be due to reverse causation. The study relied on self-reports by children; thus, we were unable to investigate psychological distress in children under 12 years of age and the data may be subject to reporting bias. Children – and orphaned children in particular – may tend to under-report (to avoid disclosure of their orphan status) or exaggerate (to obtain assistance) their levels of psychological distress. The study design did not permit investigation of the effects of community level factors that might moderate the effects of orphanhood.

In a study that purposefully oversampled orphans, 37% of children lived in households receiving external OVC support. As in a national survey in Zimbabwe (Nyamukapa et al., 2008), psychological distress in children reached by external support programmes remained high even after adjusting for other factors including extreme poverty. Longitudinal studies are needed to scientifically evaluate the impact of these programmes particularly since they typically target those in greatest need and the benefits of support may take time to show through. However, our findings could also reflect limitations in these programmes. Addressing factors that lie on the causal pathway between orphanhood and psychological distress could increase the effectiveness of these programmes. Many of these factors relate closely to the quality of care for orphaned children and focus group participants in the study suggested that this might be improved by addressing shortcomings in the selection of caregivers and the support made available to them. Thus, specific programmes might include community-based counselling and support for caregivers and courses in parenting skills and responsibilities – which, in turn, could include modules on caregiver selection and support, children’s rights (e.g. in relation to child labour, abuse, basic needs and school attendance), and stigma.

Acknowledgements

The study was funded by the World Bank through the Partnership for Child Development.

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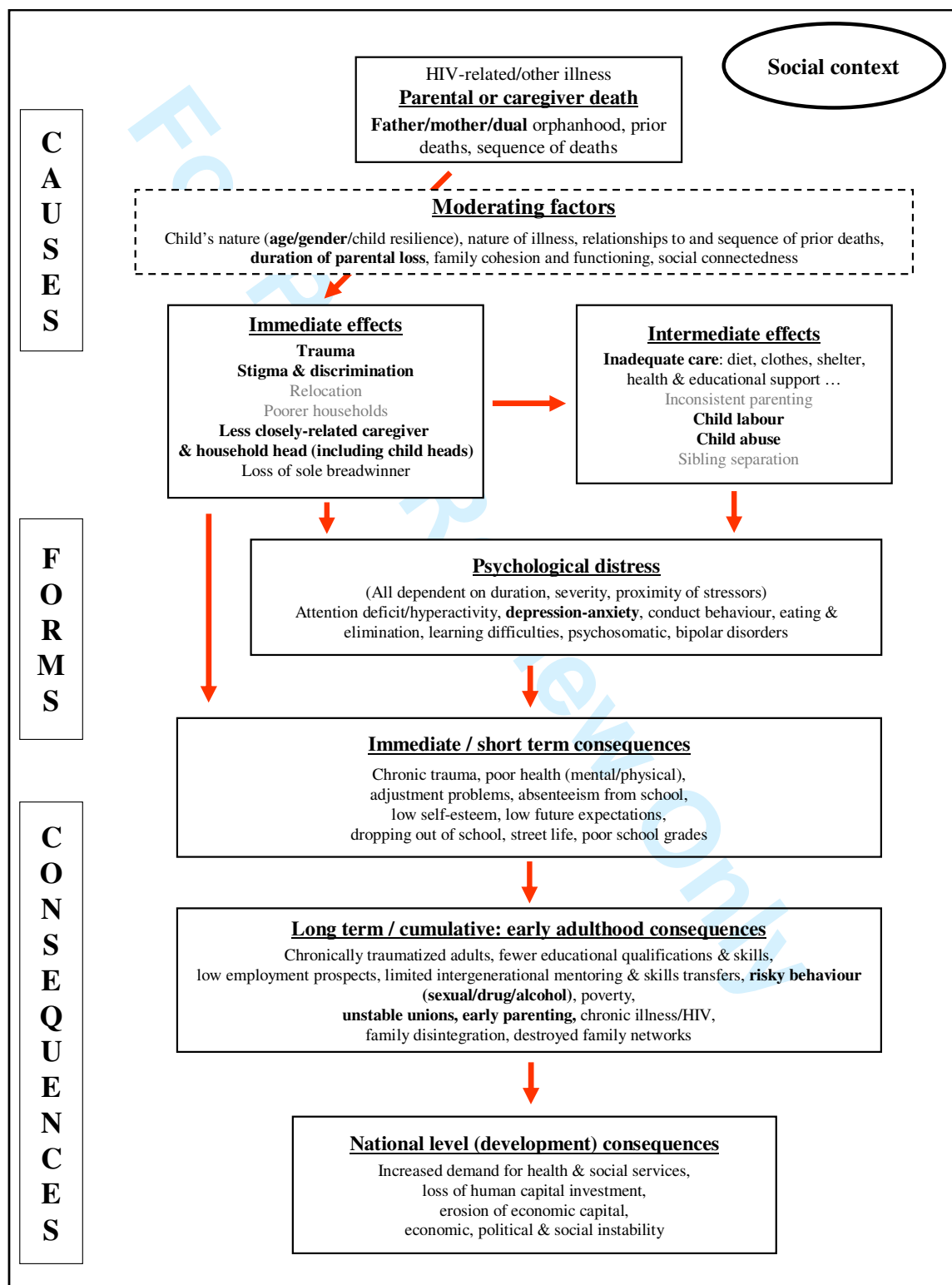
Figure captions

Figure 1 - Theoretical framework on the causes and consequences of psychological distress amongst orphans in the context of a large-scale HIV/AIDS epidemic

Figure 2 - Associations between orphanhood and psychological distress by sex and form and duration of orphanhood

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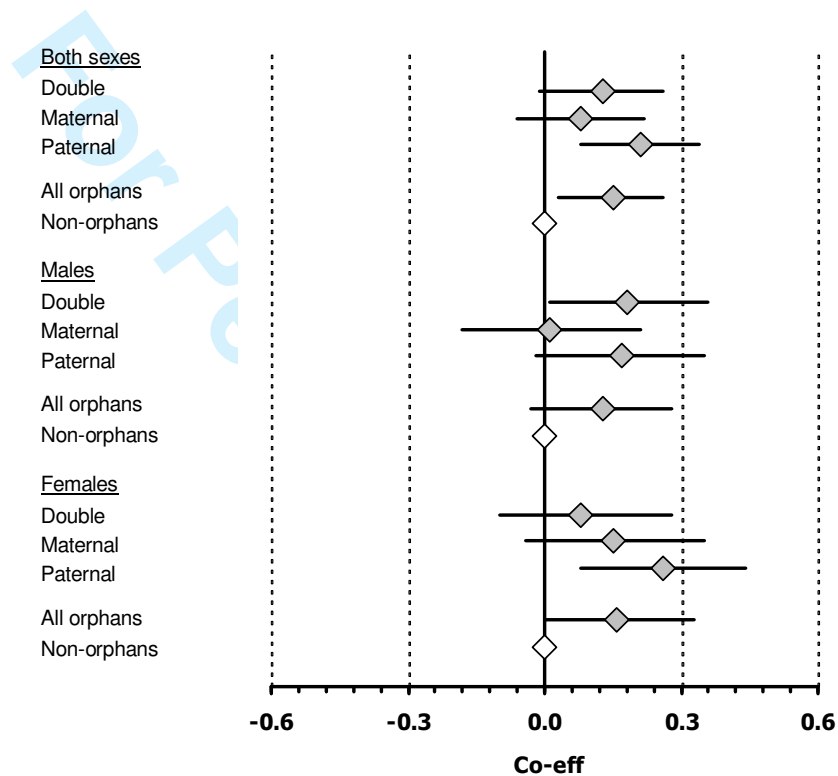
Figure 1



Note: Adapted from Nyamukapa et al. 2008. **Bold type** indicates effects for which evidence was found in the study. **Grey type** indicates effects tested in the study for which no evidence was found. **Standard type** indicates effects not tested in the current study.

Figure 2

(a) Form of orphanhood, by sex of child



(b) Duration of orphanhood, by form of orphanhood

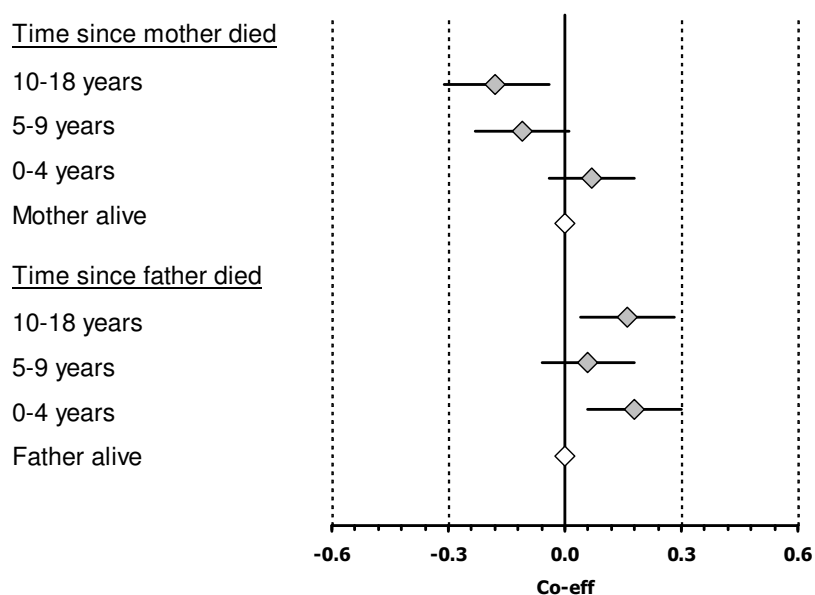


Table 1. Psychosocial distress variable items factor loading results: children's responses (12-18 years olds)

Question items	Factor loadings
1 Do you cry more than usual?	0.55
2 Do you feel tense, nervous or worried?	0.54
3 Do you feel tired all the time?	0.54
4 Do you have uncomfortable feelings in your stomach?	0.48
5 Do you find it difficult to make decisions?	0.47
6 Is your appetite poor?	0.46
7 Do you feel more unhappy than usual?	0.45
8 Do you feel a worthless person?	0.44
9 Do your hands shake?	0.43
10 Do you sleep badly?	0.43
11 Is your digestion poor?	0.40
12 Are you easily frightened?	0.40
13 Do you get tired easily?	0.39
14 Do you have trouble thinking clearly?	0.38
15 Do find it difficult to enjoy your daily activities?	0.37
16 Has the thought of ending your life been in your mind?	0.31
17 Do you often have headaches?	0.31
Question items with <0.3 factor loadings: not used	
18 Is your daily work suffering?	
19 Are you able to play a useful part in life?	
20 Have you lost interest in things?	

Table 2. Hypothesised determinants and observed effects on psychological distress in 527 children aged 12-18 years

Effects of orphanhood	Information source	Number	%	Effect on psychosocial distress		
				Coeff	95% CI	P-value
Immediate effects						
Trauma - death in household	Caregiver	312	59	0.10	0.02-0.18	0.014
Trauma - illness in household	Caregiver	266	50	0.10	0.03-0.18	0.010
Stigma and discrimination	Child	29	6	0.41	0.27-0.56	<0.001
Relocation	Child & caregiver	56	11	0.10	-0.03-0.22	0.121
Residence in poorest quintile of households	Caregiver	178	34	0.00	-0.08-0.08	0.988
Less closely-related caregiver (non-parent)	Child & caregiver	360	68	0.04	-0.04-0.12	0.327
Intermediate effects						
Inadequate care	Child & caregiver	417	79	0.24	0.14-0.35	<0.001
Not enrolled in school	Child	76	14	0.26	0.14-0.38	<0.001
Inconsistent parenting	Child & caregiver	86	16	-0.02	-0.12-0.09	0.774
Child labour	Child	172	33	0.19	0.10-0.27	<0.001
Physical abuse	Child	75	14	0.27	0.17-0.38	<0.001
Sibling separation	Caregiver	102	19	-0.08	-0.19-0.02	0.114
Mitigating factors						
Household received external support	Caregiver	196	37	0.03	-0.05-0.11	0.498

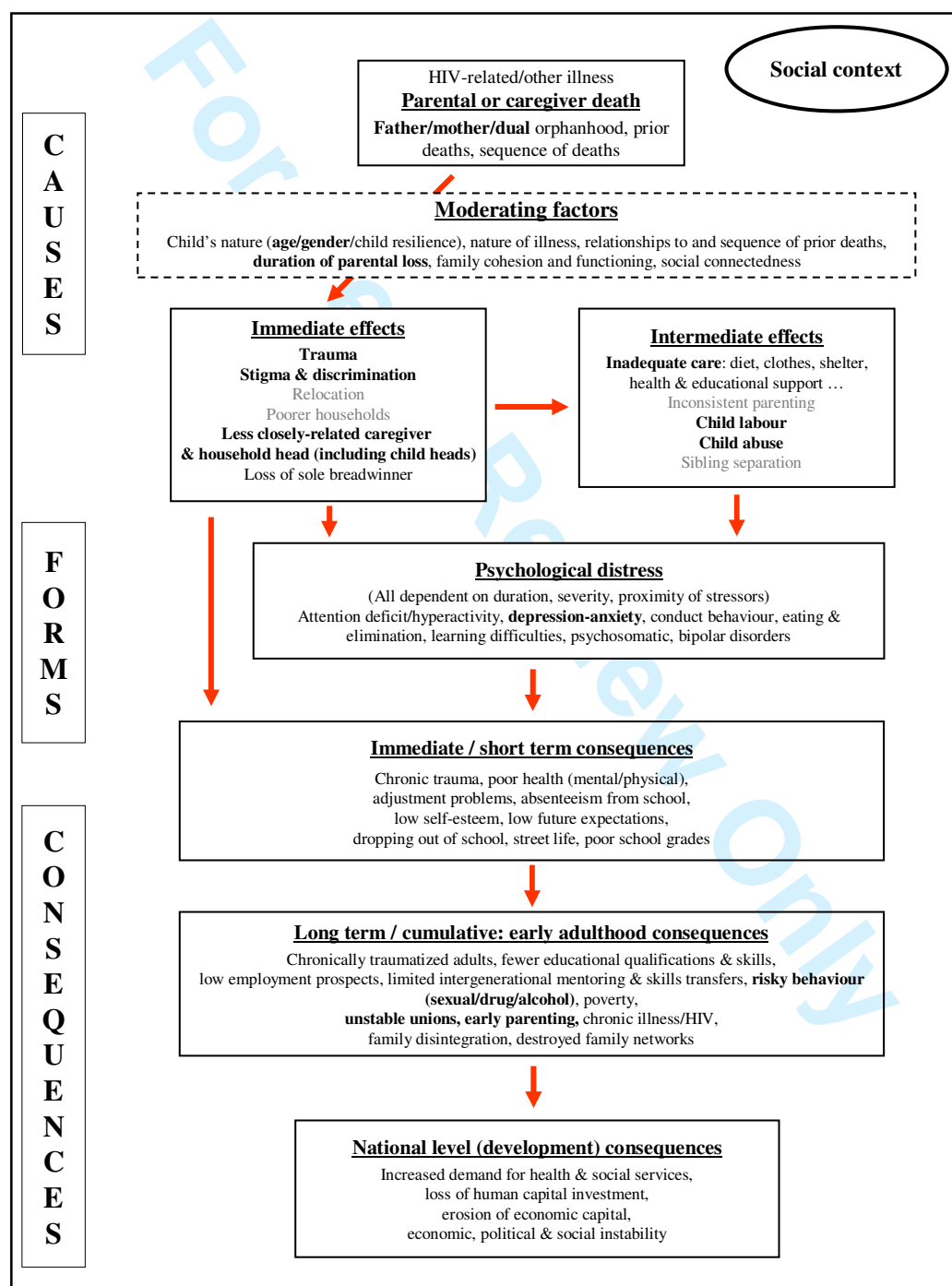
Table 3. Multivariate Poisson regression tests for experiences on the causal pathway between orphanhood and psychological distress, by form of orphanhood, in children aged 12-18 years

Model / effects of orphanhood	Orphans (444)		Double orphans (185)		Maternal orphans (109)		Paternal orphans (150)	
	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
Sex- and age-adjusted model	0.15	0.013	0.13	0.040	0.08	0.245	0.21	0.001
Full multivariate model	0.07	0.339	-0.04	0.712	-0.02	0.873	0.17	0.044
Immediate effects								
Trauma - death in household	0.10	0.040	0.11	0.214	0.17	0.063	0.02	0.767
Trauma - illness in household	0.09	0.028	0.08	0.157	-0.02	0.837	0.22	0.001
Stigma and discrimination	0.26	<0.001	0.23	0.066	0.42	0.001	0.31	0.027
Relocation	0.10	0.151	0.14	0.167	0.17	0.192	-0.07	0.636
Residence in poorest quintile of households	-0.08	0.090	-0.01	0.928	-0.20	0.011	-0.05	0.432
Less closely-related caregiver (non-parent)	0.09	0.046	-	-	0.02	0.842	0.11	0.137
Intermediate effects								
Inadequate care	0.19	0.001	0.23	0.007	0.30	0.001	0.14	0.110
Not enrolled in school	0.17	0.009	0.24	0.009	-0.03	0.808	0.16	0.089
Inconsistent parenting	-0.03	0.611	-0.08	0.249	0.11	0.345	0.19	0.207
Child labour	0.13	0.006	0.16	0.015	0.14	0.122	0.13	0.061
Physical abuse	0.21	<0.001	0.20	0.010	0.22	0.026	0.34	<0.001
Sibling separation	-0.11	0.044	0.00	0.963	-0.24	0.018	-0.04	0.711
Mitigating factors								
Household received external support	0.00	0.994	0.16	0.017	-0.13	0.140	0.17	0.044

For Peer Review Only

Causes and consequences of psychological distress among orphans in eastern Zimbabwe

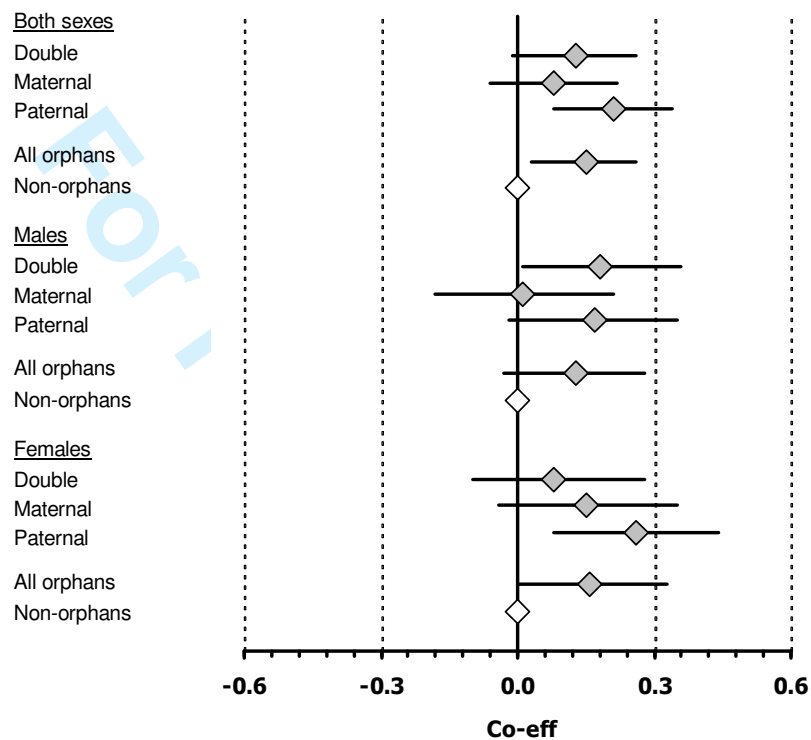
Figure 1 – Theoretical framework on the causes and consequences of psychological distress amongst orphans in the context of a large-scale HIV/AIDS epidemic



Note: Adapted from Nyamukapa et al. 2008. Bold type indicates effects for which evidence was found in the study. Grey type indicates effects tested in the study for which no evidence was found. Standard type indicates effects not tested in the current study.

Figure 2

(a) Form of orphanhood, by sex of child



(b) Duration of orphanhood, by form of orphanhood

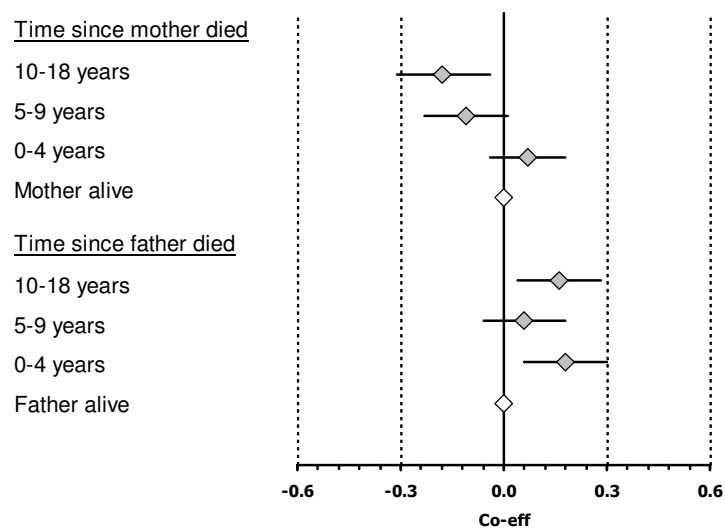


Table 1. Psychosocial distress variable items factor loading results: children's responses (12-18 years olds)

Question items	Factor loadings
1 Do you cry more than usual?	0.55
2 Do you feel tense, nervous or worried?	0.54
3 Do you feel tired all the time?	0.54
4 Do you have uncomfortable feelings in your stomach?	0.48
5 Do you find it difficult to make decisions?	0.47
6 Is your appetite poor?	0.46
7 Do you feel more unhappy than usual?	0.45
8 Do you feel a worthless person?	0.44
9 Do your hands shake?	0.43
10 Do you sleep badly?	0.43
11 Is your digestion poor?	0.40
12 Are you easily frightened?	0.40
13 Do you get tired easily?	0.39
14 Do you have trouble thinking clearly?	0.38
15 Do find it difficult to enjoy your daily activities?	0.37
16 Has the thought of ending your life been in your mind?	0.31
17 Do you often have headaches?	0.31
Question items with <0.3 factor loadings: not used	
18 Is your daily work suffering?	
19 Are you able to play a useful part in life?	
20 Have you lost interest in things?	

Table 2. Hypothesised determinants and observed effects on psychological distress in 527 children aged 12-18 years

Effects of orphanhood	Information source	Number	%	Effect on psychosocial distress		
				Test for difference		
				Coeff	95% CI	P-value
Immediate effects						
Trauma - death in household	Caregiver	312	59	0.10	0.02-0.18	0.014
Trauma - illness in household	Caregiver	266	50	0.10	0.03-0.18	0.010
Stigma and discrimination	Child	29	6	0.41	0.27-0.56	<0.001
Relocation	Child & caregiver	56	11	0.10	-0.03-0.22	0.121
Residence in poorest quintile of households	Caregiver	178	34	0.00	-0.08-0.08	0.988
Less closely-related caregiver (non-parent)	Child & caregiver	360	68	0.04	-0.04-0.12	0.327
Intermediate effects						
Inadequate care	Child & caregiver	417	79	0.24	0.14-0.35	<0.001
Not enrolled in school	Child	76	14	0.26	0.14-0.38	<0.001
Inconsistent parenting	Child & caregiver	86	16	-0.02	-0.12-0.09	0.774
Child labour	Child	172	33	0.19	0.10-0.27	<0.001
Physical abuse	Child	75	14	0.27	0.17-0.38	<0.001
Sibling separation	Caregiver	102	19	-0.08	-0.19-0.02	0.114
Mitigating factors						
Household received external support	Caregiver	196	37	0.03	-0.05-0.11	0.498

Table 3. Multivariate Poisson regression tests for experiences on the causal pathway between orphanhood and psychological distress, by form of orphanhood, in children aged 12-18 years

Model / effects of orphanhood	Orphans (444)		Double orphans (185)		Maternal orphans (109)		Paternal orphans (150)	
	Test for difference		Test for difference		Test for difference		Test for difference	
	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
Sex- and age-adjusted model	0.15	0.013	0.13	0.040	0.08	0.245	0.21	0.001
Full multivariate model	0.07	0.339	-0.04	0.712	-0.02	0.873	0.17	0.044
Immediate effects								
Trauma - death in household	0.10	0.040	0.11	0.214	0.17	0.063	0.02	0.767
Trauma - illness in household	0.09	0.028	0.08	0.157	-0.02	0.837	0.22	0.001
Stigma and discrimination	0.26	<0.001	0.23	0.066	0.42	0.001	0.31	0.027
Relocation	0.10	0.151	0.14	0.167	0.17	0.192	-0.07	0.636
Residence in poorest quintile of households	-0.08	0.090	-0.01	0.928	-0.20	0.011	-0.05	0.432
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Child labour	0.13	0.006	0.16	0.015	0.14	0.122	0.13	0.061
Physical abuse	0.21	<0.001	0.20	0.010	0.22	0.026	0.34	<0.001
Sibling separation	-0.11	0.044	0.00	0.963	-0.24	0.018	-0.04	0.711
Mitigating factors								
Household received external support	0.00	0.994	0.16	0.017	-0.13	0.140	0.17	0.044