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Child and Household Social-Economic Vulnerability: Determinants Transition from Moderate and Critical Vulnerability Levels in Rural Uganda

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Abstract
The study aimed to determine the factors that affect transition from moderate and critical levels of vulnerability to improved vulnerability status. The central argument of this paper is that individual and household characteristics differ and therefore the effect of programmatic interventions on vulnerability also differs. The assessment is based on a pre and post study of a cohort of 17,484 vulnerable households from 35 districts in rural Uganda. Vulnerability transition was studied at two levels; (i) any improvement of the vulnerability score and (ii) improvement from critical level of vulnerability. The factors associated with transition from any level of vulnerability were; region, disability of the child, parenthood status, household size, age of the parent/guardian as well as participation in the activities namely; economic strengthening, child protection and access to legal services and family strengthening ($p < 0.05$). Similarly, the factors associated with transition from critical vulnerability were; region, disability of child, parenthood status, household size, as well as participation in the activities namely economic strengthening, child protection and legal services and family strengthening ($p < 0.05$). In conclusion, whereas interventions like economic strengthening, family strengthening, child protection, and food security and nutrition were associated with improved vulnerability, the characteristics of the individuals and the surrounding household characteristics play a critical role in transition from vulnerability. We conclude that interventions alone are not enough to support transition from vulnerability, but rather it is a combination and an interplay of different influences including individual and household characteristics. There is no 'one size fits them all' solution to child vulnerability improvement. This study highlights the need to strive for solutions that recognize the unique characteristics, needs and diversity among different vulnerable populations.

Keywords Child · Household vulnerability · Transition · Determinants

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Introduction

Child and household vulnerability are a serious development agenda globally. Available evidence shows that millions of the world's most vulnerable children have not benefitted from development efforts in the last 15 years despite significant investment and achievements (UNICEF 2016b). UNICEF (ibid) further concludes that the global community risks failing millions of children if it does not focus on the most disadvantaged in its new 15-year development roadmap. The report shows, for instance, that regarding attendance in formal education settings among school-aged children, while 84.7% of children were currently enrolled in school, half (45.8%) reported absenteeism. Research further shows that children who live in households with social and economic vulnerability experience very poor welfare indicators (UNICEF 2016b, 2015a; Male and Wodon 2017). In a child focused millennium development progress report, UNICEF (2016b), reveals that despite significant achievements addressing child vulnerabilities over the last 15 years, unequal opportunities have left millions of children living in poverty, dying before they turn five years, without schooling and suffering chronic malnutrition. In Uganda, social -economic status of children in households with vulnerability are portrayed through poor education, health and social development indicators (World Bank 2016). The Orphans and Vulnerable Children (OVC) Situation Analysis Report (UNICEF 2015b) places the level of vulnerability among children in Uganda at 96%. Of the 17.1 million children below 18 years, 8% (1.3 million) were classified as critically vulnerable, and 43% (7.3 million) moderately vulnerable, which presents an enormous challenge for Uganda in terms of empowering and improving their situation (UNICEF 2015b).

This elevated level of vulnerability is attributed to poverty, HIV and AIDS, past internal conflicts and general gaps in the national response. Factors that are demographic and socio-economic in nature plus regional inequalities and, effects of conflicts have been found to associate with both child and household vulnerability (Oleke et al. 2006; UNICEF 2015b). However, the association between a programme intervention and child and household vulnerability improvements has got minimal attention in Uganda. Never the less, some studies have attempted to explore this association. Smitha et al. (2001), alludes that both government and Civil Society Organisation intervention could have brought about economic diversification which led to transition from critical to moderate or no vulnerability among vulnerable women and children in Rakai and Kumi rural districts. This study demonstrates that comprehensive micro-finance provision would reduce depression among orphaned children in Uganda. Furthermore, Han et al. (2013) found that the economic empowerment was associated with improved health and mental health of orphaned adolescents in Uganda. These studies point out that interventions could positively associate with transition from critical to moderate vulnerability. The study above were, however, limited in their geographical scope and only and focused on mental health. The findings cannot be generalized. This paper examines the association between intervention by the *Sustainable Comprehensive Responses for Orphans and Vulnerable Children and their families* (SCORE) project and child and household transition from critical to moderate or no vulnerability, controlling for individual, household and community characteristics and other known factors.

Whereas 'vulnerability' is a widely used concept, its use and meaning varies depending on the field of study (Moret 2014). The World Bank (2005) defines vulnerability as a high probability of a negative outcome or an unexpected welfare loss above a socially accepted norm. The concepts of vulnerability and poverty are closely related as they have a two way cause – effect relationship (Damas and Rayhan 2004; Lok-Dessallien 1999; Adger 2000).

These definitions show that vulnerability is a non-desirable social- economic condition that either drives a household, individual or community to poverty or makes them more susceptible to its effects. Uganda Bureau of Statistics (2016) defines vulnerability as a measure of the extent to which a community, individual, structure, service, or geographic area is likely to be damaged, disrupted, or impoverished by the impact of a disaster or hazard because of its nature or location.

In terms of child vulnerability, categories of vulnerable children have been listed as; those who are living with HIV/AIDS, whose parents are sick with HIV/AIDS, and, more generally, children who are especially vulnerable because of poverty, discrimination, or exclusion, whether because of HIV/AIDS or not (UNICEF 2006). Vulnerable children in Uganda are further defined as; those who have lost one or both parents – and other children who are likely to be in a risky situation and/or are likely to suffer significant physical, emotional, or mental harm that may result in violations of their human rights (Ministry of Gender Labour and Social Development 2011b). Lubaale and Rutaremwa (2009) are more specific in defining vulnerable children as those living with disabilities while UNICEF (2015a) further includes children living in conflict situations. In a situation analysis report, UNICEF (2015b) categorized vulnerable children in three broad categories, namely; critically, moderately and generally vulnerable. Critically vulnerable children include; orphans, children affected and infected with HIV, children with disabilities, children in worst forms of labour, those experience abuse and violence, street/abandoned or neglected children, children in contact with the law, children in child headed households, those in armed conflict, and any other child that is assessed to be in need of immediate care and protection. Moderately vulnerable children included; children out of school, child mothers, children in poverty-stricken households, those involved in hazardous work, those living with elderly, and/or parents/guardians with severe disabilities and children in hard to reach areas (Ministry of Gender Labour and Social Development 2011a). Importantly, Child vulnerability by itself is an indicator of a country's level of socio-economic development (Batana et al. 2014).

Therefore, based on the above descriptions, child vulnerability can be referred to as a state that risks children's ability to realize their full potential. The underlying themes across all definitions show that vulnerability is both at individual, household and community level. For example, child vulnerability is individual if the child is an orphan or living with a disability. It is structural in cases of poverty at household, and communal for cases in conflict areas as seen in the above definitions. These descriptions also show that vulnerability and child vulnerability specifically are complex concepts. For instance, some studies such as one that explored the association between orphan hood status and a child's development outcomes showed minimal differences in child living conditions between orphans and non-orphans (Misinde 2019). This implies that orphans, for example, may not always be vulnerable across all the different measurable aspects of vulnerability as presented in the definitions mentioned above.

In this study, vulnerability was defined as a non-desirable condition of children and their household (family) based on an aggregate score derived from assessing selected indicators covering four thematic areas namely; economic welling, nutrition and food security, child protection and access to legal services, and access to critical services. The vulnerability indicators focused on under each theme included the following; Under economic wellbeing – household income, main source of income, number of dependents on the income and main contributor. Under Nutrition and Food Security- child's frequency of eating meals, types of food a child was exposed to and frequency of going without meals. Under Child protection – child labour, child abuse and neglect, child substance abuse, child chronic illness, child

disability and access to legal assistance. Lastly, under family strengthening and access to critical services – parenthood status, guardian/parent's age, main source of drinking water, access to latrine facilities, school enrolment and absenteeism and access to health facilities. A household and its members were considered vulnerable if their vulnerability score was a mark of 40 plus based on the Vulnerability Assessment Tool (VAT). The level of household vulnerability was assessed using three outcomes namely; critical, moderate, and slight or no vulnerability.

Whereas a number of studies have examined these factors as determinants of child vulnerability (Lubaale and Rutaremwa 2009; Keogh 2008; Nyangara 2004; Shetty and Powell 2003; Oleke et al. 2006), little has been written about their association with actual transition out of vulnerability. This study examines how these factors affect transition out of vulnerability based on data collected, over four years, by the *Sustainable Comprehensive Responses for Vulnerable Children and their Families* Project (SCORE).

The Sustainable, Comprehensive Responses for Vulnerable Children and their Families Project (SCORE Project)

The SCORE project was a five-year, USAID-funded project whose goal was to decrease the vulnerability of critically and moderately vulnerable children and their households in 35 districts[1] of Uganda (Moret 2014, 2017; AVSI Foundation 2011). It targeted 25,000 households across the five-year project period (AVSI 2011). To achieve its goal, the project had the following four objectives: 1) to improve the socio-economic status of vulnerable children households; 2) to improve the food security and nutrition status of vulnerable children and their household members; 3) to increase the availability of protection and legal services for vulnerable children and their household members, and 4) to increase the capacity of vulnerable women and children and their households to access, acquire or provide critical services.

The SCORE project addressed socio-economic empowerment through an integrated, approach centered on increasing household financial resources, increasing the socio- economic skill base, and facilitating market inclusion for vulnerable household. For food security and nutrition, the activity package included those aimed at enhancing the capacities of vulnerable children households to produce and use foodstuff, as well as improving household knowledge and behavior about nutritional practices and services. These activities had a strategic aim of; (a) increased food production, (b) improved food utilization, and (c) referral and linkage to existing agricultural, nutritional and health services. Thirdly, under Child protection, the interventions aimed to strengthen social safety nets protecting vulnerable children from abuse and exploitation. The strategies in which activities were rooted are; a) mobilization and awareness of communities around child protection concerns, b) empowerment of families to access protection and legal redress services, and c) enhanced referral mechanisms for relevant protection and legal services. For the fourth objective, activities were designed to bridge existing gaps and offer a safety net that can capture and redirect vulnerable households who require further support. The main strategies pursued under this Objective were to; (a) stimulate

[1] The target districts for SCORE are Amuru, Nwoya, Gulu, Kitgum, Lamwo, Lira, Alebtong, Otuke, Luwero, Wakiso, Bugiri, Namayingo, Iganga, Luuka, Kamuli, Buyende, Mayuge, Bududa, Busia, Butaleja, Sironko, Bulambuli, Bushenyi, Buhweju, Mitooma, Rubirizi, Sheema, Isingiro, Ntugamo, Rukungiri, Kampala, Mukono, Buikwe, Buvuma and Budaka

household awareness and ownership in the request for and provision of critical services such as education, (b) reinforcement of the civil society/ community based organizations to support and care for vulnerable children and their households, and (c) the development of referral systems.

Methodology

The assessment is based on a pre and post study of a cohort of 17,484 vulnerable households and children from 35 districts of Uganda that were enrolled in the SCORE project. The records entail data for both the vulnerable household and the children therein, represented by an index child, defined as the most vulnerable child in the household. In this study, since each household represents a child, we use both the household and child interchangeably in the description of the vulnerability profile. SCORE carried out an annual vulnerability assessment to assess progress made in each household. The baseline year assessment represents the pretest stage while the final year represents the posttest assessment. The data were compiled over a four-year period based on a household/family approach where interventions targeted the whole house rather than individual vulnerable children. The data therefore represents household and child vulnerability data collected annually as part of the annual vulnerability status assessment. In particular, the data represents vulnerable children and households at four stages in the years 2011, 2012, 2013 and 2014. The annual assessment investigated if there was a reduction, increase or stagnation of vulnerability based on the vulnerability score for that year. However, this study focuses on data collected at the baseline in 2011 and at the evaluation year in 2014. Note that whereas the project worked with a total of 28,028 households by end of 2014, this analysis focuses on only the households that were; (i) Enrolled in 2011 and (ii) Had a vulnerability assessment carried out each year up to 2014. This enables us to study trends in the cohort. The data excluded households lost to follow up or enrolled after 2011.

Variables and their Measurements

The dependent variable, "vulnerability transition" was the decrease in vulnerability status between the baseline year (2011) and the end line year (2014). Vulnerability status was categorically divided into slight vulnerability (vulnerability score of Below 40); moderate vulnerability (vulnerability score between 40 and 54) and critical vulnerability (vulnerability score above 54). A vulnerability transition was defined as any decrease in vulnerability status from one higher category to another. Note that in the context of the SCORE project, slight vulnerability was equated to 'no vulnerability'.

The SCORE project developed a Vulnerability Assessment Tool (VAT) (AVSI 2011; Moret 2014, 2017). The VAT was tailored to the expected outcomes of the project with validation including a comparative field test alongside other similar tools including the Poverty Assessment Tool (USAID 2010), and the Child Status Index (O'Donnell et al. 2008). The thematic areas of the VAT were developed in line with nationally used standards (Ministry of Gender Labour and Social Development 2011a), assigned "vulnerability points" to each household according to its situation under the four major objective areas. Each of the thematic areas of the VAT yields a maximum of 30 vulnerability points while the assessor's impression yields a maximum of 10 points. The highest possible vulnerability score is 130. All thematic areas enter linearly in the overall score; households with a VAT score between 40 and 53 are

considered moderately vulnerable while those with a VAT score above 54 are considered critically vulnerable (AVSI 2011; Moret 2014). The definition of vulnerability in SCORE project therefore referred only to those that were either moderately or critically vulnerable. Vulnerability status was considered as an ordinal variable under the assumption that the levels of vulnerability have a natural ordering – slight to critical vulnerability. Therefore, a transition in vulnerability status between the pre and post evaluation stages was investigated at two stages: First, a decrease in vulnerability denotes a shift from any higher level of vulnerability to a lower level. Second, critical change in vulnerability represents a shift from critical vulnerability to any lower level.

The independent variables were: (i) demographic and socio-economic characteristics; that is, sex and age of household head, household size as well as parenthood status; (ii) presence of chronic disease and disability in guardian and index child; (iii) child labor, as child alcohol and drug use; (iv) participation of household in any of the SCORE interventions. Table 1 presents a detailed description of the variables adopted in the investigations.

The index child was defined as the most vulnerable child within a household. The concept of index child was primarily used to support processes of identification of vulnerable households. Within the vulnerable household, an index child was selected purposefully by the community child welfare officers and the other household members following a criterion listed in the national guidance for orphans and vulnerable children interventions (Ministry of Gender Labour and Social Development 2011a). The concept of the index child was adapted from the child welfare measurement approach that used a "child status index" (O'Donnell et al. 2008). Index child could be any more of the following: orphan, living with HIV/AIDs, has disability, child involved in child labour, child experiencing abuse and violence, street or abandoned child, children in contact with law, child headed household, children in armed conflict, child out of school, child mother, child in poverty stricken household, child involved in hazarded work, children living with elderly and child in hard to reach places. The index child was used to represent the conditions of the rest of the children in that household. Due to resource constraints, it was not possible to collect data on every child in the households. The household vulnerability score therefore was an aggregate of both individual child welfare indicators and those of the household in which they live.

Data Collection and Analysis

The data were collected as part of the mapping, enrollment and periodic assessment of vulnerability in the households. The data collectors included social workers, community volunteers and hired research assistants. These were supervised by a technical team of Research and Evaluation experts. Training was conducted annually for two weeks, including a week of field practice. Depending on the area, the data were collected using both paper and through Open Data Kit (ODK), a mobile data collection application. At the two different time points of data collection, the data collectors varied depending on the area or implementing partner. It was not a requirement that the same data collector visits the same household. On average, the VAT took approximately 45 min to be completed.

The analysis was done using STATA 13.0 at two stages: First step, a descriptive summary of the characteristics of vulnerability households was done using frequency distributions and summary statistics. A similar approach was adopted in describing demographic and socio-economic characteristics of the index child, health and behavioral factors, as well as the intervening factors. Unlike the vulnerability status and transition that was evaluated at the

Table 1 Description of variables adopted in the investigations

Variable	Description	Coding	Data Type
Child vulnerability	Denotes a child's level of vulnerability based on the VAT. For measurement purposes, questions specific to children were asked in reference to one child who was considered most vulnerable by the household, that is, 'index child'. However, the project worked with all the children in the household.	1-Slight [Below 40] 2-Moderate [40–54] 3-Critical [Above 54]	Ordinal
Vulnerability transition	This denotes a shift (Decrease) from any higher level of vulnerability to a lower one	1-Improved 2-Not Improved	Nominal
Region	Region of residence for the vulnerable child	1-Central 2-East 3-East Central 4-North 5-South West	Nominal
Parenthood Status	This question seeks to know if the parents of the index child are alive or live with the child.	1-Double orphaned 2-Paternal orphaned 3- Maternal orphaned 4-Father Absent 5-Mother Absent 6-Both parents Absent 7-Both parents present 8-Other	Nominal
Child has chronic disease	Whether child has any chronic disease	1-Yes 0-No	Nominal
Child has disability	Whether child has any form of disability	1-Yes 0-No	Nominal
Guardian has chronic disease	Whether parent or guardian has any chronic disease	1-Yes 0-No	Nominal
Guardian has disability	Whether parent or guardian has any form of disability	1-Yes 0-No	Nominal
Household Headship	Whether household is female headed	1-Yes 0-No	Nominal
HIV affected	Whether household has any member with HIV/AIDS	1-Yes 0-No	Nominal
Household Size	Number of regular household members	N/A	Count
Dependents	Number of dependents including children <18 years and adults above 65.	N/A	Count

Table 1 (continued)

Variable	Description	Coding	Data Type
Schooling status	Whether child goes to school by the time of the evaluation	1-Yes 0-No	Nominal
Absenteeism	Whether child has been absent from school for at-least a month in a term	1-Yes 0-No	Nominal
Sex	Sex of child	1-Female 2-Male	Nominal
Child has disability	Whether child has any form of disability	1-Yes 0-No	Nominal
Child Abuse	Whether child has been involved in any form of child abuse namely psychological, physical, sexual and neglect.	1-Yes 0-No	Nominal
Substance Use	Whether child has been involved in alcohol or substance consumption or use.	1-Yes 0-No	Nominal
Child Labor	Whether child has been involved in any form of child labor/street child/child mother.	1-Yes 0-No	Nominal
Economic strengthening	A pooled index of five activities on economic strengthening where codes 0 and 5 denote involvement in none and all activities, respectively	Codes 0 to 5	Ordinal
Food security and nutrition	A pooled index of seven activities on food security and nutrition where codes 0 and 7 denote involvement in none and all activities, respectively	Codes 0 to 7	Ordinal
Child protection and legal	A pooled index of three activities on child protection and legal services where codes 0 and 3 denote involvement in none and all activities, respectively	Codes 0 to 3	Ordinal
Family strengthening	A pooled index of three activities on family strengthening where codes 0 and 3 denote involvement in none and all activities, respectively	Codes 0 to 3	Ordinal

pre and post assessment stages, the descriptive summary for the rest of the child and household characteristics were based on data compiled at the Pretest stage. Second, differentials in vulnerability transition by demographic and socio-economic characteristics of the index child, child and caretaker health factors, and behavioral factors as well as intervening factors were assessed using the Pearson Chi-square test. The purpose of the analysis was to select variables for further analysis at the subsequent stage. All variables with a probability value of 0.05 and below were considered for further analysis at the third stage. Third, the determinants of vulnerability transition were investigated using a binary logistic regression. Choice of the approach was because vulnerability transition was evaluated using a binary outcome. The analysis investigated whether there was an overall improvement in vulnerability. In addition, the status of whether vulnerability improved from critical was also assessed. The analysis thus included two models: Model I investigated an overall improvement in vulnerability; while model II investigated a transition from critical vulnerability to any lower level.

Ethical Considerations

As mentioned, earlier, the data was collected for program design, monitoring, evaluation and management. For ethical considerations; (i) We received ethical clearance from the Mbarara University Institutional Review Committee under reference number MUIRC 1/7/13/06–13 (ii) We signed the USAID/SCORE Project Data Security Agreement that guarantees the protection of participant confidentiality and to adhere to all ethical guidelines. The ethics committee required that all data collectors through the four stages received ethics training and a merit-based ethics training certificate. For this, we used the FHI360 ethics training curriculum (FHI360 2011) for all data collectors. No one could collect data without completing and acquiring a merited certificate. To protect the identify of beneficiaries, SCORE data is stored and managed using unique codes and there is no reference to identifiable data of the beneficiaries such as names.

Limitations

The study uses a single child in the household as a reference point to explain circumstances about all children in the household. This may be a limitation as not all children may have the same vulnerability attributes. Secondly, the use of secondary data provides a limitation as we cannot explore some aspects of the data. For example, linking specific activities to outcomes.

Results

Characteristics of the Vulnerable Households and Children

In this sub section, we describe the different individual and household characteristics of the vulnerable households assessed in the study. These included; demographic and socio-economic characteristics of the children and/or households, health and behavioral factors as well as the intervening factors. We investigate the influence of these factors on vulnerability transition. Table 2 present a distribution of the vulnerable children and households by these characteristics.

Table 2 Distribution by characteristics of the participants

Characteristics	Households ($n = 17,484$)	Percentage (%)
Region		
Central	4916	28.1
East	2033	11.6
East Central	2433	13.9
North	4028	23.0
South West	4074	23.3
Parenthood Status		
Double orphaned	1791	10.2
Paternal orphaned	4257	24.3
Maternal orphaned	1002	5.7
Father absent	1817	10.4
Mother absent	648	3.7
Both parents absent	1035	4.9
Both parents present	6934	32.0
Child has Chronic Disease		
Yes	1657	9.5
No	15,827	90.5
Child has Disability		
Yes	1231	7.0
No	16,253	93.0
Guardian Age		
Below 18	58	0.3
18–65	15,571	89.1
Above 65	1855	10.6
Guardian has Disability		
Yes	1765	10.1
No	15,719	89.9
Guardian has Chronic Disease		
Yes	4148	23.7
No	13,335	76.3
Household Headship		
Female	6283	35.9
Male	11,200	64.1
HIV Affected		
Yes	2975	17.0
No	14,509	83.0

Note. Assessment is figures at the pretest stage

The median household size was 6 members (range, 1–27) while the median number of dependents was 2 (range, 0–20). Nearly seven in every ten children in these households (68%) are either orphaned or have at least one parent absent. Slightly over a quarter (17%) of the households have at least one person living with HIV/AIDS, at least one in every 10 households (10.1%) has a guardian and a child (7.1%) living with a disability. Nearly one in every ten households was headed by either a child below 18 years (0.3%) or an elderly person above 65 years (10.1%). A few of the households were therefore child headed. In summary, the findings further indicate a range of vulnerability factors.

Vulnerability Status and Transition

As earlier indicated, vulnerability status was evaluated using three outcomes namely slight or "no vulnerability", moderate and critical. Figure 1 presents a distribution of the children and/or

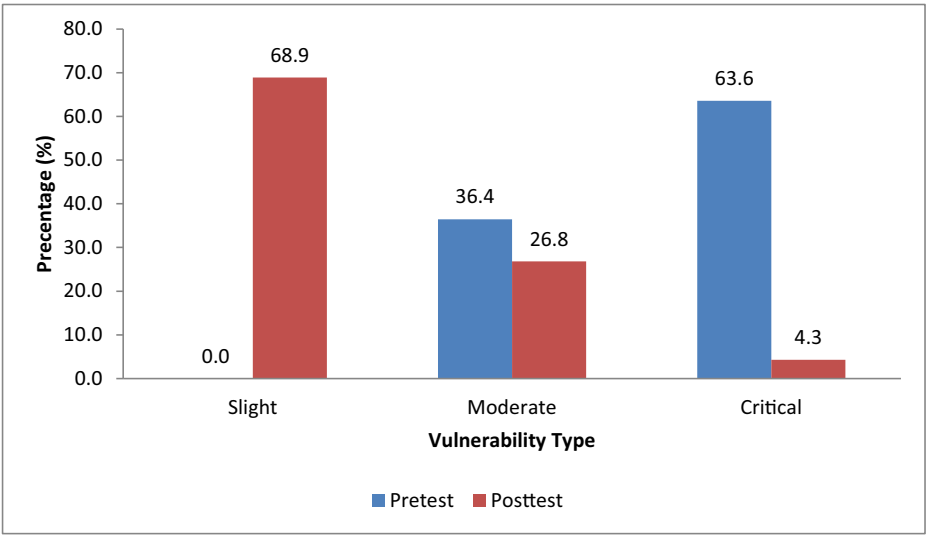

Fig. 1 Distribution by vulnerability status at the pretest and posttest stages

household by vulnerability status while Table 3 presents a distribution by transition in vulnerability at the pretest and posttest stages.

The results, according to Fig. 1, show that nearly two thirds of the households and their families (63.6%, 11,120) were critically vulnerable at the pretest stage. This proportion significantly reduced to 4.3% at the posttest stage ($p = 0.000$/CI, 95%). This change led to a corresponding increase in household that were slightly vulnerable (not vulnerable) from 0% at pretest to 68.9% at posttest. On the other hand, results on vulnerability transition shows that seven in every ten households (69.8%) had a shift from any higher level of vulnerability (critical or moderate) to a lower one. Further, nearly half of the (48.8%) had a shift from critical vulnerability to either moderate or slight vulnerability. The results therefore indicate that overall, there was an improvement (transition) from higher to lower levels of vulnerability in this population. In subsequent sections, we examine the association between the characteristics of the population and vulnerability transition.

Table 3 Distribution of households by transition in vulnerability status between baseline and evaluation stage

Vulnerability Transition	Households of vulnerable children (n)	Percentage (%)
Overall		
Improved	12,203	69.8
Not Improved	5281	30.2
Total	**17,484**	**100.0**
Critical		
Improved	8528	48.8
Not Improved	8956	51.2
Total	**17,484**	**100.0**

Table 4 Summary statistics on activities involved in

Themes	n	Min	Max	Mean
Economic strengthening	17,484	0	5	1.9
Food security and nutrition	17,484	0	6	1.7
Child protection and legal services	17,484	0	3	1.8
Family strengthening	17,484	0	3	1.2

Intervening Factors

We examined the different interventions in which these households participated to contribute to reduction in vulnerability. This refers to interventions that the households participated in between the pretest and post-test stages. As earlier indicated, the activities were grouped by four major themes which also reflect the scope of the SCORE intervention, namely; economic strengthening, food security and nutrition, child protection and legal services as well as family strengthening. The response in each of the themes signifies a pooled index of the activities that a household (any member) was involved in. For example, codes 0 and 5 denote involvement in none and all five activities under economic strengthening, respectively. Table 4 presents summary statistics on the number of activities that participants were involved in by the posttest stage.

Household members were involved in one to two activities per intervention category with family strengthening activities being the least prevalent. Results in Table 4 show variations in the mean number of activities that households were involved in by the posttest stage. Regarding economic strengthening, food security and nutrition as well as child protection and legal services, the mean number of activities in each of the themes was about two activities. The mean number of activities under the family strengthening theme was one. The minimum number of zero (0) in the various themes implies that some households were not involved in all the activities in the various themes. The question arises therefore; which activities were associated with a greater vulnerability improvement and what is the role of the demographic characteristics.

Determinants of Vulnerability Transition

The determinants of vulnerability transition were investigated by characteristics of the children and/or households plus intervening factors. As earlier indicated, vulnerability transition is denoted by Model I and Model II denoting overall improvement in vulnerability and improvement from critical vulnerability respectively. Note also, that improvement in this case is also referred to as transition.

Factors Associated with Overall Vulnerability Transition

In this sub section, we analyze the factors associated with transition from any level of vulnerability to a lower one. We explore the factors associated with any reduction in the vulnerability score. The factors associated with transition in vulnerability (any) were region, disability of child, parenthood status, household size, age of guardian as well as participation in the activities namely economic strengthening, child protection and legal services as well as family strengthening ($p < 0.05$). These findings can be summarized as follows:

Table 5 Regression analysis of vulnerability transition between pretest and post-test stages

Independent Variables	Vulnerability Transition (OR, 95% CI)	
	Model I [a]	Model II [b]
Region		
Central†	1.00	1.00
East	1.43 (1.26–1.63)	2.49 (2.23–2.79)
East Central	0.86 (0.76–0.96)	1.26 (1.14–1.40)
North	0.50 (0.44–0.57)	0.86 (0.76–0.97)
South West	0.82 (0.75–0.91)	1.10 (1.01–1.20)
Parenthood Status		
Double orphaned †	1.00	1.00
Paternal orphaned	1.05 (0.91–1.20)	0.87 (0.77–0.99)
Maternal orphaned	1.06 (0.89–1.26)	0.92 (0.78–1.08)
Father absent	0.83 (0.71–0.97)	0.66 (0.57–0.77)
Mother absent	0.79 (0.65–0.96)	0.63 (0.52–0.76)
Both parents absent	1.06 (0.89–1.26)	0.88 (0.75–1.03)
Both parents present	0.92 (0.82–1.04)	0.56 (0.50–0.63)
Child has Chronic Disease		
No †	1.00	1.00
Yes	0.89 (0.80–1.00)	1.16 (1.04–1.29)
Child has Disability		
No †	1.00	1.00
Yes	0.71 (0.63–0.81)	1.19 (1.06–1.36)
Parent/Guardian Age		
Below 18 †	1.00	1.00
18–65	2.12 (1.25–3.58)	0.92 (0.54–1.56)
Above 65	2.10 (1.23–3.58)	1.19 (0.69–2.04)
Parent/Guardian has Disability		
No †	1.00	1.00
Yes	1.07 (0.96–1.19)	1.31 (1.18–1.45)
Parent/Guardian has Chronic Disease		
No †	1.00	1.00
Yes	1.10 (1.01–1.20)	1.24 (1.14–1.34)
Household Headship		
Male †	1.00	1.00
Female	1.01 (0.93–1.10)	1.06 (0.97–1.14)
HIV Affected		
No †	1.00	1.00
Yes	0.93 (0.84–1.03)	1.02 (0.93–1.12)
Household Size	1.03 (1.01–1.05)	1.01 (0.99–1.02)
Dependents	0.98 (0.95–1.00)	0.99 (0.98–1.02)
Economic strengthening	1.07 (1.04–1.11)	0.81 (0.74–0.89)
Food security and nutrition	1.00 (0.97–1.04)	0.99 (0.96–1.06)
Child protection and legal	1.09 (1.03–1.15)	1.00 (0.96–1.06)
Family strengthening	1.06 (1.01–1.11)	1.09 (1.04–1.13)

Note. Table presents Odds Ratios (OR) and 95% Confidence Intervals (95% CI); † denotes reference category

[c] Analysis of overall improvement in vulnerability; where $N = 17{,}482$, LR Chi2 = 491.06, $p < 0.05$

[d] Analysis of improvement in vulnerability from critical; where N = 17,482, LR Chi2 = 775.49, $p < 0.05$

Overall vulnerability improvement was affected by the region in which the household was located. Vulnerable households in Eastern and central region were more likely to register improvement in vulnerability compared to other regions. The odds of reduced vulnerability were about 1.43 times higher among participants in the Eastern region compared to those in the central (OR = 1.43). However, the odds of improved vulnerability were 0.86 times lower for

participants in the East Central compared to those in the Central. Similarly, reduced odds of improved vulnerability were noted among participants in the Northern (OR = 0.50) and South West (OR = 0.82) compared to those in the Central. This implies that participants in the East Central, Northern and South West were less likely to have reduced vulnerability compared to those in the Central. Those in the East were more likely to have reduced vulnerability compared to those in the Central. This model confirms that different regions respond differently to interventions addressing child vulnerability.

Households with a double orphan were more likely to register improvement in vulnerability compared to households where only was parent was absent or dead. Participants with father absent (OR = 0.83) or mother absent (OR = 0.79) were less likely to registered reduced vulnerability compared to the double orphaned. This can partly be explained by the relative attention given to households with double orphans compared to others. It also confirms the assumption of this study that transition of vulnerable households is affected by their characteristics, sometimes as a result of programmatic emphasis.

Households with a child living with a disability were less likely to register improvement in vulnerability. The odds of improved vulnerability were about 29% lower among households with a child living with a disability when compared to those without (OR = 0.71). This implies that participants with disabilities were less likely to have registered reduced vulnerability.

Participants with guardians or parents aged between 18 and 65 years, which is the productive age (OR = 2.12) and those above 65 (OR = 2.10) were more likely to have improved vulnerability compared to those with guardians below 18 years.

Households where a parent/guardian had a chronic disease were more likely to have improved vulnerability compared to those born to parents or guardians without (OR = 1.10). This suggests that in terms of targeting, interventions structurally give more attention to households with a parent with chronic illness than those without.

Household size in the context of these vulnerable households was associated with higher likelihood of vulnerability transition compared to those of a small size. A larger number of household members was associated with increased odds of improved vulnerability compared to households with a smaller number (OR = 1.03). These findings suggest that the activity menu of the intervention in a way favored households with a bigger size. The more members in a household, the more likely that a member took part in the wide spectrum of activities which later benefit the whole household.

Higher participation in economic strengthening activities was associated with greater transition from vulnerability. Related to other findings, the results indicate that participation in a larger number of activities related to economic strengthening was associated with a higher likelihood of vulnerability transition (OR = 1.07). This implies that participants who were engaged in a higher number of economic strengthening activities were more likely to register reduced vulnerability compared to those with a lower involvement. Participation in a larger number of activities on child protection was associated with reduced vulnerability (OR = 1.09). This implies that participants engaged in a higher number of child protection activities were more likely to have reduced vulnerability compared to those with a lower involvement. Participation in a larger number of activities on family strengthening was associated with reduced vulnerability (OR = 1.06). This implies that participants engaged in a higher number of family strengthening activities were more likely to have improved vulnerability compared to those with a lower involvement.

No significant variations in improved vulnerability was noted by the rest of the variables namely guardian has disability, child has chronic disease, household headship, whether

household was HIV affected or not, number of dependents as well as involvement in activities namely family security and nutrition ($p > 0.05$).

Factors Associated with Transition from Critical Vulnerability

In this subsection, we further analyze the factors associated with transition from critical vulnerability, which is the worst level of vulnerability. The factors associated with transition from critical vulnerability were region, disability of child, parenthood status, household size, as well as participation in the activities namely economic strengthening, child protection and legal services as well as family strengthening ($p < 0.05$). These findings can be summarized as follows:

The results indicate that even with transition specifically from critical vulnerability to a better vulnerability level, there were differences based on the geographical location of the household. The vulnerable households in the East, East Central and South West were more likely to register improvement from critical vulnerability compared to those in the central. The odds of improvement in vulnerability from critical were about 2.49 times higher among participants in the Eastern region were compared to those in the central (OR = 2.49). The odds of improved critical vulnerability were 1.26 times higher for participants in the East Central compared to those in the central. Likewise, increased odds of improved critical vulnerability were noted among participants in the South West (OR = 1.10) compared to those in the central. Households from the northern region were less likely to transition from critical vulnerability (OR = 0.86).

Vulnerable households where both parents were either absent or dead were less likely to register improvement from critical vulnerability (OR = 0.88). Participants with father absent (OR = 0.87), mother absent (OR = 0.63) and paternal orphaned (OR = 0.87) were less likely to improve from critical vulnerability. Ironically, the findings further show that even households with children with both parents presents (OR = 0.56) were less likely to have improvement from critical vulnerability compared to the double orphaned participants. As mentioned earlier, this is indicative of the relative complexities associated with the concept of vulnerability.

Households in which a child has a chronic disease were more likely to have improved from critical vulnerability compared with those without. The odds of improved vulnerability from critical were about 16% higher among vulnerable households with a child living with a chronic disease when compared to those without (OR = 1.16). The possible explanation for this finding is that interventions define these households as more vulnerable (objectively and subjectively) and accord them more attention and effort.

Households in which there is a child living with a disability are more likely to transition from critical vulnerability compared to others. The odds of improved vulnerability from critical were about 19% higher among participants with a disability when compared to those without (OR = 1.19). Where the child was born to parent/guardian with a chronic disease were more likely to have improved vulnerability from critical compared to those born to parent without (OR = 1.24). Households in which the parent or guardian had a disability were more likely to register transition from critical vulnerability. Children in households with a disability were more likely to have improved vulnerability from critical compared to those born to parent without (OR = 1.31).

Higher participation in economic strengthening activities did not necessarily translate into transition from critical vulnerability to a lower one. A higher number of economic strengthening activities was associated with reduced odds of improved vulnerability from critical

(OR = 0.81). This implies that participants who were engaged in a higher number of economic strengthening activities were less likely to have improved vulnerability from critical compared to those with a lower involvement. This contradicts the general assumption that economic activities necessarily translate into improvement from critical vulnerability. In the context of this vulnerable group, this could be indicative that critically vulnerable households need another form of immediate interventions. Households transitioned better from critical vulnerability if they took part in more family strengthening activities. Participation in a larger number of activities on family strengthening was associated with improved vulnerability from critical compared to those with low activities (OR = 1.09). This implies that participants engaged in a higher number of family strengthening activities were more likely to have improved vulnerability from critical compared to those with a lower involvement.

Transition from critical vulnerability did not vary significantly by gender of household head, household size and number of dependents, guardians age, whether household was HIV affected or not as well as involvement in activities on child protection and family security and nutrition ($p > 0.05$). This implies that these variables are not significantly associated with improvement in critical vulnerability.

Discussion

This study examined the factors associated with transition from vulnerability. The study placed emphasis on the role of the characteristics of the households and the children in impeding or fostering improvement from vulnerability. The factors associated with transition from any level of vulnerability were; region, disability of child, parenthood status, household size, age of guardian as well as participation in the activities namely economic strengthening, child protection and legal services as well as family strengthening. However, the factors that were associated with transition from critical vulnerability were; region, disability of child, parenthood status, household size, as well as participation in the activities namely economic strengthening, child protection and legal services as well as family strengthening. We explore some of the factors further below;

The results suggest that transition from vulnerability is more associated with some intervention packages and not others. The study examined the association between four intervention areas and changes in the child and household vulnerability status, controlling for other known factors. The results showed that participation in a larger number of activities related to economic strengthening was significantly associated with improved overall vulnerability. This finding is in agreement with similar studies that have linked improvement in household vulnerability and amongst sub populations such as women and youth (Ssewamala et al. 2016; Wilcox et al. 2015; Bonfiglioli 2003; Zaveri 2008). Research by Han et al. (2013) found that economic empowerment associated with mental health wellbeing of children and adolescents of the households with vulnerability in Rakai-Uganda. However, this study adds that whereas economic strengthening improves vulnerability in general, it does not guarantee improvement from critical vulnerability, which is the worst level of vulnerability. Participation in higher number of economic strengthening activities was not significantly associated with transition from critical vulnerability. Family strengthening was the only factor which was significantly associated with overall vulnerability transition from critical to moderate or no vulnerability. Families strengthening activities in SCORE included psychosocial support for families, parenting skills training, life skills training, dialogue on essential issues and referring

to critical services. This suggests that whereas it is important to empower vulnerable communities economically, this can only benefit critically vulnerable people if issues around psychosocial wellbeing, linkage to critical health, education and government services are addressed. Studies such as, Ozer and Schotland (2011) show the importance of psychosocial support, an activity implemented in the family strengthening intervention package, in all round human development. The finding is further emphasized when we explore other factors. For instance, whereas participation in a larger number of activities on child protection was significantly associated with improved vulnerability (OR = 1.09), it was not a significant factor associated with transition from critical vulnerability. However, given that not all SCORE interventions were significantly associated with transition from critical to moderate or no vulnerability, requires examination of other factors that could associate with child and household transition from critical vulnerability to no vulnerability. Lack of significant association could also be explained by choice of a theory of change used. The theory used might have been inadequate (Connell and Kubisch 1998). There is need to explore this further.

Location was another factor associated with transition from vulnerability. The results indicate vulnerable household in Eastern region of Uganda were more likely to transition out of vulnerability. This runs contrary to other reports, especially those that examine poverty trends in Uganda. For example, the poverty assessment report in 2016 showed that reducing poverty was particularly slow in the Eastern and Northern region (World Bank 2016). Similarly, the Eastern and Northern districts are home to an estimated 567,348 and 710,635 vulnerable children respectively. Yet variations in vulnerability also tend to be associated with wealth distribution (UNICEF 2016a). There is more vulnerability in poorer regions of the North compared to the relatively stable parts of the country such as the central region. Several studies have shown the association between effects of war and vulnerability particularly in Northern Uganda (Olema et al. 2014; Finnström 2003; Liebling-Kalifani et al. 2008). In this regard, the study is in line with existing literature by suggesting that the households in Northern Uganda were more vulnerable. Despite this trend however, there is little evidence that shows that interventions have considered such geographic characteristics scoping their programs. There is limited exploration on the effect of the same factor on transition from vulnerability. The evidence shows that whereas there are varying proportions of vulnerability in different regions, the factors leading to this in different regions vary. This calls for interventions that address specific needs of the region, without which, the most vulnerable will not benefit. More so, it is important to note the different contexts that may affect vulnerability transition in the different areas. For instance, South western Uganda has had a greater effect of child malnutrition compared to other areas (Bachou and Labadarios 2002). To meet the most vulnerable therefore in South Western Uganda and Northern Uganda, one needs to appreciate the regional differences.

Parenthood status was another factor that had implications on transition. Parenthood status, and specifically orphan hood has long been listed as both an effect and cause of child vulnerability (UNICEF 2009). Today in Uganda, it is estimated that over 35,450 children between the ages of 10 to 19 are already heading households, while over 40,000 live in institutions and approximately 10,000 live on the streets. Ministry of Gender Labour and Social Development (2011a) indicated that about 63% of the orphans lived with caregivers other than a biological parent who themselves were typically impoverished and/or elderly grandparents – many of whom lacked access to basic services. In this study, vulnerable households with a father absent (OR = 0.83) and mother absent (OR = 0.79) were less likely to have improved vulnerability compared to the double orphaned. Participants with father

absent (OR = 0.87), mother absent (OR = 0.63), those with both parents present (OR = 0.56) and paternal orphaned (OR = 0.87) were less likely to have improvement in vulnerability from critical compared to the double orphaned participants. The reason for this could be hidden in the attention that programs direct towards households with double orphans with a generic assumption that they are worse of. Several studies show that an orphan is more likely to live in a household with unproductive caregivers. According to DHS data, throughout the 1990s in sub-Saharan Africa, orphans were much more likely than other children to be in households headed by a grandparent (Bicego et al. 2003). Data from South Africa, Zimbabwe and Malawi indicate that 65%, 62% and 50%, respectively, of children not living with their parents are living with their grandparents (Gillespie et al. 2005). Orphans are often reported to be less likely to receive adequate care from elderly caregivers, who are less likely to work and provide the necessary support (Nyangara 2004). Important for this study is the role parenthood status plays in transition from vulnerability. This goes beyond what we have known parenthood status for as a factor that determines vulnerability. This study shows it also plays a key role in determining if a household transitions out of vulnerability despite the intervention provided to it.

The size of the household, defined as the number of members in each house was another factor that determined transition from vulnerability. The study found that a larger number of household members was associated with increased odds of improved vulnerability compared to households with a smaller number (OR = 1.03). This implies that vulnerable children from households with a large household size were associated with improved vulnerability compared to households with a small size. Whereas the median number of dependents was two, a few households had up to 20 dependents including children and the elderly above 65 years, significantly constraining available meagre resources. This finding contradicts what has long been known about population size. Large household size and the presence of many dependent members is commonly associated with a higher risk to poverty, as also evidenced in the case of Ghana (Novignon et al. 2012) and can compromise well-being and quality of care for children. Pooled family resources are spread more thinly across household members (Annim et al. 2015), which can prove particularly challenging for caregivers looking after many children, especially when households include biological and non-biological children (Dako-Gyeke and Oduro 2013). In the case of this study however, the findings reveal the opposite. This, however, can be explained by the cocktail of activities that the project under study provided. Households with many eligible members for the different activities stood a better chance of getting exposed and resourcing from the various activities. This in return propelled them out of vulnerability as a unit. A household with few members, and especially nonproductive members could not partake in all the available activities limiting accessibility to some of the resources available to address household vulnerability.

The results suggest that different households respond differently to interventions addressing vulnerability depending on their social demographic characteristics. This result somewhat points to a weakness within the current Uganda policy guidelines. The Ministry of Gender Labour and Social Development (2011a) recommends a set of interventions, categorized broadly as the Core Programming Areas. It further recommends that a vulnerable child must receive a minimum of three CPAs in order to have meaningful results. However, the study above means that a policy that does not account for the different characteristics of the beneficiaries and their potential different response to the intervention. The results also suggest that the CPA model which provide standard guidelines do not effectively cater for the unique needs of the different subgroups. The findings show that interventions cannot have a ‘one size

fits them all' model if it is to realize effective results. Related to this, a lot of interventions make a bold assumption that interventions on their own will cause improvement from vulnerability on their own. The above findings however suggest that in addition to the intervention, the improvement is dependent on the characteristics of the vulnerable household. The results indicate that the complexity of vulnerability is not only limited to its definition and conceptualization but also its addressing.

Conclusions and Recommendations

In conclusion, the above findings show that whereas intervention focusing on economic strengthening, family strengthening, child protection, and food security and nutrition were associated with improved vulnerability, the characteristics of the individuals and the surrounding household characteristics play a critical role in the transition from vulnerability. The study leads us to the conclusion that interventions alone are not enough to support transition, but rather it is a combination of different factors including individual and household characteristics that determined vulnerability in the first place. Transition is contingent on the characteristic of individuals as shown above. Economic strengthening interventions, family strengthening, and others make a significant contribution but on their own cannot comprehensively explain transition. The findings also further confirm that vulnerability is a complex subject. This study reveals further that this complexity crops up even in efforts to transition households from vulnerability. For example, whereas a lot of literature points to efforts to understand child vulnerability through "determinants", the study proves that understanding determinants alone does not guarantee the right response to vulnerability issues. In some literature, we observe that concentration is put on high exposure to activities as the key to transforming children and households in vulnerability. For example the Uganda national guidelines defined a minimum activity package a child should receive in a given period(Ministry of Gender Labour and Social Development 2011a). This study however suggests that despite high level of exposure to interventions, the compounding factors are the characteristics of a given individual and households.

The results of the analysis expound further on the factors associated with a vulnerable household's transition from a higher vulnerability status to a lower one. This is different from the findings in existing literature, that focus more on how the different individual, household and community characteristics determine vulnerability. Broadly, the key findings from this analysis include the following; that transition from vulnerability varies greatly depending on the individual or household characteristics. Secondly, that the factors that affect general transition are sometimes different from those that affect transition from critical vulnerability and lastly, the analysis proves the study assumption that the effect of interventions on vulnerable populations are not homogenous. Findings from this study specifically show that individual, household and community factors are not only determinants of child and household vulnerability but are also key factors in determining transition from vulnerability. The study demonstrates that whereas programmatic intervention is the primary factor in vulnerability transition, the characteristics of the vulnerable house and children play an equally important role. Specifically we learn that despite the interventions, that is; the social, economic strengthening activities, food security and nutrition, child protection and access to legal services, as well as family strengthening interventions, the change in vulnerability is determined by a combination of factors, some related to the interventions but others to the very characteristics

of the individuals and households. Individual, community and household factors come into play and need to be considered in understanding vulnerability.

This study highlights the need to strive for solutions that recognize the unique characteristics, needs and diversity among different vulnerable populations. If programs fail to address the diversities within groups, they will continuously underrepresent and serve the most pertinent needs of the different vulnerable populations. The needs of the general vulnerable population are not homogenous.

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Compliance with Ethical Standards

Conflict of Interest Author A declares that he has no conflict of interest. Author B declares that she has no conflict of interest, Author C declares that he has no conflict of interest and Author B declares that he has no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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