

An Assessment of Health Outcomes Among Orphans in the Positive Outcomes
for Orphans Study in Rural Settings of Kenya and Tanzania

by

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Thesis submitted in partial fulfillment of the requirements for the degree of Master
of Science in the Duke Global Health Institute in the Graduate School of Duke
University

2011

ABSTRACT

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Abstract

Objectives: To compare measures of health and health quality between Orphans and Vulnerable Children (OVC) in different living arrangements-- institutional and community care; and to correlate different measures of OVC health and health quality using clinical, laboratory and quality of life instruments.

Design: Cross-sectional study.

Setting: Two rural districts (sites) in East Africa, Bungoma in Kenya, and Kilimanjaro in Tanzania.

Participants: 77 male and 45 female OVC aged 16-18 years ($N=122$). Participants, who had attained a minimum age of 16 at the date of interview, were selected from the larger sample of OVC in the Positive Outcomes for Orphans (POFO) study. POFO, a longitudinal study in five less wealthy countries that started in 2006, obtained its sample through cluster randomization.

Methods: To obtain self-ratings of OVC physical health, OVC responded to an interviewer administered SF-36 questionnaire, a multipurpose generic measure of health status. A neutral examiner then measured OVC physical health using 4 clinical variables: a physical health examination, body mass index, hemoglobin level, and the Harvard physical fitness score.

Main Outcome Measures: SF-36 scores presented as a two component score-- the physical health and mental health composite sub-scores. For physical health,

normal findings for age were considered as meeting the threshold for good physical health.

Results: Of the 122 OVC, 89 (73%) lived in the community while 33 (27%) lived in institutional settings. For the SF-36, the mean physical composite score for the entire study population was 50.6 (SD=6.2). Mean body mass index (BMI) was 19.3 (SD=2.4). Mean hemoglobin was found to be 13.2g/dl (SD=1.8). The average Harvard physical fitness score was found to be 40.7(SD=16.9). Pearson's correlations between SF-36 Physical Functioning and hemoglobin, BMI, and the Harvard Step-Test fitness score were 0.1, 0.1, and -0.1 respectively. There was no evidence that self-rating of OVC health outcomes differed by living arrangement. Using paired *t*-tests for continuous variables and chi-square tests for categorical variables, no significant *p*- values were obtained at the 95% level. Using a threshold of vision 20/20 for normal vision, 91.0% of community OVC and 78.8% of OVC in institutions had normal vision (*p*=0.07).

Conclusion: Although this study did not detect significant differences in self-reported measures of health among OVC in different living arrangements, physical examination revealed a slightly high incidence of poor vision among those living in institutions. In this sample, the correlations between SF-36 physical functioning sub-score and 3 physical health outcomes of BMI, hemoglobin, and the Harvard Step-test fitness score were weak.

Dedication

To my dear family: My wife Ruth, my daughter Neema, and my son Leon.

You are the strongest pillar in my life.

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Acknowledgements

To see this thesis come to fruition, has involved the tireless efforts of many special people who deserve acknowledgement. First, is Ann Lurie; for sponsoring my education at Duke and remaining interested in my academic progress. Ann, you sure have a heart of gold, and I remain forever indebted to you for facilitating my dream.

The entire faculty at Duke Global Health Institute (DGHI), from whom I benefitted greatly, also deserves special mention. I have benefited from their diligence, unwavering support, and innovative problem-solving skills as they work towards ensuring the program at Duke remains world-class. And although I owe something to most of you, I wish to mention just a few of the most memorable names: Chris Woods (Course Director), Sarah Martin, and Sammy Tchwenko.

I have also learnt a great deal from my cohort members at DGHI. Ours was a closely knitted cohort, extremely talented, with varied and exciting interests. I wish you well in your endeavors as you set off in your future careers.

I wish to also thank my research committee for their helpful suggestions, advice, multiple reviews of my draft manuscripts and detailed comments: Nathan Thielman, both my supervisor and mentor; Wendy O'Meara; and Mabel Nangami.

I have benefitted immensely from the work of Positive Outcomes for Orphans (POFO) study researchers, field personnel and partner organizations—ACE-Africa and the Tanzania Women Research Foundation, (TAWREF). All of

you work diligently and have been instrumental in the success of my work. I pay special gratitude to all of you. Again, I wish to mention just a few memorable names: Kate Whetten, Lynne Messer, Brian Pence, Amy Hobbie, Augustine Wasonga, Cyrilla Were and Berny Agala.

Finally, and not the least, I am thankful for all my friends and family who stood with me throughout the course of my studies. I appreciate all your prayers and good wishes. Without your constant support, I certainly would not have made it this far. Thank you.

1. Introduction

The population of Orphans and Vulnerable Children (OVC) has been on the rise in recent years [1]. Thirty years on, the HIV/AIDS pandemic continues to fuel the OVC crisis, and in Sub-Saharan Africa, it remains the leading cause of new orphans [1, 2]. With most of these children living in resource poor settings, policy makers have increasingly become concerned on OVC future outcomes. In particular, OVC health outcomes are now taking a center stage presence.

Several studies on OVC, albeit in retrospect, continue to report mixed health outcomes [3-7]. To determine the physical health of orphans under their custody, most of these studies use proxy-reports of caregivers [7, 8]. In some of these studies, the Cinderella hypothesis, the notion that caregivers may prioritize their own children over the fostered child, has been sustained [5]. A few studies have also assessed OVC physical health using OVC self-reports [9]. In the Positive Outcomes for Orphans Study (POFO), among caregivers and pre-adolescents OVC, Whetten and colleagues (2010), demonstrate a strong direct correlation for poor health between caregiver reports of health and OVC reports of health. Caregivers who reported poor health were more likely to report poor health in OVC under their custody [10]. Thus, most studies among pre-adolescents that utilize both self and proxy reports reveal a positive correlation.

In contrast, studies on quality of life and health outcomes in older school-going children and adolescents that utilize both proxy and self-reports, at best, obtain fair to moderate concordance [11]. Considering, the numerous challenges

that adolescent OVC face, such as an increased risk of early sexual debut as compared to their non-orphans counterparts , this low concordance bears important implications for policy and healthcare and highlights the need to explore measures of adolescent orphan health more fully [2, 12].

Assessing health outcomes for teenage OVC represents an opportunity for informing policy and planning. Yet in the literature of teenage OVC health outcomes, a dearth exists. Currently, most research on adolescents OVC health either utilizes generic measures to assess general health or assesses specific health conditions. To date, studies that attempt to obtain health outcomes among teenage orphans through a holistic approach incorporating the child, the caregiver and a neutral professional examiner are lacking.

Through this study, I seek to address this gap in the literature by combining both generic health measurement using the Short Form 36 (SF-36) tool and a comprehensive health assessment. The latter includes a physical health examination, anthropometric measurement of body mass index, determination of hemoglobin level, and the Harvard Step physical fitness test. For this paper, I examined the following two questions:

- a. Are there differences in health measures between teenage OVC living in the community when compared to those living in institutions?
- b. How does OVC health correlate with different measures of health and health quality using clinical, laboratory and quality of life instruments?

2. Methods and Materials

2.1 Field-site Description

A cross sectional survey was conducted among orphans enrolled in rural sites of the Positive Outcomes for Orphans Study (POFO), in 2 East-African countries – Kenya and Tanzania. Other than the two countries, the POFO study has enrolled participants from 3 more countries: Ethiopia, Cambodia, and India. This multi-country study is longitudinal in nature and seeks positive outcomes for orphans in multiple dimensions, among which is health. In Kenya, the interviews and health examinations were conducted from May 2010 to July 2010 in Bungoma District of Western province. In Tanzania, interviews and health examinations were conducted in Moshi on the Kilimanjaro region in September 2010. Descriptions of the two rural sites in both Kenya and Tanzania, are found elsewhere [13].

2.2 Sampling

POFO participants enrolled into this study, had been previously selected through a two stage randomization at the country level, and cluster randomization at the institution and community levels [14]. Additionally, participants of either gender, had to meet the following criteria: 1) be registered in the POFO database, 2) be 16 years of age or more, at the time of the interview and health examination , and, 3) be either living in an institution or the community. Participants found to be pregnant, with physical disabilities or

illnesses that constrained their performance of physical exercise, were excluded from the Harvard Step fitness test.

At the commencement of the data collection, a query was made on the POFO database. In Bungoma, there were 98 eligible orphans for the study, while in Moshi there were 151 eligible orphans. Two interviewers and the researcher contacted 61 orphans (62.2%) in Bungoma. We were unable to make contact with 37 orphans for the following reasons: 1) 13.2% of the orphans who study in boarding schools and distant locations (outside the region), were unavailable until official school break; 2) 20.5% were lost to follow-up; and 3) 4.1% were not reached despite three visits to their last known location. Similarly, in Moshi 61 orphans (40.4%) were contacted. We were unable to make contact with 94 orphans for the following reasons: 1) 20.5% of the orphans study in boarding schools and were inaccessible until official school break; 2) 6.6% declined to participate in the study; and 3) 32.5% had migrated to other towns in Tanzania. The total sample size in both Kenya and Tanzania was 122 orphans.

Research protocols for this study were approved alongside those of Round 8 of the POFO study by ethical review committees at Duke University, Kenya Medical Research Institute (KEMRI), and the Kilimanjaro Christian Medical Center (KCMC).

The survey instrument consisted of old questions from POFO I (POFO rounds 1-7) plus new questions added in round 8 that were intended to address the specific aims of POFO II grant. POFO interviewers, who are native Swahili

speakers, translated the SF-36 questionnaire from English to Swahili. Different translators were used for the translations and back-translations to English. The original English text and English back-translation were then reviewed by Duke Staff to ensure that the content was correct. In both study sites, local adult and youth community advisory boards (CABS) reviewed the new questions for round 8 of POFO and made comments regarding the acceptability and appropriateness of the language. They also helped identify response options for some questions.

Two interviewers in each study site administered the questionnaire to the participants. The researcher was blinded to both the SF-36 questionnaire and the participants' SF-36 survey responses. After the interview, the interviewers alerted the researcher who subsequently conducted the OVC health assessment.

2.3 Measures

2.3.1 General Health

General health was measured in the questionnaire using the Short Form-36 scale (SF-36) health survey adopted from the Medical Outcomes Trust, Boston, MA [15]. Although the SF-36 has been documented in more than 4000 publications [16], and been translated into over 60 languages including a Swahili version for use in Tanzania [17] for this study, the SF-36 was translated from English to Swahili by trained POFO field interviewers. The SF-36 is a multipurpose generic measure of health status that is non-specific to age, disease, or treatment group and consists of 36 items. It yields an 8- scale profile of scores and 2 summary measures. The 8 scores are: physical functioning,

physical role, bodily pain, general health, vitality, social functioning, emotional role, and mental health. Scores are transformed to a 0-100 scale, with higher scores reflecting better health [11]. The two health summary measures are the physical health component score, and the mental health component score [18].

2.3.2 Health Assessment

The health assessment measured participants' physical health using 4 clinical variables. These included the following: 1) complete physical health examination; 2) anthropometric measurement of body mass index (BMI); 3) hemoglobin level; and, 4) physical fitness testing by means of the Harvard Step Test. In situations where pathological conditions were detected, the researcher counseled the participant before making a referral to the local district hospital. In all cases, test results were explained to the study participants. 34 referrals were made; 6 from the institutions, and 28 from the community.

Anthropometric measurements of weight and height of the orphans were performed to obtain the BMI, which is the weight in kilograms divided by the height in meters squared (kg/m^2). Weight was measured to the nearest 0.1kg on a calibrated digital bathroom scale. Standing height was measured from a flat surface and expressed to the nearest 0.1cm using a wooden foldable measurement ruler.

Quantitative determination of hemoglobin and a calculated value for hematocrit were obtained through 10 μL specimen of capillary blood collected through a sterile finger prick. The blood was placed onto a Hemoglobin Test Strip

and affixed onto a portable Mission® Hemoglobin Meter manufactured from ACON Laboratories, Inc. San Diego, CA 92121 USA. The strips function by lysing erythrocytes and converting the released hemoglobin into methemoglobin.

Cardiorespiratory fitness was assessed through the Harvard Step Test [19]. The test is considered submaximal since the subject works below maximum effort. Extrapolation is used to estimate maximum capacity. The test was originally conducted among young men aged 17- 27 years, and has been adapted and validated among different teenage populations in the US, India and East-Africa [19-21]. It involves stepping onto and down from a platform 20 inches high, 30 times a minute for 5 minutes, or until the subject is unable to continue. Once the exercise is completed, the participant's pulse is counted during the periods, 1-1.5, 2-2.5, and 3-3.5 minutes. A fitness index is then calculated as = $(100 * \text{Exercise duration (sec)}) / (2 * \text{sum of the 3 pulse counts})$. It is then interpreted as: excellent > 90; good 80 – 89; high average 65 – 79; low average 55- 64; and, poor < 55.

2.4 Change in Methodology

Although the study had IRB approval to assess for HSV-2 antibodies, the absence of a consensus on a HSV-2 test-result disclosure protocol to OVC caregivers led the larger team of POFO investigators to unanimously stop the test mid-study. At this point, 63 (52%) of the OVC had been tested for HSV-2 antibodies and they all tested negative for HSV-2 antibodies.

2.5 Analysis

Data were analyzed using STATA/IC version 11.2. Univariate and bivariate analyses comparing health outcomes between teenage OVC living in the community and those living in institutions were conducted using Chi-square tests for categorical variables and *t*-tests for continuous variables. Multivariate analyses were conducted to compare SF-36 physical functioning scores and objective physical health outcomes of hemoglobin, BMI, and Harvard Step-Test fitness scores. Pearson's correlations were then sought.

3. Results

3.1 Demographic Characteristics

Study participants in Bungoma, Kenya and Kilimanjaro region in Tanzania were drawn from the POFO study sample- a longitudinal multi-site study. The total enrollment was 122 participants, with 50% of the study sample being derived from either country. A majority of the participants were male (63.1%). On average, participants were 16.8 years old (SD = 0.5). The main living arrangement was in the community (73.0%), with over a quarter (27.0%) living in institutions (see table 1).

The 139 eligible OVC that were not contacted had an average age of 16.9 years (SD=0.5), with 48% living in the community and 52% in institutions.

Table 1. Sociodemographic Characteristics of Study Participants

	(n=122)	Kenya (n=61)	Tanzania (n=61)
Age (<i>M, SD</i>)	16.8(0.5)	16.6(0.6)	17.0(0.8)
Gender			
Female (%)	36.9	32.8	41.0
Male (%)	63.1	67.2	59.0
Living Arrangement			
Community (%)	73.0	65.6	80.3
Institution (%)	27.0	34.4	19.7

3.2 Health Characteristics

OVC living in community settings and those living in institutions were found to have similar health outcomes. When compared by a neutral examiner along 4 different health indicators, (physical examination, body mass index, hemoglobin levels, and the Harvard test score of physical fitness), no significant differences were found. Although 97.5% of the OVC in both community and institutional settings were found to be in good physical health, the mean Harvard test score of physical fitness for all OVC was classified as poor ($\bar{x} = 40.7$; $SD=16.9$). Of the 11 OVC found to have a resting tachycardia (heart rate of above 100 beats per minute), 9 were females (82.0%). Incidence of poor vision was 12.3%, though none wore glasses. Among the 77 male OVC in the entire sample, 73 were circumcised (98.4%) (see table 2).

Table 2. Differences in Health Outcomes Among OVC in Community and Institutional Settings

	(n=122)	Community (n=89)	Institution (n=33)	p-value
Physical Examination				
• Good General Appearance (n, %)	119(97.5)	86(96.6)	33(100)	0.3
• Normal Visual Acuity 20/20 (n, %)	107(87.7)	81(91.0)	26(78.8)	<0.1†
• Normal Hearing (n, %)	119(97.5)	86(96.6)	33(100)	0.3
• Normal Head Findings (n, %)	122(100)	89(100)	33(100)	-
• Normal EENT Findings (n, %)	113(92.6)	83(93.3)	30(90.9)	0.7
• Normal Chest Findings (n, %)	120(98.4)	87(97.8)	33(100)	0.4
• Normal Abdominal Findings (n, %)	120(98.4)	87(97.8)	33(100)	0.4
• Systolic Blood Pressure (mmHg) (<i>M, SD</i>)	115(9.7)	115(8.5)	113(12.4)	0.4
• Diastolic Blood Pressure (mmHg) (<i>M, SD</i>)	66(8.4)	66(7.8)	66(9.8)	0.9
• Resting Pulse (b/pm) (<i>M, SD</i>)	75(15.7)	77(15.6)	71(15.4)	<0.1†
• Male (<i>M,SD</i>)	70.4(13.8)	72.3(14.0)	65.7(12.4)	
• Female (<i>M,SD</i>)	83.7(15.3)	84.4(15.2)	81.3(16.0)	
BMI (kg/m ²) (<i>M, SD</i>)	19.4(2.4)	19.4(2.5)	19.4(2.2)	0.9
• Male (<i>M,SD</i>)	18.9(2.0)	18.8(2.2)	18.9(1.5)	
• Female (<i>M,SD</i>)	20.3(2.8)	20.2(2.7)	20.5(3.0)	
Hemoglobin (g/dl) (<i>M, SD</i>)	13.2(1.8)	13.3(1.9)	12.8(1.6)	0.2
• Male (<i>M,SD</i>)	13.5(1.7)	13.7(1.8)	13.1(1.6)	
• Female (<i>M,SD</i>)	12.5(1.7)	12.6(1.8)	12.2(1.4)	
Harvard Test Score (<i>M, SD</i>)	40.7(16.9)	41.7(16.4)	38.5(8.3)	0.4
• Male (<i>M,SD</i>)	44.7(16.0)	44.5(16.5)	45.2(15.1)	
• Female (<i>M,SD</i>)	32.5(16.0)	35.7(14.7)	24.9(17.1)	
Standardized SF-36 Physical Composite Score (<i>M, SD</i>)*	50.6(6.2)	50.9(6.0)	49.6(6.7)	0.3
• Male (<i>M,SD</i>)	50.7(6.1)	50.8(5.9)	50.6(6.5)	
• Female (<i>M,SD</i>)	50.3(6.4)	51.1(6.1)	47.6(6.9)	
Standardized SF-36 Mental Composite Score (<i>M, SD</i>)*	48.2(9.1)	48.6(9.2)	47.0(8.9)	0.4
• Male (<i>M,SD</i>)	47.5(9.4)	47.7(9.6)	47.2(9.0)	
• Female (<i>M,SD</i>)	49.3(8.6)	50.1(8.4)	46.5(9.0)	

† p<0.1; *SF-36 scores are standardized to US general population norms[15, 18]

In this sample, the SF-36 showed a high level of internal reliability (Cronbach's $\alpha = 0.86$). Participants reported a mean standardized physical composite score of 50.6 (SD=6.2) and a mean standardized mental composite score of 48.2 (SD=9.1). Between the OVC groups, there was no note of a statistically significant difference.

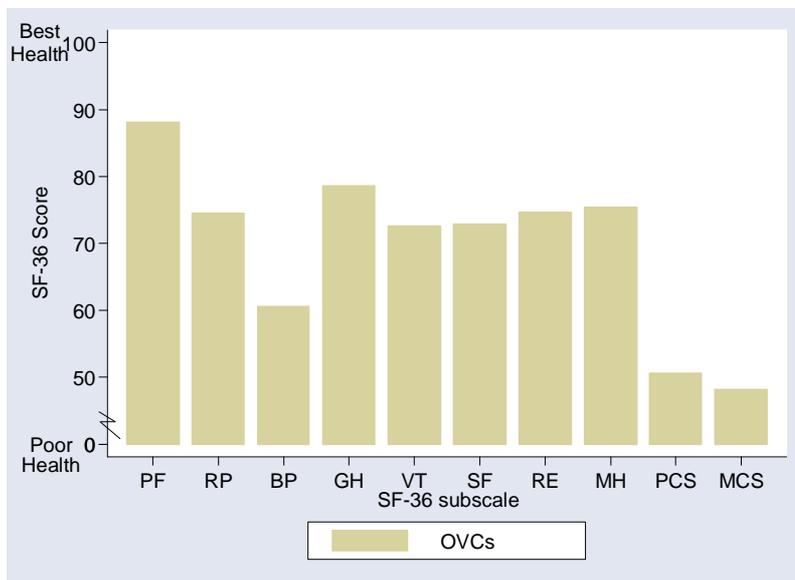


Figure 1. SF-36 Scores of Study Participants (n=122)

PF is physical functioning; RP is physical role; BP is bodily pain; GH is general health; VT is vitality; SF is social functioning; RE is emotional role; MH is mental health; PCS is physical composite score; and MCS is mental composite score.

Table 3. Mean Item Scores for items of the SF-36 Physical Functioning scale in Study Participants and other Studies from Tanzania and the US

Item content	Mean item score		
	OVC (n=122)	Tanzania [†] (n=3,802)	US [‡] (n=2,474)
Vigorous Activities	2.71	2.74	2.17
Climbing Several flights	2.74	2.73	2.54
Bending, kneeling, stooping	2.78	2.89	2.59
Walking more than a km	2.80	2.90	2.55
Moderate Activities	2.73	2.88	2.65
Lifting or carrying groceries	2.76	2.88	2.72
Walking several hundred meters	2.72	2.94	2.69
Climbing one flight	2.75	2.88	2.78
Walking 100 meters	2.74	2.95	2.82
Bathing or dressing	2.89	2.98	2.88

[†] Source: Wagner and colleagues [17]. The Tanzanian sample was a population sample aged 15 years and above.

[‡] US data is from a general population sample of adults who completed the SF-36 within a survey conducted for the Health Institute by the National Opinion Research Center [17].

3.3 Multivariate Analysis

Stratifying along gender, Pearson's correlations between SF-36 physical functioning (SF-36 PF) sub-score and 3 health outcomes were weak. It was 0.1 between SF-36 PF and hemoglobin, 0.1 between SF-36 PF and BMI, and -0.1 between SF-36PF and the Harvard Fitness score. Similarly, correlations with the Harvard Fitness score were weak. It was -0.4 between the Harvard Fitness score and BMI, -0.5 between the Harvard Fitness score and resting pulse, and 0.2 between the Harvard Fitness score and height.

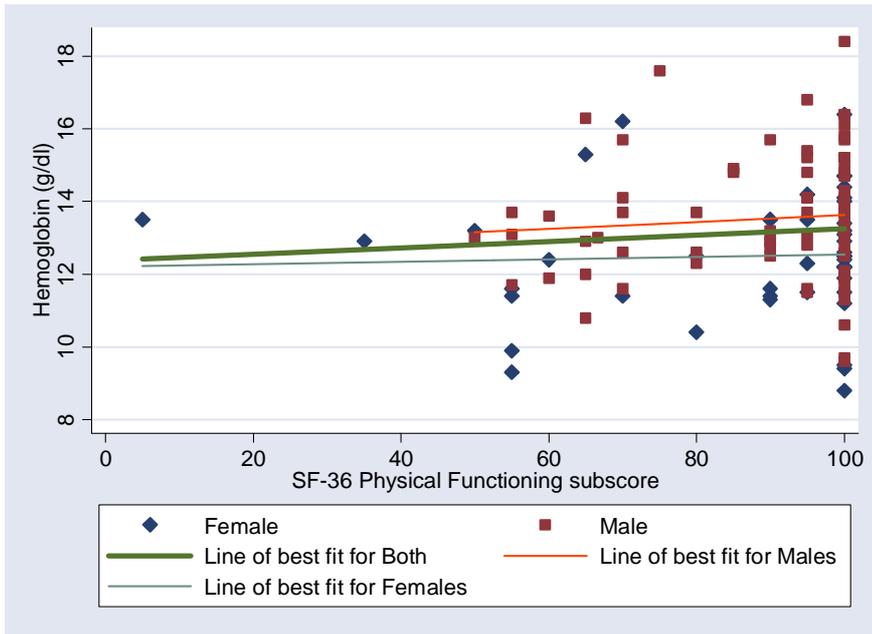


Figure 2. Comparison of Study Participants' ($n=122$), SF-36 Physical Sub-scores with Hemoglobin Levels by Gender

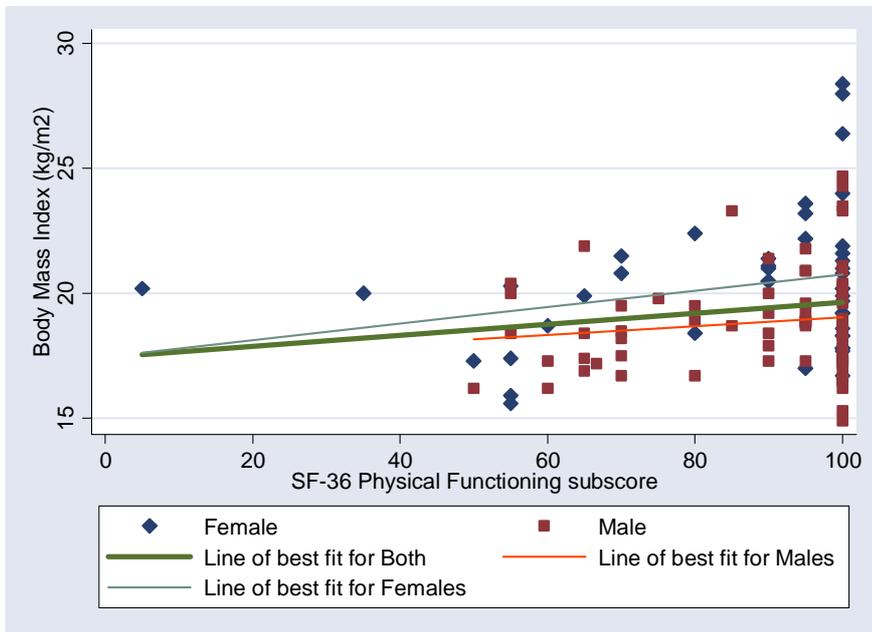


Figure 3. Comparison of Study Participants' ($n=122$), SF-36 Physical Functioning Sub-scores with BMI by Gender

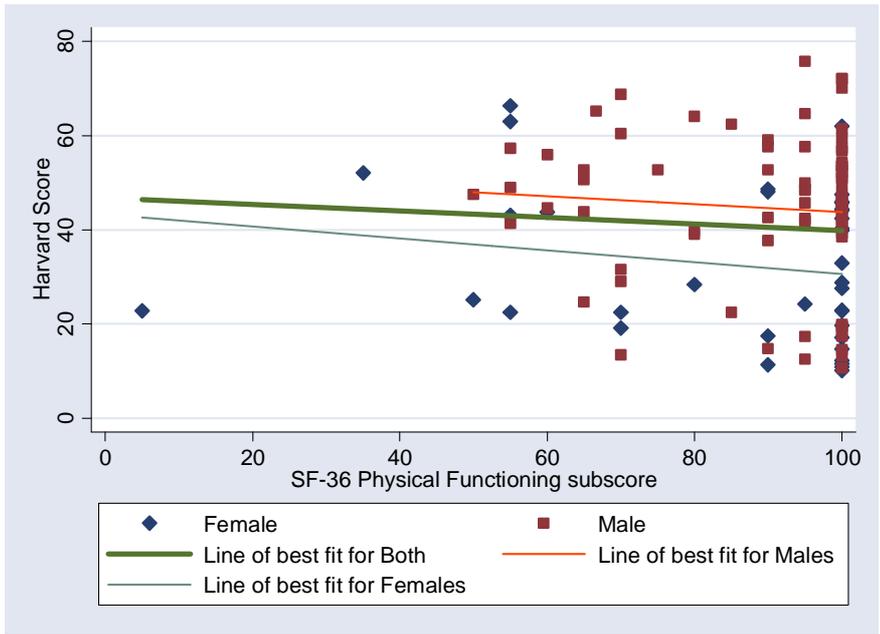


Figure 4. Comparison of Study Participants' ($n=122$), SF-36 Physical Functioning sub-scores with Harvard Step-Test Fitness scores by Gender

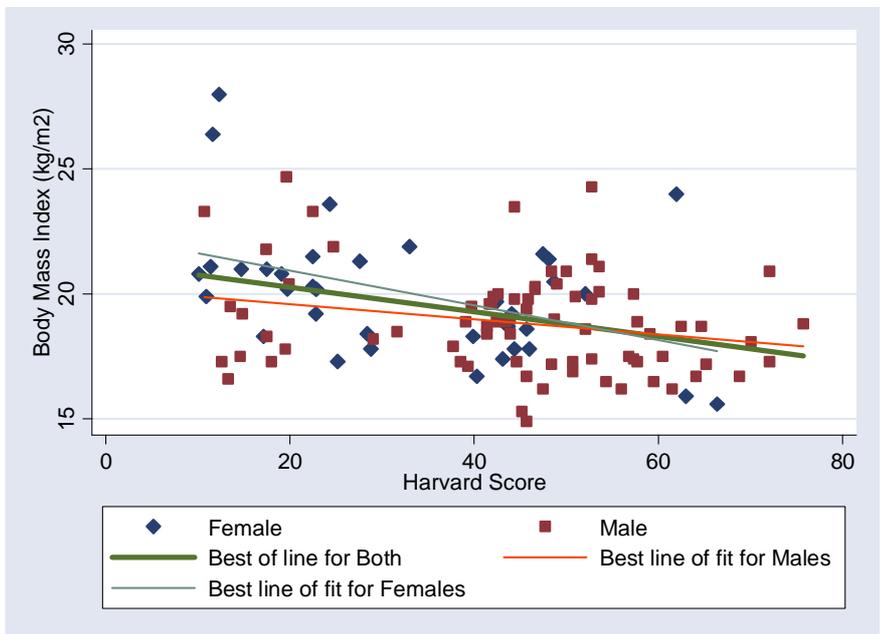


Figure 5. Comparison of Study Participants' ($n=122$), Harvard Step-Test Fitness Score with BMI by Gender

4. Discussion and Conclusion

In this study, when physical health outcomes and self-rated quality of health measures were compared among OVC living in institutions versus those living in the community, no difference was found. Applying US general population norms to the SF-36 generic health questionnaire, regardless of living arrangement, all OVC had an above-average composite score for physical health. For a majority of the OVC, physical examination revealed normal findings for blood pressure, head, EENT, chest, abdominal, and extremities. However, of note was a high prevalence of undiagnosed poor visual acuity. Most rural areas, from which the sample was drawn from, lacked access to eye-care centers. The insidious, non-painful nature of most eye illnesses, and poor access to Vitamin-A rich dietary sources, also serve to increase the prevalence of poor visual acuity.

When adjusted for age and gender, BMI and hemoglobin levels were found to be within normal reference standards [22, 23]. Incidences of both underweight and anemia conditions in both community and institutional settings were low and homogeneously spread. Despite age-appropriate physiological indices, the average fitness score obtained from the Harvard Step test was poor. This observation could be attributed to several factors. Participants of a short stature, females who wore tight or short clothing inappropriate for physical exercise, absence of privacy when the test was conducted, and anxiety among participants may have had a major negative impact on test performance.

Correlates between SF-36 physical functioning sub- scores and 3 physical health outcomes of hemoglobin, BMI, and the Harvard Step-Test fitness score,

were weak. The 3 health outcomes were chosen as they provided the most objective continuous variables for comparison purposes. Nonetheless, plotted against the SF-36 composite score for physical health, all the 3 outcomes showed little association.

Although this is among the first few studies to examine OVC health ratings at ages above 16, findings of no difference by living arrangements have been reported before. Drawing from ages 6-12 of the larger POFO sample, Whetten and colleagues found the health of OVC to be no worse in institutions than in the community[10]. Consistent with this finding are results from Uganda, Ethiopia, and rural China [9, 24, 25]. In Uganda, despite findings of higher prevalence of self-reported morbidity in orphans than non-orphans, Sarker and colleagues found no differences in reported health seeking behavior and measured anthropometric parameters [24]. However, despite the findings in support for no difference in health outcome in group homes and institutional care, for chronically ill orphans, such as with HIV/AIDs, social and cultural contexts of the living arrangements matter [25]. Thus, this study reaffirms the finding of no difference in health outcomes for OVC living in different arrangements.

On the second finding in this study of a weak correlation between SF-36 and the 3 chosen physical outcomes, literature is mixed. Overall, the SF-36 composite scores obtained in this study are above average [15]. Consistent with this finding, is a study from Mozambique [26]. While examining anthropometric measures among school-going children and adolescents, using the recommended cut-offs were, Prista and colleagues were unable to establish the

biological meaning of BMI. Other studies are more cautious. Despite finding an association of a higher BMI with a worse performance in some physical fitness tests, Monyeki and colleagues, preferred to interpret BMI as an indicator of muscle mass [27]. However, working in rural Senegal, Benefice and colleagues find that activity levels are less dependent on physiological characteristics in children in traditional subsistence societies. For instance, they found that adult women had better cardiorespiratory fitness and were more active than adolescent girls [28].

Inherent in this study are several limitations. The first relates to the characteristics of the study sample. Not only was the study sample inadequately powered, but also non-random refusal to participate led to skewed gender, age and living arrangements distributions. Hence, the generalizability of the results presented in this paper is limited. Secondly, the results are generalizable only to OVC aged above 16 years in rural East-African settings. The narrow age range of the sample, may further explain the lack of variability in the results. Thirdly, the absence of local references for BMI and an appropriate comparison group for the SF-36, limit the comparability of these results. Finally, for this study, I used the same Harvard Step for both male and female participants. Although use of the same step ensured uniformity, this may have contributed to the overall poor Harvard fitness score. In order to take regional population differences into account, several studies have readjusted the height of the Harvard step to cater for differences in gender and short stature [20, 21].

By utilizing a neutral examiner to examine OVC health outcomes and compare their ratings to a standardized tool such as the SF-36, this study is one of the first ones to examine how accurately OVC rate their health. If adequately powered and more biological outcomes such as HIV testing are included, studies similar to the one reported in this paper might obtain more generalizable results. These studies could provide future direction on whether the SF-36, could serve as objective screening tool for physical health of OVC and other adolescent populations.

In conclusion, this study found no differences in health outcomes among OVC in different living arrangements. The mean composite score for physical health on the SF-36 was above average. On 3 chosen physical health outcomes of hemoglobin, BMI, and the Harvard Step-test fitness score plotted against the SF-36 physical composite score, no correlations were noted. Although the SF-36 has been used on many other populations, this is among the first studies that have used it in a rural east African setting among adolescent OVC. Thus, this study provides a focal point for similar research. Next, it will be useful for policy makers to know what variables predict both the eight SF-36 scores, and the two summary composite scores for mental and physical health in adolescent OVC populations.

Appendix A: Health Examination Questionnaire

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https://chp-instruments.herokuapp.com/instrument_versions/31/print

POFO Round 8 ▶

Survey ID: _ _ _ _ _

q214 **Health Examination**

1) Date of Examination:

q22 Year: ____ / Month: ____ / Day: ____
Or: DK / RF / MI (or strike across for NA)

2) Examiner:

q23 _____ Δ
Or: DK / RF / MI (or strike across for NA)

3) Height (cm):

q25 _____ Δ
Or: DK / RF / MI (or strike across for NA)

4) Blood Pressure (mm Hg):

q26 _____ Δ
Or: DK / RF / MI (or strike across for NA)

5) Weight (kg):

q27 _____ Δ
Or: DK / RF / MI (or strike across for NA)

6) Resting Pulse (beats per minute):

q28 _____ Δ
Or: DK / RF / MI (or strike across for NA)

7) General Appearance:

q29 **Mark one:**
 a) Good
 b) Fair
 c) Poor
Or: DK / RF / MI (or strike across for NA)

8) [If child wears glasses, please record vision while wearing glasses]

q30 Distant Vision:
RIGHT
20/____ Δ
Or: DK / RF / MI (or strike across for NA)

9) [If child wears glasses, please record vision while wearing glasses]

q31 Distant Vision:
LEFT
20/____ Δ
Or: DK / RF / MI (or strike across for NA)

10) Wears glasses?

q32 **Mark one:**
 a) Yes
 b) No
Or: DK / RF / MI (or strike across for NA)

11) Hearing Spoken Voice:

q33 **RIGHT**
Mark one:
 a) Normal
 b) Abnormal
Or: DK / RF / MI (or strike across for NA)

12) Hearing Spoken Voice:

q34 **LEFT**
Mark one:
 a) Normal
 b) Abnormal
Or: DK / RF / MI (or strike across for NA)

13) HEAD
Indicate whether "normal" or "abnormal" then make comments and record any history of severe/chronic injury/illness.

q35 _____ Δ
Or: DK / RF / MI (or strike across for NA)

14) EYES, EARS, NOSE, THROAT
Indicate whether "normal" or "abnormal" then make comments and record any history of severe/chronic injury/illness.

q36 _____ Δ
Or: DK / RF / MI (or strike across for NA)

15) NECK
Indicate whether "normal" or "abnormal" then make comments and record any history of severe/chronic injury/illness.

q37 _____ Δ
Or: DK / RF / MI (or strike across for NA)

16) CHEST
Indicate whether "normal" or "abnormal" then make comments and record any history of severe/chronic injury/illness.

q38 _____ Δ
Or: DK / RF / MI (or strike across for NA)

Continue on next page →

Health Examination
Health Examination
Page 1 of 2

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POFO Round 8 ▶

Survey ID: _ _ _ _

- 17) **ABDOMINAL**
Indicate whether "normal" or "abnormal" then make comments and record any history of severe/chronic injury/illness.

q:1

_____ ⁶
Or: DK / RF / MI (or strike across for NA)

- 18) **EXTREMITIES**
Indicate whether "normal" or "abnormal" then make comments and record any history of severe/chronic injury/illness.

q:24v

_____ ⁶
Or: DK / RF / MI (or strike across for NA)

- ▶ If the child is a girl skip next question.

q:24y

- 19) **In the right ear:** Boys only. Examine the child to confirm his answer.

q:24w

Have you been circumcised?

Mark one:

 a) Yes b) No

Or: DK / RF / MI (or strike across for NA)

q:24x Harvard Step Test

- The Harvard Step Test is conducted as follows:
(1) Have the child step up on the platform at a rate of 30 steps per minute (every two seconds) for 5 minutes or until exhaustion.
(2) Exhaustion is defined as when the child cannot maintain the stepping rate for 15 seconds.
(3) The child immediately sits down on completion of the test.
(4) Measure the child's pulse at 1 minute, 2 minutes, and 3 minutes after finishing the test and record the results.

q:24u

- 20) Pulse at 1 minute (beats per minute):

q:w9

_____ ⁶
Or: DK / RF / MI (or strike across for NA)

- 21) Pulse at 2 minutes (beats per minute):

q:wa

_____ ⁶
Or: DK / RF / MI (or strike across for NA)

- 22) Pulse at 3 minutes (beats per minute):

q:wc

_____ ⁶
Or: DK / RF / MI (or strike across for NA)

- 23) Was blood collected for HSV-2 antibody testing?

q:we

Mark one:

 a) Yes b) No

Or: DK / RF / MI (or strike across for NA)

- 24) Was blood collected for hemoglobin testing?

q:20h

Mark one:

 a) Yes b) No

Or: DK / RF / MI (or strike across for NA)

End of survey.

Health Examination
Health Examination
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Appendix B: Child Health and SF-36 Questionnaire

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https://chp-instruments.herokuapp.com/instrument_versions/28/print

POFO Round 8 ▶

Survey ID: _ _ _ _ _

- 132) During the past week, how many times did you eat a source of protein, such as eggs, milk, sausage, buttermilk, lentils, chickpeas, soybeans, chicken, goat, lamb, mutton, pork, fish, or beef?

q:22f

Mark one:

- a) I did not eat protein during the past week
 b) 1 time per week
 c) 2 times per week
 d) 3 times per week
 e) 4 times per week
 f) 5 or more times per week

Or: DK / RF / MI (or strike across for NA)

q:2m2 **Health and Illness**

Health and Illness
The following questions are about your health.

q:2m3

- 133) Do you have any chronic medical conditions or disabilities?

q:2m4

Mark one:

- a) Yes
 b) No

Or: DK / RF / MI (or strike across for NA)

▶ If (b) or [DK] or [RF] skip next question.

q:2m5

- 134) IF YES: What chronic medical conditions or disabilities do you have?

q:2m5

Or: DK / RF / MI (or strike across for NA)

- 135) In the last 2 weeks, have you had any of the following?

q:2m6

Mark all that apply:

- a) Fever
 b) Cough
 c) Cold
 d) Headache
 e) Malaria
 f) Diarrhea
 g) Vomiting
 h) Rash
 i) Pain
 j) Problems with vision
 k) Problems with hearing
 l) Fatigue
 m) Behavioral changes
 n) Night sweats
 o) Injury
 p) Other ^Δ

Or: DK / RF / MI (or strike across for NA)

- 136) In general, would you say your health is:

q:2m7

Mark one:

- a) Excellent
 b) Very good
 c) Good
 d) Fair
 e) Poor

Or: DK / RF / MI (or strike across for NA)

- 137) Compared to one year ago, how would you rate your health in general now?

q:2m8

Mark one:

- a) Much better now than a year ago
 b) Somewhat better now than a year ago
 c) About the same as one year ago
 d) Somewhat worse now than one year ago
 e) Much worse now than one year ago

Or: DK / RF / MI (or strike across for NA)

How TRUE or FALSE is each of the following statements for you?

q:2m9

Continue on next page →

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SF-36
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POFO Round 8 ▶

Survey ID: _ _ _ _

138) I seem to get sick a little easier than other people.

q:2ma

Mark ~~one~~:

- a) Definitely true
 b) Mostly true
 c) Don't know
 d) Mostly false
 e) Definitely false

Or: DK / RF / MI (or strike across for NA)

139) I am as healthy as anybody I know.

q:2mb

Mark ~~one~~:

- a) Definitely true
 b) Mostly true
 c) Don't know
 d) Mostly false
 e) Definitely false

Or: DK / RF / MI (or strike across for NA)

140) I expect my health to get worse.

q:2mc

Mark ~~one~~:

- a) Definitely true
 b) Mostly true
 c) Don't know
 d) Mostly false
 e) Definitely false

Or: DK / RF / MI (or strike across for NA)

My health is excellent.

141)

q:2md

Mark ~~one~~:

- a) Definitely true
 b) Mostly true
 c) Don't know
 d) Mostly false
 e) Definitely false

Or: DK / RF / MI (or strike across for NA)

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

q:2me

Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.

142)

q:2mf

Mark ~~one~~:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

143) Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?

q:2mg

Mark ~~one~~:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

144) Lifting or carrying groceries.

q:2mh

Mark ~~one~~:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

145) Climbing several flights of stairs.

q:2mi

Mark ~~one~~:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

Climbing one flight of stairs.

146)

q:2mj

Mark ~~one~~:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

Bending, kneeling or stooping.

147)

q:2mk

Mark ~~one~~:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

Walking more than one kilometer.

148)

q:2ml

Mark ~~one~~:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

Continue on next page →

Child/Older:
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POFO Round 8 ▶

Survey ID: _____

149) Walking several hundred meters.

q 2mn

Mask one:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

150) Walking one hundred meters.

q 2mn

Mask one:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

151) Bathing or dressing yourself.

q 2mo

Mask one:

- a) Yes, limited a lot.
 b) Yes, limited a little.
 c) No, not limited at all.

Or: DK / RF / MI (or strike across for NA)

q 22t ChildHealth:Past4Weeks

152) How many days have you been sick during the past 4 weeks?

q 2mp

Or: DK / RF / MI (or strike across for NA)



During the past four weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

q 2mq

153) Cut down the amount of time you spent on work or other activities?

q 2mr

Mask one:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

154) Accomplished less than you would like?

q 2ms

Mask one:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

155) Were limited in the kind of work or other activities?

q 2mt

Mask one:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

156) Had difficulty performing the work or other activities (for example, it took extra time)?

q 2mu

Mask one:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)



During the past four weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling

q 2mv

depressed or anxious)?

157) Cut down the amount of time you spent on work or other activities?

q 2mw

Mask one:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

158) Accomplished less than you would like?

q 2mx

Mask one:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

Continue on next page →

Child/Older
SF-36

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POFO Round 8 ▶

Survey ID: _____

159) Did work or activities less carefully than usual?

q-2m9

Mark ~~ans~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

160) During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

q-2mz

Mark ~~ans~~:

- a) Not at all
 b) Slightly
 c) Moderately
 d) Quite a bit
 e) Extremely

Or: DK / RF / MI (or strike across for NA)

161) How much bodily pain have you had during the past 4 weeks?

q-2n0

Mark ~~ans~~:

- a) None
 b) Very Mild
 c) Mild
 d) Moderate
 e) Severe
 f) Very Severe

Or: DK / RF / MI (or strike across for NA)

162) During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

q-2n1

Mark ~~ans~~:

- a) Not at all
 b) A little bit
 c) Moderately
 d) Quite a bit
 e) Extremely

Or: DK / RF / MI (or strike across for NA)

☞ These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks.

q-2n2

163) Did you feel full of life?

q-2n3

Mark ~~ans~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

164) Have you been a very nervous person?

q-1m

Mark ~~ans~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

165) Have you felt so down in the dumps nothing could cheer you up?

q-1m

Mark ~~ans~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

Have you felt calm and peaceful?

166)

q-1m

Mark ~~ans~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

Did you have a lot of energy?

167)

q-1m

Mark ~~ans~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

Continue on next page →

Child/Older

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POFO Round 8 ▶

Survey ID: _ _ _ _

168) Have you felt downhearted and depressed?

q:1ru

Mark ~~one~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

This column is intentionally blank.

169) Did you feel worn out?

q:1rv

Mark ~~one~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

170) Have you been a happy person?

q:1rw

Mark ~~one~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

171) Did you feel tired?

q:1rx

Mark ~~one~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

172) During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

q:2n4

Mark ~~one~~:

- a) All of the time
 b) Most of the time
 c) Some of the time
 d) A little of the time
 e) None of the time

Or: DK / RF / MI (or strike across for NA)

Continue on next page →



Child/Older

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Appendix C

I. Duke IRB approval

IRB NOTIFICATION OF CONTINUING REVIEW APPROVAL

Continuing Review ID: CR4_Pro00006633
Principal Investigator: Kathryn Whetten
Protocol Title: Positive Outcomes for Orphans
Sponsor/Funding Source(s): Elton John AIDS Foundation
National Institute of Child Health and Human Development
Federal Funding Agency ID: R01HD046345-06A1
Date of Declared Concordance with federally funded grant, if applicable: N/A

The Duke University Health System Institutional Review Board for Clinical Investigations has conducted the following activity on the study cited above:

Activity: Continuing Review **Review Type:** Expedited
Review Date: 3/1/2011
Issue Date: 3/1/2011
Anniversary Date: 3/27/2011
Expiration Date: 3/27/2012

DUHS IRB approval encompasses the following specific components of the study:

Protocol, version/date: --
Summary, version/date: --12/24/10
Consent form reference date: --
Investigator Brochure, version/date: --
Pediatric Risk Category: -- 45CFR46.404 and 21 CFR 50.51 as applicable
Other: --

The DUHS IRB has determined the specific components above to be in compliance with all applicable Health Insurance Portability and Accountability Act ("HIPAA") regulations.

This study expires at 12 AM on the Expiration Date cited above. At that time, all study activity must cease. If you wish to continue specific study activities directly related to subject safety, you must immediately contact Dr. John Falletta or Jody Power. Continuing review submissions (renewals) must be received by the DUHS IRB office 60 to 45 days prior to the Expiration Date.

No change to the protocol, consent form or other approved document may be implemented without first obtaining IRB approval for the change. Any proposed change must be submitted as an amendment. If necessary in a life-threatening situation, where time does not permit your prior consultation with the IRB, you may act contrary to the protocol if the action is in the best interest of the subject. You must notify the IRB of your action within five (5) working days of the event.

The Duke University Health System Institutional Review Board for Clinical Investigations (DUHS IRB), is duly constituted, fulfilling all requirements for diversity, and has written procedures for initial and continuing review of human research protocols. The DUHS IRB complies with all U.S. regulatory requirements related to the protection of human research participants. Specifically, the DUHS IRB complies with 45CFR46, 21CFR50, 21CFR56, 21CFR312, 21CFR812, and 45CFR164.508-514. In addition, the DUHS IRB complies with the Guidelines of the International Conference on Harmonization to the extent required by the U. S. Food and Drug Administration.



DUHS Institutional Review Board
2424 Erwin Rd | Suite 405 | Durham, NC | 919.668.5111
Federalwide Assurance No: FWA 00009025

II. KEMRI IRB Approval



KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54940 - 00200 NAIROBI, Kenya
Tel: (254) (020) 2722541, 2718340, 0722-205901, 0733-400003, Fax: (254) (020) 2720030
E-mail: director@kemri.org info@kemri.org Website: www.kemri.org

KEMRI/RES/7/3/1

May 9, 2011

**TO: AUGUSTINE IMBUYE WASONGA (PRINCIPAL INVESTIGATOR)
ACE AFRICA -KENYA
P. O. BOX 1185-50200,
BUNGOMA**

Dear Sir,

**RE: NON-SSC PROTOCOL No. 278 – REVISED (RE-SUBMISSION): POSITIVE
OUTCOMES FOR ORPHANS (POFO II) (VERSION DATED 3 MAY 2011)**

Reference is made to your letter dated **May 3, 2011**.

We acknowledge receipt of the revised consent documents and the baseline findings for the initial POFO study.

The Committee is satisfied that the issues raised at the initial review have been adequately addressed.

Authorization is granted for implementation of the study effective this **9th day of May 2011**. Please note that authorization to conduct this study will automatically expire on **7th May 2012**. If you plan to continue with data collection or analysis beyond this date, please submit an application for continuing approval to the ERC Secretariat by **26th March 2012**.

Any unanticipated problems resulting from the implementation of this protocol should be brought to the attention of the ERC.

You are also required to submit any proposed changes to this protocol to the SSC and ERC prior to initiation and advise the ERC when the study is completed or discontinued.

Sincerely,


**Christine Wasunna,
FOR: SECRETARY,
KEMRI/NATIONAL ETHICS REVIEW COMMITTEE**

III. KCMC IRB Approval

CRERC FORM 07

	
TUMAINI UNIVERSITY	
KILIMANJARO CHRISTIAN MEDICAL COLLEGE	
P. O. Box 2240, MOSHI, Tanzania	
RESEARCH ETHICAL CLEARANCE CERTIFICATE	
No.096	
Research Proposal No. <u>076</u>	
Study Title: <u>POSITIVE OUTCOME FOR CHILDREN ORPHANED BY AIDS IN 6 CULTURALLY DIVERSE COUNTRIES</u>	
Study Area: <u>KILIMANJARO</u>	
P. I Name: <u>DR. MOSHINTABAYE</u>	
Institution (s): <u>KILIMANJARO CHRISTIAN MEDICAL CENTRE AND DUKE UNIVERSITY</u>	
The Proposal was approved by on: <u>11TH AUGUST, 2005</u>	
Duration of Study: <u>FROM: 30TH SEPTEMBER, 2011 TO 30TH SEPTEMBER, 2012.</u>	
Name: <u>BEATRICE Z. TEMBA</u>	Name: <u>PROF. FRANKLIN W. MOSHA</u>
Signature: 	Signature: 
Research Administrator – CRERC	Chairman – CRERC

Appendix D: Consent Forms

I. In English

Form
00046



DUKE UNIVERSITY HEALTH SYSTEM

Consent To Participate In A Research Study Positive Outcomes for Orphans

PURPOSE:

You and the child for whom you are the legal guardian are being asked to participate in a research study under the direction of Dr. Kathryn Whetten from Duke University, Durham, North Carolina, USA and (organization location). You and the child are being asked to participate in the study because the child has been abandoned or has a parent who has died, and the child has been participating in the Positive Outcomes for Orphans (POFO I) study. The purpose of this research, which is a continuation of the POFO I study, is to capture important behavioral, relationship, and achievement outcomes as children in both community-based care and institutionalized care transition to adolescence and young adulthood. The results from this study will be used to help inform local, national, and global policy-makers on how to improve outcomes for millions of orphan and abandoned children, their families, and their communities.

DURATION:

The interview and evaluation for the child will last about 120 minutes, and the interview for you, the caretaker of the child, will last for about 40 minutes. This is a longitudinal study, which means we will return to interview you and the child again with some of the same and some different instruments in 1 year, 2 years, 3 years, and 4 years from now.

PROCEDURES:

If you agree that you and the child will take part in this study, you will be asked to respond to questions about your health, your personal beliefs, and your household or institution, as well as questions about your relationship with the child. The child evaluation will involve tests of learning ability that evaluate the child's memory, ability to create shapes from a model, and ability to solve problems with pictures. For children over 10 years old, we will also ask the child questions about feelings, behaviors, experiences, beliefs, his/her physical and psychosocial health, school enrollment and performance, income earnings and work activities, and civic engagement. Children who are aged 16 years or older will also be asked questions about sexual activity and partnership, characteristics of partners, HIV testing, and drug use. The interview will be conducted by a member of (organization). If you choose to, you, the guardian, have the right to be with the child for the duration of the interview.

For children aged 16 years or older we will perform a one-time physical exam, and the child will be asked to engage in physical activity for five minutes in order to measure cardiovascular health. Some blood (less than 6 mL) may be collected with your consent and sent either to a local lab or to a laboratory in the United States to be analyzed for presence of antibodies to the herpes simplex virus type 2 (HSV-2), which may be a risk factor for getting HIV. As part of the physical health assessment, a very small amount of blood (less than 1ml) may also be collected and analyzed immediately to check the levels of certain types of blood cells (called hemoglobin) in your child's body.

RISKS AND DISCOMFORTS:

There are no physical risks to participate in this study. Some of the questions may make you or the child sad, since there are some questions about the parent who has died. The interviewers are trained to help you or the child, if needed, if the questions are emotionally difficult. The interviewers are also trained to help if you, the child, or the legal guardian want to talk about any issues that come up in the interview with the interviewer or with another community person. In addition, you or the child can refuse to answer any questions, and you or the child can ask that the interview be stopped at any time. There are no negative outcomes for asking that the interview be stopped.

There is no risk to your health from the finger prick or blood draw (for children aged 16 years or older only), as sterile techniques and equipment are always used. Some people experience mild discomfort from the finger prick or blood draw, which usually subsides after the procedure is done.

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Parent/Guardian Initials: _____



**Consent To Participate In A Research Study
Positive Outcomes for Orphans**

BENEFITS:

There are no direct benefits to you, the child, or the legal guardian, for participation in this study. However, knowledge gained from this study may contribute to providing the best care for children who have been orphaned as well as the needs of their caregivers.

CONFIDENTIALITY:

Protecting the confidentiality and privacy of study participants is very important to us. Every effort will be taken to protect the identity of the participants in the study. This means we will make sure that neither your name nor the child's name is ever published or released along with your specific answers to survey questions. When we publish the results of this study, it will be impossible to identify any single person in our results. Only with the legal guardian's written permission and the child's assent will we share the results of individual interviews with anyone. However, there is no guarantee that the information cannot be obtained by legal process or court order.

To reduce the likelihood that your identity and answers are ever released by accident, we take the following measures:

- You and the child have both been assigned a number called a "Study Identification (ID) number." This Study ID number is used instead of your name on most study forms and records. Only necessary study personnel at [organization] and at Duke University know your Study ID number, and your Study ID number is the only link between your name or other identifying information and your answers to the survey questions.
- We will never write your name, the child's name, or other identifying information on the same page as your answers to survey questions.
- We will never store or transmit your name, the child's name, or other identifying information with your answers to survey questions.
- We will store all completed surveys at [organization] in locked cabinets, and only approved study personnel will have access to these cabinets. We will store this consent form and anything else with both your name and Study ID on it in a separate locked cabinet. All electronic study data will be stored securely (encrypted and password-protected) with access restricted to study personnel.

When the information or data from the interviews is sent to the U.S. for analysis, it is sent without your or the child's names. In the U.S, we will store all the information in a locked office. Copies of the consent forms, with your and the child's name and the Study ID number, will be sent separately to Dr. Whetten and will be stored in a separate locked cabinet.

Sometimes, there are future studies where the information you give us *but not your or the child's name* could be helpful for comparison purposes. You can agree to allow Duke University to use the interview information you and the child provide, or you may refuse at anytime. You may also be contacted again to participate in future research studies. You can agree to allow Duke University to contact you, or you may refuse at anytime.

FINANCIAL COST OF RESEARCH:

There is no cost to you, the child or the legal guardian for participation in the study.

PAYMENTS TO PARTICIPANTS:

There are no payments for participation.

ETHICAL CLEARANCE:

Ethical clearance for this study has been obtained by Duke University and [organization name].

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Parent/Guardian Initials: _____



DUKE UNIVERSITY HEALTH SYSTEM

**Consent To Participate In A Research Study
Positive Outcomes for Orphans**

RIGHT TO REFUSE:

Your participation in this study is voluntary, which means you, or the child, don't have to do it if you don't want to. You can stop at any time without penalty. You may also refuse to answer any of the questions. If either of you have any questions, you may contact (lead interviewer at number), (organization director) at (organization) (number), or the Duke Researchers directly at: +1-818-613 8353.

WHOM DO I CALL IF I HAVE QUESTIONS OR PROBLEMS?

For questions about your rights as a research participant, contact Duke University Health System Institutional Review Board (IRB) Office at +1-919-688-6111.

SUBJECT'S AGREEMENT:

I give permission for a finger-prick test to be performed to look at levels of blood cells and look for antibodies for herpes simplex virus type 2 (HSV-2).

Yes No Initials

I give permission for blood (up to 5 mL) to be drawn and sent to a local lab or to a lab in the United States to look for antibodies for herpes simplex virus type 2 (HSV-2).

Yes No Initials

I give permission for staff associated with Duke University or its partner organizations to contact me for other studies in the future:

Yes No Initials

"I have read or had read to me the information provided above. I voluntarily agree to participate in this study and that the data may be utilized by Duke University for possible future studies. After it is signed, I understand I will receive a copy of the consent form."

Signature of the child (Parent)

Date _____

Name of child

Signature of caretaker (legal guardian)

Date _____

Name of caretaker (legal guardian)

Signature of person obtaining consent

Date _____

Name of person obtaining consent

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II. In Swahili

Form
M204



Tamko la Riddha/atakuhikana kwa utafiti
Matokeo Mazuri kwa ajili ya watoto yatima

MADHUMUNI:

Wewe na mtoto aliyechini ya maezi yako kisheria mneombwa kuahiriki katika stadi ya utafiti unsoelekezwa na Dr. Kathryn Whetten kutoka chuo Kikuu cha Duke, Durham, North Carolina, USA na TAWREF, Moshi, Tanzania. Wewe na mtoto mneambwa kuahiriki katika stadi hii kwa sababu mtoto buyu amechwa au amefiwa na mzazi/wazazi, na mtoto amekuwa akiahiriki kwa matokeo mazuri kwa ajili ya watoto yatima (POFO I) stadi. Madhuhuni ya utafiti huu ambao ni mwendelezo wa utafiti wa POFO I ni kuangalia umuhimu wa tabia, utasiano na matokeo uliofikiwa kama watoto katika matumao ya jamii na vituo ni kutoka kubalaha/tujana na utu uzima. Matokeo kutokana na utafiti huu yataumika kuisaidia kujulisha jamii, mataifa na ulimwengu na waimba wa sera jinsi ya kuboreha matokeo kwa mamilioni ya yatima na watoto walioschwa, familia na jamii zao.

MUDA:

Usali na uchunguzi kwa mtoto utachukua karibu dakika 120, na usali wako kama mlezi wa mtoto utachukua karibu dakika 40.

Huu ni utafiti wa muda mrefu / wa ufuatiliaji, kwa maana hiyo tutakuwa tunarudia kukusali wewe na mtoto mara kwa mara kwa maswali haya haya au yeye mabadiliko katika kila vipindi vya kati ya miaka 1, Miaka 2, Miaka 3, na Miaka 4 kutoka sasa.

UTARATIBU:

Ikiwa utakubali wewe na mtoto mtashiriki kwa stadi hii utaliziwa ujibu maswali kuhusu Afya yako, Imani yako binafsi, na kaya yako au kituo cha kuleleka watoto, na vile vile maswali kuhusu uhustano wako na mtoto.

Zoezi la mtoto litapima uwezo wa mtoto kimasomo, kumbukumbu, kutenganza mambo na utata maswali kwa kutumia picha. Kwa watoto wa umri 10 na zaidi, tutawauliza pia maswali yacayolmesu bila, mawazo na mambo ambayo wameyapitia, imani, yake kimsungo na afya ya kisaikolojia, kusajiliwa stuleni na mtendaji, kazi wa kuingiza kipato na mtendaji kazi na mesomo ya kuchumbiana. Watoto ambao wana umri wa miaka 16 au zaidi wataulizwa maswali kuhusu ngono na ushirikiano, na tabia ya mwanzin, kupimwa kwa HIV, na utumizi wa mihadarati.

Usali utongozwa na utafiti kutoka TAWREF, wewe kama mlezi wa mtoto kisheria unaweza kuamua kurwe po wakati usali wa mtoto unapendeleka.

Kwa watoto wa umri wa miaka 16 au zaidi tutafanya mihani mmoja wa viungo vya mwili, na mtoto atuliziwa kuahirikiwa mchazo wa viungo vya mwili kwa muda wa dakika tano kwa mrajili ya kupima afya ya cardiovascular. Damu nyingine (chini ya milimita 5) zinawezwa kusanywa kwa idhini yako zipelekwe, pengine kwa laboratori ya kawaida au ya United States kuchuguzwa kama kuna

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**Tamko la Riddha/makubaliano kwa utafiti
Matokeo Mazuri kwa ajili ya watoto yatima**

chembechembe za kinga mwilini herpes simplex type 2 (HSV-2), ambazo zinawaza kuwa sababu ya hatari ya kuambukizwa HIV. Kama sehemu ya ukadiriaji wa afya kimsaigo, kiasi kidogo cha damu kidogo sana (chini ya 1ml) inawezekana pia kukusanywa na kukadiriwa mara tu ili kupima viwango vya aina nyingine ya chembechembe za damu (inayoitwa haemoglobin) ndemi ya mwili wa mtoto wako.

HATARI:

Hakuna uwezekano wa hatari kwa kushiriki kwa utafiti huu. Baadhi ya maswali yanaweza kuhuzunisha wewe au mtoto kwa sababu yanakusu mzazi aliyecaga damu. Wasili wanao utaslamu wa kusaidia wewe au mtoto kama itahitajika, kama maswali yatakuwa magumu kujibu kihisia. Wasili watakuwa na utaalamu wa kukusaidia au iwapo kutakokea jambo lingine ungalipenda kuzungumzia wakati wa usili na masili. Zaidi ya hayo wewe au mtoto yuko huru kutojibu swali lotote na wewe au mtoto anaweza kuomba kuititeta usili wakati wowote. Hakuna nbaya kwa kusena usili unatishwa.

Hakuna hatari kwa afya yako kutoka kwa ncha ya kidole au kutolewa damu (kwa watoto wa Miaka 16 au wa miaka ya juu pekee), kama vile mlinu na vifaa vinavyotumika kila wakati. Wakati mwingine watu hupata mazoea mahaya kiasi kutokana na kutoholewa ncha ya kidole au kutolewa damu, ambapo kwa kawaida hupungua baada ya utaratibu kufanywa.

MAFAQ:

Hakuna mafaa ya moja kwa moja kwako au kwa mtoto, kwa kushiriki kwenu katika utafiti huu. Hata hivyo, ufahamu utakaotukana na utafiti huu unaweza kuchangia katika maezi bora zaidi kwa watoto yatima pamoja na mahitaji ya wakazi wa watoto hawa.

USIRI:

Kulinda usiri na faragha ya washiriki katika utafiti mi wa umuhimu sana kwetu. Juhadi zote zitafanyika kuhifadhi utambulisho wa washiriki katika utafiti huu.

Hili inamasisha kwamba tumbakikiasha jina lako au la mtoto halitachapishwa au kutolewa krambetana au majibu fulani katika dodoso la maswali. Wakati tukichapisha matokeo ya utafiti huu, itakuwa vigumu kutambua mtu yeyote katika matokeo yetu, ili tu kwa idhini kimasandishi kutoka kwa mlezi wa kisharia pekee na idhini la mtoto ndipo tutakapohirikisha matokeo ya usili ya mtu binafsi au mtu yeyote. Hata hivyo, hakuna ahadi kuwa taarifa hatwezi kupatikana kwa njia ya sheria au amri ya mahakama.

Kupunguza uwezekano wa utambulisho wako na majibu yatolewe kimsaigo, tunachukua hatua zifuatazo:

- Wewe au mtoto mme pewa nambari ambayo inaitwa, "Nambari ya utafiti ya utambulisho." Hii nambari ya utafiti ya utambulisho inatumika mahali pa jina lako kwenye fomu nyingi za utafiti na rekodi. Wafanyakazi muhimu tu wa TAWREB na Duke University ndiowanaojua



**Tamko la Ridhaa/arakubaliano kwa utafiti
Matokeo Mazuri kwa ajili ya watoto yatima**

nambari yako ya utafiti na nambari yako ya utafiti ndio uhusiano tu kati ya jina lako au utambulisho wa habari na majibu yako ya dodoso la maswali.

- Hatuta wahi endika jina lako, la mtoto au habari nyingine yoyote ya utambulisho kwenye Ukurasa sawa na majibu yako ya dodoso la maswali.
- Hatutawahi kuhifadhi au kusambaza jina lako na jina la mtoto, au habari nyingine ya utambulisho ya majibu yako ya dodoso la maswali.
- Tuta hifadhi fomu zote za ridhaa zilizoakumlika kwenye kabati la lilikofungwa la TAWREF na mfanyakazi aliyepitishwa tu ndiye atakayekuhaliwa kuzifikia hizo kabati. Tuta hifadhi fomu hizo za ridhaa na kitu kingine chochote kilicho na jina lako na nambari ya utafiti katika kabati tofauti la kufungwa. Data zote za elektroniki za utafiti zitalindwa na kuhifadhiwa (kupata vikwazo na kuwekwa neno la siri) na upatikaneji kuwekwa vikwazo isipokuwa wafanyakazi wa utafiti.

Wakati habari hii au data kutoka kwa hayo mahojiano inatumwa marekani kwa uchambuzi, inatumwa bila jina lako au la mtoto. Huku marekani, tutazihifadhi habari hizo zote kwenye afisi inayofungwa. Nakala za fomu za ridhaa na jina lako au la mtoto na nambari ya utambulisho ya utafiti itatumwa tofauti kwa Dr. Whetten na zitahifadhiwa kwenye kabati tofauti linalofungwa.

Wakati mwingine, tunakoalaka taswira utakozotapatia lakini siyo jina lako au la mtoto zitahitaji fidia au kifuta jazo. Unaweza kukubali au ukaridhia Duke University kutumia taswira za usali wako na mtoto mlizotoa au unaweza kukataa wakati wowote. Kuna uwazekano wa wewe kuhitajiwa katika maswala ya utafiti ujayo. Pia unaweza kukubali au kukataa wakati wowote chuo kikuu cha Duke kuwasiliana nawe.

HARAMA ZA UTAFITI:

Hakuna gharama kwako au kwa mtoto kwa kushiriki katika utafiti.

MALIPO KWA WASHIRIKI:

Hakuna malipo yoyote kwa kushiriki.

KIBALI CHA UTAFITI:

Kibali cha utafiti huu kinatolewa na chuo kikuu cha Duke na NIMRI pamoja na KCMC.

HAKI YA KUKATAA:

Ushiriki wako katika utafiti huu ni wa hisri, masana yako, hulezimiriki kushiriki kama hutaki. Unaweza kuzcha wakati wowote bila adhabu. Aidha, unaweza kukataa kujibu swali lolote. Ikiwa wewe au mtoto anaswali unaweza kuwasiliana na msaidi mkuu Bw. Amari Slaya, kupitia namba 255 764 29 74 04, Mkurungezi wa TAWREF, Bi. Dafrosa Itemba, kupitia 255 754 62 46 31 au moja kwa moja na watafiti wa chuo kikuu cha Duke kupitia +1-919-613-9353.

NANI NIMPIGIE SIMU KAMA NINA MASWALI AU MATATIZO?

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**Tamko la Ridhaa/arakubaliano kwa utafiti
Matokeo Mazuri kwa ajili ya watoto yatima**

Kwa maswali kuhusu haki zako kama mahiriki wa utafiti, wasiliana na Duke University Health System Institutional Review Board (IRB) Ofisi kwa +1-919-668-5111.

KIBALI CHA MSHIRIKI:

Napema ruhusa ya kuingwa kwa ncha kwenye kidole kuangalia viwango vya obambachambo za damu na kuangalia aina ya virusi vya 2 (HSV-2):

_____Ndio Hapana Herufi ya jina

Napema ruhusa ya kutolewa damu (hadi 5 ML) na ipolekwe kwenye mashara au mashara iliyoko marakani ili iweze kupimwa na kudhamini iwapo ina virusi vya HSV – 2:

_____Ndio Hapana Herufi ya jina

Napema kibali Kwa watanda kazi au washirika wa ubuo kikuu cha Duke kurwasiliana nami wakati wuwote:

_____Ndio Hapana Herufi ya jina

“Nimesuma au nimesomewa taarifa iliyotolewa hapo juu. Nakubali kushiriki katika utafiti huu kwa hisri yangu na kwamba taarifa nitakazutoa zinaweza kutumiwa na chuo kikuu cha Duke University. Nasitewa kuwa nitapewa nakala ya form ya ridhaa ikiheshiwa sahihi.”

Sahili ya mtoto (Ameakubali/Ameridhia)

Tarehe

Jina la mtoto

Sahili ya mlezi (Wa kisharia)

Tarehe

Jina la mlezi (Wa kisharia)

Sahili ya amayepewa ridhaa

Tarehe

Jina la amayepewa ridhaa

References

1. UNAIDS, UNICEF, and USAID, *Africa's Orphaned and Vulnerable Generations: Children Affected by AIDS, Joint Report.*, 2006, UNICEF: New York.
2. Kang, M., et al., *Maternal versus paternal orphans and HIV/STI risk among adolescent girls in Zimbabwe.* *AIDS Care*, 2008. **20**(2): p. 214-7.
3. Kidman, R., et al., *AIDS in the family and community: The impact on child health in Malawi.* *Social Science & Medicine*, 2010. **71**(5): p. 966-74.
4. Mishra, V., et al., *Education and nutritional status of orphans and children of HIV-infected parents in Kenya.* *AIDS Education and Prevention*, 2007. **19**(5): p. 383-95.
5. Parikh, A., et al., *Exploring the Cinderella myth: intrahousehold differences in child wellbeing between orphans and non-orphans in Amajuba District, South Africa.* *AIDS*, 2007. **21 Suppl 7**: p. S95-S103.
6. Andrews, G., D. Skinner, and K. Zuma, *Epidemiology of health and vulnerability among children orphaned and made vulnerable by HIV/AIDS in sub-Saharan Africa.* *AIDS Care*, 2006. **18**(3): p. 269-76.
7. Ntanda, H., et al., *Orphanhood predicts delayed access to care in Ugandan children.* *The Pediatric Infectious Disease Journal*, 2009. **28**(2): p. 153-5.
8. Amoako Johnson, F., S.S. Padmadas, and P.W. Smith, *Orphanhood and vulnerability: a conduit to poor child health outcomes in Rwanda.* *AIDS Care*, 2010. **22**(3): p. 314-23.
9. Hall, A., et al., *Case-control analysis of the health and nutrition of orphan schoolchildren in Ethiopia.* *Tropical Medicine and International Health*, 2010. **15**(3): p. 287-95.

10. Whetten, K., et al., *A comparison of the wellbeing of orphans and abandoned children ages 6-12 in institutional and community-based care settings in 5 less wealthy nations*. PLoS One, 2009. **4**(12): p. e8169.
11. Agnihotri, K., et al., *A study of concordance between adolescent self-report and parent-proxy report of health-related quality of life in school-going adolescents*. J Psychosom Res, 2010. **69**(6): p. 525-32.
12. Birdthistle, I., et al., *Is education the link between orphanhood and HIV/HSV-2 risk among female adolescents in urban Zimbabwe?* Social Science & Medicine, 2009. **68**(10): p. 1810-8.
13. DGHI. *Positive Outcomes for Orphans*. 2011 [cited 2011 October 26th]; Available from: http://globalhealth.duke.edu/research-docs/POFO_Wealth_Index_Creation_sept-2010.pdf.
14. DGHI. *Duke Global Health Institute Fieldwork Open Projects*. 2011 1/22/2011]; Available from: <http://globalhealth.duke.edu/dghi-fieldwork/open-projects/pofo-study-design>.
15. Ware, J.E., *SF-36 Health Survey Update*. SPINE, 2000. **25**(24): p. 3130-3139.
16. QualityMetric. *SF-36.org. A community for measuring health outcomes using SF tools*. 2011 [cited 2011 22nd October]; Available from: <http://www.sf-36.org/tools/SF36.shtml#VERS2>.
17. Wagner, A.K., et al., *A Kiswahili Version of the SF-36 Health Survey for Use in Tanzania: Translation and Tests of Scaling Assumptions*. Quality of Life Research, 1999. **8**(1/2): p. 101-110.
18. Ware, J., et al., *User's manual for the SF-36v2 health survey* 2ed, ed. Lincoln2007, Rhode Island: QualityMetric Incorporated.
19. Keen, E.N. and A.W. Sloan, *Observations on the Harvard step test*. J Appl Physiol, 1958. **13**(2): p. 241-3.
20. Stephenson, L.S., et al., *Physical fitness, growth and appetite of Kenyan school boys with hookworm, Trichuris trichiura and Ascaris lumbricoides*

infections are improved four months after a single dose of albendazole. J Nutr, 1993. **123**(6): p. 1036-46.

21. Amit, B., *Queen's College Step Test as an Alternative of Harvard Step Test in Young Indian Women.* International Journal of Sport and Health Science, 2008. **6**: p. 15-20.
22. CDC. *Healthy Weight - it's not a diet, it's a lifestyle!* 2011 [cited 2011 October 13th]; Available from: http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html.
23. Buchanan, A.M., et al., *Establishment of haematological and immunological reference values for healthy Tanzanian children in Kilimanjaro Region.* Tropical Medicine & International Health, 2010. **15**(9): p. 1011-1021.
24. Sarker, M., C. Neckermann, and O. Muller, *Assessing the health status of young AIDS and other orphans in Kampala, Uganda.* Trop Med Int Health, 2005. **10**(3): p. 210-5.
25. Hong, Y., et al., *Care arrangements of AIDS orphans and their relationship with children's psychosocial well-being in rural China.* Health Policy Plan, 2010.
26. Prista, A., et al., *Anthropometric indicators of nutritional status: implications for fitness, activity, and health in school-age children and adolescents from Maputo, Mozambique.* Am J Clin Nutr, 2003. **77**(4): p. 952-9.
27. Monyeki, M.A., et al., *Body composition and physical fitness of undernourished South African rural primary school children.* Eur J Clin Nutr, 2005. **59**(7): p. 877-83.
28. Benefice, E. and G. Ndiaye, *Relationships between anthropometry, cardiorespiratory fitness indices and physical activity levels in different age and sex groups in rural Senegal (West Africa).* Ann Hum Biol, 2005. **32**(3): p. 366-82.