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Measurement of Parenting Self-efficacy Among Female HIV-Affected Caregivers in Uganda

Jura L. Augustinavicius[1] · Sarah M. Murray[2] · Itziar Familiar-Lopez[3] · Michael J. Boivin[4] · Alex Mutebe[5] · Ethan Arima[5] · Judith K. Bass[6]

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Abstract

Objectives Parenting self-efficacy has been associated with positive parenting behaviors, fewer parental mental health problems, less family dysfunction, and better child development outcomes. The parenting sense of competence (PSOC) scale is commonly used to measure parenting self-efficacy in high-resource settings. This study sought to examine the factor structure, internal consistency, and convergent construct validity of the PSOC in a sample of predominantly HIV-infected women in Uganda.

Methods Using data from 155 HIV-affected caregivers who participated in a randomized controlled trial of a parenting intervention, two and three factor models of a 16-item translated version of the PSOC were tested using confirmatory factor analysis. Multivariable regression models were used to examine relationships between parenting confidence (operationalized using the best-fitting PSOC model), caregiver mental health symptoms (depression and anxiety), social support, family dysfunction, and family wealth, after adjusting for covariates.

Results Neither the two- nor three-factor models of the PSOC demonstrated adequate model fit; however, adequate model fit was demonstrated for a one-factor model that included only items from the PSOC efficacy subscale. Cronbach's alpha was 0.73 for this subscale. Correlates of parenting self-efficacy in this sample included caregiver depression, family dysfunction, and family wealth, but not caregiver anxiety or social support.

Conclusions for Practice These findings lend support for future use of the PSOC efficacy subscale among HIV-affected caregivers of children in low-resource settings such as rural Uganda.

Keywords Parenting self-efficacy · HIV · Parenting sense of competence scale · Measurement · Psychometrics

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✉ Jura L. Augustinavicius
Jaugust6@jhu.edu

Sarah M. Murray
sarah.murray@jhu.edu

Michael J. Boivin
Michael.Boivin@hc.msu.edu

Alex Mutebe
mutebe2@gmail.com

Ethan Arima
ethangodwills@gmail.com

Judith K. Bass
jbass1@jhu.edu

[1] Department of Mental Health, Bloomberg School of Public Health, Johns Hopkins University, 624 N. Broadway, Room 780, Baltimore, MD 21205, USA

[2] Department of Mental Health, Bloomberg School of Public Health, Johns Hopkins University, 624 N. Broadway, Room 863, Baltimore, MD 21205, USA

[3] Department of Psychiatry, Michigan State University, 909 Fee Rd, East Lansing, MI 48824, USA

[4] Departments of Psychiatry and Neurology & Ophthalmology, The Michigan State University College of Osteopathic Medicine0, 909 Fee Rd., Room 327, East Lansing, MI 48824, USA

[5] Global Health Uganda, Mawanda Road, Plot 667, P.O. BOX 33842, Kampala, Uganda

[6] Department of Mental Health, Bloomberg School of Public Health, Johns Hopkins University, 624 N. Broadway, Room 861, Baltimore, MD 21205, USA

Significance

Parenting self-efficacy is frequently measured in effectiveness evaluations of maternal and child health interventions, yet the construct's definition is ambiguous and difficult to operationalize, and measures of parenting self-efficacy have rarely been studied in low-resource settings. This study examines the psychometric properties of the Parenting Sense of Competence Scale (PSOC), a commonly used measure of parenting self-efficacy in high income countries, within a sample of HIV-affected caregivers in Uganda.

Introduction

Women living with HIV are often caring for children in the context of multiple co-occurring stressors, including poverty, single parenthood, stigma, and mental health problems (Murphy et al. 2002; Richter et al. 2009). As a result, caregivers living with HIV may experience a reduced sense of competency related to parenting, having lower confidence in their parenting abilities and more difficulty completing parenting tasks (Dorsey et al. 1999; Kotchick et al. 1997). Low parenting self-efficacy has been linked to mental health problems and poor well-being among caregivers, family dysfunction, and to adverse child outcomes (Angley et al. 2015; Jones and Prinz 2005; O'Neil et al. 2009; Sevigny and Loutzenhiser 2010). Conversely, social support has been associated with higher levels of parenting self-efficacy (Angley et al. 2015; Izzo et al. 2000). Individual parenting resources, such as parenting self-efficacy, may buffer the impact of environmental risks on children's health in low resource settings such as rural Uganda (Raikes and Thompson 2005).

The parenting sense of competence (PSOC) scale, a versatile domain general measure, has been widely used to measure parenting sense of competence among parents of both younger and older children (Coleman and Karraker 2000; Gibaud-Wallston and Wandersman 1978; Johnston and Mash 1989; Jones and Prinz 2005). The original 17-item scale, developed by Gibaud-Wallston and Wandersman (1978) and examined by Johnston and Mash (1989), used a total score to measure a singular sense of competence domain, but based on the results of an exploratory factor analysis that uncovered two factors, the authors presented the PSOC de-composed into two sub-domains: satisfaction and efficacy (Johnston and Mash 1989; Ohan et al. 2000). In addition, the item *"Being a good mother/father is a reward in itself"* was dropped due to its poor factor loading to form a final 16-item version of the scale (Johnston and Mash 1989).

Despite its original two-factor characterization, subsequent empirical examinations of the PSOC's factor structure have produced mixed findings. Investigations of the factor structure in Portuguese, Spanish, and Australian samples have supported two, three, and four factor solutions (Gilmore and Cuskelly 2009; Nunes et al. 2016; Rogers and Matthews 2004). In most of these studies, the 7-item efficacy subscale has remained intact, while satisfaction scale items have been re-configured or eliminated (Menéndez et al. 2011; Nunes et al. 2016; Rogers and Matthews 2004). Two additional factors of interest and control were proposed within Australian samples, however the control factor was omitted from further analyses due to low and inconsistent loadings (Gilmore and Cuskelly 2009; Rogers and Matthews 2004). Many studies continue to use the 16-item two-factor solution originally proposed by Johnston and Mash (1989).

The factor structure of the PSOC has been explored predominantly in middle- and high-income country samples (Gilmore and Cuskelly 2009; Johnston and Mash 1989; Ngai et al. 2007; Nunes et al. 2016; Ohan et al. 2000; Rogers and Matthews 2004). To our knowledge, no studies have examined measurement of parenting self-efficacy among HIV-affected caregivers in low-income countries, representing an important gap. The first objective of this study was to assess the factor structure of the 16-item PSOC in a sample of HIV-affected, but predominantly HIV-infected, Ugandan women, testing both the original two-factor structure (efficacy and satisfaction) and the three-factor structure (with the addition of an interest factor, i.e. the extent to which parents engage in the parenting role). The second objective of this study was to examine correlates of parenting self-efficacy using the scale structure identified as most suitable in our sample to assess convergent construct validity of the PSOC and associations with psychosocial characteristics of caregivers and their families. Based on prior study of parenting self-efficacy and our own qualitative work (Augustinavicius et al. 2019), we hypothesized that self-efficacy would be positively associated with social support and negatively associated with mental health symptoms, family dysfunction, and low family wealth.

Methods

Participants and Procedure

This study used baseline data from a randomized controlled trial of a parenting intervention among HIV-affected caregivers in Tororo and Busia districts in rural eastern Uganda (Bass et al. 2016). Female caregivers of an HIV-exposed (i.e. uninfected but born to an HIV-positive mother) child between the ages of 2–5 years were recruited from local

health centers and a recently completed anti-retroviral treatment trial at the Infectious Disease Research Collaboration (IDRC) in Tororo. Caregivers were eligible for inclusion if they were 18 years or older and willing to participate in the year-long intervention. Caregivers with a severe mental illness or disability that would affect their ability to participate in the intervention were excluded. A subset of caregivers agreed to enroll up to four additional children in the home (0–12 years) of any HIV status into a supplement study. Only caregivers who participated in the supplement study were included in the present analysis.

Study measures were translated into Dhopadhola, Ateso, and Luganda, and then back-translated into English. Informed consent was obtained from caregivers prior to baseline interviews. Research assistants interviewed participants in the language of their choice in the study office at Tororo Regional Hospital. The studies were approved by the Michigan State University Institutional Review Board and the Makerere University School of Medicine Research and Ethics Committee.

Study Measures

Demographic Characteristics

Demographic variables included: caregiver age; whether or not the caregiver was the study child's biological mother; the number of children and adolescents (< 18 years) currently under the participant's care; marital status (married versus single, divorced, separated, or widowed); highest education level completed (none, primary, secondary, or technical); current occupation (farmer, trading or small-scale business, professional, casual labor, or unemployed); HIV status; and anti-retroviral (ARV) use. Except for HIV-status, all demographic variables were ascertained by self-report. HIV status was ascertained based on the caregiver's file at the Health Centre from which they were recruited or from IDRC clinical records.

Parenting Sense of Competence

As previously described, the PSOC was originally developed to measure parenting sense of competence using two related but separate constructs: efficacy, represented by a 7-item scale, and satisfaction, represented by a 9-item scale (Gibaud-Wallston and Wandersman 1978; Johnston and Mash 1989). Most studies have used the full PSOC as a measure of parenting sense of competence (sometimes referred to as "parenting confidence") since its development (e.g. Shrooti et al. 2016; Zand et al. 2017); however, scores from the satisfaction and efficacy scales alone have also been reported (Coleman and Karraker 2003; Heerman et al. 2017; Johnston and Mash 1989; Lovejoy et al. 1997; O'Neil et al. 2009).

The individual items of the PSOC are listed in Supplementary Table 1. Items on the efficacy scale are positive phrased (e.g. *"If anyone can find the answer to what is troubling your child, you are the one"*), while items on the satisfaction scale are negatively phrased (e.g. *"Being a parent makes you tense and anxious"*) (Gibaud-Wallston and Wandersman 1978; Johnston and Mash 1989). In the original measure, items were rated on a 6-point scale, however, a 4-point scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*) was administered within this sample for consistency with other instruments. Items on the efficacy scale (1, 6, 7, 10, 11, 13, and 15) were reverse-coded so that higher average scores on the PSOC indicated greater parenting sense of competence. Previous studies have found the internal consistency of the PSOC to be acceptable ($\alpha = 0.79$–0.85 for the full scale, $\alpha = 0.75$–0.80 for the satisfaction subscale, and $\alpha = 0.80$–0.88 for the efficacy subscale) (Heerman et al. 2017; Johnston and Mash 1989; Lovejoy et al. 1997; Ngai et al. 2007; Ohan et al. 2000; Wittkowski et al. 2017).

Correlate Measures

Symptoms of depression and anxiety were assessed using the 15-item depression and 10-item anxiety symptom subscales of the Hopkins Symptom Checklist-25 (HSCL-25) (Hesbacher et al. 1980). Estimates of internal consistency for these HSCL-25 subscales were acceptable in this sample ($\alpha = 0.80$ for depression subscale, $\alpha = 0.86$ for anxiety subscale). Family dysfunction was assessed using the 12-item general functioning subscale of the McMaster Family Assessment Device (FAD) (Epstein et al. 1983) which had acceptable internal consistency ($\alpha = 0.81$). Family and community support were assessed using an adapted version of the Multidimensional Scale for Perceived Social Support (MSPSS) (Familiar et al. 2016; Zimet et al. 1988). The MSPSS has been validated for use in Uganda among HIV-infected and uninfected adults (Nakigudde et al. 2009; Nakimuli-Mpungu et al. 2011). Items from the family and friends subscales of the MSPSS were adapted for this study so that items referred to people in the community instead of referring specifically to friends. Cronbach's alpha estimates for the family and community support scales in this sample were 0.64 and 0.70, respectively. Across psychosocial measures, all items were rated on a four-point scale, such that higher scores indicated poorer mental health or family functioning and greater social support. Family wealth was operationalized as the top 20th, middle 60th, and bottom 20th percentiles of a wealth index. The index was categorized using factor scores obtained from a principal components analysis of a checklist of material possessions and housing quality items.

Data Analysis

Confirmatory factor analysis based on a polychoric correlation structure and weighted least squares estimator (WLSMV) was used to test the two-factor structure of the PSOC as originally described by Johnston and Mash (1989). Model goodness of fit was assessed using the following criteria: Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) > 0.95, Root Mean Square Error of Approximation (RMSEA) < 0.06, and the Weighted Root Mean Square Residual (WRMR) < 0.90 (Bentler 1990; Tucker and Lewis 1973; Yu 2002). Item-test correlations, item-rest correlations, and internal consistency (using the Cronbach's alpha coefficient (α)) were assessed for the total PSOC scale and separately for the efficacy and satisfaction subscales. Since less than 1% of data were missing, mean imputation was used to handle item-level missing data.

Descriptive statistics were examined for all variables included in the analysis. To assess the construct validity of the PSOC, univariate and multivariate general linear regression models estimated the relationships between parenting self-efficacy (operationalized using the best-fitting PSOC model), demographic variables, and psychosocial caregiver- and family-level variables (i.e. HSCL-25 anxiety and depression subscales, FAD general functioning subscale, MSPSS family and community support subscales, and family wealth) controlling for covariates. Regression diagnostics including predicted residuals were used to investigate if model assumptions had been met.

Results

Study Sample

Over 90% of caregivers were the biological mother of the study index child and were responsible for an additional four children in the home on average (Table 1). Among women who were living with HIV (over 90% of the sample), over three quarters were receiving antiretroviral treatment. Over two thirds of women were married and more than three quarters were subsistence farmers.

Table 1 Demographic characteristics of HIV-affected caregivers (N = 155) in Uganda

Variables	No. (%) or mean (Sd), range
Age (years)	34.61 (8.00), 19–65
No. of children < 18 years under caregiver's responsibility	4.55 (1.96), 2–17
Relationship to child	
Biological mother	143 (92)
Other	12 (8)
Marital status	
Married	111 (72)
Single/divorced/separated/widowed	44 (28)
Educational level completed	
None	31 (20)
Primary	106 (68)
Secondary	16 (10)
Technical	2 (1)
Occupation	
Farmer	132 (85)
Trading/small scale business	14 (9)
Professional	5 (3)
Casual labor	2 (1)
Unemployed	2 (1)
HIV status	
Positive	143 (92)
Negative	10 (6)
Unknown	2 (1)
ARV use	
Receiving ARV therapy	126 (81)
Not receiving ARV therapy	22 (14)
Unknown	7 (5)
Wealth group	
Lowest 20%	38 (25)
Middle 60%	89 (57)
Top 20%	28 (18)
Parenting self-efficacy score	3.28 (0.39), 2.14–4
Depression score	0.99 (0.53), 0–2.33
Anxiety score	0.89 (0.67), 0–3
Family dysfunction score	2.09 (0.41), 1–3.25
Perceived social support score	
Family support	2.34 (0.62), 0.75–3
Community support	1.90 (0.74), 0–3

Item Endorsement and Internal Consistency

Item endorsement for the full scale is presented in Supplementary Table 1. The most frequently endorsed items included: *"You would make a fine model for a new parent to follow in order to learn what she would need to know in order to be a good parent"* (item 6), *"Considering how long you have been a (parent), you feel thoroughly familiar with this role"* (item 13), and *"Being a (parent) is manageable, and any problems are easily solved"* (item 7) on the efficacy subscale. The least frequently endorsed item was on the satisfaction subscale: *"Your talents and interests are in other areas, not in being a (parent)"* (item 12).

Cronbach's alpha was 0.73 for the PSOC efficacy subscale, 0.53 for the satisfaction subscale, and 0.67 for the PSOC overall. Correlations between individual items and the efficacy subscale ranged from 0.57 to 0.66, and from 0.23 to 0.66 for the satisfaction scale (Supplementary Table 1).

Items with low correlations ($r \leq 0.30$) with the satisfaction subscale included: *"A difficult problem in being a (parent) is not knowing whether you're doing a good job or a bad one"* (item 8), "*Your talents and interests are in other areas, not in being a (parent)"* (item 12), and *"If being a (parent) of a child were only more interesting, you would be motivated to do a better job as a (parent)"* (item 14). Dropping items 8, 12, and 14 would have improved internal consistency of the satisfaction subscale (α = 0.54–60). Item 9, *"Sometimes you feel like you are not getting anything done",* had the lowest correlation with the overall scale and dropping this item would have marginally improved the internal consistency of the PSOC (α = 0.69).

Confirmatory Factor Analysis

The two-factor model (efficacy and satisfaction) did not fit the data well, as indicated by the goodness of fit statistics displayed in Table 2. Over half of the items on the satisfaction scale (items 2, 3, 4, 9, 12, and 16) had loadings less than 0.40. Among these, items 2 *"Even though being a (parent) could be rewarding, you are frustrated now while your child is at his/her present age"* and 3 *"You go to bed the same way you wake up in the morning—feeling you have not accomplished a whole lot"* had loadings close to 0. The overall fit of the 14-item three-factor model (efficacy, satisfaction, and interest) was improved relative to the two-factor model, but still not satisfactory (Table 2). Item 9 on the satisfaction scale, *"Sometimes you feel like you are not getting anything done"*, and item 12 on the interest scale, *"Your talents and interests are in other areas, not in being a (parent)"* had loadings less than 0.40. The correlations between the efficacy and satisfaction ($r = 0.06$, $p = 0.43$) and the satisfaction and interest factors ($r = 0.07$, $p = 0.56$) were negligible. Since indicators on the satisfaction scale did not load well in either the two- or three-factor models, a one-factor model using only items from the efficacy subscale was fit to the data. Overall fit of the model was acceptable based on CFI and TLI values and good based on the WRMR, yet the RMSEA indicated poor fit (see Table 2). All factor loadings were greater than 0.40 and statistically significant (Fig. 1). Due to poor model fit of the two-and three-factor models and low internal consistency of the satisfaction subscale, further analyses focused exclusively on the PSOC efficacy subscale as a measure of parenting self-efficacy (Fig. 1).

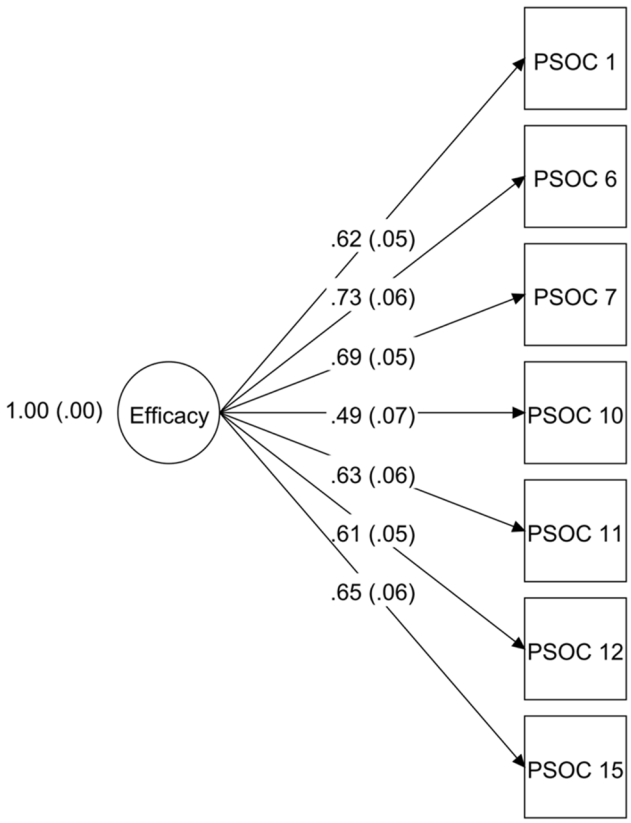

Fig. 1 Measurement model of the PSOC efficacy subscale among HIV-affected caregivers (N = 155) in Uganda

Correlates of Parenting Confidence

Univariate linear regression models revealed that average parenting self-efficacy was significantly negatively associated with average depression symptoms (β = -0.20, 95% CI − 0.31, − 0.09), average family dysfunction (β = − 0.36, 95% CI − 0.50, − 0.22), and was lower among women with low family wealth relative to women with high family wealth (β = − 0.30, 95% CI − 0.49, − 0.11). Parenting self-efficacy was marginally negatively associated with average anxiety symptoms (β = − 0.09, 95% CI − 0.18, − 0.00). Negligible associations between average parenting self-efficacy and average family support (β = 0.07, 95% CI − 0.03, 0.17) and average community support (β = − 0.05, 95% CI − 0.13, 0.04) were identified. Univariate associations between parenting self-efficacy and demographic variables were in the

Table 2 Goodness of fit indices for Parenting Sense of Competence (PSOC) scale two-, three-, and one-factor models among HIV-affected caregivers (N = 155) in Uganda

Model	CFI	TLI	WRMR	RMSEA (90% CI)
Two-factor model (Johnston and Mash 1989)	0.64	0.58	1.70	0.14 (0.13, 0.16)
Three factor model (Rogers and Matthews 2004)	0.89	0.86	1.10	0.09 (0.07, 0.10)
One-factor model (Johnston and Mash 1989 efficacy subscale)	0.96	0.94	0.77	0.10 (0.06, 0.14)

expected direction, but did not reach statistical significance. The direction, magnitude, and significance of associations between average parenting self-efficacy and average depression scores, average anxiety scores, average family dysfunction scores, and family wealth were maintained after controlling for age, marital status, number of children the caregiver was responsible for, and ARV use (Table 3).

Discussion

To accurately measure parenting self-efficacy among HIV-affected caregivers in eastern Uganda, this study tested the factor structure of the PSOC after translation into three local languages. Neither the original two-factor model proposed by Johnston and Mash (1989) nor a three-factor model proposed by Rogers and Matthews (2004) fit the data well. In the two-factor model, over half of the items on the satisfaction scale exhibited weak item loadings. In the three-factor model, items that formed part of the satisfaction scale in the two-factor model loaded poorly onto the satisfaction and interest constructs. Further, the satisfaction factor was weakly correlated with the efficacy and interest factors. Satisfaction scale items that loaded poorly in both the two- and three-factor models included item 9, "*Sometimes you feel like you are not getting anything done*" and item 12 *"Your talents and interests are in other areas, not in being a (parent)"*. Item 9 is very general, and the interpretation of item 12 may vary by culture depending on the relative value placed on parenting in the context of other life domains. Other studies of the PSOC have found similar satisfaction scale items to be problematic (Menéndez et al. 2011; Ngai et al. 2007; Nunes et al. 2016; Ohan et al. 2000; Rogers and Matthews 2004). Psychometric research has suggested that negatively worded items, such as items on the satisfaction scale, can induce confusion and function less effectively than positively worded items (van Sonderen et al. 2013). Items from the original efficacy scale loaded well onto the parenting self-efficacy construct in both the two- and three-factor models we tested, also in keeping with results of previous studies (Menéndez et al. 2011; Nunes et al. 2016; Rogers and Matthews 2004). When the PSOC efficacy subscale was examined in a separate one factor model, adequate fit was found, leading us to select the efficacy subscale items for use in further analyses. Internal consistency of the PSOC subscales and overall scale supported our factor analysis findings.

Table 3 Associations of average parenting self-efficacy with average depression, family dysfunction, and wealth group among HIV-affected caregivers (N = 155) in Uganda

Predictor	Regression coefficient	SE	Confidence interval	p-value
Depression symptoms	− 0.21	0.06	− 0.32, − 0.09	< 0.01
Anxiety symptoms	− 0.09	0.05	− 0.18, 0.01	0.07
Family dysfunction	− 0.37	0.07	− 0.51, − 0.23	< 0.001
Family support	0.08	0.05	− 0.03, 0.19	0.13
Community support	− 0.06	0.04	− 0.14, 0.03	0.18
Wealth group				
Top 20% (reference)	–	–		–
Middle 60%	− 0.16	0.08	− 0.33, 0.01	0.06
Lowest 20%	− 0.30	0.10	− 0.49, − 0.11	< 0.01

NB models were adjusted for caregiver age, marital status, the number children that they were responsible for, and ARV use

The average PSOC efficacy scale scores in this sample were high, with a minimum score of two on a four-point scale. High mean scores have also been reported in other samples, possibly reflecting the cultural importance of parenting (Ngai et al. 2007). The most highly endorsed items were related to others perceptions of caregivers' parenting abilities (item 6), overcoming daily challenges (item 7), and familiarity with the parenting role (item 13). High endorsement of items related to being a *"model parent"* for others and overcoming daily parenting challenges is in line with findings from a recent qualitative study within this sample (Augustinavicius et al. 2019). In this qualitative study, women's evaluations of their parenting abilities were heavily based on the perceptions of others, and confident caregivers felt able to use resourcefulness and creativity to overcome challenges associated with poverty, HIV, and single-parenthood. High endorsement of item 13 (i.e. familiarity with the parenting role) is unsurprising given that unpaid child care in many Ugandan districts is primarily carried out by women and girls and women in this sample reported caring for five children on average (Oxfam 2018).

Our results generally support the convergent construct validity of the PSOC efficacy scale. As expected, caregivers with higher levels of parenting self-efficacy reported lower levels of depression and family dysfunction. Similar relationships have been previously described in both high- and low-resource settings (Izzo et al. 2000; O'Neil et al. 2009). These findings may be particularly important in an HIV-affected context where poor caregiver mental health has negative implications for both caregiver (e.g. lower ARV therapy adherence) and child health (e.g. increased mental health problems) (Murphy et al. 2002; Sin and DiMatteo 2014). Few studies among HIV-affected women have examined both parenting self-efficacy and family functioning, however lower levels of family cohesion have been associated with increased parenting distress in families with an HIV-infected caregiver (Mellins et al. 2000; Murphy et al. 2002). Other family-level factors may also affect parenting self-efficacy, as indicated by our finding

that parenting self-efficacy was lower among caregivers in the poorest families relative to families in the top 20% of wealth. Previous research among parents living in low-resource contexts has found that parenting self-efficacy may serve as a buffer against economic stress, highlighting the potential added relevance of parenting self-efficacy among women living in settings of adversity (Raikes and Thompson 2005).

The hypothesized positive association between social support and parenting self-efficacy was not upheld in this study, contrary to other findings (Angley et al. 2015; Izzo et al. 2000). Social support has not always been associated with fewer mental health problems among HIV-affected caregivers, possibly due to the unique combination of adversities faced by this population, and a similar argument may hold for parenting self-efficacy (Casale et al. 2015). Other factors may impact the association between social support and parenting self-efficacy for women living with HIV in low-resource settings. For example, stigma related to poverty and HIV may isolate women, reducing the likelihood that they will seek support from family or community members or reducing the willingness of family members to provide support that would bolster women's ability to care for their children when requested (Rujumba et al. 2012). In our qualitative work, women known to be living with HIV were subjected to verbal abuse and living with HIV and having few financial resources were described as significant challenges when trying to provide for children (Augustinavicius et al. 2019; Murray et al. 2017). Providing for children was identified as an important aspect of gaining respect in the community and feeling respected as a parent contributed to positive parenting self-efficacy. The lack of association between parenting self-efficacy and social support may also be related to imprecise measurement of the construct of social support using an adapted version of the MSPSS.

Limitations

Poor model fit could have been influenced by our limited sample size. Some authors suggest that WLSMV estimation can function well even in small samples and that the RMSEA holds diminished interpretive value in models with small degrees of freedom and small sample sizes since estimates tend to be large (Kenny et al. 2014). The predictive ability of the PSOC efficacy scale may also be limited in our sample by a floor effect.

Conclusions For Practice

This study sought to examine parenting self-efficacy and its correlates among HIV affected-caregivers in Uganda. In assessing the factor structure of the PSOC, a commonly used measure of parenting sense of competence, only the efficacy subscale fit our data well. Caregiver depression, family dysfunction, and family wealth, but not anxiety and social support, were associated with parenting self-efficacy. These findings lend support for future use of the PSOC efficacy subscale among HIV-affected caregivers in low-resource settings such as rural Uganda and contribute to a preliminary description of the parenting self-efficacy construct in this context.

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