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Prevalence and Correlates of Depression among Caregivers of Children Living with HIV in Ghana: Findings from the SANKOFA Pediatric Disclosure Study

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Abstract

Prior studies show an association between caregiver depression and child health outcomes. There has been little examination of depression among caregivers of HIV-infected children in sub-Saharan countries where pediatric HIV is concentrated. Using baseline data collected in the pediatric HIV disclosure intervention trial, Sankofa, we examined the prevalence and factors associated with depression among caregivers (N=446) of children infected with HIV in Ghana. Data were analyzed with descriptive and regression analyses. The mean age of the caregivers was

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42.2 ± 10.4 years. Eighty percent of the caregivers were female and 59% were HIV-infected. Twenty-eight percent (n=126) of the caregivers were found to have mild to severe depression. In the adjusted model, factors significantly associated with caregiver depression included: HIV-positive caregiver status (P=0.04), low income (P=0.02), lower social support, (P=0.01), lower HIV knowledge, (P=0.01), worse HIV illness perceptions (P=<0.001), and greater perceived HIV stigma (P=<0.001). Although, we found a high prevalence of depression among our study participants, several of the risks factors identified are modifiable and amenable to interventions that are locally available and affordable.

Keywords

Caregiver; depression; Pediatric HIV; disclosure

Introduction

Several studies have documented depression among caregivers (Flaskerud & Tabora, 1998; Land, Hudson, & Stiefel, 2003; Songwathana, 2001; Stetz & Brown, 2004; Wight, 2000) who are plagued disproportionately by health, social, and economic problems (Freeman & Nkomo, 2006; Heuveline, 2004; Heymann & Kidman, 2009; Kangethe, 2009; Ssengonzi, 2009). There has been limited study of the mental health of caregivers of HIV-infected children. In the few studies that have been conducted to date, the reported prevalence of depression is high (Hughes & Caliandro, 1996; Lindsey, Hirschfeld, & Tlou, 2003; Lv et al., 2010). Moreover, compared with caregivers of children without HIV, caregivers of HIV-infected children are likely to have multiple non-HIV-related stressors, including poverty, emotional and physical strain, social discrimination, and substance use (Bachanas et al., 2001; Brown, Lourie, & Pao, 2000; Casale, Wild, Cluver, & Kuo, 2014; Freeman & Nkomo, 2006; Kuo, Cluver, Casale, & Lane, 2014; Meadows, Le Marechal, & Catalan, 1999; Ssengonzi, 2009). Caregiver depression has been reported to affect the outcomes of non-HIV diseases, including renal failure and asthma (Bartlett et al., 2004; Brownbridge & Fielding, 1994). Although it has received limited attention to date, available data indicate depression in caregivers of HIV-infected children is associated with ART non-adherence and elevated plasma viral load (Gibb et al., 2003; Marhefka, Tepper, Brown, & Farley, 2006; Naar-King et al., 2006; Reddington et al., 2000; Steele et al., 2001).

Based on our previous finding of high prevalence of non-disclosure among a pediatric HIV cohort in Ghana (Kallem, Renner, Ghebremichael, & Paintsil, 2011) and reported high association of depression in caregivers of HIV-infected children, we hypothesized that there will be a high prevalence of depression in our cohort of caregivers who have not disclosed their children's HIV status to them. To test this hypothesis, we analyzed the baseline data of an HIV pediatric disclosure intervention study in Ghana ("Sankofa"), a two-arm randomized controlled clinical trial comparing the disclosure intervention to usual care (Reynolds et al., 2015). The main objectives of the present study were: (1) to determine the prevalence of depression among caregivers who have not disclosed their children's HIV status to them; and, (2) to identify risk and potential protective factors for depression among the caregivers.

Methods

Study design and population

The rationale, organization, and recruitment of the subjects for the Sankofa study have been previously described (Catlin et al., 2015; Paintsil et al., 2015; Reynolds et al., 2015). The study is ongoing in the two main teaching hospitals in Ghana, Korle-Bu Teaching Hospital in Accra and Komfo-Anokye Teaching Hospital in Kumasi. Caregiver-child dyads were enrolled. All HIV-infected children receiving care at the two teaching hospitals 7 to 18 years of age who were started on ART within 12 months of study enrollment and who did not know their HIV status (based on caregiver account and medical records confirmation) were eligible. Written informed consent and assent was obtained from the caregivers and the children, respectively. The study was approved by Institutional Review Boards of University of Ghana Medical School, Komfo Anokye Teaching Hospital, and Yale University Human Investigation Committee

Procedures

Baseline data of children and their caregivers were collected with standardized questionnaires given in the clinic. Most of the interviews were conducted in interview format in English. Questionnaires were translated into Twi, the dominant local language of both sites, for study participants who did not speak English fluently. Translation from English to 'Twi' was done at each site by native Twi-speaking research staff and then compared across sites to reach agreement on word choice and meaning.

Measures

Depression was assessed using the 21-item Beck Depression Inventory (BDI) (Beck AT, 1996). At enrollment, caregivers rated each symptom on a four-point scale reflecting the degree to which they experience each symptom and a total symptom score was assigned. Severity of depression correlated with the score: minimal (0–9); mild (10–18); moderate (19–29); and severe (30–63). The BDI has been previously used to measure depressive symptoms in sub-Saharan and found to have good validity and reliability (Cronbach's alpha = 0.90) (Kagee, Nel, & Saal, 2014).

Demographic and participant characteristics were measured at baseline including age, marital status, sex, race/ethnicity, employment status, household income, education, duration and severity of illness, other siblings or family members living with HIV infection, ART treatment regimen, and relationship to the child (e.g., biologic parents, family adopted parents or unrelated adopted parents). The Social Provisions Scale (SPS; Cutrona & Russell, 1987) (Cutrona CE, 1987) was used to measure caregiver social support. This 24-item scale provides an assessment of six dimensions of support (social attachment, social integration, reassurance of worth, reliable alliance with others, guidance, and social nurturance) as well as an overall social support index. HIV knowledge was assessed with the Brief HIV Knowledge Questionnaire (HIV-KQ-18) (Carey & Schroder, 2002), an 18-item measure with good psychometric properties. Correct answer is scored as "1" and wrong or "don't know" answers scored as "0" with a possible range of 0 to 18. The Brief Illness Perception Questionnaire (Brief IPQ) (Broadbent, Ellis, Thomas, Gamble, & Petrie, 2009), a 9-item

scale, provided an assessment of the caregiver's cognitive and emotional perceptions of the child's illness. Each of first 8 items has a possible value of 0 to 10 with a possible range of 0 to 80. The 18-item HIV Stigma Scale was used to assess caregiver perceptions of stigma related to HIV (Berger, Ferrans, & Lashley, 2001). Each of the 18 items has a possible value of 1 to 3 with a possible range of scores from 18 to 54. These instruments have been used in resource-limited settings (Kotze, Visser, Makin, Sikkema, & Forsyth, 2013; Lipps et al., 2010).

Statistical analysis

Means and measures of variability (standard deviation) were calculated for continuous variables, numbers, and percentages for categorical variables. Regression analysis methods were used to assess the relationship between caregiver characteristics and depression (assessed using the Beck Depression Inventory). After running univariate regression models, any variable meeting the $p < 0.1$ threshold was included in the multivariable model. All analyses were performed using SAS v9.3, SAS Inc.

Results

Demographic characteristics of caregivers and children

The 446 caregivers of the HIV-infected children were enrolled between January 2013 and June 2016. As seen in Table 1, the mean age of the caregivers was 42.2 ± 10.4 years. Over 55% of caregivers were married and about 80% of the caregivers were female, 59% of caregivers were living with HIV and 16% had no formal education. The proportion of caregivers who were either unemployed or working in the formal sector employment, i.e., worked for government or privately owned firms, was 14% and 9%, respectively; the majority (78%) were self-employed. Seventy percent of caregivers had a monthly household income of 300 GHC (equivalent to 70 USD). Table 2 illustrates the demographic characteristics of the children. The mean (SD) age was 9.78 ± 2.27 years, with about 64% of than less than 11 years of age. Fifty-two percent of the children were male and over 95% were in school. The main mode of HIV transmission was mother-to-child (96%).

Caregiver social support, HIV knowledge, perceived stigma, HIV illness perceptions and depression

As illustrated in Table 1, the mean score for caregivers on the Social Provision Scale was 71.7 ± 8.3 (range 24 to 96). The mean score of caregivers on the brief HIV Knowledge Questionnaire (HIV-KQ-18) was 14.13 ± 2.2 (range 0 to 18). The mean HIV Stigma score was 42.6 ± 6.0 (range 18 to 54) with high scores reflecting a high level of perceived stigma. The mean score on the Brief Illness Perception Questionnaire (Brief IPQ) was 34.2 ± 11.8 (maximum score of 80). The mean score of caregivers on the Beck Depression Inventory (BDI) was 10.6 ± 10.9 (maximum score of 63) (Table 3). About 28% of caregivers had clinically significant depression; mild (12.8%), moderate (8.5%), and severe depression (7%).

Prevalence and correlates of depression among caregivers

Each of the factors that were associated with depression at $P \leq 0.1$ in the univariate analyses were included in the final multivariable regression model (Table 4). In the unadjusted analyses, HIV positive status ($P = 0.03$) was associated with depression in caregiver. Low income was also associated with depression, however, only with borderline significance ($P = 0.06$). There was no statistically significant association between gender, age, or level of education with depression. In the adjusted model, HIV positive status ($P = 0.04$) and low income ($P = 0.02$) remained significantly associated with depression in caregiver (Table 4).

The Social Provisions Scale, HIV Knowledge Questionnaire, Brief Illness Perception Questionnaire, and HIV Stigma Scale assess the knowledge, HIV-related beliefs and provisions of social relationships of the individual. We, therefore, assessed if the caregiver's scores on these instruments are associated with depression (Table 5). In the unadjusted model, for each unit increase in caregiver's score on the Social Provision Scale and HIV Knowledge Questionnaire there was 0.23 and 0.83 decrease in the level of depression, respectively. Thus, there was an inverse relationship between depression and social support or HIV knowledge. With each unit increase in the scores on Illness Perception and HIV Stigma scores, there was an increase in the level of depression. All the above associations remained statistically significant in the multivariable model (Table 5).

Discussion

We found a high prevalence of clinically significant depression (28%) among caregivers of HIV-infected children in our study compared to the 2017 WHO estimate of 5.4% prevalence among the general population in Ghana (WHO, 2017). Caregiving is a difficult role whether taking care of healthy or chronically ill children and adults. This informal, but important contribution to the fight against HIV, particularly in sub-Saharan Africa, has received little attention. Hence, the paucity of studies on the impact of caregiving of HIV-infected children on the health of caregivers. We found a positive correlation between self-reported depression and HIV-positive status and low monthly household income in caregivers. Lower scores on Social Provision Scale and HIV Knowledge Questionnaire were also associated with depression in the caregivers. In addition, as expected, caregivers with higher scores on the Illness Perception Scale and HIV Stigma Scale were more likely to have depression.

The high prevalence of depression in our study participants is consistent with prevalence of depression in caregivers of HIV-infected children reported in other studies globally (Hughes & Caliendo, 1996; Lindsey et al., 2003; Lv et al., 2010). In sub-Saharan Africa, most of the studies on caregiver depression are from high HIV-endemic communities in South Africa. Jaspan et al., using the BDI for measuring depression, reported a rate of 33% among caregivers of HIV-infected children in Cape Town, South Africa (Jaspan, Mueller, Myer, Bekker, & Orrell, 2011). Kuo et al. reported that depression among caregivers of HIV-infected children in the KwaZulu Natal province, South Africa, ranged from 27.9% to 35.2% (Kuo & Operario, 2011). A study conducted in South Africa and Malawi (Skeen, Tomlinson, Macedo, Croome, & Sherr, 2014) reported that up to 28% of caregivers of children affected by HIV presented with mental health disorders when assessed using the Shona Symptoms Questionnaire (Patel, Simunyu, Gwanzura, Lewis, & Mann, 1997). There is paucity of data

on caregiver depression in West Africa, particularly caregivers of HIV-infected children. In a study from Nigeria, the prevalence of depression of among caregivers of PLWHA was 65% and 39% using Self-Rating Depression Dscale (SDS) and Self-Report Questionnaire (SRQ-20), respectively (Abasiubong, Bassey, Ogunsemi, & Udobang, 2011). This higher prevalence, compared to our study, could be attributed to the use of different tools to assess depression as well as a different study population of caregivers (caregivers of HIV-infected adults).

The literature is replete with studies reporting high prevalence of depression among people living with HIV (PLWH) globally, ranging from 20% to >80% (Bing et al., 2001; Dew et al., 1997; Williams et al., 2005). It is, therefore, not surprising that in the multivariable analyses, we found a positive correlation between the HIV-positive status of caregiver and depression. This is also consistent with findings from other studies that caregivers living with HIV are more likely to have mental health disorders compared with both healthy caregivers and caregivers living with other chronic diseases (Casale et al., 2014; Casale, Wild, Cluver, & Kuo, 2015). The high prevalence of depression in PLWH may be attributable to HIV specific stressors (Zisook et al., 1998) as well as traditional stressors among in non-HIV population (Everson, Maty, Lynch, & Kaplan, 2002; Francis, Weiss, Senf, Heist, & Hargraves, 2007; S. J. Kim et al., 2010; Strawbridge, Deleger, Roberts, & Kaplan, 2002). Thus the challenges of caring for an HIV-infected child while coping with one's own HIV status may put caregivers of HIV-infected children at an increased risk of mental health disorders, including depression (Kuo et al., 2014). Moreover, caregivers of AIDS-orphaned children have been reported to have a range of negative mental health outcomes, including higher levels of stress, depression, and anxiety (Ssengonzi, 2007; Strug & Burr, 2003). Given that in sub-Saharan Africa, home to 90% of HIV-infected children worldwide (WHO, 2014), caregivers will continue to play a crucial role in the care of HIV-infected children, a better understanding of their mental health needs and interventions to address these needs are vital.

Caregivers with low Social Provision Scale scores had higher BDI scores. High scores on Social Provision Scale imply having a functional network of interpersonal relationships and access to social resources that one is able to call upon during stressful life events and times of need (Cohen & Wills, 1985). Thus positive social support may act as a buffer between stressors and untoward health outcomes, including depression (Casale & Wild, 2013; Dyer, Stein, Rice, & Rotheram-Borus, 2012). Our finding is consistent with other studies that found significant correlation between social support and depression. For example, Kagotho et al. found a significant correlation between social support system and depression among caregivers of children affected by HIV in Uganda (Kagotho & Ssewamala, 2012). Casale et al. recently reported that social support was a protective factor for depression among women caring for children in HIV-endemic South Africa (Casale et al., 2015). Several studies have reported that caregivers who are socially isolated and lack support from family and friends and are more likely to show symptoms of depression (Casale, 2015; Musil, 1998). Other factors which contribute to depression among caregivers include disclosure of HIV status to children (Vreeman et al., 2010), low socioeconomic status (SES), the presence of another child or adult with HIV status in the same home (Lv et al., 2010), and having no fixed

income (Kuo et al., 2014), length of time since diagnosis of the sick person, burden of care (Sung Jai Lee et al.), and stigma (Mitchell & Knowlton, 2009).

We found that caregivers with higher perceived stigma had higher BDI scores. Stigma is pervasive among persons affected by HIV and has repeatedly been associated with depression and poorer health outcomes (Alonzo & Reynolds, 1995; Ayano, Solomon, & Abraha, 2018; Chandra et al., 2018; Liu et al., 2018; Mitchell & Knowlton, 2009). Stigma, perceived or real, has consequences on one's health; it may limit access to care or resources which are either denied or never requested. Likewise, we found that low HIV knowledge and a higher level of negative illness perceptions were associated with higher BDI scores. Illness perceptions are beliefs and expectations regarding an illness that influence the individual's cognitive and emotional response to the illness and guide coping behavior such as adherence to treatment and health care use in a positive or negative way (Arat, De Cock, Moons, Vandenberghe, & Westhovens, 2018; Broadbent et al., 2015; Leventhal, Phillips, & Burns, 2016; Petrie & Weinman, 2006; Reynolds, 2003). Individuals facing illness develop common-sense constructions to conceptualize and give meaning to the illness and its consequences. The search for a meaning is a dynamic process, with possible shifts in patients' perceptions and ideas about their illness over time (Leventhal et al., 2016; Petrie & Weinman, 2006). The type and quality of available information is crucial in order to give meaning to and manage their illness. Interpreting this information is influenced by a range of individual, contextual, and cultural factors (Leventhal et al., 2016). Generally, more positive illness perceptions are related to more positive illness management and health outcomes.

Findings from our study and that of other studies render comprehensive mental health care for caregivers of HIV-infected children imperative. These findings highlight the need for programs that provide economic empowerment and social support to families affected by HIV in sub-Saharan Africa. At the community level, interventions should include support groups that will provide social support to caregivers. The Suubi-Maka family economic empowerment program is an example of successful community program. The program combines matched savings accounts and health-promotion strategies to empower families caring for children orphaned by AIDS within communities in southern Uganda (Kagotho & Ssewamala, 2012).

The need to assess depression in a standardized manner is also becoming apparent. There are different diagnostic systems (DSM or ICD), different screening measures of depression with different cut offs, and the myriad of cultural and language issues associated with translations. Finally, there is the need to pay attention to routine treatment of depression in this population. The World Health Organization recommends treatment of mental health as an essential care intervention in PLWH in resource-limited settings (WHO, 2008). There is evidence that depression is as treatable in HIV populations as it is with the general population. The Measurement-Based Care (MBC) model, an evidence-based and resource-efficient, has been used successfully to deliver best-practices and guideline-concordant medication management for depression in resource-limited settings (Adams et al., 2012; Gaynes et al., 2015). With regard to risk factors such as perception of support, stigma, HIV knowledge and illness perception, our findings indicate the need for interventions such as

Cognitive Behavioral Therapy (CBT) designed to strengthen patient's sense of control, ability to withstand stigma, and to empower them to ask for support as needed.

Our study has important strengths, including the sample size and being one of the first studies of depression among caregivers of HIV-infected children in West Africa. Further, we add to existing literature other psychosocial risk factors for depression among caregivers of children living with HIV that can inform both individual and community level interventions. However, it has several limitations. First, the data is based on self-report, which may be less reliable than provider-based assessment of depression. Second, BDI is a screening tool and not for diagnosis of depression. Third, the study is a cross-sectional study so we cannot determine the causality or temporal order of caregiving and depression. Fourth, although the BDI has been validated for use in sub-Saharan Africa (Abubakar et al., 2016; Jaspan et al., 2011), and the prevalence of depression detected by the BDI is similar to that identified with other standardized measures (Kuo & Operario, 2011; Myer, Seedat, Stein, Moomal, & Williams, 2009; Myer, Stein, et al., 2009), there could be cultural differences (M. H. Kim et al., 2014). Interestingly, there are reports that in sub-Saharan Africa, the BDI may be more sensitive than the other instruments used for measuring depression (M. H. Kim et al., 2014). Fifth, we did not compare depression in caregivers of children who don't know their diagnosis to caregivers of children who do know their diagnosis. This may limit the generalizability of our findings to all caregivers. Further research with appropriate control groups and longitudinal in design is needed.

Conclusions

In conclusion, our finding of high prevalence of depression among caregivers of HIV-infected children is of concern as this can lead to not only poor health outcomes in the caregivers but also in the HIV-infected children – poor medication adherence, virologic failure, and increased morbidity and mortality (Marhefka et al., 2006). However, most of the risk factors for caregiver depression identified are modifiable and amenable to interventions. We provide evidence to support the provision of comprehensive mental health care to PLWHA, particularly HIV-infected children, and their caregivers in sub-Saharan Africa.

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Table 1.**Caregiver Demographic Characteristics**

Variable	Total (N = 446)
Age	
Mean (SD)	42.16 (10.44)
Marital Status, N (%)	
Divorced or separated	56 (12.56%)
Married	247 (55.38%)
Single	61 (13.68%)
Widowed	77 (17.26%)
Missing ^{\$}	5 (1.12%)
Gender, N (%)	
Female	359 (80.49%)
Male	82 (18.39%)
Missing	5 (1.12%)
Caregiver HIV status	
No or Unsure	175 (39.24%)
Yes	262 (58.74%)
Missing	9 (2.02%)
Education background	
No School	72 (16.14%)
Elementary Education	241 (54.04%)
Secondary & Post-secondary Education	129 (28.92%)
Missing	4 (0.90%)
Employment Status, N (%)	
Unemployed	60 (13.45%)
Self employed	347 (77.80%)
Private/Government Sector employment	32 (9.22%)
Missing	7 (1.57%)
Monthly Household Income [£]	
Less than 50 GHC	44 (9.87%)
50-100 GHC	269 (60.31%)
Greater than 300 GHC	120 (26.91%)
Missing	13 (02.91%)
Family members/other people in home (Children)	
Mean (SD)	3.34 (2.50)
Family members/other people in home (Adults)	
Mean (SD)	3.30 (2.81)
Number of living children	
Mean (SD)	2.82 (1.68)
Distance form Clinic/Hospital, N (%)	

Variable	Total (N = 446)
0-10 kilometers	119 (26.68%)
10-20 kilometers	160 (35.87%)
20-30 kilometers	95 (21.30%)
More than 30 kilometers	65 (14.57%)
Missing	7 (01.57%)
Receiving own care at, N (%)	
Clinic/Hospital and traditional/homeopathic healer	3 (0.67%)
Clinic/Hospital	433 (97.09%)
Other	3 (0.67%)
Missing	7 (1.57%)
Frequency of visits to clinic/hospital, N (%)	
Once or never in last 5 years	117 (26.23%)
One or more times a year	320 (71.75%)
Other	1 (0.22%)
Missing	8 (1.79%)
Social Provisions Questionnaire (SPS) Overall Score	
Mean (SD)	71.71 (8.25)
HIV Knowledge (HIV-KQ-18)	
Mean (SD)	14.13 (2.22)
HIV Stigma Score	
Mean (SD)	42.59 (6.10)
Illness Perception Score (Brief IPQ)	
Mean (SD)	34.22 (11.80)
Beck Depression Inventory (BDI) overall score	
Mean (SD)	10.63 (10.87)

Footnotes:

^sMissing, either patient refused to answer or data not available

[#]Ghana Cedis (GHC): 4.3 GHC = 1 USD

Table 2.

Demographic Characteristics of Children

Variable	Total (N=446)
Gender	
Female	216 (48.43%)
Male	230 (51.57%)
Age	
Mean (SD)	9.78 (2.27)
Age category (years)	
<11	284 (63.68%)
11	151 (33.86%)
Missing	11 (2.46%)
School Attendance	
Yes	427 (95.74%)
No	6 (1.35%)
Patient refused to answer	1 (0.22%)
Missing	12 (2.69%)
HIV Transmission Mode	
MTC	372 (83.41%)
Others	22 (4.93%)
Missing	52 (11.66%)
HIV+ Caregiver (mother)	
Yes	236 (52.91%)
No or Unsure	32 (7.18%)
Missing	178 (39.91%)

Footnotes:

MTC, mother-to-child transmission of HIV.

Missing, either patient refused to answer or data not available

Table 3.

Prevalence and pattern of caregiver depression

Beck Depression Inventory (BDI)	Total (N = 446)
Minimal Depression	314 (70.40%)
Mild Depression	57 (12.78%)
Moderate Depression	38 (8.52%)
Severe Depression	31 (6.95%)
Missing [§]	6 (1.35%)

Footnotes:

[§]Missing, either patient refused to answer or data not available

Table 4.

Association of demographic characteristics with caregiver depression

	Un-adjusted model			Adjusted (multivariable model)		
	Estimate	Standard Error	P value	Estimate	Standard Error	P value
Age (years)						
An increase by 1 year	0.00	0.05	0.95	0.04	0.06	0.45
Gender (Reference, Male)						
Female	2.39	1.38	0.08	1.90	1.47	0.20
HIV Status (Reference, No HIV)						
Yes vs. No or Unsure	2.33	1.08	0.03	2.45	1.20	0.04
Education (Reference, No school)						
Elementary Education vs. No School	−1.89	1.50	0.21	−2.12	1.51	0.16
Secondary & Post-secondary Education vs. No School	−1.94	1.66	0.24	−2.15	1.74	0.22
Secondary & Post-secondary Education vs. Elementary Education	−0.05	1.23	0.97	−0.03	1.29	0.98
Monthly Household Income [‡] (Reference, <50 GHC)						
Greater than 300 GHC vs. <50 GHC	3.71	1.94	0.06	4.71	1.99	0.02
50-300 GHC vs. <50 GHC	2.11	1.79	0.24	2.59	1.80	0.15
Greater than 300 GHC vs. 50-300 GHC	1.59	1.21	0.19	2.12	1.24	0.09

Footnotes:

[‡] Ghana Cedis (GHC): 4.3 GHC = 1 USD

Table 5.

Association of caregiver's social provisions, HIV knowledge, HIV illness perceptions and perceived stigma with depression

	Un-adjusted model			Adjusted (multivariable model)		
	Estimate	Standard Error	P value	Estimate	Standard Error	P value
Social Provision Scale						
Social Provision Scale increase by 1	-0.23	0.06	<0.001	-0.14	0.06	0.014
HIV Knowledge Score						
HIV Knowledge score increase by 1	-0.83	0.24	<0.001	-0.53	0.21	0.012
Illness Perception Score						
Illness Perception Score increase by 1	0.30	0.04	<0.001	0.16	0.04	<0.001
Stigma Score						
HIV Stigma Score increase by 1	0.77	0.08	<0.001	0.61	0.08	<0.001