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Effect of Cognitive Behaviour Therapy on Depressive Symptoms among HIV-Infected Outpatients in Kenya

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Abstract

Timely diagnosis and treatment of depression among persons living with HIV (PLWH) in sub-Saharan Africa which is home to about 70% of global HIV infection is disproportionately low. In Kenya, the effect of cognitive behaviour therapy (CBT) for depression has scarcely been established through a study. Hence, we conducted an experimental study to test the effectiveness of CBT for depression among PLWH attending outpatient clinics in western Kenya. The intervention was a 2-hour weekly group-CBT conducted for 6 successive weeks. Out of 53 participants recruited, 26 were randomly assigned to CBT and 27 to control arms of the study. Data were collected using Patient Health Questionnaire (PHQ-9). Depression symptom was diagnosed for a score of >5 and reported functional impairment in the past 2 weeks. At baseline, the difference in median PHQ scores for CBT and control groups was not statistically significant (p= .644, 95%CI). At month-2, a significantly higher proportion of participants in the CBT condition had a reduction in depressive symptoms (a drop of 5.8 points) compared to those in the control arm who had a drop of 1.9 points (p= .001, 95% CI). We assessed the effect of CBT on depression and found a statistically significant result, Z= -3.276, p <.001, with a relatively large effect size (r= .5). The treatment effect of CBT was evidently sustained at 2 months post-treatment. We therefore recommend a larger randomised controlled trial to evaluate the effectiveness of CBT for long term treatment gains in similar settings.
Key words: cognitive behavior therapy, depressive symptoms, HIV, Kenya, primary health care.

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Novelty and Significance

What is already known about the topic?

- Cognitive Behavior Therapy is more effective in reducing depression than control group, treatment as usual care, and waitlist in the general population.
- Cognitive Behavior Therapy treatment gains are usually reported at timeframes with longer follow up periods like 9, 12, 18 months post-treatment.

What this paper adds?

- Provides data on the effect of a 6-session group Cognitive Behavior Therapy for depressive symptoms among HIV-infected adults.
- Provides quantitative evidence in support for adaptation of brief group Cognitive Behavior Therapy for depression among HIV infected adults in resource-constrained primary care settings.

World Health Organisation estimates of 2012 indicated that about 350 million people were suffering from depression globally (WHO, 2012). The development of depression among individuals can be as result of a combination of biological, situational and psychological factors (Barlow & Durand, 2005). In HIV infection, biological factors including poor immunity, and the occurrence of multiple opportunistic infections coupled with psychological variables such as fear of death and dying from a terminal

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illness, stigma, as well as the distress that may be related to HIV diagnosis may play a precipitating role in the development of depression (Hand, Phillips, & Dudgeon, 2006; Lichenstein, Laska, & Clair, 2002; Simbayi, 2007).

Depression among persons living with HIV (PLWH) has been associated with numerous adverse outcomes including poor immunity, higher viral loads and lower CD4 counts when compared to the non-depressed HIV positive controls (Leserman, 2008). The presence of depression in HIV positive individuals is associated with impaired innate cells, which are responsible for mediating the development of HIV to AIDS (Cruess, *et alii*, 2005). Depression in PLWH has also been associated with faster patient progression from HIV to AIDS and early death (Cruess *et alii*, 2005; Ironson *et alii*, 2005; Leserman, Petitto, Golden, Gaynes, & Gu, 2000). A study on HIV positive men found that those with depression progressed faster from an asymptomatic state to full blown AIDS at an average of 1.5 years quicker than the non-depressed controls (Page-Shafer, Delorenze, Satariano, & Winkelstein, 1996). Similarly, Ickovics *et alii* (2001) studied HIV-infected women and found that those with depression were almost 2 times more likely to die from AIDS compared to the non-depressed controls over a 7 year study period.

One mechanism that may contribute to the association between depression and faster progression from HIV to AIDS is poor adherence to antiretroviral therapy (ART). A number of researchers have reported that depression is an important predictor of poor adherence to medications including antiretroviral treatment in PLWH (Ammassari *et alii*, 2004; Bartlett, 2002; Crespaz *et alii*, 2008; González, Batchelder, Psaros, & Safren, 2011). It is important for HIV positive patients to adhere to ART, since successful viral suppression requires close to 95% adherence to ART (Chesney, 2003) and non-adherence may make patients become vulnerable to drug resistance, and perhaps spread such resistant strains to HIV negative individuals (Akena, Joska, Obuku, & Stein, 2013).

Studies conducted in sub-Saharan Africa settings have demonstrated that depression is a commonly-occurring disorder among PLWH. A systematic review by Nakimuli-Mpungu *et alii* (2011) put the prevalence of depressive disorders at 31% and that of major depression at 18% across HIV clinics in sub-Saharan Africa. The prevalence of depressive disorders among PLWH in Kenya has been reported to be as high as 42% (Ndetei *et alii*, 2009). Studies conducted in western Kenya setting have reported similar trends with results showing that as high as between 13% and 25% of PLWH in this region are presenting with major depression (Adina, 2016; Monahan *et alii*, 2008).

The above findings highlight the fact that depression could be a burden to PLWH within the region and in the local settings. Most importantly, depression could be a burden due to its tendency to cause both cognitive and functional impairments among its victims if not intervened for in a timely fashion. The most common approaches in treating depression include the use of medication and/or psychotherapy. Psychological therapies are accredited for the benefit of helping a person to recover and also help to prevent relapse into depression (Jorm, Morgan, & Hetrick, 2008) albeit at a cheaper cost than pharmacological treatment.

Among the psychological therapies commonly used for depression treatment in diverse settings is cognitive behavior therapy (CBT). CBT is considered the gold standard in the psychological treatment of disorders such as anxiety, depression, PTSD, panic disorders, eating disorders and many more (Hoffman & Smits, 2008; Norton & Price, 2007; Stewart & Chambless, 2009). A number of studies conducted over the last few decades have consistently demonstrated solid outcomes for CBT in the treatment of depression with different groups in manifold settings (Butler *et alii*, 2006; Dobson,

1989; Gloaguen, Cottraux, Cucherat, & Blackburn, 1998; Wilson, Mottram, & Vassilas, 2008). The meta-study by Beltman *et alii* (2010) demonstrated that CBT was significantly more effective at reducing depressive disorders than control, and that CBT group therapy also reduces depressive symptoms among persons suffering from a variety of somatic diseases such as cancer, HIV infection, or renal failure.

Group CBT compares favourably with individual CBT at short term post-treatment assessment, and significantly helps depressed patients more than usual care (Huntley, Araya, & Salisbury, 2012). To this end, the use of CBT to treat depression has been proven to be more efficacious and superior to wait list, support groups, usual care groups, controls, and at least as effective as antidepressant medication, with more enduring effects than medication (Hollon *et alii*, 2005; McHugh, Whitton, Peckham, Welge, & Otto, 2013).

Evidently, the use of CBT in the treatment of depression among PLWH in Kenya has not been adequately researched. Therefore, we aimed to investigate the feasibility and effectiveness of CBT intervention for depression among people with chronic physical health problem of HIV infection in a resource-constrained setting.

METHOD

Design and Participants

We performed an experimental study using pretest-posttest control group design to evaluate the effectiveness of CBT intervention for depressive symptoms among HIV-infected outpatients in a primary care setting of Western Kenya. Participants were enrolled from HIV-outpatient clinic within Turbo Sub-County Hospital in Kenya. The clinic serves a varied demography of patients from rural and urban areas of Western Kenya. Those who accepted to take part in the study were initially screened for depression using PHQ-2 mini-scale for depression (Kroenke *et alii*, 2003). All HIV positive adults with HIV diagnosis of ≥1 year and a depression score of >5 on PHQ-9 scale coupled with reported functional impairment were eligible for inclusion. The participants were included if they had at least 6th grade level of education and could communicate effectively in either English or Kiswahili language. Participants were excluded if they had a pre-existing diagnosis of psychosis, were less than 18 years old, were on alcohol, psychiatric treatment, and also unwilling to provide informed consent. Only participants in the experimental group were exposed to CBT intervention. Participants in the control condition did not receive any sessions of psychotherapy during the active face of the study intervention. However, as expected they all remained under treatment as usual care (TAU) which did not involve any form of psychotherapy. TAU services typically involve; clinical assessment, medication refills, and treatment adherence education as part of routine business of Antiretroviral Therapy (ART) care in HIV-outpatient clinics. Participants in the control condition only visited the ART clinic based on their monthly scheduled appointments, and only benefited from three sessions of CBT offered to them after the study termination.

We screened 393 patients for eligibility and recruited 53 participants who had depressive symptoms co-occurring with HIV infection and were medically stable. Patients who were on alcohol were excluded and were assessed via saliva test and clinician's reports documented on patient medical records. Ethical clearance was sought and acqui-

red from the Institutional Research Ethics Committee (IREC) of Moi University/Moi Teaching and Referral Hospital, Kenya prior to study commencement. Written informed consent was obtained from all participants.

Procedure

Patients were consented and enrolled into the treatment and control arms of the study in the ratio of 1:1. Baseline demographic and clinical information was obtained for all participants using an interview-administered questionnaire at pre-test. Participants were grouped into three groups. CBT treatment was delivered by a doctoral candidate in counselling psychology under the supervision of two professors of psychology with long standing experience in CBT. The treatment was offered to participants free of charge. CBT sessions were delivered using a closed-group format and the sessions were offered in successive weeks. Participants were expected to attend all the treatment sessions, however only 79% of participants in the treatment condition attended all the sessions, and only one individual registered CBT attendance of <70% (attended 4 sessions). In addition, a participant was deemed to be a successful completer only after month-2 post treatment assessment was administered. A total of 45 (85%) participants were assessed at post treatment which came at 60 days after terminating the CBT intervention.

Treatment

Cognitive behavior therapy (CBT) consisted of 6 weekly 2-hour sessions delivered in a group format, with groups consisting of between 8 and 9 participants. Each weekly session had a pre-defined treatment agenda during which the core components and principles that underpin CBT were discussed and implemented. The key components of CBT treatment included, psychoeducation-which highlighted the interplay between HIV, depression, ART adherence and stigma; automatic thoughts; analysis of behaviour; cognitive distortions and alternative thoughts; thought evaluation and problem solving. The CBT sessions were facilitated through group check-in discussions, role-play exercises, and homework assignments. CBT intervention session guideline was formulated and used by the facilitator as a way of ensuring fidelity to the treatment procedures and processes.

Measures

The outcomes assessed were the change in severity of depressive symptoms at 2 months post-treatment and the effect of CBT intervention on alleviating depression symptoms among study participants. Depression severity was measured using Patient Health Questionnaire/PHQ-9 Depression Scale which was developed off the PRIME MD (Spitzer *et alii*, 1999). PHQ-9 scale was used as a brief structured interview for diagnosing depression symptoms consistent with DSM-5 criteria (APA, 2013). The PHQ-9 scale screens for nine major depression symptoms and yields a total depression severity score. PHQ-9 has been used in a number of studies as a diagnostic instrument among PLWH, including western Kenya setting (Adewuya *et alii*, 2006; Chen *et alii*, 2010; Monahan *et alii*, 2008). A diagnosis of depression was arrived at for participants with a score of at least 5 out of the 27 from the PHQ-9 scale, and the participants were judged to have social and/or occupational impairments as a result of the symptoms. Participants overall levels of depression severity were categorised as minimal (5-9), mild (10-14),

moderate-severely (15-20), and severe (>20) in relation to the PHQ-9 standard cut-off guidelines (Spitzer *et alii*, 1999). The effect of CBT on depression was assessed by calculating the treatment effect size based on Cohen's (1988) criteria.

Data analysis

To achieve the primary aim of the study which was to establish the effect of cognitive behavior therapy (CBT) on reducing depressive symptoms in PLWH, categorical variables were summarised as frequencies and the corresponding percentages. Continuous variables were assessed for normality using Shapiro-Wilk test and whenever the Gaussian assumptions were violated they were summarized as median and the corresponding inter quartile range (IQR). Comparison between the treatment arms on independent categorical variables was done using Pearson's χ^2. However, where the χ^2 assumptions were violated we conducted Fisher's exact test. Generalised estimating equations was used to model the effect of CBT on depression symptoms, and the non-parametric Mann-Whitney *U* test was used to determine the treatment effect size at 95% confidence interval.

RESULTS

A total of 53 participants were recruited into the study and their characteristics depicted in Table 1 stratified by treatment condition. The overall median (IQR) age was 35 (IQR: 32, 40) years with a minimum and maximum of 19 and 54 years. More than half of the participants (58%) were male. The median (IQR) years of education was 10 (IQR: 8, 12) with a minimum and a maximum of 6.0 and 16.0 years. Up to 39% were married, half had completed secondary school education, and 39% were employed. All the participants were able to speak and write in Kiswahili which is one of the national languages in Kenya. The median (IQR) duration since HIV diagnosis was 2 years (IQR: 2, 3). There were those who were just a year old and those who were six years since HIV diagnosis. Up to one fifth of the participants (23%) had undergone HIV diagnosis post-test professional counselling, and about 34% had difficulty to remember taking their medication, however, none of the participants took a break from medication. Half of the participants had reportedly missed some dose of their medicine in the last 30 days, and 47% were fully adherent to ART.

Table 2 presents results of Fisher's exact test that was used in assessing for potential inherent differences in depression scores between CBT and control groups at the baseline (N= 53). The results did not reveal any statistically significant differences between CBT and control conditions, p >.05. This finding shows that the two groups were equivalent at pretest thereby supporting the suitability of pretest/posttest design adopted for the study. Moreover, the baseline scores obtained provided us with a vital platform for conducting within-group and/or between-groups comparisons on depressive symptom severity at post-treatment assessment.

Figure 1 presents the results of pre-and post-treatment analysis of change using box plots. The results revealed changes in the median depression scores (thick middle lines in the box) at baseline and at month-2 post treatment in each arm of the study. The median depression score at month-2 posttest among those in the CBT arm, 4.0 (IQR: 1.0, 6.0), was significantly lower than that of the baseline, 9.0 (IQR: 7.3, 12.5), p <.0001 (significant at .01). Similarly, the drop in depression levels among participants

Table 1. Baseline Socio-Demographic and Clinical Characteristics of Participants Stratified by Treatment Condition.

Variables		Control *n*= 27 (50.9%)	CBT *n*= 26 (49.1%)	*p*
Age (years)		35.0 (27.5, 40.5)	36.5 (33.0, 40.0)	0.454
Education (years)		10.0 (8.0, 12.0)	9.5 (7.3, 12.0)	0.670
HIV diagnosis time line		2.0(2.0, 3.0)	2.0 (1.3, 3.0)	0.519
Treatment Groups	1	6 (22.2%)	8 (30.85)	0.591
	2	13 (48.1%)	9 (34.6%)	
	3	8 (29.6%)	9 (34.6%)	
Male		14 (51.9%)	17 (65.4%)	0.318
Civil status	Cohabiting	1 (3.7%)	3 (11.5%)	0.111[f]
	Married	13 (48.1%)	8 (30.8%)	
	Separated/DVC	3(11.15)	9 (34.6%)	
	Single	10 (37.0%)	6 (23.1%)	
Education	Upper primary (6-8 years)	12 (44.4%)	10 (38.5%)	0.495[f]
	Secondary (9-12 years)	12 (44.4%)	15 (57.7%)	
	College/University (>12 years)	3 (11.1%)	1 (3.8%)	
Current Employment status	Employed	12 (44.4%)	9 (34.6%)	0.292[f]
	Self-employed	6 (22.2%)	3 (11.5%)	
	Unemployed	9 (33.3%)	14 (53.8%)	
Able to speak and write Swahili		27 (100.0%)	26 (100.0%)	
HIV diagnosis post-test counselling		5 (18.5%)	7 (26.9%)	0.526[f]
Difficult to remember to take medication		8 (29.6%)	10 (38.5%)	0.497
Sometimes takes break from medication		0 (0.0%)	0 (0.0%)	
Missed any dose in the last 30 days		13 (48.1%)	13 (50.0%)	0.893
ART adherence	0%	2 (7.4%)	0 (0.0%)	0.714[f]
	25%	4 (14.8%)	2 (7.7%)	
	50%	4 (14.8%)	5 (19.2%)	
	75%	5 (18.5%)	6 (23.1%)	
	100%	12 (44.4%)	13 (50.0%)	

Notes: IQR= Interquartile range; [f]= Fisher' Exact Test; *p* value significant= ≤ .05.

in the control arm was statistically significant, median depression score at two months: 6.5 (IQR: 6.0, 12.0) vs. 9.0 (IQR: 8.0, 13.5), *p*= .021 (significant at .05). On the overall, the CBT condition had a mean drop of 5.8 points in depressive symptom severity from pre-to-postest while those in the control condition had a mean drop of 1.9 points.

Further analysis was conducted to ascertain the clinical significance of change in depressive symptom severity at posttest and results of descriptive statistics revealed that 71.4% (CBT) and 16.7% (control) participants had a drop of at least five points at post-treatment outcome assessment as shown in Table 3. With a drop of five points, a participant was deemed to have moved from a more severe to a less severe depressive symptom state, and the change in depression symptoms was considered clinically significant (Spitzer *et alii*, 1999). Notably, the decrease in symptom severity at posttest in the control condition was only significant for 4 out 24 participants who successfully completed the study, and this could be attributed to either personal coping mechanisms or perhaps psychological resilience.

Figure 2 presents results of regression analysis using Generalised Estimating Equations (GEE) that was used to model the effect of CBT on depression. From this regression model, the overall mean depression score for the participants in the control condition was 10.65 (95% CI: 10.41, 10.89), while participants in the CBT condition had a lower average by 0.07 (95% CI: -0.27, 0.40) at baseline. However, the difference between the two conditions was not statistically significant. An assessment at month-2 follow up revealed that the participants in the control arm had a marginally significant

Table 2. Participants Depressive Symptoms at Baseline Stratified by Treatment Condition.

Variables	Responses	Control *n*= 27 (50.9%)	CBT *n*= 26 (49.1%)	Fisher' exact *p*
Little interest or pleasure	Several days	13 (48.1%)	12 (46.2%)	1.000
	More than half the days	9 (33.3%)	10 (38.5%)	
	Nearly every day	5 (18.5%)	4 (15.4%)	
Depressed mood	Several days	14 (51.9%)	9 (34.6%)	0.386
	More than half the days	7 (25.9%)	11 (42.3%)	
	Nearly every day	6 (22.2%)	6 (23.1%)	
Insomnia	Not at all	8 (29.6%)	8 (30.8%)	0.104
	Several days	8 (29.6%)	11 (42.3%)	
	More than half the days	2 (7.4%)	5 (19.2%)	
	Nearly every day	9 (33.3%)	2 (7.7%)	
Fatigue/low energy	Not at all	6 (22.2%)	6 (23.1%)	0.907
	Several days	14 (51.9%)	11 (42.3%)	
	More than half the days	1 (3.7%)	1 (3.8%)	
	Nearly every day	6 (22.2%)	8 (30.8%)	
Poor appetite or overeating	Not at all	9 (33.3%)	8 (30.8%)	0.837
	Several days	13 (48.1%)	12 (46.2%)	
	More than half the days	1 (3.7%)	3 (11.5%)	
	Nearly every day	4 (14.8%)	3 (11.5%)	
Feelings of failure	Not at all	11 (40.7%)	18 (69.2%)	0.151
	Several days	7 (25.9%)	2 (7.7%)	
	More than half the days	2 (7.4%)	2 (7.7%)	
	Nearly every day	7 (25.9%)	4 (15.4%)	
Problem concentrating	Not at all	12 (44.4%)	15 (57.7%)	0.621
	Several days	6 (22.2%)	4 (15.4%)	
	More than half the days	3 (11.1%)	4 (15.4%)	
	Nearly every day	6 (22.2%)	3 (11.5%)	
Psychomotor problems	Not at all	14 (51.9%)	11 (42.3%)	0.680
	Several days	2 (7.4%)	5 (19.2%)	
	More than half the days	5 (18.5%)	4 (15.4%)	
	Nearly every day	6 (22.2%)	6 (23.1%)	
Suicidal ideation	Not at all	21 (77.8%)	17 (65.4%)	0.453
	Several days	3 (11.1%)	5 (19.2%)	
	More than half the days	0 (0.0%)	2 (7.7%)	
	Nearly every day	3 (11.1%)	2 (7.7%)	

Note: *p* value significant at ≤.05.

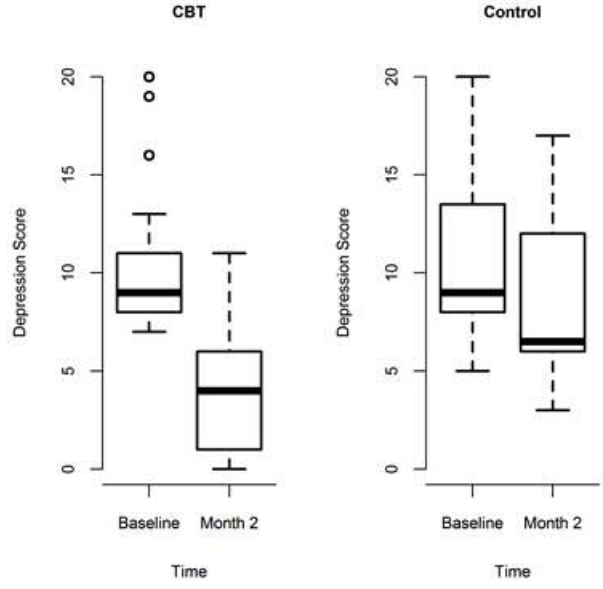

Figure 1. Comparison between Pre- and Posttest depressive symptom scores for CBT and control conditions.

Table 3: Clinical Significance of Change in PHQ-9 Scores at Posttest among Study Participants.

Variable	Category	Control (*n*= 24)	CBT(*n*= 21)
Drop in PHQ-9 score	< 5 points	20(83.3%)	6(28.6%)
	≥ 5 points	4(16.7%)*	15(71.4%)*
	Total	24(100%)	21(100%)

Note: *A drop of ≥5 points at posttest is clinically significant based on PHQ-9 standard cut-offs.

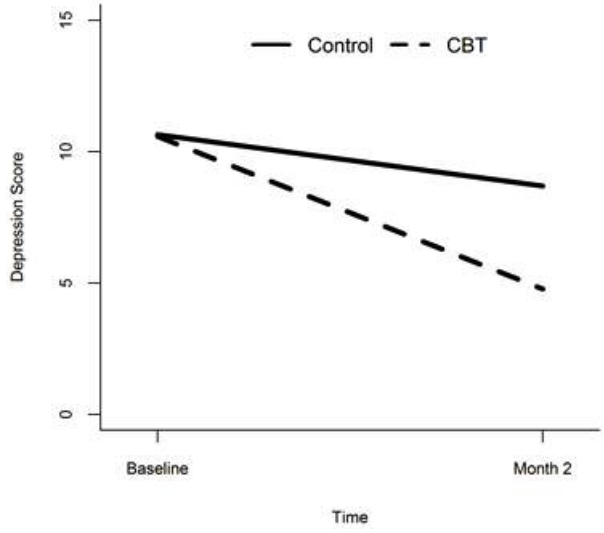

Figure 2. Modelled effect of CBT on depression using GEE.
Notes: yij= $\alpha+\beta_1$PHQ+β_2CBT+β_3Time+β_4CBT*Time+eij

Parameter	Estimate(95%CI)
Intercept	10.65(10.41, 10.89)
Baseline PHQ	0.85(0.76, 0.94
CBT	-0.07(-0.40, 0.27)
Time	-1.96(-3.32, -0.60)
CBT*Time	-3.85(-5.61, -2.09)

lower depression score by -1.96 (95% CI: -0.60, -3.32) in comparison to the baseline. Nevertheless, participants in the CBT arm had a significantly higher mean change in depression scores compared to the control arm, -3.85 (95% CI: -5.61, -2.09). The trend revealed by the regression model shows that CBT condition was more effective in reducing depressive symptom severity than the control condition.

Table 4 presents results of the non-parametric Mann-Whitney *U* test used to evaluate how effective CBT intervention was in reducing depression symptoms among participants in the experimental condition relative those in control condition at the critical

Table 4. Results of the Mann Whitney *U* Test to Compare the Groups' Posttest Depression Symptom Scores.

Groups	*N*	Mean Rank	Sum of Ranks	*U*	*Z*	*p*
CBT	21	29.00	696.00	108.00	-3.305	.001
Control	24	16.14	339.00			

Note: Based on a *Z* value of 3.305 (*N*= 45), computed treatment effect size yields, *r*= .5.

two months posttest assessment. The results revealed a statistically significant treatment effect of CBT for depressive symptoms, $z= 3.305$, $p <.001$, with a relatively large positive effect size, $r= .5$, suggesting that a majority of participants in CBT condition benefited from the intervention and therefore had less severe depressive symptoms two months after treatment termination.

Participants who were lost to follow up were compared to those who had a subsequent encounter after the baseline encounter in order to help establish the potential predisposing factors to loss to follow up. From the findings there was no evidence of any serious deviations in the baseline characteristics of the participants who were lost to follow up compared to those who were retained, $p= 0.391$. Thus it was safe to assume that the participants who dropped were a random sample of the total who were recruited at the beginning. This means that we could safely make inference from the results obtained from those who completed the study without compromising on the validity of the findings.

DISCUSSION

In keeping with our objective, study results showed that CBT was effective in reducing symptoms of depression and increasing general functioning of HIV-infected patients at month-2 post-treatment assessment. We found that participants in CBT condition had significantly lower levels of depressive symptoms than their counterparts in the control condition. On average, CBT participants had a drop of 5.8 points on the PHQ-9 score from pre-to-posttest. This was relatively way above the 1.9 points drop reported among control group participants which seemingly favoured only a few individuals. Largely, our findings on the effectiveness of CBT in reducing depressive symptoms among PLWH support that of previous studies conducted among similar populations in varied settings (Andersen *et alii*, 2016; Jayasvasti *et alii*, 2011; Safren *et alii*, 2012). Further, our findings suggest that CBT was more superior for depression than treatment as usual (TAU) where the control group members were attended during the intervention period. This outcome compares favourably with findings of previous clinical trials on CBT for depression across diverse settings (Beltman *et alii*, 2010; Hollon *et alii*, 2005; McHugh *et alii*, 2013; Wilson *et alii*, 2008).

During the 2 months posttest assessment, we established that 71.4% of participants enrolled in CBT programme had moved at least one level down in the depression severity hierarchy based on the PHQ-9 scoring cut-offs (Spitzer *et alii*, 1999) as depicted in Table 3. This finding implies that majority of patients who were in the intervention condition might have experienced remarkable symptom relief and consequently significant improvement in mood as positive outcomes of CTB effect. The findings of the current study concur with that of a systematic review on psychological interventions for common mental disorders for PLWH in low- and middle-income countries, which found that CBT was effective in reducing common mental disorders (like depression) symptoms in PLWH at 6 weeks to 12 months follow-up of study participants (Chibanda, Cowan, Healy, Abas, & Lund, 2015). The trend observed in our study elucidates the potential of CBT as an effective psychotherapy for depression especially among HIV-outpatients in primary care settings.

Concomitantly, our analysis of change trajectory of depressive symptoms revealed that participants in the CBT condition had a steeply downward trend in symptom severity

from pre-to-posttest. The reduction in depression severity among CBT participants was considered clinically significant since the direction of change was positive. The drop in severity scores among participants in CBT condition was however not of equal magnitude at posttest which basically explains the unique way in which individuals responded to the intervention. In part, this difference could be attributed to varied socio-demographic characteristics of participants for instance, level of education, which arguably plays a fundamental role in CBT and is usually correlated with intellectual capacity and the ability to think abstractly. Akechi *et alii* (2012) found that lower education level (less than 12 years) may predict depression and in certain circumstances even perpetuate depressive symptoms in terminal illness. Likewise, it has been found that inability to think abstractly may present as an impediment to the therapeutic process and thus limit the efficacy of CBT techniques, particularly for clients with low intellectual capacity (Epstein *et alii*, 1988). Comparatively, results of the current study revealed that a majority of participants had an average of 10 years of formal education which in our case was considered reasonable to stimulate logical thinking as a key ingredient in CBT intervention.

In addition, participant's response to CBT may be explained in terms of their ability to internalise intervention principles responsible for mediating change in depression severity. Just like previous authors (Sanders & Wills, 2005), we noted that clients may report a good understanding of the principles of CBT at intellectual level in therapy, but could not be able to apply them in real life situations in a way that promotes practical change. Nevertheless, our findings showed a positive treatment outcome thereby suggesting that CBT delivered using group format approach may provide an avenue for vicarious learning which in turn could reinforce participants' efficacy to process change in real life situations.

To evaluate the magnitude of change consequent to administering CBT intervention relative to change in control group, we calculated the treatment effect size and found a relatively large effect size, $r = .5$, based on Cohen's (1988) criteria at post treatment. This finding illustrates that CBT had a positive and significant treatment effect on depressive symptoms among participants. In addition, this indicates that participants' response to the intervention was fairly adequate and thus emphasises the fact that a considerable proportion of clients do respond to CBT within the first few sessions of therapy regardless of the setting (Elkin *et alii*, 1989; Miller & Berman, 1983). Not to mention, the treatment effect size reported in the current study is visibly the first of a kind to demonstrate CBT's effectiveness among depressed PLWH in a primary care setting at the acute 2 months outcome assessment. Previous studies conducted among different patient populations have consistently reported small positive treatment effect sizes of CBT in reducing depressive symptoms. For instance, meta-analysis and meta-regression findings by Cape *et alii* (2010) reported a minimal effect size on CBT for depression ($d = -.33$, 95% CI= -.6 to -.06).

Our findings on the positive impact of a short CBT intervention on depressive symptoms give credence to consider CBT as a potential treatment option within the local setting where patients are often limited to pharmacotherapy despite the serious shortage of psychiatrists. Presently, there are only 54 practising psychiatrists in Kenya against a population of 43 million people of whom 4% suffer from serious mental illnesses (Marangu, Sands, Rolley, Ndetei, & Mansouri, 2014; Ndetei *et alii*, 2009). Conspicuously, all the 54 Kenyan psychiatrists are in urban-based health facilities which are well beyond the depressed PLWH attending primary healthcare outpatient clinics. As

demonstrated by the study results, local patients may benefit from CBT just as much as they could from the use of antidepressants. Undoubtedly, CBT has the advantage of being as effective and with more long lasting effects than medication for depression as observed in previous studies (Hollon *et alii*, 2005; McHugh *et alii*, 2013).

Overall, the outcome of the study was highly serendipitous in creating a basis for adaptation and application of a brief group CBT delivered by psychotherapists in both clinical and research settings in Kenya. Manifestly, the study could be credited for providing quantitative evidence in support of brief group CBT for depressive symptoms among PLWH in primary care settings in Kenya.

The current study was limited to the extent that we did not assess depressive symptom severity for the CBT condition at the tail end of CBT session. This could have been important in elucidating the immediate treatment gain or otherwise among participants. Further limitation was observed in the omission to demonstrate the interplay between socio-demographic/clinical variables and symptom severity among participants at the 2 months outcome assessment.

We found significant results in support of CBT for depressive symptoms among PLWH and a relatively large treatment effect size at 2 months post-intervention assessment. However, the small sample size limited us from generalising the findings to other settings. And in as much as the results showed a promising trend, literacy level as part of eligibility criteria might have impeded the recruitment of some potential participants who could benefit from the intervention.

Even though the study was aimed to determine the effect of CBT, we only assessed treatment outcomes at 2 months post intervention. The period between pretest and posttest was seemingly too short to guarantee long term treatment gains of CBT intervention. We recommend further investigation to assess change in depression symptoms for longer follow up timeframes with assessment points at 6, 12, and 18 months so as to affirm the viability of CBT.

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