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Effectiveness of Cognitive Processing Therapy Among Patients with Comorbidity of Alcohol Use Disorders and Post Traumatic Stress Disorder: An Intervention Study of Rehabilitation Centres in Nairobi and its Environs

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Abstract

The comorbidity of post-traumatic stress disorder (PTSD) and Alcohol use disorder (AUD) is well documented. High rates of relapse post- treatment of AUD are often witnessed, even in patients seeking help voluntarily. The purpose of this study was to establish whether treating PTSD with Cognitive Processing Therapy (CPT) in AUD patients admitted in residential rehabilitation centers reduces PTSD symptoms and consequently reduces tendencies for relapse. The study employed a quasi-experimental design with experimental and control arms. A total of 123 respondents participated, 63 in the experimental group and 60 in the control group, consecutive sampling technique was used. PCL-5 was used at baseline, midline and endline to collect data. Descriptive and inferential statistics was used to summarize the findings. Paired T-test and repeated measures ANOVA were used to test for efficacy of CPT in reducing PTSD Symptoms and relapse. The study was done in rehabilitation Centres in Nairobi and its environs. The participants were followed at 3 months after treatment and discharge for relapse tendencies. At the end of the treatment, there was a significant reduction in PCL mean score from 38.33 to 21.46 in the group treated with CPT. In contrast, the control group showed a slight increase in mean scores from 46.98 at baseline to 48.48 at the endline. The number of respondents in the experimental group who relapsed into alcohol use were 31.7% (20) while in the control group, 61.7% (37) respondents relapsed. There was a statistically significant difference between the two groups ($p=<0.0001$). The integration of CPT with the traditional addiction treatment approach for AUD proved to be effective in the reduction of PTSD symptoms. Additionally, CPT was associated with reduced incidences of relapse of alcohol use in the experimental group compared to those in the control group. The researcher recommends that it should be mandated in policy that assessment for PTSD and use of CPT be incorporated into the treatment modalities for AUD in rehabilitation centers in Kenya.

Keywords: Cognitive Processing Therapy, Alcohol Use Disorder, Post-Traumatic Stress Disorder, Rehabilitation, Relapse Prevention, Trauma History

Introduction and Background

Alcohol use is a major public health problem in Kenya. It is estimated that 2.2 million Kenyans suffer alcohol dependency, with 21% of the people living in the urban areas in Kenya abusing alcohol (Kendagor et al, 2018). Over 90% of persons admitted to rehabilitation centers in Nairobi and surrounding environs have had one or more relapses into alcoholism (Kuria et al., 2013; Musyoka et al., 2016). Uncontrolled alcohol use detrimentally affects physical health, cognitive and social behaviour (NACADA, 2021). Even after treatment, relapse into alcohol use is a major health hazard globally.

It has been noted that relapse occurs even in persons who are very determined and committed to abstinence (Vonasch et al., 2017). The comorbidity of AUD with other mental disorders is quite high. Norman et al. (2018) determined that the prevalence of PTSD in AUD patients was 20.3%, that of Major Depressive Disorder (MDD) was 36.8% and those with suicidal ideations at 39%. When both PTSD and MDD are present, the prevalence of AUD escalates to 61.5% (Richardson et al., 2017). Depressive symptoms often coexist with PTSD and treatment of PTSD is likely to also reduce depressive symptoms. The researcher therefore set out to treat PTSD in the respondents with AUD.

Trauma is the modal denominator amongst victims of violence and abuse (Ramos, 2017). Trauma results in brain changes that are adaptive responses which lead to neuronal death eventually psychiatric disorders and risk for substance use (Talbot, 2016). Trauma may trigger consumption of alcohol as a maladaptive coping mechanism to the stress incurred (Norman et al., 2018). Traumatic experiences in early childhood following adverse Childhood experiences (ACEs) may cause trauma that may also alter brain biochemistry leading to long term mental pathologies such as AUD (Bartlett & Sacks, 2019).

ACEs may influence how different parts of the brain integrate and function together (Talbot et al., 2016). De Bellis and Zisk (2014) correlated traumatic life experiences in childhood with long-term physical and psychological disorders such as PTSD. Despite most people having the

ability to cope with post traumatic experiences, a few individuals end up developing destructive maladaptive behaviors like AUD which could adversely affect their health (Nosen et al., 2014). However, most patients with AUD do not receive appropriate treatment. This may be partially due to the high cost of medical rehabilitation services, which anecdotally cost between 250 and 500 thousand Kenya shillings.

Even among those who may receive rehabilitative therapy, the predisposing factors such as PTSD are often not assessed and thus not addressed. Failure to treat underlying PTSD – a known root cause trigger, may increase the propensity towards relapse following rehabilitation (Flanagan et al., 2018). The tendencies towards relapse may be attributed to inexhaustive evaluation of client underlying factors, resulting in deficient diagnoses that culminate in inadequate treatment (Durazzo & Meyerhoff, 2016). Epidemiological studies have shown that mental disorders such as PTSD are an indicator of poor outcome of alcohol rehabilitation (Forray & Sofuoglu, 2014). Relapse prevention with the initial treatment is beneficial to the individuals, their families and the country if we are to achieve Vision 2030 and the sustainable development goals (SDGs) since those affected are in the productive years as depicted in this study.

Methodology

The study employed quasi-experimental design with experimental and control arms. The study population were patients on residential treatment in Nairobi and its environs who were admitted with alcohol use disorder (AUD) with comorbidity of PTSD. The researcher used consecutive sampling technique which is a non-probability (convenient) sampling method that includes all accessible individuals to be part of the sample. The sample size was determined using Chow, Shao and Wang (2003) sample size formula for epidemiological studies. Selection of the study site was also done conveniently based on consent by the rehabilitation management and population size.

A total of 140 respondents were selected for the study, there was an attrition rate of 12.1% leaving 123 respondents. These 123 were analyzed at baseline, midline and endline, 63 in the experimental group and 60 in the control group. The experimental group comprised those who underwent CPT, whereas the control group did not undergo CPT. The key components of CPT

included: identification of traumatic life events (index trauma); objectively diagnosing PTSD; processing the trauma; dealing with the traumatic past; and helping the patient consciously move past the focal point of their past in which they felt that they were stuck. PCL-5 score was used at baseline, midline and endline to collect data.

Descriptive statistics was used to summarize the demographic data of the respondents. Shapiro-Wilks and Mauchly tests were used to assess normality and equality of variance of PCL-5 scores to ensure that the data met the assumptions of Gaussian distribution and equal variances at baseline. Paired t-test and repeated measures ANOVA was used to analyze the effectiveness of CPT in reducing PTSD symptoms. The participants were followed at 3 months' post discharge for relapse tendencies during clinical reviews in the rehabilitation centers and through phone calls with the next of kin. PCL-5 was used to assess PTSD symptoms at baseline before commencement of treatment, midline, 6 weeks into treatment and end line, 12 weeks, on completion of the treatment.

Results

Social Demographic characteristics of the respondents

Table 1: Socio-demographic characteristics of the respondents.

Variable	Levels	Control	Experimental	Total	X^2	df	p value
Gender	female	2(3.3%)	6(9.5%)	8(6.5%)	1.937	1	0.164
	male	58(96.7%)	57(90.5%)	115(93.5%)			
Age	<20	0(0%)	1(1.6%)	1(0.8%)	1.572	2	0.456
	20-39	47(78.3%)	52(82.5%)	99(80.5%)			
	40-59	13(21.7%)	10(15.9%)	23(18.7%)			
Residence	N/A	5(8.3%)	1(1.6%)	6(4.9%	4.866	2	0.088
	Outside Nairobi	30(50%)	26(41.3%)	56(45.5%)			
	Within Nairobi	25(41.7%)	36(57.1%)	61(49.6%)			
Education	university	20(33.3%)	33(52.4%)	53(43.1%)	7.986	3	0.046
	college	26(43.3%)	21(33.3%)	47(38.2%)			
	secondary	14(23.3%)	7(11.1%)	21(17.1%)			
	primary	0(0%)	2(3.2%)	2(1.6%)			
Religion	Christianity	55(91.7%)	55(87.3%)	110(89.4%)	2.795	4	0.593
	Hindu	0(0%)	1(1.6%)	1(0.8%)			
	Muslim	2(3.3%)	4(6.4%)	6(4.9%)			
	N/A	1(1.7%)	0(0%)	1(0.8%)			
	other	2(3.3%)	3(4.8%)	5(4.1%)			
Birth Position	First born	15(25%)	25(39.7%)	40(32.5%)	17.976	5	0.003
	5th born	1(1.7%)	1(1.6%)	2(1.6%)			
	Last born	12(20%)	16(25.4%)	28(22.8%)			
	N/A	0(0%)	3(4.8%)	3(2.4%)			
	Only child	1(1.7%)	6(9.5%)	7(5.7%)			

Onset of Alcohol use	<10	2(3.3%)	0(0%)	2(1.6%)	4.435	3	0.218
	11to20	34(56.7%)	45(71.4%)	79(64.2%)			
	21to30	22(36.7%)	17(27%)	39(31.7%)			
	31to40	2(3.3%)	1(1.6%)	3(2.4%)			
Relatives use alcohol	No	16(26.7%)	16(25.4%)	32(26%)	0.026	1	0.873
	Yes	44(73.3%)	47(74.6%)	91(74%)			

Key: df – degrees of freedom; N/A Not Applicable; x^2 – chi-square

A total of 123 respondents participated in the study. Amongst them, 51.2% (63) were in the experimental group while 48.8% (60) were in the control group. Female accounted for 6.5% (8) while 93.5% (115) were male. The control and experimental groups were comparable in gender distribution (p=0.164). Although the two groups were comparable, being male may have conferred a predilection towards AUD. It is also likely women suffer stigma due to culture and thus less likely to seek help.

Concerning their age, the majority 80.5% (99) were between 20 and 39 years and 18.7% (23) between 40 and 59 years. Only one (0.8%) was below 20 years. The respondents in both groups were comparable in their age distribution (p=0.456). However, youth appeared to be a predisposing factor towards the development of AUD. This is also a season for peer pressure and experimenting with alcohol and other substances. Majority 89.4% (110) professed Christianity and 4.9% (6) Islam. Only one (0.8%) professed Hinduism. The respondents in both groups were comparable in their religious affiliations (p=0.593). Christians are thought to form the highest population in Kenya and therefore, the findings relate proportionally. Regarding previous admissions, 35.8% (44) had been previously admitted to a rehabilitation Centre. AUD is a chronic relapsing disease by definition and frequent readmissions are likely especially without targeted treatment.

Concerning the age of initiation of alcohol use, 64.2% (79) started using alcohol between 11 and 20, 20-39 years (31.7%) between 21-30 years and 2.4% between 31-40 years. Only 1.6% started using alcohol before reaching 10 years. However, the two groups were comparable on the age of

alcohol use onset (p=0.218). Of importance is to note the early age of initiation into alcohol use when the children are still in school and brain maturity has not been achieved.

Regarding the family members using alcohol, 74% (91) affirmed having family members who consume alcohol. There was no statistically significant difference between experimental and the control group on alcohol intake by family members' (p=0.873). This may explain the role of genetics in the development of mental disorders. Additionally, the family or community environment could have played a key role in predisposing the participants to mental disorders such as AUD and PTSD.

Regarding social determinants of PTSD in adults, loss of a loved rated at 78.9%, loss of livelihood at 43.9% and marital violence at 36.6%. Also, interesting is that; of those who were married 81.8% reported marital violence. Of those who reported marital abuse, 91.1% were men suggesting that marital abuse in men is an important precursor to PTSD.

Differential effect of CPT on Participants treated for PTSD in patients with AUD to prevent alcohol relapse.

Paired t-test and repeated measures ANOVA were used to assess for differential effect of CPT in preventing alcohol relapse in patients treated for AUD with PTSD comorbidity. Prior to analysis, assumptions of normality of the data was done using QQ plots and Shapiro-Wilk tests. In the experimental group, the Q-Q plot for the observed PC-L-5 scores fell on a straight line indicating that they were normally distributed. This was further validated by Shapiro-Wilk tests which gave non-significant results (S-W=0.983, P= 0.52). Likewise, the control group Q-Q plot for the observed PC-L-5 scores fell on a straight line and the Shapiro-Wilks gave non-significant results (S-W=0.938, P= 0.4) thus validating the analysis use of paired t test and repeated measures ANOVA.

Table 2 Paired t test results for the experimental and the control group in relation to the timelines of evaluation.

	Experimental group				**Control group**			
Pair	**MD**	**95%CI**	**t**	**Sig**	**MD**	**95%CI**	**t**	**Sig**
Baseline-Midline	5.571	[2.307,8.836]	3.142	0.01	-0.663	[-2.229,0.962]	0.79	0.43
Midline-Endline	11.302	[9.606,12.997]	13.326	<0.01	-0.867	[-2.468,0.735]	-1.08	0.283
Baseline-Endline	16.873	[13.525,20.221]	10.074	<0.01	-1.5	[-3.026,0.026]	-1.97	0.054

Key: MD – mean difference; CI – Confidence Interval

Paired-sample t-test for the experimental group gave statistically significant mean change in the PCL-5 scores of the respondents following each treatment sessions. The paired t-test results between baseline and midline were (t=3.412, p=0.001), between midline and end line (t=13.326, p<0.001) and baseline and end line (t=10.074, p<0.001). Conversely, the control group paired t-test results revealed statistically non-significant mean change in respondents PCL-5 mean scores between the treatments. The paired T-test results between baseline and midline was t= -0.79, p=0.43), midline and end line t= -1.08, p=0.283 and baseline and end line t= -1.97, p=0.054. This implied that there was no notable change in the PTSD symptoms of the respondents who received treatment as usual only.

Cognitive Processing Therapy (CPT) treatment was administered to the respondents in the experimental group after baseline and midline. Their PCL mean scores for the respondents in the experimental group at baseline was 38.33 [95% CI; 34.94, 41.72], at midline was 32.76 [95% CI; 30.43, 35.09] and at end line was 21.46 [95% CI; 19.28, 23.64]. There was an observable decrease of the respondents PCL scores from 38.33 to 21.46.

The control group received treatment as usual only. The mean PCL-5 score at baseline was 46.98 [95% CI; 44.67, 49.3] with a SD of 8.968, at midline 47.62 [95% CI; 45.78, 49.45] with a SD of 7.112 and at the end line was 48.48 [95% CI; 46.5, 50.47] with a SD of 7.677. The mean PCL-5 scores for the control group increased marginally from 46.98 at baseline to 48.48 at end line.

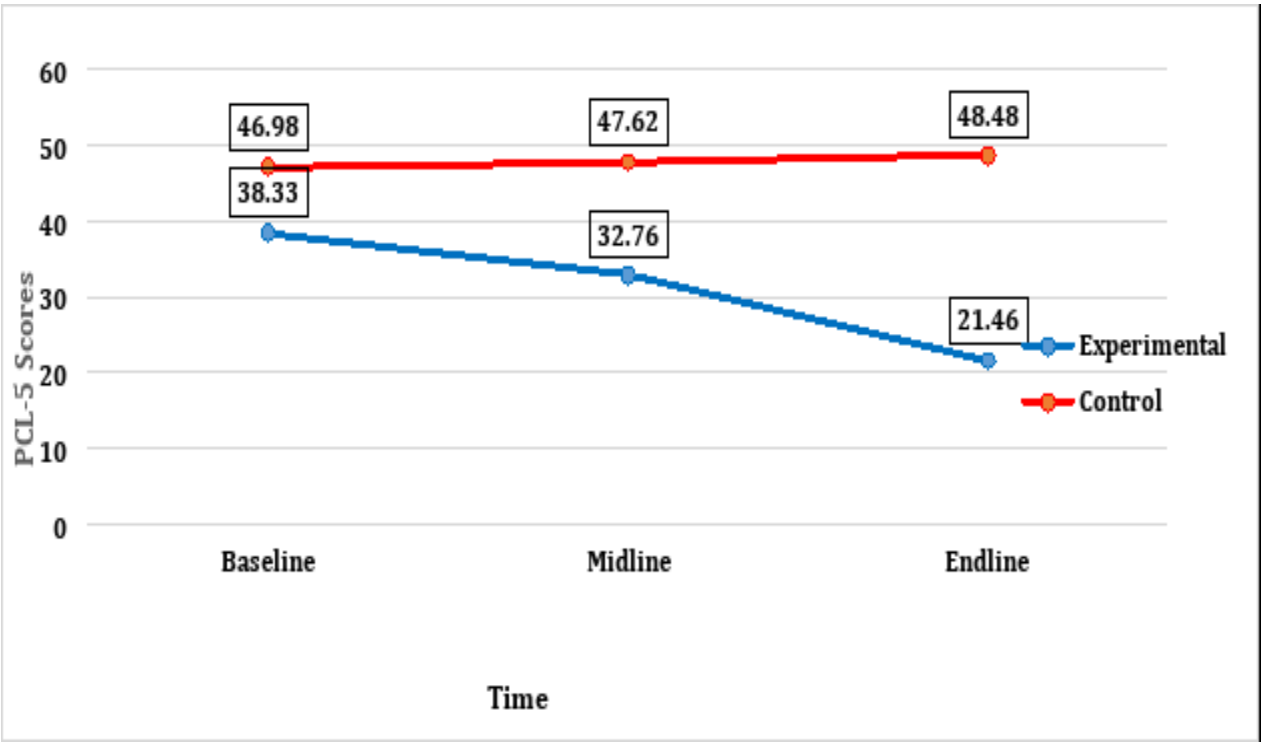

Figure 1: The mean PCL-5 scores of the respondents at baseline, midline and end line for the control and experimental groups

Repeated measures ANOVA results.

Table 3: Depicts repeated measures ANOVA of tests of within-subject effects for the experimental and the group group.

	The Experimental group					**The Control group**				
Source	**SS**	**df**	**MS**	**F**	**Sig**	**SS**	**df**	**MS**	**F**	**Sig**
Time	9312.77	1.40	6639.80	71.63	<0.01	68.04	1.993	34.15	1.83	0.165
Error	8061.22	86.96	92.70			2192	118	18.56		

The Robust Greenhouse-Geisser test in the experimental group demonstrated statistically significant results [F (1.403, 87), = 71.63, p<0.001] indicating significant mean change in the PCL-5 scores of the respondents after midline and end line assessments. Conversely, the Robust Greenhouse-Geisser test in the control group demonstrated statistically non-significant results [F (1.993, 118), = 1.832, p=0.165] for the control group indicating that no significant mean change in the PCL-5 scores of the respondents was observed between baseline, midline, and end line assessments.

The participants were followed up three months post discharge through the treatment centers during reviews and through next of kin for relapse tendencies. The number of respondents in the experimental group who relapsed into alcohol use were 31.7% (20) and in the control group, 61.7% (37) respondents relapsed into alcohol use post intervention. There was a statistically significant difference between the two groups (p=<0.0001). Twice as many respondents in the control group relapsed into alcohol use compared to the experimental group. This finding thus suggests that CPT is not only effective in reducing PTSD symptoms but also in reducing or preventing relapse.

Discussion

In this study, almost 95% of the study population were males, legitimizing the inference that male gender is a risk factor for developing AUD. This concurs with findings reported by Neupane et al (2017). However, Goldstein et al. (2016) in their epidemiologic survey on alcohol and PTSD using a pooled sample found that lifetime prevalence of PTSD and AUD was 6.1% higher in females. This paradox may be explained by a report by Khan et al. (2013) that inferred that females were less likely to seek treatment for AUD due to social stigmatization. Also notable is the significant finding that two fifths of the respondents were firstborns, informing a deduction that social pressure may be a contributor towards the development of PTSD.

Also notable is the observation that four fifths of the recruited study population were young, suggesting that PTSD following ACEs may be the root cause triggering the development of AUD. Aiken and colleagues (2018) determined that the average age of onset of AUD was 15 years. Other studies that concur with these findings include a high proportion of young adults having AUD and PTSD found 66% and 60% respectively with PTSD have AUD (Khan et al., 2013). However, it is also possible for other unevaluated socio-cultural factors to influence the propensity towards development of AUD.

The study also revealed that an overwhelming majority, 81.3% (100) of the respondents had attained a university or college level of education. The high educational attainment among the respondents suggests that alcohol-related issues can affect individuals across various educational backgrounds. It is reasonable to surmise that the attainment of tertiary levels of education is not

protective against AUD. The high level of educational attainment observed in this population contradicted recent findings of Anderson et al. (2020). This study purported that PTSD reduces academic achievement. Furthermore, it may be reasonably extrapolated that stress incurred during the academic pursuits and the possible confluence of peer pressure coupled with detachment from regular support network accountability may enhance the risk of development of PTSD and consequently AUD.

Regarding the propensity towards AUD relapse, 1/3 of the respondents had previous admissions, almost half of whom had had recurrent readmissions. This suggests that the underlying triggers for AUD may have not been evaluated or addressed. This concurred with previously published findings (Debell et al., 2014; Rampure et al., 2019).

Almost half of the study respondents were married. This contrasts with the report by Andersson et al. (2022) which observed that only 1 in 5 patients with AUD were married. Among the married respondents, four of every five disclosed having experienced marital violence. This is in concurrence with the report by Bunga et al. (2022) who negatively correlated marital satisfaction and AUD. A report by Oehme (2016) positively correlated PTSD with intimate partner and marital violence, which this study corroborates.

Given that prevalence of AUD is generally associated with high separation and divorce rates, 44.7% (55) of the respondents reported to be married. In contrast to our findings, Andersson et al. (2021) noted 21% of individuals with AUD were married. Among the married individuals, a striking 81.8% (45) disclosed experiencing marital violence. Marital violence is a crucial concern for individuals with AUD, particularly when comorbid with PTSD and a history of trauma. Bunga et al. (2022) reported that the severity of AUD correlated negatively with marital satisfaction and wellbeing. Oehme et al. (2016) found 28.6% of security officers with PTSD reported to have been violent with a family member or an intimate partner.

A significant number of the respondents, 64.2% (79) commenced alcohol intake between the ages of 11 and 20 years. The high prevalence at this age bracket of alcohol initiation raises concerns about early exposure to alcohol and its potential implications for brain development. Aiken et al. (2018) found that the mean age of onset of alcohol use was 15.1 years.

The study established a significant reduction in PTSD symptoms among the respondents in the experimental group over the course of the CPT intervention. Notably, after 12 weeks, there was a significant reduction in their mean PCL-5 scores from 38.33 to 21.46. In contrast, the control group showed a slight increase in mean scores from 46.98 at baseline to 48.48 at the end line. These results underscore the efficacy of CPT in ameliorating PTSD symptoms in individuals with AUD and highlight the importance of integrating evidence-based interventions in treatment to enhance therapeutic outcomes.

A meta-analysis by Asmundson et al. (2018) on impact of CPT on PTSD symptoms found that CPT consistently produced significant reductions in PTSD symptoms across multiple treatment settings. The contrast between the experimental and control groups further supports the specific benefits of CPT for individuals with a comorbidity of PTSD and AUD. Kaysen et al. (2014) reported that CPT led to significant reductions in both PTSD symptoms and alcohol consumption, emphasizing the potential benefits of CPT as a comprehensive intervention for this population. The current study's findings echo this, showcasing the effectiveness of CPT in reducing PTSD symptoms in individuals with AUD.

Recommendations

Since most of the identified ACEs happen in the confines of family environment, it is paramount to create awareness to parents and guardians on the impact of adverse childhood events as triggers of AUD. CPT has shown to significantly reduce PTSD symptoms and risk of relapse of AUD. CPT should be incorporated into the existing treatment packages and protocols in rehabilitation centers in Kenya. This will reduce the risk of repeated admissions that are very expensive to the families and risk loss of employment for the individuals. In addition, policy formulation and implementation in the National Authority for the Campaign against Alcohol and Drug Abuse (NACADA) should focus on mandating and enforcing rehabilitation centres in the country to employ Integrated Treatment approaches that factor in trauma-focused care. Finally, more research could be done to coherently elaborate and quantify the impact of other causes and risk factors for substance abuse in Kenya.

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