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A Comparative Efficacy of Dialectical Behavior Therapy and Pharmacotherapy in Treatment of Major Depression among Parasuicidal Adolescents: A Randomized Clinical Trial at Federal Neuropsychiatric Hospital, Yaba-Lagos, Nigeria

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Abstract

Major depressive disorder (MDD) is a debilitating disease that is characterized by depressed mood, diminished interest, impaired cognitive function and vegetative symptoms (Otte et al., 2016). The main objective of this study was to compare the efficacy of dialectical behavior therapy and pharmacotherapy in treatment of MDD among parasuicidal adolescents in a clinical trial at Federal Neuropsychiatric Hospital, Cappa-Lagos, Nigeria. The sample size of 81 participants was selected at 80% power and 30% effect size using purposive sampling technique. The research used Beck Depression Inventory (BDI-II), Suicide Behavior Questionnaire-revised (SBQ-R) and researcher generated socio-demographic questionnaire to collect data. The data collected was analysed using Statistical Package for the Social Sciences (SPSS) version 23. The results of the study showed that pharmacotherapy and DBT were efficacious in reducing MDD symptoms (p=0.0001). DiD estimator using Ordinary Least Squares (OLS) estimator was employed to assess a declining trend over the two-time period depicting reduction in MDD scores mean of 0.6753. The DiD estimator shows insignificant reduction between pharmacotherapy and DBT, meaning that the two intervention approaches were equally significant with no significant difference (p=0.271). The null hypothesis that there would be no significant difference between adolescents treated of MDD and suicide behavior was rejected and the alternative hypothesis was accepted (p=0.006). This implies that treatment of MDD among parasuicidal adolescents would reduce suicide behavior.

Keywords: pharmacotherapy, Dialectical Behavior Therapy (DBT), major depressive disorder (MDD), parasuicide behaviors, adolescents and efficacy.

Introduction and background

Depression, among other medical conditions is the most common and debilitating mental health condition affecting the general population globally (Moussavi, Chatterji, Tandon, Patel, & Ustun, 2007). Major depression is said to be the predominant cause of psychiatric hospitalization that affects nearly one out of seven people and is associated with several adverse consequences, including increased risk of suicide (Rottenberg, 2005). Patients with

major depressive disorder (MDD) are at increased risk for parasuicidal behaviors because despite its frequency in primary care and general hospital practice, depressive disorder is often undetected. Studies have shown that depression in adolescents has been more frequently misdiagnosed than it is in adults because of the prominence of irritability, mood reactivity, and fluctuating symptoms in adolescents (Thapar, Collishaw, Pine, & Thapar, 2012). Researchers have also noted that unrecognized depressive disorder may slow recovery and worsen prognosis in physical illness (Gelder & Mayou, 2005).

Rey, Bella-Awosah, and Liu (2015) described major depression as an episodic, recurring disorder characterized by persistent and pervasive sadness or unhappiness, loss of enjoyment of everyday activities, irritability, and associated symptoms such as negative thinking, lack of energy, difficulty concentrating, and appetite and sleep disturbances. However, the manifestation of major depressive disorder can vary according to age, gender, educational and cultural background (Frye, 2011). For instance, the two main classification systems (International classification of diseases -10 [ICD-10] and the American diagnostic and statistical manual of mental disorders-IV, V [DSM-IV & V] defined depression similarly with exception for children and adolescents, in which irritable rather than depressed mood is seen as a core diagnostic symptom (Lewinsohn et al., 2003). Researchers have indicated the important role that the symptom of irritability plays in the experience, onset, and maintenance of depressive illness among adolescents (Ingram et al., 2007; Sheeber et al., 2009; Wenze et al., 2006).

Most epidemiological data about rates of major depression in adolescents have shown that at least 4% of young adolescents and 16% of older adolescents suffer from major depression disorder each year (Yorbik et al., 2004). This finding means that about 1 in 25 young adolescents, and 1 in 6 older adolescents are depressed each year. Early adolescents' rates of major depression are higher in boys than girls, but from middle adolescence, prevalence rates for girls become approximately twice those of boys (i.e., a 2:1 female to male ratio) (Miller, 2007). Prevalence of dysthymic disorder (persistent depressive disorder) is less well known but studies suggest a point prevalence ranging from 1% to 2% in children and 2% to 8% in adolescents. A further 5% to 10% of young persons have been estimated to exhibit sub-syndromal depression (or minor depression). Adolescents with minor depression show some functional impairment, increased risk of suicide and of developing major depression (Moussavi et al., 2007).

One of the subtypes of depressive illness is unipolar depression. This type of depression is usually a depression without a history of manic, mixed or hypomanic episode (Rey et al., 2015). The incidence of unipolar depression notably in girls rises sharply after puberty and, by the end of adolescence, the one year prevalence rate is within 4-5 % (Thapar, Collishaw, Pine, & Thapar, 2012). In addition, bipolar depression is another subtype of depression mostly relevant to adolescent depressive illness. This is when there is a history of at least one non drug-induced manic, hypomanic or mixed episode (Rey et al., 2015). According to Dijk (2009), bipolar depression is a biological illness that causes unusual shifts in mood, level of energy, and ability to function in different aspects of life. Dijk (2009) reported that the illness used to be called manic depression because patients who were diagnosed with the illness were thought to be fluctuating between episodes of highly elevated, euphoric moods and episodes of major depression.

However, recent research has shown that patients with bipolar disorder can experience various moods and symptoms that fall in between the two extremes of mania and depression. (Rey et al., 2015). Based on diagnostic interview data from National Comorbidity Survey Adolescent Supplement (NCS-A), an estimated 2.9% of adolescents had bipolar disorder, and 2.6% had severe impairment. The prevalence of bipolar disorder among adolescents for females is 3.3% compared to 2.6% for males (National Institute of Mental Health [NIH], 2017). Furthermore, the possibility of getting bipolar when one parent is diagnosed with bipolar is 15-30%. When both parents have it, the risk is 50-75% (Abell & Ey, 2009). An estimated 25% to 50% of all individuals with bipolar disorder will make a suicide attempt (Khasakhala et al., 2012; Rucci et al., 2002;).

Further, psychotic depression is also common among suicidal adolescents. This subtype of depression displays hallucinations or delusions in addition to symptoms of major depression (Rey et al., 2015). In an emperical research conducted by Kelleher and collegues (2012), it was reported that the prevalence of psychotic depession among adolescents was 7.5%. The authors emphasized that psychotic symptoms are strongly associated with increased risk for suicidal behavior in the general adolescents population hence, assessment of psychotic symptoms should form a key part of suicide risk assessment. Penagaluri, Walker, and El-Mallakh (2010) added that patients who reported subclinical hallucinations had more severe suicidal ideation especially among patients with post-psychotic depression. This subtype of

depression (post-psychotic depression) occurs in the course of schizophrenia, often after resolution of the florid psychotic symptoms (Rey et al., 2015).

Premenstrual dysphoric disorder (PMDD) is another subtype of adolescent depressive illness relevant to clinical practice. This depressive disorder is a severe and disabling form of premenstrual syndrome affecting 3-8% of menstruating adolescent girls. The disorder consists of a cluster of affective, behavioural and somatic symptoms that recur monthly during the luteal phase of the menstrual cycle (Rey et al., 2015). In a research by Pilver, Libby and Hoff (2013), the authors reported a strong independent association between PMDD and suicidal ideation, plans, and attempts among a nationally representative sample of women. This finding suggests that clinicians treating women with PMDD should assess and be vigilant for signs of suicidal behaviors.

Pharmacotherapy vs Psychotherapy

Antidepressants are used in the treatment of depressive symptoms and several other psychiatric conditions in adolescents. However, it has been noted that in the treatment of mild and moderate depressive symptoms, non-pharmacotherapy plays a major role though a severe symptomatology may demand a combination with antidepressants (Taurines et al., 2011). There is evidence that selective serotonin reuptake inhibitors (SSRIs) can improve adolescent depression better than placebo (Masi, Liboni, & Brovedani, 2010). However, there is evidence that children and adolescents treated with SSRIs responded effectively to treatment but with an increased risk of suicide ideation and behavior. The exception to this is Fluoxetine that was reported to be effective in reducing depression symptoms in both children and adolescents (RR 1.86, 95% CI 1.49 to 2.32) with fewer adverse effects (Hetrick, Merry, McKenzie, Sindahl, & Proctor, 2007). Another meta-analysis study was conducted to obtain overall suicidality risk estimates for each drug individually, for SSRIs in depression trials as a group, and for all evaluable trials combined. The overall risk ratio for SSRIs in depression trials was 1.66 (95% CL, 1.02-2.68) and for all drugs across all indications was 1.95 (95% CI, 1.28 – 2.98). The overall risk difference for all drugs across all indications was 0.02 (95% CI, 0.01 – 0.03). The researchers concluded that the use of antidepressant drugs in pediatric patients is associated with modestly increased risk of suicidality (Hammad, Laughren, & Racoosin, 2006)

In Cochrane Database System Review, Cox and colleagues (2012) reviewed ten studies involving 1235 patients with different severities of disorders and therapeutic approaches. The

result for the majority of outcomes shows that there were no statistically significant differences between the interventions compared. Specifically, the authors reported limited evidence that antidepressant medication was more effective than psychotherapy on measures of clinician defined remission immediately after post-intervention (odds ratio (OR) 0.52, 95% confidence interval (CI) 0.27 to 0.98), with 67.8% of participants in the medication group and 53.7% in the psychotherapy group rated being in remission. (Cox et al., 2012).

In another study involving 378 participants, the researchers reported limited evidence that combination therapy was more effective than antidepressant medication alone in achieving higher remission from a depresive episode immediately post-intervention (OR 1.56, 95% CL 0.98 to 2.47), with 65.9% of participants treated with combination therapy and 57.8% of participants treated with medication, rated as being in remission (Cox et al., 2012). Similarly, there was no evidence to suggest that combination of medications and psychotherapy was more effective than psychological therapy alone (OR 1.82, 95% CI 0.38 to 8.68) (Cox et al., 2012; Masi, Liboni, & Brovedani, 2010).

Additionally, studies on pharmacotherapy revealed that the successful acute and long-term pharmacotherapy of mood disorders specifically, antidepressants, mood stabilizers, anxiolytics and antipsychotics have the capacity to reduce the risk of suicidal behavior on the vast majority of patients. The widespread use of antidepressants in the new Selective Serotonin Reuptake Inhibitor (SSRI) have also been noted to have side effects especially the antidepressants which can worsen depression and therefore indirectly increase the risk of suicidal behavior (Dunner, 2003; Lopez et al., 2001; Rihmer, 2005). Further to this, other problems associated with pharmacotherapy are suggested to be acceptability, tolerability, adherence, incomplete remission, and high rates of recurrence after drug discontinuation. Besides, antidepressant drugs are regarded to be addictive partly because of the withdrawal symptoms that can occur when they are discontinued (Lader, 2007).

Dialectical Behavior Therapy (DBT) as developed by Marsha Linehan in 1993 is a relatively new treatment approach which is a broad-based cognitive behavioral treatment originally developed for chronically suicidal individuals diagnosed with borderline personality disorder (BPD) (Freeman et al., 2005; Linehan, 2015). Linehan originally tried to understand why people self-harmed and what she could do to help them. She was able to synergize her idea from cognitive behavioral therapy in which she was initially trained and wrote *Cognitive*

behavioral treatment of borderline personality disorder (1993). In the book, she defined a new treatment approach which she called dialectical behavior therapy (Freeman et al., 2005).

DBT is based on a dialectical worldview. According to Linehan (2015), the word "dialectical" in relation to behavior therapy has two meanings; that of the fundamental nature of reality and that of persuasive dialogue and relationship. It is the treatment strategies used by the therapist to effect change. Its cardinal point is on "embracing of opposites." Applying dialectical thinking to the delivery of treatment is the art of DBT. Successfully doing it helps a person with suicidal behaviors to embrace opposite concepts, feelings, actions, and ideas (Freeman et al., 2005). In other words, it means a synthesis or integration of opposites, the seemingly opposite strategies of acceptance and change. The DBT therapist seeks to unconditionally accept clients as they are and at the same time acknowledge that they need to change in order to reach their goals. Acceptance and change is key to the four modules of DBT, which include two sets of acceptance-oriented skills (mindfulness and distress tolerance) and the other two sets target change-oriented skills (mood regulation and interpersonal effectiveness) (The Linehan Institute Behavioral Tech, 1996-2016).

DBT has been the subject of multiple randomized controlled trials and numerous quasi-experimental studies. In fact, DBT is probably the most widely known treatment that has received the most empirical support to date. It has since been adapted to treat various populations, including individuals with BPD and substance use disorders, eating disorders, PTSD, depressed elderly clients with personality disorders, major depressions and suicidal adolescents (Rathus & Miller, 2002). Studies have suggested that DBT is effective for that which it intends to target, i.e. DBT reduces suicidal and self-injurious behavior in trials of individuals with a history of suicidal behavior, significantly reducing major depressive symptoms, and noted to be efficient in reducing drug use in studies of individuals selected for drug dependence (Rizvi, 2011). Therefore, this study sought to compare the efficacy of dialectical behavior therapy and pharmacotherapy in treatment of MDD among parasuicidal adolescents at Federal Neuropsychiatric Hospital, Cappa-Lagos, Nigeria and to evaluate whether treatment of MDD will significantly reduce symptoms of suicide behaviors among the participants.

Methodology

This research was designed to employ quasi-experimental investigation of major depression among suicidal adolescents via statistical, mathematical models, theories and hypotheses pertaining to phenomena. This type of design provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships (Given, 2008). The target population of this study were parasuicidal adolescents with major depressive disorders in Nigeria. A total of 81 suicidal adolescents were recruited for the study using Casagrande et al., (1978) to calculate the sample size. The significance level was set at 0.05, the confidence level at 95% and the predictive power at 80%.

The data was collected from 81 participants using Beck Depression Inventory-II (BDI-II), Suicide Behavior Questionnaire-Revised (SBQ-R) and SBQ-R pre-treatment tools. Out of the 121 case files of inpatient adolescents at Federal Neuropsychiatric Hospital, Child and Adolescent Clinics at Cappa-Lagos, Nigeria, 38 or 46.9% inpatient suicidal adolescents with major depression were recruited to the study Group A. Another 43 representing 53.1% of the total participants were recruited from the outpatients who usually come for outpatients clinics at the same hospital. Ethical issues to ensure that the research process did not cause physical, emotional, mental and psychological or any other harm to participants were considered. Institutional approval was obtained from the Daystar University Research and Ethics Review Board. In addition, approval was obtained from the Research and Ethics Board at the Federal Neuropsychiatric Hospital, Yaba-Lagos, Nigeria where the study was carried out in accordance with the principles of declaration of Nigeria. Written informed consent was obtained from each participant or their proxies prior to participation. Participants were made aware that their participation was voluntary and that they could withdraw from the study at any time without any penalty. Identity numbers were used for all sources of data to protect their confidentiality.

The Statistical Package for Social and Sciences (SPSS) version 23 was used to analyse data collected. The assessment focused on background characteristics such as socio-demographic factors, participant's level of education, religious affiliation, parents' employments status, family's economic status and family set-up. Recruitment and assessment at baseline took four weeks of four hours per week to complete. The intervention using DBT approach, took five months to complete, hence, endline data was collected after the completion of five months skills training.

Results

Table 1: Participants' Depressive illness and Socio-Demographic Distributions

Variables Participants'	Total	Depressive Illness Non-Clinical	Clinical	Chi-Square	df	p-value
Participants' Age						
14-17	32 (39.5)	8 (9.9)	24(29.6%)	.125	1	.724
18-21	49 (60.5)	14 (17.3)	35(43.2%)			
Participants' Gender						
Male	29 (35.8)	6 (7.4)	23 (28.4)	.956	1	.328
Female	52 (64.2)	16 (19.8)	36 (44.4)			
Participants' Level of Education						
Secondary	12 (14.8)	5 (6.2)	7 (8.6)	2.857	3	.414
College	21 (25.9)	5 (6.2)	16 (19.8)			
University	29 (35.8)	9 (11.1)	20 (24.7)			
Others	19 (23.5)	3 (3.7)	16 (19.8)			
Participants' Religious Affliation						
Pentecostal	43 (53.1)	10 (12.3)	33 (40.7)	4.447	3	.217
Islam	17 (21.0)	3 (3.7)	14 (17.3)			
Evangelical/ Othordox	12 (14.8)	6 (7.4)	6 (7.4)			
Catholics	9 (11.1)	3 (3.7)	6 (7.4)			
Participants' Father Employment Status						
Employed	36 (44.4)	11 (13.6)	25 (30.9)	1.409	3	.690
Jobles	21 (25.9)	6 (7.4)	15 (18.5)			
Self-employed	21 (25.9)	5 (6.2)	16 (19.8)			
No father	3 (3.7)	0 (0.0)	3 (3.7)			
Participants' Mother Employment Status						
Employed	10 (12.3)	5 (6.2)	5 (6.2)	6.059	3	.109
Jobles	46 (56.8)	13 (16.0)	33 (40.7)			
Self-employed	16 (19.8)	4 (4.9)	12 (14.8)			
No mother	9 (11.1)	0 (0.00	9 (11.1)			
Participants' Economic Status						
Poor	37 (45.7)	11 (13.6)	26 (32.1)	3.099	2	.212
Average	22 (27.2)	3 (3.7)	19 (23.5)			
Affluent	22 (27.2)	8 (9.9)	14 (17.3)			
Participants' Family Set-Up						
Parentliving together	35 (43.2)	6 (7.4)	29 (35.8)	5.557	2	.062
Parents living apart	38 (46.9)	15 (18.5)	23 (28.4)			
Living with gurdian	8 (9.9)	1 (1.2)	7 (8.6)			

Table 1 presents distribution of participant depressive illness at baseline. Participants who scored above the borderline clinical depression were considered to present with clinical depression (≥ 21) while those who scored below or equal to borderline clinical depression on BDI-II were considered to present with non-clinical depression (≤ 20). Distribution of clinical depressive illness was higher among participants aged 18-21 (43.2%) as opposed to

participants aged 14-17 (29.6%). The distribution of clinical depressive illness was insignificant among the participants' age (p=0.724). Similarly, distribution of clinical depressive illness was higher among female participants at 44.4% than male participants at 28.4%. There was no significant difference in the distribution of depressive illness among participants' gender (p=0.328). This result seems to suggest that female participants aged 18-21 were presenting with more of clinical depression than their counterparts. There was no significant difference in distribution of depressive illness across sociodemographic characteristics as shown in Table 1.

Table 2: Inter-Group Distribution of Participants' Socio-Demographic Characteristics

Variables	Total %	Research group		χ^2	df	p-value
		Pharmacotherapy	DBT			
Participant's Age						
14-17	32 (39.5)	18 (22.2)	14 (17.3)	1.851	1	.174
18-21	49 (60.5)	20 (24.7)	29 (35.8)			
Participant's Gender						
Male	29 (35.8)	14 (17.3)	15 (18.5)	.034	1	.854
Female	52 (64.2)	24 (29.6)	28 (34.6)			
Participant's Level of Education						
Secondary	12 (14.8)	8 (9.9)	4(4.9)			
College	21 (25.9)	6 (7.4)	15 (18.5)	5.688	3	.128
University	29 (35.8)	13 (16.0)	16 (19.8)			
others	19 (23.5)	11 (13.6)	8 (9.9)			
Participant's Religion Affiliation						
Pentecostal	43 (53.1)	18 (22.2)	25 (30.9)	1.339	3	.720
Islam	17 (21.0)	9 (11.1)	8 (9.9)			
Evangelical/orthodox	12 (14.8)	7 (8.6)	5 (6.2)			
Catholics	9 (11.1)	4 (4.9)	5 (6.2)			
Participants' Father Employment Status						
Employed	36 (44.4)	17 (21.0)	19 (23.5)	3.674	3	.299
Jobless	21 (25.9)	12 (14.4)	9 (11.1)			
Self-employed	21 (25.9)	9 (11.1)	12 (14.8)			
No father	3 (3.7)	0(0.0)	3 (3.7)			
Participants' Mother Employment Status						
Employed	10 (12.3)	5 (6.2)	5 (6.2)	5.495	3	.139
Jobless	46 (56.8)	26 (32.1)	20 (24.7)			
Self-employed	16 (19.8)	4 (4.9)	12 (14.8)			
No mother	9 (11.1)	3 (3.7)	6 (7.4)			
Participant's Economic Status						
Poor	37 (45.7)	24 (29.6)	13 (16.0)	14.654	2	.001
Average	22 (27.2)	11 (13.6)	11 (13.6)			
Affluent	22 (27.2)	3 (3.7)	19 (23.5)			
Participants' Family Set-Up						
Parent living together	35 (43.2)	17 (21.0)	18 (22.2)	4.342	2	.114
Parents living apart	38 (46.9)	20 (24.7)	18 (22.2)			
Living with guardian	8 (9.9)	1 (1.2)	7 (8.6)			

Table 2 presents inter-group distribution of socio-demographic characteristics for the study. The difference in distribution of socio-demographic characteristics across the research groups was not significant (Ps>0.05). However, family's economic status showed a significant difference in distribution between pharmacotherapy and DBT groups (p=0.001). This seems to mean that family's economic status was a controlling factor and confounder between pharmacotherapy and DBT groups.

Table 3: Principal Component Analysis (PCA) of Means MDD Symptoms Reduction from Baseline to Endline

Time	Pharmacotherapy		Bartlett's Test of sphericity χ^2	df	Sig.	DBT		Barttett's Test of Shericity χ^2	df	Sig.
	Mean	Std.dev				Mean	Std.dev			
Baseline	.6579	.48078	1.099	1	.003	.7907	. 41163	1.049	1	.005
Endline	.0556	.22594				.0244	. 15617			

Table 3 shows principal component analysis (PCA) of MDD symptoms reduction from baseline to endline among the participants treated with both pharmacotherapy and DBT. PCA is an approach that considers the total variance in the data and transforms the original variables into a smaller set of linear combinations. As shown in Table 3, the mean MDD symptoms at baseline among the participants treated with pharmacotherapy was .6579 ± (SD: .48078). At endline, the mean MDD symptoms reduced to .0556 ± (SD: .22594). The Barttett's test shows that the reduction was significant (p=0.003). This implies that there was a significant reduction in mean MDD symptoms among the participants treated with pharmacotherapy. Additionally, Table 3 shows that the mean MDD symptoms among participants treated with DBT at baseline was .7907 ± (SD: .41163) and at endline, the mean MDD symptoms reduced to .0244 ± (SD: .15617). The Barttett's test indicates a significant reduction in mean MDD symptoms among the participants treated with DBT (p=0.005).

Table 4: Paired Sample T-Test Showing Paired Differences in Means of MDD Treated with Pharmacotherapy and DBT

Paired Dependent Samples T-Test

		Paired Differences							
					95% Confidence Interval of the Difference				
Paired Variables		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Research Group Pharmacotherapy Depressive illness 0 & 1	1.33333	1.03682	.11520	1.10407	1.56259	11.574	80	.000
Pair 2	Research Group DBT - Depressive illness 0 & 1	2.02597	1.03839	.11834	1.79029	2.26166	17.121	76	.000

Paired dependent sample t-test is a statistical procedure used to determine whether the mean difference between two sets of observations is zero. Table 4 presents the result of the assumption that the mean difference among participants treated with pharmacotherapy as independent variable was significant at endline. Similarly, the means difference at baseline among participants treated with DBT was also significant at endline. In other words, the result of the test indicated that the mean difference between time 0 (baseline) and time 1 (endline) among participants treated with pharmacotherapy was 1.33333 ± (SD: 1.03682). Therefore, the researcher rejected the null hypothesis that the difference was not significant (p=0.0001). This implies that, there was a significant difference between means at baseline and endline among participants treated with pharmacotherapy. Similarly, statistical analysis showed that there was significant difference in means among participants treated with DBT at baseline and the mean difference at endline. The result shows the mean difference at 2.02597 ± (SD: 1.03839). Sequel to the result of this statistics, the researcher therefore rejected the null hypothesis and accepted the alternative hypothesis that there was a significant difference in mean between participants treated at baseline and those treated at endline. Hence, both DBT and pharmacotherapy were significantly effective in symptoms reduction (p=0.0001).

Table 5: Comparative Analysis: Difference-in-Differences Estimates of Depressive Illness

	**(1) Difference-in Differences Estimates (Arm*Post-treatment)		
Baseline - Post-treatment	0.7143 – 0.0390	(0.6753)	(p = 0.271)

** (1) The DiD estimator is the interaction between treatment arms and post-treatment scores and these were determined using OLS method and controlling for family economic status as a possible confounder.

The DiD approach to isolating program effect rested upon the usual assumptions of Ordinary Least Squares (OLS). The internal validity rested upon the premise that changes in the symptoms of MDD over time in the intervention group were equivalent to the changes in symptoms of MDD in the other intervention group as if the intervention for treating major depressive disorder had not been implemented. Table 5 therefore presents the DiD estimators using the OLS estimator that shows a declining trend over the two-time period (Baseline – Endline) depicting reduction in the MDD scores (0.6753) and these reductions were not statistically significant (p =0.271). This seems to suggest that there was no significant difference between participant treated with pharmacotherapy and those treated with DBT, and consequently, that the two interventions were equally significant with no superiority.

In the interim, this study also examined if there was a significant association between MDD symptoms reduction and suicide behavior symptoms reduction. Hence, the study tested the null hypothesis that there was no significant relationship between reduction of major depressive symptoms and reduction of suicide behavior symptoms among parasuicidal adolescents at Federal Neuropsychiatric Hospital, Cappa-Lagos, Nigeria.

Table 6: Distribution of Socio-Demographic Characteristics and Participants' Suicide Behavior

		Participants' Suicide Behavior					
Variables Participants'	Total	Ideation	Plans	Attempts	Chi-square	df	p-value
			Participants' Age				
14-17	32 (39.5)	6 (7.4)	12 (14.8)	14 (17.3)	5.438	1	.066
18-21	49 (60.5)	8 (9.9)	8 (9.9)	33 (40.7)			
			Participants' Gender				
Male	29 (35.8)	5 (6.2)	5 (6.2)	19 (23.5)	1.453	1	1.484
Female	52 (64.2)	9 (11.1)	15 (18.5)	28 (34.6)			
			Participants' Level of Education				
Secondary	12 (14.8)	5 (6.2)	3 (3.7)	4 (4.9)			
College	21 (25.9)	6 (7.4)	5 (6.2)	10 (12.3)	16.476	3	.010
University	29 (35.8)	3 (3.7)	4 (4.9)	22 (27.2)			
Others	19 (23.5)	0 (0.0)	8 (9.8)	11 (13.6)			
			Participants' Religious Affliation				
Pentecostal	43 (53.1)	4 (4.9)	11 (13.6)	28 (34.6)			
Islam	17 (21.0)	3 (3.7)	2 (2.5)	12 (14.8)			
Evangelical/ Othordox	12 (14.8)	5 (6.2)	5 (6.2)	2 (2.5)	12.810	3	.046

Catholics	9 (11.1)	2 (2.5)	2 (2.5)	5 (6.2)			
			Participants' Father Employment Status				
Employed	36 (44.4)	6 (7.4)	10 (12.3)	20 (24.7)			
Jobles	21 (25.9)	4 (4.9)	3 (3.7)	14 (17.3)	2.343	3	.886
Self-employed	21 (25.9)	4 (4.9)	6 (7.4)	11 (13.6)			
No father	3 (3.7)	0 (0.0)	1 (1.2)	2 (2.5)			
			Participants' Mother Employment Status				
Employed	10 (12.3)	3 (3.7)	1 (1.2)	6 (7.4)			
Jobles	46 (56.8)	8 (9.9)	13 (16.0)	25 (30.9)	4.373	3	.626
Self-employed	16 (19.8)	3 (3.7)	4 (4.9)	9 (11.1)			
No mother	9 (11.1)	0 (0.0)	2 (2.5)	7 (8.6)			
			Participants' Economic Status				
Poor	37 (45.7)	7 (8.6)	13 (16.0)	17 (21.0)			
Average	22 (27.2)	2 (2.5)	4 (4.9)	16 (19.8)	6.259	2	.181
Affluent	22 (27.2)	5 (6.2)	3 (3.7)	14 (17.3)			
			Participants' Family Set-Up				
Parent living together	35 (43.2)	3 (3.7)	13 (16.0)	19 (23.5)			
Parents living apart	38 (46.9)	10 (12.3)	6 (7.4)	22 (27.2)	7.817	2	.099
Living with gurdian	8 (9.9)	1 (1.2)	1 (1.2)	6 (7.4)			

Table 6 presents distribution of socio-demographic characteristics and participants' suicide behavior at baseline. Frequency of suicide ideation, plan and attempts were insignificantly related across socio-demographic characteristics (Ps>0.5) except participants' level of education and religious affiliation. Chi-square test shows that the distribution of suicide behaviour among participants' level of education was significant (p = 0.010). This implies that participants' level of education played the role of confounder. Additionally, distribution of suicide behaviour across participants' religious affiliation was significant (p = 0.046). This also implies that religious affiliation was a controlling factor among the participants.

Table 7: Pearson's Correlation Analysis Showing Association between MDD and Suicide Behaviors

Pearson's Correlation Statistics

						Percentiles			Chi-square test		
	N	Mean	Std. Deviation	Minimum	Maximum	25th	50th (Median)	75th	χ^2	df	Sig.
Suicide_1	81	.8889	.31623	.00	1.00	1.0000	1.0000	1.0000	49.000	1	.000
Depression_1	81	.7284	.44756	.00	1.00	.0000	1.0000	1.0000	16.901	1	.000
Suicide_2	77	.2857	.45472	.00	1.00	.0000	.0000	1.0000	14.143	1	.000
Depression_2	77	.0390	.19477	.00	1.00	.0000	.0000	.0000	65.468	1	.000

Table 7 presents the result of Pearson's correlation analysis showing statistical relationship between MDD and suicidal behavior. The variables tested the null hypothesis that there was no significant relationship between participants' level of depression and suicide behaviors at baseline and correlates the level of association at endline. The chi-square test indicates that the null hypothesis was rejected and the alternative hypothesis was accepted (p=0.0001). This seems to imply that participants who are clinically depressed are likely to present with suicidal behaviors. Similarly, the endline correlation aimed to test whether reduction of MDD symptoms will statistically reduce suicide behavior symptoms. The result of Pearson's correlation test shows that the null hypothesis that there was no significant relationship between reduced symptoms of clinical depression and suicide behavior was rejected. Hence, the alternative hypothesis was accepted (p=-.0001). This implies that there was a significant association between treated depression and suicide behavior symptoms reduction among the participants. Therefore, when depression is treated among suicidal adolescents, it subsequently reduces suicidal behaviors.

Discussion

The objectives of this study were to compare the efficacy of pharmacotherapy and BDT in treatment of major depressive disorder among parasuicidal adolescents at Federal Neuropsychiatric Hospital, Cappa-Lagos, Nigeria, and to test the null hypothesis that there was no significant relationship between reduction of MDD symptoms and reduction of suicidal behavior among the participants. This study is timely so as to inform clinicians on appropriate therapeutic approach in helping depressed adolescents with suicidal tendencies and also to help clinicians on what should be the focus in therapy when helping adolescents with suicidal behavior. The result of the t- test indicates that there was a significant reduction in mean major depressive disorder symptoms among the participants treated with pharmacotherapy (p=0.002). This study also used dependent sample t-test to establish the efficacy of pharmacotherapy in treatment of major depression among the participants. The result implies that pharmacotherapy was efficacious in treatment of clinical depression among suicidal adolescents (p=0.0001).

This finding concurs with a study that pharmacotherapy for major depression was effective (Tedeschini et al., 2011) and several other studies that there is evidence that SSRIs and several other antidepressant medications, antipsychotic and mood stabilizer medications can significantly improve adolescent depression even better than placebo (Hammad et al., 2006;

Hetrick et al., 2007; Masi et al., 2010). The findings of a similar study indicated that the magnitude of benefit of antidepressant medication compared with placebo increases with severity of depression symptoms implies that patients with very severe depression benefited substantially in antidepressant medications compared to placebo (Fournier et al., 2010).

Results from this study indicated that that there was a significant reduction in mean major depressive disorder symptoms among the participants treated with DBT (p=0.006). This study also used dependent sample t-test to establish the efficacy of DBT in treatment of major depression among the participants. The result implies that DBT was efficacious in treatment of clinical depression among suicidal adolescents (p=0.0001). This result seems to align with several other studies that establish efficacy of DBT in treatment of major depression among adolescents. For example, results from a study among adolescents with multiple mental conditions by Rizvi (2011), indicated that DBT was effective for that which it intends to target. That study established that DBT reduced suicidal and self-injurious behavior in trials of individuals chosen for a history of suicidal behavior, it also significantly reduced major depressive symptoms, and drug use among individuals

In another five randomized controlled trials that examined the efficacy of DBT in reducing parasuicidal behavior among the participants with Borderline Personality Disorder (BPD), the result showed that DBT demonstrated efficacy in stabilizing and controlling self-destructive behavior and strong reduction in major depressive symptoms among the participants (Panos et al., 2014). A similar 39 different meta-analyses conducted in ten countries in quasi-experimental design to assess the effectiveness of mindfulness componnent of DBT in treatment of depressive symptoms and preventing relapse among the participants. The result of that study indicated that mindfulness component of DBT was superior to standard care in reducing depressive symptoms and preventing relapse with effect sizes ranging from 0.11 to 1.65 (Klainin-Yobas, Cho, & Creedy, 2011).

Further, this study using the DiD estimators of the OLS estimator that shows a declining trend over the two-time period (Baseline – Endline) depicting reduction in the MDD scores (0.6753) and these reductions were not statistically significant (p =0.271). This suggests that there is no significant difference in efficacy between pharmacotherapy and DBT. In other words, the two interventions were equally effective. This finding coincides with the result of ten studies involving 1235 patients with different severities of disorders and therapeutic approaches that showed no statistically significant differences between the interventions

compared (Cox et al., 2012). Similarly, in another study involving 378 participants, the research shows limited evidence that combination therapy was more effective than antidepressant medication alone. The result implied that there was limited evidence to suggest that combination therapy was more effective than psychological therapy alone (Masi et al., 2010).

However, although psychotherapy such as DBT and antidepressant medication are equally efficacious in the treatment of depressive and anxiety disorders it is not known whether they are equally efficacious for all types of disorders, nor whether all types of psychotherapy and antidepressants are equally efficacious for each disorder. In a meta-analysis in which DBT and antidepressant medication were directly compared in the treatment of depressive and anxiety disorders. The overall effect size indicates significant difference between DBT and pharmacotherapy. Additionally, the results of the study shows that Pharmacotherapy was significantly more efficacious than psychotherapy in dysthymia, and psychotherapy was significantly more efficacious than pharmacotherapy in obsessive-compulsive disorder. Similarly, DBT was significantly more efficacious than pharmacotherapy with antidepressants (Cuijpers et al., 2013).

In addition, this study tested the null hypothesis that there was no significant relationship between participants' level of depression and suicide behaviors. The researcher rejected the null hypothesis and accepted the alternative hypothesis that there was a significant relationship between participants that were clinically depressed and suicide behavior ($p=0.002$). This result is in accord with several studies that depression is statistically associated with suicide behavior. For example, a nonparametric t-test in a study showed a significant relationship between depression and parasuicidal behaviors among adolescents (Panda, 2015). A meta-analysis conducted in China, found that there was a significant association between depressive symptoms and suicidal ideation among college students, demonstrating that depression is a contributing factor for suicide behavior (Wang, Shi, & Luo, 2017). Similar research also established complex association between major depression and suicidality in adolescent patients with HIV (Serafini et al., 2015).

Likewise, based on the nonparametric t-test in this study tested the null hypothesis, the researcher rejected the null hypothesis that there would be no significant relationship between participants treated for clinical depression and suicide behavior and accepted the alternative hypothesis that there was a strong significant relationship between participants treated of

clinical depression and suicide behavior symptoms (p=0.0001). This result implies that when clinical depression is treated among suicidal adolescents, it would subsequently reduce suicidal behaviors. A similar study was conducted by Wilkinson and colleagues (2011) and found that Adolescent Depression Antidepressants and Psychotherapy Trial (ADAPT) reduced the severity of suicide behavior. The result of the assessment indicated that there was significant reduction of suicidality among the participants over the 28 weeks of follow-up period (Wilkinson et al., 2011). In another study, researchers evaluated the clinical and prognostic significance of suicide attempts and nonsuicidal self-injury in adolescents with treatment –resistant depression. The evaluation of the prognosis after 24 weeks of treatment of major depression showed that the rates of SAs and NSSI were 7% and 11% respectively which shows a significant prognosis of suicide reduction at p=0.002 (Asarnow et al., 2011).

Conclusion

This study identified the efficacy of both pharmacotherapy and Dialectical Behavior Therapy in the treatment of major depressive disorder among suicidal adolescents. This study revealed that both therapeutic approaches were equally efficacious in reducing symptoms of major depression with no significant difference between the two interventions. Additionally, the research established that adolescents who present with clinical depression may also present with suicidal behaviors and when the major depression is treated, the prognosis of reduction in suicide behavior is equally significant. This study therefore recommends a further study to assess whether the combination of pharmacotherapy and DBT would make a significant difference in reducing MDD symptoms among suicidal adolescents as opposed to the treatment differently with either pharmacotherapy or DBT.

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