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Efficacy of pharmacotherapy and dialectical behavior therapy in treatment of suicide behavior among inpatient and outpatient adolescents at Federal Neuropsychiatric Hospital, Annex, Cappa-Lagos, Nigeria

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Abstract: **Purpose: Suicide behavior is one of the major public health concerns and one of the leading causes of death globally. [1] However, data shows that 75% of suicide deaths worldwide emanated from low-and middle-income countries. [2] The alarming upsurge in suicide rate among adolescents in Nigeria calls for clinical effective treatment options for at-risk adolescents. This present study therefore sought to assess efficacy of pharmacotherapy and dialectical behavior therapy (DBT) in suicide behavior among inpatient and outpatient adolescents with mood disorders.**

Methods: The researchers assigned the recruited 81 patients (N = 43 outpatients for DBT) and (N= 38 inpatients for Pharmacotherapy) to participate in a quasi-experimental research design to evaluate differential effects of pharmacotherapy and DBT treatment options. The Suicide Behavior Questionnaire-revised version was used to collect data from the patients who participated in the study.

Results: The mean estimate of the two therapeutic approaches showed that the approaches were statistically efficacious to reduce suicidal behavior (Ps < 0.0001). The DiD estimator using Ordinary Least Squares (OLS) showed a declining trend over the pre-test and post-test period of assessment, depicting reduction in the suicidal scores, however, these reductions were insignificant (p=0.523). This means, the two approaches are equally effective in suicide reduction. However, Cohen *d* effect size for Pharmacotherapy (d= 2.245; 95% CI: 1.460 – 3.031) and effect size for DBT was (d=2.586; 95% CI: 1.884 – 3.241) over assessment periods indicated that pharmacotherapy intervention was able to reduce mean suicide behaviors lower (2.245) than DBT (2.586).

Conclusion: Result from this quasi-experimental study implied that treatment of suicidal behaviors among participants was slightly more effective using pharmacotherapy compared to DBT but statistically insignificant. Further study on combination of Pharmacotherapy and DBT for effective prognosis.

Keywords: **efficacy, pharmacotherapy, dialectical behavior therapy (DBT), suicide behaviors, adolescents, Nigeria.**

1. BACKGROUND AND INTRODUCTION

Suicide behavior may be a complex combination of psychological, biological, and social factors.[3] The phenomenon has been a great challenge for psychiatrists and psychologists today. Kupfer, Frank, and Phillips (2012)[4] noted that the two main subtypes of mood disorder are unipolar (depressive episodes only) and bipolar disorder (mania or hypomania, usually with

intermittent depressive episodes) are most important risk factors of suicide. Several researchers have reported the need for adequate long-term pharmacotherapy intervention especially the use of Lithium to prevent suicidal tendency in mood disorders.[5,6] Studies in pharmacotherapy have indicated that some medications provide specific anti-suicidal protection. For example, Clozapine has been reportedly shown some efficacy at reducing suicide risk in schizophrenia while olanzapine and quetiapine appear promising.[7]. Additionally, Lithium and SSRIs have been proven to be effective for suicidal patients with bipolar and major depression.[8]

In addition to pharmacotherapy, dialectical behavior therapy (DBT) has been researched to be the first empirically validated treatment for chronically suicidal patients diagnosed with borderline personality disorder (BPD).[9] DBT has been subject of multiple randomized controlled trials and numerous quasi-experimental studies.[10,11,12,13.] The results from several studies have suggested that DBT is effective in reduction of suicidal and self-injurious behavior and subsequently reducing major depressive symptoms significantly.[14,15,11,12,13.] In a similar study by Groves and colleaqeus (2011),[16] the overall findings indicate some emperical support that DBT is statistically effective for adolescents with BPD symptomatology, suicidal ideation and comorbid depression, bipolar disorder, eating disorder and impulsive behaviors.[17]

2. METHODS

Quasi-experimental research design was employed by the researchers. A quasi-experimental research design is an empirical interventional study that estimates the causal impact of an intervention on target population without random assignment. This approach resembles the traditional experimental design or randomized controlled trial, this method however allows the researchers to control the assignment to the treatment conditions.[18] This current study utilized a pretest-posttest design to examine the effect of pharmacotherapy and psychotherapy using dialectical behavior therapy (DBT) approach on suicide behaviors among 81 inpatient and outpatient adolescents at Federal Neuropsychiatric Hospital, Oshodi-Annex, Cappa-Lagos, Nigeria.

Measurement and Recruitment

A total of 81 suicidal adolescents were recruited for the study using Casagrande et al., (1978)[19] 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 The Suicide Behavior Questionnaire-Revised (SBQ-R) and SBQ-R pre-treatment tools. Out of the 121 case files of inpatient adolescents at the hospital, 38 or 46.9% of inpatient suicidal adolescents recruited to the study Group A. (Pharmacotherapy). 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

Ethical issues to ensure that the research process did not cause physical, emotional, mental, psychological or any other harm to participants were considered. Institutional approval was obtained from the Daystar University, Kenya 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 26 was used to analyze 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, end line data was collected after the completion of five months skills training.

3. RESULTS

The objective of this study sought to evaluate the efficacy of pharmacotherapy and psychotherapy using DBT in treatment of suicidal adolescents. This objective focused on effectiveness of the two interventions on suicide behaviors of the participants. Participants in Group A were treated with medications alone while on admission at the hospital, while participants in Group C were treated with psychotherapy alone. The study intended to study the significance of these two intervention techniques.

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Table 1: Socio-Demographic and Economic Characteristics of the Pharmacotherapy and DBT Groups

Characteristics	Pharmacotherapy group (Group A)	DBT group (Group C)	χ^2 statistics	p-value*
Number of participants	38	43	-	-
Participant's Age				
14 – 17	18 (56.2%)	14 (43.8%)	1.851	0.174
18 – 21	20 (40.8%)	29 (59.2%)		
Participant's Sex				
Male	14 (48.3%)	15 (53.8%)	0.034	0.854
Female	24 (46.2%)	28 (53.8%)		
Education level				
Secondary	8 (66.7%)	4 (33.3%)		
College	6 (28.6%)	15 (71.4%)	5.688	0.128
University	13 (44.8%)	16 (55.2%)		
Others	11 (57.9%)	8 (42.1%)		
Religion				
Pentecostal	18 (41.9%)	25 (58.1%)		
Evangelical/ Orthodox	7 (58.3%)	5 (41.7%)	1.339	0.720
Catholic & Others	4 (44.4%)	5 (55.6%)		
Islam	9 (52.9%)	8 (47.1%)		
Father's Employment Status				
Father employed	17 (47.2%)	19 (52.8%)		
Father jobless	12 (57.1%)	9 (42.9%)	0.918	0.632
Father self-employed	9 (42.9%)	12 (57.1%)		
Mother's Employment Status				
Mother employed	5 (50.0%)	5 (50.0%)		
Mother jobless	26 (56.5%)	20 (43.5%)	4.731	0.094
Mother self-employed	4 (25.0%)	12 (75.0%)		
Family's Economic Status				
Poor	11 (50.0%)	11 (50.0%)		
Average	24 (64.9%)	13 (35.1%)	14.654	0.001
Affluent	3 (13.6%)	19 (86.4%)		
Family Set-up				
Parents living together	20 (52.6%)	18 (47.4%)		
Parents living apart	17 (48.6%)	18 (51.4%)	4.342	0.114
Living with a guardian	1 (12.5%)	7 (87.5%)		

Re

*p-values generated using Pearson's χ^2 tests for independence

**respondents socio-economic status

Table 1 presents the socio-economic demographic characteristics of the participants in Group A for pharmacotherapy and C for DBT. The proportion of participants aged 14-17 was distributed into the two groups. Out of the participants aged 14-17, 56.2% received pharmacotherapy while 43.8% were treated with DBT. The frequency of participants aged 18-21 were also distributed into the two groups, out of which 40.8% were treated with pharmacotherapy while 59.2% received psychotherapy. The difference in distributions according to the participants' age was not statistically significant (p=0.174). This implied that the participants were consistently distributed without much difference.

Similarly, male participants were also evenly distributed among the intervention groups. The proportion of 53.8% of male participants was treated with DBT while 48.3% of male participants received pharmacotherapy as intervention. Out of the female participants, 53.8% were treated with DBT while 46.2% were treated with medications. The distribution of participants' gender was consistently distributed among the two intervention groups. This means that the difference in distribution was not statistically significant (p = 0.854).

The frequency of participants' educational level was distributed across the two interventional approaches. Among the secondary school students, 66.7% were treated with medications while 33.3% were treated with DBT. The frequency among college students indicated that 28.6% were treated with pharmacotherapy as opposed to 71.4% that were treated with DBT. Among the university students, 44.8% were on medications while 55.2% received DBT as intervention. Among the participants who were not in school at the time of data collection, 57.9% were treated with medication while 42.1% received psychotherapy. The distribution of participants' educational level was slightly different across the two intervention approaches and the difference was statistically insignificant (p = 0.128).

Participants' religious affiliations across pharmacotherapy and DBT groups were also considered. Among the participants whose denominations were Pentecostals, 41.9% were treated with pharmacotherapy while 58.1% were treated with DBT. The distribution of the participants whose religion was Evangelical/Orthodox showed that 58.3% were on medications while 41.7% were treated with DBT. Among the Catholic participants, 44.4% were in pharmacotherapy group while 55.6% were in DBT group. Similarly, among the participants whose religion was Islam, 52.9% were treated with pharmacotherapy while 47.1% were treated with DBT. The difference in the distribution across the two groups was not statistically significant (p = 0.720). This seems to suggest that the distribution was slightly different between the two groups.

The socio-economic demographic attributes were also considered in the distribution across the groups. The inter-group distribution of participants' fathers' employment status was studied. Among the participants whose fathers were employed, 47.2% were grouped with pharmacotherapy while 52.8% were grouped with DBT. Of the participants whose fathers were jobless, 57.1% were treated with pharmacotherapy, while 42.9% were treated with DBT. Similarly, among the participants whose fathers were self-employed, 42.9% were grouped with pharmacotherapy while 57.1% were grouped with DBT. The difference in the inter-group distribution of the participants' fathers' employment status was to some extent different. Chi-square analysis showed that there was no significant difference in the distribution across the two groups (p = 0.632).

In addition, participants' mothers' employment status was considered in the distribution across the groups. The participants whose mothers were employed were equally distributed into pharmacotherapy and DBT at 50% -50%. Among the participants whose mothers were jobless, 56.5% were treated with medications, while 43.5% were treated with DBT. Among the adolescents whose mothers were self-employed, 25% were grouped with pharmacotherapy while 75% were grouped with DBT. The inter-group difference appeared to be insignificant (p = 0.094). This means that the frequency of mothers' employment status was consistently distributed across the groups with little or no difference.

In terms of participants' family's economic status, those whose families were considered poor were equally distributed into the groups at 50-50%. Among the participants who described their families' economic status to be average, 64.9% were treated with pharmacotherapy, while 35.1% were treated with DBT. Out of the participants who described their families' economic status as affluent, 13.6% were treated with medications while 86.4% were treated with DBT. Among the socio-economic characteristics' distributions, family's economic status alone seemed to be significantly different in the distributions (p = 0.001).

Further, the participants' family set-up was considered in the inter-group distribution. Among the participants whose parents were living together, 52.6% were grouped with pharmacotherapy, while 47.4% were grouped with DBT. Among the adolescents whose parents lived apart, 48.6% were treated with medications, while 51.4% were treated with DBT. Among the participants who lived with guardians, 12.5% of them were treated with medications, while 87.5% were treated with psychotherapy. The difference in inter-group distributions was not statistically significant (p = 0.114).

Pearson's chi-square test for independence was used to test significance difference between the pharmacotherapy and DBT groups by key socio-economic-demographic characteristics, namely age, sex, education level, religion, father's employment status, mother's employment status, family's economic status and family set-up. The results showed that the pharmacotherapy and DBT groups were comparable with respect to key characteristics except the family's economic status. The family's economic status showed a significant difference 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.

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Table 2: Mean Estimates of Suicidal Behavior Scores for the Pharmacotherapy and DBT

Grouping	Time	Mean	Std. Error	95% Confidence Interval		p-value*
				Lower Bound	Upper Bound	
Pharmacotherapy	Time 0	12.222	0.595	11.037	13.407	<0.0001
	Time 1	4.694	0.508	3.682	5.707	
DBT	Time 0	14.244	0.558	13.133	15.355	<0.0001
	Time 1	5.951	0.476	5.002	6.900	

*Sphericity Assumed for Tests of Within-Subjects Effects

Table 2 presents the mean, standard deviation, and range of 95% confidence interval estimates of pre-test and post-test suicidal behavior scores for the pharmacotherapy and DBT groups among the suicidal adolescents. A noticeable reduction in suicide behavior mean was seen from pre-test to post-test among suicidal adolescent treated with pharmacotherapy (12.222 - 4.694 ± (0.595-0.508 SD)) and the range of confidence interval also reduced drastically from 11.037 – 13.407 (pre-test suicide behavior scores) and from 3.682 – 5.707 (post-test suicide behavior scores) for the suicidal adolescents treated with pharmacotherapy. Based on the group's mean estimates, there was a statistically significant difference between pre-test and post-test treatment using pharmacotherapy (P <0.0001), as indicated in Table 2. This demonstrates that the pharmacotherapy intervention led to statistically significant reduction in suicidal behaviors in the group.

Similarly, the mean, standard deviation, and range of 95% confidence interval of pre-test and post-test suicidal behavior scores for dialectical behavior therapy group indicated a drastic reduction of suicidal behavior scores among the adolescents treated with DBT. The pre-treatment means of 14.244 ± (0.558 SD) confidence interval range of 13.133 – 15.355 was noted to reduce drastically to the post-treatment mean of 5.951 ± (0.476 SD) confidence interval range of 5.002 to 6.900 for the suicidal adolescents treated with DBT.

The mean estimates of suicidal behavior scores differences from pre-test to post-test treatment showed that there was a significant difference in reduction of suicide behavior among the adolescents treated with DBT (p = 0.0001). This seems to suggest that DBT was statistically efficacious in reducing suicidal behavior among adolescents aged 14-21. Suffice to say that the interpretation of the data analysis based on the mean, standard deviation and range estimate of the two therapeutic approaches implied that statistically, pharmacotherapy and DBT were efficacious statistically in reducing suicidal behavior among the participants (p < 0.05).

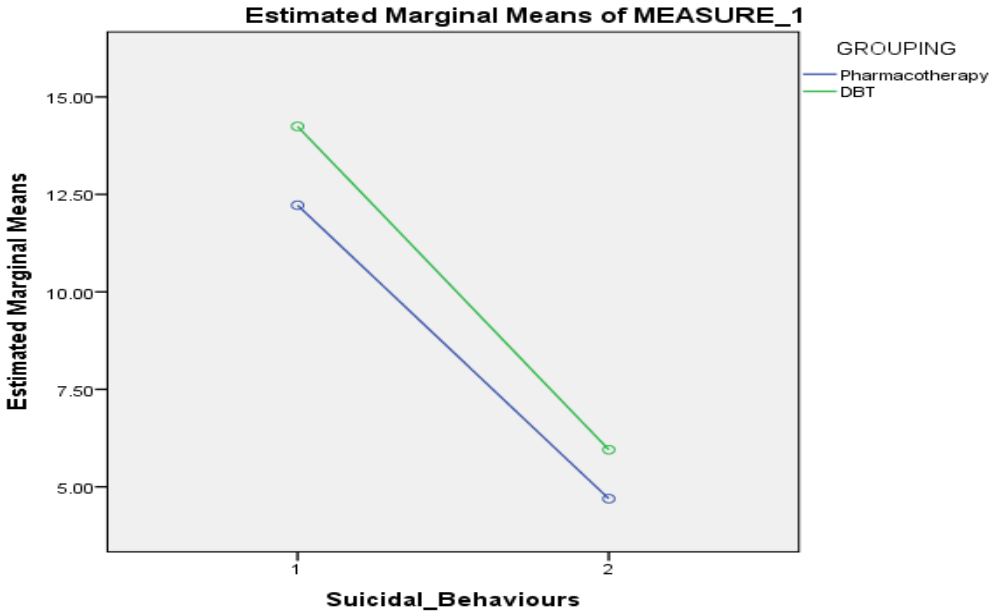

Figure 1: Profile Plot Showing the Trend in Measurements for the Pharmacotherapy and DBT Groups over Time

To affirm the trend in measurement of the two groups, profile plot was done to demonstrate the impact of the interventions on the mean suicidal scores over the post-treatment periods across the pharmacotherapy and BDT groups. The line graphs show a steep decline in the suicidal scores in the two (Figure 1). This depicted that the interventions had an impact at post-treatment in the two groups.

Table 3: Descriptive Analysis of the Suicidal Scores at Pre-Treatment and Post-Treatment among the Pharmacotherapy and DBT

	Grouping	Mean	Std. Deviation	N
Suicidal behavior – Pre-test	Pharmacotherapy	12.2222	3.90685	36
	DBT	14.2439	3.24639	41
	Total	13.2987	3.68876	77
Suicidal behavior – Post-test	Pharmacotherapy	4.6944	2.80631	36
	DBT	5.9512	3.24770	41
	Total	5.3636	3.09460	77

According to Table 3, the mean suicidal scores at pre-treatment and post-treatments for the two groups showed a steady decline in the mean suicidal scores over the study period from the mean at pre-treatment of 12.222(SD: 3.90685) to the mean of 4.6944(SD: 2.80631) for the pharmacotherapy group and mean of 14.2439 (SD: 3.24639) to mean of 5.9512 (SD: 3.24770) for the DBT group.

Table 4: Difference-in-Differences Estimates of Pharmacotherapy and DBT Therapies in Treating Suicidal Behaviors among Adolescents

	**(1) Difference-in Differences Estimates (Group*Post-treatment)
Baseline - Post-treatment	- 0.105 (p = 0.523)

**(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

Table 4 presents the difference-in-differences (DiD) estimates of the two approaches on suicidal behaviors among the participants. The study also focused on finding the superiority between pharmacotherapy and DBT in reduction of suicide behaviors among the participants. DiD is a tool to estimate treatment effects comparing the pre- and post-treatment differences in the outcome of two groups. In this study, DiD analysis was used to estimate the impact of interventions in treating suicidal behaviors among adolescents. The DiD estimator equaled the average change in outcomes in one group, after the average change in suicidal scores outcome in the second group was subtracted. The DiD approach to isolating program effect rests upon the usual assumptions of Ordinary Least Squares (OLS). The internal validity rested upon the premise that changes in suicidal behaviors over time in one group were equivalent to the changes in suicidal behaviors that would have been observed in the second group, had the interventions not been implemented. The DiD estimators are reported using the OLS estimator and they showed a declining trend over the two-time period in the two groups, depicting reduction in the suicidal scores. However, these reductions were not statistically significant (p = 0.523). This seems to imply that the two approaches were equally significant in reducing suicide behaviors among the participants.

The Effect Sizes of Pharmacotherapy and DBT

Table 5: Mean Scores at Pre-Treatment and Post-Treatment at 5 Months for Pharmacotherapy and DBT Groups

	Mean scores (SD)	
	Pre-treatment	Post - treatment/5 months
Pharmacotherapy (n=38)	12.2222 (3.90685)	4.6944 (2.80631)
DBT (n=43)	14.2439 (3.24639)	5.9512 (3.24770)

The study revealed a steady decline in the mean scores for pharmacotherapy and DBT groups at the repeated measures. Pharmacotherapy mean scores declined from 12.2222 (SD $\pm$ 3.90685) at baseline to 4.6944 (SD $\pm$ 2.80631) at post-treatment. The DBT group mean scores declined from a baseline of 14.2439 (SD $\pm$ 3.24639) to a post-treatment of 5.9512

(SD ± 3.24770) as shown in Table 5. This shows a significant drop in mean scores between baseline and post-treatment in the two groups. However, slight difference in mean was noticed that suggested that pharmacotherapy was slightly superior (4.6944 ± (2.80631 SD) at post-treatment compared to DBT (5.9512 ± (3.24770 SD) at post-test treatment but the difference in superiority was not statistically significant.

Table 6: Paired Sample Test: Mean Outcome Difference Scores from Pre-Treatment to Post-Treatment at 5 Months Follow-Up for Pharmacotherapy & DBT Groups.

	Mean difference scores (SD)	p-value
Pharmacotherapy (n=35)	10.69444 (3.53610)	P < 0.0001
DBT (n=40)	12.36585 (2.99797)	P <0.0001

Sample paired T-test was also used to determine the statistical significance in the paired mean difference scores between baseline and post-treatment. Regarding pharmacotherapy group, the study revealed mean difference scores between baseline and treatment of 10.69444 (SD ± 3.53610), which was statistically significant (p < 0.0001). With respect to the experimental group, the study showed mean difference scores between baseline and post-treatment of 12.36585 (SD ± 2.99797) and this was statistically significant (p < 0.0001). This means that the interventions influenced the treatment of suicidal behavior as indicated in Table 6.

Cohen's *d* effect sizes for the pharmacotherapy and DBT groups were calculated as: (mean at pre-treatment - mean at post-test) standard deviation of treatment difference scores with corresponding 95% confidence intervals calculated. Effect sizes were computed and showed statistically significant effect size for both pharmacotherapy and DBT groups at post-treatment. This means that both interventions were significant in reducing suicide behaviors among the participants.

Table 7: Effect Sizes from Pre-Treatment to Post-Treatment at 5-Month Follow-Up for Pharmacotherapy and DBT Groups.

	Pre/3-month post-treatment (n=53)	
	Effect sizes	95% CI
Pharmacotherapy (n=35)	2.245	1.460 – 3.031
DBT (n=40)	2.586	1.884 – 3.241

Regarding the Pharmacotherapy group, Cohen's d effect size value for (d= 2.245; 95% CI: 1.460 – 3.031) was a large effect size. For DBT group very large effect sizes were noted at post-treatment. Cohen's d effect size value for post-treatment was (d=2.586; 95% CI: 1.884 – 3.241). These suggested a very large practical significance for the two groups as shown in Table 7. This shows that the two interventions had an equal effect on the treatment of suicidal behaviors. Comparison of the efficacy of the two interventions based on the effect size from pre-treatment to post-treatment showed that the pharmacotherapy intervention was able to reduce mean suicide behaviors lower (2.245) than DBT (2.586). That seems to imply that the treatment of suicidal behaviors among participants was slightly more effective using pharmacotherapy compared to DBT though the difference was not statistically significant.

4. DISCUSSION

Key findings from the pre-post treatment assessments showed that pharmacotherapy is effective to reduce suicide behaviors symptoms (p=0.0001). Although, the researchers in this study did not administer medications to treat suicide behaviors and other psychiatric conditions of the inpatients. The researchers only assessed the suicide behaviors of the inpatients under the care of the psychiatrists while on admission. However, the result of this study showed that the treatment being received while on admission at the psychiatric hospital was efficacious to reduce suicide behaviors. Ethologically and psychologically, this result suggests that the etiology of suicide behavior can be a product of genetic, neurobiological, environmental, and psychological factors. For instance, the review of the available randomized controlled trials of pharmacotherapy for suicide behaviors with borderline personality disorder affirmed the effectiveness of using medications to stabilize symptoms and suicide behavior.[20] de-Berardis et al in an experimental study also found clinical evidence that Ketamine, an N-methyl-d-aspartate glutamate (NMDA) antagonist agent to be significantly efficacious to treat suicidal behavior in mood disorders.[21] Likewise, a systematic review of using Buprenorphine (BUP) in major depression and suicidal behavior showed several evidence that demonstrated efficacy of BUP, to be well-tolerated and safe option to reduce

depressive symptoms and severe suicide behavior.[22] Another clinical randomized trials of Varenicline, Bupropion, and Nicotine patch in the treatment of psychotic anxiety, mood disorders and severe suicide behaviors affirmed significant efficacy of psychotherapy in parasuicidal patients.[23]

Furthermore, this current study found that psychotherapy using DBT was equally effective to reduce suicide behavior symptoms among the outpatient participants (p=0001). This study was consistent with several interventional empirical studies. For example, findings from a multisite randomized clinical trial of 173 suicidal adolescents to test the efficacy of DBT to reduce the repeat suicide attempts, non-suicidal self-injury, and total self-harm as opposed to individual and group supportive therapy. Result from the study indicated that youth receiving DBT showed significant reduction of suicide behaviors compared to control group.[10] Also, a systematic review and meta-analysis of the DBT for treating self-injury in adolescents aged 12-19 years supported the findings from this current study, where it was reported that DBT showed small to moderate effects for reducing self-harm, and suicidal ideation. This implies that DBT in that study was effective compared to control group.[24] In addition, concerning clinical and preventive psychotherapy for reducing suicide and self-harm, review of current evidence shows that major advances have been achieved. DBT has been well-established to be an effective treatment option for reducing suicide mortality and suicide attempt rates.[25] Other evidence showing efficacy of DBT for reducing suicide-specific outcomes and other self-directed violence was outlined.[26]

Moreover, the difference-in-differences (DiD) estimates of the two approaches on suicidal behaviors among the inpatient and outpatient participants using Ordinary Least Squares (OLS) to test the superiority between pharmacotherapy and DBT in reduction of suicide behaviors indicates that there was no significant difference in the approaches (p=0.523). This suggests that the two approaches equally reduce suicide behaviors significantly. However, the Cohen *d* effect sizes calculation indicated that pharmacotherapy slightly reduces the symptoms lower compared to DBT, but the difference is insignificant. This finding is consistent with the results of systematic review of evidence-based strategies of treating suicide behaviors. The meta-analyses find that some medications such as antidepressants, Ketamine and many others significantly reduce suicide behavior as well as psychotherapeutic approaches such as Cognitive Behavior Therapy (CBT) and DBT.[27]

However, studies have shown adverse effects of medication to treat depression and suicidality. An example of such studies was an empirical investigation to study the adverse effect of antidepression drugs on 219,635 adult hospitalized patients. The results of the study showed 83 cases of suicidal adverse drug reactions, 44 cases of suicidal ideation, 34 attempted suicides, and 5 committed suicides. More so, all these adverse drug reactions occurred shortly after taking antidepressant drug medications.[28] Such side and adverse effect of pharmacotherapy alone might motivate a recommendation of psychotherapy and pharmacotherapy as a combined treatment plan for individuals with suicide behavior, and mood disorders.[29]

5. CONCLUSION

Suicide rates, especially among adolescents, is upsurging and disturbing. However, pharmacotherapy and psychotherapy such as DBT have been found to be efficacious in reducing the severity of suicide behaviors. The results from this current study imply that both approaches are equally significant in reducing symptoms of suicide behavior. For a better treatment prognosis, it's therefore recommended that further study is needed to ascertain whether combination of pharmacotherapy and DBT will be a better intervention for parasuicidal adolescents.

Authors' contributions

Dr. Samuel Ojuade is the principal researcher, and the data was an extract from the PhD dissertation. He designed the study and contributed to the statistical analyses of the data, interpreting the results, and writing of the article. Profs Alice Munene and Paul Mbutu were the supervisors of the PhD dissertation of the principal researcher.

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