Original Research Article

Evaluation of Dialectical Behavioral Therapy on Egyptian Patients with Borderline Personality Disorder: A Comparative Study

Comment [IG1]: Please consider revising. Strengthen the effectiveness of DBT for BPD. Example: Efficacy of DBT in BPD patients in Egypt population: a comparative study

Abstract

Background:Researchers have introduced tremendous developments in the therapy of BPD. Nonetheless, there is an urgent need for further clinical investigations regarding the role ofdialectical behavior therapy (DBT) in patients with borderline personality disorder (BPD).

Aim: We conducted this study to evaluate the efficacy of DBT in Egyptian patients with BPD.

Subjects and Methods: We conducted a prospective, comparative, non-randomized, study through the period from January 2017 to June 2019; patients were recruited if they had established diagnosis of BPD according to DSM-5**.** Eligible patients were assigned at their convenience or according to immediate availability of treatment slot to comprehensive DBT program integrating DBT skills into skills training schedule or treatment as usual (TAU).

Comment [IG2]: Please revise. Method should include DBT measurement procedures. Utilized statistical analysis in the study.

Results: DBT patients showed better improvement in borderline symptoms in comparison to patients receiving TAU($P < 0.001$). Regarding the behavior aspect, the patients in DBT group started to show significant improvement in comparison to TAU

group after 16 months (P < 0.001). DBT patients showed better improvement of emotion regulation andmindfulness in comparison to TAU. Overall, it was found that DBT groups had lower Distress Tolerance scale (DTS) score in comparison TAU (28.35 ± 3.16vs. 49.95 ± 2.39, P < 0.001). At the end of treatment, it was found that Interpersonal Effectiveness, evaluated by (IIPP) scale, were significantly reduced in DBT group compared to TAU group (P < 0.001).

Conclusions: We provide further evidence about the effectiveness of DBT in the management of BPD in Egyptian patients.

Comment [IG3]: Please revise. The conclusion ought to align with the study's title and objective. Effectiveness was not the same as efficacy.

Keywords: Borderline Personality Disorder; Bidirectional Behavioral Therapy; Psychometric Parameters; Effectiveness; Interventional Study

1. Introduction:

Borderline personality disorder (BPD) is the most prevalent personality disorder, with a general prevalence of up to 2% (Widiger, 2012). It generates a substantial negative impact on the person's quality of life, which is manifested by inadequate functioning, higher rates of attempted suicide, and mental and physical comorbidities (Tomko et al., 2014). The suicidal frequencies reach 10% among individuals with BPD, which is 50 times greater than the rates of the general population (Black et al., 2004; Leichsenring et al., 2011). Besides, personality disorders account for 24% of patients in primary care, and over 30% in psychiatry clinics (Twomey et al., 2015; Zhang et al., 2012). Therefore, research directions aimed to establish an effective treatment modalities for BPD (Dhaliwal et al., 2020; Kramer et al., 2020).

International guidelines do not usually recommend pharmacotherapy for BPD (Hancock-Johnson et al., 2017; Lieb et al., 2004). The last decade haswitnessed tremendous developments in the therapy of BPD, including dialectical behavior therapy (DBT), mentalization-based treatment (MBT), transference-focused therapy (TFP), and schema therapy (ST) (Stoffers et al., 2012). DBTis an out-patient-based modality that relies on the features of cognitive-behavioral principles; the current body of evidence demonstrated notable efficacy of DBT for management of BPD(May et al., 2016).

Nonetheless, the efficacy of DBT in developing countries, such as Egypt, has not been well characterized yet and the available literature is limited, which creates an urgent need for further clinical investigations. Therefore, we conducted this interventional study to evaluate the efficacy of DBT in Egyptian patients with BPD.

2. Subjects and Methods:

We conducted a prospective, comparative, non-randomized, study through the period from January 2017 to June 2019; patients were recruited from the inpatient and outpatient clinics ofNeuropsychiatry Department and Psychiatry, Neurology and Neurosurgery Center of Tanta University Hospitals. Patients aged 18-45 years old of both genders were included if they had established diagnosis of BPD according to DSM-5(American Psychiatric Association (APA), 2013).Patients were excluded if they refused to sign the informed consents or had schizophrenia or any other psychotic disorders. Patients with intellectual disability, traumatic brain injury, organic brain diseases, and/or other systematic and neurological diseases were excluded. The patients were recruited using a non-probability, consecutive, sampling technique.The study obtained the ethical

approval of the local ethics committee of Tanta University Hospitals prior to the enrollment of the first patient. All patients, or their first-degree relatives, singed the informed consent before their participation.

Study's Treatments

Eligible patients were assigned at their convenience or according to immediate availability of treatment slotto comprehensive DBT program integrating DBT skills into skills training schedule or treatment as usual (TAU).Patients assigned to DBT group were included in the program for one year and received once weekly individual psychotherapy session (one hour), skills training group (2 hours), and skills coaching phone calls with the primary therapist when needed. In addition, a weekly team meeting for all therapists, including the candidate and other DBT therapist, was conducted aiming at reducing therapist burnout and increasing therapist capabilities to treat these patients.

Data Collection:

The following data were collected at the baseline visit: age, sex, residence, educational level, marital status, occupation,medical and psychiatrichistory, neurological examination findings, classification of the personality disorder as determined by the Arabic version of the Structured Clinical Interview (SCID-II)(Hatata et al., 2003), co-morbid psychiatric disorders as determined byArabic version of the Structured Clinical Interview DSM-IV (SCID-I)(El Missiry, 2003), and findings ofpsychometric assessments. All assessments were done at baseline, 4, 8, 12 and 16 months of treatment.Borderline symptoms were assessed using the borderline symptom list (BSL-23)(Bohus et al., 2009).In terms of emotion regulation, we assessed this outcome

usingthe Arabic version of Difficulties in Emotion Regulation Scale (DERS)(Abdelkarim et al., 2017) and mindfulness outcomes were assessed using the Arabic version of Freiburg Mindfulness Inventory scale.(Mobasher et al.,2016). We used Distress tolerance scale (DTS) in assessment of emotional distress.Inventory of Interpersonal Problems-Short (IIPS) version was used to assess the interpersonal effectiveness(Kim & Pilkonis, 1999; Simons & Gaher, 2005). We translated and back-translated the English versions of the DTS, IIPS, and BSL-23 to the Arabic language.

Comment [IG4]: Please add. Add validation score (such as Cronbach alpha) for these questionnaires.

Statistical analysis:

Data were analyzed using statistical package of social science (SPSS, windows version 24). All continuous quantitative data were presented in mean and standard deviation (SD). While categorical data were presented in frequencies and percentages. Chi-square or Fisher Exact tests were used to test the hypothesize of significant difference in categorical variables. While Student t-test, Mann-Whitney test, and One-Way ANOVAwere used to test the hypothesize of significant difference in continuous variables.Significance of the obtained results was judged at the 5% level.

3. Results:

A total of 60 patients with BPD were recruited into either comprehensive DBT program (n= 28) or TAU group (n= 32). Twenty patients weredropoutduring treatment(eight patients from DBT group and 12 patients from TAU group.

Both groups were females with no substantial age difference with mean age of 23.90 ± 4.88 years (DBT group) and 24 ± 4.88 years (TAU group). Both groups were similar in terms of marital status, employment and schooling. There was no prior

background of serious medical problems in either category. In terms of Psychiatric co-morbidities, two subjects of bulimia nervosa in the DBT cohort and one case of anorexia nervosa in the TAU group and no major difference between the two categories of regards to either dimension I or cumulative amount of co-morbid problems.Five DBT participants have a co-morbid personality condition rather than BPD and five TAU participants have another personality problems (**Table 1**).

Nearly half of the patients in each group were receiving current psychotropic medications including antidepressants(AD), antipsychotics (AP), mood stabilizers (MS), benzodiazepines and one patient in DBT group was receiving non-stimulant medication for adult ADHD (Atomoxetine). There was no significant difference between the two groups regarding use of psychotropic medications in general nor in each drug class separately.

Borderline symptoms

DBT patients showed better improvement in borderline symptoms in comparison to patients receiving TAU. In term of symptoms aspect of the borderline symptoms assessment, the DBT subjects were significantly improved after 4 months ($P < 0.001$), 6 months ($P < 0.001$), 8 months ($P < 0.001$), 12 months ($P < 0.001$), and 16 months ($P < 0.001$) compared to TAU group (**Figure 1 A**). Regarding the behavior aspect, the patients in DBT group started to show significant improvement in comparison to TAU group after 8 months ($p = 0.007$), 12 months ($P< 0.001$), and 16 months ($P< 0.001$; **Figure 1 B**).

Emotion regulation

DBT patients showed better improvement of emotion regulation in comparison to TAU as shown in the statistically significant lower means of total score of DERS (87.55 ± 8.66 vs 128.00 ± 7.24, $P < 0.001$). Furthermore, after one treatment year, DBT group showed significantly low score in non-accept ($P < 0.001$), goals ($P < 0.001$), impulse ($P < 0.001$), aware ($P < 0.001$), strategies ($P < 0.001$), and clarity ($P < 0.001$) domains in comparison to TAU group. Similarly, during follow up after 4 months, all domains of Emotional regulation showed more significant reduction in DBT group than TAU group (**Table 2**).

Mindfulness

Total scores of mindfulness was found to be significantly increased in DBT group in comparison to TAU group at the end of treatment year (42.70 ± 2.31vs. 25.35 ± 2.70, $P > 0.001$), and during follow up after 4 months (43.55 ± 2.35vs. 25.80 ± 3.03, $P > 0.001$; **Figure 2**).

Improvement of Distress

Overall, at the end of treatment year, it was found that DBT groups reported DTS score were significantly in comparison TAU (28.35 ± 3.16vs. 49.95 ± 2.39, P < 0.001). Also, after 4 months, DTS scores in DBT groups were significantly reduced in comparison to TAU group (28.00 ± 2.79vs. 49.20 ± 2.48, P < 0.001). Furthermore, after one treatment year, DBT group showed significantly low score in Regulation (P < 0.001), Appraisal (P < 0.001), Absorption (P < 0.001), and Tolerance (P < 0.001) domains in comparison to TAU group. Similarly, during follow up after 4 months, all domains of distress tolerance scale showed more significant reduction in DBT group than TAU group (**Table 3**).

Interpersonal effectiveness

Generally, at the end of treatment year, it was found that DBT groups reported Interpersonal Effectiveness, evaluated by IIPP scale, were significantly reduced in comparison TAU (76.55 ± 9.67vs. 133.25 ± 7.58, P < 0.001). Also, after 4 months, DTS scores in DBT groups were significantly reduced in comparison to TAU group (74.65 ± 8.21vs. 131.10 ± 6.95, P < 0.001).Furthermore, after one treatment year, DBT group showed significantly low score in Interpersonal sensitivity (P < 0.001), Interpersonal ambivalence (P < 0.001), Aggression (P < 0.001), Need for scale approval (P < 0.001), and Lack of sociability (P < 0.001) in comparison to TAU group. Similarly, during follow up after 4 months, all domains of IIPP showed more significant reduction in DBT group than TAU group (**Table 4**).

Discussion:

The current body of evidence supports the efficacy of DBT in various psychological disorders, including BPD(May et al., 2016). However, limited data are available regarding its availability in limited-resource regions, such as Egypt. Thus, we conducted the present study in order toevaluate the effectiveness ofDBT on a sample of Egyptian patients with BPD.

Poor compliance of the patients to treatment's schedule in a major concern for treating psychiatrist during the management of BPD. Thus, it is crucial to ensure that any applied modality achieves acceptable level of compliance during treatment(Fleischhaker et al., 2011). In the present study, we demonstrated thatDBT group had lower drop-out cases in comparison to the TAUgroup. This is in line with the findings of initial and late trials, comparing DBT and TAU, which found lower dropout rate in the BDT(Barnicot et al., 2016; Koons et al., 2001; Linehan et al., 1999, 2006).For example,Barnicot et al(2016) recruited 70 patients with BPD to evaluate the efficacy of DBT; of them, 48 patients completed the full treatment duration; which was significantly higher retention rate than the TAU group

Researches have tried to identify the mechanisms behind acceptable level of treatment retention during DBT treatment; it was hypothesized that facilitated communication between the therapist and the patients, culturally-accepted aspects of the modality, and case management are among the factors that lead to better compliance to DBT treatment(Bornovalova& Daughters, 2007).Barnicot et al(2016) reported thattreatment credibility and the alliance were significantly associated with drop-out rate

among patients receiving DBT. Another point of strength for the current study is that our resultsshowed comparable and even better treatment retention despite of thevarious challenges faced by the treatment team such as the applicationof comprehensive DBT program in Arabic language for the first time atTanta university, up to our knowledge; the use of Arabic version of the program potentially contributed tomore adherence to treatment. We utilized the Arabic version of DBT that was previously developed by (Abdelkarim et al., 2017); in this study, 40 patients with BPD and substance abuse were recruited to a one-year treatment duration of DBT sessions utilization Arabic language, the high efficacy of DBT in this study suggested excellent validity and reliability of the Arabic version of DBT.

In the current study DBT patients showed better improvement ofborderline symptoms in comparison to TAU as shown in thestatistically significant lower means of both BSL subscales scores thatretained its statistically significant lower values at the 4 months followup following treatment year. Notably, the DBT group in our study showed significant improvement inbehavior symptoms of BPD which started from the first 4 months oftreatment. Our findings are in concordance with the accumulating evidence of previous trials that demonstrated superiority of DBT, compared to other modalities, regarding the borderline symptoms(Carter et al., 2010; Priebe et al., 2012; Sachse et al., 2011); in these trials, there were marked improvements in the self-injurious behaviors, hospitalization,anger, depression,hopelessness, and suicidal ideation. In a meta-analysis of 14 clinical studies, Kliem et al (2010) demonstrated that the DBT was effective in reducing the symptomatic burden of BPD. In another systematic review byBloom et al(Bloom et al., 2012), the effectiveness of DBT on reducing the BPD symptoms was

consistent across the eleven included studies. The improvement inself-injurious behaviors was even better in our study than the abovementioned trials, which could be explained by the long duration of treatment in our study and the inclusion of a 4-months period of follow-up. The overall results of these studies and our trial indicate that DBT is consistentlysuperior to nonspecific comparators in reducing suicidal and self-harmbehavior, health care utilization (e.g., inpatient psychiatric hospitaladmissions and emergency department visits) and improving treatmentretention.

Besides, our results indicated that theimprovement inbehavior symptoms of BPD was correlated with improvement inemotion regulation and distress tolerance. Such findings are in line with previous RCTs comparing DBT to TAU; in these trials, the improvements in self-injurious behaviors and other BPD-related behaviors were significantly correlated with the improvement in the emotion regulation and distress tolerance(Koons et al., 2001; Linehan et al., 1999, 2006).Later on, some investigated the efficacy for a shorter, 6months,courseofDBTshowedpositiveimpact on BPD symptoms and postivie correlation between this improvement and emotion outcomes(Carter et al., 2010; Lynch et al., 2007).

Interestingly, our study showed significant reduction insuicidal attemptsand improvement in BPD symptoms in DBT group, compared to TAU group, even that the negative symptoms was higher in the DBT group at the baseline visits. This comes in line with van den Bosh et al (2003) which demonstrated greater reductions of suicidal attemptsand improvement in BPD symptoms following DBT than TAU. The improvement in the BPD symptoms was more notable in patients with more severe symptoms at baseline.

The DERS is a well-validated measure for self-reporting emotional regulation among BPD patients(Carpenter & Trull, 2013).In the current study DBT patients showed better improvement ofemotion regulation in comparison to TAU as shown in the statistically significant lower means of total score of DERS and its subscales thatwere all maintained its statistically significant lower values at the 4month follow up following treatment year.These results are consistent with those shown by(Abdelkarim et al., 2017; Axelrod et al., 2011; Goodman et al., 2014).The Abdelkarim et al (2017) recruited Egyptian patients with BPD and allocated them to receive DBT for one year or TAU with a follow-up duration of four months; the results showed better improvement of emotion regulation in DBT group, compared to TAU, at the end of treatment and the end of follow-up.In Goodman et al (2014), the DERS was significantly improved in DBT, compared to control group, among BPD; in addition, the amygdala habituation was improved significantly in the DBT group. Likewise, Axelrod et al (2010) reproted significant reduction in the DERS after 20 weeks of DBT.These previous results would confirm the efficacy of DBT as apotential transdiagnostic treatment approach for persons suffering fromdefective emotion regulation in general as Attention Deficit/HyperactivityDisorder (ADHD), depression in elderly, and bulimia nervosa and binge eating.

Mindfulness skills are one of the components of DBT andan essential aspect of treatment forsubjects with BPD. In our study, DBT patientsshowed better improvement of mindfulness in comparison to TAU asshown in the statistically significant higher mean of total score ofFMI that retained its statisticallysignificant lower values after 4 months follow up following treatmentyear. These results are consistent with those of a study on

a sample of60 patients with BPD by(Soler et al., 2012). In this study, the DBT lead to significantly better improvement in mindfulness subscales (such as delectability scores), as compared to usual psychiatric management. These findings were also in line with Perroud et al (2012) who showed that the DBT led to significant improvement in mindfulness, as assessed by the Kentucky Inventory of Mindfulness Skills (KIMS). The cumulative findings of these trials and our study confirm the usefulness of DBT in improving mindfulness and the importance of mindfulness training in patients with BPD, despite that different methods of assessment of mindfulness were used.Hölzel et al.(2011) concluded that the practice ofmindfulness seems to improve emotion regulation which could result inclinical improvements in psychiatric conditions such as BPD. These findings are also consistent with research showingpromising results for mindfulness-focused treatments targeting avariety of dysregulated behaviors.

Comment [IG5]: Please add. Add study's limitation

Conclusion

The present study provides further evidence about the effectiveness of DBT in the management of BPD. Our results showed that the DBT was superior to conventional treatment in improving the symptoms of DBT and other psychometric parameters of the BPD patients. Thus, we recommend the implementation of DBT in the Egyptian guidelines for the management of BPD and the introduction of properDBT skill training programs.

4. References:

Comment [IG6]: Please revise. 24 references (total 36) were more than 10 years.

Abdelkarim, A., Molokhia, T., Rady, A., & Ivanoff, A. (2017). DBT for Co-morbid Borderline Personality Disorder and Substance use Disorder Without Drug Replacement in Egyptian Outpatient Settings: A Non-randomized Trial. *European Psychiatry*, *41*(S1), S260–S261. https://doi.org/10.1016/j.eurpsy.2017.02.068

American Psychiatric Association, American Psychiatric Association, editors. Diagnostic and statistical manual of mental disorders: DSM-5. 5th ed. Washington, D.C: American Psychiatric Association; 2013. 947 p.

Axelrod, S. R., Perepletchikova, F., Holtzman, K., & Sinha, R. (2011). Emotion regulation and substance use frequency in women with substance dependence and borderline personality disorder receiving dialectical behavior therapy. In *American Journal of Drug and Alcohol Abuse* (Vol. 37, Issue 1, pp. 37–42). https://doi.org/10.3109/00952990.2010.535582

Barnicot, K., Gonzalez, R., McCabe, R., & Priebe, S. (2016). Skills use and common treatment processes in dialectical behaviour therapy for borderline personality disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, *52*, 147–156. https://doi.org/10.1016/j.jbtep.2016.04.006

Black, D. W., Blum, N., Pfohl, B., & Hale, N. (2004). Suicidal behavior in borderline personality disorder: prevalence, risk factors, prediction, and prevention. *Journal of Personality Disorders*, *18*(3), 226–239. https://doi.org/10.1521/pedi.18.3.226.35445

Bloom, J. M., Woodward, E. N., Susmaras, T., & Pantalone, D. W. (2012). Use of dialectical behavior therapy in inpatient treatment of borderline personality disorder:

A systematic review. *Psychiatric Services*, *63*(9), 881–888. https://doi.org/10.1176/appi.ps.201100311

Bohus, M., Kleindienst, N., Limberger, M. F., Stieglitz, R. D., Domsalla, M., Chapman, A. L., Steil, R., Philipsen, A., & Wolf, M. (2009). The short version of the Borderline Symptom List (BSL-23): Development and initial data on psychometric properties. *Psychopathology*, *42*(1), 32–39. https://doi.org/10.1159/000173701

Bornovalova, M. A., & Daughters, S. B. (2007). How does Dialectical Behavior Therapy facilitate treatment retention among individuals with comorbid borderline personality disorder and substance use disorders? In *Clinical Psychology Review* (Vol. 27, Issue 8, pp. 923–943). https://doi.org/10.1016/j.cpr.2007.01.013

Carpenter, R. W., & Trull, T. J. (2013). Components of emotion dysregulation in borderline personality disorder: A review. In *Current Psychiatry Reports* (Vol. 15, Issue 1, p. 335). NIH Public Access. https://doi.org/10.1007/s11920-012-0335-2

Carter, G. L., Willcox, C. H., Lewin, T. J., Conrad, A. M., & Bendit, N. (2010). Hunter DBT project: Randomized controlled trial of dialectical behaviour therapy in women with borderline personality disorder. *Australian and New Zealand Journal of Psychiatry*, *44*(2), 162–173. https://doi.org/10.3109/00048670903393621

Dhaliwal, K., Danzig, A., & Fineberg, S. K. (2020). Improving Research Practice for Studying Borderline Personality Disorder: Lessons From the Clinic. *Chronic Stress (Thousand Oaks, Calif.)*, *4*, 2470547020912504. https://doi.org/10.1177/2470547020912504

El Missiry, A. (2003). *Homicide and Psychiatric Illness, An Egyptian Study*.

Fleischhaker, C., Böhme, R., Sixt, B., Brück, C., Schneider, C., & Schulz, E. (2011). Dialectical Behavioral Therapy for Adolescents (DBT-A): A clinical Trial for Patients with suicidal and self-injurious Behavior and Borderline Symptoms with a one-year Follow-up. *Child and Adolescent Psychiatry and Mental Health*, *5*. https://doi.org/10.1186/1753-2000-5-3

Goodman, M., Carpenter, D., Tang, C. Y., Goldstein, K. E., Avedon, J., Fernandez, N., Mascitelli, K. A., Blair, N. J., New, A. S., Triebwasser, J., Siever, L. J., & Hazlett, E. A. (2014). Dialectical behavior therapy alters emotion regulation and amygdala activity in patients with borderline personality disorder. *Journal of Psychiatric Research*, *57*(1), 108–116. https://doi.org/10.1016/j.jpsychires.2014.06.020

H, H., M, A. Z., & Khalil A. (2003). *Dual diagnosis in substance abuse, a study in an Egyptian sample.*

Hancock-Johnson, E., Griffiths, C., & Picchioni, M. (2017). A Focused Systematic Review of Pharmacological Treatment for Borderline Personality Disorder. *CNS Drugs*, *31*(5), 345–356. https://doi.org/10.1007/s40263-017-0425-0

Kim, Y., & Pilkonis, P. A. (1999). Selecting the most informative items in the IIP scales for personality disorders: An application of item response theory. *Journal of Personality Disorders*. https://doi.org/10.1521/pedi.1999.13.2.157

Kliem, S., Kröger, C., & Kosfelder, J. (2010). Dialectical behavior therapy for borderline personality disorder: a meta-analysis using mixed-effects modeling. *Journal of Consulting and Clinical Psychology*, *78*(6), 936–951. https://doi.org/10.1037/a0021015

Koons, C. R., Robins, C. J., Lindsey Tweed, J., Lynch, T. R., Gonzalez, A. M., Morse, J. Q., Bishop, G. K., Butterfield, M. I., & Bastian, L. A. (2001). Efficacy of dialectical behavior therapy in women veterans with borderline personality disorder. *Behavior Therapy*, *32*(2), 371–390. https://doi.org/10.1016/S0005-7894(01)80009-5

Kramer, U., Beuchat, H., Grandjean, L., & Pascual-Leone, A. (2020). How Personality Disorders Change in Psychotherapy: a Concise Review of Process. *Current Psychiatry Reports*, *22*(8), 41. https://doi.org/10.1007/s11920-020-01162-3

Leichsenring, F., Leibing, E., Kruse, J., New, A. S., & Leweke, F. (2011). Borderline personality disorder. *Lancet (London, England)*, *377*(9759), 74–84. https://doi.org/10.1016/S0140-6736(10)61422-5

Lieb, K., Zanarini, M. C., Schmahl, C., Linehan, M. M., & Bohus, M. (2004). Borderline personality disorder. *Lancet (London, England)*, *364*(9432), 453–461. https://doi.org/10.1016/S0140-6736(04)16770-6

Linehan, M. M., Comtois, K. A., Murray, A. M., Brown, M. Z., Gallop, R. J., Heard, H. L., Korslund, K. E., Tutek, D. A., Reynolds, S. K., & Lindenboim, N. (2006). Two-year randomized controlled trial and follow-up of dialectical behavior therapy vs therapy by experts for suicidal behaviors and borderline personality disorder. *Archives of General Psychiatry*, *63*(7), 757–766. https://doi.org/10.1001/archpsyc.63.7.757

Linehan, M. M., Schmidt, H., Dimeff, L. A., Craft, J. C., Kanter, J., & Comtois, K. A. (1999). Dialectical behavior therapy for patients with borderline personality disorder and drug-dependence. *American Journal on Addictions*, *8*(4), 279–292.

https://doi.org/10.1080/105504999305686

Lynch, T. R., Cheavens, J. S., Cukrowicz, K. C., Thorp, S. R., Bronner, L., & Beyer, J. (2007). Treatment of older adults with co-morbid personality disorder and depression: A dialectical behavior therapy approach. *International Journal of Geriatric Psychiatry*, *22*(2), 131–143. https://doi.org/10.1002/gps.1703

May, J. M., Richardi, T. M., & Barth, K. S. (2016). Dialectical behavior therapy as treatment for borderline personality disorder. *Mental Health Clinician*, *6*(2), 62–67. https://doi.org/10.9740/mhc.2016.03.62

Mobasher, M., El sayed, M., & Adam, M. (2016). *Assessment of Attention in Schizophrenic and Manic Patients, An Egyptian Study*.

Priebe, S., Bhatti, N., Barnicot, K., Bremner, S., Gaglia, A., Katsakou, C., Molosankwe, I., McCrone, P., & Zinkler, M. (2012). Effectiveness and cost-effectiveness of dialectical behaviour therapy for self-harming patients with personality disorder: A pragmatic randomised controlled trial. *Psychotherapy and Psychosomatics*, *81*(6), 356–365. https://doi.org/10.1159/000338897

Sachse, S., Keville, S., & Feigenbaum, J. (2011). A feasibility study of mindfulness-based cognitive therapy for individuals with borderline personality disorder. *Psychology and Psychotherapy: Theory, Research and Practice*, *84*(2), 184–200. https://doi.org/10.1348/147608310X516387

Simons, J. S., & Gaher, R. M. (2005). The distress tolerance scale: Development and validation of a self-report measure. In *Motivation and Emotion* (Vol. 29, Issue 2, pp. 83–102). https://doi.org/10.1007/s11031-005-7955-3

Soler, J., Valdepérez, A., Feliu-Soler, A., Pascual, J. C., Portella, M. J., Martín-Blanco, A., Alvarez, E., & Pérez, V. (2012). Effects of the dialectical behavioral therapy-mindfulness module on attention in patients with borderline personality disorder. *Behaviour Research and Therapy*, *50*(2), 150–157. https://doi.org/10.1016/j.brat.2011.12.002

Stoffers, J. M., Völlm, B. A., Rücker, G., Timmer, A., Huband, N., & Lieb, K. (2012). Psychological therapies for people with borderline personality disorder. *The Cochrane Database of Systematic Reviews*, *2012*(8), CD005652. https://doi.org/10.1002/14651858.CD005652.pub2

Tomko, R. L., Trull, T. J., Wood, P. K., & Sher, K. J. (2014). Characteristics of borderline personality disorder in a community sample: comorbidity, treatment utilization, and general functioning. *Journal of Personality Disorders*, *28*(5), 734–750. https://doi.org/10.1521/pedi_2012_26_093

Twomey, C. D., Baldwin, D. S., Hopfe, M., & Cieza, A. (2015). A systematic review of the predictors of health service utilisation by adults with mental disorders in the UK. *BMJ Open*, *5*(7), e007575. https://doi.org/10.1136/bmjopen-2015-007575

Widiger, T. A. (2012). *The Oxford handbook of personality disorders*. Oxford University Press.

Zhang, T., Wang, L., Good, M.-J. D., Good, B. J., Chow, A., Dai, Y., Yu, J., Zhang, H., & Xiao, Z. (2012). Prevalence of personality disorders using two diagnostic systems in psychiatric outpatients in Shanghai, China: a comparison of uni-axial and multi-axial formulation. *Social Psychiatry and Psychiatric Epidemiology*, *47*(9), 1409–

1417. https://doi.org/10.1007/s00127-011-0445-x

Table 1: Baseline Characteristics of the included Patients

Variables	DBT (n = 20)		TAU (n = 20)		p
	No.	%	No.	%	
Age					
Min. – Max.	17.0 – 33.0		17.0 – 33.0		^{t}p= 0.949
Mean ± SD.	23.90 ± 4.99		24.00 ± 4.88		
Median	24.0		24.0		
Marital Status					
Single	17	85.0	15	75.0	^{MC}p= 0.612
Married	2	10.0	3	15.0	
Divorced	1	5.0	2	10.0	
Work					
Student	8	40.0	7	35.0	^{MC}p= 0.606
Employed	9	45.0	8	40.0	
Un employed	3	15.0	5	25.0	
Education					
High School	9	45.0	10	50.0	^{MC}p= 0.601
Undergraduate	8	40.0	8	40.0	
Postgraduate	3	15.0	2	10.0	

Comment [IG7]: Please revise.
1.Add abbreviationsfor DBT, TAU, PBD, OCD, PTSD, etc
2.All p-value were accompanied with unidentified superscripts. DELETE all supercript (^{t}p, ^{MC}p, etc)

Family history of psychiatric disorders					
Yes	8	40.0	7	35.0	χ^2p = 0.107
No	12	60.0	13	65.0	
Family history of PBD					
Yes	7	35.0	5	25.0	χ^2p = 0.476
No	13	65.0	15	75.0	
Co-morbid psychiatric illness					
Mood Disorders	7	35.0	6	30.0	χ^2p=0.828
Anxiety Disorders	1	0.0	3	15.0	^{FE}p=0.231
PTSD	2	10.0	4	20.0	^{FE}p=0.895
Adult ADHD	3	15.0	0	0.0	^{FE}p=0.487
Eating Disorder	1	5.0	0	5.0	^{FE}P=1.000
OCD	3	15.0	3	15.0	^{FE}P=1.000
Personality Disorder other than BPD	5	20.0	5	30.0	χ^2p=0.465
Substance abuse	2	10.0	3	15.0	^{FE}p=0.762
Total Comorbid Psychiatric Illnesses					
Min. – Max.	0.0 – 3.0		0.0 – 3.0		^{MW}p= 0.611
Mean ± SD.	0.95 ± 0.85		1.05 ± 0.95		
Median	1.0		1.0		
Psychiatric Hospital Admission					

No	13	65.0	15	75.0	χ^2 p=0.476
Yes	**7**	**35.0**	**5**	**25.0**	
No. of Hospital Admissions					
Min. – Max.	0.0 – 4.0		0.0 – 4.0		^{MW}p= 0.273
Mean ± SD.	0.65 ± 1.05		0.70 ± 0.37		
Median	0.0		0.0		

Table (2): Comparison between the two studied groups according to DERS outcome at the end of treatment and after four months follow up

		DERS		
		Baseline	**End of treatment year**	**Follow up after 4 months**
NONACCEPT	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	20.05 ± 2.50	17.60 ± 2.03	17.60 ± 2.03
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	20.20 ± 2.39	19.50 ± 2.30	19.80 ± 2.06
	^{t}p	0.848	<0.001*	<0.001*
Goals	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	18.60 ± 1.69	15.70 ± 1.30	15.60 ± 1.27
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	17.95 ± 1.90	17.95 ± 1.90	18.10 ± 1.83
	^{t}p	0.262	<0.001*	<0.001*
Impulse	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	21.70 ± 2.17	12..65 ± 2.70	12.50 ± 2.12

Comment [IG8]: Please revise.
1.Add abbreviations for DBT, TAU, PBD, OCD, PTSD, etc
2.All p-value were accompanied with unidentified superscripts. DELETE all supercript (^{t}p, ^{MC}p, etc)

	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	21.75 ± 2.17	21.50 ± 2.18	21.70 ± 2.12
	^{t}p	0.942	<0.001*	<0.001*
Aware	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	21.80 ± 1.15	14.70 ± 1.62	14.45 ± 1.36
	TAU	**(n = 20)**	**(n = 12)**	**(n = 20)**
	Mean ± SD.	21.30 ± 1.49	21.15 ± 1.56	21.15 ± 1.56
	^{t}p	0.243	<0.001*	<0.001*
Strategies	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	28.95 ± 2.76	16.95 ± 2.43	16.30 ± 2.73
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	29.05 ± 2.74	27.80 ± 2.74	27.15 ± 2.41
	^{t}p	0.909	<0.001*	<0.001*
Clarity	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	20.70 ± 1.68	9.95 ± 2.43	9.85 ± 2.30
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**

	Mean ± SD.	20.85 ± 1.46	20.20 ± 2.11	19.90 ± 1.44
	^{t}p	0.786	<0.001*	0.007*
Total	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	131.80.75 ± 6.50	87.55 ± 8.66	86.30 ± 9.24
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	131.10 ± 6.34	128.00 ± 7.24	127.80 ± 5.85
	^{t}p	0.732	<0.001*	<0.001*

^{t}p: Value for Student t–test
*: Statistically significant at $p \leq 0.05$

Table (3): Comparison between the two studied groups according to Distress Tolerance outcome at the end of treatment and after four months follow up

		DTS		
		Baseline	**End of treatment year**	**Follow up after 4 months**
Tolerance	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	11.20 ± 1.00	5.20 ± 1.36	5.10 ± 1.20
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	11.40 ± 0.75	11.20 ± 0.83	11.00 ± 0.85
	^{t}p	0.481	<0.001**	<0.001**
Absorbation	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	10.95 ± 1.09	4.65 ± 0.93	4.60 ± 0.93
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	11.10 ± 1.02	10.85 ± 0.98	10.85 ± 0.95
	^{t}p	0.657	<0.001**	<0.001**
Appraisal	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	19.15 ± 1.38	10.70 ± 1.03	10.50 ± 0.94

Comment [IG9]: Please revise.
1.Add abbreviations for DBT, TAU, PBD, OCD, PTSD, etc
2.All p-value were accompanied with unidentified superscripts. DELETE all supercript (^{t}p, ^{MC}p, etc)

	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	19.25 ± 1.29	18.55 ± 1.87	17.90 ± 1.79
	^{t}p	0.815	<0.001**	<0.001**
Regulation	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	8.95 ± 1.35	7.80 ± 1.19	7.75 ± 1.11
	TAU	**(n = 20)**	**(n = 12)**	**(n = 20)**
	Mean ± SD.	9.65 ± 1.22	9.35 ± 1.18	9.45 ± 1.14
	^{t}p	0.095	<0.001**	<0.001**
Total	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	50.25 ± 2.59	28.35 ± 3.16	28.00 ± 2.79
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	51.40 ± 2.37	49.95 ± 2.39	49.20 ± 2.48
	^{t}p	0.151	<0.001**	<0.001**

^{t}p: Value for Student t–test
**: Statistically significant at $p \leq 0.01$

Table (4): Comparison between the two studied groups according to Interpersonal Effectivenessoutcome at the end of treatment and after four months follow up

Comment [IG10]: Please revise.
1.Add abbreviations for DBT, TAU, PBD, OCD, PTSD, etc
2.All p-value were accompanied with unidentified superscripts. DELETE all supercript (^{t}p, ^{MC}p, etc)

		IIPP		
		Baseline	**End of treatment year**	**Follow up after 4 months**
Interpersonal sensitivity	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	35.65 ± 3.58	19.35 ± 3.52	17.95±2.37
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	35.75± 3.38	34.85 ± 2.77	34.10 ± 2.77
	^{t}**p**	0.821	<0.001*	<0.001*
Interpersonal ambivalence	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	27.85 ± 4.24	15.10 ± 2.57	14.90 ± 2.44
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	27.95 ± 4.13	27.65 3.82	27.25 ± 3.93
	^{t}**p**	0.901	<0.001*	<0.001*
Aggression	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	22.15 ± 2.47	11.15±2.23	11.15 ± 2.23
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	22.30 ± 2.36	22.05 ± 2.32	21.95 ± 2.13
	^{t}**p**	0.707	<0.001*	<0.001*
Need for social approval	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	26.90 ± 2.78	16.45 ± 2.13	16.15 ± 1.98
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	27.40 ± 2.39	26.95±2.37	26.20 ± 2.28
	^{t}**p**	0.880	<0.001*	<0.001*
Lack of sociability	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	14.50 ± 2.48	22.00 ± 3.37	14.50 ± 2.48
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	22.25 ± 3.19	21.75 ± 3.09	21.60 ± 2.83
	^{t}**p**	0.899	<0.001*	<0.001*

Total	**DBT**	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	134.55 ± 7.18	76.55 ± 9.67	74.65 ± 8.21
	TAU	**(n = 20)**	**(n = 20)**	**(n = 20)**
	Mean ± SD.	135.65 ± 6.65	133.25 ± 7.58	131.10 ± 6.95
	^{t}p	0.789	<0.001*	<0.001*

^{t}p: Value for Student t–test

**: Statistically significant at $p \leq 0.01$

Figure 1A: Comparison between the two studied groups regarding borderline symptoms as assessed by borderline symptom list (BSL) across periods during treatment year and at 4 months follow up

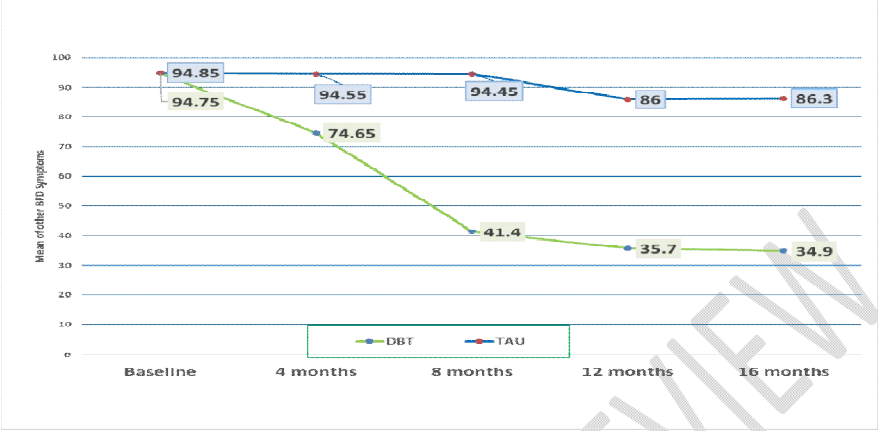

Figure 1B: Comparison between the two studied groups regarding BPD behavior symptoms subscale as assessed by borderline symptom list (BSL) across periods during treatment year and at 4 months follow up**.**

Figure 2: Comparison between the two studied groups regarding mindfulness as assessed by Freiburg mindfulness inventory scale at the end of treatment and after four months follow up.