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The Influence of Acceptance and Commitment Therapy on Depression and Quality of Life among Emerging Adults in Malaysia

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Abstract

Researches revealed that emerging adults aged 18 to 29 are more susceptible to depression than those in other age groups. Acceptance and commitment therapy, or ACT, has been shown in numerous prior studies to be effective in treating emerging adults' depression. Instead of emerging adults in general, past studies have been concentrating more on those pursuing higher education. This intentional limitation of the study focus creates a population gap in the existing literature. Therefore, this study looks at how effective ACT in improving depression symptoms among Malaysian emerging adults. Sixty eight emerging adults participated in this experimental study, which used a pre-post test control group design. Using the random assignment technique, they were divided into one treatment group (ACT) and one control group. The study used Beck Depression Inventory II (BDI-II) and World Health Organization Quality of Life – BREF (WHOQOL-BREF) as the questionnaires. Depression symptoms and quality of life improve significantly in ACT at post-test and this improvement maintains at follow-up. There is statistically significant difference in depression between ACT and control group at post-test and follow-up, where depression in ACT improves while control group shows worsening of symptom at follow-up. Results shows that there is no significant difference between the two groups in quality of life at post-test and follow-up. However, control group shows worsening in quality of life at follow-up. ACT seems to be more effective compared to control group in reducing depression. In terms of quality of life, ACT shows more improvement in comparison with control group although non-significant. This demonstrates that ACT improves depression and quality of life more effectively than the control group among Malaysian emerging adults. Future studies might focus on different countries or areas with different cultures and beliefs, particularly those where depression is more common, such as rural areas.

Keywords: Emerging Adult, Depression, Quality of Life, Acceptance and Commitment Therapy

Introduction

In Malaysia, the percentage of adults with mental health problems rose from 10.7% in 1996 to 29.2% in 2015 Institute for Public Health (2015) and majority of them aged from 20 to 24 years old. According to the reports, women, young adults, and adults from low-income backgrounds are more prone to mental health problems. The report also reported that young adults between the ages of 16 and 29 had higher mental health issues than people of other ages. The increasing number of depressed young adults had caught the attention of many scholars as this problem could lead to poor functioning at work and home World Health Organization (2021), chronic health conditions, and poor productivity and living condition (Gibb et al., 2010; Gili et al., 2018).

Emerging adulthood is the new term proposed by Arnett (2000) and it comprises of young adults aged 18 to 29 years old. In comparison to other life stages, the emerging adulthood is the most volatile phase of life following changes in relationship, education, career, and other life commitments, which may lead to instability (Arnett, 2000). Inevitably, this instability triggers pervasive emotions, such as depression and anxiety (Arnett et al., 2014). This is supported by Gustavson et al (2018) where young adults aged between 18 and 29 are adversely affected by major depression and anxiety disorders, and this prevalence declines in their 30s and 40s. On top of that, if a person has their first diagnosis in their 20s, they are more likely to experience another mental illness ten years later (Gustavson et al., 2018). Such situations may hinder young adults' ability to further their education, start a family, and find employment.

In addition, emerging adults make up an important age cohort in the Malaysia's political structure, where individuals aged 18 can vote in election (Laws of Malaysia, 2014). Besides that, the majority of other countries also use the similar minimum voting age of 18 (Batchgeo, n.d.). This is the age where they start pursuing tertiary education and they can be legally be married at this age (Nik Wajis et al., 2020). Given the substantial life events that occur at this age and the increase in depression in this age group Institute for Public Health (2015), it is important for more research to be done on how to handle and treat depressed emerging adults in general settings, especially if there is more effective therapy to treat depression among this population. Moreover, there are more available mental health services for emerging adults in academic settings compared to that of the general community (Eisernberg et al., 2012). Therefore, it is crucial to widen the target population beyond college or university students since some of them might already be employed or have chosen not to pursue higher education (Abdul Kadir & Mohd, 2021).

Despite extensive study on the mental health problems among emerging adults, the majority of the studies focused on young adults in tertiary education as opposed to those who are not (Bishop et al., 2019; Cuijpers et al., 2020; Germani et al., 2020). This is because 18 years old is the beginning of pursuing into higher education after finishing secondary or high schools. Although intentional, this approach creates a population gap in the literature. Another reason why tertiary education is the focus of most studies is that depression is the most prevalent mental health issues among university students (Merikangas et al., 2009; Mustaffa et al., 2014; Nigatu et al., 2016). Cuijpers et al (2016) concurred with this as university and college students are particularly susceptible to having mental health problems.

Studies on the effectiveness of psychological intervention on depression and quality of life among emerging adults in Malaysia is still lacking. To date, the majority of experimental

studies on emerging adults are in United Kingdom Dickson & Gullo (2015), the United States of America Farabaugh et al (2018); Lattie et al (2019), Brazil (Konradt et al., 2018), Australia Dear et al (2018); Staples et al (2019), and a few Asian countries; Japan Araki et al (2019); Saigo et al (2018), Iran (Heydari et al., 2018; Zemestani & Mozaffari, 2020). This group needs to be further studied because of characteristics like instability and self-focus that make them vulnerable to depression (Arnett et al., 2014; Kulig & Persky, 2017; Pettit et al., 2011). Additionally, their high levels of identity exploration and negativity make them susceptible to psychological stress (Baggio et al., 2017).

Recent study in Malaysia reported on the effects of CBT and ACT on depression and anxiety, but no mentioning of quality of life (Othman et al., 2023). The quality of life is defined by the WHOQOL Group (1995) as a multifaceted construct with components related to social, psychological, and physical health. It also includes aspects of daily life like interpersonal relationships, bodily and mental health, and involvement in daily activities (Papakostas et al., 2004). Based on empirical evidence, the onset of symptoms of depression in early adulthood is linked to long-term health problems, decreased productivity, and poor living conditions, which subsequently affect one's quality of life (Gibb et al., 2010; Gili et al., 2018). Kolovos et al. (2016) suggested that since depression and quality of life are two different constructs, the absence or reduction in depression does not always reflect an improvement in quality of life, or vice versa. Past study by Craigie and Nathan (2009) also agreed with this as depression and anxiety symptoms improve significantly after psychotherapy but not in quality of life. Perceivably, quality of life is independent of symptom alleviation. The lack of studies on the link between depressive symptoms and quality of life was also brought to light by (Kamenov et al., 2017; Kolovos et al., 2016).

In addition to pharmacological treatment, psychological therapy is used to manage depression (Clinical Practice Guideline, 2019). Few studies have shown that the newer therapy – acceptance and commitment therapy is equally effective as cognitive behaviour therapy in treating depression symptoms (Forman et al., 2007; Tamannaeifar et al., 2014) and patients with psychiatric and physical health conditions (Burian et al., 2021). Even so, A-Tjak et al (2021) acknowledged the need for more research to determine whether ACT works differently for different categories of depressed people. Study by Cuijpers et al (2020) found that different age groups have different effect sizes in psychotherapies, with the young adults reporting the largest effects. Therefore, the current study focuses on emerging adults aged 18 to 29 and the effect of ACT on depression and quality of life among them.

In conclusion, this study chose emerging adults as the research population in light of the statistical evidence showing that younger adults had higher mental health risks and mental disorders (Gustavson et al., 2018; Institute for Public Health, 2015). Additionally, compared to other life stages, this stage is highly unstable, which raises the likelihood of experiencing depression or anxiety (Arnett et al., 2014; Othman & Jaafar, 2022). Past studies focused on emerging adults in postsecondary education, which may not accurately reflect the age group as a whole (Bishop et al., 2019; Cuijpers et al., 2020; Germani et al., 2020; Reed-Fitzke, 2020). In addition, the current study focuses on this age group in Malaysian culture because majority of previous researches were conducted among Western, educated, industrialised, rich, and democratic (WEIRD) populations Cuijpers et al (2021); Farabaugh et al (2018); Germani et al (2020); Konradt et al (2018); Lattie et al (2019), which limits the generalizability of the results

to those living in developing and non-Western nations. Thus, emerging adults in Malaysia are the reasonable study population because this time period is culturally unique rather than universal (Arnett, 2000).
The current study examined the effectiveness of ACT on depression and quality of life among emerging adults aged 18 to 29 in Malaysia. The primary outcome is depression symptoms, while quality of life is the secondary outcome.

Hypotheses
There are four hypotheses in this study:
H_a1: There is significant difference in depression score at pre-, post-test, and follow-up in ACT.
H_a2: There is significant difference in quality of life score at pre-, post-test, and follow-up in ACT.
H_a3: There is significant difference in depression at post-test between ACT and control group.
H_a4: There is significant difference in depression at follow-up between ACT and control group.
H_a5: There is significant difference in quality of life at post-test between ACT and control group.
H_a6: There is significant difference in quality of life at follow-up between ACT and control group.

Method
Study Design
In the present study, a pre-post-test control group design is used. Using random assignment, the eligible 68 people were divided into a treatment group and a control group. The questionnaires were given to all participants at three separate times – pre-treatment (T1), post-treatment (T2), and 3-month follow-up (T3).

Procedures and Participants
Through cluster random sampling, Selangor state in Malaysia was picked out of 13 states and 3 federal territories. Following that, two locations (one from higher education and one from non-government organization) in Selangor were picked at random - Universiti Putra Malaysia (UPM) and Mental Illness Awareness and Support Association (MIASA). Since we are interested in emerging adults in community, the involvement of both university and non-university are crucial to acquire an accurate population data.

Participants were eligible if they met the following criteria; (1) Malaysian; (2) increased depressive symptoms (BDI-II scores of 14 or above); (3) age between 18 and 29; and (4) ability to communicate in either Bahasa Malaysia or English. The exclusion criteria are; (1) diagnosed with mental disorder (2) involved in drugs or alcohol abuse, (3) currently receiving psychological treatment.

All participants were provided with informed consent and they are free to withdraw from the research at any given time.

Studies indicate that an experimental study should have a minimum of 15 participants per group (Creswell, 2012; Gay, 1987; McMillan & Schumacher, 2010). In addition, Gall et al.(1996) suggest that it is recommended that each group in an experimental study to have between 15 to 30 individuals. Therefore, it is advisable to recruit a minimum of 33 individuals each group, considering a 10 percent dropout rate from 30 participants. At first, 75 emerging adults were selected. However, 7 out of 75 participants were excluded since 4 of them did not fulfil the inclusion criteria (i.e., scoring less than 14 in BDI-II, age more than 29 years old) and 3 declined to take part due to personal and logistic reasons. At the end of the initial evaluation, the study comprises of 68 participants and they were equally distributed into two groups.

After completing the BDI-II assessment, 68 participants were divided into three mutually exclusive groups through stratified random sampling method. These three groups (known as strata) describe the severity of depression symptoms which are mild, moderate, and severe. Afterwards, each stratum was chosen at random from a simple random sampling, ensuring that each had an equal probability of being assigned to either ACT or control group. To minimise the systematic variation between the participants on any variable other than the one the researcher is manipulating experimentally, it is necessary that the subjects be randomly assigned to groups Field & Hole (2003), and in this case, the variations would be the severity of depression symptoms. This process also reduces risks to internal validity. Subsequently, 68 participants were stratified and divided into two groups; ACT (n=34), and control group (n=34).

Data were collected between December 2020 to February 2022. Ultimately, 54 participants successfully completed the experiment until follow-up. The specifics of the sampling procedures are shown in the CONSORT flow diagram in Figure 1.

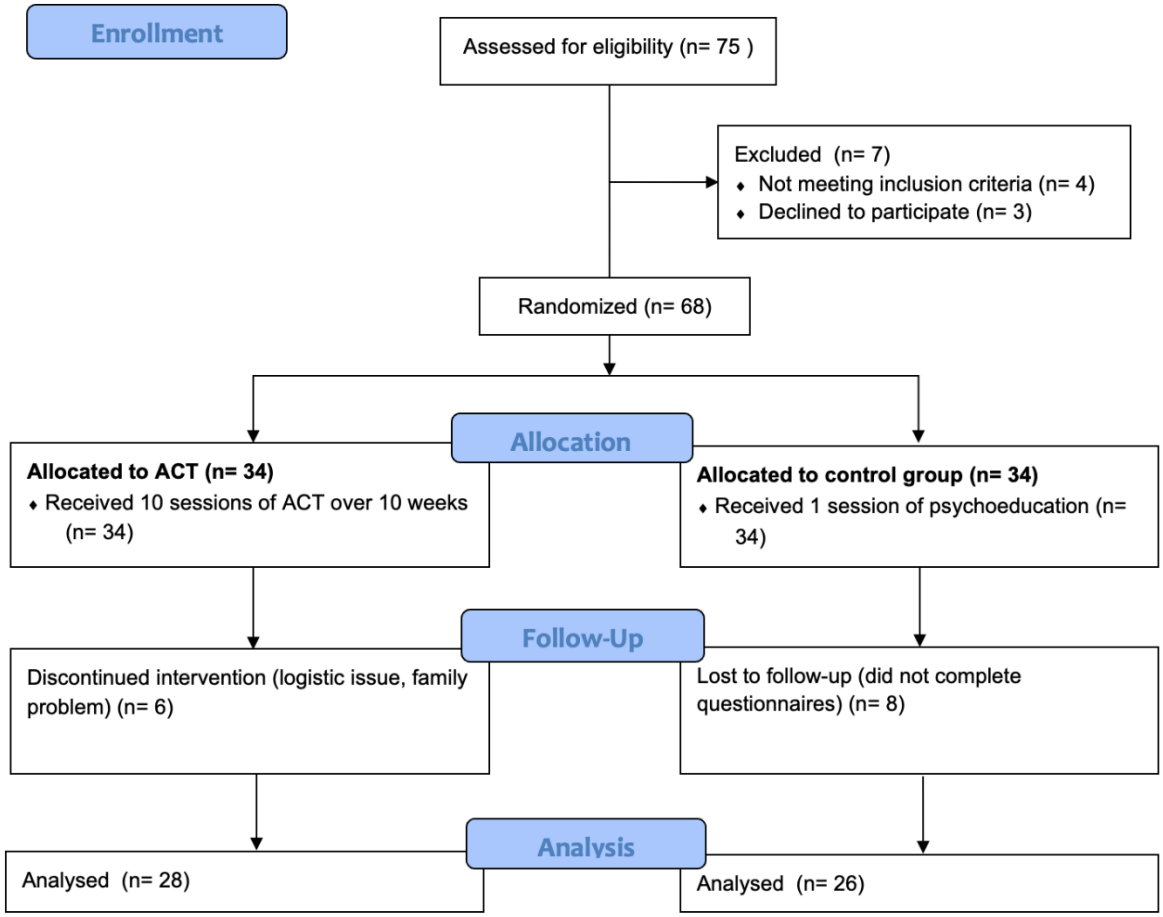

Figure 1: CONSORT Flow Diagram

Treatments

Acceptance and commitment therapy was used as the study treatment. ACT was adapted from Harris (2019); Zettle (2007) with emphasis on participants' actions based on their values. Throughout the sessions, emphasis is placed on the six core ACT therapeutic processes: committed action, defusion, acceptance, self-as-context, contacting the present moment, and values (see Appendix 2). Participants attended 10 sessions of ACT in total, one session per week, with each session lasting between 45 minutes to 1 hour. Since the researcher is a registered counsellor who has received ACT training and supervisions while pursuing her master's and doctoral degrees, she was the one who handled all the sessions. Moreover, this strategy can minimize the threat to internal validity. To ensure the quality of the sessions, supervision was conducted every two weeks by an ACT-trained and experienced senior counsellor. All the sessions were delivered in individual format.

During the study, participants in the control group attended one session of psychoeducation about depression. For ethical purpose, they were offered with ACT upon the study completion. The participants in the control group were taught on the common symptoms of depression based on (American Psychiatric Association, 2013). They were also being informed on the adaptive coping strategy, such as having a healthy habit: being physically active, journal writing, and waking up around the same time every day. A variety of exercises by Elliot and Smith (2006) were also suggested, such as the advantages-disadvantages assessment, mood

journal, and restoring relationships. Deep breathing techniques are also being taught and they were advised to carry out this exercise daily.

Measures
The participants were assessed in depression symptoms and quality of life using reliable and valid measures. Items related to demographic profiles, depression, and quality of life were all included in the study.

Demographic profiles All the participant completed the demographic information on age, gender, ethnicity, religion, marital status, level of education, occupational status, and any current medical conditions or medications.

Beck Depression Inventory II The Beck Depression Inventory-II (BDI-II; Beck at al., 1996) was used to assess the severity of depression. The BDI-II has 21 items, with a maximum score of 63 and a 4-point scale from 0 to 3. Each item is associated with a depression symptom, such as the feelings of indecisiveness, worthlessness, loss of energy, changes in appetite, and punishment feelings. The BDI-II is scored using a scale that range from 0 to 13 that indicates minor depression, 14 to 19 representing mild depression, 20 to 28 for moderate depression, and 29 to 63 indicating severe depression. The original manual states that the clinical and non-clinical samples show great internal consistency, with Cronbach's alpha values of 0.92 and 0.93, respectively. The current study's Cronbach alpha shows a good value of 0.93.
World Health Organization Quality of Life - BREF The 26 items of the WHOQOL-BREF are broken down into four categories: the environment, social relationship, psychology, and physical health. Even though there is no specific scoring system, the manual indicates that a higher quality of life is indicated by higher scores. The internal consistency for each domain, as reported by the WHOQOL Group (1995), varied from moderate to very good. The current study's Cronbach alpha indicates a good value of 0.89.

Statistical Analysis
SPSS Version 25 was used to analyse descriptive statistics, one-way ANOVA, Kruskal-Wallis test, and one-way repeated measures ANOVA. Descriptive statistics were used to obtain the frequency and percentage of the respondents' background, as well as the baseline level for depression and quality of life. Since the assumption for one-way ANOVA is violated in Hypothesis 3 (H_a3), we proceed with the Kruskal-Wallis test. The summary of the data analysis can be found in Table 1.

Table 1
Summary of Data Analysis

Hypotheses	Data analysis
H_a1: There is significant difference in depression score at pre-, post-test, and follow-up in ACT.	One-way repeated measures ANOVA
H_a2: There is significant difference in quality of life score at pre-, post-test, and follow-up in ACT.	One-way repeated measures ANOVA
H_a3: There is significant difference in depression at post-test between ACT and control group.	Kruskal-Wallis test
H_a4: There is significant difference in depression at follow-up between ACT and control group.	One-way ANOVA
H_a5: There is significant difference in quality of life at post-test between ACT and control group.	One-way ANOVA
H_a6: There is significant difference in quality of life at follow-up between ACT and control group.	One-way ANOVA

Results

Descriptive statistics

A total of 54 emerging adults participate in the study. The respondents consist of females (75.9%) and males (24.1%). The majority of the respondents aged 27 – 29 (53.7%), followed by aged 24 – 26 (22.3%) and aged 21 – 23 (13.0%), and the lowest percentage is age 18 - 20, which made up of 11.0%. Most of them are not married (75.9%) and the other 24.1% are married. For education level, the majority have bachelor's degree (64.8%), followed by diploma (22.2%) and master's degree (9.3%). Whereas for the employment status, 61.1% of the participants are working, 35.2% are studying, while 3.7% are not working nor studying (n=2).

Baseline level for depression and quality of life were analysed using one-way ANOVA. Depression symptoms using BDI-II do not differ at baseline level, $F(1,52) = 2.422$, $p = .126$. However, quality of life shows significant difference at baseline level between the two groups, $F(1,52) = 10.364$, $p = .002$. Altman and Dore (1990) explain that although appropriate random assignment may reduce selection bias, it's still not able to guarantee baseline equality between the groups. This indicates that different baseline features might actually due to the effect of chance rather than bias. As a result, the CONSORT statement (2010) suggests that baseline comparisons only to be done for the main and relevant demographic and clinical variable. Given that the focus of this research is on depression symptoms, the BDI-II scores would be the relevant clinical variable, which shows no baseline differences between the groups. Table 2 shows the descriptive statistics for depression and quality of life in ACT and control group.

Table 2
Descriptive Statistics for Depression and Quality of Life in ACT and Control Group from Pre- to Post- and to Follow-up

Measurement / time of measurement	ACT (n = 28)	Control group (n = 26)
BDI-II		
Pre	29.75 (10.42)	25.69 (8.57)
Post	16.25 (12.03)	22.23 (5.09)
Follow-up	14.00 (8.30)	24.65 (6.99)
WHOQOL-BREF		
Pre	176.18 (55.29)	231.19 (69.91)
Post	234.79 (65.78)	238.31 (62.40)
Follow-up	244.96 (56.15)	215.19 (56.58)

Inferential Statistics

H_a1: There is significant difference in depression score at pre-, post-test, and follow-up in ACT.

One-way repeated measures ANOVA was conducted to compare the effect of ACT on depression at pre-test, post-test, and follow-up. As our data violated the assumption of sphericity, we look at the values in the Greenhouse-Geisser.

One-way repeated measures ANOVA with Greenhouse-Geisser correction determine that depression scores differ statistically and significantly among time points (F(1.607,43.379) = 43.209, P < .05). Post hoc analysis with a Bonferroni adjustment shows that depression scores statistically and significantly reduce from pre-test to post-test (13.500 (95% CI, 7.81 to 19.19), p < .05), and from pre-test to follow-up (15.750 (95% CI, 11.38 to 20.12), p < .05), but not from post-test to follow-up (2.250 (95% CI, -1.52 to 6.02), p= .419). Table 3 shows pairwise comparison for depression in ACT.

Table 3
Pairwise Comparisons for Depression in ACT

		Mean Difference	**Std. Error**	**Sig. (2-tailed)**	**95% Confidence Interval for Difference**	
					Lower	**Upper**
Pair 1	**PreTest-PostTest**	**13.500**	**2.228**	**.000**	**7.813**	**19.187**
Pair 2	**PreTest-FollowUp**	**15.750**	**1.711**	**.000**	**11.383**	**20.117**
Pair 3	**PostTest-FollowUp**	**2.250**	**1.478**	**.419**	**-1.522**	**6.022**

H_a2: There is significant difference in quality of life score at pre-, post-test, and follow-up in ACT.

One-way repeated measures ANOVA was conducted to compare the effect of ACT on quality of life at pre-test, post-test, and follow-up. As our data violated the assumption of sphericity, we look at the values in the Greenhouse-Geisser.

One-way repeated measures ANOVA with Greenhouse-Geisser correction determine that quality of life scores differ statistically and significantly among time points (F(1.375,37.122) = 25.314, P < .05). Post hoc analysis with a Bonferroni adjustment shows that quality of life scores statistically and significantly increase from pre-test to post-test (-58.607 (95% CI, -91.33 to -25.89), p < .05), and from pre-test to follow-up (-68.786 (95% CI, -97.08 to -40.49), p < .05), but not from post-test to follow-up (-10.179 (95% CI, -5.86 to 26.22), p = .351). Effect size using partial eta squared is 0.48. Table 4 shows pairwise comparisons for quality of life in ACT.

Table 4
Pairwise Comparisons for Quality of Life in ACT

		Mean Difference	**Std. Error**	**Sig. (2-tailed)**	**95% Confidence Interval for Difference**	
					Lower	Upper
Pair 1	**PreTest-PostTest**	-58.607	12.819	.000	-91.328	-25.886
Pair 2	**PreTest-FollowUp**	-68.786	11.085	.000	-97.080	-40.492
Pair 3	**PostTest-FollowUp**	-10.179	6.283	.351	-5.860	26.217

H_a3: There is significant difference in depression at post-test between ACT and control group.

Equality of variances was examined before running the one-way ANOVA to compare the scores between the two groups. Findings from the Levene's test in Table 5 shows that the two groups (ACT and control group) have uniformity of variance p = .001 (p < 0.05) in depression post-test, which indicate that the assumption of homogeneity of variance was violated and one-way ANOVA could not be conducted. Alternatively, the researchers proceed with the non-parametric Kruskal-Wallis test which is equivalent to one-way ANOVA.

Table 5
Test of Homogeneity of Variances – Depression at Post-test

		Levene Statistic	df1	df2	Sig.
Depression post-test	Based on mean	11.826	1	52	.001

The Kruskal-Wallis test in Table 6 highlights a statistically significant difference in depression symptoms at post-test between ACT and the control group, $\chi^2(1) = 9.377$, $p = 0.002$, with a mean rank depression score of 21.20 for ACT, and 34.29 for the control group. Using eta squared, a large effect size of 0.16 is calculated. Therefore, H_a3 is supported where there is significant difference between ACT and control group in depression post-test.

Table 6
Kruskal-Wallis Test for Depression Post-test between ACT and Control Group

	Kruskal-Wallis test	
	Kruskal-Wallis H	Asymp. Sig.
Depression post-test	9.377	.002

H_a4: There is significant difference in depression at follow-up between ACT and control group.

Scores of depression at follow-up have uniformity of variance p = .595 (p > 0.05), which indicate that the assumption of homogeneity of variance was met and one-way ANOVA could be conducted. Table 7 shows the test of homogeneity of variances in depression at follow-up.

Table 7
Test of Homogeneity of Variances – Depression at Follow-up

	Levene Statistic	df1	df2	Sig.
Depression Follow-up	.287	1	52	.595

The ANOVA result in Table 8 implies a significant difference in depression scores at follow-up between ACT and the control group with a value of F (25.852), p = .000 (p <. 05). The effect size calculated using eta squared is large at 0.33. Therefore, H_a4 is supported where there is significant difference between ACT and control group in depression follow-up.

Table 8
ANOVA – Depression Symptoms at Follow-up between ACT and Control Group

	Sum of squares	df	Mean square	F	Sig.
Between groups	1530.208	1	1530.208	25.852	.000
Within groups	3077.885	52	59.190		
Total	4608.093	53			

Figure 2 illustrates the mean of the pre-test, post-test, and follow-up of depression scores for the two groups. The mean for depression scores in ACT reduces from 29.75 pre-test to 16.25 post-test, thus implying 13.5 in reduction. Comparatively, the control group reduces from 25.69 pre-test to 22.23 post-test, which only denotes 3.46 in reduction. Furthermore, control group shows an increment in depression mean scores at follow-up which reflects a worsening depression symptoms. Meanwhile, ACT shows a further reduction and improvement in depression scores during follow-up.

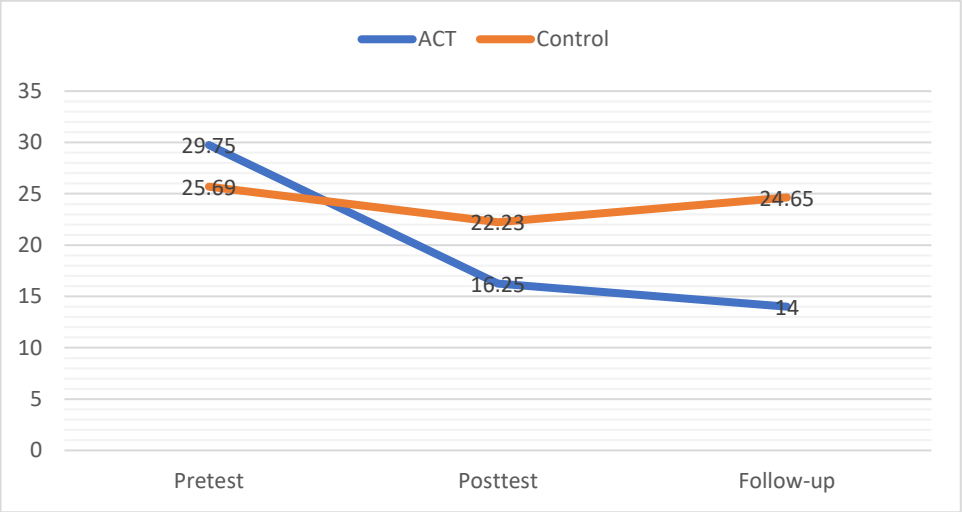

Figure 2: Mean for Depression Scores (Pre-, Post-, and Follow-up) for ACT and Control Group

H_a5: There is significant difference in quality of life at post-test between ACT and control group.

Scores of quality of life at post-test have uniformity of variance p = .827 (p > 0.05), which indicate that the assumption of homogeneity of variance was met and one-way ANOVA could be conducted. Table 9 shows the test of homogeneity of variances in quality of life at post-test.

Table 9
Test of Homogeneity of Variances – Quality of Life at Post-test

	Levene Statistic	df1	df2	Sig.
Quality of life post-test	.048	1	52	.827

The ANOVA result in Table 10 implies no significant difference in quality of life scores at post-test between ACT and the control group with a value of F (.041), p = .841 (p >. 05). The effect size calculated using eta squared is small at .00. Therefore, H_a5 is not supported where there is no significant difference in quality of life post-test between ACT and control group.

Table 10
ANOVA – Quality of Life at Post-test between ACT and Control Group

	Sum of squares	df	Mean square	F	Sig.
Between groups	167.229	1	167.229	.041	.841
Within groups	214150.253	52	4118.274		
Total	214317.481	53			

H_a6: There is significant difference in quality of life at follow-up between ACT and control group.

Scores of quality of life at follow-up have uniformity of variance p = .811 (p > 0.05), which indicate that the assumption of homogeneity of variance was met and one-way ANOVA could

be conducted. Table 11 shows the test of homogeneity of variances in quality of life at follow-up.

Table 11
Test of Homogeneity of Variances – Quality of Life at Follow-up

	Levene Statistic	df1	df2	Sig.
Quality of life follow-up	.058	1	52	.811

The ANOVA result in Table 12 implies no significant difference in quality of life scores at follow-up between ACT and the control group with a value of F (3.762), p = .058 (p >. 05). Using eta squared, a moderate effect size is calculated at 0.067. Therefore, H_a6 is not supported where there is no significant difference in quality of life at follow-up between ACT and control group.

Table 12
ANOVA – Quality of Life at Follow-up between ACT and Control Group

	Sum of squares	df	Mean square	F	Sig.
Between groups	11949.590	1	11949.590	3.762	.058
Within groups	165177.003	52	3176.481		
Total	177126.593	53			

Figure 3 depicts the mean of the pre-test, post-test, and follow-up of quality of life scores for the two groups. The mean for quality of life scores in ACT rise from 176.18 pre-test to 234.79 post-test with 58.61 increment and improvement. Regardless, the mean scores for the control group only increases by 7.72 from 231.19 pre-test to 238.91 post-test, and this scores reduce at follow-up which indicate that quality of life worsens at follow-up in the control group. Meanwhile in ACT, quality of life shows further improvement at follow-up.

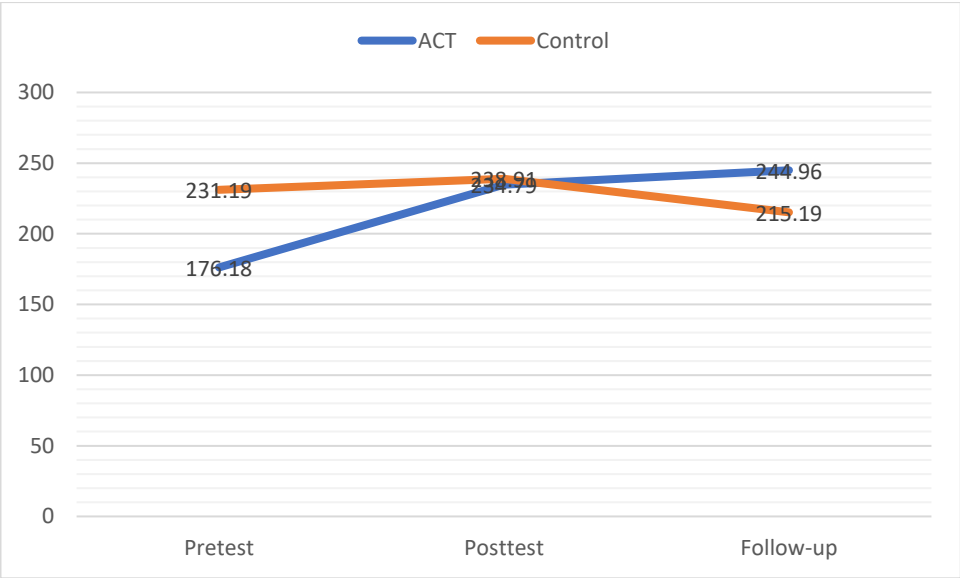

Figure 3: Mean for Quality of Life Scores (Pre-, Post-, and Follow-up) for ACT and Control Group

Discussion

Hypothesis 1

The results of the current study showed that emerging adults' depressive symptoms significantly improve after ACT and remains stable during follow-up. This result is in line with Xu et al. (2020) which reported significant reduction in depression among university students after ACT, with the effects maintained across time. Moreover, the results concur with Zemestani and Mozaffari (2020), who delivered ACT to depressed physically-handicapped individuals. After only eight sessions, a significant progress was observed, and the effect persisted at 16-week follow-up. Grégoire et al. (2018) conducted another study with fewer sessions that required university students to complete four ACT sessions, and the improvement is still noticeable. Although there are differences in the number of sessions among the past studies, a notable decrease in depression symptoms was reported. Additionally, Harris (2019) concludes that ACT could be conducted over a variety of timeframes, from four to forty sessions. Bear in mind that therapists performing ACT not only have to determine the number of sessions, they also have to take into account the participants' characteristics, whether the participants have any disability, clinical diagnosis, or any other relevant characteristics that may affect the results. Therefore, the number of ACT sessions would depend on the type of participant and the symptom. For the current study, 10-sessions of ACT seems to be effective in reducing depression symptoms among emerging adults. This brief ACT treatment is clearly not going to make participants to fully adopt a value-based, mindful lifestyle in a short time. Rather, the brief therapy concentrates on quickly and effectively providing the core components of ACT so that the participants can continue to practise the new skills even after the sessions are over.

On top of that, studies by Heydari et al (2018); Davoudi et al (2017) showed significant reduction of depression in employees and smokers after ACT. In addition to the current study, ACT demonstrates that it is effective in reducing depression in various types of individuals and there are few possible explanations for ACT's effectiveness. One of them is the aim of ACT which differs from traditional psychological treatment. Its aim is to acknowledge and accept the unpleasant and distressing emotions, and thus leading to reduction in experiential avoidance and increase psychological flexibility. Participants were taught to use meaningful and beneficial activities to help them reach their value-based goals while embracing these unpleasant experiences without judgement or resistance. This approach may lessen depression because the majority of those affected would feel inadequate and disinterested, which typically makes them feel like doing nothing or that they aren't enjoying once-pleasurable activities. Study by Danitz et al (2016) shows that acceptance – which is one of the therapeutic processes in ACT, is linked to a lower depression level. Additionally, the use of defusion and willingness in ACT would help individuals to take more control of their depression. Cognitive defusion may provide a favourable ACT outcome by helping participants realise how pervasive their thoughts are and that most of them shouldn't be interpreted seriously or acted upon. Meanwhile, the willingness concept may help individuals become less fixated on their symptoms and to concentrate on workable behaviour, thus increasing their psychological flexibility.

Hypothesis 2

In ACT, measuring quality of life is crucial because the therapy focuses more on enhancing functioning and quality of life beyond symptoms reduction (Hayes et al., 1999). According to

Zimmerman et al (2006), depressed patients evaluated factors other than symptom reduction as significant when determining the degree of their remission. In line with that, Saarni et al (2007) acknowledged that in addition to symptoms reduction, psychotherapy and other forms of mental health care have to take into account the broader notion of quality of life as the treatments' goals and outcomes.

According to the present findings, participants' overall quality of life considerably increase after ACT, and this improvement held steady at the follow-up. The results are consistent with previous research, showing a major improvement in quality of life at post-intervention ACT (Dalrymple et al., 2014, Ducasse et al., 2018). Interestingly, compared to previous ACT studies on patients with generalised anxiety disorder (Cohen's d = 0.34 by Avdagic et al., 2014) and participants with personality disorder (Cohen's d = 0.56 by Chakhssi et al., 2015), the effect size on the overall quality of life in this study post-treatment is large (eta squared = 0.44). However, this study could not be directly compared to the two previous studies since they used different types of effect size. The types of samples used may be the cause of the variations in effect sizes. In the current study, emerging adults without mental health diagnosis aged 18 to 29 and who have depressive symptoms, underwent an intervention. Avdagic et al. (2014) studied people with generalised anxiety disorder who were between the ages of 19 and 69, while Chakhssi et al. (2015) examined people with personality disorders who were 32.88 years old on average. The effect sizes might have been influenced by the variations in types of samples and intervention durations (Bakker et al., 2019). Thus, in order to compare various empirical studies, effect sizes need to be carefully interpreted.

Hypothesis 3 & 4

The results of the study showed that there is a significant difference between ACT and control group at post-test, with ACT participants exhibiting a greater reduction in depressive symptoms. These results were consistent with other research showing that ACT was superior to the control group in reducing symptoms of depression in young adults or college students (Dereix-Calonge et al., 2019; Grégoire et al., 2018; Ito & Muto, 2020; Ruiz et al., 2020; Zemestani & Mozaffari, 2020). The current study is also in agreement with a meta-analysis done by Zhenggang et al (2020) where depression symptoms reduce significantly compared to the control group especially in adult group and mild depression. The control group in Dereix-Calonge et al (2019); Ito and Muto (2020) show an increase in depressive symptoms post-test, suggesting deterioration of symptoms. Although the control group in the current study show a slight decrease in depression, this reduction is not statistically significant. Additionally, compared to ACT, the control group's symptoms got worse throughout the three-month follow-up.

The use of techniques to enhance psychological flexibility, such as acceptance, defusion skills, and mindfulness practice, is one of the explanations for the strong ACT influence on depression. Talaeizadeh (2020) agreed that by using this techniques plus with defining one's personal values, depression symptoms may be reduced. As emerging adults go through a critical transitional phase where identity explorations take place, values is one of the ACT components that might be useful (Arnett, 2000). Via defusion, disturbing thoughts remain as thoughts without having any control over our behaviour (Harris, 2019). In their study, Lappalainen et al (2007) used trainee therapists as the sample study and found that even though the trainees felt less competent about ACT, there was a significant reduction in depression in ACT. This result was supported by Zettle et al (2011), who found that depression

in ACT improved significantly compared to cognitive behaviour therapy. Zettle et al (2011) added that at follow-up, cognitive defusion—one of the strategies taught in ACT—acted as a mediator of this effect. When it comes to alleviating symptoms of depression, ACT and CBT work about equally well, despite the differences in the underlying change process (Zettle & Rains, 1989). According to Kwan et al (2010), patient attributes like age or preferences may have an impact on how well a therapeutic intervention works. Therefore, having options to choose the best treatment plan may be advantageous for both patients and therapists. In addition to the current study, which focuses on the symptoms of depression, A-Tjak et al. (2018) suggested using ACT to prevent depression or stop its relapse.

Hypothesis 5 & 6

Regardless of the symptoms, the main goal of ACT is to improve psychological flexibility. As a result, quality of life was measured in addition to depression in this study. Since ACT's primary goal is to promote valued living rather than alleviating symptoms, it is unfair to measure depressive symptoms solely in terms of their severity without also taking quality of life into consideration (Harris, 2019; Hayes et al., 2004; Lewin, 2023).

Based on the current study, there was no significant difference between the two groups' overall quality of life after the intervention and during follow-up. This could be the result of the significant baseline difference between the groups' quality of life. A more possible reason is that total quality of life is complex and requires detailed evaluation. Hence, attempting to change it in ten sessions therapy would be challenging. Nevertheless, ACT participants show a higher improvement in quality of life compared to control group; 33.27 percent improvement in ACT and only 3.34 percent for control group.

Previous research findings suggest that decrease in depressive symptoms was associated with an improvement in quality of life, suggesting an inverse relationship between the two. That being said, Kolovos et al. (2016) argued that as depression and quality of life are two different constructs, reduction in depressive symptoms may not always imply a higher quality of life or vice versa. As per this study, the ACT group's quality of life has improved more than that of the control group, although non-significant. Meanwhile, ACT shows a significant improvement in depressive symptoms. This finding is consistent with studies by Haller et al (2021); A-Tjak et al (2021), which found that lower depression may be associated with a higher quality of life. However, this results need to be carefully examined since there is no significant difference between quality of life scores between the two groups both at post-test and follow-up.

Despite the fact that the scores between the two groups were not statistically significant, the participants in control group experienced reduced quality of life at follow-up, with the mean score for overall quality of life declining by 9.93% from post-test to follow-up. On the other hand, although not statistically significant, quality of life in ACT maintain at follow-up. Comparing ACT to the control group, the former appears to be more effective in sustaining or enhancing quality of life (Avdagic et al., 2014, A-Tjak et al., 2021; Juarascio et al., 2021). Despite the lack of statistical significance, it is important to note the broader picture, which shows a considerable improvement in ACT when compared to the control group.

Significance of the Study

The study would be beneficial to emerging adults, which constitute most of the young adults and undergraduate students population with vulnerability to depression (Boyne & Hamza, 2022). The current empirical findings would provide emerging adults with ideal intervention that is more suitable for their age. Besides that, this study demonstrates that ACT may be an alternative to traditional counselling or other psychotherapy when psychiatric care is not available or affordable among emerging adults with mild-to-moderate depression (Reangsing et al., 2022).

Limitations and Future Research

While there are many advantages to this study, there are also some limitations that should be taken into account when interpreting the findings. Malaysia is a diverse country with unique cultural identities and belief systems held by each ethnic group and culture. As such, generalising the study findings to all emerging adult within the Malaysian subgroup is not feasible. Studies conducted in rural settings, where depression is more common and a more vulnerable subpopulation, may offer a comprehensive understanding of the treatment impacts on Malaysian emerging adults (Institute for Public Health, 2020). Aside from that, because the main emphasis of this study is emerging adults, we could not generalize the findings to other age groups. Hence, it is suggested that future research to include emerging adults from different parts of Malaysia as well as from other states or nations in order to increase the validity of the findings. This is because emerging adulthood is not a general stage but rather is unique to some cultures particularly those that take more time to move into adult responsibilities and duties.

Conclusion

In summary, ACT outperforms the control group in depression at post-test and follow-up. With respect to quality of life, ACT shows larger improvement compared to the control group, though non-significant. This shows that ACT is superior compared to the control group in terms of improving depression and quality of life among emerging adults in Malaysia. However, future research should concentrate on various regions or nations with distinct cultures and beliefs, especially with those with higher prevalence in depression such as in rural settings.

Ethics Approval

Ethics clearance was obtained from The Ethics Committee for Research Involving Human Subjects, Universiti Putra Malaysia (JKEUPM). The ethical standards of JKEUPM, which are based on the principles stated in the Declaration of Helsinki (Ashcroft, 2008), were followed in every step of this study. The reference number for the ethical clearance is JKEUPM-2020-010.

Human and Animal Rights

Every component of this study was carried out in compliance with JKEUPM's ethical guidelines, which are based on the Declaration of Helsinki (Ashcroft, 2008).

Consent for Publication

All subjects have given their informed consent.

Availability of Data and Material

The data supporting the study's findings are available within the article.

Declaration of Conflicts of Interest

There are no conflicts of interest among the authors.

Appendix

Summary of Acceptance and Commitment Therapy

Session	Session Content & Activities
1	• Introduction to ACT. • Recognizing presenting problems. • Acquiring important past history. • Determine behavioral goals and their connection to values. • Psychoeducation on depression symptoms. • Introduction to Choice Point. • Developing action plan (e.g., Filling up Choice Point). • Providing a summary. • Eliciting feedback.
2	• Review of action plan. • Establishing agenda. • Discussion of issues on the agenda. • Main interventions: - Creative hopelessness: Person in a hole metaphor. - Values clarification: Ten years from now, looking back. • Developing action plan. • Providing a summary. • Eliciting feedback.
3	• Review of action plan. • Establishing agenda. • Discussion of issues on the agenda. • Main interventions: - Drop the struggle: Pushing away paper metaphor. - Introduction on Contacting the present moment: The emotional storm metaphor. - The dropping anchor exercise. • Developing action plan (e.g., Practise dropping anchor). • Providing a summary. • Eliciting feedback.
4	• Review of action plan. • Brief mindfulness exercise: - The dropping anchor exercise. • Establishing agenda. • Discussion of issues on the agenda. • Main interventions: - Introduction on cognitive fusion.

- Recognizing participant's experiential avoidance/ escape behaviour.
- Establishing connection between fusion and experiential avoidance.

- Developing action plan.
- Providing a summary.
- Eliciting feedback.

5
- Review of action plan.
- Brief mindfulness exercise:
  - The dropping anchor exercise.
- Establishing agenda.
- Discussion of issues on the agenda.
- Main interventions:
  - Introduction on Defusion: Bad chair metaphor.
  - Deeper into Defusion: Hands as thoughts and feelings.
- Developing action plan (e.g., Practise defusion technique).
- Providing a summary.
- Eliciting feedback.

6
- Review of action plan.
- Brief mindfulness exercise:
  - The dropping anchor exercise.
- Establishing agenda.
- Discussion of issues on the agenda.
- Main interventions:
  - Verify whether participant has understand and accept the unworkability of his/her escape behaviours.
  - Introduction on Acceptance: Physicalize the painful feelings.
  - Introduction on Self-as-context: The stage show metaphor and There go your thoughts… .
- Developing action plan (e.g., Practise mindfulness exercise).
- Providing a summary.
- Eliciting feedback.

7
- Review of action plan.
- Brief mindfulness exercise:
  - The dropping anchor exercise.
- Establishing agenda.
- Discussion of issues on the agenda.
- Main interventions:
  - Combining the 4 core processes (Defusion, Acceptance, Contacting the present moment, and Self-as-context) into 1 exercise: The leaves on a stream exercise.
  - Explain the rationale of this mindfulness exercise in daily life.
- Developing action plan (e.g., Practise mindfulness exercise).
- Providing a summary.
- Eliciting feedback.

8	• Review of action plan. • Brief mindfulness exercise: - The leaves on a stream exercise. • Establishing agenda. • Discussion of issues on the agenda. • Main interventions: - Goal setting, action planning, and problem solving. - Developing other SMART behavioural goals. - Setting up Flexible exposure. • Developing action plan (e.g., Practise Flexible exposure by incorporating mindful, values-guided exposure). • Providing a summary. • Eliciting feedback.
9	• Review of action plan. • Brief mindfulness exercise: - The leaves on a stream exercise. • Establishing agenda. • Discussion of issues on the agenda. • Main interventions: - Using Choice point to: a) Validate payoffs and highlight the costs of participant's unworkable behaviour. b) Highlight payoffs and validate costs of participant's workable behaviour. - Preparing for termination. • Developing action plan. • Providing a summary. • Eliciting feedback.
10	• Review of action plan. • Brief mindfulness exercise: - The leaves on a stream exercise. • Establishing agenda. • Discussion of issues on the agenda. • Process reactions to termination. • Summarize self-therapy notes. • Providing a summary. • Reminding of 3-months follow-up. • Eliciting feedback.

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