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An internet-based cognitive behavioural intervention for adults with depression in Arabic-speaking countries: A randomized controlled trial

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Abstract

Internet-based interventions have proven to be effective for the treatment of depression in different samples, but evidence from the Middle East and North Africa (MENA) region is scarce. The aim of this study was to investigate the acceptance and efficacy of an internet-based cognitive behavioural writing intervention for Arabic-speaking participants with depression living in the MENA region. A total of 259 participants (167 female, age in years: $M = 25.58$, $SD = 6.39$) with depressive symptoms indicative of clinical relevance were randomly allocated to a treatment group (TG; $n_{TG} = 128$) or a waitlist control group (WG; $n_{WG} = 131$). The TG received an internet-based intervention over a 6-week period. The primary outcome was depressive symptoms, and secondary outcomes were anxiety and quality of life (QoL). T-tests with change scores from pre- to post-treatment were used for data analyses. Intention-to-treat (ITT) as well as completer analyses were calculated. The ITT analysis revealed significant differences between the TG and WG in depression ($T_{257} = -4.89$, $p < 0.001$, $d = 0.70$) and QoL ($T_{257} = 3.39$, $p < 0.001$, $d = 0.47$). Significant differences regarding anxiety symptoms ($T_{257} = 3.25$, $p < 0.05$, $d = 0.53$) were identified for the completer sample. The general dropout rate was 39.9%. The results indicate the feasibility and efficacy of an internet-based cognitive behavioural writing intervention in adults from Arabic-speaking countries. The development and implementation of such interventions can be used to improve access to psychological help and adequate treatment.

KEYWORDS
anxiety, Arabic-speaking, depression, e-mental health, iCBT, MENA region, quality of life

1 | INTRODUCTION

The prevalence of depressive disorders in Arabic-speaking countries (including: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen—all countries mentioned belong to the MENA region, with the exception of the Comoros) increased from 1990 to 2019 (Moradinazar et al., 2022) and current prevalence rates for most Arabic-speaking countries were found to be higher than the global average (Moradinazar et al., 2022). This high prevalence also applies to other disorders in Arabic-speaking countries, which often occur as comorbid disorders, such as anxiety disorders (Effatpanah et al., 2024; Ohaeri & Awadalla, 2012). In recent years, many Arabic-speaking countries have been exposed to political and social changes (e.g., Egypt, Tunisia, Algeria), conflict and war (e.g., Sudan, Syria, Yemen, Iraq). Studies have shown that conflict and war have an impact on the mental health of both civilian and combatant populations (Al-ghazawi et al., 2014; Stein et al., 2021). Indeed, a recent meta-analysis revealed high prevalence rates of mental disorders in conflict-affected countries like Syria, Iraq, or Yemen, with an average prevalence of 10.8% for depression and 21.7% for anxiety (Charlson et al., 2019). Furthermore, sexual and physical abuse (e.g., violence in couple relationships, bullying, childhood abuse) is also associated with higher prevalence rates of depressive disorders (e.g., in Egypt, Morocco; Moradinazar et al., 2022). Despite this, few people receive treatment: A study across 21 countries showed that only 16.5% of people diagnosed with depression received treatment; the treatment rate in countries from the Middle East and North Africa (MENA) region was even lower, at only 7% in Lebanon and 2% in Iraq (Thornicroft et al., 2017).

There are several barriers to treatment in Arabic-speaking populations, some of which are similar to those found in samples from Europe, Australia or the United States (e.g., fear of stigmatisation, shame, lack of time, treatment expectations; Elyamani et al., 2021; Ibrahim et al., 2020, 2022). Other treatment barriers, however, are specific to the MENA region. The medical and mental health care system in this region is often expensive and individuals do not have the financial means to receive treatment (Dent et al., 2017; Ibrahim et al., 2020; Karam et al., 2019; Mahmoud & Saravanan, 2020). Moreover, a lack of mental health and psychosocial support provision also limits the ability to access care. In 2019, for example, Egypt, Iraq, Morocco, Sudan, and Syria had fewer than two psychiatrists and one psychologist per 100,000 population (World Health Organization, 2019). A further barrier lies in the lack of transportation to health care services, especially in rural areas (Kronfol, 2012). Personal attitudes also hinder treatment uptake, with individuals often assuming that they can 'solve the problem' themselves, that it will disappear by itself, or that the treatment will not work (Ibrahim et al., 2020; Mahmoud & Saravanan, 2020). Especially in conflict-affected countries, the potential of internet-based interventions (IBIs) to provide access to psychological treatment is clear. Internet use is on the rise, with an estimated 79.7% of individuals (approximately 214 million) using the internet in the Middle East (Internet World Stats, 2022). Researchers have also reported a generally high acceptance of IBIs among Arabic-speaking adults living in Jordan, Iraq, Egypt, Lebanon, Saudi-Arabia, Australia (Kayrouz, Dear, Karin, et al., 2018; Kayrouz, Dear, Kayrouz, et al., 2018). IBIs vary widely, with differences to be found regarding the presentation of information (text, video, audio files), communication (synchronous vs. asynchronous, written or oral) and therapist guidance (unguided vs. therapist-guided, Baumeister et al., 2017).

The efficacy of IBIs in reducing the symptoms of mental disorders, especially depressive symptoms, has already been described in reviews and meta-analyses (Etzelmueller et al., 2020; Karyotaki et al., 2021). However, few studies have assessed their efficacy in Arabic-speaking samples, and most of these analysed Arabic-speaking individuals living in Europe, United States of America, or Australia (Kayrouz, Dear, Kayrouz, et al., 2018; Lindegaard et al., 2021). In a pilot study, Kayrouz et al. (2016) reported that internet-based cognitive behavioural therapy (iCBT) seemed to be effective in Arabic-speaking samples from different countries in reducing depressive but also anxiety symptoms, although the study did not include a control group. Nevertheless, their findings suggest a high acceptability of IBIs in Arabic-speaking populations (91%; Kayrouz et al., 2016). In a study with Arabic-speaking individuals in Sweden, significant between-group effects were also found in the decrease of depressive symptoms, but not for anxiety or quality of life (QoL; Lindegaard et al., 2021).

The increasing importance of the internet in the MENA region is reflected not only in the growing number of users, but also in its role in political events, for example, the Internet offered citizens a way to express their protest against governments during the events of the Arab Spring in 2010, Hofheinz (2013). It can be expected that internet-based communication will grow further in the future (Internet World Stats, 2022). Therefore, the MENA region is a particularly relevant geographic area to evaluate the efficacy of an IBI for mental health problems such as depression.

As described above, depression is one of the most common mental disorders in the MENA region, and the provision of appropriate treatment is crucial to improve the mental health of those affected. The present study therefore investigated the efficacy of an internet-based CBT approach for depressive symptoms in an Arabic-speaking sample living in the MENA region. We further analysed the impact of the treatment on comorbid symptoms of anxiety as these are as prevalent as depressive symptoms in the MENA region (Effatpanah et al., 2024) and internet-based treatments for depression have been shown to reduce comorbid anxiety symptoms (Kayrouz et al., 2016). In addition, we also analysed the impact on QoL at post-treatment as the severity of depressive symptoms is linked to QoL impairment (Rapaport et al., 2005) and CBT has been shown to improve QoL in patients with depression (Hofmann et al., 2017; Shih et al., 2023). To these aims, a written counsellor-guided internet-based cognitive behavioural intervention was administered to Arabic-speaking individuals suffering from depression in the MENA region. To the best of our knowledge, this is the

first randomized controlled trial to assess an internet-based CBT approach in participants in Arabic-speaking countries.

2 | METHOD

The study was part of a project on the internet-based treatment of depression and posttraumatic-stress disorder (PTSD) in individuals living in Arabic-speaking countries in the MENA region that is offered by a psychosocial centre based in Germany. The Ethics Committee of the University of Leipzig approved the study (236-11-22082011).

2.1 | Participants

Participants were recruited from May 2013 to July 2014 through social media and the project website. They were asked to register on the study website and to provide informed consent online, after which they received login data for the password-protected portal. Eligibility was assessed in a two-step diagnostic process: first, through online self-report screening questionnaires which included demographic variables, and second, through outcome measures and telephone- or voice-over-IP-administered clinical interviews (Kessler et al., 2004) conducted by trained interviewers.

To be included in the study, participants had to speak Arabic, have a minimum age of 18 years, and suffer from a depressive disorder according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association [APA], 1994), which was assessed using the Composite International Diagnostic Interview (CIDI; Kessler et al., 2004). Exclusion criteria, which were also assessed using the CIDI (Kessler et al., 2004), were as follows: risk of suicide, psychotic symptoms, substance abuse, simultaneous psychotherapeutic treatment, and no stable dose of psychopharmacological medication 3 months prior to inclusion in the study. In addition, participants who scored above the cut-off of 45 on the Beck Depression Inventory II (Ghareeb, 2000) were excluded. This cut-off was set internally based on our initial experiences in the project where non-completion of weekly writing assignments and homework was explained by severe symptoms of depression. The cut-off proved to be feasible in a piloting phase.

Participants were assigned to depression or PTSD treatment based on the clinical interview. In the present study, only depression treatment is analysed (for PTSD treatment, see Böttche et al., 2021). Participants in this study were not part of the PTSD intervention at any time, as this intervention has different goals (e.g., reducing re-experiencing symptoms) and thus involves different techniques.

Participants who were eligible for the depression intervention were randomly assigned to the written iCBT for depression (treatment group, TG) or to a waitlist control group (WG). Participants in the WG received the same treatment after 6 weeks of waiting. Figure 1 shows the participant flow of the programme (for depression and PTSD).

Of the total of 259 participants with depression, 167 were female (64.5%) and the average age was $M = 25.78$ ($SD = 6.39$) years. The majority of participants were highly educated (university degree = 57.1%) and single (68.7%). The sample consisted primarily of individuals originating from Egypt (38.2%), Saudi Arabia (17.3%), Morocco (10.4%), Algeria (8.5%), Syria (5.4%), and Palestine (4.6%). Only 18.91% reported not residing in their country of origin. At the time of the treatment, the most frequently reported current countries of residence were Egypt (35.1%), Saudi Arabia (13.1%), Morocco (9.7%), Algeria (8.5%), and Jordan (3.9%). On average, the subjects had experienced $M = 2.73$ ($SD = 2.74$) different traumatic events. For a detailed overview, please see Table 1.

2.2 | Measures

In addition to sociodemographic variables (i.e., gender, age, marital status, education) and the number of traumatic life events experienced, participants completed several self-report questionnaires. These were completed online at baseline (pre-treatment) and post-treatment (i.e., directly after the last session) for the TG and 6 weeks after baseline for the WG. All measures were already available in Arabic or were translated using the forward-backward method (Guillemin et al., 1993).

2.2.1 | Depression

The Beck Depression Inventory-II (BDI-II; Beck et al., 1996) is a 21-item self-report instrument to assess the severity of depression on a 4-point rating scale (0—absent to 3—most severe), coinciding with the DSM-IV criteria for depression (APA, 1994). The Arabic version was used in the present study (Ghareeb, 2000). A total score up to 13 indicates no or minimal depression, values between 14 and 19 can be interpreted as indicating mild depression, values from 20 to 28 as moderate depression, and values from 29 to 63 as severe depression (Beck et al., 1996). Studies have shown good to very good reliability of the BDI-II ($\alpha = 0.78$–0.93, Kühner et al., 2007; Selmo et al., 2019). In the present sample, the internal consistency was acceptable, with $\alpha = 0.73$.

2.2.2 | Anxiety

The Hopkins Symptom Checklist-25 (HSCL-25; Mollica et al., 1987) is a 25-item self-report instrument that assesses anxiety and depressive symptoms on a 4-point Likert scale ranging from 1 (not at all) to 4 (extremely). The subscale for anxiety symptoms was used in the present study. A cut-off value of 1.75 indicates caseness (Winokur et al., 1984). The Arabic version of the questionnaire has shown appropriate psychometric properties (Selmo et al., 2019). The internal consistency of the anxiety subscale in the present sample was $\alpha = 0.86$.
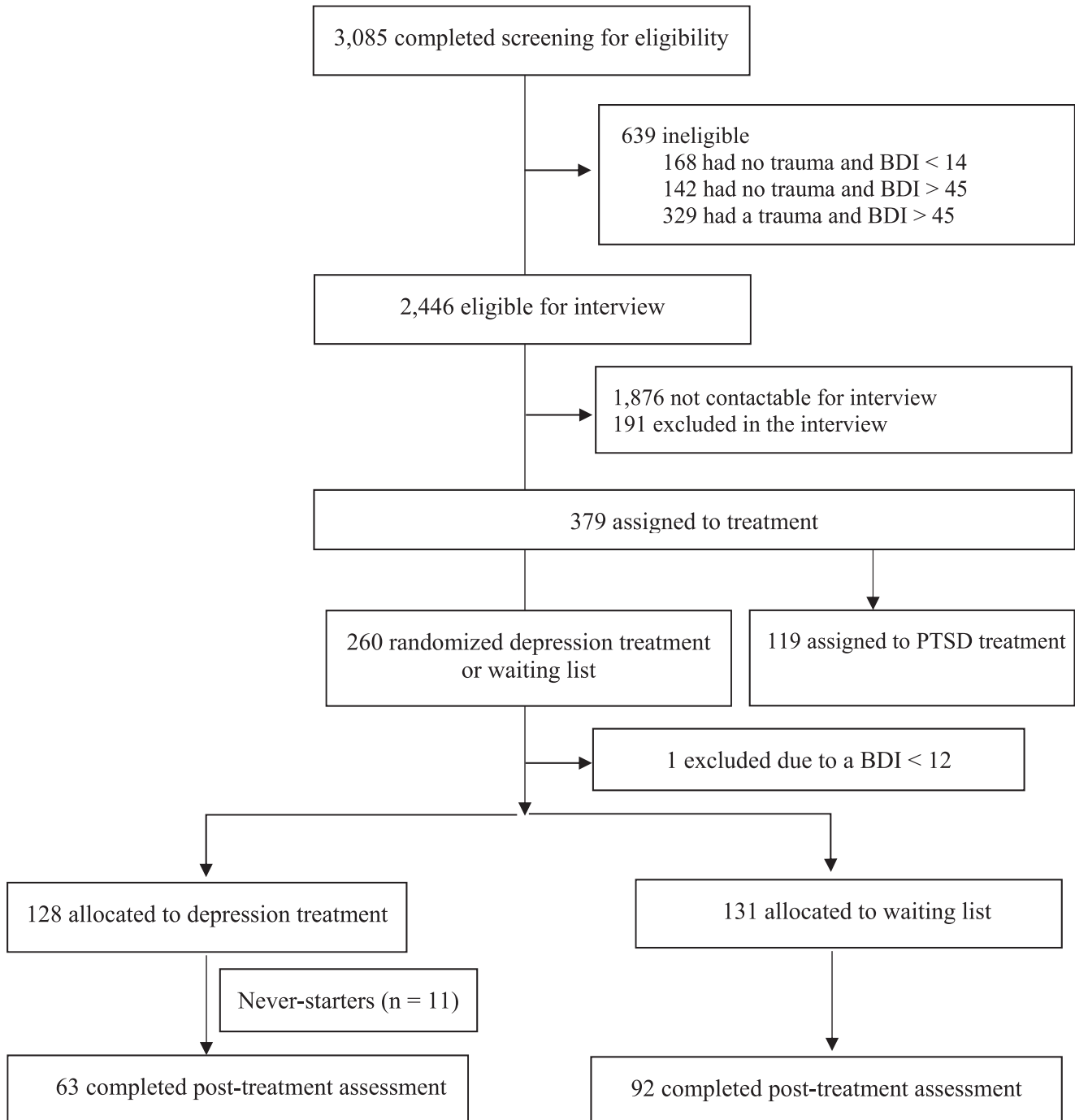
FIGURE 1 Participant flow for intervention for depression. Due to the joint screening for the treatment of PTSD and depression, the inclusion and exclusion criteria for PTSD are also considered here. PTSD, posttraumatic-stress disorder.

2.2.3 | Quality of life

Quality of life (psychological, physical, social, and environmental) was assessed using the European Health Interview Survey 8-Item Index (EUROHIS-QoL-8; Schmidt et al., 2005). Items were rated on five-point Likert scales ranging from 1 to 5 (different response formats), with higher scores indicating a better QoL. International studies have reported acceptable to good cross-cultural performance and a satisfactory discriminant validity of the scale (Da Rocha et al., 2012;

Schmidt et al., 2006). In the present study, internal consistency was $\alpha = 0.73$.

2.3 | Intervention

The intervention (iCBT-depr) was based on the cognitive-behavioural internet-based approach Interapy for depression (Lange et al., 2005), which was translated into modern standard Arabic and culturally-

TABLE 1 Demographic characteristics of the treatment and waitlist control group at pre-treatment ($N = 259$).

Demographic characteristics	TG ($n = 128$)	WG ($n = 131$)	t (257)	χ^2(df)	p
Age; M (SD)	25.54 (6.56)	26.02 (6.24)	0.608		0.54
Age; range	18–55	18–51			
Gender, n (%)				0.015 (1)	0.90
Female	83 (64.8)	84 (64.1)			
Educational level, n (%)				0.733 (3)	0.87
Completed secondary school	4 (3.1)	5 (3.8)			
High school	15 (11.7)	13 (9.9)			
Student	34 (26.6)	40 (30.5)			
University degree	75 (58.6)	73 (55.7)			
Marital status, n (%)				3.9 (2)	0.14
Single	93 (72.7)	85 (64.9)			
Married	27 (21.1)	41 (31.1)			
Divorced	8 (6.3)	5 (3.8)			
Traumatic events, M (SD)	2.84 (3.03)	2.63 (2.42)	0.604		0.52

Note: $p < 0.05$, significant.

Abbreviations: df, degrees of freedom; M, mean; SD, standard deviation; t, t-test; TG, treatment group; WG, waitlist control group; χ^2, Chi-square test.

shaped. Primarily, it involved surface adaptions, such as metaphors, idioms, and specific instances of positive activities and behavioural experiments. These adaptations were carefully reviewed with Arabic-speaking team members. The intervention was counsellor-guided and consisted of five phases. The aim of the *first phase* was to identify situations in which depressive symptoms had been experienced in the past, and whether these could be defined as preceding causes or triggering events. The *second phase* focused on (re-)establishing positive activities in the individual's daily life. The *third phase* addressed negative and dysfunctional thoughts, with the goal of replacing them with new, more functional and helpful thoughts. While the first three phases primarily focused on behavioural and cognitive components, the *fourth phase* shifted the focus to social behaviour. Through homework and behavioural experiments, participants learnt to set boundaries, express positive feelings, or make new social contacts. The *final phase* served to prevent relapses.

Participants received two structured writing assignments per week with psychoeducational information and instructions regarding their tasks from the counsellor (e.g., writing down past situations in which depressive symptoms were experienced). Participants were asked to spend 45 min on each task. After completing each assignment, participants received individual written supportive and validating feedback from their counsellor within 48 h, which was tailored to each participant's needs. Contact by telephone was limited to technical problems or emergency situations (e.g., suicidal ideation). In total, the treatment lasted for approx. Five weeks (10 writing sessions, twice a week for 45 min each).

The counsellors were native Arabic speakers based in Germany and Egypt who either held a Bachelor's degree in psychology/psychology-related disciplines or had several years of professional

experience in psychosocial mental health support. They received multiple and continuous training sessions on specific aspects of IBIs and on the handling of the treatment manual. In addition, monthly supervision sessions were conducted. The supervisors were experienced and trained cognitive behavioural therapists with many years of experience in internet-based treatment.

2.4 | Statistical analysis

After inspecting for outliers and summarising the descriptive statistical sample characteristics, pre-TG differences regarding demographic characteristics and the number of traumatic events experienced were investigated using Chi-square (χ^2) and t-tests. Due to the relatively high dropout rate (39.9%), a dropout analysis was performed to examine whether completers and non-completers differed in demographic and clinical characteristics using χ^2 and t-tests. The efficacy hypotheses were investigated using t-tests. Therefore, change scores from pre- to post-treatment were examined for all outcome variables (depression, anxiety, and QoL). For t-tests, the dependent variables are required to be normally distributed (Eid et al., 2017) and must show homoscedasticity; however, this was not the case for depression, anxiety and QoL change scores (for details, see Supporting Information S1: Supplement A). Nevertheless, as the t-test is robust to such a violation of assumptions in the case of large sample sizes, the results may still be interpreted (Eid et al., 2017). Due to the violation of homogeneity of variance, a Welch correction was performed. To keep the validity as high as possible, the analyses were based on the intention-to-treat (ITT) approach (Gupta, 2011). Hence, multiple imputation was performed

to account for missing data at post-treatment. The analysis of missing values illustrated that for the measures of the dependent variables (i.e., BDI-II, HSCL-25 anxiety subscale, EUROHIS-QoL-8), 35.4%–38.1% of the items were not answered. Bodner (2008) as well as White et al. (2011) recommend that the number of imputations should at least correspond to the percentage of missing values of the items; hence, 50 imputed datasets with 25 iterations were generated. In accordance with the recommendations of Jakobsen et al. (2017), a completer analysis was also conducted. Cohen's d was used as a measure of effect size ($d = 0.2$ small, $d = 0.5$ medium, $d = 0.8$ large effect; Cohen, 1992). To examine whether there was a statistically relevant change, the reliable change index was computed according to Jacobson and Truax (1991) using completer data. A χ^2 test was used to determine whether the number of individuals showing a reliable change was greater in the TG than in the WG. All calculations were performed using IBM SPSS Statistics (version 25 for Windows).

3 | RESULTS

3.1 | Outlier analysis

To examine outliers and extreme values, a visual inspection of the data was carried out using box plots. No data were excluded.

3.2 | Descriptive statistical sample characteristics

The data of the total sample indicated severe symptoms of depression ($M = 30.81$, $SD = 7.72$; TG: $M = 31.16$, $SD = 8.06$; WG: $M = 30.47$, $SD = 7.39$). On average, the anxiety symptoms were not clinically relevant ($M = 1.55$, $SD = 0.71$; TG: $M = 1.49$, $SD = 0.72$; WG: $M = 1.61$, $SD = 0.70$). The average QoL was rather low ($M = 11.34$, $SD = 5.12$; TG: $M = 11.41$, $SD = 5.01$; WG: $M = 11.26$, $SD = 5.25$). Table 1 illustrates demographic variables and the average number of

traumatic events experienced in both groups. Since no systematic differences between the groups (TG and WG) were found at pre-treatment, these covariates were not included in the efficacy analyses.

3.3 | Analysis of dropouts

Sixty-three (49.22%) of 128 participants in the TG and 92 (70.23%) of 131 participants in the WG completed the post-treatment assessment. Individual reasons for dropout were difficult to discern because participants did not respond to emails and unfortunately, due to the technical version of the portal at the time, there is no information about the exact time at which participants dropped out of the intervention. Group differences between completers and non-completers were analysed. With respect to almost all demographic characteristics, completers and non-completers did not differ (gender: $\chi^2(1) = 0.003$; $p = 0.96$; educational level: $\chi^2(3) = 7.84$; $p = 0.05$; marital status: $\chi^2(2) = 0.91$; $p = 0.63$; country of origin: $\chi^2(18) = 15.32$; $p = 0.64$). The groups were found to differ in terms of age ($t(257) = 2.05$; $p = 0.04$), although upon further inspection of the mean values and standard deviations, it became clear that this difference was only minimal (completer: $M = 26.42$ years, $SD = 6.32$; non-completer: $M = 24.74$ years, $SD = 6.41$). The two groups did not differ regarding the number of traumatic experiences ($t(257) = -0.47$; $p = 0.64$). At pre-treatment, there were no differences in depressive symptoms ($t(257) = 0.20$; $p = 0.84$), anxiety ($t(257) = -0.12$; $p = 0.91$), or QoL ($t(257) = 0.90$; $p = 0.37$).

3.4 | Primary analysis: Intention-to-treat sample

Table 2 presents means and standard deviations of change scores for all outcome variables in the ITT sample. In addition, t-test results are illustrated. Significant differences were found between the TG and

TABLE 2 Results of t-test for the treatment and waitlist control group with change scores: Intention-to-treat and completer analysis.

Outcome variables	Intention-to-treat, M (SD)		t	p	d
	TG ($n = 128$)	WG ($n = 131$)			
Depression, BDI-II	11.87 (14.79)	3.04 (10.01)	−4.89	<0.001**	0.70
Anxiety, HSCL-25	2.00 (7.72)	3.70 (5.82)	−1.85	0.064	0.25
Quality of life, EUROHIS-QoL	−3.56 (6.82)	−0.79 (4.85)	3.39	<0.001**	0.47
	Completer, M (SD)		t_{153}	p	d
	TG ($n = 63$)	WG ($n = 92$)			
Depression, BDI-II	15.84 (14.32)	2.02 (8.56)	−6.86	<0.001**	1.23
Anxiety, HSCL-25	0.50 (0.73)	0.15 (0.53)	−3.25	0.002*	0.53
Quality of life, EUROHIS-QoL	−5.52 (6.96)	−0.18 (4.07)	5.44	<0.001**	0.98

Abbreviations: BDI-II, Beck Depression Inventory-II; d, Cohen's d; EUROHIS-QoL, EUROHIS-quality of life 8-item index; HSCL-25, Hopkins Symptom Checklist 25; M, mean; SD, standard deviation; t, t-test; TG, treatment group; WG, waitlist control group.
*$p < 0.05$, **$p < 0.001$.

WG regarding depression and QoL change scores, with medium to large effect sizes for depressive symptoms ($d = 0.70$), medium effect sizes for QoL ($d = 0.47$), and a small effect for anxiety ($d = 0.29$). There were no significant differences regarding anxiety.

3.5 | Secondary analysis: Completer sample

In total, the data of $N = 155$ participants can be considered as the completer sample. In the TG $n = 63$ (i.e., those who completed the treatment) and in the WG $n = 92$ (i.e., those who completed the 6-week waiting period) completed the questionnaires at both measurement time points. Table 2 presents means and standard deviations of change scores for all outcome variables for the subgroup of participants who completed the treatment. The table further illustrates significant differences between the TG and the WG in the change scores for depression, anxiety, and QoL. As shown, also in the completer sample, depression and anxiety symptoms decreased significantly and QoL increased in the TG. Effect sizes were very large for depressive symptoms ($d = 1.23$), large for QoL ($d = 0.98$), and medium for anxiety ($d = 0.53$).

3.6 | Reliable change index

The reliable change frequencies for depression and anxiety at post-treatment are presented in Table 3. The number of participants with a reliable change was significantly higher in the TG than in the WG.

4 | DISCUSSION

The aim of this study was to investigate the efficacy of an iCBT approach for depressive symptoms in an Arabic-speaking sample living in the MENA region. The results revealed significant differences in depressive symptoms between the TG and the WG, with medium to large effect sizes. Meaningful differences in QoL, with medium effect sizes, were also observed. Moreover, completer analyses indicated significant differences regarding anxiety symptoms. In

TABLE 3 Percentage of participants showing reliable change at post-treatment.

Outcome variables	Group, n (%) TG, n = 63	WG, n = 92	χ^2(df)	p
Depression, BDI-II	43 (68.3)	15 (16.3)	43.1 (1)	<0.001**
Anxiety, HSCL-25	22 (34.9)	17 (18.5)	5.37 (1)	0.021*

Abbreviations: BDI-II, Beck Depression Inventory-II; df, degrees of freedom; HSCL-25, Hopkins Symptom Checklist 25; TG, treatment group; WG, waitlist control group; χ^2, Chi-square test.
*$p < 0.05$, **$p < 0.001$.

addition, over two thirds of the completer participants in the TG had experienced a significant reliable change.

Regarding the primary outcome, the finding of a reduction in depressive symptoms corresponds to previous research in Western samples, demonstrating the efficacy of iCBT interventions in treating symptoms of depression (Etzelmueller et al., 2020; Karyotaki et al., 2021). Some studies have also demonstrated the efficacy of iCBT interventions in treating depression in Arabic-speaking adults in Sweden (Lindegaard et al., 2021) and other countries (Kayrouz, Dear, Kayrouz, et al., 2018; Kayrouz et al., 2016) and showed large effect sizes for the change in depressive symptoms after treatment (Lindegaard et al., 2021: $d = 0.85$; Kayrouz, Dear, Kayrouz, et al., 2018: $d = 1.26$). A significant reliable change in depressive symptoms was also found in a study with Arabic-speaking refugees (Lindegaard et al., 2021). The successful reduction of depressive symptoms in this study is of great importance, as depression is one of the most prevalent mental health problems in Arabic-speaking countries (Moradinazar et al., 2022).

This IBI for Arabic-speaking individuals demonstrated a significant decrease in anxiety symptoms with a moderate effect size. Within the TG, 34.9% of participants experienced a significant reliable change in anxiety symptoms. This positive result mirrors the findings of a meta-analysis highlighting the efficacy of internet-based treatment for depression in comorbid anxiety symptoms (Königsbauer et al., 2017). Additionally, a study with Arabic-speaking refugees in Sweden found a significant reduction in anxiety symptoms following an IBI targeting both depression and anxiety (Lindegaard et al., 2021). The finding that this intervention additionally had an impact on anxiety symptoms is highly promising with respect to the comorbidity of anxiety and depression in countries of the MENA region (e.g., in Lebanon: Fares et al., 2021), but also worldwide (meta-analysis: Saha et al., 2021).

In the present study, a significant moderate effect was observed regarding the improvement in QoL. In the literature, the evidence for the impact of internet-based treatment on QoL is less conclusive. For example, one meta-analysis found a moderate effect on QoL for internet-based transdiagnostic/tailored treatment of anxiety and depression (Păsărelu et al., 2017). However, another meta-analysis regarding internet-based treatment of depressive symptoms found only one study with a significant effect on QoL (Königsbauer et al., 2017) and an IBI with Arabic-speaking refugees for depressive and anxiety symptoms showed no significant improvement in QoL, although an effect size of $d = 0.79$ was observed (Lindegaard et al., 2021). However, the association between depressive symptoms and QoL was demonstrated in a large Arabic-speaking sample in Kuwait (Ohaeri & Awadalla, 2012), where individuals with comorbid anxiety and depression reported the lowest QoL. It can therefore be assumed that an improvement in depressive symptoms could also be associated with an improvement in QoL. Further research is needed at this point to clarify these inconclusive effects.

Overall, a relatively high dropout rate (39.9%) was found. While IBIs generally show higher dropout compared to face-to-face contexts (Fernandez et al., 2015), the dropout rate in the present study is

higher than the rates reported for guided internet-based CBT for depression in meta-analyses (average dropout rate between 25% and 38%, Karyotaki et al., 2021; Taylor et al., 2021). In Arabic-speaking samples, dropout rates varied between 2% and 64% in face-to-face and internet-based treatment studies (Kayrouz, Dear, Kayrouz, et al., 2018). A recent study with Arabic-speaking refugees in Sweden showed a comparable dropout rate of 39% (Lindegaard et al., 2021). A first explanation for the dropout rates may be the type of treatment because the iCBT approach was only culturally shaped and maybe required more in-depth adaptation. It is also possible that another treatment approach may lead to a higher level of commitment. Moreover, the dropout rate may have been further influenced by the relatively young age of the sample. We found a significant difference between non-completers and completers with respect to age; participants who dropped out were younger (mostly 18–21 years old). The majority of the sample was young (age: $M = 25.79$, $SD = 6.38$), female (64.23%), and highly educated (57.3% had a university degree, 27.3% were studying). This is unsurprising given that individuals with a higher educational level more frequently consult mental health professionals than those with a lower educational level (Salaheddin & Mason, 2016). Furthermore, regardless of country of origin and psychological disorder, participants who tend to prefer internet-based treatment are often younger and have a higher level of education (Golsteijn et al., 2017; Greaney et al., 2014). In addition, IBIs necessarily require literacy skills and therefore inherently exclude individuals with low levels of education. Wilks et al. (2020) identified technological problems as a key predictor of dropout from internet-delivered interventions, and some participants in the present study reported the handling of the platform as challenging. This may also be related to local conditions in Arabic-speaking countries, where unstable power connections, the take-up of broadband Internet, and the price of broadband service persist as a problem (Gelvanovska et al., 2014).

The preponderance of females in our sample is in line with the majority of IBIs in general (Păsărelu et al., 2017) as well as in an Arabic-speaking sample (Knaevelsrud et al., 2015). Compared to men, women have generally been shown to be more open to psychotherapy and more likely to seek help (Haavik et al., 2019), and this mental health help-seeking behaviour can also be found in Arabic-speaking samples (Heath et al., 2016). Despite this phenomenon, 35% of the participants in the present study were male, suggesting that an IBI may help to reduce the perceived barriers to seeking mental health care in men, due to the (visually) anonymous nature of the intervention.

Several limitations of the present study should be noted. First, the sample is not representative for all Arabic-speaking countries, and consisted mostly of female and young individuals with high levels of education. Although these sample characteristics reflect those of other internet-based and face-to-face studies (Lewis et al., 2019, 2020), future research should endeavour to reach a greater diversity of participants. Additionally, the largest proportion of participants was from Egypt, which cannot be considered representative of the entire MENA region. Moreover, the high dropout rate may have impacted the results. Second, it is relevant to note that the data were collected in 2013 and 2014, and the diagnosis of depression was therefore assigned according to the DSM-IV criteria. However, the DSM-5 (APA, 2013) does not include any major changes in the diagnosis of depression. Third, the design of the study limits the generalisability of the results. The use of a waitlist as the control condition limits the validity and generalisability of the results compared to the use of an active control group. In addition, due to the lack of follow-up measurements, it was not possible to analyse any long-term effects of the intervention. Finally, all outcome measures were only assessed online via self-report, with the exception of the clinical interview, which was conducted to underpin the self-reported depressive symptoms.

Despite these limitations, the findings demonstrate great potential for providing care for people with depression in the MENA region. Visually anonymous and geographically independent treatment can represent a great opportunity and resource, especially in politically unstable countries, and can reduce barriers associated with mental health care access, uptake, and utilization. Therefore, internet-based guided CBT, should be implemented into and scaled up within health care systems, also in hard-to-reach regions and populations.

CONFLICT OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author up on reasonable request.

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