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A Wait-List Controlled Study of a Trauma-Focused Cognitive Behavioral Treatment for Intermittent Explosive Disorder in Timor-Leste

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We tested a trauma-focused, cognitive–behavior therapy treatment (TF-CBT-anger) for intermittent explosive disorder (IED) and related dimensions of anger adapted to the local culture in postconflict Timor-Leste. The intention-to-treat sample ($n = 78$) comprised Timorese nationals (women = 49; men = 29), ages 18 years and older, meeting *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.) criteria for IED, with equal numbers ($n = 39$ each) being randomized to the treatment group (TG) and wait-list (WL). Assessments were made at 1 week prior to therapy, immediately at posttreatment, and at 1 month follow-up. Primary measures included an IED diagnosis made according to the East Timor explosive anger measure and the directionality of expression and control of anger assessed by 4 dimensions of the State–Trait Anger Expression Inventory (STAXI-2). Secondary measures included psychological distress assessed using the Kessler scale and an index of posttraumatic stress disorder (PTSD) assessed using the Harvard Trauma Questionnaire. In the TG, there was a decline in IED from 100% to zero at follow-up. In the WL, more than 70% (of the 100% at baseline) showed persisting IED at second and third assessments. The TG alone showed significant ($p < .05$) improvements on all STAXI-2 scales, the effect sizes for the intervention being uniformly large (>0.80). Psychological distress and PTSD showed substantial reductions in the TG but not the WL group. Although based on a modest-sized sample, our findings provide the first evidence in support of the efficacy of TF-CBT-anger for IED in a culturally diverse, postconflict setting.

Public Policy Relevance Statement
We report the first evidence for a brief trauma-focused psychological therapy that can effectively reduce explosive anger attacks and related emotional problems among survivors in postconflict Timor-Leste. After further testing, the treatment protocol has the potential to be adapted and implemented by lay counselors in similar settings worldwide, the aim being to reduce anger and aggression in postconflict societies across different cultures.

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Civilians exposed to warfare and other forms of violent political upheaval are at risk of manifesting extreme forms of anger in the postconflict period (Campfield & Hills, 2001; Kassinove, Sukhodolsky, Eckhardt, & Tsytsarev, 1997; Rees et al., 2013; Silove et al., 2009; Somasundaram, 2010). As yet, however, no studies have evaluated psychological treatments specifically focused on anger in culturally diverse, low-income countries, the location of most contemporary armed conflicts. We report a wait-list controlled study of a trauma-focused, cognitive–behavioral treatment (TF-CBT-anger) for intermittent explosive disorder (IED) and related dimensions of anger in postconflict Timor-Leste.

There has been growing interest in the study of pathological forms of anger in recent decades. Early studies showed that anger attacks, defined as sudden, intense episodes of anger in response to minor triggers, associated with feelings of loss of control and autonomic arousal (Fava, Anderson, & Rosenbaum, 1990; Fava & Rosenbaum, 1999; Letica-Crepulja, Salcioglu, Franciskovic, & Basoglu, 2011), are common among patients with depressive and anxiety disorders (Başoğlu, Ekblad, Bäärnhielm, & Livanou, 2004; Fava & Rosenbaum, 1999). More recently, the focus of research has turned to the category of intermittent explosive disorder (IED), defined in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*), by episodes of extreme anger associated with repeated acts of aggression (Coccaro, 2012; Coccaro, Posternak, & Zimmerman, 2005; Kessler, Coccaro, & Fava, 2007; Kessler et al., 2006). The revised category of IED has now been incorporated into the disruptive, impulse control and conduct disorders in *DSM–5* (American Psychiatric Association, 2013).

Evidence from a nationally representative study based on *DSM–IV* criteria indicated that 6% of the adult U.S. population experienced lifetime IED, the prevalence rates varying between 1.8% and 9% across other countries (Al-Hamzawi et al., 2012; Coccaro, 2012; Coccaro et al., 2005; Karam et al., 2006; Kessler et al., 2006; Yoshimasu & Kawakami, 2011). Importantly, several studies indicate that IED is a persisting and disabling disorder (Campfield & Hills, 2001; McCloskey, Noblett, Deffenbacher, Gollan, & Coccaro, 2008).

An important observation is that trauma exposure is a key factor in the pathogenesis of pathological forms of anger including IED. Most studies, however, have focused on explosive anger in the context of posttraumatic stress disorder (PTSD) among combat veterans, a pattern associated with major interpersonal difficulties (Friedman & Jaranson, 1994; Silove, 2004). More recent studies have focused on explosive anger in its own right, showing a specific association between trauma exposure and broadly defined anger attacks as well as more narrowly defined IED (Brooks, Silove, Steel, Steel, & Rees, 2011; McLaughlin et al., 2012; Orth, Montada, & Maercker, 2006; Rees et al., 2013; Silove et al., 2009). Among Indochinese refugees attending a psychiatric clinic in the United States, anger was found to be commonly comorbid with panic and PTSD symptoms (Hinton, Hsia, Um, & Otto, 2003; Hinton, Pich, Marques, Nickerson, & Pollack, 2010). In addition, family conflict was a common feature among those refugees reporting pronounced symptoms of anger (Hinton, Rasmussen, Nou, Pollack, & Good, 2009).

Our research program in Timor-Leste has focused on identifying the origins and manifestations of explosive forms of anger in a low-income country exposed to extensive conflict and persecution.

In a longitudinal study of a rural and an urban community, we found that the population prevalence of broadly defined anger attacks (approximately 40%) remained stable over a 6-year period (Silove, Liddell, et al., 2014). Eight percent of the sample met strict criteria for IED at follow-up (Rees et al., 2013). Factors found to be associated with explosive anger in Timor-Leste included past exposure to conflict-related trauma, ongoing adversity, and distressing preoccupations with injustice related to human rights violations (Brooks et al., 2011; Rees et al., 2013).

There is growing interest in developing and testing interventions for pathological forms of anger. Although there is little evidence in support of the effectiveness of pharmacological interventions for explosive anger (Coccaro & Kavoussi, 1997), psychological interventions appear to offer promise. A meta-analysis of 50 studies conducted between 1975 and 1995 found that cognitive–behavioral therapy (CBT) was effective in treating various forms of pathological anger (Beck & Fernandez, 1998), a conclusion supported by five subsequent meta-analytic reviews which included an expanded number of contemporary inquiries (Boutron, Moher, Altman, Schulz, & Ravaud, 2008; Brooks et al., 2011; Van Dijk, Schoutrop, & Spinhoven, 2003). The components of CBT found to be most effective included cognitive restructuring, stress inoculation, relaxation training, and multicomponent treatments.

Only one randomized clinical trial, conducted in the United States, has assessed a psychological intervention specifically designed to address IED (McCloskey et al., 2008). Forty-five persons with IED were randomized to three active psychological treatments and a wait-list control group. Cognitive restructuring and coping skills training were found to be superior to wait-list control in addressing IED, clinical improvement being evident immediately posttreatment and at a 3-month follow-up (McCloskey et al., 2008). No comparable studies, however, have been undertaken in culturally diverse populations in postconflict countries. Here, we report a wait-list controlled study testing a trauma-focused, CBT treatment for IED and related dimensions of anger (TF-CBT-anger) in postconflict Timor-Leste.

The present study was conducted in Dili, the capital of Timor-Leste, a geographical region that includes 70% of the national population. The people of Timor-Leste were exposed to extensive trauma during successive periods of mass conflict. The Indonesian occupation (1975–1999) was marked by widespread deaths, including extrajudicial killings and disappearances, detention, torture, and other forms of ill treatment, as well as the broader social impacts of conflict including famine and untreated medical illness (Modvig et al., 2000). Women experienced gender-based abuses including politically motivated rape, forced marriages, involuntary chemical sterilization, traumatic loss of husbands and family members due to murder, and forced removal of children (Del Vecchio & O'Leary, 2004; Rees et al., 2013). Forced migration and displacement were common, reaching a crisis point during the humanitarian emergency that followed a vote on national independence in September 1999, when a quarter of a million people were displaced both internally and across the border into Indonesian territory (Modvig et al., 2000). The United Nations restored peace and Timor-Leste gained national independence in 2002. Further periods of internal conflict followed, the most severe being in 2006–2007, an upheaval that impacted heavily on the Dili district, resulting in destruction of property, internal population displace-

ments, injuries, and deaths. At the time of our study, the Dili district had returned to a state of peace and security.

In planning our intervention, we drew on the Adaptation and Development after Persecution and Trauma (ADAPT) model as the informing theoretical framework for understanding the origins of extreme anger in settings of postconflict (Silove, 2013). The ADAPT model postulates that five core psychosocial pillars are undermined by mass conflict comprising safety/security, bonds and networks, justice, roles and identities, and existential meaning (Silove, 2013). The ADAPT model gives particular emphasis to the nexus between exposure to human rights violations and persisting feelings of injustice and anger, a constellation of psychological responses which, it is postulated, can become persistent and pathological, particularly if survivors encounter ongoing conditions of adversity and deprivation, for example, extreme poverty and ongoing family or community tensions or conflict, circumstances that are common in postconflict settings such as Timor-Leste.

We also drew more generally on the principles of trauma-focused psychotherapy for PTSD as applied among culturally diverse, conflict-affected, and refugee populations worldwide, in low- (Neuner, Schauer, Klaschik, Karunakara, & Elbert, 2004) and high- income (Hinton et al., 2003; McCloskey et al., 2008) settings. We embedded the therapy in a narrative approach in which sequential traumatic events were recorded during the process of eliciting a life story, a methodology that originated in testimony therapy (Cienfuegos & Monelli, 1983) and which has been adapted subsequently for use in other postconflict and refugee settings (Mollica et al., 1992; Neuner et al., 2004; Weine, Kulenovic, Dzubur, Pavkovic, & Gibbons, 1998).

Our study was designed to test the following hypotheses: that in comparison to a wait-list control condition, active treatment would result in a significant reduction in IED rates; that the active intervention would significantly reduce outward and inward expressions of anger and the capacity to control anger; and that the intervention would have a beneficial effect on the secondary outcomes of PTSD and psychological distress.

Method

Design

The study was designed in conformity with the Consolidated Standards of Reporting Trials (CONSORT) extension for nonpharmacologic treatment interventions (Boutron et al., 2008). In summary, we undertook an assessor-blinded, wait-list controlled trial of TF-CBT-anger consisting of seven sessions, each 120 min in duration, conducted over 4 weeks. The therapist was blind to serial assessments conducted independently at 1 week prior to treatment, at 1 week posttreatment completion, and at 1 month follow-up. Participants assigned to the wait-list (WL) condition were assessed at equivalent time points and were offered interventions following the completion of the study.

Registration and Ethics

The research protocol is registered with the Australian and New Zealand Clinical Trial Registry (ACTRN-12612000300875). The study was approved by the Human Research Ethics Committee of the University of New South Wales, Australia, and the Timor-Leste Human Research and Ethics Committee of the Ministry of Health, Dili. All assessments and therapy sessions were conducted under conditions of complete privacy in an annex of a nongovernmental organization (NGO), Communication Forum for Women from Timor-Leste (FOKUPERS), which provides psychosocial support services in Timor-Leste. Written informed consent was obtained from all participants prior to the intervention.

Recruitment and Setting

Recruitment involved a multipronged approach, including by word of mouth and by advertising in local newspapers, as well as via posters placed on notice boards in the community, at government departments and agencies, at hospitals, clinics, and NGOs providing psychosocial services, and at offices of private health practitioners. To raise awareness of issues related to anger, two local mental health professionals in the research team conducted a series of 12 community workshops, open to all interested participants, at various locations around Dili. Topics included identification of normative and dysfunctional expressions of anger, the traumatic antecedents of the reaction, its familial and social consequences, and basic principles of self-management.

Persons were eligible for inclusion in the trial if they (1) were Timorese nationals 18 years or older; (2) voluntarily initiated contact with the treating team; (3) met current diagnostic criteria for IED as defined by *DSM–IV* (noting that the study commenced prior to the publication of *DSM–5*); (4) reported lifetime exposure to at least one potentially traumatic event (PTE-assessed according to measures described hereinunder); (5) had basic literacy skills; and (6) were willing to participate once the processes of therapy and randomization were described. Excluded were persons with clinically evident organic brain disorder, with intellectual impairment, or among whom another common mental disorder (substance abuse, PTSD, major depressive disorder) clearly dominated the clinical picture (noting that comorbid disorders or symptoms that were judged not to be the dominant presenting concern, e.g., the presence of PTSD symptoms, did not lead to exclusion).

Intervention

In designing the intervention, the team drew on their extensive collective experience working in Timor-Leste as well as on information provided by a range of indigenous cultural advisors. Several external influences (Malay, Chinese, Japanese, African, and Portuguese) have shaped Timorese culture over past centuries. Most Timorese are multilingual, all being fluent in Tetum (the lingua franca), and many in Indonesian, Portuguese, and regional dialects.

Mythology and legend play an important role in the Timorese culture. Although Catholicism is a strong influence, many Timorese continue to adhere to ancient belief systems based on animist spiritualism, particularly the notion that spirits of ancestors materialize in a multiplicity of forms (*lulik*) as stones, animals, wells, streams, or objects. Spirits are both revered and feared, being endowed with magical powers that can bring either good or bad fortune (Brooks et al., 2011). The therapy was designed to encour-

age participants to express their beliefs about the source of their anger, the therapist showing an active interest in these cultural attributions.

Within this broad psychosocial and cultural framework, we drew on empirically supported therapeutic components for the treatment of anger in other settings, modifying the content and style of delivery to the context of Timor-Leste. Key components included cognitive processing and restructuring, coping skills training, and narration of trauma stories related to explosive anger episodes.

The therapy protocol initially consisted of 12 sessions of TF-CBT of 120 min each spread across 6 to 8 weeks. Two sessions were reserved at the end of therapy to include a family member selected by the participant in keeping with the cultural salience given to the family as the unit of care and recovery. Piloting led to several modifications to the therapy process. The therapy protocol was reduced to seven sessions of 120-min duration conducted over a period of 4 weeks both because the duration was more convenient for participants and the treatment could be completed in that timeframe In addition, the inclusion of a family member was omitted because few participants favored this option. Piloting also indicated the need to give greater emphasis to mindfulness-based relaxation training, particularly breathing techniques, which proved to be well suited to persons from the Timorese culture in dealing with acute symptoms of psychophysiological arousal related to explosive anger episodes. The final therapy session included the establishment of a step-by-step guide for posttherapy maintenance of recovery and relapse prevention, including a safety plan and continuous monitoring of use of acquired cognitive coping and relaxation skills, particularly when self-identifying early potential relapses.

From the outset of therapy, participants were guided in the creation of a personal "Timor lifeline," an adapted version of the "life line" of Narrative Exposure Therapy (Neuner, Schauer, Klaschik, Karunakara, & Elbert, 2004; Onyut et al., 2005) which recorded (in visual representation) the timing and details of the major trauma events they had experienced, identifying corresponding periods in which a pattern of explosive anger occurred or was exacerbated. Systematic imaginal exposure was then used to focus on the most severe of these traumatic events during therapy (Başoğlu et al., 2004), in this instance, in relation to explosive anger episodes.

Psychoeducation was introduced early in the therapy in relation to identifying provocative events that triggered anger and the use of self-awareness bulletins, reinforcement of these skills occurring throughout the process of therapy. The focus was on providing information about and maintaining awareness of the genesis, manifestations, and triggers of anger in a way that was personalized according to each participant's experiences (developmental, conflict related, interpersonal, and in the contemporary context). We drew on research data from Timor-Leste and elsewhere to illustrate to and discuss with participants, once again in a personalized manner, how the normative response of anger as a reaction to injustice could become dysfunctional and contextually inappropriate, impacting adversely on the self, the family, and others (Brooks et al., 2011).

During piloting, we tested the use of traditional Timorese dolls ("Boneca's de Atauro"), attired according to the dress of each participant's region of origin, to provide a concrete representation of how the participant experienced anger and to track in a tangible manner the change in this response over the course of therapy. The therapist assisted in guiding "conversations" between the participant and the dolls who were used flexibly to symbolize not only the self but key persons in the person's life (spouse, parents, others). The procedure facilitated the restructuring of cognitive, emotional, and behavioral responses associated with feelings of injustice and anger as the participant interacted with key figures in his or her life, again noting the change in the management of anger in these relationships over the course of therapy. Throughout the course of therapy, the participant affixed different colored stickers to the doll, systematic changes in color signifying positive changes in the levels and expression of anger and aggression in relation to key persons in his or her life. This tangible and concrete technique facilitated the narration of episodes of interpersonal trauma and stress associated with explosive anger episodes, greatly shortening the time taken to reveal and analyze these experiences.

Homework assignments involved completion of anger-monitoring tools (records of strategies used to improve recognition of triggers, detection of early psychophysiological and cognitive signs of escalating anger), use of newly acquired skills to avert or curtail anger attacks, and recording of memories, dreams, and reflections concerning past trauma and feelings of injustice. Coping techniques were enhanced with the use of reminder cards, as well as mindfulness-based breathing techniques. In this way, strategies for expressing anger in constructive ways were rehearsed, reinforced, and documented in homework assignments.

Following piloting, we assembled all materials, including the therapy manual, 13 handouts, and a booklet depicting in comic-book form, the story of a Timorese person with anger (Atoi's Story, a fictional account of a man with explosive anger based on an amalgam of accrued clinical material). The materials were translated into their final form and back-translated by qualified local translators trained by the Linguistic Institute of Timor-Leste (all materials available on request). In addition, the extensive manual was finalized and translated into Tetum and back-translated to English to guide the therapy process.

All therapy sessions were audiotaped with the permission of participants. Fidelity checks against the therapy manual were conducted by a Timorese mental health professional not directly involved in the program. Using a double-random method, two audiotaped sessions were selected from 10 participants, each session being systematically rated against a schedule identifying the key components and goals of therapy. The procedure confirmed that all sessions assessed achieved ≥95% coverage of each of the key therapy components and goals specified as core to therapy as represented in the treatment manual.

Personnel and Training

Kalhari Hewage, who is fluent in Tetum, conducted all interventions. Hewage is a clinical psychologist with 20 years of experience, including 12 years working in Timor-Leste, both in direct clinical work and under the supervision of other clinicians. Supervision was provided by a psychiatrist with 35 years' experience working with postconflict populations in diverse cultural settings, including a period spanning 20 years working among the Timorese. Two research assistants from Timor-Leste, with university degrees in social work and psychology, respectively, were

trained and supervised by an experienced consultant from the University of New South Wales (UNSW) to administer the assessment package at the designated time intervals pre- and posttherapy. Assessments were conducted independently of the therapist who remained blind to the findings until the completion of the project.

Measures

Primary outcomes.

East Timor explosive anger measure. The design, adaptation, and testing of the measure of IED has been described in full (Liddell et al., 2013). Based on criteria meeting both the definition of broadly defined anger attacks and of the strictly defined category of IED, as derived from the Western literature and *DSM–IV*, we conducted an iterative process of community consultations, piloting, and feedback to ensure that the interview was semantically and linguistically appropriate to the Timorese society. In a convergence study, the community measure applied by field workers was compared with independent IED assignments by Australian psychologists using the relevant module of the Structured Clinical Interview for *DSM–IV* (SCID; Liddell et al., 2013). A high level of concordance was achieved between the two assessments as indicated by an area under the curve (AUC) of 0.90 (95% confidence interval [CI] [0.83, 0.98]); a sensitivity of 93.3%; a specificity of 87.5%; a positive predictive power of 0.89; a negative predictive power of 0.92; and an overall correct IED classification of 90.6%. In the present analysis, we applied a *DSM–IV* diagnosis of IED (present or absent) as our primary outcome measure. Given that our measure of IED included items rated on various response formats (ordinal, binary, visual analogue), we were not able to undertake conventional reliability analyses on the instrument.

State-Trait Anger Expression Inventory (STAXI – 2). The STAXI-2 is a multidimensional, self-report measure of anger expression and control (Campfield & Hills, 2001). The measure has been widely used in cross-cultural epidemiological, and treatment studies (Elson, Mohseni, Breuer, Scharkow, & Quandt, 2014; Fanning, Meyerhoff, Lee, & Coccaro, 2014; Morris & Silove, 1992).

Psychometric analyses based on data from these studies have yielded interpretable scales of anger expression and control, including those used herein (Forbes et al., 2005; Jacob, Neuner, Maedl, Schaal, & Elbert, 2014; Van Dijk et al., 2003). Specifically, in the present study, we used four subscales (rated on a 4-point Likert scale) as primary outcome measures (each subscale consisting of 8 items, 32 items in total): Anger Expression–Out (AX-O), assessing outward expression of anger and aggressive behavior; Anger Expression-In (AX-I), assessing the extent to which anger is suppressed; Anger Control-Out (AC-O), assessing the energy expended in controlling outward expressions of anger; and Anger Control-In (AC-I), assessing how much energy a person expends in calming down and reducing anger.

In the present sample, the reliability coefficient (Cronbach's alpha) for the item clusters ranged from 0.67 to 0.83 (AX-O: 0.77, AX-I: 0.67, AC-O: 0.81, AC-I: 0.83). For the purposes of statis-

tical analyses, the total score for each of the four subscales was calculated by adding the scores of the eight constituent items.

Secondary outcomes.

Kessler Psychological Distress Scale (K10). The Kessler-10 (K10) has been used extensively across cultures as a general measure of psychological distress (Kessler et al., 2002). The measure consists of 10 items (including depression, anxiety, and somatic symptoms) each scored on a 5-point frequency scale. In two previous studies testing the convergence of the K10 with an independently conducted structured clinical interview in Timor-Leste, we found that the international cut-off of ≥30 achieved the best balance between sensitivity and specificity for the measure (Silove, Liddell, et al., 2014), the cut-off used herein to determine those with and without threshold scores. In the present sample, Cronbach's alpha for K10 item pool was 0.81.

The Harvard Trauma Questionnaire (HTQ). The HTQ is the most widely used measure of PTSD in the postconflict and refugee mental health field (Steel et al., 2009). We applied the trauma events inventory and section for posttraumatic stress symptoms (the latter as a secondary outcome) based on symptoms scored on a 4-point frequency scale, broadly corresponding to the *DSM–IV* criteria for PTSD. The summary score (1–4) is calculated by dividing the total score by the number of items (Mollica et al., 1992). Our aforementioned convergence study demonstrated sound agreement between the HTQ PTSD scale administered by Timorese field workers and the SCID PTSD module applied independently by psychologists, yielding an AUC = 0.82 (95% CI [0.71, 0.94]) (Silove, Liddell, et al., 2014). The analysis indicated that a score of 2.2 provided the best balance between specificity and sensitivity, the threshold applied for categorical assignment in the present study. In the present sample, Cronbach's alpha for the HTQ PTSD item pool was 0.86.

Potentially traumatic events (PTEs). The PTEs derived from the HTQ involved conflict-related items (exposure to torture, combat, conflict-related injury, witnessing murder, and extreme deprivation arising from fire, loss of shelter, and lack of food and water), with a minority referring to natural disasters (flood and earthquake) which are common in Timor-Leste. Each trauma category was rated with yes = 1 or no = 0. Participants had to endorse at least one trauma category to be included in the study.

Participants

A total of 308 participants attending the community information workshops completed a self-report screen for broadly defined explosive anger (based on the presence of at least one anger attack a month).

The workshops concluded with a reiteration of the types of persons being sought for the trial, a broad description of the proposed intervention, and guidance to those whose self-ratings were positive for explosive anger on how to contact the research assistants supporting the project. In addition, in direct contact with workers in relevant government agencies and NGOs, we provided advice about the type of persons being sought by the team to participate in the intervention.

From all these sources, 173 Timorese returned self-report questionnaires indicating that they experienced one or more anger attacks a month. Of these, 85 made active contact with the research

team indicating that they were willing to participate in the full baseline assessment to be conducted at the NGO FOKUPERS in Dili where the research team and the therapist were located. Of the 85 assessed, 78 met criteria for IED (49 women, 29 men) and all of these indicated their willingness to participate in the trial once the procedure was explained to them, thereby comprising the intention-to-treat (ITT) sample (see Figure 1).

The final eligible pool of participants was randomized by an independent member of the UNSW team in Sydney using the SAS

9.2 software package. A block size of six with a one-to-one ratio was used to generate an alternating sequence of three participants allocated to TG and WL, yielding a total of 39 participants in each group. Participants were informed of their allocation after the completion of the procedure.

Of those in the TG, 32 out of 39 (82%) completed both second and third assessments. Of the WL group, seven dropped out after the second assessment, a total of 32 (82%) participants completing all three assessments. In summary, a total of 64 participants (TG:
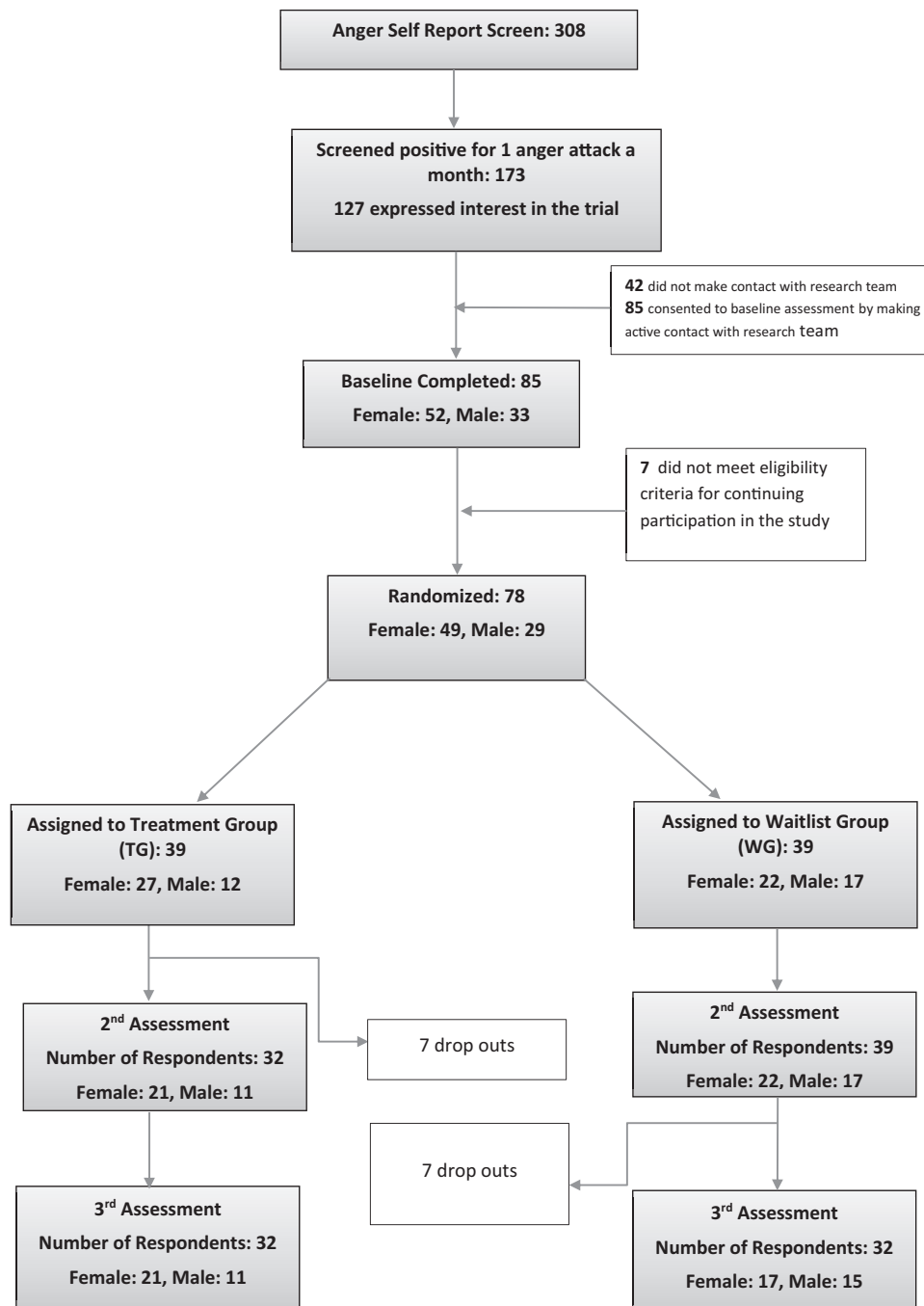

Figure 1. Participant flow chart.

32; WL: 32) completed all three assessments. Figure 1 presents the flow of TG and WL participants through the process.

Statistical Analysis

We applied an ITT analytic approach (Başoğlu et al., 2004; Başoğlu, Paker, Ozmen, Tasdemir, & Sahin, 1994; Hobfoll et al., 2009; Jacob et al., 2014). For the 14 dropouts, all data were missing for second or third assessments or both. We report sociodemographic characteristics and mental health measures at Assessment 1 for the whole sample. Because of the continuous or correlated nature of the data, we applied the Markov Chain Monte Carlo (MCMC) method to impute missing values (Schaefer, Quesenberry, & Wi, 1995).

Bivariate analyses were used to assess the relationship of mental health outcomes (threshold or mean scores, depending on the measures) with sociodemographic characteristics. Formal statistical tests were not conducted for changes in IED because of the zero prevalence in the TG at immediate follow-up. For continuous scales on the STAXI-2, we applied mixed models to examine Time $\times$ Group (TG, WL) effects. The method allows flexibility in modeling covariance structures involving longitudinal and repeat data of a correlated type, taking into account within-subject, time-dependent correlations (McLaughlin et al., 2012). In the mixed-model analyses, we assessed differences between TG and WL groups across assessment periods, based on least-squares (LS) means (with 95% CIs). Effect sizes for outcome measures were calculated using Cohen's d, taking into account the first and third (final) assessments (Jacob et al., 2014). According to convention

(Cohen, 1988), we interpreted effect sizes of 0.20, 0.50, and 0.80 as small, medium, and large, respectively.

Results

Table 1 presents the sociodemographic characteristics of the sample as well as the prevalence rates/scores for the primary and secondary mental health indices at baseline (Assessment 1) for the TG and WL groups. To examine whether comorbidity with PTSD differentiated participants according to the extent of their trauma exposure, we divided the entire sample (TG and WL combined) into those with IED + threshold PTSD and the remainder with IED alone. The mean trauma count did not differ between these two groups, suggesting that the presence of threshold PTSD did not signify greater trauma exposure for the relevant participants with IED.

The TG included more paid workers ($p < .05$) and recorded a slightly higher mean score on the STAXI-2 AX-O scale compared to WL. The TG and WL groups reported a similar level of exposure to PTEs (13.4 and 13.8, respectively). Reported common traumatic events included being a member of the resistance or being a resistance fighter, followed by experience of flood, fire (house burned down), and witnessing serious injury.

Table 2 shows changes in IED rates across assessments for the TG and WL group. Compared to the 100% rate at baseline, no TG participants met criteria for IED at second or third assessment. In contrast, in the WL group, of the 100% with IED at baseline, 79.5% and 71.8% continued to meet criteria for the

Table 1. *Sociodemographic Characteristics and Mental Health Indices at Baseline (Assessment 1) for Treatment Group and Wait-List Control Group*

Sociodemographic characteristics and mental health indices	Treatment group ($n = 39$), n (%) or mean (95% CI)	Wait-list control group ($n = 39$), n (%) or mean (95% CI)	Treatment vs. control p
Gender: n (% male)	12 (30.8)	17 (43.6)	.242
Age: 30 years or older	16 (41.0)	14 (35.9)	.638
Age: mean (*SD*)	29.9 (8.2)	30.2 (11.0)	.458
Postschool education	23 (59.0)	23 (59.0)	1.000
Paid work	21 (53.8)	13 (33.3)	.067
Married	12 (30.8)	12 (30.8)	1.000
PTEs: mean (*SD*)	13.4 (5.7)	13.8 (6.8)	.777
Primary outcome measures at baseline			
IED	39 (100.0%)	39 (100.0%)	
AX-O	17.7 (16.2, 19.3)	15.8 (14.5, −17.1)	.040
AX-I	19.2 (18.0, 20.4)	17.7 (16.2, 19.2)	.120
AC-O	18.6 (17.0, 20.2)	18.1 (16.7, 19.5)	.645
AC-I	18.8 (17.2, 20.4)	18.3 (16.8, 19.8)	.654
Secondary outcome measures at baseline			
Psychological distress K10 $\geq$30	17; 43.6% (27.8, 60.4)	20; 51.3% (34.8, 67.6)	.496
PTSD $\geq$2.2	13; 33.3% (19.9, 50.2)	8; 20.5% (9.3, 36.5)	.202

Note. AX-O = Anger Expression-Out; AX-I = Anger Expression-In; AC-O = Anger Control-Out; AC-I = Anger Control-In; CI = confidence interval; PTEs = potentially traumatic events; PTSD = posttraumatic stress disorder; K10 = Kessler 10 psychological distress; IED = intermittent explosive disorder.

Table 2. *Bivariate Analyses and Mixed Models for Change in Mental Health Measures (With 95% CIs) by Treatment and Wait-List Groups Across Three Assessment Periods*

Assessment period	Treatment group ($n = 39$)	Wait-list group ($n = 39$)	p: TG vs. WL
	Primary outcome measures		
Intermittent explosive disorder			
Assessment 1	100%	100.0%	
Assessment 2	0	$n = 31$; 79.5% [64.5, 89.2]	.001
Assessment 3	0	$n = 28$; 71.8% [54.9, 84.5]	.001
Anger Expression-Out			
Assessment 1[a]	17.7 [16.5, 19.0]	15.8 [14.5, 17.1]	.040
Assessment 2	13.0 [11.7, 14.3]	16.7 [15.4, 18.0]	.001
Assessment 3	13.0 [11.7, 14.3]	17.8 [16.6, 19.1]	.001
Time value of F[b]	$F = 18.57, p = .001$	$F = 2.29, p = .105$	
Anger Expression-In			
Assessment 1	19.2 [17.8, 20.6]	17.7 [16.3, 19.1]	.120
Assessment 2	14.5 [13.1, 15.9]	18.8 [17.4, 20.2]	.001
Assessment 3	13.3 [11.9, 14.7]	19.3 [17.9, 20.7]	.001
Time value of F[b]	$F = 22.57, p = .001$	$F = 1.117, p = .331$	
Anger Control-Out			
Assessment 1	18.6 [17.1, 20.1]	18.1 [16.6, 19.6]	.645
Assessment 2	21.0 [19.5, 22.5]	18.7 [17.2, 20.2]	.014
Assessment 3	23.4 [21.8, 24.9]	19.1 [17.6, 20.6]	.001
Time value of F[b]	$F = 8.89, p = .001$	$F = .465, p = .630$	
Anger Control-In			
Assessment 1	18.8 [17.3, 20.3]	18.3 [16.8, 19.8]	.654
Assessment 2	20.6 [19.1, 22.0]	18.9 [17.5, 20.4]	.125
Assessment 3	22.8 [21.3, 24.2]	19.1 [17.6, 20.6]	.001
Time value of F[b]	$F = 6.39, p = .002$	$F = .339, p = .713$	
	Secondary outcome measures		
K10 >30 (psychologically distressed)			
Assessment 1	$n = 17$; 43.6% [27.8, 60.4]	$n = 20$; 51.3% [34.8, 67.6]	.496
Assessment 2	$n = 1$; 2.6%	$n = 12$; 30.8% [17.0, 47.6]	.001
Assessment 3	0	$n = 12$; 30.8% [17.0, 47.6]	
PTSD ≥ 2.2			
Assessment 1	$n = 13$; 33.3% [19.1, 50.2]	$n = 8$; 20.5% [9.3, 36.5]	.202
Assessment 2	0	$n = 3$; 7.7%	
Assessment 3	0	$n = 6$; 15.4% [5.9, 30.5]	

Note. CI = confidence interval; TG = treatment group; WL = wait-list; PTSD = posttraumatic stress disorder; K10 = Kessler 10 psychological distress. [a] All means are based on least squares (LS) means and 95% confidence intervals for means calculated from mixed models. [b] Time F with p values indicate differences within each group across time.

disorder at second and third assessments, respectively (see Table 2).

Table 2 presents the mixed-model results based on LS means for the four STAXI-2 scales across the three assessment periods, with missing values imputed by the MCMC method. All four indices improved in the TG group relative to the WL. Specifically, compared to WL, the TG showed statistical reductions in scores on anger expression-out, anger expression-in, and statistical increases in scores on anger control-in and anger control-out at the second and third assessments as compared to baseline. In the TG, there was no statistical difference in anger expression-out between second and third assessments. Furthermore, in the TG, all primary and secondary mental health measures (anger expression-out, anger expression-in, anger control-out, anger control-in, PTSD, psychological distress, and intermittent explosive disorder) showed significant improvements at Assessments 2 and 3 as compared to Assessment 1

(baseline). In contrast, for the WL group, none of the mental health outcome measures showed significant improvement at Assessment 2 or 3 as compared to baseline (see Table 2).

Table 3 shows the results for the STAXI-2 scales based on the mixed models with interaction effects for time (Assessment periods 1, 2, 3) and group (TG, WL). All four scales (anger expression-out, anger expression-in, anger control-out, anger control-in) showed significant differences by group (with TG improving more than WL), adjusting for time effects over the three assessment periods. The results also indicate that outcomes differed across assessment periods within each group (TG improving relative to WL). In addition, except for anger control-in, STAXI-2 scales showed statistically significant and positive interactions of group by time in the TG (see Table 3).

In relation to secondary measures, the results for bivariate analyses indicated that the TG showed significant reductions in rates of PTSD and psychological distress at the second and third

Table 3. *Results of Mixed Models by Group (TG and WL), by Time (Three Assessments), and by Interaction of Group With Time*

Effect	AX-O		AX-I		AC-O		AC-I	
	F	p	F	p	F	p	F	p
Group (TG and WL)	10.4	.0019	14.42	.0003	8.46	.0048	6.94	.0100
Assessment (time)	6.9	.0014	7.16	.0011	8.11	.0005	5.34	.0058
Group × Assessment	19.08	.0001	20.1	.0001	3.5	.0328	2.48	.0875
Likelihood ratio test								
Model chi-square	21.94	.0001	36.65	.0001	21.54	.0001	11.69	.0006

Note. AX-O = Anger Expression-Out; AX-I = Anger Expression-In; AC-O = Anger Control-Out; AC-I = Anger Control-In; TG = treatment group; WL = wait-list.

assessments. In addition the TG showed significant ($p < .05$) improvements in these indices when compared with WL at the second and third assessments (see Table 2). In the WL, PTSD and psychological distress showed no significant change at the second or third assessment compared to baseline (see Table 2).

Table 4 presents effect sizes (Cohen's d) for outcome measures by TG and WL groups, respectively. For all four STAXI-2 subscales, effect sizes for the TG exceeded 0.80, indicating uniformly large effects for active treatment. The observed power for the four STAXI-2 indices are as follows: anger expression-out (0.92), anger expression-in (0.97), anger control-out (0.98), and anger control-in (0.91), indicating that, given the size of the therapeutic effect achieved, the study had a 90% chance of achieving a p value of $<5\%$ ($p < .05$) in conducting statistical tests assessing change. In contrast, effect sizes in the WL group were <0.50 for all four STAXI-2 scales, indicating small effects for changes in these measures where there was no intervention.

We assessed whether an analysis using the whole ITT sample ($n = 78$; TG: 39 and WL: 39) including dropouts achieved the same results as the aforementioned analysis in which missing values were imputed ($n = 64$; TG: 32 and WL: 32). The results for both analyses were virtually identical (Table 2 and Table 5), suggesting that the imputation method was robust.

Table 4. *Effect Size Cohen's d for Changes in Mental Health Measures for Treatment and Wait-List Control Groups*

Measure	Treatment group (n = 39)		Wait-list control group (n = 39)	
	Effect size d	r^{a}	Effect size d	r
Anger Expression-Out	1.18	.51	.43	.21
Anger Expression-In	1.54	.61	.32	.16
Anger Control-Out	0.91	.41	.19	.10
Anger Control-In	0.83	.38	.17	.08

Note. The effect size (Cohen's d) for individual items for each group was calculated by comparing the Assessment 3 outcome with that of Assessment 1 (baseline). Overall effect size was calculated by adjusting for interaction effect of target and wait-list control group. Thresholds for Cohen's d (r): small = .20 (.10); medium = .50 (.24); large = .80 (.37) (J. Cohen, 1988).
[a] The r is calculated on the basis of the formula $r = [d/\sqrt{(d^2 + 4)}]$.

Discussion

To our knowledge, this is the first study of a psychological intervention for IED in a low-income, postconflict country. Of the 100% participants in the intervention group with IED at baseline, none met criteria for the disorder at 1 week or 1 month follow-up. In contrast, 70% of participants in the WL group (100% of whom had IED at baseline) had persisting IED at both follow-up points. Compared to WL, the TG showed marked improvements in all four STAXI-2 scales (i.e., statistical reductions in scores on anger expression-out and anger expression-in, and statistical increases in anger control-in and anger control-out). In all instances, changes with therapy were substantial as indicated by the large effect sizes recorded. In contrast, in the WL group, STAXI-2 scales showed either no significant change or evidence of worsening of symptoms over time. In relation to secondary outcomes, there was a large reduction in psychological distress in the TG (from >40% to zero at final assessment), whereas in the WL, the decline over time was modest (50% to 30%). In the TG, the numbers exceeding the PTSD symptom threshold reduced from >30% at baseline to zero at second and third assessments. In contrast, there was no statistical change in PTSD rates over time in the WL group.

The study had several strengths. The therapist was fluent in the local language, Tetum, and hence was able to work without an interpreter. The team had a long-term engagement with the Timorese community and researchers were familiar with the culture and historical context. Extensive consultations and piloting allowed iterative refinement of the intervention, a process which ensured recognition and incorporation of local beliefs and customs concerning anger and its sources into the therapeutic process. In addition, we drew on a coherent theoretical framework (the ADAPT model) to guide the therapy, particularly the principle that exposure to injustices spanning the past and the present play a central role in the genesis and perpetuation of pathological expressions of anger (Silove, 2013). The STAXI-2 has a strong record of use across cultures (Elson et al., 2014; Fanning et al., 2014), and all other measures had been adapted previously to the culture and context and psychometrically tested in the context of the intervention (Liddell et al., 2013).

The high retention rate from baseline assessment ($n = 85$) to the point of participation ($n = 78$) is unusual and may be an outcome of the detailed information provided both at the community level and when participants first met with the team, a process in which we described fully the features of IED, its possible causes, and its

Table 5. *Successful Followed-Up Matched Sample: Bivariate Analyses for Change in Mental Health Measures (With 95% CI) by Treatment and Wait-List Groups Across Three Assessment Periods*

Assessment period	Treatment group ($n = 32$)	Wait-list ($n = 32$)	p: TG vs. WL
	Primary outcome measures		
Intermittent explosive disorder			
Assessment 1	$n = 32$; 100%	$n = 32$; 100.0%	
Assessment 2	0	$n = 24$; 75.0% [56.3, 87.8]	.001
Assessment 3	0	$n = 22$; 68.8% [49.8, 83.1]	.001
Anger Expression-Out			
Assessment 1	17.1 [15.5, 18.7]	15.5 [14.1, 17.0]	.132
Assessment 2	13.6 [12.6, 14.7]	16.7 [15.6, 17.7]	.001
Assessment 3	13.4 [12.1, 14.7]	17.3 [15.7, 18.9]	.001
Time value of F[a]	$F = 14.57, p = .001$	$F = 2.62, p = .116$	
Anger Expression-In			
Assessment 1	19.2 [17.9, 20.4]	18.1 [16.3,–19.8]	.309
Assessment 2	14.4 [12.9, 15.8]	18.9 [17.2, 20.6]	.001
Assessment 3	13.4 [11.7, 15.0]	19.8 [17.8, 21.8]	.001
Time value of F[a]	$F = 26.59, p = .001$	$F = 3.07, p = .091$	
Anger Control-Out			
Assessment 1	18.1 [16.4, 19.9]	18.3 [16.7, 19.9]	.893
Assessment 2	21.2 [19.3, 23.0]	18.4 [17.3, 19.6]	.011
Assessment 3	23.1 [21.3, 24.8]	18.9 [17.1, 20.8]	.002
Time value of F[a]	$F = 23.86, p = .001$	$F = .64, p = .430$	
Anger Control-In			
Assessment 1	18.1 [16.6, 19.6]	18.3 [16.6, 20.0]	.888
Assessment 2	21.5 [19.7, 23.2]	18.7 [17.3, 20.1]	.018
Assessment 3	23.0 [21.2, 24.8]	18.3 [16.6, 20.0]	.001
Time value of F[a]	$F = 14.96, p = .001$	$F = .008, p = .930$	
	Secondary outcome measures		
K10 >30 (psychologically distressed)			
Assessment 1	$n = 16$; 50% [32.7, 67.3]	$n = 18$; 56.3% [39.1, 73.4]	.616
Assessment 2	$n = 1$; 3.7%	$n = 7$; 21.9% [7.6, 36.2]	.059
Assessment 3	0	$n = 10$; 31.3% [15.2, 47.3]	.001
PTSD $\geq$ 2.2			
Assessment 1	$n = 12$; 37.5% [20.7, 54.3]	$n = 7$; 21.9% [7.6, 36.2]	.423
Assessment 2	0	$n = 2$; 6.3%	
Assessment 3	0	$n = 2$; 6.3%	

Note. CI = confidence interval; TG = treatment group; WL = wait-list; PTSD = posttraumatic stress disorder; K10 = Kessler 10 psychological distress.
[a] Time F with p values indicate differences within each group across time.

consequences. It is important to acknowledge that from a diagnostic perspective, the *DSM–IV* criteria for IED are relatively broad, not specifying a precise number of anger attacks or the duration of symptoms needed to make the diagnosis, a possible reason for the high prevalence rates of IED observed in past epidemiological studies (Kessler et al., 2005, 2006). In that sense, the recruited group may have been diverse in both the severity and nature of explosive anger and aggression they experienced. Whether a different pattern of outcomes is achieved using the stricter criteria for diagnosing IED in *DSM–5* awaits to be studied.

Other limitations of the study include the modest sample size and the short follow-up period. In particular, 18% of the total sample (14 out 78) dropped out during the follow-up period (although dropouts were equally balanced, seven from the TG group and seven from the WL group). To account for the attrition, we applied the recommended ITT analytic approach which retained all 78 persons recruited, applying a standard imputation method to account for missing data. Our post hoc analyses comparing data from the ITT with that undertaken on the sample excluding dropouts produced almost identical results, attesting to the robustness of our findings. Nevertheless, further studies are needed involving larger samples and longer follow-up periods to confirm that TF-CBT-anger has enduring effects in overcoming IED and other dimensions of anger. Adapting and trialing the method in different cultures will also be necessary to confirm the robustness and applicability of our therapeutic approach; however, the inclusion of a wait-list group assisted in controlling for possible expectancy effects, natural recovery, and symptom regression to the mean. The absence of a separate study arm involving a credible alternative intervention prevents us from drawing any conclusions concerning the specificity of TF-CBT-anger or its individual components as effective interventions for overcoming anger in this setting. Given the state of knowledge in the field, however, demonstrating superiority of the intervention to WL establishes the necessary baseline on which further studies can build, specifically by comparing several active intervention arms.

For the first study of its kind, employing a single, skilled mental health professional who is fluent in the local language and who has extensive experience in working in the community, conferred the advantages of consistency and integrity in the conduct of the therapy. As such, the findings are likely to represent the best-case scenario in terms of outcomes, particularly since we cannot rule out the possibility that nonspecific therapist characteristics contributed. Whether similar results can be achieved by personnel with lower levels of experience and training is an important consideration in a country where there is an extreme shortage of mental health professionals (at the time of the study, one psychiatrist) for a population of in excess of one million persons. Finally, given the common pattern of comorbidity of mental disorders in postconflict settings, there is a possibility that, in spite of our attempts to ensure that IED was the primary disorder at the time of intervention, anger might be secondary to other constellations, particularly PTSD.

Notwithstanding the aforementioned caveats, our positive outcomes for the TG group offer an important foundation for pursuing the treatment of IED and related dimensions of anger in low-income, postconflict countries such as Timor-Leste. Our capacity to reduce the number of sessions to seven after piloting, as opposed to the standard 12 to 16 sessions of TF-CBT used in most interventions for PTSD, offers a time-efficient and cost-effective approach for clinicians and therapists in such settings.

We made several adaptations and introduced innovations in our modification of conventional TF-CBT to suit the Timor-Leste context, including the use of the Timor "lifeline," traditional Timorese dolls, and the provision of a fictional story of a Timorese man who overcame anger attacks, components which appeared to facilitate the procedure by fostering engagement with the culture, and creating a nonjudgmental, trust-based atmosphere to encourage participants to disclose experiences of trauma and to discuss difficult issues relating to the interpersonal effects of their explosive anger episodes. To our knowledge this is the first time that traditional dolls have been successfully used in the context of a TF-CBT therapeutic intervention in treating any disorder including IED, although analogous approaches have been used with traumatized children (Cavett, 2012; Cohen, Mannarino, & Deblinger, 2006). Our firm impressions were that the use of the dolls provided a visual and tactile representation that facilitated the recounting of trauma narratives in a manner that reduced distress. The dolls also allowed a concrete monitoring of the progress of therapy by the use of colored stickers signifying changes in levels of anger in the participant. All these components are fully detailed in the therapy manual (available in English) together with a comprehensive package of psychoeducational material and homework assignments, materials that provide simplified guidance for adaptation purposes for both mental health and lay professionals in other conflict-affected countries.

The relevance of our findings is underscored by our past studies which found consistent evidence of high rates of explosive anger (whether defined broadly as anger attacks or more strictly as IED) in the Timorese community as a whole (Brooks et al., 2011; Silove et al., 2009). More recent studies suggest that these problems are particularly prevalent among women including those in the antenatal period. In addition, these and other studies have shown strong and consistent associations between explosive anger and exposure to the traumas of past conflict, ongoing conditions of adversity, and preoccupations with feelings of injustice (Brooks et al., 2011; Silove et al., 2009; Silove, Ivancic, et al., 2014; Tay, Rees, Chen, Kareth, & Silove, 2015) offering empirical support to the theoretical underpinnings and content of the therapy we have trialled. From an observational perspective, it was evident in the course of therapy that there was a strong nexus among anger, trauma, and injustice in the histories and psychological responses of participants, consistent with the predictions of the ADAPT model (Silove, 2013).

Our community studies have shown that explosive anger among survivors of mass conflict in Timor-Leste may have dire personal, family, and social consequences (Silove, Liddell, et al., 2014). Uncontrollable episodes of anger, often triggered by minor events, can result in survivors of trauma enacting aggression within the family (Rees, Thorpe, Tol, Fonseca, & Silove, 2015). In particular, IED may be associated with intimate partner violence and harsh patterns of parenting, potentially contributing to family conflict and instability and placing other members (spouses, children) at risk of physical and psychological harm. A major concern is that a pattern of recurrent anger and violence by a parent with IED, itself a consequence of the injustices that that person has experienced, may have long-term consequences for the mental health of offspring, a potential transgenerational manifestation of the transmission of trauma (Rees et al., 2015). Based on our clinical observations, participants attending the treatment program recognized the deleterious effects of their IED symptoms on the family, a common motivation for seeking therapy, and a theme repeatedly discussed in sessions.

From a translational perspective, the first author (KH) has trained 20 Timorese working in a range of psychosocial agencies in the basic procedures of TF-CBT-anger in order to ensure that services are offered in the future in Timor-Leste with minimal additional resources. Naturalistic follow-up studies are ongoing to assess the effectiveness of these interventions in the real-life service setting. Clearly, however, individual psychotherapy is only one component of a multipronged approach needed to assist persons with IED in this context; other strategies (family based, social, and cultural) may assist in addressing the sense of injustice that many survivors of conflict experience and which, it is assumed, lies at the heart of the tendency to respond to ongoing stressors with extreme forms of explosive anger. Nevertheless, for selective persons with established IED, there may be grounds to offer an intervention such as that outlined herein, within the limits of the resources and skills available in low-income, postconflict countries.

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