



Fostering resilient recovery: An intervention for disaster-affected teachers in Indonesia

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ABSTRACT

Disasters leave survivors at heightened risk of negative psychological consequences. Teachers require post-disaster psychosocial support, given their added responsibility for supporting their students' recovery. However, alongside coping with their own mental health, teachers often lack training to support students psychologically. This study addresses this gap by detailing an intervention designed to foster resilient recovery among secondary school teachers in Central Sulawesi, Indonesia, to enhance their ability to support both themselves and their students after a devastating earthquake/tsunami.

Teachers (n = 37) from three disaster-affected schools participated in a one-day workshop exploring collective strengths and strategies to develop their own and their students' post-disaster resilience, featuring the Tree of Life activity. Impact was evaluated using a pre-post intervention design. Findings from a three month follow up demonstrated significant improvements across various resilience-related measures, including *personal resilience*, *community resilience*, *social support*, *adaptive coping strategies*, *psychological help seeking*, *earthquake anxiety*, *post-traumatic stress*, *complex post-traumatic stress* and *fatalism*. Open-ended survey responses indicated that most teachers reporting subjective improvements in their own recovery and their capacity to support students psychologically. This study emphasises the importance of creating teacher interventions underpinned by disaster recovery theory, which offer practical skills to foster post-disaster psychosocial recovery. While the intervention exhibits promising initial results, future research would benefit from an evaluation using a randomised control group.

1. Introduction

The risk of exposure to natural hazards is increasing globally (Guha-Sapir et al., 2017), with a heightened vulnerability to their impacts in low- and middle-income countries (LMICs) (Hallegatte et al., 2020). Notably, the impacts of disasters are highly concentrated in the Asia and Pacific region, since this area is the most affected by natural hazard-based disasters globally (UN.ESCAP, 2017). The area is also underrepresented in existing disaster research (Hechanova and Waelde, 2017).

Survivors need to be supported for disasters' negative psychosocial impacts. However, there is a persistent gap between need and access to

evidence-based, culturally appropriate mental health care in LMICs (Patel et al., 2011). This need is exacerbated after a collective traumatic event, such as a tsunami or earthquake, which has a profound impact on the community's mental health (Makwana, 2019), particularly impacting young people (Norris et al., 2002; Peek, 2008).

Teachers play a crucial role in addressing the psychosocial needs of young people (Le Brocque et al., 2017; Parrott et al., 2023; Seyle et al., 2013). Teachers' knowledge of students and their extensive time together makes teachers adept at identifying students who may require additional support (Widyatmoko et al., 2011; Wolmer et al., 2011). Support delivered by teachers is also cost-effective (Wolmer et al., 2011). Numerous studies among populations exposed to collective

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trauma find that students' recovery can be supported by interventions that involve training teachers to deliver psychosocial support (e.g., see Coombe et al., 2015). In the absence of mental health services, the teachers' role may be particularly vital in LMICs. This fits with task-shifting approaches, involving the redistribution of care to less specialised workers, that aim to increase access to mental health care in LMICs (Fazel et al., 2014). Teachers' disaster-related knowledge and skills may also permeate the wider community by way of intergenerational transfer of knowledge from students to their parents (Edmeade and Buzinde, 2021). Therefore, teachers play a vital role in fostering both young people's and the wider community's resilience following disaster (Buzinde et al., 2019; Edmeade and Buzinde, 2021; Pacheco et al., 2022).

However, teachers may not be well-prepared for this role: alongside the burden of managing their own post-disaster stressors, they may feel ill-equipped to support students (Johnson and Ronan, 2014). Teacher's stress is likely to be heightened by additional post-disaster responsibilities, including supporting students with trauma-related distress (Alisic, 2012), which can contribute to emotional exhaustion and burnout (Kuntz et al., 2013; O'Toole, 2017; O'Toole and Friesen, 2016).

A seminal example of an intervention that responded to this dual role of teachers as both survivors and agents of student resilience involved a teacher-based intervention after Hurricane Katrina (Baum et al., 2014). The intervention focused on self-empathy, self-regulation and self-awareness through breathing and clay moulding activities that teachers could use for themselves and their students. Teachers reported post-intervention improvements in confidence to support students, as well as to discuss difficult issues and empathise with students. In Indonesia, Seyle et al. (2013) devised an intervention that reduced teachers' depression and post-traumatic stress symptoms (PTSS) through a three-day workshop featuring psychoeducation, relaxation and coping exercises. Developing appropriate and efficacious interventions to support teachers' psychological recovery and increasing their confidence to support their students' following disasters is crucial for the resilience of the community, which is tied to the interplay between individuals' capacity and the strength of key social institutions, including schools (Pacheco et al., 2022; Sadri et al., 2018). This paper reports the development and evaluation of an intervention for teachers in Indonesia following a devastating earthquake, tsunami and landslide.

1.1. Theoretical foundations: A strengths-based approach

Aspects of resilience theory guide the development of the intervention reported in this paper. While a large volume of psychological research has focused on the capacity of individuals to adapt via intra-personal factors, such as personality and individual coping strategies (e.g., see Luthar, 2006 for a review), the discursive bias towards individual-level traits ignores the influence of dynamic, interconnected, social and cultural systems on resilience (Masten et al., 2021). There is a growing consensus that resilience is best defined as a systems concept, which recognises that the resilience of an individual depends on the adaptive pathways within and between interconnected systems (e.g., the individual, family and society) (Masten, 2019; Masten and Motti-Stefanidi, 2020). As the school is an important system in which children and young people (CYP) are embedded, the multisystem perspective of resilience positions schools and teachers as important to fostering the resilience of CYP (Masten, 2021; Ungar et al., 2019).

Since determinants of resilience can vary depending on the cultural context (Ungar, 2015), this intervention aimed to harness the socioculturally-specific determinants of resilience through adopting a 'strengths-based' intervention approach, which recognises survivors' capacity for strength and resilience, assumes competency and empowers them to overcome disaster-related challenges (Snider et al., 2010). To foster resilience in a locally grounded way, the intervention sought to create safe social spaces and dialogue, promote knowledge of locally

valued strengths and coping mechanisms and to identify and strengthen existing capacities (Burgess and Mathias, 2017; Campbell and Burgess, 2012).

To promote positive coping and effective functioning in populations affected by mass trauma, a seminal paper by Hobfoll et al. (2007) proposed five post-disaster evidence-based intervention elements: 1) a sense of safety, 2) calming, 3) self and community efficacy, 4) connectedness and 5) hope (see Fig. 1). These theoretical tenets underpin existing intervention models, including the widely deployed 'psychological first aid', which was designed with the aim of stabilising and managing acute stress, analogous to physical first aid (Dieljtjens et al., 2014; Everly and Lating, 2021). The elements have been successfully applied in non-Western cultural contexts such as Haiti (Cornelli Sanderson et al., 2016) and can be fostered in schools (Mooney et al., 2020).

1.2. Current study

While many published interventions focus on training teachers to implement clinically informed strategies and materials for building student resilience (Coombe et al., 2015; Wolmer et al., 2011), this can inadvertently neglect the psychological impacts of the disaster on the teachers themselves (Baum et al., 2014; Seyle et al., 2013). Therefore, the present study reports the development and evaluation of a culturally-grounded intervention designed with a dual aim: enhancing both teacher and student resilience. This involves empowering teachers in a low resource context to manage their distress, while also equipping them to support their students' psychological recovery more effectively. As the intervention content is novel and context-specific, this study aims to test the feasibility and initial efficacy of the intervention.

2. Method

2.1. Research context

On the September 28, 2018 a powerful earthquake measuring 7.7 Mw caused a tsunami, triggering liquefaction and landslides in the Central Sulawesi region of Indonesia. The impact was catastrophic: 4340 people died, 211,000 people were displaced from their homes, 374 schools sustained major damage (Pemerintah Provinsi Sulawesi Tengah, 2019).

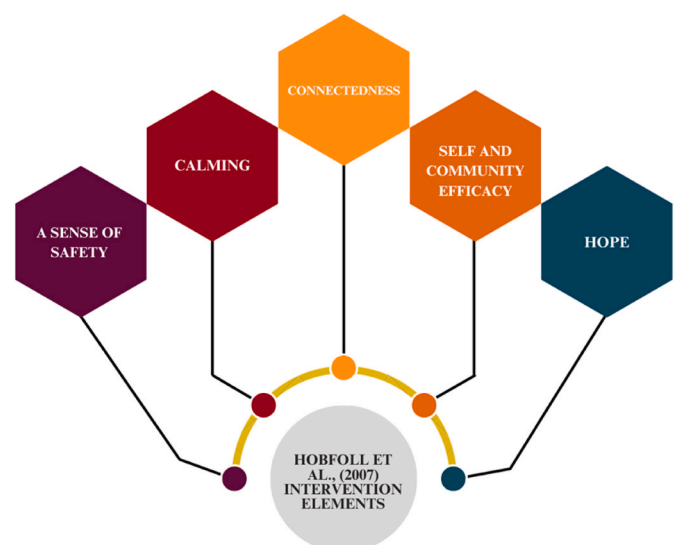


Fig. 1. Hobfoll et al. (2007) intervention elements.

2.2. Site selection and participants

Three schools were chosen in the disaster area, based on their exposure to different elements. School A was impacted by earthquake and liquefaction, School B by earthquake and School C by tsunami. School A and B were structurally damaged while School C encountered extensive flooding and sediment deposition. Participants were recruited from a non-clinical sample of disaster-exposed teachers from these schools. Once principals had given permission for the research, teachers were randomly selected and invited to participate. For the intervention, teachers from three schools gathered at an accessible site, not affiliated with any school. Although forty teachers were recruited at baseline, thirty-seven participated in the intervention (87% female, M age = 49.50). Reasons for non-participation included prior family commitments and a bereavement. The final samples characteristics and exposure indicators are displayed in [Table 1](#).

2.3. Study design

A pre-post-intervention design was used to investigate changes in teachers' recovery. A questionnaire was administered: 1) prior to the intervention between January–April 2022 and 2) approximately one year after the initial questionnaire, between March–April 2023, three months post-intervention. The time elapsed between the pre-intervention data collection and the intervention allowed for analysis of the data on both student and teacher resilience needs and informed the design of the intervention. In addition, to assess the feasibility and acceptability of the intervention, a feedback form featuring open and closed questions on teachers' subjective experience of the intervention was completed on the intervention day and three months post-intervention.

2.4. Procedure

At the first data collection time point 40 months post-disaster, participants were informed about the study and provided informed consent. An individual, anonymous identification code was used to match pre- and post data for each teacher. Both pre- and post-intervention, self-

Table 1
Characteristics of sample.

Characteristic	Percentage of sample
Site	School A: 41% School B: 32% School C: 27%
Age	51–60 years: 62% 41–50 years: 19% 31–40 years: 14% 25–30 years: 5%
Gender	Female: 87% Male: 14%
Religion	Muslim: 92% Christian: 8%
Time worked at current school (years)	Up to 5: 16% 6–10: 16% 11–20: 32% 21–30: 24% More than 30: 11%
Disaster exposure	
Experienced shaking	100%
Separated from members of household family	76%
Injured during the disaster	68%
Participated in rescue efforts	51%
Witnessed grotesque scenes (e.g., body parts)	49%
Witnessed death of somebody	41%
Witnessed liquefaction	35%
Heard voices trapped under debris	27%
Trapped under debris	16%
Witnessed tsunami water rise	11%

administered survey items were completed by teachers in their place of work using either an electronic tablet or a paper version, which was then entered into the survey collection software KoboToolbox (<https://eu.kobotoolbox.org>). A local research assistant was present in-person to offer technical and emotional support. Alongside completion of the surveys, participants were interviewed regarding coping with the disaster and the school's role (reported elsewhere: [Lomeli-Rodriguez et al., 2024](#); [Parrott et al., 2023a,b](#)). Following completion of the surveys, teachers were thanked and provided a gift of appreciation. They were also informed they would be re-contacted, subject to granting permission.

The day-long intervention took place in-person in December 2022. Prior to the intervention, a team of British and Indonesian researchers collaboratively devised the content via online meetings. This process was guided by local perspectives to ensure the intervention aligned with cultural norms and values and addressed bottom-up priorities. To achieve this, the activities were informed by an analysis of the teachers' assessment phase data, that elicited nuanced cultural concepts central to facilitating recovery efforts. This included 'gotong royong', translating closely to 'mutual help', and 'tutura', a concept specific to the Central Sulawesi region denoting a form of oral storytelling involving a cathartic expression of emotion when sharing difficult life circumstances in a supportive environment. Through incorporating local idioms of coping and strength into the intervention content, the intervention aimed to recognize, harness and develop teachers' existing strengths and capacities, to ensure the intervention was well-accepted and empowering for teachers.

To devise the intervention, additional intervention facilitators were also invited to meetings to discuss the intervention's content, key principles and practicalities (approximately 10 hours of meetings). These meetings culminated in the creation of an in-depth intervention strategy handbook containing the schedule, activity instructions, examples of responses/scripts to common scenarios as well as key 'do's' and 'don'ts'. Facilitators (all Indonesian) comprised: an academic researcher, a clinical psychologist, the founder of a local mental health NGO and an employee of the organisation. In addition to the facilitator leading each session, a facilitator was assigned to each of the three school-based groups, ensuring the availability of individualised support and guidance for each task. Facilitators were instructed to refer any concerns regarding participant well-being to the clinical psychologist. Indicators of concern included expression of emotional distress, social withdrawal, low motivation and somatic complaints.

Feedback forms were completed at the end of the intervention day. Intervention assessment data was collected by research assistants approximately three months post-intervention.

2.5. Intervention design and delivery

The authors developed a non-clinical, group-based intervention incorporating narrative techniques, psychoeducational material, mindful breathing and our findings ([Lomeli-Rodriguez et al., 2024](#); [Parrott et al., 2023a,b](#)) to form vignettes. The design combined psychological theory with practical guidance for promoting adaptive coping strategies for the teachers, so they could also provide effective psychological support for students.

This intervention aligned with many of the features of 'psychological first aid' (PFA), which aims to stabilise survivors' acute distress and promote adaptive coping ([Allen et al., 2010](#)). The features relevant to the present intervention, from those outlined by [Everly and Lating \(2021\)](#), included an emphasis on the development of an empathetic, compassionate relationship with a trauma-exposed group, being culturally and developmentally informed, allowing the voices of trauma-affected individuals to be heard, determining survivors' needs and providing guidance and coping skills.

PFA is underpinned by [Hobfoll et al.'s \(2007\)](#) five intervention principles (see [Fig. 1](#)), which the intervention aimed to promote. However, we did not follow a specific PFA model (e.g., The National Child

Traumatic Stress Network Psychological First Aid Field Operations Guide model; Brymer et al., 2006 or the Johns Hopkins RAPID-PFA model; Everly and Lating, 2017). Rather, we aimed to ensure that the intervention was adapted to the specific cultural context. While PFA typically functions as an early psychological triage and crisis intervention (Everly and Lating, 2021), the current intervention was designed to be beneficial over a more extended time scale. This approach aimed to confront lingering feelings, given that it was implemented over three years post-disaster. Its objective was also to foster sustainable psychosocial recovery within school systems.

The intervention was delivered over the course of one day (7 hours). An outline of the activities and their aims are presented in Table 2.

The intervention began with an introduction from the facilitators, followed by icebreaking activities to foster a positive communal atmosphere. This featured an interactive game and listening to music, as advised by local practitioners during the interventions design. While most research featuring icebreaker activities centres on young people, research with adult learners suggests benefits include social bonding, rapport building, initiating conversations, relieving tensions and fostering a safe, supportive learning atmosphere (Chlup and Collins, 2010).

A collective narrative technique was used in the second session, through the 'The Tree of Life'. The activity supports groups and communities to overcome life challenges by promoting identity, hope, connectedness and empowering individuals to re-author their stories (Denborough, 2012). Although originally designed to support vulnerable children in Zimbabwe (Ncube, 2006), when used with adults it has been found to elicit rich discussions (e.g., in post-conflict settings; Burgess and Fonseca, 2020). To our knowledge, no published research exists that reports using the technique in Indonesia. However, our decision to implement the activity was guided by the advice of a local clinical psychologist who supported facilitating the intervention. The

clinical psychologist was experienced in delivering the technique in the region and considered it to be contextually relevant and impactful. Supporting this assertion, the activity aligned well with participants valuing reciprocal storytelling (*tutura'*) for supporting coping, as the activity facilitated an exchange of experiences of strength and coping within a supportive space.

Using the metaphor of the tree, participants depict their personal disaster experiences as the roots, the present as the ground, and gifts/resources as fruit. Metaphorical 'clouds' and 'storms' shake the tree, but participants are reminded of their resources and sources of strength to weather difficulties and foster growth. A worksheet (see Fig. 2) is provided to explain the activity. Completed individual trees are shared with the wider group to discuss similarities and differences in experiences of coping. Similarities are highlighted and amalgamated into a group Tree of Life after the psychoeducational session.¹

Following the individual Tree of Life activity, session three endeavoured to give the teachers a sense of the adaptive forms of coping that they had highlighted in earlier interviews as well as how they saw their role and that of schools for supporting coping. This culminated in a presentation of five key principles for a resilient recovery (see Fig. 3), based on salient themes extracted from the participants' interview data, which aligns with the evidence base on effective coping. These principles were used to ensure that the coping strategies promoted in the intervention aligned with participants' cultural norms and values. They also recognised existing coping strategies and the inherent resilience of the trauma-exposed population, as recommended by Snider et al. (2010). This also constituted a form of 'member checking' (Thomas, 2016) as the teachers' responses to the principles validated that our interpretation of their data collected during the assessment phase resonated with their experiences, norms and value systems.

The third session incorporated psychoeducation as an early component within the broader intervention, in line with common practice in trauma interventions (Pfefferbaum et al., 2014). Hobfoll et al.'s (2007) five essential elements of recovery were introduced to guide the day's activities. Teachers received this theoretical framework through presentation slides featuring definitions of each element (see Fig. 4), accompanied by examples of actions to promote them (see Fig. 5 for one example). These slides were included in a handout of materials provided to teachers.

Two mindful breathing exercises featured as components of the intervention (sessions four and six). The brief exercises were designed to support teachers to regulate their emotions and for use with students. Consistent with stress management training, these techniques draw on cognitive and behavioural techniques without focusing on the traumatic event (Bisson and Andrew, 2007; World Health Organization [WHO], 2013). Body-oriented emotional regulation strategies are frequently incorporated into psychosocial interventions in southeast Asia, including in post-disaster contexts (see Panting et al., 2020 for a review). Mindful breathing is proposed as a culturally relevant, inclusive and accessible response to disaster survivors' needs as the practices do not require previous skills or resources and are not associated with a specific religion. Mindful breathing can promote non-judgemental acceptance of emotions and address survivors' potential feelings of shame without requiring explicit emotional expression (Panting et al., 2020). These techniques show promising results for stabilising and reducing stress, anxiety and PTSS (e.g., see Jerath et al., 2015; Panting et al., 2020; Taylor et al., 2020).

To transition from the psychoeducational session to the mindful breathing component (session four), the facilitator explained that the following exercises aimed to promote the 'calm' and 'safety' components of the Hobfoll et al. (2007) model. Teachers were reassured about the

Table 2
Overview of intervention activities.

Session	Activity	Aim
Session 1	Introduction and icebreakers	To build rapport and foster a positive atmosphere
Session 2	Tree of Life (personal reflection)	To reflect on lingering emotions regarding the disaster and to recognize sources of strength to overcome adversity
Session 3	Presentation of resilience themes and theory to support post-disaster resilience and coping	To feedback findings from teachers' interviews regarding collective strengths and a psychoeducational component to enhance teachers' psychosocial competence and confidence
Session 4	Mindful breathing to stay calm: Grounding	To develop teachers' emotional regulation and stress management techniques (for themselves and to teach students)
Session 5	Tree of Life (group)	To build on session 2 to identify and share collective experiences of the disaster and sources of collective strength to develop collective efficacy and empowerment
Session 6	Mindful breathing to stay calm: Square Breathing	See Session 4
Session 7	Presenting themes from their students' interview data and refresher of the theoretical framework	To feedback findings from students' interview data to support understanding of their post-disaster experiences and valued coping mechanisms
Session 8	Co-create school guidance on how to support themselves and their students psychologically after disaster and apply these to vignettes	To increase teacher knowledge and confidence to support themselves and students by promoting adaptive actions and developing teachers' competency, efficacy and empowerment

¹ Figures featuring materials created for use in the intervention are included in their English version. Materials were translated to Bahasa Indonesian for the intervention.

TREE OF LIFE

The Tree represents your life since the 2018 disaster

1. Create your tree of life by adding the following.
 - In the roots you should write the past experiences you had during the disaster.
 - The ground is the present. How are you feeling now?
 - In the trunk you should write about the skills and activities that have helped you cope with the disaster.
 - On the branches you should write about your hopes for the future.
 - In the leaves you should write the important people in your life who have supported you since the disaster.
 - In the fruits you should write what gifts and resources you are given by others that help them cope with disaster. These are not material resources. It might be something you have been taught by someone else.

2. Sometimes there might be a storm that shakes your tree. This means you might still experience challenges about the 2018 disaster. In the storm cloud write any challenges you face here →

Remember: It is normal to have good days and bad days but the storm will pass and the water will make your tree grow even stronger! Focus on all the people and resources you have in your life to help you stay calm, get through difficulties and be resilient!



Fig. 2. Tree of Life worksheet.

5 principles for a resilient recovery from our data

Knowing how to manage intense feelings



Seeing disaster recovery as an opportunity for growth and hope



Finding strength in sharing talk (Tutura)



Complementing prayer with these actions to promote well-being



By supporting yourself you will increase your capacity to support students



Fig. 3. Presentation slide of teachers' principles of a resilient recovery.

normalcy of their experiences but encouraged to manage their distress using the techniques.

The first technique featured an exercise designed to engage the five

senses to anchor the participant in the present moment. The grounding technique, the '5, 4, 3, 2, 1' method, was taught and practiced focusing on the five bodily senses, identifying: 5) things you can see, 4) things you can touch, 3) sounds, 2) smells and 1) taste (Adams and Branscome, 2020; Davis, 2022; World Health Organization [WHO], 2020). The method aids in managing experiences of anxiety, flashbacks and intrusive thoughts to re-establish a sense of safety and calm. The second session, held later in the day, involved a 'square breathing' (or 'box breathing') exercise, involving deep inhalation, breath retention, exhalation and a final breath hold, while visualising a square shape (Ahmed et al., 2021; Lauria et al., 2017; Wei, 2023).

Following the initial exercise, teachers were grouped by school. During session five, each school-based group created a large 'Tree of Life' by amalgamating their individual trees to represent their collective strengths and communal coping resources (see Fig. 6). The activity aimed to foster post-disaster resilience by promoting positive coping strategies to increase sense of control, reduce anxiety and improve well-being. Teachers were told the group's tree would be transformed into a poster to be displayed in a communal school area as a visual narrative of post-disaster recovery, to memorialise the disaster and remind teachers of the collective strengths of their school community.

The group-based element of the activity was inspired by local perspectives and wider evidence suggesting group work among trauma-exposed populations provides feelings of comfort, combats isolation and stigma, and fosters reciprocal support (Baird and Alaggia, 2021; Steinberg, 2014; Yalom, 1998). During the assessment phase interviews, participants highlighted the cultural value of oral storytelling (locally termed 'tutura') to cope with adversity. Storytelling can have collective benefits, as narrating experiences can validate shared trauma by authenticating collective memory (Ainslie, 2013), building a sense of community (Mankowski and Rappaport, 2000) and supporting the co-construction of identity (van de Ven, 2020), including a shared cultural identity (Aho, 2014). Therefore, the group 'Tree of Life' incorporated elements of oral storytelling, fostering a safe space for dialogue therefore allowing participants to share their narratives of post-disaster coping.

This group-based technique aligns with the growing evidence-base supporting collective approaches to trauma recovery. They aim to engage and empower affected communities (Pearlman, 2013), by

recognising and enhancing their collective resilience (see Saul, 2022). Notably, group work with members of one's in-group (e.g., colleagues) may be highly valued in Indonesia, where the self is conceptualised as interdependent with others and a preference is shown for closeness, social harmony and achieving collective goals (Hofstede et al., 2010; Sagala et al., 2009). In this context, group-work can be empowering and alleviate shame, isolation and helplessness (Engelbrecht and Jobson, 2016), particularly given the high value placed on mutual support/collaboration (Hechanova et al., 2015).

Afternoon sessions transitioned from the focus on the teachers' resilience to addressing how teachers could support their students. During session seven, coping strategies valued by their students, derived from student interviews in the wider research project, were presented to teachers as six principles (see Fig. 7). Based on these principles, the students had created songs during an interrelated student intervention (see Joffe et al., in preparation). The songs were played to teachers, who were guided to reflect on: 1) How the songs make you feel? 2) What messages do you get from the songs? 3) Does anything about the song surprise you?

For session eight, teachers collaboratively developed guidelines to support the resilience of themselves and their students, scaffolded by Hobfoll et al.'s (2007) theoretical framework (see Fig. 8). Considering the promotion of each element of the model, teachers integrated insights from the morning activities, resilience principles derived from their interviews and their professional experiences. The strategy sought to affirm the responsibility of teachers for supporting their own

psychological recovery and that of students; re-affirming group roles (e.g., of teachers) can be beneficial during interventions (Dueck and Byron, 2012). This also aimed to foster community empowerment, collective efficacy and outcome expectancy through promoting concrete actions, which can enhance their motivation, a central component of sustaining behaviour change (Michie et al., 2011). The discussion-based activity resulted in each school recording and presenting their principles to the other school groups, ultimately forming a 'coping toolbox' of resilience resources for teachers, originally designed in interventions for teaching coping techniques to children (see Brown et al., 2006).

Lastly, teachers applied the principles they had devised to school-based vignettes, created by the authors, based on the teacher and student interview content. The vignettes aimed to resonate with participants' experiences for practical utility. For example: "During teaching a class, a large truck drives past outside. The movement of the truck causes the building to shake. Before the 2018 disaster, this would have felt normal so no one would have noticed. However, the shaking reminds the teacher of the disaster so startles them and they can feel themselves panicking. Some students exchange worried looks. The teacher feels their hands shaking, even though the truck has now gone by." In groups, teachers discussed handling each scenario and practiced deciding which principles to apply, fostering collective problem-solving skills and increasing confidence to navigate challenging situations.

Participants were also invited to join a WhatsApp group after the intervention, with the purpose of sustaining a sense of group cohesion, fostering social interaction, sharing learning and facilitating feedback. For example, teachers exchanged images of the posters created during the intervention displayed in their schools. The WhatsApp group was managed by a Palu-based research assistant who built a strong rapport with the teachers during data collection and the intervention. This is similar to the use of Facebook groups to sustain intervention behaviour change (Joffe et al., 2016, 2019).

Each school's 'Tree of Life' and guidelines were transformed into a poster by a local artist to be displayed in schools (see Fig. 9). The designs were shared with the WhatsApp group to invite feedback from the teachers before printing. Teachers were also gifted mug and tote bag reminders of teachers' resilience principles (see Fig. 10).

3. Measuring the impact of the intervention

To capture whether the intervention enhanced resilient recovery, the following variables were measured pre-intervention and three months post-intervention: personal resilience, community resilience, PTSD and CPTSD, personal subjective wellbeing, fatalism, social support, coping strategies and attitudes towards psychological help seeking. This battery of measures was devised to feature a range of determinants and expressions of resilience, as resilience depends on a complex array of factors (Masten, 2019; Masten and Motti-Stefanidi, 2020; Ungar, 2015). Collectively, these measures indicate a capacity for successful adaption following a disaster. This measurement approach is consistent with recommendations to adopt a broader view of the resilience concept and avoid a narrow focus on a single dimension or aspect (Mayunga, 2007). Demographic and disaster exposure information was collected as part of the pre-intervention survey.

Instruments were selected based on their relevance in measuring elements considered important for indicating teachers' adaptive capacity to recover following a disaster. Generally, standardised measures were used due to their established validity and reliability. These standardised scales were not adapted to retain their robust psychometric properties, thus contributing to the study's rigour and credibility. In addition, using standardised scales allows our work to build on previous research and facilitates potential comparison of these findings with other research.

However, to complement the standardised measures, additional exploratory items were incorporated into the survey, which were particularly relevant to resilience in the Indonesian context. This



Fig. 7. Six principles for the resilient recovery of students as presented to teachers.

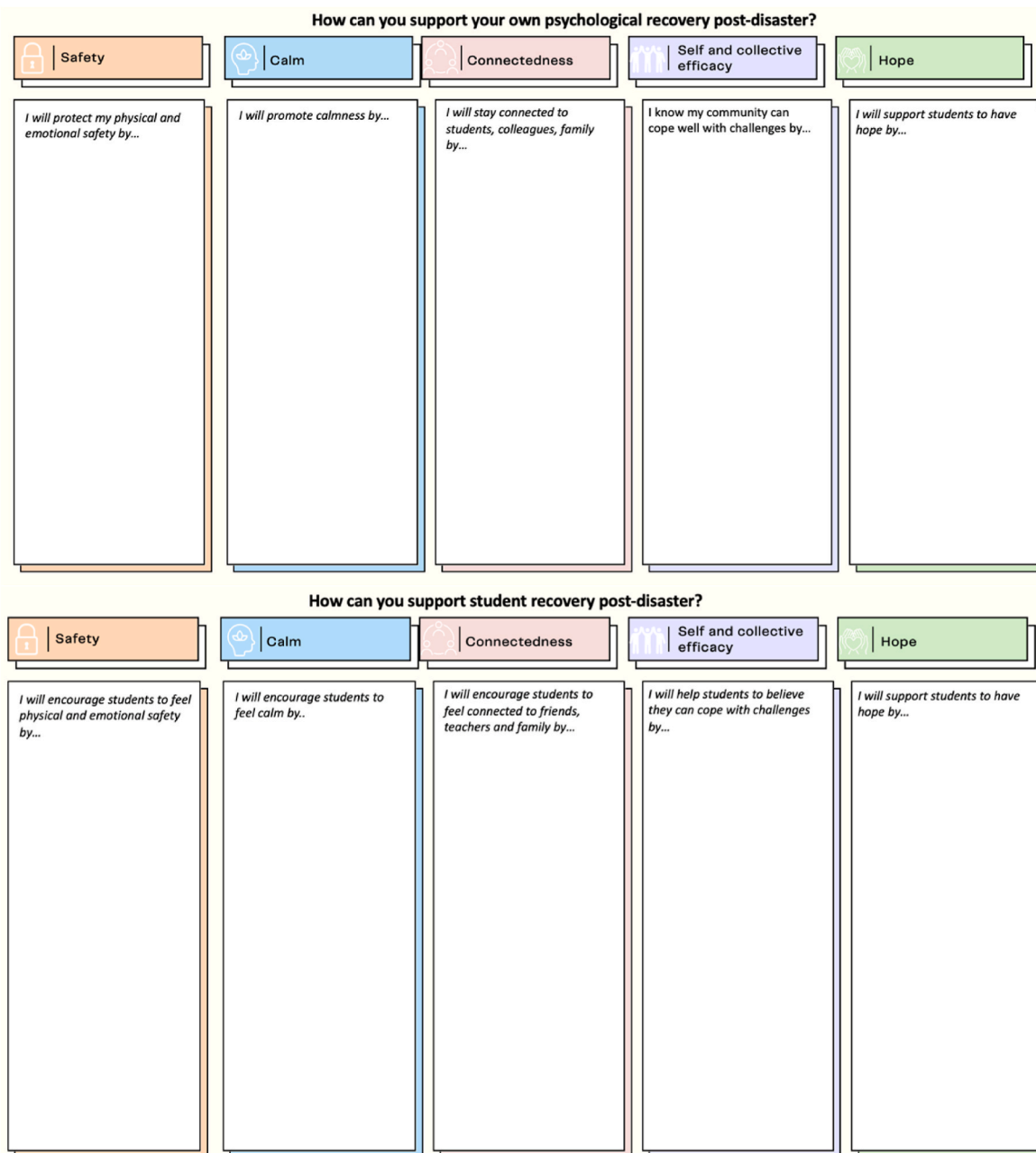


Fig. 8. Template used to create school guidelines.

included the ability of the *community* to bounce back from adversity and the role played by God’s support and monetary satisfaction for supporting wellbeing. This method, featuring translated instruments alongside context-specific items, is consistent with the ‘emic plus etic’ approach recommended for conducting mental health research in the global South (Bhui et al., 2003). Furthermore, all scales were selected in collaboration with Indonesian researchers who ensured the conceptual relevance of all measures. Face and content validity of standardised scales were also assessed by bi-lingual researchers during the translation process.

Personal subjective wellbeing was assessed using the Personal Well-being Office for National Statistics Scale (ONS4) (Tinkler and Hicks, 2011). The four-item measure consists of four independent themes that are scored separately: life satisfaction, life worthwhile, happiness, and anxiety. This scale is recommended for measuring well-being when prioritising brevity (VanderWeele et al., 2020). Two additional items

were added and scored separately: God support and monetary satisfaction. The inclusion of these two items was based on research regarding sociocultural features of wellbeing in Indonesia (Maulana et al., 2019).

Personal resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC) two-item version (Connor and Davidson, 2003), designed to capture the essential elements of personal resilience: adapting to change and bouncing back from adversity. The items are on a Likert scale ranging from 0 (‘not true at all’) to 4 (‘true nearly all the time’).

To measure community resilience, participants rated their *community’s* adaptability and bounce back from challenges using two items inspired by the CD-RISC. The Likert scale mirrored that of the personal resilience measure.

PTSD and CPTSD were measured using the International Trauma Questionnaire (ITQ) (Cloitre et al., 2018). The self-report measure comprises 18 items representing three PTSD symptom clusters:

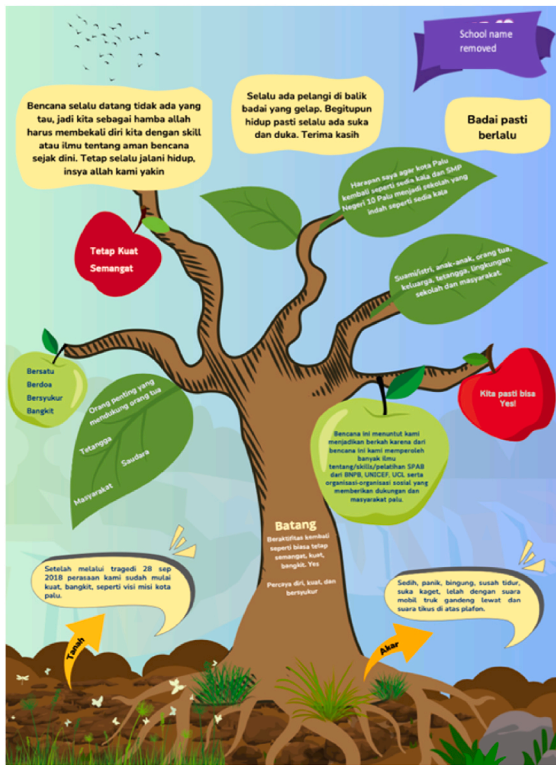


Fig. 9. Examples of Tree of Life (left) and guidelines (right) posters created by local artists based on the teachers' output, for one of the schools.



Fig. 10. Reminders gifted to participating teachers featuring the teachers' resilience principles.

re-experiencing, avoidance, sense of current threat. It also encompasses three CPTSD symptom clusters related to disturbances in self organisation (DSO): affective dysregulation, negative self-concept and disturbances in relationships. Additional items gauge functional impairment associated with PTSD and CPTSD (occupational, social/relational and other important areas of life/activities). Diagnostic scoring is based on symptom presence in each cluster and a related functional impairment, allowing for probable PTSD or CPTSD diagnosis.

Perceived social support was measured using The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1988), comprising three subscales for family, friends and a significant other. Each sub-scale contains four items, rated on a 7-point scale from 1 ('very strongly disagree') to 7 ('very strongly agree'). Higher scores indicate greater perceived social support.

Fatalism was measured by a set of eight items developed by Joffe et al. (2013) and used in Joffe et al. (2016, 2019). Each item is rated from 1 ('strongly disagree') to 4 ('strongly agree'). A higher score indicates higher fatalism.

Earthquake anxiety was measured using a set of seven items devised by Paton et al. (2003), which has been employed in several disaster studies, including Joffe et al. (2016, 2019). Responses are rated on a

4-point Likert scale from 1 ('not at all') to 4 ('a great deal'). Higher scores indicate greater earthquake anxiety.

The frequency of coping strategies was assessed using a series of items developed from the coping literature and discussion with the Indonesian authors. Identified strategies featured: 1) sports and/or exercise, 2) hobbies/interests, 3) letting time pass, 4) mental health/psychological services, 5) family support, 6) colleague support, 7) peer support, 8) alcohol, cigarettes and/or drugs, 9) prescription medication and 10) prayer and/or meditation. Attitudes towards psychological services were also gauged, with two questions regarding likelihood of seeking professional psychological support for oneself and likelihood of recommending support for others.

To assess teachers' experiences of the intervention, teachers responded to open-ended questions at the time of the intervention in a feedback form and in a three month follow up survey. Questions were designed to elicit their preference of activities, recommendations to improve the intervention, how they experienced the intervention and the impact they felt it had on their students.

Table 3
Paired sample T-test results.

Measure	Pre intervention		Post intervention		95% confidence interval of the difference		t	Effect size Cohen's d	Sig (2-tailed)
	M	SD	M	SD	Lower	Upper			
Earthquake anxiety	2.75	0.64	2.44	0.55	0.04	0.57	2.38	0.39	0.023 ^a
Fatalism	2.90	0.44	2.75	0.47	0.18	0.29	2.29	0.38	0.028 ^a
PTSD/CPTSD (ITQ)									
PTSD symptoms	12.78	5.83	8.57	4.64	2.32	6.11	4.52	0.74	<0.001 ^c
Re-experiencing in the here and now	3.54	2.02	2.59	1.95	0.09	1.80	2.24	0.37	0.031 ^a
Avoidance	4.38	2.52	2.92	2.34	0.61	2.30	3.50	0.58	0.001 ^b
Sense of current threat	4.86	2.16	3.05	2.32	0.90	2.72	4.04	0.66	<0.001 ^c
DSO symptoms	6.54	6.11	3.41	3.83	0.82	5.45	2.74	0.45	0.009 ^b
Affective dysregulation	2.76	1.88	1.38	1.42	0.60	2.16	3.57	0.59	0.001 ^a
Negative self-concept	2.05	2.57	1.22	1.95	-0.21	1.88	1.63	0.27	0.112
Disturbances in relationships	1.73	2.31	0.81	1.58	0.10	1.74	2.28	0.37	0.029 ^a
Perceived social support (MSPSS)									
Significant others	5.51	1.15	6.11	0.53	-0.99	-0.21	-3.15	-0.52	0.003 ^b
Family	5.61	1.02	6.09	0.57	-0.87	-0.09	-2.49	-0.41	0.017 ^a
Friends	5.24	1.27	5.70	0.67	-0.92	-0.01	-2.07	-0.34	0.046 ^a
Personal resilience (CD-RISC)	3.12	0.58	3.50	0.55	-0.59	-0.17	-3.60	-0.59	<0.001 ^c
Community resilience	2.99	0.55	3.33	0.50	-0.58	-0.12	-3.12	-0.51	0.004 ^b
Wellbeing (ONS)									
Life satisfaction	8.30	1.43	8.57	0.90	-0.75	0.21	-1.15	-0.19	0.257
Life worthwhile	8.62	1.11	8.49	0.90	-0.331	0.60	0.59	0.10	0.560
Happiness	8.46	1.66	8.59	1.30	-0.774	0.50	-0.43	-0.07	0.671
Anxiety	6.65	2.80	5.89	2.54	-0.47	1.98	1.25	0.21	0.218
Wellbeing additional items									
Monetary satisfaction	7.54	2.41	8.03	1.17	-1.32	0.34	-1.19	-0.20	0.242
God support	9.59	0.69	9.49	0.61	-0.16	0.38	0.81	0.13	0.422
Coping strategies									
Sports and/or exercise	1.35	0.59	1.24	0.80	-0.16	0.38	0.81	0.13	0.422
Meditation and/or prayer	2.76	0.44	2.92	0.28	-0.31	-0.02	-2.23	-0.37	0.032 ^a
Alcohol, cigarettes and/or drugs	0.11	0.39	0.03	0.16	-0.06	0.23	1.14	0.19	0.262
Prescription medication	0.32	0.78	0.14	0.42	-0.02	0.40	1.87	0.31	0.070
Hobbies or interests	1.89	0.81	2.08	0.92	-0.65	0.28	-0.83	-0.14	0.414
Colleague support	1.38	0.83	2.38	0.72	-1.34	-0.66	-5.92	-0.97	0.000 ^c
Peer support	1.73	0.90	2.51	0.65	-1.13	-0.44	-4.62	-0.76	0.000 ^c
Family support	2.11	0.88	2.73	0.45	-0.95	-0.29	-3.85	-0.63	0.000 ^c
Mental health/Psychosocial provider/services	0.35	0.72	0.16	0.50	-0.06	0.44	1.56	0.26	0.128
Passage of time	1.76	0.98	1.81	1.10	-0.53	0.42	-0.23	-0.04	0.817
Controlling own emotions (e.g., rationalisations)	1.92	0.72	2.62	0.55	-0.99	-0.42	-5.06	-0.83	0.000 ^c
Psychological help seeking									
Likelihood of seeking professional psychological	1.30	0.74	2.00	0.75	-1.04	-0.37	-4.29	-0.71	0.000 ^c
Likelihood of recommending professional psychological support to others	1.22	0.71	1.62	0.59	-0.67	-0.14	-3.09	-0.51	0.004 ^b

^a p < .05.
^b p < .01.
^c p < .001.

3.1. Data analysis

Statistical analyses were conducted with SPSS (Mac Version 29). Paired samples t-tests examined differences in pre and post intervention outcome measures. All data was normally distributed and met the assumptions for a t-test, therefore non-parametric tests were not required. However, for the dichotomous variable (probable diagnosis of PTSD and/or CPTSD), a McNemar test was used. Statistical tests were two-tailed with a p-value of 0.05 or less considered statistically significant. Effect sizes were also examined and reported.

Open ended survey questions were entered into excel and analysed using content analysis. A content analysis involves categorising and counting key themes that occur (Wester and Krippendorff, 2005). The method is useful for analysing open-ended survey questions due to the brevity of responses, which renders the data unsuitable for a more in-depth thematic analysis.

4. Results

4.1. Pre- and post-intervention quantitative measures

37 participants completed the pre- and post-intervention resilience related measures. Results of paired sample t-tests are presented in Table 3.

T-tests revealed that teachers reported significantly lower levels of earthquake anxiety and fatalism ($p < .05$) following the intervention. Overall, PTSD symptoms significantly reduced ($p < .001$) across all symptom clusters ($p < .05$), as did DSO symptoms ($p < .01$), specifically in the clusters of affective dysregulation and disturbances in relationships ($p < .05$). Post-intervention, teachers reported significant increases in perceived social support from friends ($p < .05$), family ($p < .05$) and significant others ($p < .01$). Teachers also rated their personal resilience and community resilience as significantly higher following the intervention ($p < .01$). Moreover, teachers reported using the following coping strategies significantly more frequently post-intervention: medication and/or prayer ($p < .05$), colleague ($p < .001$), peer ($p < .001$) and family ($p < .001$) support and controlling one's emotions (e.g., self-reassurance) ($p < .001$). Teachers also reported significant increases in likelihood of seeking psychological help for themselves and recommending psychological support to others post-intervention ($p < .01$).

Furthermore, an exact McNemar test determined that there was a statistically significant difference in the proportion of diagnostic criteria reached for PTSD and CPTSD pre-versus post-intervention, $p = .002$. Twelve participants (32%) met criteria for either probable PTSD or CPTSD pre-intervention. After the intervention, two participants met the criteria for PTSD (5%) and none for CPTSD.

4.2. Feedback forms

Thirty-six teachers responded to open-ended questions in feedback forms immediately after the intervention. This section reports teachers' feedback obtained via the forms regarding their subjective experiences of the intervention's: 1) purpose and content, 2) impact on psychosocial recovery and 3) the impact on their capacity to support students.

The main purpose of the intervention was reported to be teachers' recovery from disaster (22%). For example, "how to overcome and recover from disaster." Within this category, some referred to harnessing intra-personal psychological resources, such as building the "psychological strength of teachers" and the ability to "stay spirited and grateful when we were tested." An equal number of teachers felt the focus had been specifically on feeling calm (22%), often associated with mindful breathing. For example, "breathing exercises to feel calm and happy in order to feel calm and not panic in facing disaster." Others felt the day aimed to promote social cohesion (19%), such as "togetherness in teamwork", "cooperation" and "able to meet & gather with friends."

The breathing exercises were liked most (33%) followed by the Tree

of Life (31%), working together with others (8%), the icebreaking activities (dancing and singing) (8%), and 'everything' (8%). Regarding their least favourite aspect, most participants (75%) stated 'nothing'.

Regarding intervention improvements, nearly half the participants requested a longer intervention duration and follow-up sessions. Some suggested logistical improvements, including providing electronic copies of the materials, a detailed itinerary and alignment with their school schedule. A question-and-answer component was also suggested.

Regarding teachers' subjectively experienced improvements to psychosocial recovery, all participants found the intervention to be calming. Specifically, half mentioned breathing exercises, while around a third cited the Tree of life and dancing, bodily movements and singing (i.e., ice breaking activities) as calming. A small number (14%) found calmness in the materials disseminated by the speaker, completing tasks collaboratively (14%) and through social interactions with facilitators and other teachers (11%).

When asked which activities helped the teachers to cope with their post-disaster psychological recovery, a quarter mentioned religious practices. For example, "always praying ... bringing myself closer to the Almighty". A quarter mentioned the development of intra-personal psychological skills, including emotional regulation. For example, "able to manage my feelings well and always motivate myself" and "have a good confidence".

Nearly all teachers (94%) reported feeling an improved ability to support their students psychologically. In open-ended responses, 17% felt that the Tree of Life and responding to the vignettes enhanced their support capabilities. Teachers also mentioned the guidelines and principles (including learning resilience theory) (14%). For example, by using the, "5 steps that support the student's recovery in overcoming the disaster (willingness, calmness, connectedness, self-efficacy, and hope)". Fourteen percent mentioned feeling better able to motivate and strengthen their students. For example, "motivate students not to be down due to the situation after the earthquake". Eleven percent mentioned implementing the activities with their students. A small number (9%) felt their improved psychological recovery would contribute to better supporting students and that "trauma" could be solved collectively.

Teachers overwhelmingly expressed a likelihood of recommending the intervention, with 83% 'very likely' and 14% 'quite likely'. None answered that they were 'not likely' or 'not at all likely', although one teacher did not respond. Reasons included the workshops benefits for teachers' psychological recovery knowledge (e.g., "Because it was very good in enhancing knowledge on overcoming mental problems post-disaster"), the ability to disseminate insights to colleagues (e.g., "I am going to share what I got today with my colleagues at school"), the feasibility of implementing knowledge in school (e.g., "The knowledge learned was very easy to be implemented at school and to colleagues") and the personal benefits for their psychological recovery (e.g., "Because it was very useful for myself psychologically and mentally").

4.3. Survey responses: three months post-intervention

The vast majority of teachers (33/37) completed open-ended questions three months post-intervention. Teachers reported on their lasting impressions of the workshop and their subjective perspective of the workshop's impact for themselves and their students. All teachers felt the workshop had an impact on them. When asked to elaborate on what the impact was, just under half spontaneously reported a reduction in negative affect and psychological distress. For example, feeling "calmer, not as panicked as before ..." and "... stronger when remembering the earthquake ...". Recovery was attributed to the Tree of life, guidelines and psychoeducation, including self-awareness and understanding of anxiety. Just under a quarter of teachers (24%) expressed the impact of their improved ability to support students. For example, as the content teachers learnt "can be used as a learning example in class" and to "teach students not to panic during an earthquake ...". This included an "increase [in the teachers] the sense of responsibility towards students". A small

number of teachers (18%) reported that they had learnt about themselves, including developing self-understanding and self-awareness of their challenges (18%). For example, “*My tree of life can recognize ourselves and see problems and think about solutions ...*” and “*... some lessons that we learned, such as knowing ourselves and being able to be enthusiastic about seeing life in the future ...*”. No negative impacts were mentioned.

The vast majority of teachers reported that the intervention positively impacted their teaching practice (85%). This was often due to implementing the techniques learned, as well that their improved psychosocial knowledge meant that: “*when we teach, we understand the student’s mental state or condition. If someone is experiencing a problem, we can recognize it and know how to find a solution for that student*”. Nearly half mentioned that the intervention improved their teaching practice through keeping calm, which could influence student-wellbeing: “*students will feel happy if the teachers also feel calm*”. Teachers also mentioned intrapersonal resources, including motivating, encouraging and strengthening students. For example, “*because we also have to be strong and became models for students*”. All teachers (15%) who felt the intervention hadn’t had a pedagogical impact mentioned not yet implementing activities. This was for a variety of reasons: lack of time, planning to begin next term, retirement and forgetting the interventions content.

Similarly, regarding teachers’ perception of the intervention’s impact on students, 79% believed it had an effect. When invited to elaborate, teachers wrote that positive perceived effects for students included reduced post-disaster distress and improved emotional regulation, particularly during an earthquake that had occurred shortly before data collection (e.g., “*My students in class were calmer when the earthquake occurred ...*”). Teachers also reported improved knowledge and awareness of how to act during disasters.

Regarding teachers’ lasting impressions of the workshop, in written responses, 38% mentioned the Tree of Life activity, describing it as “*... useful*”, “*... interesting*” and supporting positive affect. Relatedly, nearly a third (31%), highlighted a reduction in negative affect and trauma with an increase in positive emotional experiences, including, “*... forgetting the trauma and enjoy more ...*” and “*... overcome post-disaster fears*”. Comments regarding positive affect included feeling motivated and happy. A quarter focused on their lasting impressions of knowledge and learning regarding disaster preparation and emotional control. For example, “*A lot of knowledge was gained, such as how to anticipate disasters, control the panic and emotions when a disaster occurs*”. A quarter mentioned social opportunities, such as feeling “*... happy to gather with fellow teachers*”, as well as the opportunity to “*... meet new friends*” from different schools. Additionally, 19% expressed general positive impressions, finding the activities “*... fun ...*” and feeling “*... entertained ...*”.

5. Discussion

This community, strengths-based intervention aimed to foster the resilient recovery of schoolteachers by supporting their psychosocial recovery and by increasing their confidence and knowledge to support their students. Three months after the intervention, teachers reported significant improvements in various aspects of psychosocial recovery: *individual resilience, community resilience, PTSD symptoms, DSO symptoms, fatalism, earthquake anxiety, social support and adaptive coping strategies*. Furthermore, in open-ended responses, teachers expressed that the intervention was beneficial for themselves and their students.

Despite the overwhelmingly positive changes observed in teachers’ adaptive coping strategies following the intervention, there were no significant changes found in coping strategies related to *‘alcohol, cigarettes and/or drugs’* and *‘prescription medication’*, *‘Sports and/or exercise’* and *‘hobbies or interests’* or *‘mental health/psychosocial provider/services’*. These items were included in the assessment phase survey to gain insight into how teachers coped and are reported here for transparency. However, the lack of changes in reported use of these strategies was expected, considering that these areas were not directly targeted in the

intervention. This was because teachers’ use of maladaptive coping strategies (e.g., substance use) was already extremely minimal at baseline. The finding that coping through *‘mental health/psychosocial provider/services’* did not increase while there was an increase in *‘likelihood to seek psychological support’* and *‘likelihood to recommend professional psychological support’*, suggests that teachers may not have felt the need to seek professional support in the three months following the intervention. Alternatively, this finding could imply that mental health support was desired but inaccessible, which aligns with reported concerns about the disparities between the need for and access to professional psychological services in Indonesia (Setiyawati et al., 2014).

Overall, the results highlight the feasibility and efficacy of combining narrative practice with psychoeducation, mindful breathing and skills-based scenarios. Since the outcome of each component was not examined separately, disentangling their specific influence on the outcome measures is challenging. This complicates evaluating the effectiveness of commonly used intervention components, such as psychoeducation, which typically feature as one aspect of a larger intervention (Pfefferbaum et al., 2014). However, given the success of the intervention, we recommend that future interventions retain the multiple components, and with larger sample sizes explore the specific mechanisms that contribute to the impact seen in different areas of wellbeing and development.

Based on existing literature it is likely that mindful breathing and grounding exercises may have eased PTSD symptoms and hazard anxiety (e.g., Thompson et al., 2011). Our results corroborate a small number of previous post-disaster intervention studies from Southeast Asia that find mindful breathing to facilitate self-regulation of physiological stress reactions (see Panting et al., 2020, for a review). The sessions may also have influenced teachers’ coping behaviours, indicated by a significant increase in reported meditation and/or prayer post-intervention. While this measurement item does not distinguish between prayer and meditation, as the community highly valued prayer as a coping strategy pre-intervention (see Lomeli-Rodriguez et al., 2024), it’s likely that the increase specifically refers to the mindful breathing exercises contributing to the teachers’ psychological adjustment.

A large component of the intervention brought teachers together to orally share their experiences of post-disaster coping and sources of strength. By fostering a non-judgemental and accepting space, the Tree of Life activity facilitated teachers to collectively reclaim adaptive narratives. This collective storytelling (*‘tutura’*) may have influenced teachers’ reported increases in social support post-intervention, according to both the multi-dimensional social support scale and items measuring coping by drawing on peer, family and colleague support. This aligns with the notion that sharing lived experience narratives among a sub-set of the community, such as teachers, can foster community resilience (Edmeade and Buzinde, 2021). Furthermore, storytelling may have contributed to improving less directly relevant outcome measures, including individual resilience, reduced PTSD symptoms and earthquake anxiety. This is because storytelling can support the release of emotions (D’Cruz et al., 2020), support making sense of traumatic experiences (Kellas and Trees, 2006; Park, 2010), authenticate collective memory (Ainslie, 2013), and rebuild shared, cultural identity (Aho, 2014; van de Ven, 2020). It is possible that the benefit of the narrative component of the intervention may be heightened in cultures oriented towards collectivism, where the self is perceived as an interdependent unit (Hofstede, 1980; Markus and Kitayama, 2010); this may foster cooperation and supportive networks (Triandis, 2000). Teachers from individualistic cultures, where the self is perceived as independent and autonomous, may, in contrast, be more reluctant to disclose personal stories to avoid exposing their vulnerabilities (Nurser et al., 2018). This corroborates previous findings that group therapies are well-suited to collectivistic cultures (Engelbrecht and Jobson, 2016) such as the Indonesian one.

While the reported increase in social support post-intervention may be associated with the easing of Covid-19 containment measures, that

limited social contact, feedback forms suggest the intervention's role in uniting teachers and fostering social connections, as they shared identities as disaster survivors, residents of the same region and teachers. Given previous research demonstrating a decline in social support over time post-disaster (Guilaran et al., 2018; Kaniasty and Norris, 1995, 2008), it is likely that the teachers' heightened social support is attributable to the intervention. A practical implication of this finding is that schools should allow teachers time and space to reconnect post-disaster; this time would best be used for orally sharing stories of coping and communal strengths.

Despite the potential psychosocial benefits of oral storytelling, intervention facilitators must be mindful of the risk of re-traumatisation. In the current intervention, storytelling focused on survivors' coping strategies and sources of strength rather than on traumatic content. However, participants' memories of traumatic experiences may be triggered by others' descriptions (Ford and Courtois, 2013). Therefore, it is crucial to have a psychologist or mental health specialist present to moderate the story-sharing content and provide support in case participants experience psychological distress.

Alongside storytelling, the intervention incorporated skill-based components, to foster adaptive coping skills and normalise negative emotional experiences, which may have contributed to reducing teachers' earthquake anxiety, PTSS and increasing adaptive coping strategies, such as coping by self-reassurance and rationalisation. Intervention activities encouraged emotional regulation strategies linked to PTSS reduction. For instance, the Tree of Life and mindful breathing activities promoted acceptance and cognitive reappraisal, associated with lower PTSD (Boden et al., 2013; Tull et al., 2007). Furthermore, creating school psychosocial guidelines and applying them to school-based vignettes may have contributed to teachers' psychosocial improvements through engagement in collective problem-solving (Gil, 2005) and fostering collective empowerment through engagement in meaningful actions (Drury and Reicher, 2005; Dudgeon et al., 2017).

It is possible that the Covid-19 pandemic and associated public health measures may have impacted the results, due to the psychological and social repercussions related to loss of life, unemployment, limits on movement and restricted social interactions (Brooks et al., 2020). For disaster survivors, existing evidence suggests that the pandemic exacerbated PTSS and impeded functional recovery (First and Houston, 2022; Marko et al., 2020). However, we found teachers experienced reduced PTSS following the intervention, despite the potentially aggravating influence of Covid-19.

Our study revealed a decrease in symptoms of PTSD and/or CPTSD among teachers approximately four years post-disaster, emphasising the importance of intervening beyond the immediate aftermath of a disaster. While this improvement could be attributed to the passage of time and gradual recovery from the Covid-19 pandemic between the two data collection timepoints, previous literature suggests that PTSD prevalence often remains elevated even 8–10 years post-disaster (Fong et al., 2022; Lu et al., 2021). Given the highly traumatic nature of the largescale disaster and the on-going disruption hindering a return to normalcy, a natural recovery between the data collection timepoints is unlikely.

Contextual factors related to teachers' roles and environments are also likely contributors to persistent PTSS without intervention. Akin to emergency workers and crisis psychologists, who often suffer PTSD due to frontline support roles (Tahernejad et al., 2023), teachers also provide comfort and guidance to trauma-exposed students (Mooney et al., 2020; Mutch, 2015, 2018; Parrott et al., 2023a,b). Caring for students who experienced trauma can trigger trauma memories, secondary traumatic stress and burnout for teachers (O'Toole, 2017; O'Toole and Friesen, 2016). The varying, on-going damage of the schools may regularly expose teachers to trauma triggers (Hackmann et al., 2004). Therefore, considering teachers' exposure to these risk factors, the significant reduction in teachers' PTSS is likely due to the intervention's efficacy rather than solely the passage of time.

Despite an overall decrease in teachers' post-traumatic stress symptoms following the intervention, no significant changes were found in the symptom cluster of 'negative self-concept'. This highlights that while the intervention demonstrated generally beneficial effects for survivors experiencing post-traumatic stress symptoms, it should not be considered a substitute for clinical, trauma-focused treatments. This is because the intervention was not focused on alleviating specific trauma symptoms but on fostering broader psychosocial recovery in a non-clinical sample. To address specific clinical symptom domains, disaster survivors experiencing debilitating functional impairment due to PTSD should be offered cognitive behavioural therapy with a trauma focus or eye movement desensitisation and reprocessing (EMDR) (World Health Organization [WHO], 2013).

The rapport between intervention facilitators and teachers likely contributed to the intervention's impact. Teachers had previous interactions with facilitators during data collection, featuring personal, in-depth 1:1 interviews (see Lomeli-Rodriguez et al., 2024). This familiarity may have developed a relationship that enhanced teachers' willingness to share emotional content. The facilitators noted a warm atmosphere during the sessions, encouraging teachers to openly share post-disaster coping stories. All intervention facilitators were Indonesian, possessing knowledge of local faith, customs and norms, mitigating a potential power imbalance that may have existed with Western facilitators.

Previous disaster intervention literature, such as after Typhoon Yolanda (Field, 2017), indicates a potential disconnect between survivors' needs and desires and the interventions provided. To bridge this gap, our study design integrated an extensive assessment phase to understand participants' desires for recovery and to identify existing community strengths that could be harnessed. For instance, culturally valued coping systems, including oral story telling (*tutura*) and mutual assistance (*gotong royong*), were recognised and incorporated into activities. To prevent pathologising responses, we avoided Western diagnostic labels during coping discussions (Gelkopf et al., 2008; Summerfield, 1999). This culturally sensitive design likely contributed to positive feedback in follow-up surveys, with participants suggesting improvements only in the timing and frequency of sessions. Notably, the intervention was well-accepted as teachers showed no desire to alter intervention content. Gauging the subjective experience of participants is an important but often neglected feature of school-based intervention research (Zakszeski et al., 2017). However, social desirability biases should be considered, due to cultural tendencies in Indonesia to avoid expressing strong negative feelings or complaining (Schwarz, 2014).

While the intervention likely contributed to resilience improvements, it should complement, rather than substitute, broader socio-economic structural policies supporting vulnerable populations post-disaster. As teachers' post-disaster coping is embedded in the wider societal context, establishing physical and economic security is essential for promoting health outcomes amid adversity (Burgess, 2023; Summerfield, 2006). Survivors from the same community have expressed a need for economic support, humanitarian assistance and employment opportunities (Lomeli-Rodriguez et al., 2024; Parrott et al., 2023a,b). Furthermore, economic revitalisation and improved housing can enhance Hobfoll et al.'s (2007) resilience-building elements, including feelings of safety, hope and family connectedness (Panter-Brick and Eggerman, 2012). Therefore, alongside interventions promoting intra-personal and social coping resources, post-disaster policies must address structural and socioeconomic determinants of risk and resilience.

Ongoing WhatsApp communications and follow-up reminders aimed to retain group-bonds and reinforce long-term learning of intervention materials. This can motivate teachers to adhere to their resilience principles (Michie et al., 2011), potentially embedding them into school policy and culture. The posters also serve as memorial of the 2018 disaster, aiding in reappraising events and promoting adaptive post-disaster conduct (Bonder, 2009). The school, as a potential memorial location (Pacheco et al., 2022), can contribute to maintaining a

shared post-disaster identity, sustaining social connectedness and support (Ntontis et al., 2018).

5.1. Limitations and directions for future research

The encouraging results of this study must be considered in the context of some limitations. As this study aimed to test the feasibility and initial efficacy of a novel intervention, a control group was not included. This decision was also informed by the urgent need for psychosocial support among disaster-displaced residents in this low resource context. Thus, ethical and practical considerations precluded the inclusion of a control group. Surveying teachers at two time-points without potential intervention benefits was deemed overly burdensome. While a waitlist control may mitigate ethical concerns by allowing delayed provision of care to research participants (Cunningham et al., 2013), our uncertainties regarding the feasibility of offering the intervention to a waitlist, given project timing, funding and researcher availability, raised ethical concerns (Carlson et al., 2018).

While this design means that we cannot conclusively attribute change to the intervention, positive feedback and subjectively experienced benefits from participants are promising. Furthermore, given longitudinal research on the persistence of lingering PTSS and other aspects of psychosocial functioning following disasters, particularly when left untreated (e.g., Briere and Elliott, 2000; Goenjian et al., 2005), it is reasonable to conclude that the intervention contributed to participants' psychosocial improvements. Future research should employ a non-treated, ideally randomised, control group and a larger sample size to disentangle the intervention effects from natural recovery over time. A waitlist control group is advised to alleviate ethical concerns by ensuring a delayed provision of care to all participants (Cunningham et al., 2013).

A further limitation concerns the predominantly female sample, reflecting the gendered division of the labour force at selected school sites and the disproportionate negative impacts of disasters on women (see Neumayer and Plümpner, 2007; Tanyag, 2018b, 2018a). However, future studies may benefit from recruiting a gender-representative sample. As there are gender differences in post-disaster mental health and coping (e.g., Jin et al., 2014; Tamres et al., 2002), men may have a different experience of the intervention to women. Furthermore, the likelihood of men experiencing stigma related to psychological help seeking (Topkaya, 2014) underscores the importance of targeting men in future interventions.

The self-report measures used may have some limitations. Due to stigma, self-reporting can lead to an underreporting of mental health symptomatology (Bharadwaj et al., 2017; Hahm et al., 2020). Furthermore, while local researchers were included in discussions regarding selecting appropriate scales, many of the measures used were not created in the Indonesian context. This may be a limitation, as Western understandings of mental health do not always align with the cultural perspectives of Non-Western populations (Summerfield, 2006). While acknowledging criticisms (Pupavac, 2002; Summerfield, 2004), we chose to measure PTSD due to evidence for cross-cultural trauma symptomatology (e.g., Hinton and Lewis-Fernández, 2011) and the practical utility of PTSD for identifying mental health needs and organising care in Indonesia (Good, 2015).

Relatedly, the lack of significant changes to participants' reported well-being may be due to the cultural bias of the well-being measure for favouring individualist dimensions of mental health that are less applicable to non-Western conceptualisations. The ONS scale emphasises individual emotions and life satisfaction, whereas culturally specific collectivistic understandings of well-being may focus more on gratitude, self-acceptance and spirituality (Maulana et al., 2019). Although this potential Western influence was considered when selecting the scale, sociocultural determinants of well-being that were not captured elsewhere in the survey (including God support and monetary satisfaction) were incorporated to mitigate against Western bias. While this aided in

understanding participants' well-being in the assessment phase, these factors were not directly targeted in the intervention, as God support was high at baseline and improving monetary satisfaction was beyond the scope of the reported intervention. Therefore, the lack of significant changes in these context-specific items was anticipated.

In contrast, the absence of significant changes in indicators of well-being according to the standardised well-being scale, such as to happiness and anxiety, was surprising, as this contradicts other significant findings that would be expected to indicate an improvement in well-being. For example, a reduction in post-traumatic stress symptoms, hazard anxiety and increase in perceived social support. Future research would benefit from employing a novel scale adapted to align with Indonesian conceptualisations of well-being (e.g., Maulana et al., 2019) and undertaking a robust process of validation in the local context.

Furthermore, some intervention changes may not have been captured by the measures used. Future research would benefit from exploring the impact of the intervention in schools and on students. This could involve an observational study of teachers responding to students' psychosocial needs, a study of student views on how their teachers' cope with their emotional distress and/or a study of the impact of the intervention on students' resilience.

Additionally, in future, a two-day intervention may be more impactful. In extending the intervention, one day could focus on teachers' resilient recovery and the second on how teachers can support their students. This suggested modification is based on feedback from the teachers, who expressed a desire for a longer intervention and additional follow-up activities. Furthermore, many teachers felt the intervention was more beneficial for their own recovery than for their students. Several teachers suggested this was because they had not yet implemented specific recovery activities with their students. However, the intervention aimed to foster a culture shift similar to trauma-informed training by enhancing teachers' capacity to respond effectively to students (Ford and Russo, 2006), rather than delivering explicit psychosocial content. Consequently, some teachers may have been unaware of the more subtle benefits to students that may become clearer over time. Nevertheless, it is also possible that the intervention overemphasised supporting teachers' recovery at the expense of developing their capacity to support their students. Therefore, in future, a two-day intervention may be a more effective and well-accepted design.

6. Conclusion

Overall, this paper reports the development and evaluation of a school-based intervention in a disaster-affected, low resource, under-researched context. The intervention aimed to support teachers to cope with distress and to support their students' psychological recovery, harnessing strategies highly valued by the community. The findings suggest that a group-based intervention for teachers combining theory, narrative practice, mindful breathing and skills-based elements can contribute to the psychosocial recovery of teachers. The intervention was well-accepted and participants reported feeling subjective benefits for themselves and their students. These findings contribute to an emerging evidence base supporting effective interventions for disaster exposed teachers that take place beyond the immediate disaster aftermath in LMICs. However, further research is needed to establish the efficacy of the intervention with a larger sample size and a non-treatment wait-list control group.

Ethical approval

Approval for this study was obtained from the ethics committee of University College London (UCL) Project ID: 0525/001.

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CRedit authorship contribution statement

Elinor Parrott: Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization. **Martha Lomeli-Rodriguez:** Writing – review & editing, Methodology, Conceptualization. **Alfi Rahman:** Writing – review & editing, Investigation, Data curation. **Yulia Direzka:** Writing – review & editing, Investigation, Data curation, Conceptualization. **Andrea Bernardino:** Writing – review & editing, Formal analysis, Data curation, Conceptualization. **Rochelle Burgess:** Writing – review & editing, Supervision. **Helene Joffe:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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