
Psychological Impacts of Natural Disaster Conséquences psychologiques des catastrophes naturelles

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ABSTRACT

The Canadian Red Cross approved funding for the Psychologists' Association of Alberta through its Alberta Wildfires 2016 Community Organization Partnership Program. Funding was used to directly resource psychological trauma assessment and treatment until June 2020. Outcome-informed practices were employed to empirically validate treatment employing the Outcome Rating Scale (ORS). Sixteen approved psychologists provided trauma-informed services to 349 clients over 3 years, with the ORS being completed at five-session intervals. Results indicated very low levels of functioning and well-being at intake. For adults, overall average functioning and well-being increased over the treatment period. By the 5th, 10th, and 15th sessions, there was an average reported increase in perceived well-being of 65%, 57%, and 100%, respectively. Treatment made a significant difference for clients. The resulting five primary recommendations are 1) to provide timely access to qualified assessment and treatment, 2) to conduct trauma-informed screening of referrals, 3) to identify and provide additional resources for vulnerable populations, 4) to tailor services to gender considerations, and 5) to take steps to reduce barriers to accessing assessment and treatment.

RÉSUMÉ

La Croix-Rouge canadienne a approuvé un financement pour la Psychologists' Association of Alberta dans le cadre de son programme de partenariats communautaires dans la lutte contre les feux en Alberta en 2016. Le financement a servi à financer directement l'évaluation de traumatismes psychologiques et de traitements jusqu'en juin 2020. Des méthodes fondées sur les résultats ont été utilisées pour valider de manière empirique les traitements en employant l'échelle de notation des résultats. Seize psychologues approuvés ont fourni des services tenant compte des traumatismes à 349 clients sur 3 ans, l'échelle de notation des résultats étant remplie toutes les cinq séances. Les résultats indiquaient de très faibles niveaux de fonctionnement et de bien-être à l'évaluation initiale. Pour les adultes, le fonctionnement et le bien-être moyens généraux ont augmenté sur la période de traitement. Les résultats moyens indiquaient une amélioration déclarée de 65 %, 57 %, et 100 % du bien-être ressenti à

la 5^e, 10^e, et 15^e séance, respectivement. Le traitement a beaucoup amélioré les choses pour les clients. Les cinq principales recommandations sont : 1) un accès rapide à une évaluation et un traitement par des professionnels qualifiés, 2) un aiguillage après examen tenant compte des traumatismes, 3) le repérage des populations vulnérables et des ressources supplémentaires pour ces populations, 4) l'adaptation des services aux considérations de genre, et 5) des mesures pour réduire les obstacles à l'accès à une évaluation et à un traitement.

Natural disasters produce well-known psychological consequences that begin immediately and may persist for some time (Beaglehole et al., 2019; Makwana, 2019; Morganstein & Ursano, 2020). Common psychological responses include emotional instability, behavioural abnormalities, increased stress, anxiety, depression, trauma, and even PTSD (Makwana, 2019; Naushad et al., 2019). These psychological effects have a massive impact on the individual and the community (Makwana, 2019; Morganstein & Ursano, 2020). Vulnerable sub-groups are more prone to adverse psychological effects (Beaglehole et al., 2019; Morganstein & Ursano, 2020; Naushad et al., 2019). Medical professionals, first responders, those with prior psychological difficulties or maladaptive coping strategies, and those with limited social support are at greater risk of long-term psychological difficulties (Beaglehole et al., 2019; Makwana, 2019; Naushad et al., 2019), including depression and PTSD, resulting from natural disasters (Bromet et al., 2017; Cukor et al., 2011; Nagamine et al., 2018; Naushad et al., 2019).

Resilience and Post-Traumatic Growth

Although disasters have a significant impact on the individuals and communities involved (Makwana, 2019), psychological effects are widespread but not universal (Beaglehole et al., 2019). Most, but not all, individuals recover with time, depending on effective post-intervention techniques and individual strengths (Makwana, 2019). Many people adapt to situational needs while remaining effective in their work and family lives, and some experience an increased sense of efficacy that has been called post-traumatic growth, or PTG (Morganstein & Ursano, 2020).

PTG is the positive psychological change that develops when people successfully overcome adversity (Tedeschi & Calhoun, 2004). These outcomes are associated with reduced levels of loneliness and depression in the aftermath of disasters (Lee et al., 2019). Survivors who confidently manage their post-disaster ruminations report higher levels of PTG (Nalipay & Mordeno, 2018). The ability to find meaning in life is a crucial element of PTG in the context of recovery from natural disasters (Dursun et al., 2016). Consistent with trauma exposure, the benefits of PTG have been identified at both the individual and collective community levels (Włodarczyk et al., 2017).

Protection and Preparedness

Various protective factors have been identified in those who recover following a disaster (Morganstein & Ursano, 2020). Key among them are personal and community resilience (Makwana, 2019; Morganstein & Ursano, 2020), effective coping skills (Every et al., 2019; Makwana, 2019), strong religiosity or spirituality (Aten et al., 2019), and a deep sense of community, including social ties with neighbours (Sasaki et al., 2020). These key factors have a more robust effect when there is demonstrated willingness among individuals and in the community to make positive psychological adjustments (Makwana, 2019). Fostering social cohesion post-disaster is important for decreasing the risk of negative psychological outcomes (Sasaki et al., 2020) and may be community specific, as in the case of faith communities (Aten et al., 2019).

Psychological and material preparedness for disasters by individuals and their communities is essential (Every et al., 2019) and has specific implications for public health and the successful restoration of affected social structures (Makwana, 2019). Fortunately, disasters tend to have predictable patterns of psychological and behavioural outcomes and community disruptions (Morganstein & Ursano, 2020).

Clinical Intervention

Afifi et al. (2012) examined the effects that uncertainty and a community's coping have on mental health after natural disasters. They found that uncertainty in terms of individuals' personal safety, the safety of their loved ones, and the status of their homes negatively affected mental health. The effects were mitigated, to some degree, by community coping strategies like joint problem solving. Esterwood and Saeed (2020) further identified ongoing risks associated with natural disasters in three domains, including 1) deteriorating mental health in predisposed individuals, 2) the development of trauma disorders in individuals with no previous history, and 3) the emergence of sub-threshold stress-induced symptoms in those with no diagnosis. These findings highlight the need to identify at-risk community members who require professional intervention. Robust assessment can successfully identify those less likely to benefit from treatment and those with enhanced vulnerabilities (such as comorbid psychological conditions or prior trauma) resulting from their disaster experience (Grandison et al., 2020; Lindebø Knutsen et al., 2020).

Psychological intervention is key to positive long-term outcomes during and after a disaster (Beaglehole et al., 2019; Makwana, 2019). Interventions should include broad-reaching public health initiatives that target the full rehabilitation of all community members (Beaglehole et al., 2019; Makwana, 2019). Quick responsiveness to restore economic and housing resources decreases the psychological burden (Cohen et al., 2019). Access to free, quality counselling, medical care, and health-promotion activities is also beneficial to community recovery

(Beaglehole et al., 2019). Fostering participation in social activities that build social capital and increase community cohesion is also important (Sasaki et al., 2020). All of these interventions have been shown to benefit psychological health and community responsiveness post-disaster (Makwana, 2019). They should be delivered via community-based approaches, which further advance social capital in the community. Makwana (2019) and Sasaki et al. (2020) advise that these approaches may require the involvement of education and health care systems as well as local governments. As Aten et al. (2019) add, religious or spiritual communities may also play a role. It has been demonstrated that general preparedness and the fostering of community strength and social capital have significant benefits when it comes to the impacts of disasters and responses to them (Makwana, 2019; Sasaki et al., 2020). Clinical intervention may also involve providing evidence-based trauma treatment to community members.

Evidence-Based Trauma Treatment

It has been clearly demonstrated that evidence-based trauma treatment (including use of evidence-based modalities such as EMDR and trauma-focussed CBT) reduces distress, enhances well-being, and improves the functioning of individuals and communities (Morganstein & Ursano, 2020; Norcross & Wampold, 2019). Primary benefits include increased psychological self-efficacy in individuals as well as increased social capital and community connectedness (Morganstein & Ursano, 2020). At the centre of this process is a clinical assessment that examines a broad range of behavioural and psychological factors, including the need for specialized trauma treatment (Larsen et al., 2019; Morganstein & Ursano, 2020). From this point, qualified care providers can best balance three core considerations—evidence, clinical expertise, and client needs (Norcross & Wampold, 2019)—to reduce distress, improve well-being, and optimize functioning (Morganstein & Ursano, 2020). There are clinical practice guidelines (Hamblen et al., 2019) for this process as well as evidence-based treatment modalities with demonstrated efficacy, including Trauma-Focused Cognitive Behavioural Therapy (Lindebø Knutsen et al., 2020) and Eye Movement Desensitization and Reprocessing (EMDR) therapy (Shapiro & Robin-Brown, 2019).

It is important to note that not all clinicians, and not even all psychologists, are qualified to provide specialized trauma treatment (Henning & Brand, 2019) because of the complex symptomatology clients may experience as a result of trauma exposure. For example, a unique variable informing the clinical picture is the forced separation from close-attachment figures during evacuation. Separation from family members during a natural disaster has been found to result in higher levels of PTSD (Gallagher et al., 2016). The emotional uncertainty also has a long-term deleterious effect on survivors (Afifi et al., 2012). Qualified clinicians integrate research evidence, clinical expertise, and client needs while using psychological trauma treatment guidelines (Norcross & Wampold, 2019; Silver

& Levant, 2019). Psychologists have access to several such guidelines, including the 2017 “Clinical Practice Guideline for the Treatment of Posttraumatic Stress Disorder (PTSD) in Adults,” published by the American Psychological Association (Silver & Levant, 2019). The sharing of such expertise provides opportunities for research that continues to improve our understanding of trauma treatment (Lindebø Knutsen et al., 2020).

Qualified providers optimize the therapeutic relationship, which is crucial in trauma treatment (Henning & Brand, 2019; Norcross & Wampold, 2019), through meaningful consideration of both clinician and client needs, among them cultural needs, individual needs, preferences, and values (Hamblen et al., 2019; Henning & Brand, 2019). Clinician experience and judgment, the use of best practice guidelines, and self-care are core considerations. A well-established therapeutic relationship lends itself to greater client treatment response (Norcross & Wampold, 2019) and, furthermore, ensures that clients are receiving optimized, evidence-based care (Hamblen et al., 2019).

Most studies have found that those psychologically affected by disaster will have, at a minimum, residual symptoms (such as sub-threshold PTSD) and associated comorbidities, particularly in the case of vulnerable groups (Larsen et al., 2019; Lindebø Knutsen et al., 2020). It is therefore important to note that general counselling may be insufficient. When qualified providers have used evidence-based treatment interventions, outcomes were better because of the integration of a variety of effective measures (Makwana, 2019).

Outcome-Informed Practices

Outcome-informed practices (OIPs), or the use of progress-monitoring techniques in clinical practice (sometimes referred to as feedback-informed treatment), empirically validate treatment response (Brown & Cazauvieilh, 2020; Kowalyk et al., 2013; Mahon, 2020). The Psychologists’ Association of Alberta (PAA) promotes the use of progress-monitoring tools that have been demonstrated to increase clinician expertise and highlight biases in clinical judgment (Brown & Cazauvieilh, 2020; Kowalyk et al., 2013; Mahon, 2020). To the individual’s benefit, OIPs identify high-risk clients, increase treatment compliance, and decrease no-show and cancellation rates (Kowalyk et al., 2013; Brattland, Koksvik, Burkeland, Gråwe, et al., 2018). OIPs have demonstrated positive outcomes for the therapeutic alliance (Brattland, Koksvik, Burkeland, Klöckner, et al., 2019). Furthermore, OIPs are well placed to improve poor outcomes by identifying clients who are less likely to benefit from treatment or who are at risk of dropping out early, thereby prompting earlier matching with more appropriate services (Mahon, 2020). OIPs align with the PAA’s mandate of advancing the science-based profession of psychology.

Scott Miller’s feedback-informed treatment includes the use of the Outcome Rating Scale (ORS), a popular OIP with a solid empirical foundation and the

ability to differentiate between clinical and non-clinical populations (Mahon, 2020). This scale can be used to strengthen therapeutic relationships, aid clinical decision making, and provide insight into treatment plan modifications (Bringhurst et al., 2006; Fitzpatrick, 2012; Mahon, 2020; Miller, 2012).

Purpose of Project

This brief report presents final treatment results from the 2017–2020 Wood Buffalo Wildfires Psychological Trauma Treatment Program, which was delivered by the PAA and funded by the Canadian Red Cross (CRC). Treatment was provided by registered psychologists with trauma expertise. Data were collected from program participants (clients) and through clinician feedback. The purpose of the program was to provide trauma-specific assessment and treatment to vulnerable community members identified by the CRC and to assess treatment outcomes.

Method

Wood Buffalo Wildfires Psychological Trauma Treatment Program

The CRC approved funding for the PAA on April 1, 2017, through its Alberta Wildfires 2016: Community Organization Partnership Program. This funding was used for psychological trauma assessment and treatment for those affected by the 2016 wildfires in the Wood Buffalo region. Originally set for 2 years, funding was extended to 3 years to accommodate identified ongoing needs, with the program concluding in the summer of 2020.

PAA operates a short-term disaster response network (DRN) that was activated immediately after the 2016 wildfire. Given the scale of this disaster and the limited pro bono interventions provided by the DRN, it was determined that a more formalized intervention was warranted. The CRC funded the Wood Buffalo Region Psychological Trauma Treatment Program with the intent of providing more robust assessment and treatment by psychologists with trauma expertise. Data for this brief report was derived only from clients served in the funded portion of the project.

To fund trauma assessment and treatment for individuals, families, and first responders affected by the 2016 Wood Buffalo Region Wildfires, PAA partnered with individual psychologists (specialists in trauma treatment) and with an organization that employed registered psychologists with trauma expertise. The funded organization was the Wood Buffalo Regional Collaborative Service Delivery (WBRCS). All providers were registered psychologists with trauma expertise (or provisionally registered psychologists supervised by a psychologist specializing in the treatment of trauma survivors), as evidenced by certification or trauma training in Prolonged Exposure (PE) Therapy, Eye Movement Desensitization & Reprocessing (EMDR), Cognitive Processing Therapy (CPT), Present-Centered

Therapy, and/or Stress Inoculation Training. An evaluation of the different clinical modalities was beyond the scope of this project.

To be approved for funding, clients had to have resided in Alberta and/or previously resided in the region between April 1, 2016, and April 1, 2017. This included migrant or temporary workers employed in the area from April 1 to October 1, 2016, and first responders who were actively employed from April 1, 2016, to April 1, 2017, along with their children, spouses, and family members. Approved clients were those who were self-referred or referred by CRC intake workers and who met the criteria for program inclusion.

The responsibilities of the PAA included management of the program and financial reimbursement of services provided. The responsibility of all contracted providers was to provide trauma-informed psychological assessments and treatment, to ensure eligibility criteria were met for all service recipients, and to collect required outcome-informed measures using the ORS. Clients originally self-referred but, in the last year, were predominantly identified by frontline CRC staff and referred for ongoing significant psychological distress.

Participants

All 349 participants (clients) in the Wood Buffalo Region Psychological Trauma Treatment Program were referred in one of two ways. Some were referred by CRC intake workers responsible for identifying and triaging individuals who appeared to have a trauma or psychological response to the wildfires. Others self-referred in response to advertisements through social media, media, and other online sources that promoted the service being provided and the eligibility criteria. There were 349 clients served—individually, in groups, or as families. Usable data were collected from 91, or 26%, of the clients served (a representative sample) individually. The participant sample included children ($n = 17$), adolescents ($n = 24$), and adults ($n = 50$). Of the participants, clients were female (48%), male (48%), or unspecified (4%). Of the 43 female clients, 7% were children ($n = 3$), 16% represented adolescents ($n = 7$), and 77% were adults ($n = 33$). Of the 44 male clients, 32% were children ($n = 14$), 34% were adolescents ($n = 15$), and adults represented 34% ($n = 15$). Of the unassigned or unknown genders, two were adults and two were adolescents. See Table 1 for the breakdown of participants whose data was eligible for analysis.

Measures

In this study, overall functioning and well-being were operationally defined using scores on the ORS. Specifically, the ORS data collected for this brief report was scored on a 1–10 scale. The ORS provides clients and clinicians with an outcome measurement tool that is easily implemented on a routine basis in everyday clinical practice. The scale is brief and useful for targeting both clients' functioning and the therapeutic alliance (Mahon, 2020). They rate their general well-being,

Table 1
Gender of participants by age category for the sample analyzed (n = 91)

	Total	Female	Male	Unspecified/ Unassigned
Children	17	3	14	0
Adolescents	24	7	15	2
Adults	50	33	15	2
Proportion of Sample	100%	48%	48%	4%

Note: Usable data was collected from 91, or 26%, of all clients served individually, which is a representative sample.

personal well-being, family relationships, and social relationships, enabling the ORS to measure the four domains of individual, interpersonal, social, and overall functioning (Campbell & Hemsley, 2009). The ORS provides a reliable measure (0.58–0.84 test-retest reliability) of feedback on therapeutic progress that assesses areas of life functioning (distress, interpersonal well-being, social role, and overall well-being) known to change as a result of therapeutic intervention (Bringhurst et al., 2006; Miller, 2012). The scale demonstrates strong reliability estimates, providing rapid, valid information about patient functioning and well-being. Furthermore, results can be used to compare outcomes of individuals and programs with insight into treatment plans or program modifications (Bringhurst et al., 2006; Fitzpatrick, 2012; Miller, 2012).

Procedure

Sixteen approved psychologists provided trauma-informed psychological services (three from the Wood Buffalo Region and one who travelled to the community). At intake (session 1), clients’ consent included information about the ORS, program intent, and confidentiality (protected through de-aggregating ORS data using letter codes). Clients completed the ORS at five-session intervals. Project data were collected over a period of 56 weeks. Client ORS information was compiled in a spreadsheet and basic statistical analyses were carried out with average and sum calculations for grouped data. Data analysis included focus on the overall category of functioning as outlined in the ORS form. The statistical analysis was intended to determine the effects of trauma treatment over time. Results were not compared against some of the participant sub-groups (such as

community members versus immigrant workers) or for specific treatment modality employed.

In addition to the OSR data collected from clients, the PAA sought feedback about the program from participating clinicians. They shared their thoughts about the program's success by completing a 26-item questionnaire in Survey Monkey (e.g., "Did session frequency affect clinical outcomes? Explain"; "Did clients have pre-existing trauma that was exacerbated by the disaster? Explain"; "As a provider, did you feel adequately supported in your role? Explain"). A thematic content analysis of the clinicians' responses was then conducted.

Results

Functioning and Well-Being at Intake

All clients completed the ORS at intake to provide a baseline of functioning and well-being, the best possible score being 10. Eighty-two percent of participants were rated 5/10 or lower at intake, indicative of low levels of functioning. Seventy-four percent of adults, 100% of adolescents, and 82% of children had low levels of functioning at intake. One hundred percent of adults and adolescents of non-specified gender reported low functioning at intake. These results indicate a very low level of functioning and perceived well-being among clients, and more so for adolescents. Adolescents reported the lowest levels of functioning at intake.

Treatment Results

To gain a detailed understanding of clients' progress, ORS scores were captured at five-session increments. Scores at intake, at the end of the evaluation period (typically session 5), and at the end of the first treatment period (typically session 10) were then compared in order to highlight clinical progress. Twenty-nine percent of participants received five or more sessions. Of those receiving at least five treatment sessions, 65% demonstrated clinically significant improvements in overall well-being. Of those receiving at least 10 treatment sessions, 57% demonstrated clinically significant improvements in overall well-being. For those receiving at least 15 treatment sessions, 100% demonstrated clinically significant improvements in overall well-being. Reduced improvement rates in those receiving 10 sessions may be explained by Rozental et al.'s (2016) finding that clients can experience unpleasant memories, stress, anxiety, and increased or new symptoms over the course of therapy. Results indicated that overall average functioning and well-being increased over the treatment period, with the greatest benefits experienced after 15 sessions.

Clinician Feedback

Information obtained from the interviews revealed that, overall, clinicians had a mixed view of the program's success. Positive feedback was received regarding

PAA's administrative management of the program and the financial compensation received. However, significant challenges remained in terms of implementing the therapy. In addition to their concerns regarding treatment delays, clinicians identified a number of issues, including (a) lack of access to an appropriate, confidential counselling space, (b) a significant number of inappropriate, non-traumatic referrals from the CRC, (c) the inability to offer consistent weekly counselling sessions to clients, (d) pre-existing mental health issues that greatly exacerbated the emotional impact of the disaster, (e) clients' ongoing financial distress in relation to the CRC, which became a chronic stressor throughout the course of treatment, and (f) premature termination of treatment due to loss of funding. It is noteworthy that treatment results were positive despite these concerns, suggesting that an improved project plan could facilitate even better outcomes. Certainly, the feedback-informed approach itself may have been a mitigating factor that facilitated positive outcomes despite these logistical challenges (Brown & Cazauvieilh, 2020; Mahon, 2020).

Discussion

Psychological and behavioural responses create the most significant public health burden following a disaster (Morganstein & Ursano, 2020). As part of the Alberta Wildfires 2016 Community Organization Partnership Program, funded by the CRC, the PAA helped mitigate those responses through the coordination of specialized trauma care. Over the course of the 3-year project, 349 clients were served by 16 psychologists, and a sample of 91 (26% of all program participants) provided data for this brief report.

Approximately 92% of the sample clients who participated in the PAA Wood Buffalo Trauma Treatment Program did not receive counselling until 18 to 24 months after the disaster, owing to considerable delays. The CRC had not planned on providing trauma treatment. When the PAA lobbied for the provision of trauma treatment, the CRC indicated that it had not been done previously, though there was a willingness to consider a funding proposal to determine if the program would benefit the population affected by the 2016 Wood Buffalo Wildfires. The result was several months of program development and approval by the PAA and the CRC.

The length of treatment varied, with better results among clients who received more sessions. This outcome is consistent with results from a meta-analysis of the dose-effect relationship in psychotherapy; Howard et al. (1986) found that approximately half of the patients they studied improved by session eight. Chen and Keenan (2021) later found that a minimum of eight sessions was needed for half of their sample group to achieve reliable change. Furthermore, the extensive treatment delay experienced by participants in the Wood Buffalo Region Psychological Trauma Treatment Program is noteworthy. As previous studies have

demonstrated, early intervention after trauma exposure results in greater clinical outcomes of psychological treatment (Litz, 2015; Oosterbaan et al., 2019).

Assessments at intake indicated that, regardless of age or gender, clients participating in the program self-reported very low levels of functioning and well-being at intake. Thirty-three percent of adult females showed improvement after participating in the program. Adolescents received fewer sessions, thereby limiting comparisons by age and gender. This factor is unfortunate as it is well established that, in general, women and girls present with higher levels of psychological distress, depression, and anxiety than men and boys (Van Droogenbroeck et al., 2018).

Clinician feedback is an important element of a project review. The clinicians contracted in this brief report also indicated a need to minimize treatment delays. Additionally, given their experience in this funded project, they recommended that programs (a) provide access to appropriate treatment space, (b) make improvements to the triage and referral process, and (c) ensure consistent access to treatment, taking into consideration pre-existing and comorbid treatment considerations (other psychological conditions and financial distress, in particular) and possible abrupt treatment termination related to the end of funding.

Finally, while 13% of the 44 male clients did report clinical improvements, overall they received significantly fewer treatment hours compared with female clients. Indeed, none of the 26 male adolescents and children appears to have achieved the minimal five-session benchmark that was set to acquire comparative data on clinical progress. This finding reaffirms the well-established data in clinical literature regarding the many barriers faced by males seeking treatment for mental health issues (Lynch et al., 2016; Perlick & Manning, 2007).

The use of outcome measures can enhance therapeutic outcome, even when clients do not demonstrate improvement in their well-being, as these measures serve to inform the therapeutic process and provide additional information on well-being and functioning. As in general therapy, it is not uncommon for clients to experience increased symptoms during trauma assessment or the early stages of trauma treatment (Rozental et al., 2016). This process is considered necessary for psychological growth and resiliency but can result in delays before progress is indicated on outcome measures. When this occurs, as Hatfield (2006) notes, additional sessions are required to enable sufficient time for the client to respond positively to treatment. This suggests that a continuation of the current treatment plan is the appropriate clinical decision despite the lack of clear outcomes early in the process.

Recommendations for Practice and Research

Based on the data emerging from this program, the PAA makes the following five key recommendations for practice:

1. Individuals must be provided with timely access to trauma assessments and regular/sufficient counselling in the face of natural disasters. These services need to be provided in appropriate clinical settings (that ensure confidentiality), and treatment should comprise no fewer than 15 counselling sessions with a reasonable end date (which may exceed program deadlines).
2. Clinical screening of clients seeking trauma recovery services must be conducted by trauma-informed professionals to ensure appropriate referrals and best use of resources.
3. Vulnerable populations should be identified and provided with additional or tailored supports. Special consideration must be given to the unique needs of children and youth, who are exceptionally vulnerable to the long-term effects of trauma exposure. Similarly, since those with pre-existing or comorbid considerations may experience more significant impacts of trauma, additional treatment or resources should target those additional considerations.
4. Existing barriers to men's access to mental health treatment must be identified and removed to ensure gender-specific program planning.
5. Barrier reduction must be a key consideration. Barriers include transportation, child care, telepsychology options, and other factors that limit participation in assessment and treatment for trauma.

Additionally, two recommendations for future research emerge from this study. In future projects of this nature, it is recommended that follow-up be conducted at 3, 6, and 12 months after treatment to assess long-term outcomes. Furthermore, comparators across treatment modality and age groups would provide valuable data for treatment recommendations post-disaster.

Conclusion

Although natural disasters are a regrettable fact of human life, their deleterious long-term psychological effects can be ameliorated through individual and community preparedness and effective care. Despite disruption to quality of life, which negatively affects individual and community mental health (Makwana, 2019), early, effective, sustained interventions can aid recovery and optimize community functioning (Morganstein & Ursano, 2020). Qualified providers who are compassionate and skilled in the use of multiple evidence-based treatments can play a crucial role in a community's successful recovery from disaster (Makwana, 2019). These interventions must be timely, culturally appropriate, and expertly tailored to meet the unique needs of individuals and communities in the aftermath of disaster.

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