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Effectiveness of a 10-Day Residential Murray Method Trauma Regulation Programme for Civilians with War-Related Psychological Trauma in Ukraine: A Prospective Cohort Study

Olha Yuryk[1*], Anatoliy Stashkevych[2], Ruslan Ilchenko[3], Nataliia Zinchenko[4] and Oleksandr Zlobin[5]

[1,2]Laboratory of Neuroorthopedics and Pain Problems, State Institution "National Institute of Traumatology and Orthopedics of the National Academy Of Medical Sciences Of Ukraine", 27 Bulvarno-Kudriavska St., Kyiv 01601, Ukraine
[3]Department of Psychology, Faculty of Psychology and Social Work, Poltava V. G. Korolenko National Pedagogical University, 2 Ostrogradski St., Poltava, 36000, Ukraine
[4]Department of Physical Education, Sports Medicine and Occupational Therapy, Faculty of Health Sciences, Ivano-Frankivsk National Medical University, 2 Halytska St., Ivano-Frankivsk, Ukraine
[5]Department of Psychiatry, Addictiology, Psychotherapy and Clinical Psychology, Educational and Scientific Medical Institute, National Technical University "Kharkiv Polytechnic Institute", 2 Kyrpychova St., Kharkiv, 61002, Ukraine

Author Designation: [1,2]Professor, [3]Assistant, [4,5]Associate Professor

*Corresponding author: Olha Yuryk (e-mail: olhayuryk01@gmail.com).

Abstract **Objectives:** An armed conflict is usually associated with high rates of psychological trauma among civilians, this includes Post-Traumatic Stress Disorder (PTSD), depression, anxiety and functional impairment. In this context, access to sustained outpatient psychotherapy is frequently limited, making the need for intensive, structured rehabilitation models more important. **Objective:** To evaluate the effectiveness of a 10-day Murray Method Trauma Regulation Programme (MM-TRP) program in reducing PTSD, depression and anxiety symptoms among war-affected civilians in Ukraine. **Methods:** A prospective, single-arm cohort study with mixed methods was conducted in Poltava, Ukraine (March 2022 to March 2024). A total of 192 civilians participated. Assessments were performed at baseline, post-intervention and at three-month follow-up using the PTSD Checklist for DSM-5 (PCL-5), Beck Depression Inventory-II (BDI-II) and Generalized Anxiety Disorder-7 scale (GAD-7). Due to the observational, single-arm design without a control group, causal inferences cannot be drawn. **Results:** Mean PCL-5 scores decreased from 58.3±12.4 (95% CI: 56.5-60.1) at baseline to 32.7±10.8 (95% CI: 31.1-34.3) post-intervention and 35.4±11.2 (95% CI: 33.7-37.1) at three-month follow-up ($p<0.001$). A reduction of 30% or greater in PCL-5 scores was observed in 78.6% of participants, suggesting substantial symptom improvement within the cohort. Mean BDI-II scores declined from 28.6±10.2 (95% CI: 27.1-30.1) to 14.3±8.6 (95% CI: 13.0-15.6) post-intervention and 16.8±9.1 (95% CI: 15.4-18.2) at follow-up, while GAD-7 scores decreased from 13.2±4.8 (95% CI: 12.5-13.9) to 6.4±3.9 (95% CI: 5.8-7.0) and 7.3±4.2 (95% CI: 6.6-8.0), respectively (all $p<0.001$). Improvements were additionally observed in disability, quality of life and post-traumatic growth. **Conclusion:** The MM-TRP residential program was associated with substantial and sustained reductions in traumatic stress, depressive and anxiety symptoms among war-affected civilians. However, given the observational design, these findings should be considered preliminary and definitive conclusions regarding efficacy require controlled trials.

Key Words Trauma Rehabilitation, Residential Intervention, War-Affected Civilians, PTSD Symptoms, Humanitarian Mental Health, Murray Method

INTRODUCTION

Armed conflict is widely recognized as a major determinant of population mental health. Civilian exposure to war is consistently associated with increased rates of Post-Traumatic Stress Disorder (PTSD), depression, anxiety disorders and long-term functional impairment. A recent systematic review and meta-analysis reported pooled PTSD prevalence estimates ranging between 20 and 30% in conflict-affected settings [1], with substantial psychiatric comorbidity across trauma-exposed groups. Civilians exposed to hostilities, regardless of diagnostic categories, tend to report persistent sleep problems, hypervigilance, emotional instability, difficulty concentrating and reduced social functioning. These patterns suggest that both exposure

to acute trauma and prolonged psychological stress related to uncertainty and insecurity are contributing factors.

Trauma is rarely an isolated event for populations in war situations. People may experience situations such as forced displacement, repeated bombings, the loss of family members, the destruction of their homes and economic collapse. Studies examining migrants previously exposed to this type of armed conflict reveal that psychological distress tends to persist even after relocation, especially when displacement is exacerbated by social instability and limited support networks [2]. These findings indicate that war-related trauma is often cumulative and embedded within ongoing stressors that complicate recovery.

Since February 2022, Ukraine has experienced armed hostilities resulting in mass displacement and disruption of essential services. According to UNHCR global reports, the scale of forced displacement from Ukraine has reached historic levels [3]. Epidemiological data collected during the first months of the invasion documented high levels of anxiety, trauma-related symptoms and stress reactions among the civilian population in multiple regions [4]. Other parallel analyses have also demonstrated significant associations between disruption of daily life and anxiety among Ukrainians following the invasion [5]. Surveys conducted at the beginning of the war similarly documented high levels of psychological distress and maladaptive coping strategies among civilians [6]. Increased rates of acute stress reactions have also been documented among Ukrainian war refugees during the initial phase of displacement [7]. Recent assessments have also confirmed a significant mental health burden among Ukrainians both within the country and abroad [8]. A separate study comparing internally displaced persons with non-displaced urban residents identified a significantly higher prevalence of PTSD among displaced persons [9].

Most validated protocols are trauma-centered and were developed within outpatient treatment models. These require weekly sessions for several months. Randomized trials have evaluated narrative exposure therapy delivered by trained providers for war-affected Ukrainian populations [10]. These approaches assume environmental stability, predictable access to care and sustained therapeutic engagement. However, in contexts characterized by displacement, transportation barriers and ongoing insecurity, prolonged outpatient participation is often not feasible. In contexts for the Ukrainian population characterized by displacement, transportation barriers and ongoing insecurity, prolonged outpatient participation is often not feasible. Refugees from Ukraine have reported substantial barriers to accessing healthcare and social services during integration processes [11]. The health effects of war have recently highlighted the critical importance of strengthening rehabilitation systems in the country [12]. International guidelines on mental health and psychosocial support emphasize the importance of context-specific, scalable interventions that include the restoration of functional and social stability along with psychological care [13]. Emerging rehabilitation approaches, including technology-assisted and nature-based interventions, have shown promise in diverse clinical populations [14,15]. Despite these recommendations, few prospective evaluations have analyzed intensive multimodal or residential rehabilitation models in active conflict settings. The primary hypothesis of this study was that participation in the MM-TRP would be associated with significant reductions in PTSD, depression and anxiety symptoms from baseline to post-intervention, with improvements sustained at three-month follow-up.

The Murray Method Trauma Regulation Program (MM-TRP), a ten-day residential program, was implemented to address the needs of people affected by the war in Ukraine. The program is based on the Murray Method, an integrative psychosocial rehabilitation framework that combines trauma-focused psychotherapy with psychoeducation, emotion regulation strategies, interpersonal boundary work and body-oriented practices [16,17]. The Way Out rehabilitation center adapted its services following the escalation of hostilities to offer structured residential intervention to civilians affected by war-related trauma.

The present study employed a single-group prospective cohort design to assess changes in PTSD symptoms, depressive symptoms, anxiety symptoms, functional disability, quality of life and post-traumatic growth. Given the humanitarian context, a controlled design was not feasible; therefore, this study provides preliminary observational evidence.

METHODS

Study Design

This study used a prospective, non-randomized observational cohort design, with repeated measurements at three established time points. Baseline (T1), Post-Intervention (T2) and three-month follow-up (T3). The study did not include a control or comparator group. Due to emergency implementation in a humanitarian context, prospective trial registration was not performed- a limitation noted in accordance with reporting standards. Reporting followed TREND guidelines for nonrandomized evaluations [18]. The role of clinical research methodology in improving medical practice in humanitarian settings has been increasingly recognized [19].

Setting

The study was conducted at “The Way Out” rehabilitation facility located in Poltava, Ukraine. In response to the armed conflict in February 2022, the center implemented the MM-TRP a structured 10-day residential programme designed specifically for civilians affected by war-related psychological trauma. Parallel telemedicine initiatives have been implemented to expand mental health access during the ongoing conflict [20]. Knowledge-exchange platforms have also been developed to support trauma-focused clinical training during the war [21].

Participants

Eligibility Criteria: Participants were civilians aged 18 to 65 years who had experienced war-related traumatic exposure as a direct or indirect consequence of hostilities in Ukraine.

Eligible trauma exposures included forced displacement, exposure to shelling or bombardment, loss of family members, destruction of property, sexual violence, or repeated exposure to life-threatening events. To ensure clinical relevance of the intervention, participants were required to demonstrate probable PTSD symptomatology at baseline, operationalized as a score of ≥33 on the PTSD Checklist for DSM-5 (PCL-5), a commonly used screening threshold for clinically significant PTSD symptoms [22].

Exclusion criteria were established to ensure participant safety and the feasibility of the program. Individuals were excluded if they had an active psychotic disorder; acute suicidal behavior with a specific plan requiring immediate crisis intervention; a serious somatic illness that prevented participation in structured daily activities; an active substance dependence requiring medical detoxification; or cognitive impairment that prevented informed consent or meaningful participation in group therapy.

Recruitment and Screening Procedure

Participants were self-selected through community outreach initiatives, referrals from local humanitarian organizations and direct contact with the rehabilitation center. This voluntary enrollment introduces potential selection bias, as participants may have differed from the broader war-affected population. Those who met the prerequisites were invited for a face-to-face psychological evaluation approximately one week before the program began. During this evaluation, clinicians reviewed trauma exposure history, implemented tools for early symptom detection, assessed clinical stability and confirmed the absence of exclusion criteria. Over the course of the study, 192 eligible civilians enrolled in the program. A total of 186 participants successfully completed the ten-day intervention. Outcome data were available for 168 individuals at the three-month follow-up assessment, representing 90.3% of all participants who completed the program.

Intervention: MM-TRP Programme

The MM-TRP is a 10-day residential program with a defined structure. It is based on a manual and combines psychosocial and somatic elements with trauma-focused psychotherapy. Participants lived at the rehabilitation center for the duration of the treatment and the intervention was conducted in a closed residential setting.

Therapeutic Framework

The program is based on a multidisciplinary model. This model draws on the psychological, social, physiological and existential spheres as they relate to trauma recovery. The intervention was designed to promote emotion regulation, restore functionality and facilitate social reintegration beyond symptom reduction alone.

Daily group therapy sessions included psychoeducation about trauma reactions, emotion regulation strategies, cognitive restructuring, narrative processing of traumatic experiences and work on interpersonal boundaries. When clinically necessary, individual psychiatric treatment was provided. Table S1 (Supplementary Material) provides a detailed session-by-session schedule of the 10-day program, including therapeutic content, duration and provider discipline for each component. Physical activities incorporated breathing exercises, Nordic walking, mindfulness techniques and yoga-inspired movements to support autonomic regulation and somatic awareness. Guided meditation and group reflection sessions promoted cognitive integration of traumatic experiences. Structured physical rehabilitation programs have demonstrated benefits for trauma-affected populations [23]. To enhance reproducibility and fidelity, all sessions followed a standardized treatment manual. Weekly supervision meetings were conducted and session checklists were completed by group facilitators. Treatment fidelity was assessed as 94% adherence to protocol across the study period.

Daily Structure

Intervention Reporting (TIDieR Framework): The intervention was conducted by licensed psychiatrists and clinical psychologists with specialized training in trauma-focused psychotherapy and at least five years of clinical experience. Prior to the program's implementation, staff received in-house training on the specific protocol of the MM-TRP model. Treatment fidelity was ensured through structured session guidelines and weekly supervision meetings. The core components of the intervention consisted of standardized psychoeducational modules, trauma processing frameworks and structured group activities. No significant changes were made to the intervention protocol throughout the study period.

A structured daily program included psychotherapy sessions, group discussions, physical exercises, community activities and time for individual reflection.

Outcome Measures

Primary Outcomes: The PTSD Checklist for DSM-5 (PCL-5) [24] is used to assess the severity of PTSD symptoms. This instrument consists of 20 items rated on a five-point Likert scale (0–4), with total scores ranging from 0 to 80. A score of 33 or higher was used as a sign that PTSD is likely.

Due to differences in psychometric validation among language adaptations, particular attention was paid to translation aspects. Although previous efforts have been made to adapt PTSD assessment tools for people in Ukraine [25], large-scale validation studies remain scarce. The cultural and linguistic challenges of assessing PTSD in the Ukrainian population have also been highlighted by recent research [26]. In the present study, the version reflecting local clinical practice was used; however, a limitation related to its measurement is its limited formal validation.

The Generalized Anxiety Disorder Scale (GAD-7) [27] was used to measure anxiety symptoms and the Beck Depression Inventory-II (BDI-II) [28] was used to assess depressive symptoms. Both instruments are widely used and show robust psychometric properties in various population groups.

Secondary Outcomes

Secondary outcomes were chosen to cover broader areas of adaptation and functioning. Quality of life (assessed using the World Health Organization Quality of Life Questionnaire [WHOQOL-BREF] [29]), post-traumatic growth (measured using the Post-Traumatic Growth Inventory [PTGI] [30]) and functional disability (assessed using the World Health Organization Disability Assessment Scale 2.0 [WHODAS 2.0] [31]) were among the items included.

Data Collection Procedures

Outcome data were collected at three time points: baseline (T1); days 1–2 of the intervention (T2); days 11-12; post-intervention; and at three months (T3). Initial and post-intervention assessments were conducted in person, under the supervision of trained research staff to ensure their comprehensiveness and accuracy. For participants without internet access, follow-up assessments were conducted via structured telephone interviews or secure online questionnaires. Reminder contacts were made when necessary to maximize retention at follow-up.

Statistical Analysis

Descriptive statistics were computed for demographic and clinical variables. Continuous variables are presented as means with standard deviations and categorical variables as frequencies and percentages.

Within-subject changes across time were examined using repeated-measures ANOVA with Greenhouse–Geisser correction when sphericity assumptions were violated. To adjust for potential confounding variables, multivariable linear regression analyses were conducted including age, gender, baseline trauma severity (PCL-5 score), displacement status (internally displaced vs. non-displaced) and social support as covariates.

All statistical analyses were conducted using SPSS version 28.0. Statistical significance was set at a two-tailed alpha level of 0.05. Post-hoc power analysis indicated that the achieved sample size provided >0.99 power to detect a medium effect size (f = 0.25) in repeated-measures ANOVA. A sensitivity analysis was conducted using a Last Observation Carried Forward (LOCF) approach for participants lost to follow-up (n = 24). The overall pattern and statistical significance of results remained materially unchanged.

Ethical Considerations

The study protocol was reviewed and approved by the Ethics Committee of Poltava V. G. Korolenko National Pedagogical University (Protocol No. 2022-03-15/A). All participants provided written informed consent prior to participation. Participants were explicitly informed that the program was voluntary and that non-participation or withdrawal would not affect access to other services. The study was conducted in accordance with the Declaration of Helsinki.

RESULTS

Participant Flow and Baseline Characteristics

A total of 192 participants enrolled, 186 (96.9%) completed the full 10-day intervention and 168 (87.5% of enrolled) provided three-month follow-up data. The cohort was predominantly female (64.5%), with a mean age of 42.8±11.3 years. Baseline clinical burden was substantial: probable PTSD in 73.1%, moderate-to-severe depressive symptoms in 68.3% and moderate-to-severe anxiety in 61.8% (Table 1).

Changes in PTSD Symptoms

Post-intervention mean score declined to 32.7±10.8 (95% CI: 31.1–34.3). At three-month follow-up, the mean score was 35.4±11.2 (95% CI: 33.7–37.1) (Figure 1).

Repeated-measures analyses demonstrated a statistically significant effect of time ($p<0.001$). The repeated-measures ANOVA showed a significant main effect of time ($F(2, 334) = 215.73$, $p<0.001$, $\eta^2 = 0.62$). In multivariable analyses adjusting for age, gender, displacement status, baseline trauma severity and social support, the effect of time remained significant ($p<0.001$), suggesting that improvements were not fully explained by these covariates. Bonferroni-adjusted post-hoc pairwise comparisons confirmed significant reductions between T1–T2 ($p<0.001$) and T1–T3 ($p<0.001$). The difference between T2–T3 was smaller but remained statistically significant ($p = 0.04$). The within-group effect size for PTSD symptom reduction from Baseline (T1) to Post-Intervention (T2) was large (Cohen's $d = 2.05$). The effect size from baseline to three-month follow-up (T3) was also large (Cohen's $d = 1.89$). Clinically meaningful improvement (≥30% reduction from baseline PCL-5 score) occurred in 78.6% of participants at discharge (Table 2).

PTSD Symptom Clusters

All four DSM-5 PTSD symptom clusters demonstrated statistically significant reductions over time ($p<0.001$ for overall time effects) (Table 3).

Depression and Anxiety Outcomes

Depression (BDI-II)

Mean depressive symptom severity decreased from 28.6±10.2 (95% CI: 27.1–30.1) at baseline to 14.3±8.6 (95% CI: 13.0-15.6) post-intervention. At follow-up, the mean score was 16.8±9.1 (95% CI: 15.4-18.2) (Table 4).

Table 1: Sociodemographic and Clinical Characteristics (N = 192)

Variable	n (%) or Mean±SD
Participants enrolled	192
Programme completion	186 (96.9%)
Follow-up completion	168 (87.5%)
Age (years)	42.8±11.3
Female	120 (64.5%)
Male	66 (35.5%)
Married	38.7%
Divorced	27.4%
Unmarried	22.0%
Widowed	11.9%
Internally displaced	54 (28.1%)
Probable PTSD (Baseline)	136 (73.1%)
Moderate–Severe Depression (Baseline)	128 (68.3%)
Moderate–Severe Anxiety (Baseline)	118 (61.8%)
Probable PTSD (3-Month Follow-Up)	30.4%
Moderate–Severe Depression (3-Month Follow-Up)	34.5%
Moderate–Severe Anxiety (3-Month Follow-Up)	29.8%

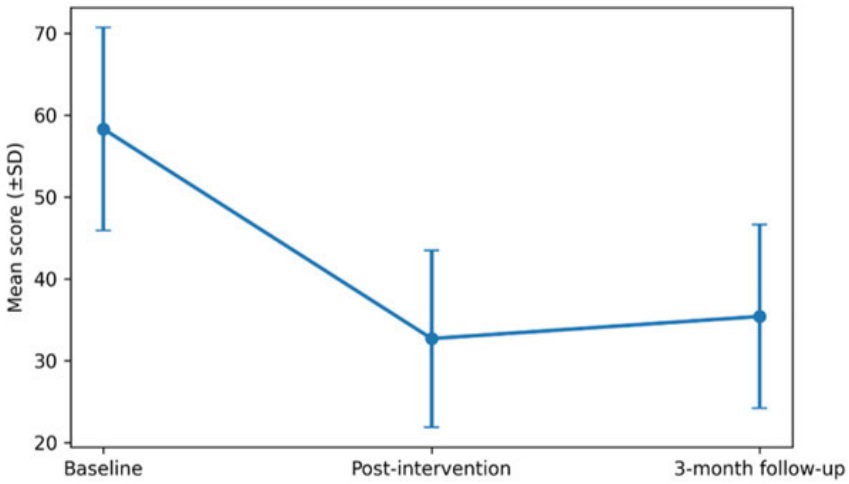

Figure 1: PTSD Symptoms (PCL-5) Across Time Points (Mean±SD)

Table 2: Changes in PTSD Symptoms and Diagnostic Status (PCL-5)

Time Point	Mean±SD (95% CI)	Change from Baseline (%)	Meeting PCL-5 ≥33 (%)
Baseline	58.3±12.4 (95% CI: 56.5–60.1)	—	73.1
Post-Intervention	32.7±10.8 (95% CI: 31.1–34.3)	–43.9	22.6
3-Month Follow-Up	35.4±11.2 (95% CI: 33.7–37.1)	–39.3	30.4

Table 3: PTSD Symptom Clusters (PCL-5 Domains)

Symptom Domain	Baseline Mean±SD	Post-Intervention Mean±SD	Follow-Up Mean±SD
Intrusion	15.3±3.8	8.4±3.2	9.1±3.4
Avoidance	6.8±1.9	3.6±1.7	4.0±1.8
Negative Cognitions/Mood	20.8±5.2	11.3±4.6	12.2±4.9
Hyperarousal	15.5±4.1	9.4±3.8	10.1±3.9

Table 4: Changes in Depressive and Anxiety Symptoms

Outcome	Time Point	Mean±SD (95% CI)	% Change from Baseline
Depression (BDI-II)	Baseline	28.6±10.2 (95% CI: 27.1–30.1)	—
	Post-Intervention	14.3±8.6 (95% CI: 13.0–15.6)	–50.0%
	3-Month Follow-Up	16.8±9.1 (95% CI: 15.4–18.2)	–41.3%
Anxiety (GAD-7)	Baseline	13.2±4.8 (95% CI: 12.5–13.9)	—
	Post-Intervention	6.4±3.9 (95% CI: 5.8–7.0)	–51.5%
	3-Month Follow-Up	7.3±4.2 (95% CI: 6.6–8.0)	–44.7%

Table 5: Post-Traumatic Growth (PTGI)

Time Point	Mean±SD
Baseline	42.3±18.6
Post-Intervention	63.7±19.2
3-Month Follow-Up	68.4±20.1

Table 6: WHOQOL-BREF Domain Scores

Domain	Baseline	Post-Intervention	Follow-Up
Physical Health	48.3±12.6	64.2±11.8	62.5±12.1
Psychological Health	42.7±13.2	61.5±12.4	59.8±12.7
Social Relationships	45.8±15.3	59.7±14.2	57.9±14.5
Environment	51.2±14.1	63.8±13.5	62.4±13.8

The within-group effect size for depressive symptom reduction from T1 to T2 was large (Cohen's d = 1.57) and from T1 to T3 remained large (Cohen's d = 1.23). Mean anxiety scores decreased from 13.2±4.8 (95% CI: 12.5-13.9) at baseline to 6.4±3.9 (95% CI: 5.8-7.0) post-intervention and 7.3±4.2 (95% CI: 6.6-8.0) at follow-up (p<0.001). The effect size for anxiety reduction from T1 to T2 was large (Cohen's d = 1.58) and from T1 to T3 remained large (Cohen's d = 1.30) (Table 5).

Secondary Outcomes

Post-Traumatic Growth (PTGI): Mean PTGI scores increased from 42.3±18.6 at baseline to 63.7±19.2 post-intervention and 68.4±20.1 at follow-up (p<0.001).

Quality of Life (WHOQOL-BREF)

All domains demonstrated statistically significant improvement from baseline to post-intervention (p<0.001), with sustained gains at follow-up (Table 6).

Functional Disability (WHODAS 2.0)

Functional impairment decreased significantly over time (p<0.001) (Table 7).

Overall Pattern of Change

Across PTSD, depression, anxiety, quality of life, post-traumatic growth and functional disability, a consistent pattern of improvement was observed between baseline and post-intervention assessments. During the three months, most gains were maintained, although modest attenuation in symptom severity was observed relative to immediate discharge.

Table 7: Functional Disability (WHODAS 2.0)

Time Point	Mean±SD
Baseline	24.6±8.3
Post-Intervention	13.2±6.9
3-Month Follow-Up	14.5±7.2

DISCUSSION

In this prospective cohort study of war-affected civilians, participation in a 10-day residential, multimodal MM-TRP program was associated with marked reductions in PTSD, depressive and anxiety symptoms, accompanied by improvements in disability, quality of life and post-traumatic growth. Symptom reductions were observed immediately after program completion and were largely sustained at three-month follow-up, although modest attenuation was evident across several domains.

At the individual level, the degree of PTSD symptom reduction was clinically significant. At discharge, mean PCL-5 scores dropped by around 44% and at follow-up, they were still about 40% below baseline. Clinically significant improvement was defined as a 30% or greater reduction in symptom intensity, which occurred for a large proportion of participants. Significant reductions were observed in all four DSM-5 PTSD symptom clusters. However, without a comparison group, these improvements cannot be definitively attributed to the intervention itself. Natural recovery, regression to the mean, temporary environmental stabilization within the residential setting and expectancy effects may have contributed to the observed outcomes. Without a comparison group, causal inference is not possible. The residential setting may contribute to symptom recovery by temporarily reducing environmental stressors, increasing the perception of safety and providing structured daily routines. Regional health authorities report a sustained increase in demand for trauma-related mental health and rehabilitation treatments across Ukraine [22]. Global mental health policy frameworks emphasize the importance of transforming mental health systems to address widespread trauma in the population [32]. Consequently, although the level of improvement demonstrated in this cohort is clinically promising, it should not be considered definitive proof of its efficacy or superiority over well-established trauma-focused treatments. PTSD management in various treatment settings can be carried out through systematic procedures, according to VA/DoD guidelines and other international standards of clinical practice [33,34]. One of the distinctive features of the MM-TRP program is its rigorous residential approach. The MM-TRP program is an intensive residential rehabilitation method that was created for humanitarian situations in which long-term psychotherapy is not always accessible. This differs from most evidence-based treatments for PTSD, which are provided on an outpatient basis over extended periods. In humanitarian and war situations, when long-term outpatient treatment is sometimes challenging to maintain, the residential format may be a particularly pertinent approach. Intensive rehabilitation programs may help with stabilization and recovery processes that are challenging to accomplish in fragmented care environments by temporarily lowering environmental stresses and offering a structured psychosocial environment. Empirical evaluations of such residential rehabilitation models in active conflict environments remain limited in the current literature. Most evidence-based PTSD treatments were developed for outpatient delivery, typically involving weekly sessions over several months. Among established trauma-focused therapies, Eye Movement Desensitization and Reprocessing (EMDR) has demonstrated clinically meaningful symptom reductions in randomized trials [35]. Similarly, meta-analytic evidence supports the efficacy of narrative exposure therapy for reducing PTSD and depression symptoms in trauma-exposed populations [36]. Economic and comparative effectiveness analyses have further evaluated the clinical and cost-effectiveness of EMDR in adult PTSD populations [37]. Systematic reviews of psychological therapies for adult PTSD consistently report moderate to large treatment effects under controlled conditions [38]. Recent umbrella reviews of published meta-analyses similarly confirm consistent effectiveness of trauma-focused interventions for adult PTSD [39]. Network meta-analytic evidence further supports the comparative efficacy of established psychological treatments for PTSD [40]. Meta-analytic evidence indicates that trauma-focused psychological interventions are generally effective across diverse trauma exposures, including repeated and complex trauma contexts [41]. Exposure-based approaches remain among the most empirically supported treatment modalities for PTSD [42]. The MM-TRP program's rigorous residential style is one of its unique features. The MM-TRP program is an intense residential rehabilitation approach intended for humanitarian circumstances where sustained access to long-term psychotherapy may be limited, in contrast to the majority of evidence-based PTSD therapies that are provided in outpatient formats over lengthy periods of time. In humanitarian and war situations, when long-term outpatient treatment is sometimes challenging to maintain, the residential format may be a particularly pertinent approach. Intensive rehabilitation programs may help with stabilization and recovery processes that are challenging to accomplish in fragmented care environments by temporarily lowering environmental stresses and offering a structured psychosocial environment. The Murray Method supports the applicability of organized multimodal therapies in complicated trauma contexts by conceptualizing trauma as a multidimensional disturbance requiring integrated cognitive, emotional and somatic regulation methods [16,17]. Phase-oriented and multimodal treatment frameworks are increasingly recommended in clinical guidelines for complicated PTSD [43,44]. Improvements in the quality-of-life (WHOQOL-BREF) and disability (WHODAS 2.0) domains, in addition to symptom severity, may be explained by this wider therapeutic scope. These findings align with previous research on quality of life among persons with disabilities in rehabilitation settings [45,46]. In addition to symptom reduction, evaluating functional disability, quality of life and post-traumatic growth represents a more comprehensive rehabilitation-oriented viewpoint that is becoming more and more important in international mental

health and trauma recovery research. From baseline to follow-up, post-traumatic growth scores rose, indicating progressive processes of emotional and cognitive integration. Media influences and social factors have been shown to affect psychological outcomes in vulnerable populations [47,48]. The clinical significance of functional and disability-related outcomes in trauma rehabilitation studies is further supported by the common correlation between higher comorbid psychopathology across various dimensions and PTSD symptom patterns [49]. Recovery from trauma can be hampered by comorbid illnesses and substance abuse disorders, requiring comprehensive treatment [50]. Growth may signal an adaptive reconstruction of meaning following intensive rehabilitation, but should not be confused with symptom remission. The concept of post-traumatic growth in conflict settings has been previously explored in relation to meaning-making processes [39,17]. To verify durability, longer-term monitoring is necessary.

Several methodological limitations must be acknowledged. First, the absence of a control or comparator group substantially limits internal validity. Causal inference is not possible and the observed improvements may reflect natural recovery, regression to the mean, or non-specific effects of residential care and expectancy. Second, selection bias is likely, as participants voluntarily enrolled in the program and may have differed from the broader war-affected population in motivation, resources, or symptom profile. Third, all outcomes were self-reported, introducing potential social desirability and recall biases. Future studies should include clinician-administered diagnostic interviews (e.g., CAPS-5) and objective physiological markers. Fourth, the follow-up period was only three months; longer-term durability (6-12 months) remains unknown. Fifth, the psychometric validation of Ukrainian versions of PCL-5, BDI-II and GAD-7 remains limited, potentially affecting score interpretation and cross-study comparability [26]. Sixth, prospective trial registration was not performed due to the emergency humanitarian context, limiting transparency relative to contemporary standards. Seventh, expectancy effects and social desirability bias-participants who invested significant time and effort in a residential program may have been motivated to report improvement-cannot be ruled out.

Despite these limitations, the study has notable strengths: a relatively large sample for a conflict-zone rehabilitation study, acceptable follow-up retention (87.5%), comprehensive outcome assessment and reporting according to TREND guidelines.

CONCLUSION

Participation in the MM-TRP residential programme was associated with substantial short-term reductions in PTSD, depressive and anxiety symptoms, alongside improvements in disability, quality of life and post-traumatic growth. However, given the observational, single-arm design, these findings should be considered preliminary. Definitive conclusions regarding efficacy require randomized controlled trials with active comparators, longer follow-up and clinician-administered assessments. The results support the feasibility and potential utility of intensive multimodal rehabilitation models in conflict-affected areas, but causality cannot be established.

Limitations

The main limitations are:

- Lack of a control group
- Potential selection bias
- Self-report measures without clinician-administered validation
- Short follow-up (3 months)
- Limited psychometric validation of Ukrainian instrument versions
- Absence of prospective trial registration
- Possible expectancy and social desirability effects.

Consent for Publication

Not applicable. The manuscript does not contain identifiable individual data, images, or personal information requiring additional consent for publication.

Availability of Data and Materials

The datasets generated and analysed during the current study are not publicly available due to the sensitive nature of trauma-related data and ongoing security considerations in a conflict-affected setting. De-identified data may be made available from the corresponding author upon reasonable request and subject to institutional approval.

Competing Interests

The authors declare that they have no competing interests, financial or non-financial, that could have influenced the design, conduct, or reporting of this study.

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This research received no external funding. The MM-TRP programme operates as part of the rehabilitation services provided by “The Way Out” centre. No commercial entity had any role in study design, data collection, analysis, interpretation, or manuscript preparation.

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Artificial Intelligence Statement

Artificial intelligence tools were used exclusively for linguistic editing and language refinement. No AI tools were used for data analysis, interpretation, or generation of scientific content.

Ethical Statement

The study protocol was reviewed and approved by the Bioethics Committee of Poltava V. G. Korolenko National

Pedagogical University (Protocol No. 2022-03-15/A). All participants provided written informed consent prior to participation. Participants were informed about the voluntary nature of the programme, confidentiality safeguards, and their right to withdraw at any time without consequences for access to care. Data were anonymized and stored in secure, encrypted databases accessible only to authorized research personnel. The study was conducted in accordance with the principles of the Declaration of Helsinki.

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