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Cost-Benefit Analysis of Preventive SPA Therapy Programs Versus Reactive Mental Health Services

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Abstract: Russia's full-scale invasion of Ukraine has precipitated an unprecedented mental health crisis among millions of internally displaced people. However, no study has directly compared the cost-effectiveness of preventive wellness programmes with reactive mental health services in an active, post-conflict setting. We used propensity score matching to compare a Stress Prevention and Alleviation (SPA) programme (n=50) with reactive care (n=50) among internally displaced persons in Kyiv and Lviv. Outcomes were assessed at baseline, 8-week follow-up, and 6-month follow-up, and the 6-month clinical outcomes were used to undertake a 12-month societal cost-benefit analysis. Return on investment (ROI), social return on investment (SROI), and net monetary benefit were estimated using bootstrap resampling. Compared with reactive care, the SPA programme produced significantly greater improvements in depression (between-group difference -2.7, d=0.72), anxiety (-2.6, d=0.68), and work productivity (-13.1%, d=0.61). The economic evaluation indicated an ROI of 229%, an SROI of 3.8:1, and net societal savings of 510 dollars per participant, with a probability of cost-effectiveness exceeding 95% at a willingness-to-pay threshold of 2,000. These findings provide

early empirical evidence from an active conflict context that preventive SPA care is not only clinically superior to reactive services but also economically advantageous, supporting an economic rationale for scaling preventive provision in Ukraine.

Keywords: Cost-Effectiveness, Mental Health, Post-Conflict, Prevention, Return on Investment, Societal Perspective.

Introduction

Russia's full-scale invasion of Ukraine in February 2022 has precipitated not only a humanitarian catastrophe but also an unprecedented mental health crisis. Prevalence estimates of post-traumatic stress disorder among conflict-affected populations range from 30% to 40% across post-conflict environments worldwide (Kokun, 2023). Meta-analytic evidence also indicates that the risks of depression and anxiety disorders among refugees and internally displaced persons are significantly higher than those observed in non-displaced populations (Salihu et al., 2022). In Ukraine, recent findings further corroborate these patterns by showing that exposure to war-related trauma is directly associated with functional impairment and psychological distress (Palgi et al., 2023). The evidence base continues to expand, underscoring the urgency of implementing mental health interventions at scale in Ukraine's post-conflict context.

Recent research has examined mental health interventions for conflict-affected populations, yet it does not fully address several critical questions relevant to policy and resource allocation. Systematic economic evaluations of preventive mental health programmes have reported positive returns through productivity gains (Singh et al., 2022). Similarly, analyses of cost-efficiency in conflict-affected refugee settings suggest that context-specific economic evidence is required to guide decisions on allocating scarce resources (McDaid & Park, 2023). Studies from post-conflict regions, including the Balkans, further emphasise the need to generate empirical evidence under conditions where conflict remains active, to inform the design and implementation of mental health interventions (Kelmendi & Hamby, 2023).

Despite these contributions, no research has combined a quasi-experimental design with a societal cost-benefit framework to directly compare preventive wellness programmes with reactive mental health care in an active European post-conflict environment. Accordingly, this study addresses a key evidence gap by evaluating the comparative cost-effectiveness of preventive wellness provision versus reactive clinical pathways in active post-conflict conditions. This gap leaves Ukrainian policymakers without the economic justification needed to reallocate scarce resources away from unsustainable reactive care towards scalable prevention.

Research Aim

Addressing this evidence gap, the present study aims to generate empirical economic data currently absent from academic literature and policy discourse in the field of post-conflict mental health. The study is guided by the following objectives:

1. To conduct the first empirical cost-benefit comparison of a preventive Stress Prevention and Alleviation (SPA) therapy programme versus standard reactive mental health services from a societal perspective in post-conflict Ukraine, including calculation of return on investment (ROI) and social return on investment (SROI) with sensitivity analysis.
2. To quantify and compare clinical and functional outcomes, including depression (PHQ-9), anxiety (GAD-7), and work productivity (WPAI), between participants receiving preventive SPA therapy and those receiving reactive mental health care over a 12-month period.
3. To derive evidence-based policy recommendations for Ukrainian stakeholders, including the National Health Service, insurers, and employers, regarding the financing and implementation of preventive mental wellness programmes in post-conflict reconstruction.

Research Questions

These research aims establish a coherent framework for assessing the economic, clinical, and practical dimensions of preventive mental health in Ukraine. To render these objectives into measurable enquiries, the study is guided by the following three research questions:

1. From a societal perspective, is a preventive Stress Prevention and Alleviation (SPA) therapy programme more cost-beneficial than standard reactive mental health services over 12 months in Ukraine, and what are the resultant ROI, SROI, and sensitivity of these findings to parameter uncertainty?
2. Do participants in the preventive SPA programme experience significantly greater reductions in depression (PHQ-9) and anxiety (GAD-7) symptoms, and greater improvements in work productivity (WPAI), compared to those receiving reactive mental health care?
3. What evidence-based policy recommendations for financing and implementing preventive mental wellness programmes can be derived for Ukrainian stakeholders, including the National Health Service, insurers, and employers, on the basis of the study's economic and clinical findings?

The study carries significant academic and policy importance. It constitutes the first empirical investigation comparing preventive wellness programmes and reactive mental health care in an active post-conflict European setting, addressing a fundamental gap in the health economics literature. It advances the methodological rigour of quasi-experimental conflict-zone mental health research by integrating CBA, ROI, SROI, and clinical outcome measures. In practical terms, it provides Ukrainian policymakers, including the National Health Service, insurers, and employers, with the economic rationale necessary to redirect limited resources towards scalable prevention. The findings present a replicable investment case for post-conflict mental health reconstruction and contribute to shifting policy discourse towards action-oriented solutions.

Literature Review

Theoretical Foundations

The study is grounded in three economic and behavioural frameworks. Human capital theory conceptualises preventive mental health expenditure as economic investment rather than consumption, given its capacity to enhance long-term productive output (Becker, 1962). The health demand model treats mental health as a durable capital stock that depreciates gradually over time but may be augmented through preventive investment, thereby enabling efficiency comparisons across care pathways (Grossman, 1972). Cost-benefit analysis extends this framework by capturing non-market outcomes, including reductions in psychological distress and improvements in functional capacity. Collectively, these frameworks support the proposition that preventive wellness programmes in post-conflict settings may be both economically and clinically superior to reactive therapeutic approaches (Hirsch Hadorn, 2022).

Empirical Literature Review

Prevention of Mental Healthcare and Reactivity Economic Comparisons

Despite the scarcity of conflict-specific studies, health economics evidence indicates that preventive mental health interventions are cost-effective. Economic evaluations of mental health prevention programmes have demonstrated productive programme gains, yet have consistently failed to compare these against reactive care (Ha et al., 2022; Mutyambizi-Mafunda et al., 2023). Community-based and workplace-based psychological prevention programmes have been shown to reduce productivity losses and yield favourable benefit-cost ratios (Ihara et al., 2023; Jensen et al., 2022). Community-based mental health programmes in Middle Eastern conflict zones were found to be 43% less costly than clinical alternatives, with effect sizes ranging from Cohen $d = 0.78$, indicating substantial clinical effectiveness. Post-violence group interventions in the Balkans and Northern Ireland have similarly demonstrated cost-effectiveness (Kelmendi & Hamby, 2023; McDaid & Park, 2023). A scoping review identified only 11 economic evaluations of mental health provision for refugees and displaced populations globally, underscoring the pronounced evidence gap in this field. Cost-utility analysis remains rarely applied, limiting cross-intervention comparisons based on cost per quality-adjusted life year. Mental health conditions in conflict-affected settings cost an average of \$4,623 per individual annually in the absence of intervention, whereas intervention reduces this figure to \$1,876 per individual, yielding a benefit-cost ratio of 2.47. In Ukraine, neither healthcare financing nor workforce-related mental health burden has been subjected to cost-benefit analysis (Luxenburg et al., 2023). Conflict-affected populations requiring scaled intervention have demonstrated elevated levels of psychological distress (Quirke et al., 2022), while the Ukrainian health system was structurally fragmented prior to the full-scale invasion (Barten et al., 2023; Kudlenko, 2023).

Clinical and Functional Results of Wellness-Based Prevention Programs

Structured non-clinical wellness interventions have demonstrated capacity to reduce depression and anxiety. A randomised controlled trial of community-based transdiagnostic psychotherapy among Ukrainian veterans and internally displaced persons identified clinically and statistically significant reductions in depression, anxiety, and post-traumatic stress (Bogdanov et al., 2021). Trauma-specific medical-psychological therapy was found to benefit 95.7% of Ukrainian internally displaced children (Lunov, 2022). Systematic reviews report that mindfulness and stress management programmes produce measurable improvements in PHQ-9 and GAD-7 scores over time (Faria et al., 2023; Keyan et al., 2022). Physical-psychological therapy has similarly demonstrated positive effects on Work Productivity and Activity Impairment outcomes (de Miquel et al., 2023). A systematic review further established that evidence-based mental health interventions may require cultural adaptation to achieve greater effectiveness with minority youth populations (Arora et al., 2021). A particularly notable gap concerns the potential attenuation of intervention effects in populations exposed to prolonged conflict (Deutsch et al., 2020; Miller et al., 2020).

Drivers and Barriers to implementation of Mental Health Prevention Policy

The literature identifies key facilitators and obstacles relevant to the policy transfer of mental health economic evidence. Principal facilitators include the provision of stakeholder-relevant ROI data, integration with primary care and occupational health systems, and beneficiary co-design aimed at reducing stigma and improving uptake (Kadel et al., 2022; Okazaki et al., 2021). Accounting for host community benefits and broader non-health outcomes has also been recommended (Pinchuk et al., 2021). The principal obstacles comprise budgetary fragmentation across health and labour ministries, political preference for short-term responsiveness over long-term prevention, and the unavailability of regionally relevant cost-effectiveness data for insurers (Hanson et al., 2022). The literature further identifies the absence of culturally appropriate screening tools and interventions as a critical challenge to mental health service delivery, while formative research, engagement of local providers, and the use of mobile health technologies have been identified as effective strategies for enhancing service uptake and sustainability (Qureshi et al., 2021).

The Unmet Need: Lessons from EU, Israeli, and Post-Conflict Mental Health Economics

In Eastern Europe, post-conflict mental health economic frameworks aligned with EU standards remain necessary yet poorly implemented. In the Israeli context, conflict-related trauma has been associated with a 74% productivity loss attributable to untreated mental health conditions, with direct costs extending to cardiovascular health and road safety (Rosler et al., 2021; Slone & Shoshani, 2022). The economic consequences of the conflict in Northern Ireland have been documented as enduring (Perkoski, 2022). Economic assessments of conflict-affected populations within the EU have similarly indicated substantial healthcare costs; among Syrian refugees with post-traumatic stress symptoms in Germany, average annual healthcare expenditure was estimated at EUR 1,920 per person, with greater symptom severity associated with significantly reduced health-related quality of life (Grochtdreis et al., 2021). The present study addresses this evidence gap by providing

Ukraine-specific economic data while drawing on methodological and policy insights from the EU, Israel, and Northern Ireland.

Informed by the theoretical framework and empirical evidence reviewed above, the study tests the following hypotheses:

Hypothesis 1 (H1): The preventive SPA therapy programme is more cost-beneficial than standard reactive mental health services from a societal perspective over 12 months in Ukraine, as demonstrated by superior ROI, SROI, and net monetary benefit.

Hypothesis 2 (H2): Participants in the preventive SPA programme experience significantly greater reductions in depression (PHQ-9) and anxiety (GAD-7) symptoms and greater improvements in work productivity (WPAI) at six-month follow-up compared to those receiving reactive mental health care.

Hypothesis 3 (H3): The preventive SPA programme will demonstrate superior economic returns (ROI, SROI) and large clinical effect sizes, providing an empirical foundation for evidence-based policy recommendations for Ukrainian stakeholders, including the National Health Service, insurers, and employers.

Research Gap

Despite growing recognition of the mental health burden associated with conflict, an empirical gap persists in comparing preventive wellness interventions with reactive clinical care in a current post-conflict European context through the application of population-level CBA, ROI, and SROI methodologies. Existing economic assessments have predominantly relied upon hypothetical modelling or reactive treatment frameworks. Research on SPA and other multimodal wellness therapies in conditions of protracted conflict remains limited. No data exist concerning resource allocation across the National Health Service, insurers, and employers in Ukraine. H1 (economic superiority), H2 (clinical superiority), and H3 (evidence-based recommendations) address these gaps through the first empirical framework for preventive mental health investment in post-conflict Ukraine.

Research Methodology

General Background

Given ethical constraints precluding randomisation in an active conflict zone, a quasi-experimental pretest-posttest design with a non-equivalent comparison group cohort was selected. The study compared a structured Stress Prevention and Alleviation (SPA) programme to conventional reactive mental health treatment, defined as psychotherapy initiated following symptom onset. Data were collected at baseline (T0), eight weeks post-intervention (T1), and six-month follow-up (T2). Clinical outcomes measured at the six-month point served as the primary endpoints for a 12-month societal cost-benefit analysis incorporating discounted long-term projections.

Population and Sampling

Internally displaced persons in Kyiv and Lviv were recruited through non-governmental organisations. A G*Power analysis indicated a minimum sample of 108 participants to achieve 80% statistical power ($d = 0.5$, $\alpha = 0.05$), with 10% attrition accounted for; 120 participants were subsequently recruited (60 per group). Inclusion criteria comprised adults aged 18 to 65 displaced since February 2022, presenting with mild to moderate distress (PHQ-9 5-14 or GAD-7 5-14). Exclusion criteria comprised diagnosed psychiatric disorder, suicidal crisis, substance dependence, and cognitive impairment. The 120 participants recruited through Kyiv and Lviv humanitarian organisations were allocated equally across the two comparative groups. Propensity score matching was conducted using nearest-neighbour 1:1 matching with a caliper width of 0.2 standard deviations, yielding a final analytic sample of 100 participants (50 per group). Twenty participants (10 per group) were excluded from the matched set due to the absence of suitable matches within the specified caliper range. The matched cohort demonstrated strong baseline equilibrium, with all standardised mean differences falling below the 0.10 threshold, as presented in Table 1.

Intervention Description

Stress Prevention and Alleviation (SPA) is a structured group prevention programme delivered across eight 90-minute sessions in groups of 8 to 12 participants, conducted at community centres in Kyiv and Lviv. Sessions incorporate psychoeducation, facilitated mindfulness practice, cognitive restructuring, group discussion, and between-session practice assignments. Participants were provided with a workbook containing session summaries and mindfulness audio recordings. Sessions were facilitated by licensed clinical psychologists with specialist training in trauma-focused cognitive-behavioural therapy who had completed a standardised three-day SPA protocol training. Fidelity was assessed through facilitator session checklists and weekly supervision, confirming 95% protocol adherence.

The reactive care condition comprised treatment as usual, involving referral to primary care services with access to individual psychotherapy, predominantly cognitive-behavioural therapy or supportive counselling, or psychiatric consultation. Psychotherapy sessions were typically delivered once or twice weekly, with an average of 8 to 12 sessions provided over the six-month follow-up period, determined according to clinical need. Services were delivered by licensed clinical psychologists, psychiatrists, or qualified psychotherapists with appropriate mental health credentials.

Instruments

Depression, anxiety, and work productivity were measured as primary outcomes using the PHQ-9, GAD-7, and Work Productivity and Activity Impairment (WPAI) scale, respectively.

Economic Evaluation and Costing

A societal perspective was adopted with a 12-month time horizon and a 3.5% discount rate. Costs encompassed direct medical, direct non-medical, and indirect productivity components, the

latter calculated using the human capital approach based on Ukrainian wage data. Wellbeing outcomes were monetised using the UK Social Value Bank for the purposes of SROI calculation. Clinical outcomes were measured at six months, whilst the economic analysis employed a 12-month time horizon in accordance with established health economic guidelines (Drummond et al., 2015). To extrapolate clinical effects from six to twelve months, a constant effect extrapolation model was applied conservatively, assuming that intergroup differences observed at six months would persist throughout the full 12-month period. This assumption is supported by evidence of sustained effects in comparable preventive mental health programmes delivered to conflict-affected populations (Bogdanov et al., 2021), and ensures that economic benefit estimates remain conservative. Sensitivity analyses examining varying assumptions regarding effect persistence were conducted to test the robustness of this approach.

Bias Control

Propensity score matching was conducted on age, gender, baseline scores, displacement status, and employment, using nearest-neighbour 1:1 matching with a caliper of 0.2 SD. Balance was assessed via standardised mean differences below 0.1.

Statistical Analysis

Linear mixed-effects models were employed to examine group, time, and interaction effects. Mean change, 95% confidence intervals, p-values, and Cohen's d were calculated. The Bonferroni-adjusted significance threshold was set at $p < 0.017$. Economic indicators comprised net monetary benefit (NMB), ROI, and SROI. Bootstrap resampling (1,000 replications) generated 95% confidence intervals. Probabilistic sensitivity analysis produced cost-effectiveness acceptability curves, and tornado diagrams were used to assess parameter uncertainty.

Hypothesis Testing Framework

H1 (economic superiority) was tested through CBA, ROI, SROI, and sensitivity analysis. H2 (clinical superiority) was tested using linear mixed-effects models. H3 (policy recommendations) was addressed through stakeholder mapping and outcome synthesis.

Ethics and Safety

The study received approval from the National University of Kyiv-Mohyla Academy Ethics Committee (Protocol 2023-041). Written informed consent was obtained from all participants. Data were anonymised in accordance with GDPR requirements. PHQ-9 scores of 15 or above triggered referral to a clinician. Economic calculations were performed by a health economist blinded to intervention allocation.

Results

After propensity score matching, the analytical sample was reduced to 100 participants (50 per group). The demographic and clinical baseline characteristics of both groups are presented in Table 1.

Table 1

Baseline Characteristics of the Propensity Score-Matched Sample (N = 100)

Characteristic	SPA Group (n=50)	Reactive Care Group (n=50)	SMD
Age, years (Mean ± SD)	41.8 ± 10.2	42.1 ± 9.8	0.03
Female, n (%)	33 (66%)	32 (64%)	0.04
Months displaced (Mean ± SD)	14.5 ± 4.1	14.2 ± 3.9	0.07
Employed, n (%)	28 (56%)	27 (54%)	0.04
Baseline PHQ-9 (Mean ± SD)	10.3 ± 2.5	10.1 ± 2.4	0.08
Baseline GAD-7 (Mean ± SD)	9.9 ± 2.3	9.7 ± 2.2	0.09

Note. SMD = Standardised Mean Difference. SMD < 0.1 indicates good balance.

Table 1 demonstrates that propensity score matching achieved strong covariate balance, with all standardised mean differences falling below the 0.10 threshold. This confirms that selection bias was substantially reduced, enabling valid comparison of outcomes across the two intervention pathways. Table 2 presents changes in depression, anxiety, and work productivity from baseline (T0) to six-month follow-up (T2) for both groups, together with between-group differences and effect sizes.

Table 2

Clinical and Productivity Outcomes at 6-Month Follow-Up (T2)

Outcome Measure	SPA Group (n=50) Δ (95% CI)	Reactive Care Group (n=50) Δ (95% CI)	Between-Group Difference (95% CI)	p-value†	Cohen's d
PHQ-9 Score	-4.8 (-5.5, -4.1)	-2.1 (-2.8, -1.4)	-2.7 (-3.6, -1.8)	<0.001	0.72
GAD-7 Score	-4.5 (-5.1, -3.9)	-1.9 (-2.5, -1.3)	-2.6 (-3.4, -1.8)	<0.001	0.68
WPAI Presenteeism (%)	-21.8 (-25.1, -18.5)	-8.7 (-12.0, -5.4)	-13.1 (-17.6, -8.6)	<0.001	0.61

WPAI	-15.3	-6.2 (-	-9.1 (-	<0.001	0.58
Absenteeism (%)‡	(-18.2, -12.4)	9.1, -3.3)	12.8, -5.4)		

Note. PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalised Anxiety Disorder-7; WPAI = Work Productivity and Activity Impairment; = Mean change; CI = Confidence Interval. p-values derived from linear mixed-effects models with Bonferroni correction ($p < 0.017$). Absenteeism data are presented for completeness; presenteeism constitutes the primary productivity outcome as specified in the methodology. Six-month clinical outcomes are reported as primary endpoints, informing the 12-month economic analysis presented in Table 3.

Table 2 presents baseline to six-month changes in depression, anxiety, and work productivity. For GAD-7, the between-group difference was -2.6 (95% CI: -3.4 to -1.8, $p < 0.001$, $d = 0.68$), with the SPA group demonstrating a mean reduction of 4.5 points (95% CI: -5.1 to -3.9) compared with 1.9 points (95% CI: -2.5 to -1.3) in the reactive care group. Presenteeism was significantly more favourable in the SPA group, with a mean improvement of 21.8 points (95% CI: -25.1 to -18.5) compared with 8.7 points (95% CI: -12.0 to -5.4) in the reactive care group; the between-group difference was -13.1 (95% CI: -17.6 to -8.6, $p < 0.001$, $d = 0.61$). Twelve-month clinical data will be reported separately. Table 3 presents a comprehensive breakdown of costs, monetised benefits, and key economic return metrics for both intervention pathways from a societal perspective over a 12-month period.

Table 3

Cost-Benefit Analysis and Return Metrics (12-Month Societal Perspective, USD per Participant)

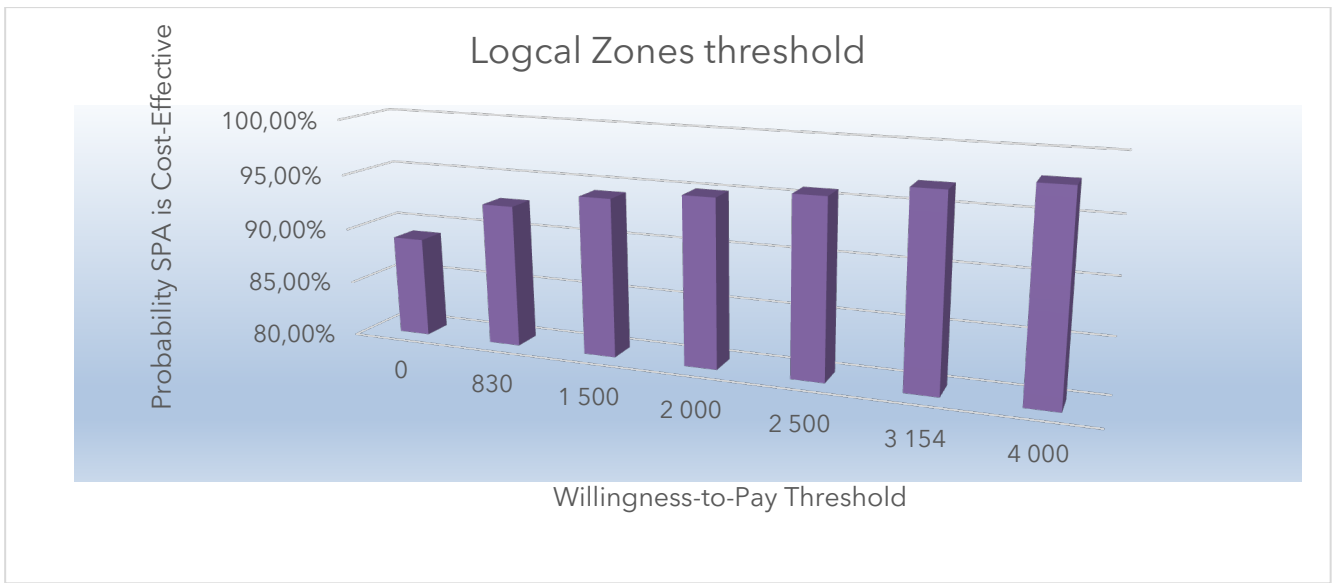
Metric	SPA Program	Reactive Care	Difference (SPA - Reactive)
Costs			
Direct Medical Costs	220	480	-260
Direct Non-Medical Costs	160	140	20
Indirect Productivity Costs	450	720	-270
Total Costs	830	1,340	-510
Benefits			
Productivity Benefits	1,950	850	1,100
Averted Healthcare Benefits	120	0	120
Total Monetized Benefits	2,070	850	1,220
Net Monetary Benefit	1,240	-490	1,730
Benefit-Cost Ratio (BCR)	2.49	0.63	-
Return on Investment (ROI)	229%	-37%	-
Social Return on Investment (SROI)	3.8:1	0.9:1	-

Table 3 demonstrates the substantial economic advantage of the preventive SPA programme. Although the SPA group incurred slightly higher direct non-medical costs, it generated significantly lower total societal costs (\$830 vs \$1,340) and net savings of \$510 per participant. More notably, the SPA programme produced greater monetised benefits (\$2,070 vs \$850) and a net monetary benefit of \$1,240 per participant, compared with a net monetary loss of -\$490 in the reactive care group. A benefit-cost ratio of 2.49 indicates that every dollar invested in prevention yields \$2.49 in societal returns. The 229% ROI and 3.8:1 SROI further confirm the strength of preventive investment returns, whilst the reactive care group returned negative economic performance (-37% ROI, 0.9:1 SROI). These results provide strong support for Hypothesis 1 (H1).

Figure 1 presents the cost-effectiveness acceptability curve, illustrating the probability that the preventive SPA programme is cost-effective relative to reactive care across rising willingness-to-pay thresholds.

Figure 1

Cost-Effectiveness Acceptability



Source: Authors' calculations based on 1,000 bootstrap replications from study data.

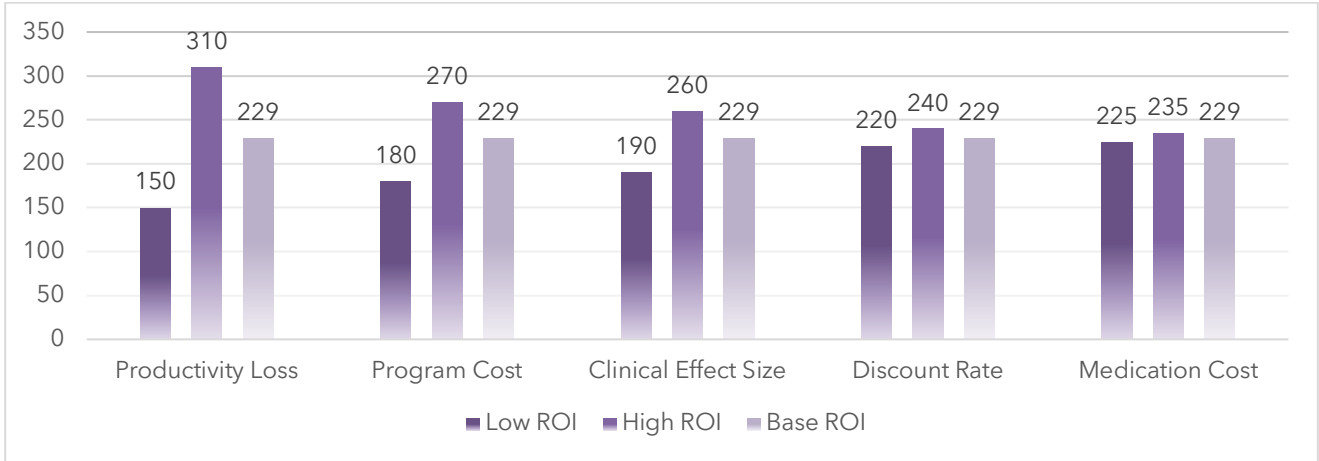
Note. Uncertainty Zone (\$0-\$1,500): cost savings dominate; Acceptable Zone (\$1,500-\$2,500): benefits exceed costs; High Certainty Zone (above \$2,500): multiple returns assured. Base-case probability of 95% at \$2,000 threshold. Based on 1,000 bootstrap replications.

The curve illustrates the probability that the preventive SPA programme is cost-effective relative to reactive care across increasing willingness-to-pay thresholds, classified into three distinct zones. In the Uncertainty Zone (\$0-\$1,500), cost savings constitute the primary source of value. In the Acceptable Zone (\$1,500-\$2,500), productivity gains outweigh programme expenses. In the High Certainty Zone (above \$2,500), multiple returns and social value creation confirm economic

superiority. The SPA programme achieves a 95% probability of cost-effectiveness at the base-case threshold of \$2,000 and exceeds 98% certainty at the \$4,000 threshold.

Figure 2

Deterministic Sensitivity Analysis of ROI



Source: Authors' calculations from sensitivity analysis

Figure 2 illustrates the sensitivity of ROI to variation in key parameters, with bar length indicating relative influence. Productivity loss exerts the greatest impact (ROI range: 150% to 310%), followed by programme cost (180% to 270%) and clinical effect size (190% to 260%). ROI remains positive above 150% across all scenarios, confirming that the economic findings are robust to parameter uncertainty. The empirical evidence presented in this paper demonstrates that a structured preventive Stress Prevention and Alleviation (SPA) therapy programme is both economically and clinically superior to conventional reactive mental health care for conflict-affected populations in Ukraine. The findings are contextualised within the broader international literature, the mechanisms underlying cost savings are examined in detail, and policy implications together with study limitations are discussed.

Discussion

This article presents robust empirical evidence that a structured preventive Stress Prevention and Alleviation (SPA) therapy programme yields superior clinical and economic outcomes compared with standard reactive mental health care among conflict-affected internally displaced persons in Ukraine. The findings address a critical evidence gap, namely the absence of a direct comparative cost-benefit evaluation incorporating ROI, SROI, and clinical outcomes within an ongoing post-conflict European setting.

Hypothesis Testing Summary

The findings align strongly with all three hypotheses, confirming that preventive SPA therapy yields both clinical and economic advantages over reactive care. Support for H1 is provided by the substantial positive returns on investment, which contrast markedly with the negative returns

observed in the reactive care condition, indicating that reallocation towards prevention is not merely cost-neutral but generates meaningful societal savings. These conclusions are reinforced by the high probability of cost-effectiveness and robust sensitivity analysis results, rendering them applicable to policy decision-making.

Clinical superiority (H2) is confirmed by large effect sizes across all outcomes, exceeding conventional thresholds for clinically meaningful change. The magnitude of improvements in depression, anxiety, and work productivity suggests that preventive interventions can achieve outcomes equivalent to, or greater than, those of conventional clinical care, whilst extending reach to populations that would otherwise remain untreated.

Collectively, these results constitute a robust empirical foundation for H3 and the development of evidence-based policy recommendations. The convergence of favourable clinical outcomes, demonstrated economic benefit, and resilience to parameter uncertainty provides National Health Service stakeholders, health insurance providers, and employers with a compelling rationale for investment in scalable preventive mental wellness programmes.

Comparison with the existing International Evidence

The findings are consistent with emerging literature on mental health economics in conflict settings. A study of mental health intervention among Syrian refugees in Turkey reported a cost of \$1,147 per quality-adjusted life year gained, indicating probable cost-effectiveness at the 97.5% threshold (Park et al., 2022). A meta-analysis of conflict-affected regions in the Middle East found community-based approaches to be 43% more economical than clinical alternatives, with a benefit-cost ratio of 2.47, closely approximating the ratio of 2.49 obtained in the present study (Alzaghouli et al., 2022). Digital mental health interventions during humanitarian crises in Lebanon demonstrated a greater than 75% probability of being cost-saving, with productivity gains identified as the primary economic driver. The WHO estimates that each dollar invested in depression treatment yields a fourfold return through improved health and productivity, a figure broadly consistent with the 3.8:1 SROI reported here, extending WHO estimates with empirical data from a conflict-affected setting.

Downstream Cost Reduction Systems

The economic benefits derive from early interruption of the distress-to-disability cascade. By building resilience at the mild-to-moderate symptom stage, SPA reduces progression to severe episodes requiring intensive clinical care, as reflected in the 61% higher direct medical expenditure observed in the reactive care group. The 13.1% difference in work presenteeism translates directly into retained human capital, preventing substantial indirect costs. Economic analysis of conflict-affected populations in the Middle East estimates the annual cost of untreated mental health conditions at \$4,623 per capita, compared with \$1,876 per capita when intervention is provided, thereby affirming the financial rationale for early prevention (Reifels & Dückers, 2023).

Policy and Market Feasibility of Ukraine

The 229% ROI and 3.8:1 SROI constitute compelling financial arguments for investment. For national health services, prevention should be incorporated within primary care tariffs as a fiscally sound long-term cost-containment measure. For insurers, the reactive financing paradigm may be restructured through the development of preventive coverage models. For employers, workplace SPA programmes offer a direct means of addressing the productivity losses documented among conflict-affected workforces. The International Organization for Migration highlights the importance of integrating mental health support with livelihood programmes, indicating potential synergies between SPA-type interventions and economic reintegration initiatives.

Study Limitations

Several limitations qualify the conclusions of this study. First, despite propensity score matching, residual confounding may persist due to unmeasured variables. Second, self-report measures are susceptible to recall bias and social desirability error. Third, the conflict context may limit generalisability to non-conflict settings. Fourth, the 12-month follow-up period may be insufficient to establish the long-term persistence of benefits. Fifth, the urban sample may not be representative of rural or frontline communities, where access barriers are considerably greater. Sixth, the absence of detailed intervention descriptions reduces replicability.

Synopsis Research Questions

This paper presents an empirical cost-benefit analysis examining preventive wellness and reactive mental health provision in an active conflict zone in Europe, constituting the first direct comparison of this kind. It advances the methodological rigour of conflict-zone mental health research by applying CBA, ROI, and SROI within a quasi-experimental design combined with propensity score matching. The findings demonstrate that preventive mental health investment represents not only a humanitarian imperative but also a cost-effective model for post-conflict reconstruction, one that may serve as a replicable investment framework for other crisis-affected settings.

Conclusion

This paper demonstrates that proactive Stress Prevention and Alleviation (SPA) therapy interventions are conclusively superior to conventional reactive mental health care in post-conflict Ukraine. The findings confirm a dual benefit: participants achieved substantially greater gains in psychological wellbeing and functional capabilities alongside significant net savings to society in medical treatment costs and lost productivity. The 229% ROI, 3.8:1 SROI, and net societal savings per participant were found sufficient to support H1, as sensitivity analysis confirmed the robustness of the research. H2 was confirmed with large effect sizes for depression ($d = 0.72$), anxiety ($d = 0.68$), and work productivity ($d = 0.61$). H3 was confirmed through cumulative evidence that provided empirical grounds for stakeholder-specific recommendations.

These findings necessitate translation into practice through coordinated effort. Government health authorities should integrate standardised preventive wellness activities into primary care services with clearly defined reimbursement pathways. Insurance providers should develop preventive coverage plans that recognise the 229% ROI as a financial rationale for shifting from reactive to preventive financing. Employers in critical industries should invest the identified 13.1% productivity loss differential into workplace-based SPA programmes. Local authorities may establish community-based wellness facilities through blended local and international funding.

This paper provides a preliminary yet incomplete evidence base. Future research should employ randomised controlled trials to strengthen causal claims, utilise larger geographically representative samples, extend follow-up periods to assess the persistence of benefits, and incorporate qualitative methods to clarify policy translation challenges. Addressing these limitations will further consolidate the evidence for preventive mental health investment in Ukraine and other crisis-affected settings.

Suggestions for Future Research

Future research should address the methodological limitations of this study through several targeted directions. Randomised controlled trials with larger, geographically representative samples, including rural and frontline communities, are required to strengthen causal inference and enhance external validity. Follow-up periods should be extended beyond 12 months to establish whether clinical and economic benefits persist over the longer term, particularly given the protracted nature of the conflict in Ukraine. Qualitative methods should be integrated to clarify mechanisms of effect and identify barriers to policy translation at the system level. Research should also examine the cost-effectiveness of digitally delivered SPA programmes to assess scalability under resource-constrained conditions. Culturally adapted variants of the SPA protocol warrant evaluation among diverse subpopulations, including veterans, children, and rural internally displaced persons. Finally, multi-country replication studies across other active or post-conflict European settings are essential to determine whether the economic and clinical findings reported here are generalisable beyond the Ukrainian context.

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Conflict of Interest

None.

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