Implementation and effectiveness of the WHO Self-Help Plus (SH+) intervention in the Gaza Strip: a prospective hybrid type 1 non-randomised study

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Summary

Background Self Help Plus (SH+) is a WHO intervention that provides strategies for managing distress arising from adversity. In the Palestinian context, SH+ holds promise in supporting psychological well-being and mitigating the impact of trauma, with the critical challenge in adapting and scaling the intervention for feasible and sustainable delivery.

Methods This is the piloting phase of a prospective hybrid type-1 non-randomised follow-up study investigating the implementability and effectiveness of SH+ in early 2023 in the Gaza Strip. Participants were recruited by the Gaza Community Mental Health Programme, which also facilitated the intervention. Assessments were conducted immediately before and one week after the intervention. Exposure to traumatic events was measured by the Gaza Trauma Checklist (GTC). Implementability was evaluated using the Feasibility of Intervention Measure, the Acceptability of Intervention Measure, and the Intervention Appropriateness Measure. Effectiveness was assessed using the Depression, Anxiety, and Stress Scale—21 items (DASS-21), the WHO-5 Well-being Index, and the WHO Disability Assessment Schedule (WHODAS 2·0)–12 items. After each session, the facilitators completed an online fidelity test for the intervention.

Findings Of 177 eligible participants, 162 completed the pre-assessment, and 157 the post-assessment. Results indicated that 151 participants (96·16%) found SH+ acceptable, 131 (83·44%) appropriate, and 139 (88·45%) feasible. In terms of effectiveness measures, the estimated average psychological well-being score increased from 10·78 (SE = 0·42) to 17·69 (SE = 0·41), indicating a substantial enhancement in well-being. The disability scores were estimated to decrease, on average, from 22·70 (SE = 0·63) to 18·35 (SE = 0·53), and significant improvements were also observed across all DASS subscales, and in the global DASS score, with fitted model values declining from 58·97 (SE = 1·85) to 33·02 (SE = 1·71).

Interpretation The pilot phase of the study shows that SH+ is a scalable psychological intervention for individuals exposed to trauma in the Gaza Strip. Conducting the implementation phase is needed to confirm the findings.

Funding None.

Keywords: Self Help Plus; Gaza Strip; Implementation research; Acceptability; Appropriateness; Effectiveness

Introduction

The World Health Organization (WHO) estimates that one in five people who have experienced war or other conflict will have depression, anxiety, post-traumatic stress disorder, bipolar disorder, or schizophrenia.[1] Further, it is estimated that one in 11 people living in a setting that has been exposed to conflict in the previous 10 years will have a moderate or severe mental disorder. Despite these substantial global estimates, few research studies have examined the impact of trauma, violence, and deteriorating socioeconomic conditions on the population in the Gaza Strip (see the Appendix).

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Research in context

Evidence before this study

We have searched the major research engines, including PubMed and Web of Science, from inception to July 7, 2025, using the terms Self Help Plus and/or SH+. Fifteen relevant papers were found, including one editorial, one pilot study, one feasibility study, one meta-analysis, three study protocols, and eight trials. Five of the trials were conducted on asylum seekers, refugees, and other migrant populations, and three were conducted on healthcare providers exposed to stressful conditions. The trials showed considerable evidence that the intervention effectively reduces anxiety, stress, and depression, and improves the well-being of the target populations.

Added value of this study

Previous studies have not been conducted in contexts of significant adversity. In contrast, the present study took place in the Gaza Strip in early 2023. Although the most recent war had not yet begun, the population was already living under considerable stress due to earlier, devastating but shorter conflicts. This is also the first comprehensive study to examine the implementability of SH+ in a war-affected setting.

Implications of all the available evidence

While existing evidence has shown the efficacy of SH+ across a variety of settings, this study demonstrates its feasibility and potential effectiveness in populations living in areas of significant adversity. The study also suggests that SH+ could play a vital role in alleviating the psychological impact of war on the population of the Gaza Strip and improving their well-being once conditions permit.

A study that was conducted in 2007 after the second Intifada found that 68·9% of adolescents from refugee camps in the Gaza Strip developed PTSD, and 94·9% had severe anxiety levels.[2] Another study investigated the quality of life of university students in 2017 and reported that 87·2% had limited opportunities to enjoy leisure activities or daily life. Two-thirds felt sad, 60% felt hopeless about their future, and one-third (35%) had experienced suicidal thoughts sometimes or often.[3] Veronese et al., 2021 confirmed in another group of university students that living under the siege compromised participants' resilience, increased the sense of hopelessness, and exposed them to anxiety, stress, and depression.[4] Some studies reported other forms of suffering caused by the protracted conflict and deteriorating socioeconomic conditions. Palestinians in the Gaza Strip reported feeling broken or destroyed, causing a sense of human insecurity; poor psychological well-being and quality of life; existential, psychological, and social suffering; humiliation; injuries to dignity; multiple losses; and a life being experienced as 'on hold'.[5]

Responding to the intensifying humanitarian catastrophe in Gaza, humanitarian agencies, mental health experts, and academics have articulated various urgent calls for immediate, comprehensive, and sustained interventions aimed at ameliorating the profound mental health crisis. Central to these appeals is the necessity for prompt mobilisation of mental health services to deliver critical psychological support.[6] However, the limited availability of mental health services necessitates the use of scalable psychological interventions. Scalability means that interventions delivered by trained non-specialists can reach more people at a lower cost. Examples of those interventions promoted by the WHO include Thinking Healthy, Problem Management Plus, Step-by-Step, and Self-Help Plus (SH+).[7]

SH+ is based on Acceptance and Commitment Therapy (ACT),[8] a therapeutic intervention that improves psychological flexibility through techniques such as mindfulness exercises and cognitive defusion. SH+ has been shown to be effective in a wide range of populations exposed to psychological distress, including asylum seekers, refugees, displaced people, individuals exposed to armed conflict or natural disasters, and health care staff.[9–14] A study that assessed the effectiveness of SH+ to reduce psychological distress in South Sudanese female refugees in Uganda showed greater improvements for the SH+ group compared to the control group on psychological distress three months post-intervention.[9] Two multinational randomised control trials were conducted to test the effectiveness of SH+ in preventing mental health disorders among refugees and asylum seekers in Western Europe and in Türkiye, respectively.[11,12] Both Türkiye studies showed evidence of an impact of SH+ on preventing mental disorders and reducing stress. This effect was much more pronounced in the study conducted in Türkiye, where substantial effects were observed at the 6-month follow-up, compared with the Western European study, where effects were observed only immediately post-intervention.[11,12] This difference may be explained by differences in context, as participants in Türkiye faced many more stressors during the study than those in Western Europe.[13]

With those promising results, SH+ could be an important tool in helping distressed Palestinian people living in the Gaza Strip once it is proven to be acceptable, culturally appropriate, feasible, and effective. Against this background, the present pilot study was conducted to identify and address challenges in implementing SH+ in the Gaza Strip and to ensure the intervention is acceptable, appropriate, feasible, and effective.

Methods

Study design and participant selection

This is the piloting phase of a prospective hybrid type-1 non-randomised follow-up study, as described by Curran and colleagues.[15] The study design followed the Proctor et al.[16] model of implementation research (see Page 2 and Fig. 1 in the Appendix) and was planned to have three components or phases (Fig. 2 in the Appendix). Phase 1 piloted the intervention on six groups of participants (15–20 participants each). Phase 2 involved adapting the intervention to make it more feasible. Phase 3 aimed to test the feasibility and effectiveness of the intervention by running 30 groups with beneficiaries. The study protocol was registered in the Open Science Framework.[17] This article provides the results of the piloting phase of the study.

Baseline assessments were conducted before the SH+ intervention, and post-intervention evaluations were conducted immediately after the intervention. Potential participants were approached by the Gaza Community Mental Health Programme (GCMHP) teams. GCMHP is a non-government organisation established in 1990 to introduce community mental healthcare to Gaza.[18] The nature of the research and the intervention were explained in detail to participants prior to the pre-assessment. They were given the choice to participate or decline participation. It was also clear to them that they could withdraw from the study at any time. Participants attending the preassessment session signed a written consent form. During the preassessment session, the screening took place. Those eligible for the study continued the pre-assessment. Others who did not meet the inclusion criteria or had a reason for exclusion were provided with an explanation and excluded accordingly.

Ethical approval was obtained from the Palestinian Ministry of Health (No: PHRC/HC/1243/23), and all participants signed an informed consent form before enrolling in the study. The intervention was offered in Arabic (using the official WHO translation). GCMHP staff received two training courses as facilitators. The first was provided by the WHO Collaborating Centre of the University of Verona, and the second through the WHO office in Jerusalem.

Participants who joined the intervention sessions had to fulfil the following inclusion criteria: age 18 years and older; presence of psychological distress as measured by a Depression, Anxiety, and Stress Scale—21 items (DASS-21) score above 8 (anxiety scale) or 10 (depression scale), or 15 (stress scale); availability for attending the sessions and signing the informed consent form. Exclusion criteria included clinical evidence of severe mental illness (psychosis, bipolar disorder, major depressive disorder, suicidality) and a clinical history of cognitive disability.

SH+ intervention

SH+ uses a pre-recorded audio, illustrated book, and discussions to teach skills that help reduce stress. It is delivered in five group sessions of up to 2 h in a space where a group can comfortably sit. Each of the five sessions follows a similar format. Facilitators begin by welcoming the participants and playing the audio. The audio reviews previous topics or introduces new ones, incorporates practicing skills learned, and includes a brief group discussion.[19] All sessions conclude with instructions for home practice and commitment from the participants. Each session focuses on specific skills. The first session introduces the concept of stress and emphasises the importance of grounding, avoiding feeling overwhelmed, and maintaining awareness of one's mind, body, and environment. The second session builds participants' skills in unhooking from thoughts or feelings that may control them. The third and fourth sessions focus on identifying personal values and developing strategies to align with those values, while also highlighting the importance of self-care and caring for others. The last session focuses on acceptance, reviewing the skills taught, and conducting some exercises.

Measures

The following tools were used for the assessment (see Page 2 and Table 1 in the Appendix): Gaza Trauma Checklist (GTC),[20] Depression, Anxiety and Stress Scale–21 Items (DASS-21),[21] WHO-5 Well-Being Index,[22] WHO Disability Assessment Schedule (WHODAS 2·0) (12 item).[23] The implementability of the intervention was evaluated using the Feasibility of Intervention Measure (FIM), the Acceptability of Intervention Measure (AIM) and the Intervention Appropriateness Measure (IAM) at post-assessment.[24] Fidelity was measured using the SH+ fidelity checklist.[25]

Statistical analysis

Descriptive statistics were used for demographic and clinical variables. Continuous variables were expressed as means and standard deviations, while categorical variables were expressed as absolute numbers and percentages. We collected the following sociodemographic variables of interest: age (divided into the following age groups: 18–24, 25–45, over 45), gender, governorate of residence (North Gaza governorate, Gaza governorate, Middle governorate, Khanyounis, Rafah), marital status (single, married, divorced, widowed), educational level (no education, primary school, preparatory school, secondary school, university, postgraduate). "University" and "postgraduate" were combined into a single group. Data were also collected on employment status, which was regrouped into "unemployed" and "employed". The "employed" category included "worker with a temporary contract", "worker with a permanent contract", "employer", "self-employed", "student" and "other"). Family income sources were categorized into the following groups: salaries, wages and agriculture; other sources or

support (such as UNWRA support, government support, and external aid); and those without a systematic source of income (including real estate, other sources, and no regular source of income). Information regarding ethnicity was not collected, given that 99% of the population in the Gaza Strip is Palestinian Arabs.[26,27]

For each clinical outcome, in order to fully exploit information from both baseline and post-intervention values, mean values of interval-level clinical variables (together with the standard error of their estimate) at both time points were jointly estimated through maximum likelihood with missing values, and a mixed model with individual random-effect and the time indicator as the only predictor was performed to assess presence of a change between baseline and follow-up. Such a model allowed for a non-null correlation and distinct variances between baseline and post-treatment values; moreover, robust standard errors (SEs) were adopted to allow for heterogeneity at the individual level.

Additionally, to evaluate change at the individual level, the Reliability Change Index (RCI) was calculated for each person who had both measurements for all clinical scales and the three DASS subscales. We used, as a reliability index, the test–retest correlations found for WHODAS (0·83),[28] for the DASS subscales (0·713 for DASS-D, 0·785 for DASS-A, and 0·813 for DASS-S),[29] and for WHO-5 (0·87).[30] The reliability index for DASS was derived from the information available in Brown et al.[29] (details in the Appendix). We also calculated the percentage of participants that improved (RCI > 1·96 for WHO-5, RCI < –1·96 for the other outcomes), those that worsened (RCI < –1·96 for WHO-5, RCI > 1·96 for the other outcomes) and those with nonreliable change (–1·96 < RCI < 1·96) for each clinical outcome.

For each trauma in the GTC questionnaire, the "1 to 3" and "more than 3" categories were combined to calculate, for each item, the percentage of participants who had experienced the trauma at least once. Analogously, the implementability measures were dichotomised (1–3 vs 4–5) to calculate the percentage of participants who agreed with each item. Moreover, for each DASS subscale, a categorization was performed to have a more intuitive description of the sample: for DASS-D, absent (0–9), mild (10–13), moderate (14–20), severe (21–27) or extremely severe (28–42) depression; for DASS-A, absent (0–7), mild (8–9), moderate (10–14), severe (15–19) or extremely severe (20–42) anxiety; finally, for DASS-S, absent (0–14), mild (15–18), moderate (19–25), severe (26–33) or extremely severe (34–42) stress.

Several studies have highlighted the severe impact of exposure to trauma, sociodemographic factors, and contextual text on the mental health, resilience, and quality of life of the Palestinian population, particularly in the Gaza Strip.[31–34] The association between clinical outcomes and predictors, including the number of SH+ sessions, sociodemographic variables and the GTC score at baseline, was assessed through a set of regressions. In particular, the following approach was adopted. First, a seemingly unrelated regression (SUR) equation model was performed,[35] with the clinical scales (the scores of the three DASS subscales, the WHO5 and the WHODAS) at post-intervention as outcomes, controlling for their respective baseline values. Then, if overall statistical significance was found, the five regressions for each outcome were performed separately. For each of them, results for each predictor were only considered if the global statistical significance of the whole set of parameters was achieved.

For the implementability outcomes, we calculated the percentage of participants who responded "agree" or "strongly agree" to all four items as synthetic measures of acceptability (AIM), appropriateness (IAM), and feasibility (FIM). The combination of a limited sample size and the binary nature of the outcomes necessitated limiting the number of predictors to ensure model stability and an adequate number of events per variable. Thus, we chose home address, GTC score, employment status, and marital status at baseline as predictors, together with clinical scales, in logistic regressions with the outcome being the response "strongly agree" to all four items (of FIM, IAM, and AIM, respectively). Thus, three logistic regressions were performed simultaneously; in particular, a seemingly unrelated estimation[36] model was used to test all predictors of interest. In case of statistical significance, a global test was performed for each regression. Only if the results of such tests were statistically significant were the p-values from the independent logistic regressions considered.

The association between the number of sessions and clinical outcomes was assessed using five separate regressions, with baseline outcome value and the number of sessions as the only predictors. The association between the number of sessions and the implementability outcomes was assessed through three simple logistic regressions, again using a seemingly unrelated estimation model to perform a global test across the three regressions; the three odds ratios were considered only if this test was significant.

Fidelity in each session was calculated as the percentage of items endorsed across all the group/topic combinations. The same was done across all sessions to obtain a global fidelity percentage for the study. Furthermore, reasons for dropouts were collected, and the percentage of those who chose not to participate for non-logistical reasons (relative to the subgroup without logistical constraints) was calculated. Adverse events were also reported in the results section. Finally, quotations from some participants are reported in the Appendix. Statistical analyses were implemented with

the software Stata 18.[37] Given the likely sensitivity of results to the choice of predictors included in the regressions (due to the high number of parameters relative to the sample size), we implemented two sensitivity analyses using more parsimonious models to evaluate the reliability of our results. Additionally, as a sensitivity analysis for the pre-post test of clinical scales, we performed paired t-tests on the DASS total and subscales, the WHO-5, and the WHODAS scores. These tests included only participants for whom data were available at both the baseline and post-intervention time points.

Role of the funding source

There was no funding for this study.

Results

A total of 212 potentially eligible participants were invited to receive the intervention. All had been exposed to traumatic events and were approached by the GCMHP Psychological First Aid (PFA) teams. Of these, 192 accepted to attend the intervention, and 15 scored below the inclusion cut-off points; thus, a total of 177 met the inclusion criteria. Of these, 162 participants completed the pre-assessment and 157 completed the post-assessment (Fig. 3 in the Appendix). Given the higher-than-expected number of people meeting the inclusion criteria, participants were allocated to 12 groups (instead of the planned six) based on gender and location.

Sociodemographic characteristics

Sociodemographic characteristics are shown in Table 1. The participants were predominantly women, mostly in early to middle adulthood, and the majority were married. Most had completed secondary or higher education, were unemployed, and lived across all governorates of the Gaza Strip, with many relying on external support or irregular sources of family income. In terms of exposure to traumatic experiences, all participants reported seeing the impact of the bombing on the Gaza Strip and hearing bombardment. Almost all reported hearing warplanes. One out of ten experienced being threatened with being shot and being used as human shields. Five per cent were arrested during a ground incursion. See Table 2 in the Appendix for the detailed findings of GTC.

Female gender (%)	**59·26% (96/162)**
Age	
18–24	12·96% (21/162)
25–45	62·35% (101/162)
Over 45	24·69% (40/162)
Marital status	
Single	16·05% (26/162)
Married	73·46% (119/162)
Divorced	1·85% (3/162)
Widowed	8·64% (14/162)
Educational level	
Primary school	4·94% (8/162)
Preparatory school	17·90% (29/162)
Secondary school	48·77% (79/162)
University	27·78% (45/162)
Postgraduate	0·62% (1/162)
Home address	
North Gaza governorate	20·37% (33/162)
Gaza governorate	15·43% (25/162)
Middle governorate	32·72% (53/162)
Khanyounis	29·01% (47/162)
Rafah	2·47% (4/162)
Employment	
Employed[a]	12·96% (21/162)
Unemployed	87·04% (141/162)
Source of family income	
Salaries, agriculture, and wages	30·86% (50/162)
Other sources (support)	58·02% (94/162)
No systematic source of income	11·11% (18/162)

[a]Employed includes being a student, self-employed, having temporary work, and "other".

Table 1: **Main sociodemographic characteristics of the 162 participants included in the implementation study in the Gaza Strip.**

Implementability of SH+

With fidelity above 98% of each session (Table 3 in the Appendix), almost all participants agreed or strongly agreed with each acceptability item, and more than 83·4% agreed or strongly agreed with each appropriateness and 88·5% with each feasibility item (Table 2).

Effectiveness of SH+

As shown in Table 3, all clinical outcomes improved significantly following the intervention ($p < 0·001$). These results were confirmed by the paired t-test and by the pre- and post-intervention distributions across severity groups, as shown in Tables 4 and 5 in the Appendix.

Individual-level psychological change using RCI showed a reliable improvement for most participants in well-being (63·64%) and stress (52·45%), and for a high proportion in the disability outcome (46·85%). Improvements in depression (74·83%) and anxiety (72·03%) were unreliable for most participants, and only a small fraction of participants reliably worsened (at most 4·20% on the WHO-5), indicating the changes either were unreliable or reflected improvement (see Table 6 in the Appendix).

Regression analyses

The regression analysis revealed that higher acceptability and appropriateness were associated with geographical location, with Gaza Governorate scoring highest. Additionally, higher baseline well-being scores were associated with a lower likelihood of reporting high acceptability (Table 4).

Outcome	Item	N. of participants agreeing or strongly agreeing with the item	Percentage
Acceptability	SH+ meets my approval	157/157	100%
	SH+ is appealing to me	152/157	96·82%
	I like these sessions	154/157	98·09%
	I welcome these sessions	155/157	98·73%
	Overall Acceptability	151/157	96·18%
Appropriateness	This intervention seems fitting	151/157	96·18%
	This intervention seems suitable to me	149/157	94·90%
	This intervention seems applicable	149/157	94·90%
	This intervention seems like a good match	140/157	89·17%
	Overall Appropriateness	131/157	83·44%
Feasibility	SH+ seems implementable	152/157	96·82%
	SH+ seems possible	145/157	92·36%
	SH+ seems doable	142/157	90·45%
	SH+ seems easy to use	147/157	93·63%
	Overall Feasibility	139/157	88·54%

Table 2: **Implementation outcomes among participants receiving the WHO Self-Help Plus intervention.**

The regression analysis of clinical outcomes revealed that a greater improvement in stress levels was associated with higher levels of baseline trauma. Improvement in anxiety was associated with geographical location, with the Gaza Governorate showing the greatest improvement (Table 5). In addition to being married, the geographical area was associated with improvements in disability, with Khanyounis/Rafah showing the greatest one. These results were confirmed by a sensitivity analysis, which also suggested a possible improvement in anxiety with higher GTC scores (results of the sensitivity analysis are presented in Tables 7–10 in the Appendix).

Drop outs

Seventeen participants failed to complete the intervention, including seven men and 10 women. A total of 11 participants had to stop attending the sessions for (logistic) reasons: five were busy with other things, two travelled abroad, and one got sick. Two women were prevented by their husbands from leaving their homes, and one was unable to leave her baby alone at home. Among the 166 participants who completed the intervention, six expressed dissatisfaction. Specifically, two women reported dissatisfaction with the audio recordings, while four men stopped responding to phone calls, resulting in a dissatisfaction rate of 3·61%. Facilitators anticipated that some participants might not enjoy the intervention's format, particularly because it involves listening to audio recordings. In contrast, people typically attend therapy to engage in conversation. However, during the first session, facilitators observed that the exercises successfully kept participants engaged. For instance, the awareness exercise, which focused on drinking a cup of tea, along with the other activities during the session, proved effective in addressing this challenge.

Outcome	Pre (N = 162)	SE	Post (N = 157)	SE
WHO5	10·78	0·418	17·69	0·413
WHODAS	22·70	0·629	18·35	0·528
DASS–D	18·41	0·740	9·67	0·631
DASS–A	17·07	0·735	10·23	0·630
DASS–S	23·52	0·635	13·11	0·669
DASS (Total)	58·97	1·852	33·02	1·710

SE = Standard Error. WHO-5: WHO-5 Well-Being Index. WHODAS: WHO Disability Assessment Schedule. DASS-D: Depression, Anxiety, and Stress Scale—Depression Subscale. DASS-A: Depression, Anxiety, and Stress Scale—Anxiety Subscale. DASS-S: Depression, Anxiety, and Stress Scale—Stress Subscale.

Table 3: **Clinical outcomes among participants receiving the WHO Self-Help Plus intervention.**

Adverse events

During the piloting phase, five adverse events were recorded, all involving women. These incidents were distributed across sessions: two in the 3rd, one in the 4th, and two in the 5th. Intriguingly, despite varying timing, all events shared a common trigger: discussions centred on personal values and coping strategies. Specifically, the first two events emerged during a value identification exercise in Session 3, the third during the reviewing exercise in Session 4, and the final two during the coping with pain and sadness exercise in Session 5. Further analysis revealed a consistent association with familial challenges: three cases involved marital or in-law conflicts, one concerned a daughter's divorce, and the last involved issues with siblings. While the first two sessions introduce participants to the concepts of stress, awareness, and being overwhelmed, as well as unhooking exercises, the subsequent sessions delve into values, exploring sensitive and personal topics. Therefore, women recalling their dysfunctional families, which became a source of distress rather than a coping mechanism, likely surfaced their feelings of vulnerability.

The co-facilitator provided immediate intervention for the five participants. One woman rejoined the session quickly. Three women returned after a 10-min break, during which they received the facilitator's support. The fifth participant insisted on discussing her difficulties within the group, which was challenging to the facilitators. The group listened and offered support, ending the situation with the woman receiving collective support before the session resumed. Facilitators noted that participants were aware of the importance of resuming the session as usual. Following the intervention, three of the five women were referred to GCMHP community centres for further intervention.

Intervention appropriateness measure	Odds ratio (95% CI)
DASS at baseline	1·008 (0·986, 1·031)
WHO-5 at baseline	0·965 (0·891, 1·046)
WHODAS at baseline	0·953 (0·906, 1·003)
GTC	1·016 (0·933, 1·107)
Married (Yes vs No)	0·632 (0·267, 1·495)
Home address* (Reference North Gaza)	
Gaza Governorate	2·142 (0·534, 8·590)
Middle Governorate	0·428 (0·148, 1·233)
Khanyounis/Rafah	0·361 (0·117, 1·110)
Unemployed (Yes vs No)	2·374 (0·722, 7·801)
Observations	141
Acceptability of intervention measure	**Odds ratio (95% CI)**
DASS at baseline	0·986 (0·964, 1·009)
WHO-5 at baseline*	0·913 (0·840, 0·992)
WHODAS at baseline	0·958 (0·910, 1·008)
GTC	1·026 (0·940, 1·120)
Married (Yes vs No)	0·653 (0·271, 1·572)
Home address* (Reference North Gaza)	
Gaza Governorate	3·027 (0·636, 14·418)
Middle Governorate	0·610 (0·205, 1·815)
Khanyounis/Rafah	0·360 (0·115, 1·130)
Unemployed (Yes vs No)	1·238 (0·386, 3·972)
Observations	141
Feasibility of intervention measure	**Odds ratio (95% CI)**
DASS at baseline	1·002 (0·982, 1·024)
WHO-5 at baseline	0·955 (0·884, 1·031)
WHODAS at baseline	0·953 (0·907, 1·001)
GTC	1·016 (0·935, 1·103)
Married (Yes vs No)	0·651 (0·287, 1·478)
Home address (Reference North Gaza)	
Gaza Governorate	1·397 (0·410, 4·760)
Middle Governorate	0·963 (0·343, 2·705)
Khanyounis/Rafah	0·483 (0·160, 1·460)
Unemployed (Yes vs No)	0·964 (0·321, 2·894)
Observations	141

*p < 0·05, **p < 0·01, ***p < 0·001. CI: Confidence Interval. DASS: Depression, Anxiety, and Stress Scale. WHO-5: WHO-5 Well-Being Index. WHODAS: WHO Disability Assessment Schedule. GTC: Gaza Trauma Checklist.

Table 4: **Sociodemographic and clinical factors associated with implementability outcomes: regression analysis.**

DASS-S	Coefficient (95% CI)
DASS-S at baseline***	0·470 (0·284, 0·656)
GTC*	−0·317 (−0·623, −0·012)
Gender (Female vs Male)	0·558 (−2·255, 3·370)
Age (Reference 18–24)	
25–45	2·883 (−1·653, 7·420)
Over 45	1·784 (−2·931, 6·499)
Married (Yes vs No)	−0·771 (−4·131, 2·590)
Home address (Reference North Gaza Governorate)	
Gaza Governorate	−1·391 (−6·016, 3·235)
Middle Governorate	0·841 (−3·587, 5·269)
Khanyounis/Rafah	2·954 (−1·084, 6·992)
Number of family members (Reference less than 4)	
4–7 people	−2·160 (−6·844, 2·524)
8 or more	−3·018 (−7·890, 1·854)
Educational level (Reference No education)	
Preparatory School	−3·257 (−9·785, 3·270)
Secondary School	−2·268 (−8·391, 3·854)
University	−4·331 (−11·003, 2·341)
Unemployed (Yes vs No)	2·273 (−1·983, 6·530)
Source of income (Reference No regular income)	
Salaries, agriculture, and wages	3·274 (−2·131, 8·680)
Other	0·468 (−3·968, 4·904)
Observations	143
DASS-A	**Coefficient (95% CI)**
DASS-A at baseline***	0·410 (0·257, 0·563)
GTC	−0·044 (−0·332, 0·244)
Gender (Female vs Male)	0·565 (−2·166, 3·296)
Age (Reference 18–24)	
25–45	1·610 (−2·614, 5·835)
Over 45	−0·023 (−4·409, 4·364)
Married (Yes vs No)	−0·093 (−3·164, 2·978)
Home address* (Reference North Gaza Governorate)	
Gaza Governorate	−2·044 (−6·316, 2·228)
Middle Governorate	4·131 (0·004, 8·258)
Khanyounis/Rafah	3·033 (−0·875, 6·941)
Number of family members (Reference less than 4)	
4–7 people	1·765 (−2·571, 6·100)
8 or more	1·874 (−2·603, 6·350)
Educational level (Reference No education)	
Preparatory School	−0·499 (−6·505, 5·507)
Secondary School	1·011 (−4·612, 6·633)
University	−2·688 (−8·863, 3·486)
Unemployed (Yes vs No)	0·872 (−3·037, 4·781)
Source of income (Reference No regular income)	
Salaries, agriculture, and wages	0·760 (−4·199, 5·719)
Other	−0·115 (−4·174, 3·943)
Observations	143
DASS-D	**Coefficient (95% CI)**
DASS-D at baseline***	0·475 (0·301, 0·650)
GTC	−0·174 (−0·477, 0·128)
Gender (Female vs Male)	−0·133 (−2·905, 2·640)
Age (Reference 18–24)	
25–45	−1·563 (−6·025, 2·899)
Over 45	−1·321 (−5·978, 3·337)
Married (Yes vs No)	−0·946 (−4·218, 2·326)

(Table 5 continues on next page)

One participant ultimately withdrew from the study due to spousal disapproval. Notably, no adverse reactions occurred during grounding exercises as facilitators anticipated.

Discussion

This is the first study that investigated the feasibility of implementing SH+ in a context affected by war. It provides results from the piloting phase of a three-phase study that aims to investigate the implementability and effectiveness of the SH+ intervention among individuals exposed to traumatic events in the Gaza Strip. The piloting phase was conducted in early 2023.

DASS-D	Coefficient (95% CI)
(Continued from previous page)	
Home address (Reference North Gaza Governorate)	
Gaza Governorate	−4·225 (−8·930, 0·480)
Middle Governorate	1·388 (−2·987, 5·762)
Khanyounis/Rafah	0·114 (−4·227, 4·455)
Number of family members (Reference less than 4)	
4–7 people	1·963 (−2·647, 6·573)
8 or more	1·363 (−3·420, 6·147)
Educational level (Reference No education)	
Preparatory School	−3·681 (−10·103, 2·742)
Secondary School	−4·372 (−10·391, 1·648)
University	−4·790 (−11·347, 1·767)
Unemployed (Yes vs No)	0·731 (−3·440, 4·903)
Source of income (Reference No regular income)	
Salaries, agriculture, and wages	0·438 (−4·856, 5·732)
Other	−1·763 (−6·091, 2·565)
Observations	143
WHO-5	**Coefficient (95% CI)**
WHO-5 at baseline*	0·213 (0·037, 0·389)
GTC	0·038 (−0·185, 0·262)
Gender (Female vs Male)	1·330 (−0·697, 3·356)
Age (Reference 18–24)	
25–45	0·314 (−2·949, 3·578)
Over 45	0·231 (−3·144, 3·606)
Married (Yes vs No)	−0·018 (−2·417, 2·381)
Home address (Reference North Gaza Governorate)	
Gaza Governorate	1·518 (−1·773, 4·810)
Middle Governorate	−0·860 (−4·055, 2·335)
Khanyounis/Rafah	−0·033 (−2·849, 2·784)
Number of family members (Reference less than 4)	
4–7 people	−1·836 (−5·226, 1·554)
8 or more	−1·099 (−4·625, 2·426)
Educational level (Reference No education)	
Preparatory School	1·365 (−3·350, 6·080)
Secondary School	0·896 (−3·513, 5·306)
University	1·614 (−3·202, 6·429)
Unemployed (Yes vs No)	−1·434 (−4·506, 1·639)
Source of income (Reference No regular income)	
Salaries, agriculture, and wages	1·492 (−2·364, 5·347)
Other	1·882 (−1·294, 5·058)
Observations	143
WHODAS	**Coefficient (95% CI)**
WHODAS at baseline***	0·539 (0·425, 0·653)
GTC	−0·053 (−0·265, 0·158)
Gender (Female vs Male)	−1·850 (−3·743, 0·044)
Age (Reference 18–24)	
25–45	1·993 (−1·057, 5·044)
Over 45	2·630 (−0·520, 5·780)
Married (Yes vs No)**	−3·079 (−5·300, −0·859)
Home address* (Reference North Gaza Governorate)	
Gaza Governorate	1·644 (−1·421, 4·709)
Middle Governorate	2·698 (−0·291, 5·686)
Khanyounis/Rafah	−1·222 (−3·854, 1·411)
Number of family members (Reference less than 4)	
4–7 people	0·363 (−2·818, 3·544)
8 or more	−1·496 (−4·808, 1·817)

(Table 5 continues on next page)

The main implementation phase was planned to start in October 2023, but was postponed due to the war.

Although no predefined cutoff points for feasibility, acceptability, and appropriateness were specified, the observed high levels of agreement provide evidence of success on these indicators. The high implementability rates of SH+ suggest that it was well received, perceived as fitting participants' needs, and considered practical for delivery. This aligns with findings from a recent study on the acceptability and feasibility of rape and Gender-Based Violence survivors in South Africa that reported enjoying learning the new skills and using them, and appreciated the social aspects of the sessions, connecting with new friends and having a 'purpose to get up'.[38]

When it comes to effectiveness, the results build on existing experimental and observational data demonstrating SH+'s effectiveness across various populations. Depression and stress levels improved from moderate to normal, and levels of anxiety significantly improved, from severe to moderate. The higher level of anxiety could be attributed to the high level of exposure to traumatic events such as hearing bombardment and warplanes. On the other hand, RCI showed that more participants have reliable improvement in well-being, stress, and disability than in depression and anxiety outcomes. This divergence suggests a critical difference between mean-level population change (effect size) and individual-level clinical change (RCI). While the intervention successfully shifted the mean group scores for anxiety and depression, likely by benefiting a large number of participants to a small degree, it often did not produce a sufficiently large change in individual participants to overcome the threshold of 1·96 standard errors. Interestingly, a recent meta-analysis[39] that investigated the effects of SH+, primarily on depressive symptoms of refugees and asylum seekers, found no evidence of a difference between SH+ and Enhanced Care As Usual in reducing depressive symptoms at post-intervention. However, SH + had significantly larger effects among vulnerable participants (ie, unemployed and with lower mental well-being levels). Results from this meta-analysis, combined with our RCI findings, suggest that SH+ is an effective tool in reducing distress. However, a more specialised intervention is needed for conditions that are more persistent or severe.

In our pilot study, regression analysis showed that higher exposure to trauma at baseline was significantly associated with greater improvement in stress levels, suggesting that individuals with more severe trauma exposure may benefit considerably from the intervention in terms of stress reduction. Interestingly, although the Gaza Strip is a small geographical area, the findings show the significance of location as a contributing factor. Initially, we anticipated a correlation between the geographical area and exposure to

trauma events, but this was not confirmed using the GTC. The Checklist recorded the exposure to traumatic events without having a specific timeframe. To address this, a time frame should be incorporated into the GTC during the implementation phase. Another finding is that being married at baseline was significantly associated with greater improvement in disability; perhaps as social support could play a protective factor,[40] or a greater feeling of responsibility towards the family necessitates more functionality.[41,42]

It is noteworthy that while the overall predictors significantly impacted stress, anxiety, and disability scores, no global statistical significance was observed for depression or well-being in the regression analysis. This suggests that while individual symptoms improved, the overall predictors might influence specific symptom clusters differently. Results from the future implementation phase with a larger sample size could lead to more findings and a better explanation. Additionally, our outcomes may have been influenced by unmeasured confounders, such as the recency of the traumatic events.

During our research, the facilitators received two rounds of training on the intervention, with one focusing on practical themes and possible scenarios. They reported some variations between the original English audio and the Arabic version, with the Arabic version being of longer duration due to the inclusion of detailed explanations. Additionally, they considered more suitable wording options. These minor findings were reported to the WHO office in Geneva, which worked on a new version of SH+. Observations and proposed adaptations are present in Table 11 in the Appendix.

The occurrence of five adverse events, all involving women, all sharing a common trigger, suggests that introspection on values and personal agency, while therapeutic, can also confront participants with deep-seated distress, especially when these values or choices conflict with their lived realities. Some studies show that women often utilise emotion-focused coping and tend to seek social support from family.[43,44] Social environment, including family ties, was found to be a key factor for maintaining positive psychological functioning and the ability to adjust to traumatic war events among Palestinian women.[45] Family support is a key protective factor for coping with adversities and traumatic experiences.[46,47] The fact that all events were linked to severe family problems further emphasises the compounded burden faced by these women, where personal agency is often intertwined with complex familial dynamics. The instance where one participant chose to openly discuss her issues within the group, receiving support from others, indicates the potential for group-based interventions in moments of acute distress. The referral of three cases to GCMHP community centres highlights the need for established functioning referral pathways and a stepped-care approach, acknowledging that some individuals may require individualised support. GCMHP's implementation enabled the smooth referral of participants who needed further assessment and therapeutic intervention. Proper training on adverse events management and clear referral pathways during future implementation of the intervention are important for the intervention's scalability beyond the walls of GCMHP. The referral pathways need clear referral criteria, a straightforward referral process, and accessibility to higher-level intervention. Finally, the single dropout due to a husband's prohibition illustrates the external and cultural barriers that can impede access to and retention in mental health services, particularly for women, in this context.

WHODAS	Coefficient (95% CI)
(Continued from previous page)	
Educational level (Reference No education)	
Preparatory School	−0·435 (−4·892, 4·022)
Secondary School	0·321 (−3·826, 4·467)
University	−1·279 (−5·904, 3·346)
Unemployed (Yes vs No)	1·825 (−1·061, 4·711)
Source of income (Reference No regular income)	
Salaries, agriculture, and wages	3·278 (−0·327, 6·884)
Other	2·278 (−0·694, 5·250)
Observations	143

CI: Confidence Interval. DASS-S: Depression, Anxiety, and Stress Scale—Stress Subscale. DASS-A: Depression, Anxiety, and Stress Scale—Anxiety Subscale. DASS-D: Depression, Anxiety, and Stress Scale—Depression Subscale. WHO-5: WHO-5 Well-Being Index. WHODAS: WHO Disability Assessment Schedule. GTC: Gaza Trauma Checklist. *p < 0·05, **p < 0·01, ***p < 0·001.

Table 5: **Sociodemographic and clinical factors associated with clinical outcomes: regression analysis.**

Limitations

This study represents only the piloting phase of a larger research project. The small sample size of 162 participants completing the pre-assessment, compared to an expected total of 500 across both the piloting and implementation phases, inevitably limited the statistical power and the generalizability of the findings to other target populations. The participant allocation into groups was not based on randomisation, but on gender and location, primarily to ensure adequate representation of subgroups and to maintain logistical feasibility within the study settings. Such an approach may introduce potential selection bias; however, it was deemed appropriate for an implementation study, where the primary objectives were to test procedures, refine the intervention, and assess feasibility, appropriateness, and effectiveness under real-world conditions. Another possible source of bias may be the presence of unmeasured confounders, such as the recency of traumatic events (as discussed above). Another potential

limitation is the use of age groups rather than date of birth during data collection, which limits the ability to examine age groups above 60. The study also has other limitations, such as the lack of a control group or the use of an ACT process measure. The presence of a control group is important to confirm that the improvement is due to the intervention. An ACT process measure adapted to SH+ could provide evidence on whether psychological flexibility mediated treatment outcomes. Additionally, although the conditions are very fragile and unpredictable in that context, a follow-up assessment could be warranted. The cost of the intervention, and even an estimate of it, is missing in the current study, which is one of the components of the Proctor model. These limitations need to be addressed during the study's implementation phase, once the situation improves.

The minimal requirements for implementing SH+ in the Gaza Strip include the availability of trained facilitators, interested participants who meet the specified criteria, and appropriate settings. While the first two requirements are theoretically met, the third requirement severely hinders implementation feasibility. Given the recent war (see the Appendix), which places individuals under a constant threat of losing their lives or facing displacement, safety becomes a critical concern for both facilitators and participants. The lack of a sense of safety, combined with the potential change of location, complicates participants' ability to commit to an intervention that requires their presence at a specific time once a week for five weeks. Moreover, most MHPSS activities are now taking place in tents or shelters, which are unsuitable for group interventions and lack adequate privacy. The SH+ intervention relies on audio recordings that require a power supply to play, presenting another challenge. Thus, the lack of appropriate space and a sense of safety makes it inappropriate to implement SH+ under the current circumstances. Yet, the reached ceasefire might open the door to improved living conditions, enabling the intervention and the study's implementation phase. The promising results from this pilot phase suggest that SH+ could be among the scalable interventions to address the massive needs of the population resulting from the war.

Conclusions

The promising findings of this piloting phase have several important implications for planning mental health interventions in the Gaza Strip and similar conflict-affected settings. SH+ appears to be a highly effective and contextually appropriate brief and scalable psychological intervention for individuals with trauma exposure. Its high acceptability and feasibility make it appropriate for broader implementation. The postponement of the main implementation phase due to the war underscores the immense challenges of conducting research and delivering humanitarian interventions in active conflict zones. Understanding and addressing external barriers to care, such as cultural norms and familial pressures, particularly for women, is critical to improving access and retention. Finally, while the current findings are promising, it is important to resume and complete the larger implementation phase once conditions permit, explore how SH+ can be integrated into existing mental healthcare structures, and build a comprehensive mental health response in this deeply affected region.

Contributors

YA and CB conceptualised and designed the study, with inputs from the co-authors. YA collected the data. All authors accessed and verified the data, and YA and FT performed the statistical analyses. YA wrote the first draft of this paper, with inputs from CB. All the authors provided crucial input to the results interpretation, presentation, and reporting of the data. All the co-authors critically reviewed the report. YA and CB coordinated and directed the project. All the authors provided final approval to submit the manuscript for publication.

Data sharing statement

The dataset and analysis code will be available upon a motivated request to the corresponding author, after discussion and agreement among all co-authors.

Editor note

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Declaration of interests

Authors declare no competing interests.

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To ensure strict adherence to The Lancet's formatting requirements, Gemini (Google) was used as a secondary check for reference-style consistency. All AI-generated suggestions were critically appraised and corrected by the corresponding author. No original text or scientific claims were generated by artificial intelligence.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lanepe.2026.101670.

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