Supplementary appendix

Effectiveness of a self-help psychological intervention for preventing mental disorders among Syrian refugees in Turkey: a randomized trial

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Description of the study setting

The study setting of the trial was Turkey in which by the end of 2020, only 1.6% of Syrian refugees lived in camps and most Syrians resided in cities[1]. It is reported that most Syrians in cities live in rented apartments while some who cannot afford the rent live in storehouses[2]. The trial was conducted in two different cities in Turkey which were Istanbul and Mardin. Mardin is a city that has borders with Syria, located at the southeast of Turkey. 88.897 Syrians live in Mardin who make the 10,60 percent of the whole Mardin's population. The reasons for Syrians to choose Mardin to reside are reported to be the city's location and employment opportunities[3]. However, around 90% of the Syrians in Mardin work in short-term jobs and only a small percentage of them work officially with an insurance[3]. The Syrians in Mardin who are working report experiencing challenges to receive their salary, difficult work conditions, working for long hours, discrimination and meeting their basic needs such as food and shelter[4]. A study has found that Syrians in Mardin experience financial difficulties and two-third of them rate their financial situation as bad or very bad[5].

On the other hand, Istanbul is a metropolitan, located at the North-west of Turkey. The highest number of Syrian refugees in Turkey resides in Istanbul with 516.510 Syrians which makes the 3,33 percent of the whole Istanbul's population. However, the Syrians in Istanbul are unevenly distributed to districts in which some districts have higher number of Syrians in its borders[6]. It has been reported that these districts are usually categorized as disadvantaged locations in terms of its economic capacity, education and health services, social life and infrastructure[7]. One of the reasons why Syrians prefer to live in these districts has been reported to be the lower costs of rental apartments and living expenses[8]. A study indicates that more than half of the refugees are unemployed and 92% of employed Syrian refugees work informally and are underpaid[9]. Another qualitative study reported that Syrian refugees in Istanbul experience difficulties due not knowing Turkish and not being able to receive social support or services, challenges in official procedures, discrimination in the employment market and the society, living difficulties and adaptation problems[10].

Description of the experimental and control intervention

SH+ was designed to be relevant for large segments of adversity-affected populations, it is intended to be non-diagnostic, easily adaptable to different cultures and languages, and both meaningful and safe for people with and without mental disorders. The SH+ programme is based on acceptance and commitment therapy (ACT), a form of cognitive-behavioral therapy[11]. ACT is based on the concept that ongoing attempts to avoid or suppress unwanted thoughts and feelings can paradoxically increase the impact that these problems have on a person's life. Instead, it emphasizes learning new ways to accommodate difficult thoughts and feelings while guiding people to take proactive steps towards living in a way that is consistent with their values[1]. The SH+ pre-recorded audio material is delivered across five 2-hour sessions to large groups for example, 30 people. The audio material imparts key information about stress management and guides participants through individual exercises and small group discussions. To supplement the audio recordings, the illustrated self-help book reviews all essential content and concepts.

The SH+ intervention was delivered by pairs of trained facilitators with a migration background, who were native Arabic speakers. Most of the facilitators had no formal mental health training or work experience in this field. Facilitators completed an initial five days of training delivered by WHO Expert Trainers, which included listening to the audio recordings, receiving instruction in SH+ facilitation skills, and role-playing and practicing SH+ sessions. This was followed by practice groups and ongoing supervision. The facilitator's role consisted of playing the audio recording, responding to questions and disruptions, demonstrating the exercises in the audio recording, reading out scripted discussion questions and ensuring safety by responding to any risk related issues. Intervention supervision was provided by psychiatrists or other health care professionals, who were available for questions, discussion, and debriefing after the sessions. Additional training and consultation were available when necessary from SH+ expert trainers at WHO through calls and local visits. Fidelity was checked by the intervention supervisor through session adherence forms completed by facilitators. In addition, the intervention supervisor observed at least 10% of the sessions and completed an adherence form designed for each SH+ session.

The participants in the Enhanced Treatment as Usual (ETAU) arm did not receive SH+ but continued to receive routine social support and/or care according to ordinary practice and local regulations. In addition, ETAU arm received information about the governmental and non-governmental organizations which provide mental health and social support to refugees. They were not directly connected with mental health services by the researchers, in order to avoid medicalization of their condition of psychological distress. The ETAU arm received baseline and follow- up assessments according to the study schedule.

Table S1: Balance of full list of collected socio-demographic variables at baseline

Variable	ETAU	SH+	Total	Standardized Difference
Age in years: mean (SD)	31.73 (9.16)	31.22 (8.89)	31.47 (9.02)	-0.040
Female gender: n/N	198/320	206/322	404/642	0.031
	61.87%	63.98%	62.93%	
Country of origin: Syria	311/320	317/322	628/642	0.061
	97.19%	98.45%	97.82%	
Country of origin: Iraq	7/320	4/322	11/642	-0.051
	2.19%	1.24%	1.71%	
Single	49/320	53/322	102/642	0.022
	15.31%	16.42%	15.89%	
Married	260/320	258/322	518/642	-0.020
	81.25%	80.12%	80.69%	
Divorced	6/320	6/322	12/642	-0.001
	1.875%	1.86%	1.87%	
Widow/widower	5/320	5/322	10/642	-0.001
	1.56%	1.55%	1.56%	
No of relatives: mean (SD)	4.87 (2.27)	5.04 (3.71)	4.96 (3.08)	0.039
No of children: mean (SD)	2.73 (1.92)	2.73 (1.89)	2.73 (1.90)	0.001
Years of education: mean (SD)	9.12 (3.73)	8.94 (3.72)	9.03 (3.72)	-0.033
Illiterate	8/320	17/322	25/642	**0.102**
	2.50%	5.28%	3.89%	
Primary school	195/320	202/322	397/642	0.026
	60.94%	62.73%	61.84%	
Secondary/high school	64/320	53/322	117/642	-0.065
	20.00%	16.46%	18.22%	
University	46/320	47/322	93/642	0.004
	14.38%	14.60%	14.49%	
Education not reported	7/320	3/322	10/642	-0.072
	2.19%	0.93%	1.56%	
No of siblings: mean (SD)	7.68 (3.79)	6.96 (3.05)	7.32 (3.45)	**-0.147**
Religion: Muslim	143/320	135/322	278/642	-0.039
	44.69%	41.93%	43.30%	
Single pre migration	86/320	92/322	178/642	0.027
	26.88%	28.57%	27.73%	
Married pre migration	223/320	222/322	445/642	-0.011
	69.69%	68.94%	69.31%	
Divorced/widowed pre migration	11/320	6/322	17/642	-0.069
	3.44%	1.86%	2.65%	

Variable	ETAU	SH+	Total	Standardized Difference
Unemployed pre migration	48/320	54/322	102/642	0.034
	15.00%	16.77%	15.89%	
Employed pre migration	83/320	70/322	153/642	-0.070
	25.94%	21.74%	23.83%	
Self-employed pre migration	8/320	9/322	17/642	0.013
	2.50%	2.80%	2.65%	
Student pre migration	71/320	73/322	144/642	0.008
	22.19%	22.67%	22.43%	
Home maker pre migration	93/320	107/322	200/642	0.064
	29.06%	33.23%	31.15%	
Other occupation pre migration	15/320	9/322	24/642	-0.070
	4.69%	2.80%	3.74%	
Living with partner pre migration	214/320	214/322	428/642	-0.006
	66.88%	66.46%	66.67%	
Living with parents pre migration	92/320	99/322	191 /642	0.031
	28.75%	30.75%	29.75%	
Other living condition pre migration	14/320	9/322	23/642	-0.060
	4.38%	2.80%	3.58%	
Age at departure in years: mean (SD)	27.20 (8.96)	26.91 (11.13)	27.06 (10.10)	-0.021
Departure agreement	309/318	317/320	626/638	0.099
	97.17%	99.06%	98.12%	
Balkan or Mediterranean route	7/320	5/322	12/642	-0.033
	2.19%	1.55%	1.87%	
Other route	284/320	289/322	573/642	0.023
	88.75%	89.75%	89.25%	
Unreported route	29/320	28/322	57/642	-0.009
	9.06%	8.70%	8.88%	
Travel duration in months: mean (SD)	0.71 (2.35)	0.49 (0.90)	0.60 (1.79)	-0.088
Present country is the final destination	209/318	217/322	426/640	0.025
	65.72%	67.39%	66.56%	
Detention during travel	17/316	16/320	33/636	-0.012
	5.38%	5.00%	5.19%	
Detention duration in months: mean (SD)	8.27 (19.33)	10.89 (23.00)	9.34 (20.41)	0.087
Travelled alone	24/320	26/322	50/642	0.015
	7.50%	8.07%	7.79%	
Travelled with friends or relatives	198/320	204/322	402/642	0.022
	61.875%	63.35%	62.62%	
Travelled with migrants	15/320	16/322	31/642	0.009
	4.69%	4.97%	4.83%	
Other travel conditions	81/320	75/322	156/642	-0.033
	25.31%	23.29%	24.30%	

Variable	ETAU	SH+	Total	Standardized Difference
Relatives in the country of origin	307/319	300/321	607/640	-0.089
	96.24%	93.46%	94.84%	
Sons/daughters in the country of origin	13/320	10/322	23/642	-0.036
	4.06%	3.11%	3.58%	
Partner: husband/wife in the country of origin	23/320	20/322	43/642	-0.028
	7.19%	6.21%	6.70%	
Parents in the country of origin	105/320	100/322	205/642	-0.027
	32.81%	31.06%	31.93%	
Other relatives in the country of origin	240/320	236/322	476/642	-0.028
	75.00%	73.29%	74.14%	
Friends in the country of origin	4/320	3/322	7/642	-0.022
	1.25%	0.93%	1.09%	
No information on which relatives in the country of origin	6/320	6/322	12/642	-0.001
	1.875%	1.86%	1.87%	
Asylum seeker	45/320	55/322	100/642	0.059
	14.06%	17.08%	15.58%	
Humanitarian protection	6/320	7/322	13/642	0.015
	1.875%	2.17%	2.02%	
Subsidiary protection	251/320	241/322	492/642	-0.060
	78.44%	74.84%	76.64%	
Political asylum	6/320	11/322	17/642	0.068
	1.875%	3.42%	2.65%	
Other legal status	8/320	6/322	14/642	-0.031
	2.50%	1.86%	2.18%	
Length of stay in host country in months: mean (SD)	44.35 (35.74)	54.53 (41.44)	49.39 (38.94)	**0.186**
Living alone post migration	19/320	22/322	41/642	0.026
	5.94%	6.83%	6.39%	
Living with partner post migration	251/320	253/322	504/642	0.002
	78.44%	78.57%	78.50%	
Living with parents post migration	31/320	31/322	62/642	-0.001
	9.69%	9.63%	9.66%	
Living with other relatives post migration	8/320	11/322	19/642	0.038
	2.50%	3.42%	2.96%	
Living with others post migration	9/320	3/322	12/642	-0.098
	2.81%	0.93%	1.87%	
Rented apartment post migration	218/320	236/322	454/642	0.080
	68.13%	73.29%	70.72%	
Accommodation found through private association	71/320	83/322	154/642	0.059
	22.19%	25.78%	23.99%	
Accommodation found through voluntary association	8/320	8/322	16/642	-0.001
	2.50%	2.48%	2.49%	
Accommodation found in other way	238/320	225/322	463/642	-0.071
	74.38%	69.88%	72.12%	

Variable	ETAU	SH+	Total	Standardized Difference
Unemployed post migration	103/320	93/322	196/642	-0.051
	32.19%	28.88%	30.53%	
Employed post migration	54/320	62/322	116/642	0.044
	16.88%	19.25%	18.07%	
Student post migration	23/320	29/322	52/642	0.047
	7.19%	9.01%	8.10%	
Home maker post migration	126/320	133/322	259/642	0.028
	39.38%	41.30%	40.34%	
Other occupation post migration	13/320	5/322	18/642	**-0.108**
	4.06%	1.55%	2.80%	

Table S2: Health service use during the study

Variable	ETAU	SH+	Total	P
Primary health care	1 (0.38)	0	1 (0.19)	-
Community mental health care	0	0	0	-
Any outpatient treatment	1 (0.38)	0	1 (0.19)	-
General hospital inpatient treatment	2 (0.77)	7 (2.75)	9 (1.75)	0.526
Any medications	0	0	0	-
Total	3 (1.16)	7 (2.75)	10 (1.94)	0.472

Table S3: Per-protocol analysis

FREQUENCY OF MENTAL DISORDERS	**ETAU**	**SH+**	**Cramer's V**	**p-value**	**RR (95% CI)**
Baseline	0/320	0/228			
Post-intervention	36/267 (13.48%)	27/213 (12.68%)	0.012	0.795	0.940 (0.590 to 1.497)
6 months (primary outcome)	112/275 (40.73%)	47/218 (21.56%)	0.204	<0.001	0.529 (0.396 to 0.708)
SECONDARY OUTCOMES			**Coefficient**	**p-value**	**Std. coeff. (SE)**
GHQ score (0-36)					
Baseline (N=548)	16.776 (4.299)	17.727 (4.514)			
Post-intervention (N=479)	13.491 (5.101)	12.736 (4.847)	-0.924	0.042	-0.092 (0.045)
6 months (N=518)	13.768 (4.548)	13.277 (4.802)	-0.598	0.149	-0.064 (0.044)
PCL5 score (0-80)					
Baseline (N=547)	20.138 (14.278)	20.686 (14.989)			
Post-intervention (N=480)	14.814 (14.597)	16.263 (12.173)	1.266	0.280	0.046 (0.043)
6 months (N=518)	15.085 (12.855)	13.609 (11.000)	-1.278	0.195	-0.052 (0.040)
PHQ9 score (0-27)					
Baseline (N=533)	6.299 (4.725)	6.680 (4.580)			
Post-intervention (N=479)	5.324 (5.124)	5.028 (4.627)	-0.426	0.316	-0.043 (0.043)
6 months (N=518)	6.694 (5.455)	4.763 (4.791)	-2.132	<0.001	-0.200 (0.041)
WHO-5 (0-100)					
Baseline (N=548)	43.591 (23.766)	41.403 (23.920)			
Post-intervention (N=480)	48.494 (23.520)	51.268 (24.094)	3.177	0.141	0.066 (0.045)
6 months (N=518)	49.320 (22.670)	52.679 (21.601)	3.730	0.055	0.083 (0.043)
WHODAS (12-60)					
Baseline (N=546)	17.924 (7.089)	18.301 (6.659)			
Post-intervention (N=478)	15.561 (6.477)	15.198 (4.585)	-0.408	0.395	-0.035 (0.042)
6 months (N=518)	14.275 (4.259)	14.754 (4.733)	0.438	0.260	0.049 (0.043)

SECONDARY OUTCOMES	ETAU	SH+	Coefficient	p-value	Std. coeff. (SE)
PSYCHLOPS score (0-20)					
Baseline (N=420)	8.911 (5.269)	9.074 (5.693)			
Post-intervention (N=368)	6.890 (5.640)	6.128 (5.586)	-1.062	0.116	-0.091 (0.058)
6 months (N=495)	6.168 (6.499)	4.619 (5.155)	-1.307	0.029	-0.107 (0.049)
PMLD (0-68)					
Baseline					
Post-intervention (N=478)	18.864 (12.689)	16.122 (10.585)			
6 months (N=473)	12.322 (11.536)	13.130 (10.398)	1.422	0.169	0.063 (0.046)
EQ-5D					
Baseline (N=534)	0.720 (0.282)	0.718 (0.275)			
Post-intervention					
6 months (N=463)	0.799 (0.250)	0.857 (0.218)	0.065	0.002	0.139 (0.045)

Table S4: Analysis with no imputation

SECONDARY OUTCOMES	ETAU	SH+	Coefficient	p-value	Std. coeff. (SE)
GHQ score (0-36)					
Baseline (N=635)	16.762 (4.290)	17.375 (4.530)			
Post-intervention (N=500)	13.549 (5.072)	12.674 (4.951)	-1.049	0.019	-0.104 (0.044)
6 months (N=522)	13.935 (4.407)	13.420 (4.686)	-0.659	0.100	-0.072 (0.044)
PCL5 score (0-80)					
Baseline (N=597)	20.050 (14.448)	20.653 (14.871)			
Post-intervention (N=490)	14.612 (14.483)	16.813 (13.001)	1.566	0.203	0.057 (0.044)
6 months (N=509)	14.894 (12.740)	13.508 (11.119)	-1.517	0.148	-0.065 (0.045)
PHQ9 score (0-27)					
Baseline (N=620)	6.242 (4.751)	6.448 (4.726)			
Post-intervention (N=491)	5.332 (5.147)	5.214 (4.764)	-0.291	0.506	-0.029 (0.044)
6 months (N=522)	6.870 (5.579)	4.904 (4.938)	-2.111	<0.001	-0.197 (0.043)
WHO-5 (0-100)					
Baseline (N=637)	43.660 (23.823)	42.558 (24.465)			
Post-intervention (N=498)	48.513 (23.602)	50.903 (24.599)	3.049	0.155	0.063 (0.045)
6 months (N=525)	49.267 (22.742)	51.878 (21.594)	2.477	0.196	0.056 (0.043)
WHODAS (12-60)					
Baseline (N=625)	17.833 (6.999)	18.414 (7.355)			
Post-intervention (N=498)	15.532 (6.461)	15.352 (4.696)	-0.168	0.729	-0.015 (0.042)
6 months (N=518)	14.124 (4.071)	14.502 (4.512)	0.178	0.628	0.021 (0.043)
PSYCHLOPS score (0-20)					
Baseline (N=466)	8.785 (5.341)	9.262 (5.629)			
Post-intervention (N=381)	6.192 (5.740)	6.858 (5.679)	-1.133	0.100	-0.096 (0.058)
6 months (N=463)	6.131 (6.627)	4.489 (5.203)	-1.619	0.013	-0.131 (0.053)
PMLD (0-68)					
Post-intervention (N=478)	19.031 (12.692)	16.610 (11.002)			
6 months (N=473)	12.277 (11.572)	13.438 (10.509)	1.989	0.062	0.087 (0.046)

Table S5: Results adjusted for imbalances at baseline*

Variable	N (regr.)	Risk Ratio (95% CI)	Std. coeff. (SE)
FREQUENCY OF MENTAL DISORDERS			
Post-intervention	487	0.889 (0.555 to 1.424)	-0.059 (0.120)
6 months (primary outcome)	528	0.526 (0.400 to 0.691)	-0.322 (0.070)
SECONDARY OUTCOMES			
Variable	**N (regr.)**	**Coefficient (p-value)**	**Std. coeff. (SE)**
GHQ Post-intervention	486	-0.965 (0.037)	-0.095 (0.045)
6 months	554	-0.421 (0.294)	-0.045 (0.043)
PCL5 Post-intervention	486	2.030 (0.090)	0.073 (0.043)
6 months	553	-0.809 (0.418)	-0.033 (0.041)
PHQ9 Post-intervention	486	0.002 (0.997)	0.0002 (0.044)
6 months	554	-1.877 (<0.001)	-0.177 (0.042)
WHO5 Post-intervention	487	1.901 (0.388)	0.039 (0.045)
6 months	554	2.905 (0.115)	0.066 (0.041)
WHODAS Post-intervention	481	-0.064 (0.897)	-0.006 (0.043)
6 months	547	0.684 (0.079)	0.074 (0.042)
PSYCHLOPS Post-intervention	295	-1.049 (0.334)	-0.089 (0.057)
6 months	405	-1.317 (0.028)	-0.108 (0.049)
PMLD 6 months	437	1.982 (0.065)	0.088 (0.047)
EQ-5D 6 months	480	0.066 (0.002)	0.143 (0.045)

* Adjusted for the following variables: literacy, number of siblings, length of stay in host country, and occupational status post migration.

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