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A longitudinal study of mental health in refugees from Burma: The impact of therapeutic
interventions

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Abstract

Objective: The present study seeks to examine the impact of therapeutic interventions for people from refugee backgrounds within a naturalistic setting.

Method: Sixty-two refugees from Burma were assessed soon after arriving in Australia. All participants received standard interventions provided by a resettlement organisation which included therapeutic interventions, assessment, social assistance, and referrals where appropriate. At the completion of service provision a follow-up assessment was conducted.

Results: Over the course of the intervention, participants experienced a significant decrease in symptoms of post-traumatic stress disorder, anxiety, depression and somatisation. Pre-intervention symptoms predicted symptoms post-intervention for post-traumatic stress, anxiety, and somatisation. Post-migration living difficulties, the number of traumas experienced, and the number of contacts with the service agency were unrelated to all mental health outcomes.

Conclusions: In the first Australian study of its kind, reductions in mental health symptoms post-intervention were significantly linked to pre-intervention symptomatology and the number of therapy sessions predicted post-intervention symptoms of post-traumatic stress. Future studies need to include larger samples and control groups to verify findings.

Key words: refugees, mental health, intervention studies, evaluation, Burma

A Longitudinal Study of Mental Health in Refugees from Burma: The Impact of Therapeutic Interventions

People from refugee backgrounds often experience significantly poorer mental health and well-being than the general population (Fazel et al., 2005; Norredam et al., 2009). In a systematic review, Fazel and colleagues (2005) estimated that across all cultural groups rates of PTSD are around 9%, major depression around 5%, and generalised anxiety disorder around 4%. Even in the absence of a diagnosable mental disorder, people from refugee backgrounds experience high rates of distress. Mental health of refugees is further compromised by high rates of comorbidity (Fazel et al., 2005). Comorbid mental health diagnoses negatively impact functional ability and increases the experience of subjective distress (Momartin et al., 2004). Mental health symptoms in refugees improve over time (Porter and Haslam, 2005). However, recovery is often not complete, with studies identifying high levels of distress and relapses of symptoms as many as 10 to 23 years post-resettlement (Boehnlein et al., 2004; Vaage et al., 2010). This suggests that despite improvement over time, people from refugee backgrounds remain vulnerable to mental health problems.

High rates of mental health problems in refugees have been shown to be related to the complex interaction between pre- and post-migration experiences. Refugees experience high rates of pre-migration trauma and loss, and it is argued that it is the refugee experience of multiple traumas over a prolonged period that increases the complexity of mental health issues in refugees (Gerritsen et al., 2006; Palic and Elklit, 2009). Across diverse refugee populations, pre-migration trauma consistently predicts symptoms of PTSD, depression and anxiety (Ai et al., 2002; Birman and Tran, 2008; Carswell et al., 2009; Ichikawa et al., 2006; Nickerson et al., 2011; Schweitzer et al., 2006, 2011) and preliminary evidence also suggests pre-migration trauma is predictive of somatisation (Schweitzer et al., 2006). Other pre-migration factors that predicted poorer outcomes were identified in a meta-analysis including:

older age, female sex, rural background (compared to urban), higher education, and higher socio-economic status (Porter and Haslam, 2005). Higher rates of PTSD, anxiety and depression were found in people who reported higher rates of post-migration living difficulties (Carswell et al., 2009; Schweitzer et al., 2006, 2011), and lower social support (Birman and Tran, 2008; Schweitzer et al., 2006).

Mental health outcomes are also differentially influenced by cultural background (Gerritsen et al., 2006; Norredam et al., 2009). While there are likely cultural factors influencing prevalence rate differences, differences in mental health outcomes are also influenced by the range of factors experienced by different cohorts. Studies suggest that the experience of being a refugee has a significant impact upon mental health and people from refugee backgrounds are often in need of psychological interventions that accommodate their unique experiences and cultural backgrounds.

Mental Health Interventions with Refugees

Mental health interventions for people from refugee backgrounds have largely focused on treatment of PTSD (Nickerson et al., 2011). In addition, a significant proportion of research has focused on cognitive behavioural therapies (CBT) and narrative exposure therapy (NET) (Crumlish and O'Rourke, 2010; Palic and Elklit, 2010). Evidence suggests that these therapies can be effective in decreasing PTSD, anxiety and depression (Murray et al., 2010). Palic and Elklit (2010) argue that there is sufficient evidence for two types of CBT treatments: NET for PTSD; and culturally specific CBT addressing anxiety, depression and PTSD for refugees from Cambodia and Vietnam.

There has been some criticism of an overly biomedical paradigm in evaluating refugee well being with investigators calling for a more multi-dimensional mental health practice response (Miller and Rasco, 2004; Watters, 2001; Westoby and Ingamells, 2010). Notwithstanding these important debates we need to acknowledge a variety of practice

frameworks. Non-government settlement services offer a wide spectrum of social support services as well as torture and trauma counselling which draw upon a range of possible therapies based on a broad and diverse range of practitioner skill sets. The current study provides the opportunity to better understand the complexity of refugee mental health within the real world context of service delivery. Such naturalistic interventions are uncontrolled and work in conjunction with other forms of social assistance such as housing and employment support. There have been inconsistent results regarding the effectiveness of naturalistic interventions (Nickerson et al., 2011). Some naturalistic interventions have shown positive outcomes (Birman et al., 2008; Palic and Elklit, 2009; Renner, 2009). By comparison, other studies have found limited improvements (Carlsson et al., 2005; Mollica et al., 1990).

The present study aims to examine mental health outcomes for Burmese refugee clients following a naturalistic intervention. Research suggests varying factors predict mental health outcomes differentially in the presence and absence of intervention. Therefore, the study aims to identify factors that impact mental health outcomes post-treatment. It was predicted that the mental health of participants would improve over time and that worse pre-intervention mental health, a higher number of trauma events and a higher number of post-migration living difficulties would negatively impact mental health outcomes at post-intervention. Based on the finding that therapeutic dose influences outcomes (Carlsson et al., 2005; Drozdek and Bolwerk, 2010; Schulz et al., 2006), it was expected that higher service contacts would be related to better mental health outcomes.

Method

Participants

Participants were 70 adult refugees from Burma who were engaged with a Queensland-based community organisation involved in refugee resettlement. The service

organisation provides services to all persons who arrive in Australia under the Humanitarian Resettlement Program and are allocated to the area covered by the resettlement services. Of the initial 70 participants, eight dropped out of treatment or did not complete the final assessment (final $N = 62$). Mann-Whitney tests confirmed that there were no significant differences in participant demographics, initial symptom scores or trauma experiences between those who completed the outcome measures and those who did not ($p > .05$).

Participants were aged between 18 and 80 years ($M = 34.13$, $SD = 14.07$), were primarily female (57%), married (52%), Christian (68%) and self-identified as Karen (57%). Table 1 provides detailed demographic information. At initial assessment, participants had been in Australia for an average of 3.09 months ($SD = 2.21$, range 1-15 months).

Table 1 goes about here

Materials

Demographic information. Demographic information was collected from the community service provider and included: age, gender, visa type, highest education attained, ethnicity, date of arrival in Australia, primary language spoken, and religious background.

Harvard Trauma Questionnaire (HTQ). The HTQ assesses the experience of traumatic events (17 questions) and PTSD symptoms (16 questions) in refugee populations. Symptom questions are derived from PTSD criteria from the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV). Mean PTSD scores range from 0-4, with higher scores indicating more symptomatology. A score of ≥ 2 is indicative of clinically significant PTSD symptoms (Mollica et al., 1992). It is a valid and reliable measure in refugee populations (Hollifield et al., 2002; Mollica et al., 1992) and has been previously used with Burmese refugees (Lopes Cardozo et al., 2004; Schweitzer et al., 2011). In the

present study the HTQ was reliable at pre-intervention ($\alpha = .84$) and post-intervention ($\alpha = .84$).

Hopkins Symptom Checklist-37 (HSCL-37). The HSCL-37 is a self-report measure designed to assess anxiety (10 questions), depression (15 questions), and somatic (12 questions) symptoms. Mean scores for each scale range between 0-4, higher scores indicate higher symptomatology. For the depression and anxiety subscales, scores of 1.75 + are indicative of clinically significant distress (Mollica et al., 1987). No clinical cut-off score is available for the somatisation scale. The HSCL has good reliability and validity in a number of refugee populations (Hollifield et al., 2002). The HSCL-37 had good reliability in the current study for anxiety (pre-intervention $\alpha = .88$, post-intervention $\alpha = .86$), depression (pre-intervention $\alpha = .83$, post-intervention $\alpha = .75$) and somatisation (pre-intervention $\alpha = .76$, post-intervention $\alpha = .75$).

Post Migration Living Difficulties (PMLD) checklist. The PMLD assesses seven post-migration stressors commonly experienced by refugees resettled in Australia (Schweitzer et al., 2006; Silove et al., 1997). A final question addresses overall satisfaction with life in Australia. Each item is designed to be assessed individually. Total PMLD scores were calculated as the sum of the items, scored on a 0-4 Likert scale.

Therapeutic interventions. Given the present study was a non-randomised naturalistic intervention, there were no restrictions on the therapeutic techniques employed by the therapists. All six therapists were employees of the partner agency. The therapists had 1.5 to 15 years experience working with people from refugee backgrounds, and had professional backgrounds in psychology ($n = 4$), social work ($n = 1$) and counselling ($n = 1$). Five of the therapists were from culturally and linguistically diverse backgrounds.

Interventions identified included: psychoeducation, structured skills-based therapy, expressive therapy, supportive therapy, couples and family therapy, and CBT and exposure

therapy. All therapies were conducted with the aim of facilitating adjustment and acculturation. Both the psychoeducation and structured skills-based therapy focused on adjustment to living in Australia and an understanding of distress in the context of acculturation and previous traumatic experiences. In addition, structured skills-based interventions included the development of life skills, such as the process involved in accessing a medical practitioner or an interpreter. Expressive therapy was utilised for people dealing with the impact of trauma, including loss of family or torture and involved the explicit use of imagery through the use of art or music. Supportive therapy was based largely upon a person-centred counselling paradigm and privileged empathic understanding. Therapists' described the role of this approach in providing a supportive and non challenging environment to support people dealing with difficulties of adaptation and acculturation. Similarly, people dealing with the separation and loss of family, culture and home are assisted by a supportive approach. Couples and family therapy was utilised to support people dealing with significant changes in gender and family roles that occur during resettlement. A common concern is the dislocation of families and the anxieties which result from such experiences. Furthermore, the greater economic opportunities available to women challenge traditional gender roles, and the faster rate of acculturation in children impacts family structure. CBT and exposure therapy draws upon a structured CBT paradigm in facilitating adjustment and acculturation, and managing the impact of trauma. For example, therapists used CBT to support people dealing with a range of unusual or distressing responses to adjustment processes, previous traumatic experiences and less problematic concerns such as learning English or seeking employment. Exposure therapy, when used as an adjunct, was used in relation to ongoing issues related to trauma.

Therapy was conducted with the assistance of experienced interpreters. The interpreters received specific training to enable them to work with people from refugee

backgrounds. Interpreters were required to be sensitive to individual client needs and facilitate the development of trust between client, interpreter and therapist. In instances where trust might be an issue due to ethnicity or religion, specific processes were followed to involve an interpreter who was acceptable to the client.

Procedure

Following approval of all materials and procedures by the university Human Research Ethics Committee, potential participants were approached by a therapist working in the partner agency. Participants were given information regarding the study and invited to participate. Due to the potentially sensitive nature of the study, client welfare took precedence over research priorities. In one instance the therapist did not refer the participant due to his potential vulnerability. All other potential participants agreed to participate in which makes the sample representative of the population utilising the services of the agency.

Pre and post-intervention assessments were completed independent of therapeutic engagement. Post-intervention assessments were completed at the conclusion of service provision. All assessments were administered in English with the assistance of an interpreter. The assessments lasted between 2-3 hours and were conducted over 2-3 sessions. The mean post-intervention follow up time was 6.9 months ($SD = 3.0$, range 1-14 months). However, this was impacted by missing data and the date of final data collection was only recorded for 60% of participants.

Therapeutic approaches were identified through chart review undertaken by the Director of Clinical Services at the service organisation. The total number of service contacts was derived by in-situ analysis of all case files, and included assessment, therapy, and referrals. In instances where a single session covered more than one category of intervention, such as supportive and referral, an assessment was made as to the prime purpose of the session. All sessions were thus coded once only dependent upon their prime purpose.

Analysis. Paired samples t-tests were used to examine changes in symptomatology over time. Non-parametric, Mann-Whitney U tests were used where normality assumptions were violated. Multiple regression analyses were conducted using SPSS (version 18) with HTQ PTSD, HSCL Anxiety, HSCL Depression and HSCL Somatisation as the dependent variables. Predictor variables were selected based on a review of previous literature and were limited to variables with significant correlations with mental health outcomes. Predictor variables included pre-intervention symptom scores, number of trauma events experienced, post-migration living difficulties and total number of service contacts.

Results

Services Received During the Intervention Period

Participants had an average of 11.34 ($SD = 6.94$, range 0-33) service contacts; this included an average of 3.93 ($SD = 2.41$, range 0-12) assessment sessions and an average of 6.58 ($SD = 5.09$, range 0-23) therapy sessions. The predominant intervention comprised psychoeducation (89% of participants), followed by structured, skills-based therapies (55%), supportive psychotherapy (55%), expressive therapy (48%), couples and family therapy (16%) and CBT and exposure therapy (11%). Most participants received a combination of interventions ($M = 2.8$ intervention types, $SD = 1.31$).

Eight participants did not engage in any intervention with the service organisation. There were no significant differences across variables between participants who engaged in interventions and those who did not. However, there were non-significant differences in the experience of traumatic events: participants who did not engage in the intervention experienced fewer trauma events ($M = 4.0$, $SD = 3.21$), than those who did engage in the intervention ($M = 6.59$, $SD = 3.21$), $U = 126$, $p = .057$, $r = -.25$.

Trauma Experiences

All participants reported experiencing at least one type of trauma event; the maximum experienced from the HTQ was 14, ($M = 6.21$, $SD = 3.41$). Trauma events most commonly experienced included lack of food or water (76%), lack of shelter (71%), ill health without access to medical care (58%) and combat situations (57%). Further details of the trauma experienced can be found in Schweitzer et al. (2011).

Post Migration Living Difficulties

The post-migration living difficulties most commonly cited as serious problems were communication difficulties (68%) and worry about family not in Australia (54%). The majority of items on the PMLD were identified as not being a problem. See Schweitzer et al. (2011) for more details of PMLD. Overall, the majority of participants described themselves as satisfied with their lives in Australia (65%), 16 participants were very satisfied (26%) and six participants were very unsatisfied (10%).

Mental Health

Psychological symptom scores pre and post-intervention are presented in Table 2. Pre-intervention a high proportion of participants were in the clinically significant range for PTSD (27%), anxiety, (23%), and depression (37%). The number of participants in the clinically significant range had decreased post-intervention: PTSD (5%), anxiety (5%), and depression (7%). Pre-intervention six participants (10%) had significant PTSD symptoms to receive a PTSD diagnosis, post-intervention this had decreased to one participant (2%).

Table 2 goes about here

Correlations

The strength of the relation between initial symptom score, final symptom score, PMLD and trauma experiences was assessed using Spearman's Rank Order Correlation

(Table 3). Results of these analyses indicated strong positive relations between all psychological measures at both pre- and post-intervention. Only initial PTSD, initial depression and initial somatisation scores were associated with PMLD and trauma experiences, there was no significant relation between these variables and final symptomatology.

Table 3 goes about here

Predictors of Mental Health Outcomes

Multiple linear regression was used to determine predictors of mental health outcomes post-intervention, with predictors added in a stepwise fashion. In each of the models predicting final mental health scores, the initial symptom score was entered at step 1, total number of traumas experienced, and PMLD entered at step 2, and total number of contacts with the service organisation entered at step 3. Given violations of univariate normality, regressions were conducted on standardised scores for anxiety and PTSD. Results showed no difference between standardised and non-standardised regressions, therefore results of non-standardised regressions are reported here. Assessment of multivariate assumptions found no violations. In addition, to take a conservative approach to adjust for multiple comparisons, a Bonferroni correction was implemented to set the significance threshold at $p < .0125$. Results of the regression are presented in Table 4.

Post-traumatic stress disorder. Results of the analysis showed that initial PTSD score significantly predicted final PTSD score at steps 1, 2 and 3. In step 3, total number of service contacts significantly predicted final PTSD score ($p = .03$), however this was not significant when the Bonferroni correction was applied. The overall model was significant ($R^2 = .302$, adjusted $R^2 = .252$).

Anxiety. In a model predicting final anxiety score, the initial anxiety score significantly predicted final anxiety score at steps 1, 2 and 3. No other factors were predictive of final anxiety score. The overall model was significant ($R^2 = .347$, adjusted $R^2 = .301$).

Depression. In a model predicting final depression score, initial depression score was significant using traditional significance levels at step 1 ($p = .032$); however, this finding is not significant when using the more conservative Bonferroni correction. None of the predictors entered predicted final depression score at step 2 or step 3. The overall model was not significant ($R^2 = .128$, adjusted $R^2 = .067$).

Somatisation. In a model predicting final somatisation score, initial somatisation score was significant at steps 1, 2 and 3. None of the other predictors entered into the model predicted final somatisation score. The overall model was significant ($R^2 = .243$, adjusted $R^2 = .190$).

Table 4 goes about here

Discussion

There has been limited assessment of outcomes following naturalistic mental health interventions with people from refugee backgrounds. The study, utilizing naturalistic data from a refugee service agency, demonstrates that participants experienced significant improvements in PTSD, anxiety, depression and somatisation over time. The service agency is a non-government organisation that provides specialist settlement and therapeutic services to individuals from refugee backgrounds. The participants were newly arrived refugees from Burma who received assessment, therapeutic interventions and referrals from the service agency. Service provision ranged from 0 to 33 sessions with an average of 11.34 service contacts over 6.9 months; this included an average of 6.58 therapy sessions and 3.93

assessment sessions. The range of service provision allowed meaningful comparisons to be made within a naturalistic setting.

Consistent with predictions, pre-intervention mental health was a significant predictor of post-intervention outcomes for PTSD, anxiety, and somatisation. With the exception of depression, participants with poorer mental health scores pre-intervention also had poorer mental health post-intervention.

Inconsistent with hypotheses, post-migration living difficulties did not make a significant contribution to reduced mental health symptoms at post-intervention. These results are inconsistent with research on general predictors of mental health outcomes in refugee populations, which suggests that post-migration living difficulties predicts outcomes for PTSD, anxiety, depression and somatisation (Schweitzer et al, 2006, 2011). These inconsistencies may be attributed to the short duration that the participants in the current study have spent in Australia. The notion of a curvilinear effect where symptoms increase following resettlement then eventually decrease over time has previously been discussed (Beiser, 1988; Tran et al., 2007) and may impact the results of the present study. Therefore, the time period of assessment may influence reported mental health symptoms.

Similarly, in contrast to predictions, number of trauma events experienced did not predict mental health outcomes. This is particularly surprising in relation to PTSD outcomes post-intervention. However, when examining bivariate correlations there are small and insignificant correlations between reports of trauma events collected at the initial assessment and all mental health outcomes. This is despite the fact that trauma experience is significantly correlated with all mental health symptoms (PTSD, anxiety, depression, and somatisation) at baseline. This finding may support the idea that trauma experience is a significant factor in the onset of symptoms, but that the symptoms themselves are important contributors in the maintenance of pathology. This is an interesting finding and warrants further investigation.

The current data did not support the hypothesis and previous findings (Carlsson et al., 2005; Drozdek and Bolwerk, 2010; Schulz et al., 2006) for therapeutic dose predicting better mental health outcomes. However, we took a conservative approach by implementing a Bonferroni correction to reduce the likelihood for Type I error given multiple comparisons. In examining findings without the Bonferroni correction, the number of service contacts with the agency significantly predicted PTSD post-intervention ($p = .03$). With or without the Bonferroni correction, number of contacts did not significantly predict outcomes for depression, anxiety, and somatisation. Findings in the current study may be limited by the small sample size and the diversity of service contacts received (e.g. mental health services, assessment sessions, and other resettlement services) and further research is warranted.

Results of the present study provide preliminary data regarding factors related to therapy outcomes, however given the uncontrolled nature of this naturalistic intervention it is unclear how each of these components contributed to change. Further studies are needed to identify the mechanisms that are most effective in contributing to healing and recovery. Time since resettlement positively predicts outcomes for refugees (Porter and Haslam, 2005); however, due to missing data it was not possible to examine the effects of time on the outcomes reported in the present study. It is possible that time had a significant contribution to participant change which could not be determined here. Importantly, these results show that refugee clients do experience improved mental health over time, regardless of the mechanism.

These results cannot be generalized to broader cultural populations, particularly given research which shows that therapy outcomes vary dependent on cultural groups (Gerritsen et al., 2006; Mollica et al., 1990) and the impact of cultural homogeneity in predicting larger effect sizes (Murray et al., 2010). These results highlight the need to assess treatment

outcomes following intervention in differing cultural groups who experience a variety of difficulties.

Of note, the participants in the current study had low HTQ scores compared to the results of previous studies. Consistent with estimates by Fazel and colleagues (2005), 9% of participants in this study met the HTQ criteria for PTSD; however the overall HTQ scores of this study were lower than that seen in other intervention studies. In other intervention studies, participation is generally restricted to individuals with a diagnosis of PTSD or those identified as severely traumatized (Nickerson et al., 2011). This difference likely reflects different population experiences of the sample and services offered by the refugee organisation, where therapeutic interventions are not dependent on symptomatology.

Findings are limited by a number of factors, some of which are particular to naturalistic type studies. A larger sample size and a greater length of intervention would provide a more comprehensive overview of the effectiveness of refugee related services and provide greater confidence for generalising the findings. Similarly, findings are based on the work of a single agency, future studies would benefit from examining services across agencies. Language always poses challenges when working with diverse cultural groups. The current study did not include checks on the interpretation of assessment measures and it is recognised that the use of standard protocols in the participant's own language is advantageous. The chart review involved a single director of services coding the data. It may be argued that the rigour of future studies would be enhanced through the use of multiple raters and assessment of inter-rater reliability. Similarly, therapists adherence to particular models needs to be assessed in future studies; this is arguably a drawback which is intrinsic to naturalistic studies but also points to the advantages of such studies. The scope of research in this area might also be extended to better connect the evaluation of mental health interventions with broader social support services such as income, housing, employment

support and English language education. Finally, we acknowledge that ‘refugees from Burma’ represents a culturally diverse category and that studies using greater cultural specificity including ‘insider’ ethnographic studies will in the future begin to unpack the cultural complexities not only within specific population groups but also will increasingly bring to light the cultural assumptions of western modes of mental health practice. Nonetheless, the current study provides a realistic snapshot of the outcomes of services provided in a naturalistic setting; in which the heterogeneity of presenting clients is among the greatest challenges.

This is among the first studies to examine therapeutic interventions for refugees from a Burmese background. In order to further expand knowledge regarding therapeutic effectiveness for individuals from refugee backgrounds, future research must address the factors that differentially influence outcomes for this client group. This knowledge will assist in further developing evidence-based practice in mental health interventions for refugees.

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Table 1.

Demographic Characteristics of Burmese Participants (N = 62).

Demographic characteristics		n	%
Education	Secondary School	28	45
	Primary School	25	40
	Did not attend school	7	11
	Apprenticeship/trade	1	2
	University/College	1	2
Marital Status	Married	32	52
	Single	23	37
	Widowed	5	8
	Defacto	1	2
	Separated	1	2
Visa Status	200 (Refugee)	56	90
	204 (Women at risk)	6	10
Ethnic Group	Karen	36	57
	Chin	13	21
	Karenni	5	8
	Mon, Kayan, or Kachin	8	13
Religion	Christian	49	79
	Buddhist	13	21

Table 2.

Mean Pre- and Post- Intervention Mental Health Scores, and Correlations between Pre- and Post-Intervention Scores.

	Pre-intervention		Post-intervention		Effect size (<i>r</i>)
	Mean (SD)	Clinical range (<i>n</i>)	Mean (SD)	Clinical range (<i>n</i>)	
PTSD [§]	1.74 (0.6)	17	1.30 (0.3) *	3	-0.42
Anxiety [§]	1.41 (0.5)	14	1.18 (0.3) *	3	-0.45
Depression [°]	1.69 (0.5)	23	1.31 (0.3) *	4	0.57
Somatisation [°]	1.62 (0.5)	n/a	1.28 (0.4) *	n/a	0.60

Note. [§] Due to low variation and violations of normality assumptions, comparisons between pre- and post-intervention are Wilcoxon's Signed Ranks Test. [°] Comparisons between pre- and post-intervention are paired samples t-tests.

* $p < .001$

Table 3.

Summary of Bivariate Correlations between Variables using Spearman's Rank Order

Correlation

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Initial PTSD	1	-	-	-	-	-	-	-	-	-
2. Initial anxiety	0.45**	1	-	-	-	-	-	-	-	-
3. Initial depression	0.65**	0.67**	1	-	-	-	-	-	-	-
4. Initial somatisation	0.75**	0.67**	0.82**	1	-	-	-	-	-	-
5. Final PTSD	0.38**	0.41**	0.37**	0.46**	1	-	-	-	-	-
6. Final anxiety	0.28*	0.49**	0.27*	0.41**	0.56**	1	-	-	-	-
7. Final depression	0.36**	0.30*	0.37**	0.36**	0.64**	0.58**	1	-	-	-
8. Final somatisation	0.36**	0.48**	0.41**	0.47**	0.68**	0.77**	0.80**	1	-	-
9. PMLD [§]	0.42**	0.22	0.42**	0.46**	0.17	0.10	0.11	0.19	1	-
10. Trauma experience	0.41**	0.26*	0.31*	0.36**	0.11	0.14	0.12	0.08	0.38**	1

[§] Post-migration living difficulties; * $p < .05$, ** $p < .001$

Table 4.

Hierarchical Regression Models for PTSD, Anxiety, Depression, Somatisation

		Symptoms											
		PTSD (n = 61)			Anxiety (n = 62)			Depression (n = 62)			Somatisation (n = 62)		
Predictor		b	SE b	β	b	SE b	β	b	SE b	β	b	SE b	β
Step 1	Initial symptom score	.267	.062	.488**	.360	.066	.578**	.164	.075	.273*	.330	.082	.463**
Step 2	Initial symptom score	.252	.074	.461**	.337	.070	.540**	.146	.082	.242	.325	.093	.456**
	Trauma experience	.002	.013	.019	.010	.011	.120	.006	.014	.069	.010	.014	.092
	PMLD	.005	.016	.044	-.001	.013	-.006	.003	.017	.025	-.008	.017	-.065
Step 3	Initial symptom score	.220	.073	.401*	.337	.072	.541**	.115	.082	.191	.315	.093	.443**
	Trauma experience	-.004	.013	-.039	.010	.011	.121	.001	.014	.012	.005	.014	.050
	PMLD	.003	.015	.029	-.001	.013	-.006	.011	.016	.007	-.010	.017	-.081
	Total service contacts	.013	.006	.270	.000	.005	-.005	.011	.006	.238	.008	.006	.159
Model Diagnostics													
	Significance (F-value)	6.06**			7.56**			2.09			4.58*		
	R ²	30.2%			34.7%			12.8%			24.3%		
	Adjusted R ²	25.2%			30.1%			6.7%			19.0%		

^s Post-migration living difficulties; * $p < .0125$ ($p < .05$ significance after Bonferroni

correction for multiple comparisons), ** $p < .001$