

# The Psychological Consequences of Pre-Emigration Trauma and Post-Migration Stress in Refugees and Immigrants from Africa

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**Abstract** Over 50 million people have been displaced, some as a result of conflict, which exposure can lead to psychiatric sequelae. The aims of this study were to provide estimates of pre-emigration trauma, post-migration stress, and psychological sequelae of immigrants and refugees from predominantly Sub-Saharan Africa who immigrated to Sweden. We also examined the predictors of the psychiatric sequelae as well as acculturation within the host country. A total of 420 refugees and immigrants were enrolled using stratified quota sampling. A battery of questionnaires including the Harvard Trauma Questionnaire, Post-Migration Living Difficulties Scale, the Cultural Lifestyle Questionnaire; and the Hopkins Checklist were administered. Descriptive statistics, Chi square analyses, Pearson correlations, analysis of variance, and logistic and linear regression were performed to test the aims of the study. Eighty-nine percent of participants reported at least one traumatic experience prior to emigration. Forty-seven percent of refugees reported clinically significant PTSD and 20 % reported clinically significant depressive symptoms. Males reported a significantly greater number of traumatic events [ $F(1, 198) = 14.5, p < 0.001$ ] and post-migration stress than females [ $F(1, 414) = 5.3, p = 0.02$ ], particularly on the financial,

discrimination, and healthcare subscales. Females reported a higher prevalence of depressive symptoms when compared to males [ $F(1, 419) = 3.9, p = 0.05$ ]. Those with a shorter duration in Sweden reported higher rates of PTSD [ $F(63, 419) = 1.7, p < 0.001$ ]. The greater number of traumatic events was found to be significantly associated with the severity of PTSD symptoms [ $F(34, 419) = 9.6, p < 0.001$ ]. Using regression analysis, 82 and 83 % of the variances associated with anxiety and depression, respectively, was explained by gender, education, religion, PTSD and post-migration stress. Sixty-nine percent of the variance associated with PTSD included education, number of traumatic events, depressive symptoms and post-migration stress. Forty-seven percent of the variance for acculturation was accounted for by a model that included age, education, duration in Sweden, anxiety, depression, and post-migration stress. These predictors were also significant for employment status with the exception of depressive symptoms. Multidimensional interventions that provide treatments to improve psychiatric symptoms in combination with advocacy and support to reduce stress (e.g., financial, access to health care) are recommended. The focus of the intervention may also be modified based on the gender of the participants.

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## Introduction

In 2010, the United Nations High Commission for Refugees (UNHCR) reported over 43 million ‘persons of concern’ worldwide including refugees, internally displaced persons (IDPs), and other vulnerable groups [1]. Although

more than 80 % of refugees remain in their region of origin [2], some seek asylum in other countries. Sweden receives the largest number of asylum-seekers in the world, after the U.S. and South Africa [3]. At the time of this study, 78 % of refugees and IDPs were from Africa [4]. Over ten million (33 %) of the UNHCR persons of concern were from Africa [2], and five of the top ten countries of origin of populations of concern were in Africa [5].

Prior to leaving their home countries, many immigrants and refugees from Africa are exposed to traumatic life events (e.g., loss of loved ones, combat, torture) but the prevalence of psychological sequelae from these experiences is unknown. Reviews of the literature suggest that the prevalence of post-traumatic stress disorder (PTSD) in refugee populations varies from 3–86 % [6]. This wide range is a result of differences across studies with regard to sample size, age and ethnicity of participants, duration since displacement, and the diagnostic method and interviewer characteristics used to assess trauma and PTSD. A plethora of research has been conducted concerning pre-migration trauma in samples of non-African refugees who have sought asylum in Western countries [7, 8]. However, there is a lack of research concerning refugees from Africa despite the overrepresentation of refugees from Africa who have resettled in Western countries.

Not only pre-emigration trauma but ongoing post-migration stress can compound the ability to cope with traumatic life events experienced prior to emigration [9]. Chronic stress after arriving in the host country is associated with resettlement leads to poorer quality of life and health. Few studies concerning refugee health have attempted to assess the role of post-migration stress on health and mental health. Even fewer have attempted to disentangle the psychological and physical consequences that may be associated with pre-migration trauma versus post-migration stress.

The psychiatric sequelae that results from the traumatic events and/or ongoing stress associated with emigration can result in difficulties with acculturation. Several theories of acculturation exist and more complex models have evolved from the original linear models of acculturation and mental health. The latest theories are multi-dimensional and reflect traits that often lead to increased economic and social mobility while maintaining the values of their original culture [10].

Castro and Murray have adapted the stress and coping theories of Lazarus and Folkman by describing the many challenging post-migration events or stressors immigrants and refugees must face including discrimination, problems with health, economic and social changes which may or not be perceived as controllable [11]. The ability to apply effective coping skills and behaviors (e.g., self-regulation, problem focused coping) leads to decreased levels of stress

and depression and the ability to assimilate to a new culture [11].

Previous research has demonstrated that psychological consequences of trauma (e.g., PTSD) and post-migration stress are barriers to acculturation [12]. Refugees who have a history of trauma, likely also experience increased post-migration stress, are at increased risk for difficulties with language acquisition, problems with health and a decrease in quality of life [13] when compared to those who have migrated without prior traumatic life experiences [11, 12, 14]. Difficulties with language acquisition, social integration, and acceptance of the traditions of the host countries may lead to difficulties with employment or educational attainment [15–26]. The aims of this study were threefold: (1) to provide estimates of pre-migration trauma, post-migration stress, and psychiatric symptomatology; (2) to begin to examine predictors of psychiatric symptoms, and (3) investigate predictors associated with acculturation and employment status.

## Methods

### Design and Participants

Stratified quota sampling that reflected the 2001 Swedish census was used to recruit a representative sample of participants of from Africa. Study recruitment took place between November 2002 and April 2005. Participants were recruited based on gender, country of origin, and involvement in community organizations. Undocumented persons were also recruited to provide a representative sample of all African immigrants and refugees residing in Sweden.

### Interview Questionnaires

#### *Traumatic Events*

The Harvard Trauma Questionnaire (HTQ) was used to identify the traumatic experiences of refugees [27]. Participants responded “yes” or “no” to 47 items that described traumatic events which occurred before migration to the host country. An additional 16 items assessing symptomatology of PTSD were queried on a 4-point Likert Scale (1—not at all; 4—extremely) for each symptom of PTSD (e.g., avoiding, re-experiencing, arousal) that had bothered them within the past week. The Harvard Trauma Questionnaire has been demonstrated to have good reliability and validity cross-culturally [27, 28]. While it has been widely tested in South East Asian and Indochinese refugee populations, the HTQ has also been shown to have high internal consistency in African refugees [28].

### *Symptoms of Anxiety and Depression*

The Hopkins-25 Checklist is a screening instrument that contains 15 items for depression and 10 items for anxiety. Likert Scales of 1 (not at all) to 4 (extremely) were used to detect each symptom. Scores for each item were then averaged [29]. The range of the questionnaire is 0–100. A study with Tanzanian women suggested that individuals from some African cultures may be more likely to under-report the severity of symptoms of depression [30].

### *Post-Migration Living Difficulties*

The Post-Migration Living Difficulties (PMLD) questionnaire was used to assess social and economic issues that refugees and immigrants experienced in their host country of Sweden [31]. Subscales of the PMLD consist of items assessing financial, healthcare, family, discrimination, and immigration difficulties. The questionnaire consists of 25 questions with a response scale measured on a 4-point Likert Scale from 1 (not a problem) to 4 (serious problem) [31]. The range of the total score is from 0 to 100 for the total score and varies according to the subscales: Financial 0–32; Healthcare 0–20; Family 0–20; Discrimination 0–12 and Immigration 0–8.

### *Acculturation*

The Cultural Lifestyle Questionnaire is a 28-item questionnaire that measures the degree of acculturation [32]. Positive integration is associated with maintaining one's own beliefs, traditions, customs, and language while also adopting that of the host country. The Cultural Lifestyle Questionnaire yields a total score and three subscale scores which reflect integration with regard to (1) language acquisition, (2) social integration, and (3) adoption of the customs and traditions [32]. The total score ranges from 0–112 and a high score on each subscale represents the ability to read, write, and speak Swedish and/or English; social integration with natives from Sweden; and the adoption of traditions and customs from the host country while maintaining one's own customs and traditions, respectively [32]. This questionnaire has been used in other refugee and/or immigrant populations with excellent reliability and validity [33, 34].

### **Procedures**

Prior to the study commencement we received approval from the National Institutional Review Board in Sweden. We worked closely with community leaders to recruit

participants for this study. The project coordinator met with potential participants and explained the rationale, risks, and benefits of the study. The community leaders were often elected or appointed by the members of a community organization (e.g., Ethiopian community center, Somalian community center). The community leaders referred all participants based on predetermined population based quota sampling. For example leaders would request a specific number of members of the organization to volunteer if interested in participating in the study (e.g., 3 men and 3 women from Tanzania). We also sought to enroll undocumented refugees as it was estimated that at least 10,000 undocumented refugees from different countries resided in Sweden. After several months of building relationships with the different organizations', community leaders were willing to also refer undocumented refugees for participation in the study.

After receiving written informed consent, one of two trained interviewers conducted the 1.5–4 hour interviews at various locations including participants' homes, community centers and at the Karolinska Institute. When the participant was not fluent in English, s/he was interviewed with a gender-matched interpreter—a paid individual from the community who had been trained in confidentiality and interview-specific issues. All English speaking participants were interviewed by a female interviewer. If the participant expressed distress, the individual was referred to social service agencies for assistance.

### **Statistical Analysis**

Descriptive statistics were performed to test the distribution of the data and to calculate the prevalence of trauma, post-migration stress, and psychological symptoms. Correlations, Chi square analyses and analyses of variance (ANOVA) were performed to examine the univariate relationships between demographic variables, number of traumatic events, acculturation, post-migration stress, and psychiatric symptoms. Logistic and linear regression analysis was used to test predictors of psychiatric symptoms, employment status, and acculturation in a multi-variable analysis.

## **Results**

### **Sample Characteristics**

Table 1 depicts the characteristics of the sample (N = 420) by gender. The mean age of the sample was 33 years with a range of 16–80 years. The mean number of years residing in Sweden was 7.3 years with a range of 2–42 years. The majority of participants were from Somalia (30 %),

**Table 1** Demographic characteristics of sample

	Males N = 219	Females N = 201	Total N = 420
Age (years)			
Mean	32	34	33
Range	16–65	16–80	16–80
Years residing in Sweden			
Mean	6.4	8.4	7.3
Range	0.2–33	0.4–42	0.2–42
National origin by UN region (n, %)			
Eastern Africa	154 (71)	149 (75)	303 (72)
Middle Africa	6 (3)	6 (3)	12 (3)
Northern Africa	20 (9)	11 (5)	31 (7)
Southern Africa	5 (2)	5 (2)	10 (2)
Western Africa	34 (16)	30 (15)	64 (15)
Marital status (n, %)			
Single	121 (56)	69 (34)	190 (45)
Married	62 (28)	67 (34)	129 (31)
Divorced	22 (10)	38 (19)	60 (14)
Widowed	4 (2%)	14 (7)	18 (4)
Separated	6 (3)	5 (3)	11 (3)
Engaged	3 (1)	4 (2)	7 (2)
Education (n, %)			
Primary	18 (9)	17 (9)	35 (9)
Secondary	20 (9)	25 (13)	45 (11)
High school equivalent	81 (38)	70 (37)	151 (38)
Some college	23 (11)	21 (11)	44 (11)
College degree	39 (18)	39 (21)	78 (20)
Graduate/professional	31 (15)	13 (7)	44 (11)
Occupation (n, %)			
Executive	1 (.5)	1 (.5)	3 (.5)
Administrative	17 (8)	7 (4)	24 (6)
Clerical	9 (4)	30 (15)	39 (9)
Skilled Labor	11 (5)	11 (6)	22 (5)
Unskilled Labor	12 (6)	13 (7)	25 (6)
Military	1 (.5)	1 (.5)	2 (.5)
Student	43 (20)	40 (20)	83 (20)
Retired	3 (1)	11 (6)	14 (3)
Leave of Absence	0 (0)	5 (3)	5 (1)
Religious (n, %)			
Christian	108 (49)	105 (52)	213 (51)
Islam	100 (46)	92 (46)	192 (46)
Other	11 (5)	4 (2)	15 (3)

Ethiopia (19 %) and Eritrea (9 %). With regard to marital status, 45 % of participants were single, followed by married (27 %), divorced (19 %), separated (3 %), and widowed (1 %). The recruited participants reflect the national census of immigrants and refugees from Africa residing in Sweden in 2001 according to country of origin and gender. An equal number of male and female

immigrants and refugees from countries in Africa which comprised at least one percent of the total African immigrant and refugee population in Sweden were eligible to participate in the study.

Thirty-one percent of participants had a college, graduate or professional degree. Another 49 % had the equivalent of a high school diploma or some college. Eleven

percent of participants had only a secondary education and 10 % had a primary education or less. Nearly half of the sample (48 %) reported unemployment in Sweden. Nineteen percent were currently enrolled in college; 6 % had unskilled jobs and 5 % were skilled laborers. Fifteen percent of participants reported a clerical or administrative position and 1 % worked as an executive. An approximately equal number were Christian (51 %) and Muslim (46 %).

### Translation of Interview

Analysis of variance was performed to test differences between translated and non-translated interviews. Of the 420 interviews, 42 % of the interviews were translated (36 % of all males and 48 % of all females). Only level of acculturation significantly differed based on whether the interview was translated or not [ $F(1, 411) = 46.7, p = 0.001$ ]. Participants who had an interpreter reported lower levels of acculturation when compared to those who did not require an interpreter to complete the interview.

### Pre-Migration Trauma and Descriptive Statistics for Psychological Symptoms

Eighty-nine percent of the sample reported at least one traumatic event prior to emigrating to Sweden. The mean number of traumatic events was 9 events ( $SD = 8.1$ ). Males reported a greater number of traumatic events (mean = 11;  $SD = 8$ ) when compared to females (mean = 7;  $SD = 7$ ) [ $F(1, 198) = 14.5, p < 0.001$ ]. Of the total sample, 68 % of participants reported material deprivation, 65 % death/disappearance of family, 63 % reported witnessing violence, 60 % reported forced confinement, 54 % reported exposure to war-like conditions, 38 % bodily injury, and 21 % reported being forced to harm others. No difference was found with regard to reporting of traumatic life events prior to emigration based on whether an interpreter was present. Figure 1 provides details regarding the percentage of participants who reported each of the traumatic events on the HTQ.

### Prevalence of Psychiatric Symptoms

The mean total Hopkins Symptom Checklist score was 23.0 ( $SD = 22.1$ ) with subscale score means of 12.3 ( $SD = 11.5$ ) for depression and 10.8 ( $SD = 11.1$ ) for anxiety. The mean score for the PTSD subscale of the HTQ was 24.9 ( $SD = 1.9$ ) and the mean score for the functional limitations subscale was 15.2 ( $SD = 6.7$ ). Sixteen percent of participants reported five or more depressive symptoms on the Hopkins Symptom Checklist which is consistent

with the DSM IV criteria for Major Depressive Disorder and 47 % would have met the DSM IV criteria for PTSD if the questions were responded to in the same way with a structured clinical interview.

No differences in the prevalence of psychiatric symptoms were observed by age or whether the interview was translated or administered in English. Females reported a higher prevalence of depressive symptoms when compared to males [ $F(1, 419) = 3.9, p = 0.05$ ]. Refugees and immigrants who had a shorter duration in Sweden reported higher rates of PTSD [ $F(63, 419) = 1.7, p < 0.001$ ]. A greater number traumatic events was found to be significantly associated with the severity of PTSD symptoms [ $F(34, 419) = 9.6, p < 0.001$ ].

### Post-Migration Stress

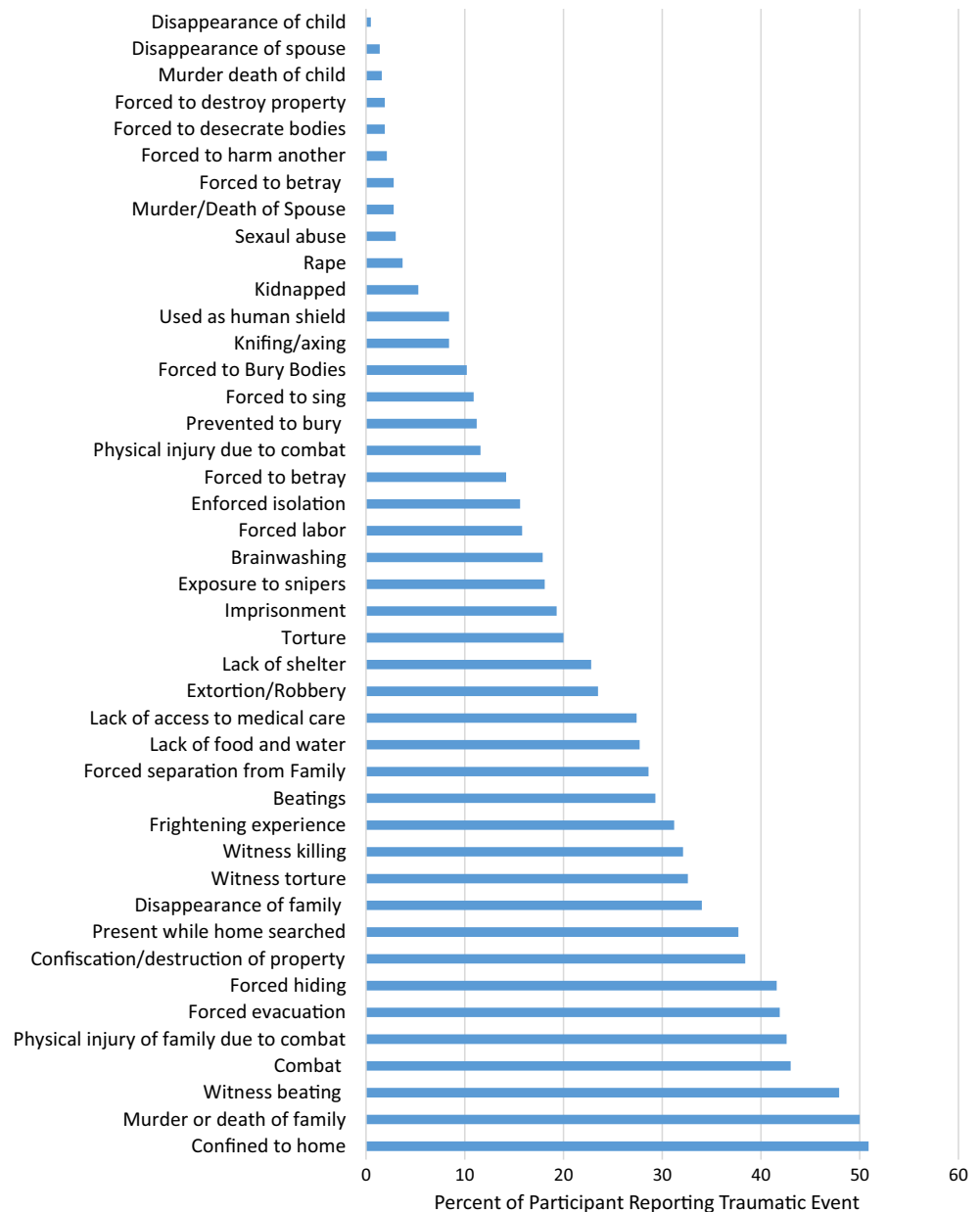
The responses to the PMLD questionnaire can be found in Fig. 2. The mean score for the Post-Immigration Living Difficulties total scale was 24.9 ( $SD = 18.5$ ). Figure 3 depicts gender differences in post-migration stress. Males (Mean = 10;  $SD = 9$ ) reported significantly greater overall stress than females (Mean = 8;  $SD = 9$ ;  $F(1, 414) = 5.3, p = 0.02$ ), particularly on the financial [ $F(1, 418) = 7.6, p = 0.003$ ], discrimination [ $F(1, 416) = 7.8, p = 0.002$ ], and healthcare [ $F(1, 418) = 3.3, p = 0.05$ ] subscales. Males and females reported similar stress levels on the family and immigration subscales.

The length of time residing in Sweden, while covarying for gender, was also found to be associated with overall post-migration stress [ $F(64, 414) = 1.7, p = 0.002$ ], financial stress [ $F(64, 418) = 3.6, p = 0.001$ ], stress associated with access to health care [ $F(64, 417) = 1.2, p = 0.003$ ], family stress [ $F(64, 417) = 1.3, p = 0.01$ ], discrimination related stress [ $F(64, 416) = 1.1, p = 0.02$ ], and immigration problems [ $F(64, 418) = 1.3, p = 0.01$ ]. The stress was reported to be greater for the people who had resided in Sweden longer compared to those who had lived there for a shorter time. Age, educational level, and marital status were not found to be related to post-migration stress.

### Predictors of Psychiatric Symptoms

Correlations and ANOVA were performed to examine which factors were associated with psychiatric symptoms. All factors that were significantly related to psychiatric symptoms in a univariate analyses were entered into a regression model, see Table 2. Linear regression analysis was performed to determine the amount of variance that pre-migration trauma, post-migration stress as well as gender, education, religion, number of traumas contributed to depression (Adjusted  $R^2 = 0.83, p < 0.001$ ); anxiety

**Fig. 1** Percent of participants reporting types of pre-migration trauma



(Adjusted  $R^2 = 0.82$ ,  $p < 0.001$ ); and PTSD ( $R^2 = 0.69$ ,  $p < 0.001$ ). Table 3 provides the multivariable regression analysis with significant predictors of anxiety, depression, and PTSD symptoms.

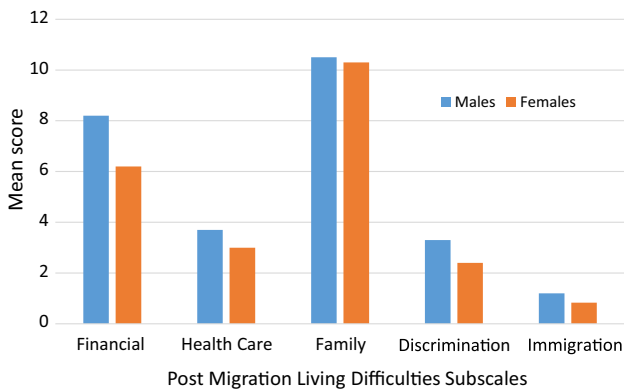
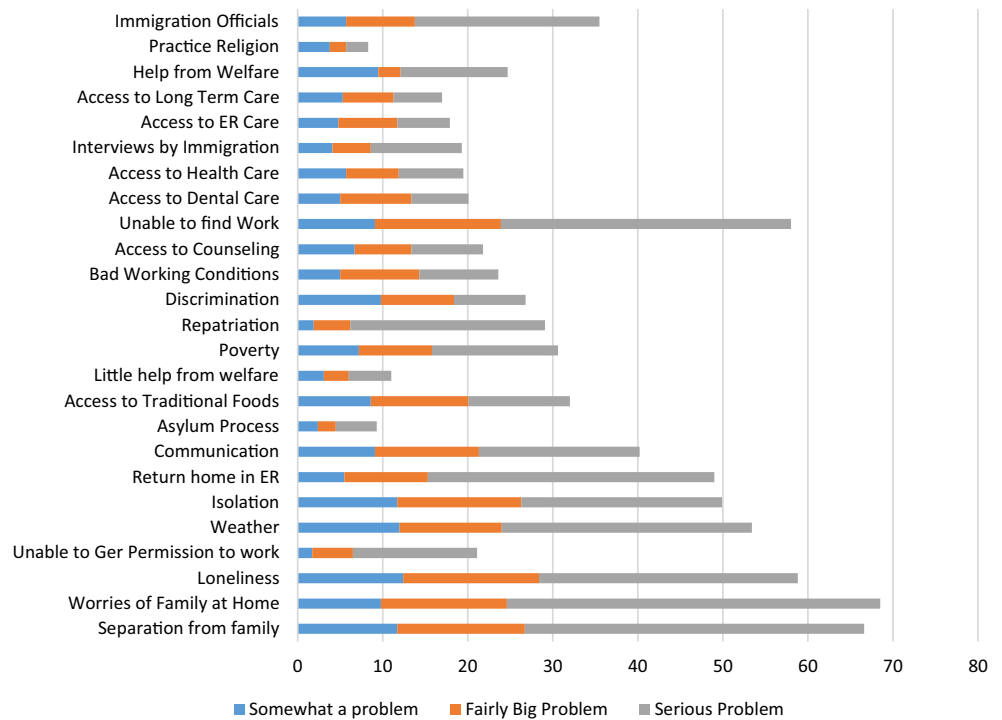
### Acculturation and Employment Status

Predictors and outcomes of acculturation were analyzed using regression analysis. Significant predictors of acculturation in univariate analyses included: gender, age, duration in Sweden, religion, anxiety, depression, PTSD and post-migration stress. Together, these variables accounted for 47 % of the variance [ $F(10, 380) = 35.11$ ,  $p < 0.001$ ] and age, education, duration in Sweden,

anxiety, depression and post-migration stress significantly predicted acculturation in the multivariable model. Depression and lower educational level was associated with higher acculturation while younger age, longer duration in Sweden, and less anxiety and post-migration stress was associated with higher levels of acculturation, see Table 4.

Forty-eight percent of participants reported being unemployed. Univariate analyses demonstrated that employment status was significantly associated with acculturation [ $F(1, 411) = 78.13$ ,  $p < 0.001$ ], age [ $F(1, 417) = 4.96$ ,  $p = 0.026$ ], education [ $F(1, 396) = 27.70$ ,  $p < 0.001$ ], post-migration stress [ $F(1, 412) = 7884.61$ ,  $p < 0.001$ ], anxiety [ $F(1, 410) = 32.26$ ,  $p < 0.001$ ], depression [ $F(1, 410) = 39.0$ ,

**Fig. 2** Percent of participants reporting post-migration difficulties



**Fig. 3** Mean subscale scores for the PMLD by gender

$p < 0.001$ ] and PTSD [ $F(1, 417) = 74.96, p < 0.001$ ]. Significant factors were entered into a logistic regression model and we found that gender, age, education, acculturation, post-migration stress, anxiety and PTSD significantly predicted

employment status while male gender, being younger, having more education, lower levels of acculturation, higher anxiety and post-migration stress, and greater level of PTSD symptomatology was associated with a lower likelihood of being employed, see Table 5.

### Discussion

Pre-emigration traumatic events were prevalent in African immigrant and refugees with the majority of participants reporting at least one traumatic event prior to emigrating. Men experienced a greater number of traumatic events and the number of events was associated with greater PTSD symptoms. The findings are consistent with a study in Norway which evaluated psychiatric symptoms in a sample of refugees who were undergoing outpatient psychiatric care in Norway [35]. Teodorescu et al. found that 82 % reported symptoms consistent with PTSD and 71 % had

**Table 2** Relationships between variables using Pearson correlations

	PM stress	Depression	Anxiety	PTSD
Age (Pearson r)	-0.073	-0.020	-0.051	0.064
No. of years of education (Pearson r)	0.051	0.110*	0.142**	0.134**
Depression	0.590**	-	0.894**	0.705**
Anxiety	0.573**	0.894**	-	0.689**
PTSD	0.571**	0.705**	0.689**	-
Post-migration stress	-	0.590**	0.573**	0.571**

\*  $p < 0.05$ ; \*\*  $p < 0.01$

**Table 3** Regression analysis of the variance accounted for by trauma and stress for psychiatric symptoms reported by refugees

Variable	R	R <sup>2</sup>	Unstandardized coefficients		t	p value
			B	SE		
ANXIETY model	0.91	0.82	–	–	243.20	<0.001
Gender			0.41	0.54	0.77	0.443
Education			0.17	0.16	1.10	0.269
Religion			0.08	0.22	0.36	0.072
Number of Traumas			–0.70	0.04	–1.75	0.081
Depression			0.76	0.03	22.70	<0.001
PTSD			0.13	0.39	3.45	0.001
PM stress			0.30	0.02	1.65	0.101
DEPRESSION model	0.91	0.83	–	–	262.40	<0.001
Gender			0.88	0.54	1.65	0.100
Education			–0.27	0.16	–1.58	0.115
Religion			–0.05	0.22	–0.21	0.837
Anxiety			0.76	0.03	22.72	<0.001
Number of Traumas			–0.05	0.04	–1.23	0.220
PTSD			0.18	0.04	4.80	<0.001
PM Stress			0.05	0.02	2.81	0.005
PTSD model	0.83	0.69	–	–	121.30	<0.001
Gender			–0.37	0.71	–0.53	0.595
Education			0.73	0.20	3.61	<0.001
Religion			–0.27	0.29	–0.92	0.359
Anxiety			–0.70	0.04	–1.75	0.081
Number of Traumas			0.49	0.05	10.37	<0.001
Depression			0.32	0.07	4.79	<0.001
PM stress			0.08	0.02	3.27	0.001

**Table 4** Regression analysis for acculturation

Variable	Unstandardized coefficients		t	p level
	B	SE		
Gender	–1.29	0.87	–1.48	0.141
Age	–0.38	0.04	–8.78	<0.001
Education	–0.62	0.26	–2.43	0.016
Religion	–0.05	0.04	–0.14	0.889
Duration in Sweden	1.08	0.07	15.51	<0.001
Number of traumatic events	0.36	0.07	0.56	0.575
PTSD	–0.03	0.06	–0.45	0.653
Anxiety	–0.18	0.08	–2.15	0.033
Depression	0.24	0.08	2.86	0.005
PM Stress	–0.07	0.03	–2.20	0.029

current symptoms of major depressive disorder. However, these refugees were seeking mental health treatment whereas this study included a community sample of refugees and immigrants [35].

We found that post-migration stress, in addition to anxiety and PTSD, contributed significantly to symptoms of depression. Furthermore, in a multivariable model post-migration stress, the number of type of traumatic events,

and depression were significant predictors of PTSD. Silove and colleagues reported similar findings in that trauma accounted for 20 % of the variance while stress contributed to 14 % of the variance of PTSD symptomatology in Tamil asylum-seekers in Australia [36].

Lindencrona and colleagues found pre-emigration trauma contributed only 5.5 % of the variance whereas personal capacity to manage stress (26 %) and resettlement



**Table 5** Logistic regression analysis for employment status

Variable	B	SE	HR	<i>p</i> value
Gender	−0.660	0.280	0.57	0.019
Age	−0.046	0.013	0.955	0.001
Education	0.303	0.082	1.353	<0.001
Acculturation	−0.076	0.014	0.927	<0.001
PM stress	0.037	0.010	1.037	<0.001
Depression	0.035	0.027	1.036	0.188
Anxiety	−0.052	0.027	0.949	0.053
PTSD	0.057	0.019	1.059	0.002

related stressors (24 %) contributed the largest percent of the variance for PTSD [37]. These findings are consistent with Castro and Murray resilience theory which suggests that effective coping strategies may lead to decreased stress and psychiatric symptomatology [11].

As might be expected, younger age, longer duration in Sweden, less post-migration stress and anxiety were associated with better acculturation. However, lower education and higher levels of depressive symptoms were unexpectedly found to be positively associated with acculturation. One explanation may be that those who had adopted the language, traditions, and had a mixed social network of people from their own country and Sweden may be more depressed as they may have experienced a loss associated with their culture as some theories suggest [38, 39]. Furthermore, having a higher education attainment may also be met with frustration secondary to being unemployed or employed in a position that does not reflect one's educational level, and thus resulting in lower levels of acculturation.

Several factors were found to be related to unemployment including higher levels of post-migration stress, anxiety, depression, PTSD, and a higher number of traumatic events. Because this was a cross-sectional study, it is not clear whether these factors, with the exception of pre-migration trauma, influenced the ability to obtain gainful employment, or whether these symptoms were a result of unemployment. It is likely a bidirectional relationship and complex process in which additional factors (e.g., current labor market, discrimination) affect an individual's ability to obtain employment. Alternatively, high levels of psychiatric symptoms may be a result of unemployment rather than predictors of unemployment [15–26].

This study had many strengths including a large sample size and the inclusion of an understudied refugee population that also included undocumented refugees and immigrants. Although it was preferable to conduct a random sample of the population based on records from the immigration authority, this would likely have resulted in a

biased sample of only registered refugees from Africa, excluding recent immigrants and undocumented refugees. Therefore, although not optimal, our sampling strategy likely provided a reasonably representative estimate of the prevalence and types of trauma, mental health problems, stress, and barriers to integration for this population in Sweden.

Due to the cross-sectional nature of the study, the direction of the relationships between variables is not known. Future research should include a longitudinal and/or prospective study to explore the temporal relationship of these variables. High rates of trauma and psychiatric symptoms were reported despite the presence of an interpreter from their home country. No differences in the prevalence of psychiatric symptoms or predictors of these symptoms were observed regardless of the presence of an interpreter. The interviews were performed based on a structured set of items from standardized questionnaires which have been used in refugee populations. However, even though structured questionnaires were used, the use of interpreters may have resulted in a slightly different interpretation of the questions. To reduced variability, all interpreters were trained by the study team. The same interviewers were used for participants from each country which may have also reduced variability across interviews.

This research also has important policy implications. Culturally appropriate mental health assessment and service provision should be incorporated into Sweden's integration policy. Assessments should take into account cultural distinctions as well as the way that mental health disorders are experienced and expressed in order to identify problems more accurately. Health professionals should be trained in how culture or pre-migration trauma may impact the expression of mental health symptoms. Service provisions should be both culturally competent and consistently provided by the same mental health professionals over time, so that meaningful relationships and trust can be built between patients and providers.

Although mental health intervention are needed, even more important may be multimodal interventions that not only include treatment for common psychological symptoms and disorders like depression and PTSD but also addressing practical issues such as language acquisition, financial and employment assistance, improving access to health care, and providing information for resources available to immigrants and refugees resettling in host countries. Some pilot studies have been conducted in the U.S. with success to reduce post-migration stress in refugees and immigrants from Africa [40].

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## References

- United Nations High Commissioner for Refugees. 2009 global trends: refugees, asylum-seekers, returnees, internally displaced, and stateless persons. <http://www.unhcr.org/4c11f0be9.html>. Accessed 15 June 2010.
- United Nations High Commissioner for Refugees. 2007 global trends: refugees, asylum-seekers, returnees, internally displaced and stateless persons. UNHCR. 2008.
- Migrationsverket. Personal contact and statistics. [www.migrationsverket.se](http://www.migrationsverket.se).
- United Nations High Commissioner for Refugees. The state of the world's refugees: the challenge of protection. New York: Penguin Books; 2000.
- United Nations High Commissioner for Refugees. Statistical yearbook 2006: trends in displacement, protection and solutions. UNHCR. 2007.
- Hauff E, Vaglum P. Chronic posttraumatic stress disorder in Vietnamese refugees. A prospective community study of prevalence, course, psychopathology, and stressors. *J Nerv Ment Dis*. 1994;182(2):85–90.
- Lopes Cardozo B, Vergara A, Agani F, Gotway CA. Mental health, social functioning, and attitudes of Kosovar Albanians following the war in Kosovo. *JAMA*. 2000;284(5):569–77.
- Ghazinour M, Richter J, Eisemann M. Quality of life among Iranian refugees resettled in Sweden. *J Immigr Health*. 2004;6(2):71–81.
- Samarasinghe K, Arvidsson B. 'It is a different war to fight here in Sweden'—the impact of involuntary migration on the health of refugee families in transition. *Scand J Caring Sci*. 2002;16(3):292–301.
- Boehnlein JK, Kinzie JD, Sekiya U, Riley C, Pou K, Rosborough B. A 10-year treatment outcome study of traumatized Cambodian refugees. *J Nerv Ment Dis*. 2004;192(10):658–63.
- Arieli A, Aycheh S. Psychopathology among Jewish Ethiopian immigrants to Israel. *J Nerv Ment Dis*. 1992;180(7):465–6.
- Sondergaard HP, Theorell T. Language acquisition in relation to cumulative posttraumatic stress disorder symptom load over time in a sample of re-settled refugees. *Psychother Psychosom*. 2004;73(5):320–3.
- Emdad R, Sondergaard HP. Impaired memory and general intelligence related to severity and duration of patients' disease in Type A posttraumatic stress disorder. *Behav Med*. 2005;31(2):73–84.
- Sondergaard HP, Theorell T. A longitudinal study of hormonal reactions accompanying life events in recently resettled refugees. *Psychother Psychosom*. 2003;72(1):49–58.
- Blight KJ, Ekblad S, Persson JO, Ekberg J. Mental health, employment and gender. Cross-sectional evidence in a sample of refugees from BosniaHerzegovina living in two Swedish regions. *Soc Sci Med*. 2006;62:1697–709.
- Priebe S, Warner R, Hubschmid T, Eckle I. Employment, attitudes toward work, and quality of life among people with schizophrenia in three countries. *Schizophr Bull*. 1998;24:469–77.
- Jayasinghe UW, Proudfoot J, Barton CA, Amoroso C, Holton C, Davies GP, et al. Quality of life of Australian chronically-ill adults: patient and practice characteristics matter. *Health Qual Life Outcomes*. 2009;7:50.
- Shams M, Jackson PR. The impact of unemployment on the psychological well-being of British Asians. *Psychol Med*. 1994;24:347–55.
- Schwarzer R, Jerusalem M, Hahn A. Unemployment, social support and health complaints: a longitudinal study of stress in east German refugees. *J Community Appl Soc Psychol*. 1994;4:31–45.
- McKee-Ryan F, Song Z, Wanberg C, Kinicki A. Psychological and physical well-being during unemployment: a meta-analytic study. *J Appl Psychol*. 2005;90:53–76.
- Linn MW, Sandifer R, Stein S. Effects of unemployment on mental and physical health. *Am J Public Health*. 1985;75:502–6.
- Jin RL, Shah CP, Svoboda TJ. The impact of unemployment on health: a review of the evidence. *CMAJ*. 1995;153:529–40.
- Pumariega AJ, Rothe E, Pumariega JB. Mental health of immigrants and refugees. *Community Ment Health J*. 2005;41:581–97.
- Marshall GN, Schell TL, Elliott MN, Berthold SM, Chun CA. Mental health of Cambodian refugees 2 decades after resettlement in the United States. *JAMA*. 2005;294:571–9.
- Beiser MN, Hou F. Ethnic identity, resettlement stress and depressive affect among Southeast Asian refugees in Canada. *Soc Sci Med*. 2006;63:137–50.
- Taloyan M, Johansson SE, Sundquist J, Kocturk TO, Johansson LM. Psychological distress among Kurdish immigrants in Sweden. *Scand J Public Health*. 2008;36:190–6.
- Yeh CJ. Age, acculturation, cultural adjustment, and mental health symptoms of Chinese, Korean, and Japanese immigrant youths. *Cult Divers Ethnic Minor Psychol*. 2003;9(1):34–48.
- Mollica R, Caspi-Yavin Y, Bollini P, Truong T, Tor S, Lavelle J. Harvard Trauma Questionnaire: brief summary of its development, statistical properties, use, and scoring. In: Goldfeld N, Pine M, Pine J, editors. *Measuring and managing health care quality: procedures, techniques, and protocols*, vol. 1. Gaithersburgh: Aspen Publishers; 1996.
- Kaaya SF, Fawzi MC, Mbwambo JK, Lee B, Msamanga GI, Fawzi W. Validity of the Hopkins Symptom Checklist-25 amongst HIV-positive pregnant women in Tanzania. *Acta Psychiatr Scand*. 2002;106(1):9–19.
- Silove D, Sinnerbrink I, Field A, Manicavasagar V, Steel Z. Anxiety, depression and PTSD in asylum-seekers: associations with pre-migration trauma and post-migration stressors. *Br J Psychiatry*. 1997;170:351–7.
- World Health Organization. UNDCP/WHO global initiative on primary prevention of substance abuse: overall evaluation: baseline assessment guidelines and instruments. Department of Mental Health and Substance Dependence. 2002.
- Walters K. Urban American Indian identity attitudes and acculturation styles. *J Hum Behav Soc Environ*. 1999;2(1–2):163–78.
- Kinzie JD. Immigrants and refugees: the psychiatric perspective. *Transcult Psychiatry*. 2006;43(4):577–91.
- Lepore S, Evans G. Coping with multiple stressors in the environment. In: Zeidner M, Endler NS, editors. *Handbook of coping: theory, research, applications*. 728th ed. Oxford: Wiley; 1996. p. 350–77.
- Kiecolt-Glaser JK, McGuire L, Robles TF, Glaser R. Psychoneuroimmunology: psychological influences on immune function and health. *J Consult Clin Psychol*. 2002;70(3):537–47.
- Silove D, Steel Z, McGorry P, Mohan P. Trauma exposure, postmigration stressors, and symptoms of anxiety, depression and post-traumatic stress in tamil asylum-seekers: comparison with refugees and immigrants. *Acta Psychiatr Scand*. 1998;97(3):175–81.
- Walters KL. Urban American Indian identity attitudes and acculturation styles. *J Hum Behav Soc Environ*. 1999;2(1–2):163–78.
- Mendoza RH. An empirical scale to measure type and degree of acculturation in Mexican-American adolescents and adults. *J Cross Cult Psychol*. 1989;20(4):372–85.
- Lessenger LH. Use of acculturation rating scale for Mexican Americans-II with substance abuse patients. *Hisp J Behav Sci*. 1997;19(3):387–98.
- Goodkind JR, Hess JM, Isakson B, LaNoue M, Githinji A, Roche N, Vadnais K, Parker DP. Reducing refugee mental health disparities: a community based intervention to address post-migration stressors with African adults. *Psychol Serv*. 2014;11(3):333–46.