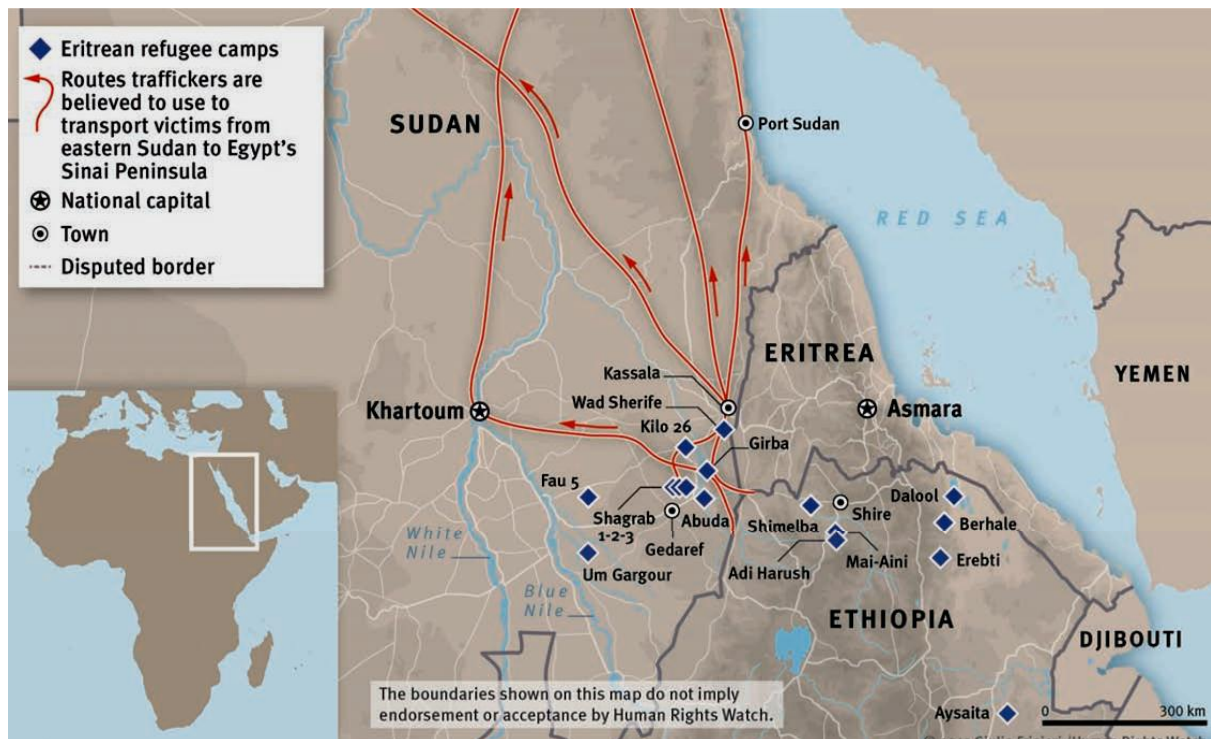




**DEPRESSION, POST TRAUMATIC STRESS DISORDER AND ALCOHOL MISUSE
AMONG ERITREAN REFUGEES LIVING IN A CAMP IN ETHIOPIA: RISK AND
PROTECTIVE FACTORS**



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Table of Contents

Table of Contents	iv
List of Tables	vi
List of Figures	vii
List of Abbreviations	viii
Declaration statement.....	x
_Toc14234900 Acknowledgements	xii
Abstract	xiv
1. Introduction	1
1.1. Study Background.....	1
1.2. Statement of the problem	5
2. Literature Review.....	9
2.1 The prevalence of PTSD and Depression in refugees from post-conflict settings.....	9
2.2 Associated potential risk factors for refugees' mental health	14
2.3 Depression and factor structure of Center for Epidemiologic Studies for Depression Scale (CES-D)	15
2.4 Mediating and moderating associates of refugees' depression and PTSD.....	16
2.5 Traumatic events and PTSD among Africans in humanitarian settings.....	17
2.6. Post-migration Daily Hassles and Refugee Mental Health.....	22
2.7. Culture-specific mental health care for refugees	22
2.8. Social inclusion and refugee mental wellbeing.....	28
2.9. Resilience factors for refugees' mental health	28
2.10. Sense of Coherence and the factor structure of its measure (SoC-13).....	29
2.11 Social support and its association with PTSD and depression.....	30
2.12. Coping styles.....	30
2.13 Exposure to Cumulative Trauma and Poor Mental Health	32
2.14 Interrelationship between alcohol use, exposure to trauma and symptoms of PTSD and depression	33
2.15. Conceptual Framework.....	35
3. Objectives and hypotheses of the study	39
3.1 General Objective of the study.....	39
3.2. Specific objectives of the study	39

3.3. Research Hypotheses	40
4. Methods and Materials	41
4.1. Study settings and context:	41
4.2. Study Design.....	42
4.3. Source and Study population	42
4.4. Sample size and sampling.....	43
4.5. Data collection procedures.....	44
4.6. Survey Instruments	45
4.7. Adaptation procedures of Instruments	47
4.8. Data management and analysis	48
4.9. Data Quality Assurance	51
4.10. Ethical considerations	51
4.11. Summary of study objectives and methods.....	53
5. Result	54
5.1. Socio-demographic characteristics of study participants.....	54
5.2 Measurement model of scales used in the present study.....	54
5.2.1 Measures for the outcome variables.....	55
5.2.2 Measurement of exposure variables.....	64
5.2.3. Measures of mediating factors	65
5.3. Associates of PTSD and depression.....	73
5.4. Symptom covariance between depression and PTSD	75
5.5. Correlates of refugees' alcohol use	76
5.6. Direct and mediating associates of PTSD and depression	78
5.7 Moderators of exposure to traumatic events	80
5.8. Structural Model	82
6. Discussion.....	86
6.1. Validity of Center for Epidemiologic Depression Scale (CES-D).....	86
6.2. Validity of sense of Coherence (SoC-13)	88
6.3. Socio-demographic and trauma related factors as associates of symptoms of PTSD and depression	90
6.4. Correlates of refugees' alcohol misuse	92
6.5. Direct, mediating and moderating associates of PTSD and depression.....	93
6.6. Cumulative Trauma and Refugee Alcohol use	96
6.7. Validity and generalisability of findings for refugees' health care	98

7. Strengths and Limitations of the study	99
8. Conclusions implications of findings and recommendations	99
8.1. Conclusions.....	99
8.2. Implications of the findings	100
8.3. Recommendations.....	101

List of Tables

Table 1: Summary of selected studies on prevalence of post traumatic stress and associated factors among some post conflictCommunity	11
Table 2: Review of selected studies related to Traumatic Experiences of refugees / displaced persons in Eritrea and Ethiopia.....	18
Table 3: Summary of selected studies on intervention of trauma and PTSD following emergency for trauma survivors in Africa, Latin America, South East Asia and Europe	24
Table 4: Study objectives and corresponding method of analysis	53
Table 5: Socio-demographic characteristics of participants	54
Table-6: Comparison of fit indices to the computing factor structures of CES-D to Eritrean refugee sample	56
Table 7: Comparison of second order two factors CES-D model for males and females	60
Table 8: Summary of item-total correlation, internal consistency and content relevance of CES-D.....	61
Table 9: Item total correlation, internal consistency and content validity index of PC-PTSD screener	62
Table 10: Internal consistency, item-total correlation and Content Validity Index of FAST..	63
Table 11: Comparison of fit indices for computing factor structures of SoC-13 and their modifications	67
Table 12: Comparison of item loadings of each item of SoC-13 in Eritrean sample with evidence of previous studies.....	69
Table 13: Internal consistency, item-total correlation and content validity of the Tigrigna version of Oslo Social Support, three items (OSS-3).....	71
Table 14: Internal consistency, factor structure and item loadings of measures in pilot and main studies	72

Table 15: Associates of PTSD and depression symptoms in multiple linear regression models for short term residents (n=287)	73
Table 16: Associates of PTSD and depression symptoms in multiple linear regression models for long term residents (n=275)	74
Table 17: Correlates of refugees' alcohol use in the logistic regression model	77
Table 18: Mediation analysis between exposure to trauma during pre and post- migration period and symptoms (PTSD and depression)	78
Table 19: Moderation analysis for sense of coherence, task-oriented coping style and social support	80
Table 20: Main and interaction effect of predictors on symptoms of PTSD and depression ..	81
Table 21: Comparison of fit indices for plausible structural models to the present data of Eritrean refugee sample	85

List of Figures

Figure 1: The conceptual Model of refugees' mental health derived from the ecological model explaining exposure, mediating and outcomes for refugee mental health	37
Figure 2: Map of the Mai Aini Camp	42
Figure 3: Flow diagram depicting the procedures for sampling	44
Figure 4: Four factors model of CES-D, Sheehan's item allocation	57
Figure 5: First-order four factors with second-order common factor model of CES-D model, Sheehan's item allocation	58
Figure 6: Two factors with second order common factor model of CESD	59
Figure-7: Two correlated second-order factor structure for the pre and post-migration living difficulties checklist.....	65
Figure 8: Three correlated factors of SoC-13, with correlated error terms	66
Figure 9: Single factor model of SoC-13 with uncorrelated error terms	67
Figure 10: One factor model of SoC-12, with correlated error terms.....	68
Figure- 11: Structural model depicting symptom co-variance between PTSD and depression	75
Figure 12: Numbing as a common indicator symptom in structural model of symptom co-variance and overlap between PTSD and depression.	76
Figure-13: Path model depicting direct and indirect (mediated) association between exposure to trauma and mental health outcomes	79

Figure 14: Full structural model depicting direct and indirect association between cumulative trauma and symptoms.....	83
Figure 15: Full structural model depicting direct and indirect association between cumulative trauma and poor mental health	84

List of Abbreviations

AAU	Addis Ababa University
ARRA	Administration of Refugee and Returnees Affairs
CES-D	Center for Epidemiologic Studies Scale
CIDI	Composite International Diagnostic Interview
CVT	Center for Victims of Trauma
CFI	Comparative Fit Index
DSM	Diagnostic Statistical Manual
I-CVI	Item-Level Content Validity Index
IRC	International Rescue Committee
JRS	Jesuit Refugee Service
MGCFA	Multi Group Confirmatory Factor Analysis
NRC	Norwegian Refugee Council
OSS-3	Oslo Social Support Scale,3-Items
PC-PTSD	Primary Care PTSD Screener
RMSEA	Root Mean Square Error of Approximation
SoC-13	Sense of Coherence Scale,13-Items
S-CVI/Ave	Scale-Level Content Validity Index, Average method
SRMR	Standardized Root Mean Square Residual
SGCFA	Single Group Confirmatory Factor Analysis
SCAN	Schedule for Clinical Assessment in Neuropsychiatry
TLI	Tucker Lewis Index
UNHCR	United Nations Higher Commissioner for Refugees

USA	United States of America
WHO	World Health Organization

Source for the map on the cover page: “I Wanted to Lie Down and Die” Trafficking and Torture of Eritreans in Sudan and Egypt.human right watch, 2014.
<https://www.hrw.org/...wanted-lie-down-and-die/trafficking-and-tortur..>

Declaration statement

This PhD research is my own original work, and its contents have not been submitted elsewhere in whole or part as a requirement for a degree in any University.

Berhanie Getnet Gebresilus

“This page is left blank to honor my dearest brother, Firew Getnet Gebresilus, who was always in my side, providing me the needed emotional treatment, support and courage. He played a very significant role in nurturing my life, including his passionate encouragements for the pursuit of my academic adventure, but who died at his younger age before he was able to see my final destiny. His dream is now successful!”

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Abstract

Background

By the year 2020, depression is projected to be the second leading cause of disability and the fourth leading contributor to the global burden of disease. Depression and post traumatic stress disorder (PTSD) are among the commonest mental health problems in refugee communities. Studies have shown that exposure to traumatic events refugees encountered in the pre-migration, during exile and post-migration periods are associated with symptoms of PTSD and depression in refugee populations. There were inconclusive findings from previous studies that have looked into the differential predictive significance of trauma related factors, particularly that of exposure to in pre-migration and post-migration traumatic experiences with symptoms of PTSD and depression among refugees. More importantly, there is no a rebust study that investigated the significance of association between trauma related and socio-demographic factors as predictors of psychological symptoms in Eritrean refugees living in Ethiopia. Despite the fact that there are several studies on detection of depression in the community using different measures, valid depression measure adapted in Eritrean culture for Eritrean community in humanitarian settings does not exist. In this regard, the latent factor structure (symptom presentation) for most measures of depression in many low income countries, particularly in almost all African countries, is not well understood

Although there is abundant literature and theoretical basis on the co-morbidity of PTSD and depression in people affected by trauma, the extent of symptom co-variance and overlap between the two frequently reported forms of psychological symptoms by refugees (PTSD and depression) is not well known particularly in our study population.

Mental health research is also increasingly focusing on the importance of investigating resilience in dealing with risk factors for mental health problems, such as personal coping styles and sense of coherence in people who are vulnerable for mental health problems in humanitarian crisis. Although extensive studies on the topic of resilience and sense of coherence were carried out among Eritreans in humanitarian settings, empirical adaptation studies on resilience measures and their validity were not given due attention. There is no quantitative evidence to confirm the psychometric properties of resilience measures in Eritrean refugees living in Ethiopia to date.

There is also increasing concern on the co-morbidity of alcohol misuse with other mental health problems in refugee population in the context of humanitarian settings (refugee

camps). Indeed, the current study tried to investigate the relationship between theory driven risk and protective factors with mental health concerns of refugees (depression, PTSD and alcohol misuse) in Eritrean refugees living in Mai Aini refugee camp.

Objectives: The objectives of this study are to: (a) identify which socio- demographic and trauma related factors are associated with PTSD and depression; (b) explore the direct, mediating and moderating effects of traumatic events on PTSD and depression; (c) determine the psychometric properties of measures employed in the study; (d) determine the structural relationship between exposure to cumulative trauma and poor mental health (indicated by co morbid symptoms of depression, PTSD and alcohol misuse).

Methods: Cross-sectional study was conducted. In the survey, 562 adults were randomly selected from Eritrean refugees living in Mai Aini camp, Ethiopia. Center for Epidemiologic Studies Depression (CES-D) scale, Post-Migration Living Difficulties checklist, Primary Care PTSD screener (PC-PTSD), Oslo Social Support Scale (OSS-3), Sense of Coherence Scale (SoC-13), Coping Style scale and Fast Alcohol Screening Test (FAST) were administered concurrently.

Data were analyzed using multiple linear regression modeling, path analysis and multivariable logistic regression model. In order to estimate the structural relationship between exposure to trauma, risk and protective factors (as mediating factors), and co morbid mental health outcomes (indicated by PTSD, depression and alcohol misuse), Structural Equation Modeling (SEM) was employed. SEM was also employed to identify the percentage of variance explaining common latent factors by the three outcomes of mental health concerns in refugees (PTSD, depression and alcohol misuse). It was also used to estimate symptom co-variance between symptoms of PTSD and depression. In order to test the factor structure of measures used in the present study, Confirmatory Factor Analysis (CFA) was carried out.

Results

PTSD and depression symptoms did not vary across major demographic variables with respect to gender, age and marital status. Exposure to pre-migration trauma was associated significantly both with increased symptoms of PTSD ($\beta = 0.11$, $p < 0.05$) and depression ($\beta = 0.29$, $p < 0.001$) after adjusting for demographic factors, sense of coherence and social support. Exposure to post-migration trauma was associated with increased symptoms of

depression ($\beta = 0.21$, $p < 0.001$), but not with PTSD symptoms. There was 85% co-variance between latent factors of depression and PTSD, which shows the likelihood of symptom overlap between the two constructs.

Pre-migration living difficulties were directly associated with symptoms of PTSD ($\beta = 0.09$, $p < 0.05$), and indirectly associated with PTSD through paths of duration of stay in camp, sense of coherence, post-migration living difficulties, task-oriented coping style and depression (standardized indirect coefficient = 0.26, $p < 0.01$). Depression was directly associated with pre-migration ($\beta = 0.35$, $p < 0.001$) and post-migration ($\beta = 0.23$, $p < 0.05$) living difficulties. Post-migration living difficulties were indirectly associated with PTSD through paths of sense of coherence, task-oriented coping style and depression (standardized indirect coefficient = 0.13, $p < 0.01$). Social support moderated the effect of post-migration living difficulties on depression ($\beta = -0.106$, $P < 0.05$). Emotion-oriented coping style moderated the effect of pre-migration threat for abuse on PTSD ($\beta = -0.18$, $p < 0.001$) and depression ($\beta = -0.12$, $p < 0.01$). It also moderated threat for life on PTSD ($\beta = -0.13$, $p < 0.001$).

With respect to the measure of depression, first-order two factors with second-order single factor model of CES-D (correlated error terms) yielded the best fit to the data [CFI = 0.975; RMSEA = 0.040 (90%CI = 0.032, 0.047)]. The 16 items defining depressive affect were internally consistent (Cronbach's alpha = 0.932) and internal consistency of the four items defining Positive Affect was medium (Cronbach's alpha = 0.703). CES-D has acceptable convergent validity with pre-migration living difficulties checklist ($r = 0.545$, $p < 0.001$), post-migration living difficulties checklist ($r = 0.47$, $p < 0.001$), PC-PTSD ($r = 0.538$, $p < 0.001$) and FAST ($r = 0.197$, $p < 0.001$). It has acceptable divergent validity with SoC-13 ($r = -0.597$, $p < 0.001$) and OSS-3 ($r = -0.319$, $p < 0.001$).

Key findings regarding the validity of the measure for sense of coherence (SoC-13) demonstrated that the one factor model of SoC-13 with twelve items best fitted the present data (CFA = 0.982, RMSEA = 0.035), with good internal consistency (Cronbach's Alpha = 0.75). The negative association between SoC-13 and PC-PTSD ($r = -0.433$, $p < 0.001$), CES-D ($r = -0.597$, $p < 0.001$), pre-migration and post-migration living difficulties checklist sub-scales ($r = -0.265$, $p < 0.001$ and $r = -0.249$, $p < 0.001$ respectively), and FAST ($r = -0.105$, $p < 0.001$) provided sufficient evidence for its divergent validity. SoC-13 has positive association with Oslo Social Support scale (OSS-3) ($r = 0.363$, $p < 0.001$) and task oriented coping style sub-scale ($r = 0.089$, $p < 0.001$), demonstrating acceptable convergent validity of this measure.

Multivariable logistic regression analysis indicated that exposure to pre-migration living difficulties (Adj. OR = 1.09 [95%, CI =1.03, 1.08] $p < 0.001$) and use of emotion-oriented coping (Adj. OR=1.63 [95% CI=1.15, 2.32], $p < 0.01$) were positively associated with refugees' alcohol misuse. Bi-variate analysis of Pearson's correlation also indicate that refugees' alcohol misuse is positively associated with depression ($r=0.197$, $p<0.01$). In addition, in the multivariable logistic model, being a female (Adj. OR = 0.30[95%, CI= 0.17, 0.55], $p < 0.001$) is associated with decreased odds of alcohol misuse compared to males. Participants aged 25-34 (Adj. OR = 0.40 [95%, CI =0.20, 0.80], $p < 0.05$) and those within age group of 45-54 (Adj. OR =0.14 [95% CI=0.02, 0.78], $p < 0.05$) were less likely exposed for alcohol misuse compared to the younger refugees aged 18-24. Increased frequency of prayer was negatively associated with probable alcohol misuse (Adj. OR = 0.51 [95%, CI= 0.37, 0.70], $p < 0.001$). Furthermore, findings from the SEM analysis demonstrated that alcohol misuse has significantly loaded onto the second-order common factor ($\beta =0.21$, $p<0.001$) with symptoms of PTSD and depression; which means 21% of variance for the second-order common factor (co-morbid problem) is accounted for by alcohol misuse in a structural model which demonstrated close acceptance of fit to the current data ($\chi^2/df=2.508$, CFI=0.868; TLI=0.855, RMSEA= 0.052(90%:0.055 0.066).

Conclusions

Fostering sense of coherence, social support, task-oriented and emotion-oriented coping styles and preventing post-migration abuses, especially for female refugees, need to be given particular consideration when planning an intervention. The current finding regarding significant positive correlates of alcohol misuse (such as pre-migration trauma, depression, emotion-oriented coping, and younger age) and significant negative correlates (such as being female in gender, sense of coherence and frequency of prayer) provide useful information specific to intervention of alcohol misuse in Eritrean refugees. Inferences from co-variances of latent factors indicate that there is a strong co-morbidity between the two mental health concerns in Eritrean refugees (PTSD and depression). The evidence regarding modest co morbidity between alcohol misuse and psychological symptoms strongly suggests the importance of considering alcohol misuse as an integral part of intervention in the mental health care endeavors for Eritrean refugees. The findings regarding' refugees' longer duration of stay in the camp for mediating the effect of exposure to pre-migration traumatic experiences on PTSD informs the need for their acceleration of repatriation, resettlement or integration with the host society.

1. Introduction

1.1.Study Background

Displacement due to man made or natural calamities has a broad impact on the mental health of survivors, such as refugees and internally displaced people, because they are often exposed for different forms traumatic events (1). The definition of a traumatic event, as given by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), is exposure to actual or threatened death, serious injury or sexual violence in one or more of four ways: (i) experiencing the event directly; (ii) witnessing events occurring in a person ; (iii) being informed that such traumatic event has happened to one's family member or a friend; (iv) experiencing repeated or extreme exposure and the details of its adversities, such as reminders of the first response. Actual or threatened death must have occurred either in violence or accident; however, experiences via media such as television, movie or pictures cannot instigate trauma (2).

More than 14 million refugees are displaced around the world as per the report in 2014, and among whom those from low income countries are leading unstable life and live in refugee camps and unsafe settings (3). At the end of 2017, UNHCR has estimated 68.5 million forcibly displaced people of whom 40 million were internally displaced people, 25.4 million were refugees, and 3.1 million were asylum seekers (178).

In view of this, it is not difficult to imagine how essential it is to address the psycho-social needs of these refugees. Yet, following an emergency crisis, there was a paradoxical opportunity undertaken in the improvement of the status of mental health services in some post conflict settings, because there were intervention undertakings just following an emergency (1).

Mental health studies conducted among refugees consistently reported that Post Traumatic Stress Disorder (PTSD) and depression are the most common forms of mental health problems among displaced people in humanitarian settings (3, 4, 5, 6, 7). The co-morbidity of these two mental health problems is also documented among migrant asylum seekers from Ethiopia and Eritrea in Western countries (8). In that cross cultural study, which focused on the relevance of PTSD and depression among diversified ethnic groups in Canada where Ethiopian and Eritrean asylum-seeking refugees were involved, findings suggest that the

common mental health problems of these refugees were PTSD and major depressive episode (MDE) (8).

A recent report regarding the range of mental disorders in emergency settings by World Health Organization (WHO) indicated that the estimate for severe mental disorders (i.e. severe depression, psychosis and severely disabling anxiety) was estimated to be 2% to 3% before the occurrence of emergency situation and 4% to 5% after the emergency (1). Similarly, the estimated prevalence for mild mental disorders (i.e. mild and moderate depression and anxiety disorders including PTSD) in these settings is projected to be 10% before and 15% to 20% after emergency (1). The report of World Health Organization (WHO) in a recent meta-analysis study indicated that the prevalence of PTSD ranged from 0.3% to 6.1% in the general population globally while it is 15.4% in conflict-affected populations(4).

Despite the fact that depression is a common mental problem in the refugee population, it has been given lower coverage in mental health literature of refugees globally compared to PTSD. By the year 2020, depression is projected to be the second leading cause of disability and the fourth leading contributor to the global burden of disease (9, 10). Studies indicate that refugees are at higher risk of developing mental health problems, including depression, compared to the general population. In this regard, refugees are described as one of the disadvantaged and vulnerable populations whose vulnerability is characterized by not having legal rights like citizens rendering them to abuses, hostility from the host community, and being economically disadvantaged; all of these disadvantages are risk factors for psychological distress (11).

In a study among South East Asian refugees resettled in Canada, three major paradigms were indicated to explain the scientific conception of migrants' mental health. These include: (a) pre-existing mental disorder that migrants could bring with them; (b) migrants could develop mental health problems due to stress associated with resettlement and, (c) the interaction between individual disposition vis-à-vis risk and protective factors operate to determine migrants' wellbeing (12).

The existing evidence regarding the predisposing factors for refugees' PTSD and depression is somewhat mixed. For example, among Cambodian refugees, a high proportion (75%) of variance in PTSD is accounted by worry arising from daily hassles (13). Similarly, peri-

migration and post-migration living difficulties (cumulative trauma) were found to be associated with the intensity of PTSD symptoms among Ethiopian immigrants in Israel (14). A study conducted in South East Asian refugees in Canada indicated that the ongoing resettlement stressors can substantially impact their mental wellbeing (12). Other studies also have reported that there is a significant association between post-migration stressors and mental health problems, which outweigh the effects of traumatic events that the refugees had experienced (15, 14). Contrary to this, findings of a previous study on the effect of torture on refugees' mental health in Somali and Oromo refugees in the United States of America indicated that exposure to torture in their own countries before migration is highly correlated with PTSD symptoms (16). In this regard, it was argued that the subsequent development of PTSD is predicted by the type of the traumatic events (16). The comparative impact of past traumatic events and stressors in refugee camps on present status of refugees' PTSD and depression was one of the issues that the present study targeted to address, because evidence from some studies showed only the importance of post-migration stressors. For example, a systematic review done on the traumatizing factors of Sudanese refugees in humanitarian settings indicated more concern with their current stressors than with past trauma (15). Besides identification of past and recent traumatizing factors for refugees' mental health, a recent publication indicated that identification of direct, mediating and moderating risk and protective factors for Eritrean refugees deemed vital to provide information helpful for informed decision in the mental healthcare endeavors for these vulnerable refugees (17). The migration of Eritreans to refugee camps of Ethiopia is principally to use it as a transit route to get resettlement opportunity in economically rich countries (18).

These all gaps in knowledge call for the need for undertaking scientific investigation to understand the psycho-social problems faced and related factors in these refugees. Besides being exposed to multiple forms of traumatic events and memories both in the remote and recent past, Eritrean refugees were continuously confronted with mass displacement with highly likely exposure to past stressful events during their own country, on transit and in the fragile refugee camp environment in Ethiopia.

Continuous migration of Eritrean youth to refugee camps of Ethiopia is owing to different reasons: unemployment (19), search for better life and economic need, seeking for family reunification and perceived conscription (18). As a consequence of this, they are vulnerable to feelings of isolation, concerns of health problems in the face of limited health care

facilities, uncertainties about the fate of their future, and concerns for their family they left behind (19). As of 2013, there were 53,035 refugees in four camps of Ethiopia: Mai Aini, Shimelba, Adi harush and Hitsats (20). Of these, 37,562 (70.8%) were males. Mai Aini, where this study was conducted, is the second largest camp where 17,825 refugees resided of whom 11,892 (66.7%) were males (20). The majority of them were students followed by ex-military most of whom were unemployed before coming to Ethiopia (20). A recent update by United Nations High Commissionaire for Refugees (UNHCR) indicates that about 11,718 Eritrean refugees were living in Mai Aini camp, of which 4,826 (41%) were females (21). Eritreans were among the largest group migration crisis (22). The United Nations estimates that nearly 170,000 Eritrean refugees live in Ethiopia as of 2018 (22).

In a study which was aimed at investigating trauma and identifying psychological symptoms, and contextual factors related to psychological wellbeing among the youth in Eritrea, the narrative accounts of the participants represent most symptoms of PTSD (23). In that study, age, gender and ethnicity didn't explain significant variability across the overall PTSD symptoms (23). Similarly, a study in Ethiopia, which was aimed at investigating gender difference in traumatic life events, coping and social support in 1,200 displaced people from Eritrea, indicated that higher traumatic life events related to childhood and displacement were found to be higher in men compared to women (24). Among many possible stressful conditions in the Eritrean refugee camps, intimate partner physical violence was reported to be one of the post traumatic events in Shimelba refugee camp in Ethiopia (25). Another recent qualitative exploratory research among Somali refugees in South East Ethiopian camps and Addis Ababa supported this finding (26). According to that study women refugees were continuously vulnerable to different types of gender-based violence in which domestic violence, rape and abduction were found to be major problems at their country of origin, in transit and in the host country, respectively (26).

Literatures are increasingly interested on the importance of investigating post traumatic alcohol misuse following exposure to different types of traumatic events (27-31). Despite the fact that the majority of existing research has focused on investigation of common mental health problems associated with trauma (such as post-traumatic stress disorder, depression and anxiety), there are few studies that highlighted the pressing need for investigation of alcohol misuse in trauma affected people including refugees.

With this background in fragile refugee camps of East Africa, the present study tried to assess refugees' mental health problems (symptoms of PTSD and depression) as a primary outcome, and alcohol misuse as a secondary co-morbid outcome. The present study was also targeted

to identify socio-demographic correlates of depression, PTSD and alcohol misuse. In addition, the study identified the mediating and moderating effects of trauma-related, personal, social and environmental factors on psychological symptoms (PTSD and depression).

1.2. Statement of the problem

Adequate study has not been conducted on the consequence of traumatic events on displaced people in post-conflict low income countries, and hence little is known about the effect of the experienced trauma (5, 6). Research on PTSD among communities in post conflict African countries is scarce and the few studies conducted before used tools which were not properly validated and hence they lack methodological consistency (5). After conducting investigation regarding the association between lifetime events and PTSD in four post-conflict countries (i.e. Algeria, Ethiopia, Cambodia and Gaza), experts in the area indicated that adequate study was not conducted on the consequences of traumatic events in displaced people in these settings (6). The literature on refugee mental health is by far limited to refugees living in the West although the majority of the refugee population lives in low-income countries (6, 32).

The need for conducting further studies in humanitarian settings of Africa is recommended because more and more Africans are exiling out from their own home countries and entering into refugee camps situated in neighboring countries (5). The need for studies on PTSD and its co-morbid depression among Eritrean refugees in the refugee camps of neighboring Ethiopia is in line with that recommendation. However, there were no valid tools to measure those psychological constructs in most African settings, which include Eritrean refugees in Ethiopia. Therefore, we thought it is timely to give attention to look into the validity of measures instead of attempting to estimate prevalence of mental health problems using in the absence of prior validity studies of these measures whose cut-off points were not normed in a target population, as indicated in previous study (33). For example, there are no adapted outcome measures for mental health problems such as PTSD and depression, and evidence of their association with theoretically relevant predictors like, resilience, coping style, social support and alcohol misuse in the Eritrean refugee population, which are our interest of investigation in the present study. There is no quantitative evidence about the psychometric properties of the tools employed in the present study in the context of Eritrean refugees living in Ethiopia. Hence, one of the objectives of this study was adaptation of tools used for detection of PTSD and depression symptoms and possible predictors of the disorders in this community.

Although there is empirical evidence regarding the protective role of task-oriented coping style and social support in the context of emergency settings in Eritrea and Ethiopia (23, 24), no study is available addressing the pathways through which sense of coherence, social support and coping sub-scales may operate in decreasing the symptoms of PTSD and depression. Although there are reports on mediating and moderating roles of sense of coherence, coping styles, and social support in the association between exposure to trauma and psychological symptoms in mental health research in humanitarian settings, to our knowledge, there are no such studies in Eritrean refugees living in Ethiopia. Therefore, among others, one purpose of the present study was addressing this knowledge gap.

The range of traumatic events that Eritrean refugees are likely to be exposed can be inferred from previous studies conducted in Eritrea humanitarian settings in Ethiopia (6, 23, 25, 26, 34) and other studies made among Somali and Oromo immigrants in the United States (35, 29), Rwandese, Sudanese and Somali refugees in Uganda (5), Sudanese refugees in camps of Darfur (36) and the trauma of health workers in post-conflict Liberia (31). From these studies, the most common types of trauma in refugee camps include direct and indirect exposure to war, loss of family members, looting and loss of property, sexual abuse, gender-based physical violence and torture.

The magnitude and direction of association between pre/post traumatic life events and symptoms of PTSD, depression and alcohol misuse, as the concerns of mental health problems of refugees, were not known in our study population. Furthermore, the extent of symptom overlap between depression and PTSD in these refugees is not available. The growing research interest on issues of alcohol misuse and its co-morbidity as part of refugees' mental health concern (29, 37, 38) also has not been investigated in this population. Therefore, the present study aimed at addressing the aforementioned research gaps in terms of sources of stress and aggravating factors in this community, which are among top priorities in mental health research in the context of emergency settings in low and middle income countries (8).

This study has the following practical and theoretical significances:

1. Adaptation of tools/measures to Eritrean culture and language (Tigrigna). This was thought to be an important contribution for future research to detect common mental health problems among Eritrean refugees. Once such measures are adapted the next

step would be validating them for detection of mental disorders in the community and for use by counselors, psychiatrists, social workers in the assessment of respective psychological symptoms and making diagnosis in clinical settings. The validity of adapted measures will provide useful information about ‘etic’ knowledge of the Western constructs (such as PTSD, depression, and sense of coherence) in the context of humanitarian settings in Africa, specifically in Eritrean refugees in Ethiopia. Knowledge gained from the factor structure of the measures would be useful to give insight into the current controversy on whether DSM based bio-medical constructs, such as PTSD and depression in Eritrean refugees represent valid factor structures (symptom manifestations) as reported in previous studies (39, 40, 41). The findings derived from validity study of measures are also equally vital to yield inferences whether the western constructs may or may not be valid measures in Eritrean refugees measuring the respective valid constructs in this community as reported in previous studies for other group non-western sample (23, 42, 43).

2. Identifying the extent and direction of association between theoretically relevant associated factors of refugees’ mental health. This is useful to generate evidence for intervention. Specifically, predicting refugees’ mental health in reference to each of hypothesis driven factors such as pre/post migration traumatic events, socio-demographic factors, social support, sense of coherence and coping were thought to be essential to provide the necessary information for those who wish to devise and implement mental health care for Eritrean refugees living in Ethiopia. In addition, information about the mechanism underlying predisposing as well as resilience factors of refugees’ mental health (in terms of direct, mediating and moderating predictors) between exposure to pre-migration and post-migration stressful events and their poor mental health is so vital for planning an intervention. Since there is interplay between personal, social and environmental factors to determine refugees’ well-being as dictated by the ecological model, this will enable us to consider multiple intervention options for refugees’ mental health care. Identification of significant mediators and moderators will provide vital information for those stakeholders (like international and national humanitarian organizations), counselors, psychiatrists, social workers and researchers who would like to devise and implement mental health interventions for this community.

3. Assessing the extent of symptom overlap between the two mental health outcome variables (PTSD and depression) in the context of Eritrean refugees in Ethiopia will provide information to health care practitioners to take care in assigning symptoms to either of the conditions, and develop appropriate evidence-based intervention package to deal simultaneously with both conditions in a cost-effective manner. It will also help to adapt the existing trauma focused intervention practice and to tailor to the Eritrean refugees by Center for Victims of Trauma (CVT), American supported counseling center working to assist Eritrean refugees living in Ethiopian camps and the refugee psychiatric service rendered by Administration of Refugee and Returnees affairs (ARRA) health center in the refugee camps.
4. Alcohol misuse is reported to be higher in people exposed to different types of trauma and in refugee populations. Thus, one of the objectives in this study was generating empirical data on refugees' alcohol misuse and its associated factors. This is meant to help planners to include alcohol problems as an integral part of mental health intervention plans for refugees in general, and Eritrean refugees in particular. There is no sufficient evidence regarding alcohol misuse in refugee mental health literature, especially in the African humanitarian context in general and in Eritrean refugees in particular.

2. Literature Review

Literature search for the purpose of this review used multiple search strategies. Hence, PubMed, Google Scholar, PsycINFO, and MEDLINE websites were used as main sources of literature. Other relevant PhD dissertations and reports of UNHCR and WHO were employed as a sources of references for this study. To find literature specific to the mental health of Eritrean refugees, a broader scope of search was made that included other journal articles related to traumatic experiences of refugees and their coping strategies using mesh terms such as: traumatic experiences, PTSD, depression, refugees, resilience, coping style and the like. Important literatures done across the world on the mental health of people who have undergone through forced migration is presented under the following themes.

2.1 The prevalence of PTSD and Depression in refugees from post-conflict settings

Studies consistently indicate that the prominent mental health problems of refugees are PTSD and depression (24, 44, 45). The prevalence rates in PTSD among refugee communities are by far higher than in the general population and other non-refugee communities such as immigrants (46). The distinction between migrants and refugees in literature is that the former leave their place of origin voluntarily while the latter are either forced to exile or migrate secretly and are likely exposed to experiences trauma and loss (46).

The prevalence of PTSD in displaced persons in East Africa ranges from 15.8% in displaced Ethiopians in Kality shelter (6) to 80.9% in displaced Darfuri female students in Sudan (47). One can assume such a wide range of disparity in the prevalence rates is likely to be attributable to existence of community social support in the case of Ethiopian displaced persons (6), methodological disparities, issues related to lack of measurement equivalence, difference in exposure to different severity levels of traumatic life events.

There is a higher prevalence for PTSD and depression among refugees in Africa with some variations in range. For example, prevalence rates of PTSD in Ugandan refugee camp of Nakivale in Somali and Rwandese refugees were found to be 48.1% and 32%, respectively (5). In that study, authors reported that the overall prevalence of PTSD for the whole sample was found to be 37.8% (5). From another study, the prevalence rate of PTSD among refugees of Somali, Sudan and others in the Kenyan refugee camp of Kakuma was found to be 38.6% (3).

In a study which was aimed at exploring the relationship between exposure to war related traumatic events and PTSD among Darfuri female university students in Sudan using cross sectional study, it was reported that 54% of the participants had either experienced or witnessed war related events (47). In that study, close to 81% of the Darfuri female students met the DSM –IV criteria for PTSD symptoms. Summary of some important studies on the prevalence of PTSD and its co-morbid disorders among refugees in post-conflict emergency settings is indicated in Table-1.

Table 1: Summary of selected studies on prevalence of post traumatic stress and associated factors among some post conflictCommunity

Context	Author/ s	Purpose of the Study	Participants	Method	Major Findings	Comments
Nakavale Refugee Camp (Uganda)	Onyut, et al., (2004)	-Determining the prevalence of PTSD for Rwandese & Somali refugees	(n=1473)	-Epidemiological survey was used. -Employed standardized instruments HSCL,PDS and CIDI with the necessary steps of validation procedures.	-High and chronic PTSD was found (31.1% for Rwandese and 47% for Somali)	Strength -Clinical psychologists were involved for validating the translated instruments
Ethiopia Algeria Cambodia Gaza	de Jong, et al. (2001)	-To determine the prevalence of PTSD and risk factors in four post conflict countries	Ethiopia (n=1200) Algeria (n=653) Cambodia (n=610) Gaza (n=585)	-Epidemiological survey from randomly selected participants from respective countries -PTSD module of CIDI was used to measure PTSD symptoms	-Prevalence of PTSD was found to be: 1) Ethiopia=15.8% 2) Algeria=37.4% 3) Cambodia=28.4% 4) Gaza=17.8%	Strength -The content, criterion, technical, conceptual and semantic equivalence of measures were ensured using a 7 step rigorous adaptation procedures. Weakness -Interpretation bias may happen because of multiple raters of CIDI. -Doesn't address socio-cultural factors, which may intricate participants to manifest higher on some PTSD symptoms and lower on others.

Liberia	Turyhabwa et al. (2011)	-To examine the experiences of war trauma and psychological wellbeing among health workers participated in intervention in emergency.	Health workers (n=50)	-Cross sectional survey was employed -Employed standardized instruments(HSCL &HTQ)	-The prevalence of PTSD and Major Depression Disorder was found to be 14% and 26% respectively.	Weakness: -Nothing was stated as how the instruments were adapted(i.e. neither validity nor reliability of the adapted instruments were mentioned).
Kakuma refugee Camp (Kenya)	Kamau, et al. (2004)	To determine the prevalence of psychiatric disorders among clients of community-based mental health service in Kakuma refugee camp in Kenya.	*8737 consultations	A three year logbook based data which was maintained by a nurse manager was used for analysis. Thus, the data consist of the diagnosis of patients at the first phase assessment along with follow up recordings.	-The most common disorder was PTSD (38.6%), followed by anxiety (22.7%). In addition, refugees were having depression (10.6%), bi-polar disorder (12.3%), Psychosomatic, insomnia &psychosexual together (8.9%) and epilepsy (6.9%). -Factors that affected the health seeking behaviors of refugees include: severity& persistence of symptoms, instability of the immediate social environment, level of disability, and refugees' endurance to live with the problem.	Strength -The study used a compiled data, which was carried out in natural clinical context (not based on contrived sample) for three years of extended time makes this study more realistic and enhances contextual validity. Weakness -The measures may not be reliable as it may differ from one clinician to another clinician. The cross cultural validity of diagnostic tools is questionable because some of the measures may not be validated on the respective refugee group, and the report didn't mention anything about this.

Ahfad University for Women (AUW) Omdruman (Sudan)	Badri,et al. (2012)	-To explore the association between war related trauma and PTSD, and determine its prevalence.	Darfuri female university students exposed with war trauma (n=123)	-Cross sectional survey was employed. -HTQ was employed to measure PTSD after rigorous validation of the instrument to the local context	-The findings indicate a strong association between experiential exposure to events of war trauma and PTSD sub-scales. -Thus, 80.9% of the participants met the DSM-IV criteria of PTSD.	The obtained prevalence is unusually very high in the midst of protective resources such as education opportunity. Such finding may be related to the validity of the instrument.
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Note::* Total number of consultations was considered as a source of data in Kakuma refugee camp in Kenya.

The life time prevalence of PTSD among the general population is estimated to be between 1% to 14%, while it is greater than 15% in refugee sample around the world (8). The prevalence of Major Depression Episode (MDE) varies from 3% to 7% in general population, while its estimate is much higher (ranging from 15% to 80%) in refugee population (8). The co-morbidity of PTSD and MDE is also frequently noted in refugee population when the prevalence is high (8). Another study from Ethiopian refugees and immigrant sample in Canada reported that the lifetime prevalence of depression in Ethiopian immigrants and refugees was higher (9.8%) compared to the residents of Ontario population (7.3%) (50).

2.2 Associated potential risk factors for refugees' mental health

Traumatic experiences related to armed conflict in humanitarian settings of Africa were carried out in countries of Ethiopia, Uganda, South Sudan and Liberia (5, 6, 15, 34, 36, 31). However, sufficient research works have not been made on the role post-migration stressors in predicting mental health of refugees, except for few studies made in Sudanese refugees (15, 36). Alcohol dependency, PTSD, major depressive disorder and attempted suicide were psychological problems of emergency workers reported following the conflict in Liberia (31). A review on the mental health of Sudanese refugees reported that refugees were suffering from high rates of PTSD and depression (36). In a systematic review of study made on refugees and immigrants, findings indicated that refugees often develop PTSD and other chronic impairment because of exposure to an extreme traumatic experience, such as fear of violence or starvation (49). When there is a resemblance between refugees' country of origin and the host society, the rate of developing psychopathology decrease on the part of the refugees (49). This literature helps one to postulate that the relative similarity in culture between Eritrea and Ethiopia may create a conducive environment for the likelihood of resilience on the part of Eritrean refugees in Ethiopian camps.

Regarding demographic correlates of PTSD and depression, the existing literature is inconclusive. The disparity of findings might be explained by disparity of cultural contexts of research participants. Being a female is associated with lower depression and lower level of education (50, 51), and lower support outside family (51). Community based studies conducted in England demonstrate that women score higher on PTSD than men (52). PTSD prevalence was found to be higher in women (6.4%) compared to men (3.6%); PTSD prevalence is also higher among unemployed (12.5%), and those with lowest level of income (14.8%) (52).

Ethiopian displaced males in a previous study reported to have higher traumatic experiences than females (24). The difference for the reduction in symptoms for males was likely explained by differences in coping strategies employed by women and men to deal with effect of trauma in another literature (48). Among others, one target of the present study was to identify demographic predictors for mental health problems of refugees (specific to PTSD, depression and alcohol misuse), which were inconclusive and mixed in previous studies.

2.3 Depression and factor structure of Center for Epidemiologic Studies for Depression Scale (CES-D)

Although depression is among top priority mental health problems with high contribution to global burden of disease (9, 10), there is paucity of valid measures for detection in low and middle income countries. Center for Epidemiologic Studies Depression Scale (CES-D) is one of the most common instruments used to measure depression in non-clinical populations (53). CES-D was also employed in different group of vulnerable populations, including prisoners (54), genocide survivors in Rwanda (55), and Eritrean refugees in United States (56), and Bosnian refugees where? (57). It was also used in Korean immigrants in Canada to detect depression (58). Despite the presence of several studies on detection of depression in the community using different measures, the latent factor structure for most measures of depression in many low income countries, particularly in almost all African countries is not well understood. Mere reliance on total score of depression measures without understanding their latent factor structure is not sounding for reasons associated with possible problems of validity, and hence ensuring measurement equivalence (measurement invariance) is becoming important in such measures (59, 60, 61). In strengthening the argument regarding the variation in symptom presentation of depression across different cultural contexts as reported by previous studies indicated above, it was reported that the variation in symptom presentations for depression across cultures imply the likelihood of incompatibility of existing measures of depression with local concepts of distress (42).

Four factor structure of CES-D was previously fitted to the data from elderly population of Spain and Mexico (62), China and Dutch (63), African Americans and Caucasians living in the United States (64), and Hispanic older adults (65). In addition, the four factor structure demonstrated the best fitting model among black women in United States with or without history of cancer (66) and Eritrean refugees living in the United States (56)

Studies indicate that the factor structures of CES-D can vary across different cultures (60, 64, 67). Alternative model of four latent factors with Sheehan's item allocation was tested as a variant for four factors structural model and had demonstrated a better fit to the data in many studies on samples from different cultures (61). The original four latent factor structure of CES-D proposed by the original scale developer, Radloff (1977) (68), has not been seen consistently across cultures.

It was reported that the two factors model, which combines all the negative items on one separate factor, and the remaining positive items on the second factor has showed superior fit (69). For example, the two factors model, negative affect (16-items) and wellbeing (4-items) best fitted data in different studies, such as samples in Rwanda (55), elderly Mexicans in United States (67), Puerto Ricans (70), and in studies from South Africa (71). From the reviewed literature we have understood that there are variant factor structures of CES-D, which are different from the four factor structure of this tool common in western literature. The rationale behind the present investigation lies on the assumption that the factor structure of CES-D may vary between Eritrean refugees living in Ethiopia compared to those Eritrean refugees living in United States due to the possible difference in symptom manifestation of depression in response to difference in their current culture.

2.4 Mediating and moderating associates of refugees' depression and PTSD

There is a growing interest to test significance of mediation between exposure to stressful events and mental health outcomes targeting aggravating risk factors such as: exposure to post migration trauma (72, 73), maladaptive coping methods like alcohol misuse (74), as well as protective personal resources, specifically sense of coherence(75, 76) and engagement (problem-oriented) coping strategy (77).The moderating roles of sense of coherence (78), emotion-oriented coping method (79, 24), the inverse relationship between social support and depression (80) and moderating role of social support (81) has been reported. Specifically, social support has a moderating effect on exposure to trauma for its effect on symptoms of PTSD among Eritrean and Sudanese asylum seekers in Israel (81). In other cultural contexts it was reported that coping style would moderate (strengthen or weaken) the association between the other resilience variables and PTSD symptoms (82). In the same study, an engagement coping style was hypothesized to strengthen the above associations, while a disengagement coping style would weaken them (82).

A similar study from Democratic Republic of Congo indicated that the interaction between emotion-oriented coping strategy and problem-oriented coping strategy (coping flexibility) were associated with lower psychological distress (79)

Population-based studies in Eritrea and Iraq have shown that sense of coherence was found to be negatively associated with PTSD symptoms (83, 84). The mediating role of sense of coherence between social support and stress and its partial mediating role on the impact of trauma on both anxiety and social dysfunction was also reported (10, 76).

Findings from analysis of Structural Equation Modeling (SEM) from among Zimbabwean refugees in South Africa showed that post-migration living difficulties partially mediated the association between pre-migration living difficulties and PTSD (72). A study in Ethiopia among internally displaced persons indicated that some sub-scales of coping style interact with displacement related traumatic events leading to have significant association with mental distress (24).

2.5 Traumatic events and PTSD among Africans in humanitarian settings

The major form of traumatic events common to refugees that need to be assessed by clinicians include, experiences of torture, beating, rape, imprisonment and starvation (46). In addition, assessment of traumatic life events associated with loss of family members, relatives and friends; loss of property (46).

Regarding the traumatic events to people from African origin, findings from previous studies in Somali and Oromo populations in United States indicate that exposure to torture is highly correlated with PTSD symptoms (35). In study of war related traumatizing experiences among post conflict Liberia, pain experienced from beating, loss of a close relative as a result of war, physical assault and loss of property by destruction and looting (livestock) were the most traumatic events for the participants (31).

A review of selected studies dealing with traumatic experiences among displaced persons in Ethiopia and Eritrea is summarized in Table-2

Table 2: Review of selected studies related to Traumatic Experiences of refugees / displaced persons in Eritrea and Ethiopia

Setting	Author/ s	Purpose of the Study	Size of Participants	Method	Major Findings	Comments
Shimelba refugee camp (Ethiopia)	Feseha, et al.,(2012)	To know the magnitude of intimate partner physical violence among refugees.	422	-Cross sectional survey using standardized instruments was employed.	-The annual and life time prevalence of physical violence is 25% and 31% respectively. -Being from a farmer as well as Muslim background, learning physical abuse from neighbor, having history of maternal intimate partner violence, having a drunk partner were found to be risk factors for intimate physical violence.	Strength- Selection bias was minimized by random sampling. Weakness -The study should have looked into the perceived cultural interpretation of Physical violence from husbands and emotional violence from wives
IDP camps of Gash Barka region (Eritrea)	Westerveled-Sassen, L.(2005)	-Assessment of the psychosocial needs of children (8-18yrs old)	348	-Analysis of previous research -In-depth interview -FGD with key informants -Systematic observation of school children	-Children were protected from harmful effects of war by factors including: preparedness, social support from family, intact social network, and sense of pride,	Weakness- Determinants were roughly identified without making a controlled quantitative method.

Gash Barka, Tsabara, Dekemehari & Massawa. (Eritrea)	Farwell, et al (2005)	-Investigation of war trauma and identifying psychological symptoms, and contextual factors related to psychological well being among youth (mean of 16.8 years old).	97	-Two phased mixed methods design (i.e. qualitative study followed by quantitative study) was employed. -The study employed in-depth interview, FGD, participant observation and closed & open ended questionnaire -Employed Hopkins symptom checklist (HS-CL) & Harvard Trauma Questionnaire (HTQ) to measure depression & PTSD respectively.	-Narrative accounts of the participants represent most symptoms of PTSD. -The intra-psychic western frame work of PTSD are too narrow to capture war trauma in Eritreans, which is deep rooted in socio-economic, political and cultural context. -Economic hardship and exposure to war trauma significantly predicted the psychological distress. -Age, gender and ethnicity do not explain significant variability across the overall PTSD symptoms. -Refugee status does not predict lower symptoms in PTSD. -Recommended for the importance of promoting non- clinical intervention (i.e. indigenous forms of healing) to deal with traumatic cases.	Strength -Its qualitative exploration on the relevance of PTSD on Eritrean samples together with quantitative assessment. -Representation was maintained by selecting samples from different regions of Eritrea. Weakness -Data were treated to fit to the pre existing constructs of PTSD - Findings do not reveal which PTSD symptoms are more important compared to others; the author instead reported percent of respondents showing symptoms, not factor loadings for each symptom.
Kality & Koremeda IDP shelters (Ethiopia)	Araya, et al., (2007)	To investigate gender difference in traumatic life events, coping and social support	1,200	- A cross sectional survey was employed. -Standardized instruments which were adapted by Tropical Psychosocial Organization (TPO) were used to measure traumatic events, social support and coping.	-Significantly higher traumatic life events related both with childhood & displacement is found in men compared to women. -Men scored significantly higher on social support compared to women. -Females score higher emotion focused coping strategy, while men score higher on task-oriented coping strategies.	-The adapted instruments by TPO need further qualitative investigation. Specifically, too much questions were devoting to measure childhood trauma & family history; the scope of coping for Africans has increased to ritual & spiritual dimensions).

Addis Ababa & three refugee camps in Jijiga (Kebribeyah Aw Barre & Sheder) (Ethiopia)	Wirtz, et al.,2013	-Making an exploratory research for ultimate purpose of developing a screening tool to measure Gender Based -Violence(GBV) among Somali refugees in Ethiopian camps.	37 & Interview 77 (FGD)	-The study involves a two stage sequential exploratory mixed design and hence, this is the report of the 1st stage of qualitative part (NB:the quantitative part is underway). -In-depth interview with female refugees whose ages are greater or equal to 15. -11 FGDs were conducted with a total of 77 participants.	-Women refugees are continuously vulnerable to different types of GBV. -Domestic violence, rape (opportunistic violence) & abduction were found to be major problems at their country of origin, in transit and in host country respectively.	-Those women who were interviewed are currently obtaining support from GBV from partner organizations, and hence this may introduce social desirability bias. -Authors' plan to develop a violence screening tool including for boys and men based from the qualitative data generated from females will negatively affect the validity of the subsequent instrument.
Post conflict Tigray (Ethiopia)	Nordanger (2007)	-To understand the discourse about grieving to loss among war affected survivors of Tigray in Ethiopia.		-Focused ethnography which was conducted in six months time.	-Authoritative non-western Tigriyan discourse encourages avoidance to grieving and crying to loss with a belief that it has a negative physical and spiritual consequence whose social consensus is shaped by the dogma of orthodox church. -This finding is contrary to the trauma intervention, which is rooted in the ethnocentric western discourse which encourages the need to disclose and confront the traumatic memories rather than avoiding it.	Is the Ethiopian discourse surrounding to grieving to the loss totally avoidance one? The study should have been looked into bereavement ceremonies (which gives much room to release emotion), and other rituals as well as religious ceremonies. Thus, interpretation bias seems to be there.

Displaced Somali in Eastern Ethiopia	Zarowsky, (2000)	-Understanding the experiences and meaning of psychological trauma, violence and death among Somali community in Ethiopia		-Ethnographic study based on direct personal experiences, field visits, and notes of observation	-Participant's anger has a meaning in social context. Thus, war related distress in Somali context shall not be interpreted in western biomedical framework; and rather, it is imbedded in socio-politics of Somali land.	-The study is worth appreciated in challenging the western framework of PTSD to understand traumatic experience among Somali destitute. -Limited data were analyzed without making further triangulation. -There seems an interpretation bias because the report does not clearly show connection between the analysis & data interpretation with an observed data. It seems as if the analysis was dictated by preconceived literature. -Methodological procedures is not clear.
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2.6. Post-migration Daily Hassles and Refugee Mental Health

Emphasis was not given in refugee mental health studies to daily hassles associated with the situation of the camp, inadequacy of the services as well as social life of displacement (36). Compared to potentially traumatic events, daily hassles are found to reveal statistically significant contribution to distress and the consequent functional impairment in sample of Darfuri refugees living in camps of Chad, and it was concluded that for people affected by war, daily hassles are reliable predictors of distress, and suggested to include them as potential targets of interventions (36). Similarly, a review of mental health studies about Sudanese refugees reported that refugees are more concerned with recent stresses than past trauma (85). Furthermore, a recent study that focused on the importance of post-migration stressors in ecological model of refugees' mental health reported that post-migration stressors have consistently been found to predict levels of distress as powerfully as exposure to pre-migration trauma, like exposure to violence (86).

2.7. Culture-specific mental health care for refugees

An appropriate treatment, which addresses refugees' illness associated with cultural and spiritual life in both the pre-migration and post-migration periods, is not available to refugees (87). Despite an increase in quality of research for refugees who migrated from non-western background and living in the western countries, the services rendered for them remain poor and the reason lies behind lack of maintaining cultural and psychiatric expertise that can properly help and address their mental health needs (49). There is inadequacy of research which focused on the prevention of trauma for African people which is culturally sensitive (88).

Intervention- oriented researches, which are aimed at addressing the culture of refugees from non-western cultures began to flourish in some areas and they are quite promising (5, 41, 89). The ethnographic study from participants of Ethiopian immigrants in UK using Buna (Coffee) ceremony, gives a talking cure in a group context to deal with their distress in a way it preserves their cultural heritage. The author indicated that it helps those who develop distress because of lack of social support as well as social isolation (89). Similarly, the study conducted on Eastern African refugees in the United States indicates that the Kaffa ceremony for East African refugees is found to be culturally appropriate intervention in group context (41). The authors indicate that such group counseling bridges the gap between East African culture and Western counseling and, it is advantageous to help refugees suffering from long-

held trauma; it also helps the counselor to reconnect the clients with the process of their own traditional healing (41). Furthermore, multiple-family group intervention is suggested to be important intervention to enhance family coping capabilities against their trauma (90).

For refugees who came from non-western culture (such as: Africa, Latin America and Asia), researches have increasingly developed an interest on the pressing need on the provision of culturally competent counseling or psychotherapy. For example, many researchers and practitioners develop high interest on the mental health of Sudanese refugees in association with specific cultural information (85). Instead of relying on western models of intervention to trauma or psychotherapy, researchers have adapted existing therapies in a way it is sensitive to the culture of target people seeking for intervention (5, 41, 89). In addition, somatically focused cognitive behavioral therapy was suggested to address the traumatic symptoms, which manifest in terms of somatic complaints in Cambodian refugees (91). Selected intervention studies for trauma related intervention in humanitarian settings is presented in Table-3.

Table 3: Summary of selected studies on intervention of trauma and PTSD following emergency for trauma survivors in Africa, Latin America, South East Asia and Europe

Setting & Intervention	Author/ s	Purpose of the Study	Participants	Method	Major Findings	Comments
Narrative Exposure Therapy (NET) in Nakavalle Refugee camp (Uganda)	Onyut,et al.(2004)	-Development of short-term treatment approaches which can be applied by personnel in disaster affected regions -determining the prevalence of PTSD of refugees	561 (Rwandese) 912 (Somali)	Randomized Control Trial which involves the efficacy of treatment group taking NET vis-à-vis the controls taking Supportive Counseling (SC).	-Preliminary results revealed that there is a significant reduction and improved function for those participants who were treated by NET and supportive counseling (SC).	Strength It was reported that NET can be applied by non-medical local personnel, and it makes its accessibility cost effective and unrealistic in settings where the professional psychiatrists are very few. Weakness The authors underscore cross- cultural relevance of NET as every culture has oral tradition, but it doesn't demonstrate how it can be applied in a society where secrecy and privacy is highly respected and the norm.
<i>Condombie</i> African Spiritual Healing)	DeLoach & Paterson (2010)	-Explore the healing experiences of Afro-Brazilian community in Salvador, Bahai	5 priests & 5 devotees	-A Phenomenological study was employed. -Convenience sampling was employed to recruit participants. -Data were collected using participant observation & in-depth interview	-The spiritual practice of <i>Condombie</i> has implications in a multiple dimensions of the believers' life, including their illness which was often misdiagnosed and whose treatment remain unsuccessful under medical centers. -It gives a sense of pride as being having an African ancestor, and hence it is helpful to give them strong sense of identity.	Strength -Strategies to ensure credibility of the data were employed: -triangulation of detailed field observation and researchers notes (anecdote data) with interview and narrative data.

Group Counseling (Kaffa ceremony)	Loewey, et al.,2002	To explore the healing advantage of kaffa ceremony in group context integration with group counseling to heal the trauma held by Eritrean & Ethiopian women in United States.	4 Eritrean & 2 Ethiopian women	-Participatory ethnographic study, which stayed for 2 hours for six weeks once in a week and 2 hours each in one of the participant's home. -Participants' were asked to complete two instruments before the intervention is commenced. 1.Intake interview 2.Trauma assessment form	-The pain of narration made by one participant had profound effect on others in that each began to share their experiences deeply. -This led to other group members to share experiences of anger, grief and sadness when they realize that there are others in the group with the same problem. -A striking & uncommon resiliency and strength was demonstrated by each of the six women.	Weakness -The findings would have been much trustful if baseline held trauma was compared with their trauma after intervention to clearly show up its effect. -The resilience and strength were reported as outcomes of the study without empirically measuring them and hence, this conclusion must have been arrived out of interpretation bias.
Somatically focused Cognitive Behavior Therapy	Hinton & Otto (2006)	-To explore the culture specific symptom presentation and meaning making of traumatic experiences among Cambodian refugees for adaptation of culturally sensitive intervention.	—	-Meta analysis was made based on relevant literatures, which includes: common cultural syndromes of Cambodian refugees, Cambodian understanding of anxiety symptoms, metaphoric resonance to trauma symptoms, culturally sensitive measurement characteristics employed among Cambodian refugees.	-Among Cambodian refugees symptom presentation is somatic, and the meaning given is rooted in cultural belief. Specifically, the cultural belief of disturbance is caused by <i>wind</i> and anxiety emanates from the belief of <i>wind blockage</i> . -Cognitive and exposure interventions shall address fears underlying PTSD, panic, anger & guilt. -It is concluded that since traumatized Cambodian refugees manifest multiple somatic symptoms, interventions shall be somatic focused and hence the	-The study assumes that every refugee has similar symptom manifestations and belief about traumatic and anxiety related disorders. Factors regarding individual difference as well as impact of globalization, education, media, and acculturation in shaping belief about causes and solutions to illness in general and mental health problems in particular were

					authors recommended an application of somatic focused cognitive behavior therapy.	not taken care of . -Rather than relying on secondary sources of data, extensive qualitative study would have been important.
Cognitive Therapy	Duffy, Gillespie & Clark (2007)	-To investigate the effectiveness of cognitive therapy for post-traumatic stress disorder related to terrorism and civil conflict in Northern Ireland	58 consecutive patients with chronic PTSD	-Randomized Control Trial(RCT) -Used instruments PDS to measure PTSD & BDI to measure depression	-Significant improvement was observed in the symptom of PTSD after 12 weeks on those who received immediate cognitive therapy after two weeks of randomization.	-Individual difference in the effectiveness of cognitive therapy cannot be inferred from the report. -If some of them belong to non-western background, there could be variation in treatment preferences and thus, the given therapy may not be equally applicable for them.

In a previous study on symptoms of expression, there was evidence of difficulty of communication between Israeli doctors and Ethiopian patients because of cultural disparity in defining illness and belief about health (92). Insight gained into the source of medical misunderstandings among Ethiopian community in Israel may be applied to health care involving similar population in other settlement countries (92).

After visiting the psychiatric service in Ethiopia and evaluating its target beneficiaries, it was recommended to extend culturally sensitive psychiatric services outside hospital, rather than restricting services to specialized clinics and private offices where there is high concentration of mental health workers (12).

A meta analysis of studies by a panel of researchers who were aimed at identifying mental health Gap Action Program (mhGAP) trauma intervention, reported in WHO has come up with recommendation to trauma intervention (4). Among others, with respect to the best practices of interventions to adult PTSD in emergency settings, it was indicated in this document that individual CBT with trauma focus, Eye Movement Desensitization and Reprocessing (EMDR), stress management and group CBT with trauma focus were effective in the treatment of adult PTSD. However, the authors reported that there was no statistical heterogeneity on outcomes for both stress management and other therapies (such as: non-directive counseling, psychodynamic therapy, hypnotherapy, person-center therapy)(4). Yet, in this systematic review of the quality of evidence in trauma intervention, the major determining variable (i.e. culture) was not taken into account as criteria of appraisal although the research panelists appraise trauma intervention studies based on the criteria of analysis while reviewing literatures such as: risk of bias, inconsistency, indirectness, imprecision and publication bias. Evidence from Burma refugees in neighboring refugee camps of Thailand recommend the need to strengthen community based intervention instead of relying on health facility centered intervention (93).

The WHO has reported a major shift towards in the status and improvement of the mental health intervention towards expanding community based mental health service besides strengthening clinical based intervention for all mental health disorders(including PTSD and depression) in ten countries which have undergone through political instability, civil war as well as natural disaster(1). Many Non-Governmental Organizations take part in launching the community based mental health schemes in these countries (1). Since the year 2008, WHO has launched implementation of mental health into a non-specialized care, such as the need

for its integration into primary health care service. This has led to a renewed interest in this potential method of mental health service delivery under the program of mental health Gap Action Program (mhGAP) (94). The concerns of problems which necessitated the shift in the attention of intervention include: the medicalization of social and psychological problems, narrowly focus on primary care without sufficient attention given to strengthening other levels of the healthcare system, community-based care and care on district levels (94).

2.8. Social inclusion and refugee mental wellbeing

Social inclusion is advocated for disadvantaged people who are vulnerable. For example, social inclusion and recovery-oriented way of intervention is recommended for mental health professionals (94). Although social inclusion is believed to bring protective environment for the mental wellbeing, the prejudice and discrimination faced as ways of resistance by the host society makes this approach challenging (95).

In indicating the importance of social inclusion has suggested that relocating the displaced people from isolated shelters to the community has dual advantages (34). These include: (a) the host community can protect the environment from wastage and unnecessary resource damage by new settlers; (b) feeling of belongingness and acceptance of the displaced people enhances quicker emotional rehabilitation and hence reduce mental distress and ultimately improve better quality of life (34).

Since 2010, Ethiopian government has formalized out of camp policy (18). In this regard, Eritrean refugees, after being stayed for six months in the refugee camp, legible refugees can move to urban centers without much restriction, and even may live with their relatives as far as they can afford to help themselves (18).

2.9. Resilience factors for refugees' mental health

Knowledge on the personal and social resources, which enhances refugees' resilience to cope effectively with their mental health problems, is vital. After reviewing 270 articles a comprehensive definition of resilience was given as follows: "Resilience is the process of negotiating, managing and adapting to significant sources of stress or trauma. Assets and resources within the individual, their life and environment facilitate this capacity for adaptation and 'bouncing back' in the face of adversity"(88). There are multiple forms for sources of resilience which are personal or social in nature. The three major sources of resilience which are considered in this study based on priority of theoretical relevance in predicting refugees' mental health, and which often are common and widely described in

mental health literatures of humanitarian settings are sense of coherence, social support and coping style.

2.10. Sense of Coherence and the factor structure of its measure (SoC-13)

One specific personal resource which was used as a measure of resilience in many previous studies, including Eritrea (83) is sense of Coherence. The definition for concept of sense of coherence as was described by Antonovsky (1987, p.19) is “a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feelings of confidence that (1) the stimuli deriving from one’s internal and external environments in the course of living are structured and predictable and explicable; (2) the resources are available to one to meet the demands posed by the stimuli; and (3) these demands are challenges worthy of investment and engagement”(96). Mental health research is increasingly focusing on the importance of investigating resilience in dealing with risk factors for mental health problems, like sense of coherence in refugees living in low income countries and vulnerable for mental health problems in humanitarian crisis (83, 84). Sense of coherence has also demonstrated an inverse association with chronic physical condition (97, 98). Findings of cross-cultural studies in Chinese and United States participants showed that sense of coherence was predictor of problem solving and avoidance coping strategies (99). The validity and robustness of SoC-13 as a measure of resilience is confirmed by increased application around the world, such as: North America, Europe, Australia, South Africa, and the Middle East (83). Sense of coherence has demonstrated a significant inverse relationship with psychological symptoms of mental illnesses such as that of Post-Traumatic Stress Disorder (PTSD) and depression (100). It has also been widely used for predicting adverse health conditions such as: coronary heart disease, injuries, cancer, and all-causes of mortality (97), rheumatoid arthritis (98), and congenital heart disease (101). However, there are no consistent findings regarding the factor structure of SoC-13 when tested using Confirmatory Factor Analysis (CFA) across different cultures (102). For example, in a study that aimed at understanding the dimensionality of SoC-13 using CFA in an Italian sample, a one-factor model of this scale best fitted their data (103) whereas, a three factor model best fitted the data compared to a single factor model in Peruvian sample of college students (104). Indeed, the majority of literatures reviewed supported either an evidence to one factor structure of SoC-13 (103, 105) or a three correlated factor structure of this measure (104, 106). For such measure, whose factor structure is not uniformly consistent across cultures (102), investigating its fit to the data generated in the present study deemed necessary. Such

investigation focused on testing the dimensionally sense of coherence enable us to fully understand its relevance in the context of Eritrean refugees in Ethiopia.

2.11 Social support and its association with PTSD and depression

An ethnographic qualitative study which involved participants of Nigerian immigrants in Johannesburg reported that social contact reduces PTSD among refugees; however, the authors cautioned that only if an individual can associate social support with a sense of belongingness that it can have a positive impact on his/her mental health (107). It is further indicated that social support may not have an effect on individuals' mental wellbeing if there is an intentional isolation (107). Conversely, since individuals with chronic PTSD are likely developing an avoidance behavior, they refrain from asking help (48). Thus, individual's ability to obtain social support is contingent upon the intensity of the negative consequence of PTSD (48). Recent evidence regarding the potential benefit of social support was documented in samples of Eritrean Sudanese asylum seeking refugees in Israel (86). In that study, social support has moderated the effect of exposure to trauma on symptoms of PTSD among Eritrean and Sudanese asylum seekers in Israel (86). Studies consistently found that there is a significant negative correlation between perceived social support and depression scores (50, 44). Perceived social support is negatively correlated with exposure to violence, depression and traumas, which are threatening to life (108). A study involving a systematic review reported that perceived social support predict positive health outcomes as compared to received social support (109). However, perceived social support is not associated with the health outcome in a sample of displaced Ethiopians from Eritrea (34). In the present study, the availability of social support is assumed to be one among many environmental factors, which may contribute in strengthening the resilience of refugees from adverse effects of stressors.

2.12. Coping styles

Coping refers to the processes that individuals use to alter unpleasant aspects of their environment as well as to minimize internal threat induced by stress (48). Many cross cultural studies reveal that refugees of African origin have their own coping strategies compared to the westerners. For example, the fact that Sudanese refugees employed coping strategies such as silence and suppression (85) as well as the displaced Ethiopians use of avoidance coping strategy (34) imply that the shared coping style in East Africa is more of refraining from action-oriented resolution to the source of their distress, and hence there seems to be a preference to forget. This tendency of avoidance was confirmed in findings of qualitative

study focusing on coping response to loss among those who were exposed to war trauma in post-war Tigray, Ethiopia (110). From this ethnographic study aimed at exploring coping strategies employed to manage traumatic experiences in post conflict Tigray (i.e. a region most affected by war in Ethiopia), three dimensions of coping strategies were emerged out of the qualitative data (110). These include: (i) diverted thinking (i.e. directing mind to comfortable thoughts; (ii) distraction (i.e. distracting feelings of sorrow and preoccupation with work and activities); (iii) future investment (i.e. encouraging oneself & others to build capacity for future rather than focusing in the loss of the past) (110).

In one study which compared the use of coping strategy among victims of PTSD and controls, it was found that those with PTSD were more likely to use emotion-oriented coping in dealing with stressful events than those without PTSD (48). Consistent to this, previous evidence from sample of internal displaced persons in Ethiopia indicates that trauma during displacement was positively correlated with emotion-oriented coping for both genders (24).

Indeed, coping can impact individuals' health in two ways: use of non-adaptive coping styles may predispose to adverse consequences, like disease (111). Making use of a disordered coping may have negative consequence such as: disclosure of negative emotion, pessimism and withdrawal (111). Such unfavorable negative coping strategies employed by the refugees were evidenced in refugee population which may be reflected as part of their day to day life in post-migration period, which may be expressed in terms of alcohol misuse, smoking, drug abuse, and sex-trading (111).

Unlike the western literature on coping generated from individualistic society, the evidence for the source of coping transcends beyond the conventional coping styles common in literature. For example, it was reported that Sudanese refugees are forced to miss the community who are the source of coping and healing (85). That study indicated that the source of healing and coping for East Africans include: healing rituals, traditional healers, family and religious beliefs (85). The author further indicated the adjustment become problematic when the refugees miss connections to their cultural traditions (85). Other study also reported that there is substantial preference to local indigenous healers and wise men than visiting the modern clinic centers in sample of Borena nomads in Ethiopia (112). In a study conducted on coping strategies of African minority in Canada, there is little opportunity to use problem-focused coping for individuals of African descent (113). That study outlined specific coping practices of Africans such as: meditation, candle lighting, prayers as a means

of coping at times of distress (113). The study further suggested on the pressing need to address on the identification of the specific coping strategies that dictates to understand individuals from African descent in future studies arguing that their coping framework in individualistic society cannot fully capture and address their coping styles (113).

2.13 Exposure to Cumulative Trauma and Poor Mental Health

Previous study conducted in Somali adolescent refugees resettled in the United States indicated that exposure to trauma was most strongly associated with PTSD symptom severity (114). The theory of transactional stress proposed by Lazarus and Folkman contends that stress is resulted from the interaction between a stressor (potentially threatening stimulus from the environment) and psychological and biological stress response (personal factors), and their interaction is mediated by a complex appraisal processes within the individual; specifically, assessment of individual resources to deal with potentially stressful events (115). In a study which involved examining if multi-dimensional stress model, findings from cross-sectional data and prospective data indicates that childhood trauma is directly related to chronic stress, and partially related to chronic stress via resilience (116).

The cumulative effect of pre-migration, transit and post- migration living difficulties were also accounted together to predict psychological distress. For example, evidence from sample of Ethiopian refugees in Israel demonstrated that exposure to pre, peri and post-migration stressful events (cumulative trauma) is associated with psychological problems, specifically to PTSD and dissociations (14). Similarly, evidence from Iraqi refugees exposed to traumatic events suggested that refugees are more at risk of developing PTSD (117). Other study conducted on Iraqi veterans has demonstrated that besides the direct effect of cumulative trauma on PTSD and other mental disorders, it has shown a direct significant predictor of other physical illnesses such as: neurological, blood pressure and other circulatory, respiratory, digestive, musculo-skeletal and endocrine disorders (27).

A comprehensive test of mediation regarding exposure to cumulative trauma and the consequent psychological distress in relation to substance use and multiple psychological resources in women patients in South Africa was carried out using structural equation modeling (74). Their findings suggest that trauma has directly and positively predicted psychological distress (composite latent structure of PTSD, depression and anxiety).

Psychological resources modified the effect of cumulative trauma over the psychological distress (74).

2.14 Interrelationship between alcohol use, exposure to trauma and symptoms of PTSD and depression

Literatures are increasingly interested on the importance of investigating alcohol use in emergency settings. For example, in a clinical study which was aimed at providing exposure therapy for veteran of the Iraq exposed for war trauma and the consequent alcohol dependence, the baseline assessment revealed that the patient screened positive for alcohol dependence consumed alcohol up to 7 times a week with 10 or more drinks per setting (27). It was argued that when trauma is over, endorphin levels gradually diminish and eventually withdraw which can stay from hours to days. Thus, the emotional distress and other symptoms of posttraumatic stress disorder (PTSD) may be attributable to a response to emotional distress caused by Endorphin withdrawal (27). It was asserted that endorphin activity is increased by alcohol use, and thus drinking following trauma may be used to compensate loss of endorphin withdrawal, and mitigates the associated emotional distress (28).

Regarding the association between exposure to trauma and alcohol use, evidence from one study indicates that there is co-morbidity between exposure to childhood trauma and alcohol use (29). That study asserts that in order to dampen (self medicate) mood symptoms associated with a deregulated biological response of stress, there may be an increased risk of substance use disorders (29). After exposure to trauma, shared and genetically mediated vulnerability to psychopathology can be represented by gender difference in the co-morbidity of PTSD with substance abuse (29). Besides, there is a report of gender difference in alcohol and drug abuse as a related risk of exposure to trauma, which stated that exposure to traumatic events increases risk for substance use disorders for young women, but not for young men (29). However a contrasting finding was reported by another study, which indicated that men with PTSD, alcohol abuse and dependence is the most common co-occurring disorder (118). However, that study underscored that for those women with PTSD whom depression and other anxiety disorders are also common, alcohol abuse and dependence is co-morbid problem (118). In the new classification of DSM-5 problem drinking, which were independently classified as alcohol abuse and alcohol dependence in DSM-IV, are merged under one classification called alcohol use disorders (119).

The relationship between alcohol misuse disorder and the development of PTSD is not clear, and hence a variety of possible mechanisms have been advanced to explain the association of PTSD with alcohol abuse in literature of which an alternative explanation asserts that alcohol abuse is caused by PTSD if individuals with PTSD begin to misuse alcohol in order to self-medicate their PTSD symptoms (120). Specific instances regarding the mechanism of operation stated by literature include: individual exposed for disaster might begin to use alcohol to dampen nightmares about the disaster, to allow themselves to experience pleasurable emotions (i.e., to deal with emotional numbing), to reduce physiological arousal symptoms such as exaggerated startle, or to allow them to reduce avoidance and instead face reminders of the disaster (120). Conversely, if chronic, heavy drinking maintains or exacerbates PTSD symptoms over the long run, alcohol abuse might contribute to increased PTSD symptoms (120). From among four distinct dimensions of symptoms of PTSD, post-traumatic alcohol abuse are demonstrated relationship with symptoms of hyper-arousal, and re-experiencing arguing that traumatized individuals may misuse alcohol in order to dampen traumatic memories(120). It was mentioned that treatment of PTSD-SUD is more effective than treatment of PTSD alone (121). In this regard, it was reported that Combat Veterans with PTSD had a concurrent diagnosis of substance abuse disorder at a rate of 22% as compared to veterans without PTSD at 1.1% (122). In that study findings indicate that alcohol use as measured by the CAGE demonstrated a positive association with PTSD as measured by PC-PTSD. Specific to each symptoms of PTSD, alcohol abuse was significantly and positively associated with those who had nightmares about the traumatic event, constantly on guard, watchful, or easily startled. Those with PTSD felt that they should cut down on their drinking (122). Alcohol misuse was inversely and significantly associated with refugees' sense of coherence in Eritrean sample reported in recent publication (123).

Indeed, literatures show that exposure to trauma has adverse effect for psychological symptoms like PTSD, depression and anxiety; it leads for alcohol abuse and dependency as a form of co morbid problem, and hence exploring this in present study in Eritrean refugees living in Ethiopia deemed vital.

In summary, exposure to different forms of trauma repeatedly at different time and context results in increased vulnerability. Exposure to multiple stressful conditions in the present study was operationally considering refugees' exposure to traumatic events in both pre migration and post migration periods. Since the theory of transactional stress proposes that exposure to multiple forms of trauma can affect mental health in interaction with personal

and social resources, we base this theory to formulate our assumption regarding exposure to traumatic experiences of Eritrean refugees in both pre and post migration periods alone can't determine their mental health. Hence consideration of personal and social resources, like their sense of coherence and social support is vital to test prior theory driven hypothesis and estimate in the extent and direction of direct and indirect effect of exposure to cumulative trauma on refugees' poor mental health.

2.15. Conceptual Framework

In order to come up with a conceptual framework for the present study, two theoretical models were taken into consideration.

1) Model of Migration Contingencies and Mental Health

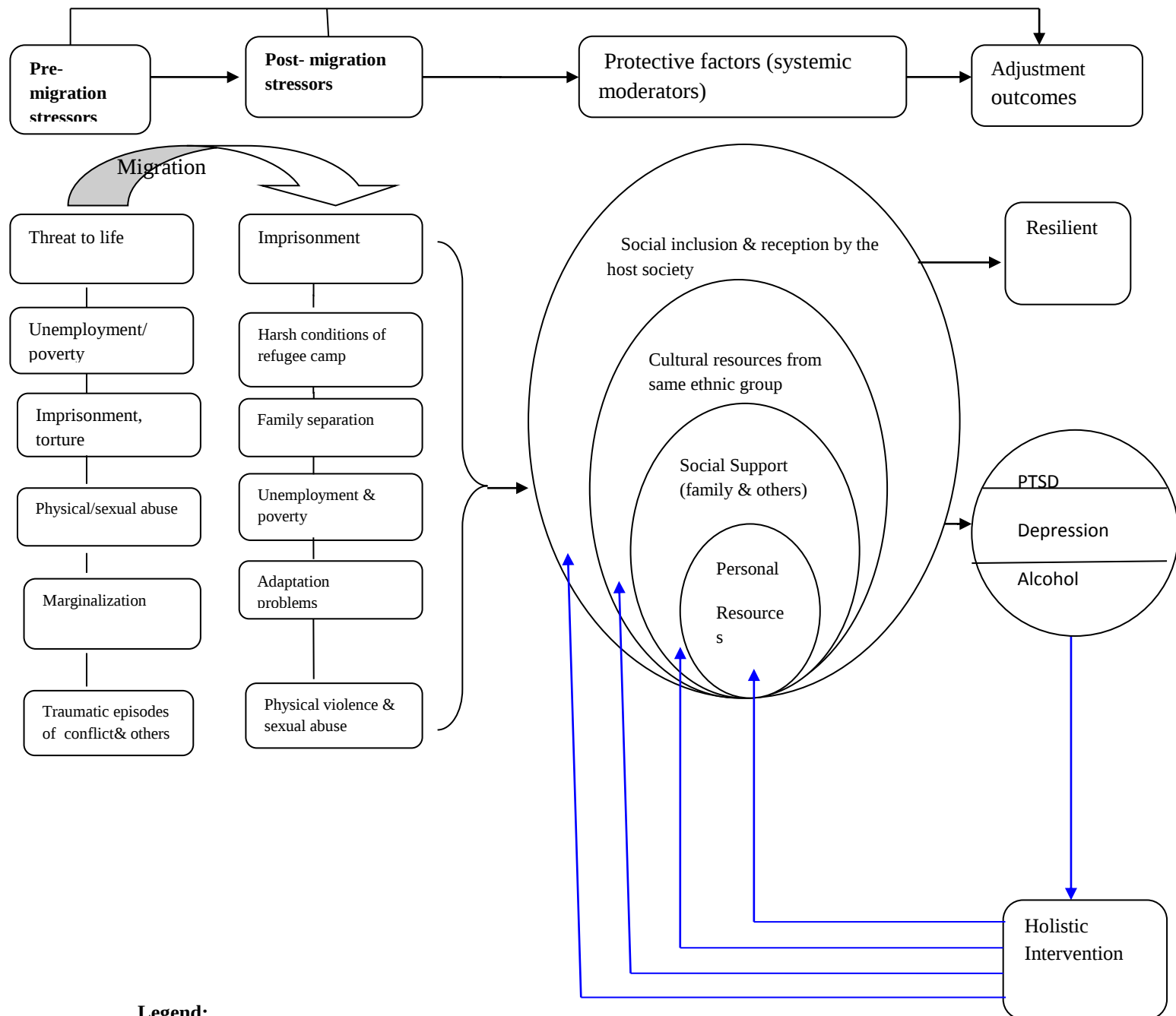
Pre-migration and post migration stressors negatively affect the mental health of refugees, which in turn makes their adaptation to the new setting difficult (12). It is argued that PTSD is one of the syndromes refugees develop as a result of cumulative trauma or overwhelming stressful experiences during the pre-migration period. Yet, the effect of relatively recent post migration challenges to refugees' on current mental health in comparison with their pre-migration experiences of stress has not been looked at in previous studies (12). The model of migration contingencies and mental health which was , adapted from a stress process model suggests that catastrophic traumatic events, such as experiences of pre-migration refugee camp internment, and loss of family, property as part of pre-migration stressors and recent life events such as poverty, separation from family unemployment as part of post-migration stressors may put the mental health of migrant people at risk (50). It was further indicated that personal and social resources may buffer the negative effects of exposure to stressful conditions in pre-migration and post migration periods (50). In this regard, personal and social resources are said to have either a direct contribution or indirect contribution to adverse psychological symptoms through altering and mediating the effect of experiences of stress (12). The social resources are described in two levels: (a) micro-level resource which includes emotional support as well as tangible support provided by family members (b). The macro-level resource which is the support obtained from the same ethnic group or the kind of reception by the host society (12). Factors hypothesized by this model as resources to buffer the adverse effects of pre-migration and post-migration stress and bring beneficial effects on mental health include: personal resources like ethnic pride, fluency in the language in the host country and social support from family and ethnic community (50).

2) Diathesis-stress model

An alternative model for refugees' mental health called the 'diathesis-stress model' asserts that the impact of traumatic events as a form of stressor interacts with vulnerabilities such as individual differences in pre-trauma and conditions which influence the development of PTSD (124). In this framework, pre and post-migration difficulties become risk factors and act on personal dispositions, which lead to poor mental health, including PTSD (124).

Based on these two models stated above the following were proposed as a conceptual framework in the present study: (i) The adjustment for the mental health outcome for the refugees is likely to be determined by a dynamic interplay between exposure to pre-migration stressors and post-migration environmental stressors and, personal, social and cultural resources (ii) Holistic intervention for refugee's psychological wellbeing can be addressed by maximizing the potential utilization of his/ her personal, familial, institutional, cultural and broad societal resources(see Figure-1). The scope of our study, however, is delimited to investigation into the complex association between the primary exposure variables (pre and post migration stressors) and mental health outcomes (PTSD and depression symptoms and alcohol misuse), taking into consideration the multiple factors which involve personal and social resources plus environmental predisposing and aggravating factors.

Figure 1: The conceptual Model of refugees' mental health derived from the ecological model explaining exposure, mediating and outcomes for refugee mental health



Legend:

- All the arrows pointing from exposure variables (pre/post-migration living difficulties) through systemic /ecological resources to mental health adjustment outcomes depict the dynamic interplay between environmental and personal factors as determinants of refugees' mental health adjustment outcomes.
- Multiple arrows pointing from mental health outcomes to each level of ecology depict importance of undertaking holistic (integrated) intervention.

Definition of important key exposure, mediating and outcome variables of the research interest in the model

- a) *Pre-migration stressors* refers to exposure traumatic experiences before migration, having been experienced in custody, experienced any form traumatic events such as being beaten (physical abuse), or raped (sexual abuse) or seeing other people hurt or killed(50).
- a) *Post-migration stressors* refers to refugees' sources of trauma included catastrophic experiences related to internment in the refugee camp, and the consequent poverty, unemployment, and separation from family which put refugees at risk for mental health problems as reported in previous study (12).
- b) *Post traumatic Stress Disorder (PTSD)* refers to a mental health problem following exposure to one or more traumatic events. The definition of PTSD based on DSM-5 is stated as follows: "direct or indirect exposure to some aversive event that could result in death or serious injury. Symptoms can present in one of four categories: re-experiencing, avoidance, negative mood, and arousal"(Lenn sperry, et al, 2015, p. 135) (125).
- c) *Depression* refers to extreme sadness or despair in which the victims are having symptoms like: lack of appetite, lack of sleep, head ache, stomach ache, a feelings of helplessness, hopelessness, exhaustion and restlessnesswhich lasts for at least two weeks or longer and it interferes with activities of daily living (126).
- d) *Alcohol use disorder* in the new DSM-5 is defined as follows:" experience of a problematic pattern of alcohol use leading to clinically significant impairment or distress as manifested by at least 2 of eleven specified symptoms over 12 months period"(Craighead , et al., 2017, p.548) (119).
- e) *Resilient* is some one who is able to cope up with adverse effects of stressors through resilience, which refers to the process of negotiating, managing and adapting to significant sources of stress or trauma (88). Resilience is considered as common and the normal response of people to conditions of adversity (127).
- f) *Personal resources*: Among others, personal resources in the present study refer to sense of coherence and coping styles.
 - i)*Sense of coherence*-This personal attribute as a source of resilience is defined in Antonvsky (1987, p.19) as follows: "a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feelings of confidence that (a) the stimuli deriving from one's internal and external environments in the course of living are structured and predictable and explicable;(b) the resources are available to one to meet the demands posed by the stimuli; and (c) these demands are challenges worthy of investment and engagement" (96).
 - ii) *Coping styles* refers to the psychological process that individuals respond to stressors and life hassles, which plays the mediating role between stress and

psychological wellbeing (128). In the present study, coping styles are represented in terms of three coping strategies: task-oriented, avoidance-oriented and emotion-oriented coping as reported in previous study (24).

- g) *Social support*- refers to appraisal of refugees perception towards the assistance in terms of tangible material (i.e. money, other materials) or intangible (such as: intimate interaction, listening, caring, understanding and a show respect, guidance, which can be offered in terms of advice, direction or information. It serves as a moderator through facilitating the way individuals cope and adapt (129).
- h) *Cultural resources from the same ethnic group*-refers to extra-familial support obtained from the same ethnic or cultural group, or the refugee community, which may incorporate intangible resources such as: cultural identity and belongingness, social network, and sources of spiritual or ritual healing as described in previous study (12,50).
- i) *Social inclusion*- in this study is used to mean a philosophy of integrating refugees who were exposed to multiple forms of abuse, and those who are at risk of mental problem to the immediate and broader community so as to provide opportunity of participation in social and economic aspects of life as reported in previous study (34).

3. Objectives and hypotheses of the study

3.1 General Objective of the study

The general objective of this research is to investigate PTSD, depression and alcohol misuse and identifying their direct, mediating and moderating risk and protective factors among Eritrean refugees living in Ethiopia.

3.2. Specific objectives of the study

The specific objectives of this study include:

- 1) To test the best fitting factor structure and identify other psychometric properties for the adapted Tigrigna versions of outcome measures (Center for Epidemiologic Studies Depression (CES-D) scale, Primary care PTSD (PC-PTSD) screener, Fast Alcohol Screening test (FAST), and measures of associated factors.
- 2) To identify socio- demographic and trauma related factors associated with PTSD, depression and alcohol misuse.
- 3) To test the direct, mediating and moderating factors in the relationship between exposure to traumatic events and PTSD and depression.

- 4) Investigating structural relationship between exposure to cumulative trauma and the common latent factor 'poor mental health' (indicated by depression, PTSD symptoms and alcohol misuse).

3.3. Research Hypotheses

In order to address the above specific objectives, the following alternative hypotheses were formulated based on evidence from previous research and theory.

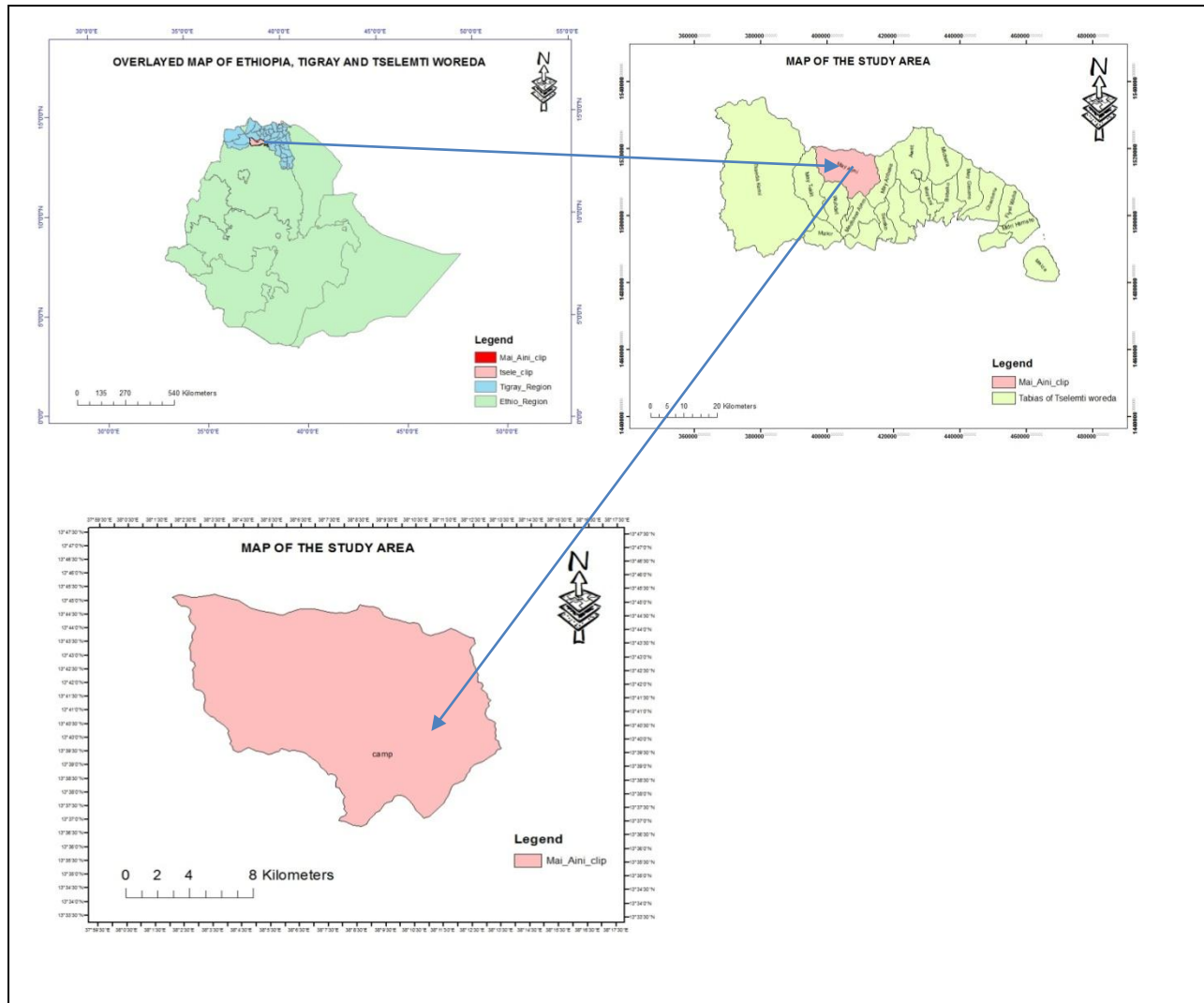
- a) Exposure to trauma in pre and post-migration periods, and current living difficulties is positively associated with symptoms of PTSD and depression after adjusting for socio-demographic and other confounding factors.
- b) Sense of coherence and task-oriented coping styles together mediate the relationship between exposure to pre and post-migration living difficulties and psychological symptoms of PTSD and depression.
- c) Social support moderates the effect of exposure to traumatic events on symptoms of PTSD and depression.
- d) The interaction between emotion-orientated and task-oriented coping styles are associated with reduced symptoms of PTSD and depression.
- e) Cumulative trauma is directly and indirectly associated with poor mental health (indicated by co morbid PTSD, depression and alcohol misuse).

4. Methods and Materials

4.1. Study settings and context:

This study was conducted at Mai Aini refugee camp, one of the four camps in Northern Ethiopia for Eritrean refugees (see Figure-2). The camp is situated at a distance of 1116 km to the north of Addis Ababa, the capital of Ethiopia. Mai Ani camp was established in 2008 by the United Nations High Commissioner for Refugees (UNHCR) (18). As of 2013, this camp alone hosted about 17,825 Eritrean refugees (20). Within the camp, there are three churches for Orthodox, Protestant and Catholic religious followers and one Mosque. Different humanitarian institutions provide health services in the camp. Among others, the two institutions that offer healthcare services are: the Administration of Refugees and Returnees Affairs (ARRA) health center and the Center for Victims of Trauma (CVT), the latter offering counseling and other forms of mental health care. In addition, the Norwegian Refugee Council (NRC), International Rescue Committee (IRC) and Jesuit Refugee Service (JRS) provide education; psychosocial care and logistical support to Eritrean refugees (130). Activities of these organizations are jointly run by a coordinated task of ARRA of Ethiopian government and UNHCR (131).

Figure 2: Map of the Mai Aini Camp



Source: Temalow (2013), reproduced with permission of the author

4.2. Study Design

This thesis reports quantitative data gathered through cross-sectional survey.

4.3. Source and Study population

What is reported in this thesis is based on a quantitative data gathered through cross-sectional survey from a sample of Eritrean adult refugees aged 18-74 in five zones of Mai Ani camp in Ethiopia. According to the refugee statistics document prepared by the UNHCR (January,2016), there were a total of 10,006 registered refugees living in Mai Aini camp

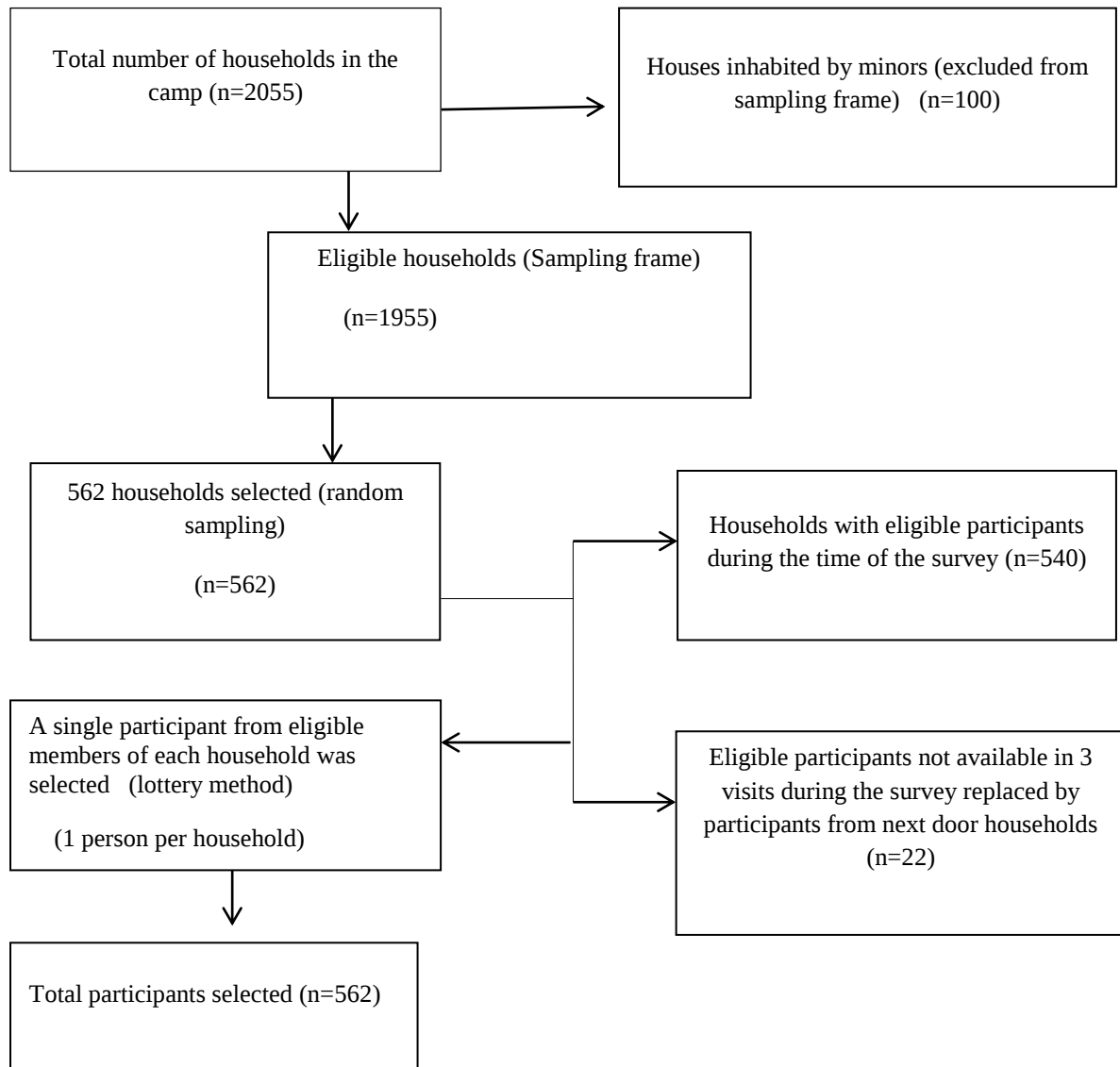
during the time of the study, of which 4,257 were females. The document did not contain information necessary for sampling such as telephone numbers or house numbers. Thus, household census was carried out from December 26, 2015 to January 10, 2016 in all five zones of Mai Aini camp. We first gave house number to each house and conducted a household census in the camp assuming that we would find at least one eligible person in each household. The census identified a total of 2055 households. Of these, 100 households were excluded from the sampling frame because household members in those houses were all minors. This left us with 1955 households that had at least one eligible adult.

4.4. Sample size and sampling

Using the above figure as a sampling frame, 562 households were selected using simple random sampling. In order to estimate the sample size, an average PTSD prevalence of 30.73% among refugees and displaced people in East African camps (3,5,6) with 4% precision and 95% confidence was used. In addition, 10% was added taking the likelihood of non-response into account, which resulted in a final sample size of 562.

In a household where more than one eligible household member was residing, only one participant was selected using the lottery method. Eligibility criteria were 18 and above years of age, having Eritrean nationality before migration and being well enough to give answers to questions (see Figure-3 below for details of the sampling procedure).

Figure 3: Flow diagram depicting the procedures for sampling



When household members were not available in the randomly selected house after three visits, that household was replaced by the next doorhousehold preceding or following the selected household. Through this procedure, 22 (3.9%) randomly selected households were replaced by next door households.

4.5. Data collection procedures

Data collection was done by trained data collectors by visiting each selected household. For few of those participants who were not literate, data collectors read the information sheet and explained to them when necessary, and assisted them to give finger print to confirm their consent before initiating interview. The principal investigator of the study (BG) supervised

the data collection and did a routine check on the completed questionnaires for consistency and completeness on a daily basis.

4.6. Survey Instruments

Pre and Post Migration Living Difficulties Checklist

This tool was developed and used to measure traumatic events of Zimbabwean refugees in South Africa in pre-migration and post-migration periods. It is a 14-items checklist with five point response categories (i.e. strongly disagree = 1; disagree = 2; neutral = 3; agree = 4, and strongly agree = 5) (72). Two Examples of items from the tool read: “*I was beaten and harassed*” and “*I was sexually harassed*” (72). In order to differentiate those who had encountered living difficulties from those who had not, previous studies re-coded the original scores 1 to 3 to 0 and 4 and 5 to 1(124); and we did the same in this study.

Center for Epidemiologic Studies Depression Scale (CES-D)

CES-D is a 20 items scale with four e response categories: ‘None of the time’, ‘A little of the time’, ‘Moderate amount of time’, and ‘Most of the time’ (132). One example item reads: “*I was bothered by things that usually do not bother me*”. This instrument is designed to measure depressive symptomatology in the general population (132). The author found high internal consistency in general population (Cronback’s $\alpha=0.85$) and patient population (Chronback’s $\alpha=0.90$) (132). CES-D was translated into Tigrigna and validated for Tigrigna speaking Eritrean refugees in the United States resulting in Cronbach’s α value of 0.86 and 0.91 for test re-test reliability (133).

Primary Care PTSD Screener (PC-PTSD)

This is a four items brief screening instrument, having two response options, ‘Yes’ or ‘No’(134). This scale has one common instruction for all items, “*In your life, have you ever had any experience that was so frightening, horrible, or upsetting that, in the past month...*”. One example from among items following this instruction is: “*Have had nightmares about it or thought about it when you did not want to?*”(134). Test re-test reliability was found to be 0.83 (135), and the sensitivity and specificity of PC-PTSD was 0.78 and 0.87, respectively (134). This scale was extensively used to study PTSD among veterans in the United States (134, 135). It has been also used in studies involving samples from Afghanistan and Iraq from veteran population (136); its use for screening PTSD in refugees is also well documented (137, 138). In a study aimed at systematically reviewing the use

of PTSD screening among primary care and high-risk populations, it was suggested that PC-PTSD has the advantage to be employed in community settings with high risk of PTSD, and it has a clear set of cut-off score across populations (139). PC-PTSD was used in a study aimed to assess mental health status and healthcare access and utilization among Iraqi refugees, asylum seekers, or those on special immigrant visas aged 18 years and older in the United States following their initial eight months, as well during the post-arrival period (137). Four underlying factors of PC-PTSD (i.e. re-experiencing, numbing, avoidance and hyper-arousal) are demonstrated by factor analysis, and these specific PTSD constructs were not confounded by any psychological distress (134). PC-PTSD was prepared purposefully to be understood by eighth grade reading level (134). Thus, PC-PTSD is a good tool to be applied in study settings where level of literacy is relatively low.

Coping Style Scale

The Coping Style Scale was developed by the Trans-cultural Psychosocial Organization (TPO). This 10-item instrument was used to measure the coping strategies of refugees (24). The items require participants to respond in one of the two response categories: “this is not like me” or “this is like me”. The first set of 4-items follow one scenario: “Imagine, someone is spreading a damaging gossip about you”. One example of item following the above scenario reads: “*Some people would try to find the person who began the gossip and discuss it with him/her*” (24). The second set of 6-items follow imaginative scenario “*Imagine that some property of your, money, food or object of value is lost or stolen*”, one example of item following this scenario reads: “*some people would avoid thinking about the lost or theft*”. This instrument was cross-culturally validated by Trans-cultural Psychosocial Organization (TPO), and later used to study the coping strategies from among displaced Ethiopians from Eritrea during cessation of Eritrea from Ethiopia (24, 34). This scale roughly captured three coping strategies, namely, task-oriented, avoidance-oriented and emotion-oriented coping strategies (24).

Sense of Coherence Scale (SoC-13)

This tool measures resilience of individuals to deal with adversities (83, 140). SoC-13 is a 13-item semantic differential scale adapted for the Eritrean culture in the form of a 5-point Likert scale from the original 7-point scale to reduce complexity (83). For example, item-1 asks: “*Do you have feeling that you don’t really care about what goes on around you?*” Response options range from “very seldom or never” to be scored as 1 to “very often” to be scored as 5(83). Responses for the items 1, 2, 3, 7, and 10 were reverse coded as indicated in

previous literature (141). The instrument was reported to have proved an adequate measure of resilience in Eritrean population (83).

Oslo Social Support Scale (OSS-3)

Refugees' social support was measured using a brief three items tool, the Oslo social support Scale (OSS-3) (142). For this measure the sum scores range from 3-14, which was then categorized into three broad categories: value of 3-8 representing "poor support", a value of 9-11 representing "moderate support" and value of 12 to 14 representing "strong support" (143). Cronbach's alpha value was 0.5 in a validation study of OSS-3 in Nigeria (144). In another study there was a significant correlation between psychological distress and scores from the OSS-3. Moreover, the instrument has demonstrated good discriminate validity which was shown between depression sub-scales of hospital anxiety and depression scale (HADS) (144). There is an increased use of OSS-3 in the Ethiopian context; typically, it was used in a population based study involving mental distress in rural Ethiopia (145).

Fast Alcohol Screening Test (FAST)

Refugees' alcohol misuse was measured using *Fast Alcohol Screening Test (FAST)* (146). FAST is a brief scale having four items, which is meant to measure refugees' use of alcohol. This instrument was derived by taking few items from Alcohol Use Disorder Identification Test (AUDIT) (146, 147). Each item is scored from 0 to 4 and an individual is considered FAST positive if the total score is at least three (146). The total score for inter-rater agreement was 0.83, demonstrating excellent inter-rater agreement (147). This instrument was employed to study alcohol use in the settings of East Africa, including Ethiopia (145). Some of the standard units of drink in the tool are represented by cultural drinks common to Ethiopia and Eritrea (145). FAST demonstrated overall high sensitivity (91%) and specificity (93%) (146), and can be used in busy medical settings (147).

4.7. Adaptation procedures of Instruments

All the instruments were adapted following adaptation procedures of instruments to trans-cultural study (148). First, instruments were translated from the source language (English) into the target language (Tigrigna) by two bilingual experts. These translations were back translated into English by two different bilingual experts. The translations as well as the back translations were provided for experts to solicit feedback. After providing feedback from four experts, two consensus meetings were held at expert level in Addis Ababa and Mekele Universities.

Expert opinions were solicited to check the translated Tigrigna versions of the measures before consensus was reached by forward translations. For example, the feedbacks provided by the experts for sense of coherence scale (SoC-13) and the corresponding modifications made to merge the translations are indicated in the appendix-IX. Having obtained feedback from experts, other two consensus meetings were held to merge the translations. Items in the final version of the translations were then rated using a 4-point rating scale for their content relevance by seven bi-lingual (English and Tigrigna) experts (i.e. one psychiatrist, five practitioners working in psychiatric wards and one clinical psychologist). The purpose of the rating was to determine Content Validity Index (CVI) (149, 150).

Besides, cognitive interviews were made to check and ensure the feasibility and understandability of each item contained in the instruments to the refugee's culture. Based on respondents' feedback minor revisions were made. More specifically, the final instruments were given to six refugees identified among the target population. These individuals were asked to comment on the understandability and acceptability of the instruments. Their feedbacks in terms of culturally acceptable expressions of few items, which were not considered during the translations, were incorporated. For example, to further refine the instruments before they were distributed for pilot study. Four instruments (i.e. pre and post migration checklist, Primary care PTSD screener (PC-PTSD), Center for Epidemiologic Depression Scale (CES-D) and coping style scale) were pilot tested on a sample of 50 refugees and the rest three instruments [i.e. Fast Alcohol Screening Test (FAST), Oslo Social support scale (OSS-3) and Sense of Coherence Scale (SoC-13)] were pilot tested on a sample of 52 refugees before all the instruments were used to collect data for the main study.

4.8. Data management and analysis

IBM SPSS, version 20 and IBM SPSS Amos, version 21 were used for the statistical analysis. The two outcome variables of interest in this study are total symptom scores of PC-PTSD and CES-D as measures of PTSD and depression, respectively.

PTSD and depression symptoms were individually modeled using multiple linear regression. In each of the two models, independent variables were selected based on their theoretical relevance. Checking of the assumptions of multiple linear regression, including absence of co-linearity and normality of distributions, were carried out. More specifically, normality of data for each outcome measures (PTSD and depression) were individually tested using box plot and Q-Q plot (see supplement Figure-1 to Figure-4). Since some socio-demographic

variables (educational background, marital status, employment status, and resilience variables such as coping, social support and sense of coherence are assumed to be interrelationship. Assuming that these predictor variables might have a suspected level of co linearity as simultaneous predictors of depression and PTSD, test for the possible effect of multi-co linearity among these independent variables for predicting psychological symptoms (PTSD and depression) was carried out based on the maximum cut off point for variance inflation factor (VIF) (based on critical value <10) and the minimum level of tolerance (threshold value > 0.1). Durbin Watson test was also used to provide additional checkup whether predictors demonstrate multi co-linearity or not. Some categorical and nominal variables were dummy coded: religion (taking Orthodox Christianity as reference), educational background (taking non-literate as a reference), marital status (taking unmarried as a reference), gender (taking male as a reference), and employment status (taking 'not employed' as a reference). In the present study it was assumed that the wider variation in duration of stay in refugee camp (which ranges from one week to 11 years) could possibly bring a difference in the recollection of pre/ post migration experiences on the part of the participant refugees. Thus, multiple linear regression model was fitted to estimate the effects of socio-demographic and trauma related factors in predicting symptoms of PTSD and depression after dividing the participants into two groups (short- term residents and long-term residents in the camp) based on median cut off point (i.e. 4 years of stay in the refugee camp).

After running multiple linear regression models, estimates of unstandardized coefficients were reported with their corresponding 95%CI. Content relevance of each item of all measures used in the present study was determined based on cut off values for Item-level Content Validity Index (I-CVI) as suggested in the literature (149, 150). Values of 0.78 or higher for I-CVI are considered as valid indices for content validity if the instrument is rated by 6 to 10 experts as suggested in previous study (149). Key socio-demographic variables and hypothesized protective factors were considered as potential confounders in multiple linear regression models, where PTSD and depression were considered as primary outcome variables. In addition, multivariate logistic regression was done to identify factors associated with the likelihood of alcohol use, after adjusting variables having a possible confounding effect in the model. Path analysis was carried to test the significance of associations as well as the direct and indirect effect of variables as hypothesized in the current study based on the existing literature. IBM SPSS Amos, version, 21 was employed to fit the path models. To

carry out the other analyses, such as multiple linear regression model, logistic regression model and Pearson's correlations, IBM SPSS, Version 20 was used. The effect of interaction among theoretically potential confounding factors that might confound the effect of exposure to pre/post-migration living difficulties on development of symptoms of PTSD, depression or both were investigated. Thus, the interaction between social support, sub-scales of coping (task-oriented, avoidance-oriented, emotion-oriented), sense of coherence and duration of stay with pre-migration and post-migration difficulties were investigated one at a time by including the product of the variables in the model. Then, the statistical significance of each interaction term was tested after fitting path model that have two main independent variables and one interaction term as predictors and PTSD or depression as an outcome variables.

Structural equation Modeling (SEM) was used to estimate symptom co-variance as well as possible symptom overlaps between second-order common latent factor of depression and first-order latent factor of PTSD symptoms. SEM was also used to analyze the structural relationship between latent factors of cumulative trauma and poor mental health as an outcome (indicated by co morbid PTSD, depression and alcohol use). Confirmatory Factor Analysis (CFA) was employed to estimate the factor structure, convergent and discriminant validity of each of the measures adapted in the present study. Basic assumptions of Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were evaluated on the basis of negative definiteness of correlation matrix among latent structures, and the minimum required number of participants ($n > 200$). Preliminary assumptions for multivariate normality were checked for each SEM model, and potential outlier observations in those models were traced and filtered out based on critical values of Mahalanobi's distance (observations furthest from the centroid) ($p < 0.001$) suggested in the literature (151).

Cut-off values of fit indices for accepting a model were determined based on standard cut-off minimum criteria: values of χ^2/df should be less than or equal to 3 and values should be greater than or equal to 0.95 for CFI; greater than or equal to 0.95 for TLI; less than or equal to 0.08 for RMSEA (152). Convergent validity was assessed by examining the extent to which the indicators loaded onto the expected factors, divergent or discriminate validity was judged using the correlation between the latent factors. Discriminant validity is considered adequate when this correlation is less than or equal to 0.80 or 0.85 (153).

Preliminary assumption test indicated that Fast Alcohol Screening Test (FAST) did not satisfy the assumptions of multiple regression analysis. Instead of relying on the total score, participants were dichotomized into cases and non-cases for alcohol use based on a recommended cut-off point of ≥ 3 (146). Hence a logistic regression model was found ideal, and we employed this statistic to identify correlates of alcohol use in Eritrean refugees.

In order to estimate the moderating effect of three coping styles on the effect of exposure to pre/post migration living difficulties on psychological symptoms (PTSD and depression), thirteen independent moderation path models were tested, each of which constituted two main and one interaction variable.

4.9. Data Quality Assurance

In order to ensure the quality of data, data collectors were given training on procedures and ethical expectations of data collection during the pilot study and before initiation of the main study. The maximum precaution was taken to prevent data loss. A close field supervision has ensured data quality, and efforts were made to minimize data loss. Data collectors were made to revisit respondents at their homes and bring missing response. The maximum response rate was achieved through replacement of randomly selected houses (3.9%) whose members were not around in three visits. Incomplete questionnaires were given back to data collectors and they were completed by going back to houses from which incomplete information was obtained. Data collection took place from January to March, 2016.

4.10. Ethical considerations

This study was conducted after obtaining ethical clearance from the Institutional Review Board (IRB) of the College of Health Sciences, Addis Ababa University (AAU) (protocol number: 052/14/Psy). Participants were provided with information sheet about the study regarding its objective, relevance, beneficence, risk, participant's rights and others. Then a written consent from each participant was obtained before engaging them to participate in the study. For few of those participants who were not literate, data collectors assisted them to read the information sheet, explained to them when necessary, and marked their consent agreement on the consent form before getting them involved in the study. Ethical issues as outlined by the declaration of Helsinki for human participants in medical research (154) were adhered to. The following specific ethical issues were addressed in the study.

Protection and Avoidance of Harm

Since refugees are vulnerable group, it is a must to obtain informed consent before getting them involved in scientific study (11). Some issues contained in questionnaire or the interview guide may be sensitive to evoke emotion and upset the respondents, and hence due care was taken in administering the questionnaire. In addition, participants were ensured about their full freedom either to have the right to proceed with responding to the questionnaire or terminate it when they feel overwhelmed and distressed.

During the process of data collection, when the Principal Investigator (BG), as field supervisor, felt that the current status of the participant's PTSD or depression has affected his/her social, occupational or personal wellbeing, participants were encouraged to visit local healthcare or counseling. For example, when a participant's current distress is suspected to potentially lead him/her to develop chronic devastation such as suicidal thought, such a participant was referred to obtain an immediate counseling or psychiatric services available in the refugee camp. Besides, those who scored high on PTSD and depression symptoms were referred to visit a mental health care clinic through Eritrean health care staff.

Potential Benefit

Although this study may provoke some discomfort while remembering and discussing some stressful memories and current psychological distress, the outcome of this study has an immediate as well as long run benefits. Hence those few participants who felt overwhelmed by the questionnaire or interview as well as have shown acute symptoms of distress were given the necessary counseling through referral to the local mental health care as well as emotional debriefing. The outcome of the study published was already disseminated to the stake holders (ARRA and CVT). Furthermore, the outcome of this study will be disseminated through workshops and briefing sessions to important governmental as well as humanitarian stakeholders (including UNHCR, IOM and ARRA) for the ultimate benefit of improving the mental health services.

Privacy and Confidentiality

As outlined under the ethical codes of privacy and confidentiality stipulated under British psychological society (155), the names and personal profiles of participants were kept confidential. Names along with addresses of the participants were kept under securely locked files on a computer only accessed by the investigator. Hard copies of questionnaire are kept in a locked box. Participants were invited a refresher, like coffee, tea or and soft drinks just to keep them alert during their participation.

4.11. Summary of study objectives and methods

Different analyses were done based on the same dataset obtained from a cross-sectional survey. The overall summary regarding methods of analyses used to address each of the objective are presented in table 4.

Table 4: Study objectives and corresponding method of analysis

Objectives	Methods of analysis employed
1. Identifying factor structure and other psychometric properties in the adapted Tigrigna version of measures used in the present study.	-Internal consistency (using Cronbach's alpha) -Item-total correlation -Content validity index (CVI) -Confirmatory factor analysis (CFA)
2. Identification of socio- demographic and trauma related associated factors of PTSD, depression and alcohol misuse.	-Multiple linear regression and multiple logistic regression modeling
3. Testing the direct, mediating and moderating effects of PTSD and depression	-Path analysis
4. Investigation of the structural relationship between exposure to cumulative trauma and poor mental health (with indicators of co morbid depression, PTSD symptoms and alcohol misuse)	-Structural Equation Modeling (SEM)

5. Result

5.1. Socio-demographic characteristics of study participants

Of the 562 participants, 304(54.1%) were females, 84% were followers of Orthodox Christianity and the vast majority of participants were literate (78.1%). Age ranged from 18 to 74 years (with mean age of 29.6 years, SD=10.18). The average duration of stay in the camp was 3.71 years, ranging from recent arrivals that had stayed for only one week to people who had lived in the camp for 11 years. A high proportion of participants (92%) belonged to the Tigriya ethnic group. A small number of participants came from Saho, Bilen, Tigre and Jabelty ethnic groups (constituting 8% altogether). Although participants had diverse types of occupation before coming to Ethiopia, students, military and farmers constituted 71% of the total participants (Table-5).

Table 5: Socio-demographic characteristics of participants

Characteristics		Number (%)
Sex	Male	258(45.9)
	Female	304(54.1)
Age	Mean(SD)	29.6(10.2)
	18-24	205 (36.5)
	25-34	219(39.0)
	35-44	89(15.8)
	45-54	29(5.2)
	55-64	15(2.5)
	65-74	5 (0.9)
Educational Background	Non-literate	67(11.9)
	Elementary school	232(41.3)
	Secondary school	238(42.3)
	College graduate or above	25(4.5)
Marital status	Single	189(33.6)
	Married	327(58.2)
	Divorced	29(5.2)
	Widowed	17(3.0)
Religion	Orthodox	477(84.9)
	Protestant	17(3.0)
	Catholic	23(4.1)
	Muslim	44(7.8)
	Jehovah witness	1(0.2)
Past occupation in Eritrea	Student	201 (35.8)
	Military	111 (19.8)
	Farmer	89 (15.8)
	Home maid	66 (11.7)
	Educator	23 (4.1)
	Daily laborers	15 (2.7)
	Others	57(10.1)

5.2 Measurement model of scales used in the present study

Findings of the properties of the measure used in the present study are highlighted, specific to internal consistency and factor structure. Further detailed analyses of psychometric properties are given only for the Tigrigna versions of the two measures: Center for Epidemiologic Depression Scale (CES-D) and Sense of Coherence Scale (SoC-13).

5.2.1 Measures for the outcome variables

Findings on basic psychometric properties of mental health concerns of refugees (depression, PTSD and alcohol use) are indicated below.

5.2.1.1 Center for epidemiologic Studies Depression Scale (CES-D)

Preliminary test for assumption of factor analysis for CES-D items indicates that Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.939. Bartlett's Test of sphericity was significant ($\chi^2 = 5258.70$; $df=190$, $P < 0.001$). The minimum sample size needed (i.e. $n > 200$) for running factor analysis was also met ($n=562$). After allowing unique values to correlate, Confirmatory Factor Analysis (CFA) suggested that the present data best fitted best to first-order two factors with second-order common factor structure presented in the form of negative affect and positive affect ($\chi^2 = 271.65$; $df=144$; CFI=0.975; TLI= 0.967; SRMR= 0.0378; RMSEA=.04) with sufficient loadings of all the 20 items to either of these two dimensions better than other computing factor structures of CES-D in the literature. Thus, composite internal consistency reliability of the negative Affect with 16-items had Alpha value 0.93, whereas the positive Affect (4-items) had alpha value of 0.70. In the present study, CFA results for total sample ($n=562$) indicated that the four factors solution of CES-D model, which was identified by the original scale developer (Radloff), hasn't achieved a minimum of adequate fit because of negative definitiveness across the variance matrix within the factors. Further investigations of the alternative models of CES-D factor structures were made and the findings are shown in Table-6.

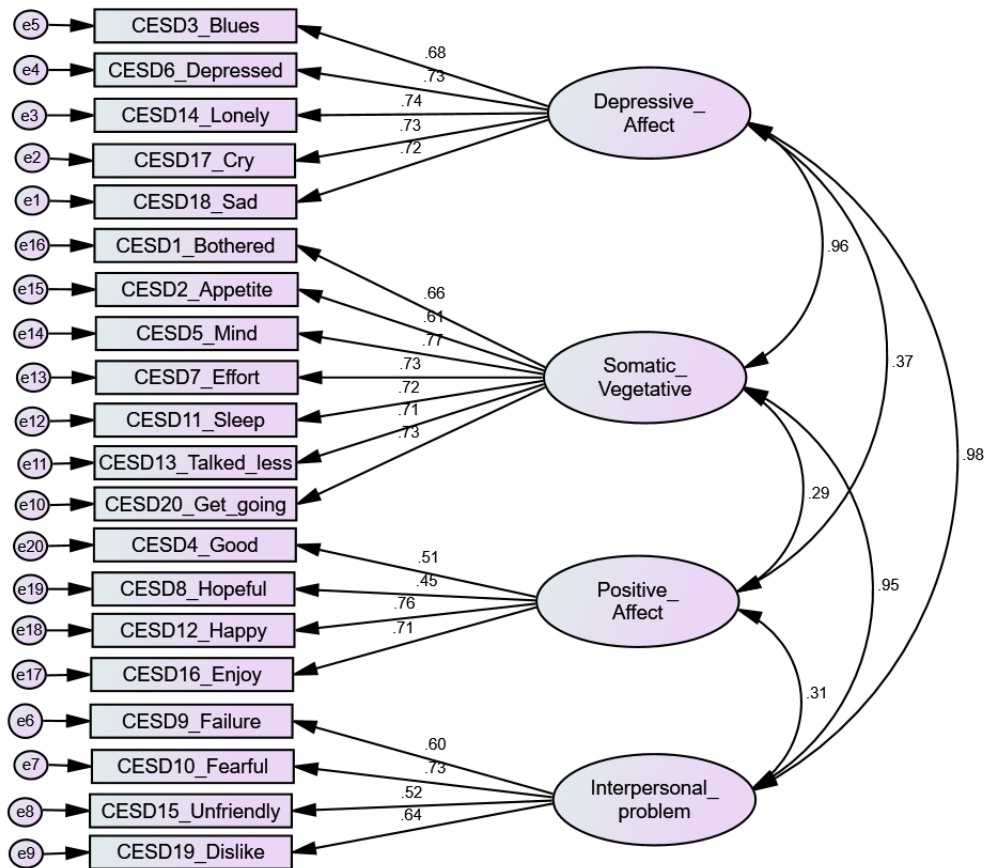
Table-6: Comparison of fit indices to the computing factor structures of CES-D to Eritrean refugee sample

Proposed model of CES-D		Sample	$\chi^2(df)$	CFI	χ^2/df	GFI	TLI	SRMR	RMSEA	P-value
1. Four correlated factors model (Sheehan's item allocation)	Correlated error terms	Total sample (n=562)	588.62(158)	0.916	3.725	0.903	0.899	0.0475	0.070	p<0.001
	Uncorrelated error terms	Total sample (n=562)	704.346(164)	0.895	4.295	0.882	0.878	0.0504	0.077	p<0.001
2. First-order four factors with second order model (Sheehan's item allocation)	Correlated error terms	Total sample (n=562)	619.63(161)	0.911	3.819	0.897	0.895	0.0480	0.071	p<0.001
	Uncorrelated error terms	Total sample (n=562)	709.251(166)	0.894	4.273	0.881	0.879	0.0508	0.076	p<0.001
3. Two correlated factors structure	Correlated error terms	Total sample (n=562)	302.801(150)	0.970	2.019	0.950	0.962	0.0391	0.043	p<0.001
4. First-order two factors, second-order common factor	Correlated error terms	Total sample (n=562)	271.65(144)	0.975	1.886	0.955	0.967	0.0378	0.040	p<0.001
	Correlated error terms	Female (n=304)	239.495	0.965	1.5886	0.929	0.956	0.0484	0.044	p<0.001
	Correlated error terms	Male (n=258)	284.592	0.952	1.801	0.901	0.943	0.0479	0.056	p<0.001

Legend: χ^2/df =Chi-square to degree of freedom; CFI=Comparative Fit Index; GFI=Goodness of Fit Index; TLI=Tucker Lewis Index; SRMR=Standardized Root Mean Residual; RMSEA=Root Mean Error of Approximation

In addition, the four correlated factors structure of CES-D (Sheehan's item allocation) demonstrated poor fit to the present data with CFI < 0.90 and RMSEA > 0.05 (see Figure-4).

Figure 4: Four factors model of CES-D, Sheehan's item allocation

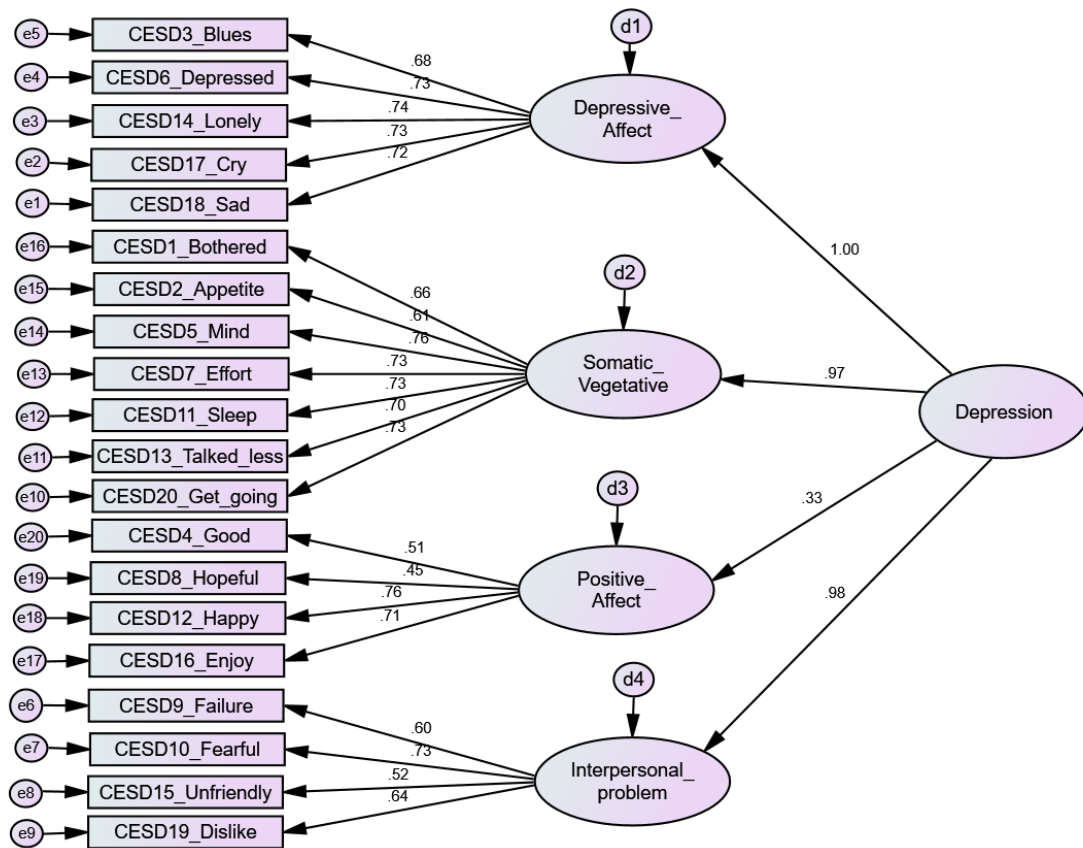


Legend: Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent factor loadings; double-headed arrows represent co-variances between factors; circles represent error terms for each item (e).

Model fit: $\chi^2=704.346$; $df= 164$; $\chi^2/df= 4.295$; CFI= 0.895; TLI= 0.878; RMSEA= 0.077; SRMR= 0.0504

Further modifications on this model based on Modification Index (MI), after allowing error terms to correlate, suggested a reasonable fit of the data: $\chi^2 =588.62$; $df= 158$; CFI= 0.916; RMSEA= 0.070; SRMR= 0.0475. The first-order four factors with second-order single factor model (Sheehan's item) allocation yielded more or less similar results with four correlated factors structure of CES-D (see Figure-5).

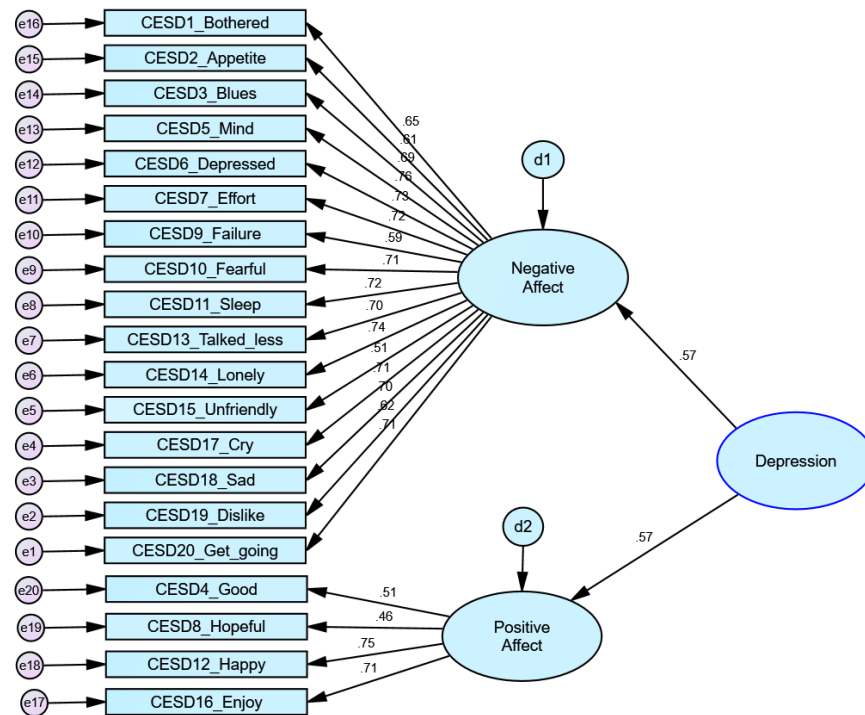
Figure 5: First-order four factors with second-order common factor model of CES-D model, Sheehan's item allocation



Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent factor loadings; circles represent error terms for each item (e), and disturbance terms of each latent factor (d).

The two correlated factors model of CES-D yielded a similar estimate of item loadings as well as the same fit indices with the second order two factors model of CES-D. However, after modifications of the model, allowing error terms to correlate based on Modification Index (MI) suggested that the first-order two factors with second-order single factor model of CES-D (Table-6, model-4) best fitted the data in Eritrean sample better than all models tested: $\chi^2=271.65$; $df=144$; CFI= 0.975; SRMR= 0.0378; RMSEA= 0.040 (90%CI=0.032, 0.047). The first factor, Negative Affect (16-items) has excellent internal consistency (Cronbach's alpha value of 0.932) whereas the second factor, Positive Affect (4-items), has good level of internal consistency (Cronbach's alpha value of 0.703).

Figure 6: Two factors with second order common factor model of CESD



Legend: Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent item and factor loadings; circles represent error terms for each item (e), and disturbance terms of each latent factors (d).

Multi Group Confirmatory Factor Analysis (MGCFA) for CES-D

MGCFA for males and females was performed on first-order two factors with second-order one common factor structure of CES-D (uncorrelated error terms), which showed a close fit to the current data ($\chi^2 = 938$, $df = 338$, $p < 0.001$; CFI = 0.884, TLI = 0.870, RMSEA = 0.056 [90%CI = 0.052, 0.061], SRMR = 0.0538). Separate analysis for each group indicates that the fit indices for males ($n = 258$) were $\chi^2 = 432$, $df = 169$, $p < 0.001$; CFI = 0.901, TLI = 0.888, SRMR = 0.0538; RMSEA = 0.078 (90%CI = 0.069, 0.087), and the fit indices for females ($n = 304$) were $\chi^2 = 505.571$, $df = 169$; CFI = 0.867, TLI = 0.851, SRMR = 0.0602, RMSEA = 0.081 (90%CI = 0.073, 0.089). Further analysis for measurement weight, measurement intercept, structural co-variance and measurement residuals indicate that chi-square differences were not significant ($p > 0.05$) (see Table-7). Overall, second order two factors model is invariant between males and females. Thus, the findings demonstrate configural invariance, metric invariance, scalar invariance and structural co-variance invariance.

Table 7: Comparison of second order two factors CES-D model for males and females

Model	Df	χ^2	P-value	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	18	13.965	0.731	0.003	0.003	-0.007	-0.007
Measurement intercepts	38	49.601	0.099	0.009	0.009	-0.010	-0.011
Structural covariances	41	55.456	0.065	0.010	0.011	-0.010	-0.011
Measurement residuals	61	76.714	0.085	0.014	0.015	-0.016	-0.017

Note: df= Degree of Freedom; χ^2 =chi-square; NFI=Normed Fit Index; IFI= Incremental Fit Index;
RFI=Relative Fit Index; TLI= Tucker Lewis Index

Divergent Validity OF CES-D

CES-D was negatively and significantly associated with Sense of Coherence Scale (SoC-13) ($r = -0.597$, $p < 0.001$) and Oslo Social Support Scale (OSS-3) ($r = -0.319$, $p < 0.001$).

Convergent validity OF CES-D

The bi-variate Pearson's correlation coefficient (r) of CES-D with pre-migration living difficulties checklist ($r = 0.545$, $p < 0.001$), post migration living migration checklist ($r = 0.47$, $p < 0.001$); PC-PTSD ($r = 0.538$, $p < 0.001$); FAST ($r = 0.197$, $p < 0.001$) indicates a significant positive relationship.

In addition, the first-order two latent factors were adequately loaded onto second-order single common factor, and all the 20 indicator items have demonstrated sufficient loading onto their respective latent factors. More specifically, in the modified form of this model with correlated error terms, 57% of variance in the single second order factor 'depression' is explained by first-order latent factor, positive affect(4 items), while another 61% of variance of this single common construct 'depression' is explained by first-order latent factor, negative affect (16-items) (see supplementary Figure-7 in appendices). In the first-order two factors with second-order single factor model of CES-D (both modified and unmodified) , all the sixteen items sufficiently loaded onto the first factor (negative affect) ranging from 0.51 to 0.76, while four items sufficiently loaded onto the second factor (positive affect) ranging from 0.46 to 0.75 (Figure-7). In the single common factor second order model with four first order factors (Sheehan's item allocation) all the 20 items of CES-D sufficiently loaded onto the expected four separate latent factors ranging from 0.45 to 0.76 (Figure-5).

Discriminant Validity

Evidence from the present study with respect to discriminant validity among four latent correlated factors (Sheehan's item allocation) demonstrates that there is strong co-variance between the three factors of depressive affect, somatic vegetative and interpersonal problems ($r \geq 0.95$, $p < 0.001$), which is greater than the threshold of value for a factor to be significant for discriminant validity. In the four correlated factors model (Figure-5), there is a satisfactory discriminant validity below the maximum cut-off point ($r < 0.80$) demonstrated between positive affect with each of the three latent factor structures (i.e. depressive affect, somatic vegetative and interpersonal problems) with standardized co-variance of 0.37, 0.29 and 0.31, respectively.

Content Validity

The Item-level Content Validity Index (I-CVI) values for the 20 items ranged from 0.71 to 1, and the Average Scale Level Content Validity Index (S-CVI/ Ave) for the total scale was 0.92 (see Table-8).

Table 8: Summary of item-total correlation, internal consistency and content relevance of CES-D

Items	Item-total Pilot study (n=50)	Item-total Main study (n=562)	Cronbach's Alpha if Item deleted	I-CVI (n=562)
1: I was bothered by things that usually don't bother me.	0.698	0.670	0.740	1
2: I did not feel like eating; my appetite was poor.	0.631	0.623	0.742	1
3: I felt that I could not shake off the blues even with help from my family.	0.781	0.687	0.738	0.86
4: I felt that I was just as good as other people.	0.289	0.284	0.750	1
5: I had trouble keeping my mind on what I was doing.	0.598	0.735	0.739	1
6: I felt depressed.	0.756	0.721	0.738	0.86
7: I felt that everything I did was an effort.	0.681	0.70	0.738	0.86
8: I felt hopeful about the future.	0.223	0.210	0.752	1
9: I thought my life had been a failure.	0.715	0.601	0.741	1
10: I felt fearful.	0.755	0.712	0.739	1
11: My sleep was restless.	0.549	0.732	0.739	0.86
12: I was happy.	0.404	0.425	0.747	1
13: I talked less than usual.	0.610	0.698	0.740	1
14: I felt lonely.	0.731	0.742	0.737	1
15: People were unfriendly.	0.461	0.525	0.744	0.86
16: I enjoyed life.	0.549	0.386	0.747	1
17: I had crying spells.	0.704	0.738	0.738	0.71
18: I felt sad.	0.714	0.706	0.739	1
19: I felt that people disliked me.	0.845	0.662	0.740	1
20: I could not "get going."	0.786	0.707	0.739	1

Note: S-CVI/Ave(Scale level Content Validity Index, Average method) = 0.92

5.2.1. 2. Primary care PTSD Screener (PC-PTSD)

In the present study, the internal consistency alpha value was found to be 0.68 in the pilot study (n=50) and 0.70 in the main study (n=562). Item-total correlation for the four items ranged from 0.59 to 0.75 in the pilot study and 0.64 to 0.80 in the main study (Table-9).

Table 9: Item total correlation, internal consistency and content validity index of PC-PTSD screener

Items	Dimensions	Item questions	Item-total Correlation		
			Pilot Study (n=50)	Main Study (n=562)	CVI-I
Item-1	Re-Experiencing	Have had nightmares about it or thought about it when you did not want to?	0.750	0.796	1
Item-2	Avoidance	Tried hard not to think about it or went out of your way to avoid situations that reminded you of it?	0.589	0.723	1
Item-3	Arousal	Were constantly on guard, watchful, or easily startled?	0.764	0.742	1
Item- 4	Numbing	Felt numb or detached from others, activities, or your surroundings?	0.750	0.636	1
Cronbach's Alpha			0.683	0.698	S-CVI=1

For the four items of PC-PTSD, Item level Content Validity Index (I-CVI) is 1, which makes the overall Scale level Item Validity Index (S-IVI) to be 1. Moreover, Principal Component Analysis (PCA) showed that the four items loaded on a single factor (ranging from 0.582 to 0.818).

Assumptions for running factor analysis were met for Primary Care PTSD Screener (PC-PTSD). More specifically, KMO=0.7; Bartlett's test of sphericity was significant ($\chi^2=414.379$, $df = 6$, $p<.001$); the minimum number of participants to conduct factor analysis was met (n=562). The data was tested for negative definitiveness. CFA suggested that all items sufficiently loaded on a single latent factor (standardized coefficient > 0.40). All items loaded significantly onto a common factor when tested for EFA and CFA, providing a sufficient evidence for this tool as a measure a PTSD construct having one common factor. More specifically, CFA analysis demonstrated that all the four items, each of which basically represents one factor structure of PTSD, loaded adequately onto a single dimension, ranging from 0.43 (numbing) to 0.78 (re-experiencing). The present data demonstrated closer fit with

a single factor structure of PTSD with fit indices of $\chi^2=17.275$; $\chi^2/df= 8.622$, CFI=0.963; TLI=0.888; RMSEA=0.117 (90%CI=0.070, 0.17), SRMR=0.0355.

5.2.1.3 Fast Alcohol Screening Test (FAST)

In the present study, item-total correlation ranges from 0.711 to 0.876 for pilot study (n=52) and from 0.723 to 0.905 in main study (n=562). Cronbach's alpha value for pilot and main studies were 0.73 and 0.86 respectively (see Table-10).

Assumptions for performing CFA for the Tigrigna version of FAST were met, with values of KMO value of 0.761 and asignificant value of Bartlett's sphercity ($\chi^2=1642.883$, $p<0.001$). In addition, the minimum required number to run factor analysis was met (n=562). Internal consistency alpha value was 0.86. CFA test suggested that all the items are sufficiently loaded onto a single factor, ranging from 0.45 (item-4) to 0.96 (item-2), and the overall single latent factor model for FAST is close to fit to the present data (CFI=0.995; SRMR=0.0109; RMSEA0.115; (90%CI=0.053, 0.192). FAST has demonstrated a positive significant correlation with pre-migration living difficulties ($r= 0.299$, $p< 0.01$), depression ($r= 0.197$, $p< 0.01$) and emotion-oriented coping ($r= 0.219$, $p< 0.001$), providing sufficient evidence of its convergent validity. Significant and inverse association is demonstrated between FAST and measures of mental wellbeing, such as sense of coherence scale ($r=-0.105$, $p< 0.05$) (see table-4 in appendices) and refugees' frequency of religious attendance ($r=-0.31$, $p<0.001$), providing evidence of its divergent validity.

Table 10: Internal consistency, item-total correlation and Content Validity Index of FAST

Items	Item – total Correlation	Main Study (n=562) (I-CVI)
	PilotStudy (n=52)	Main Study (n=562)
FAST-1	.728	.905
FAST-2	.711	.886
FAST-3	.876	.890
FAST-4	.726	.723
Cronbach's Alpha	.730	.859 (S-CVI=1)

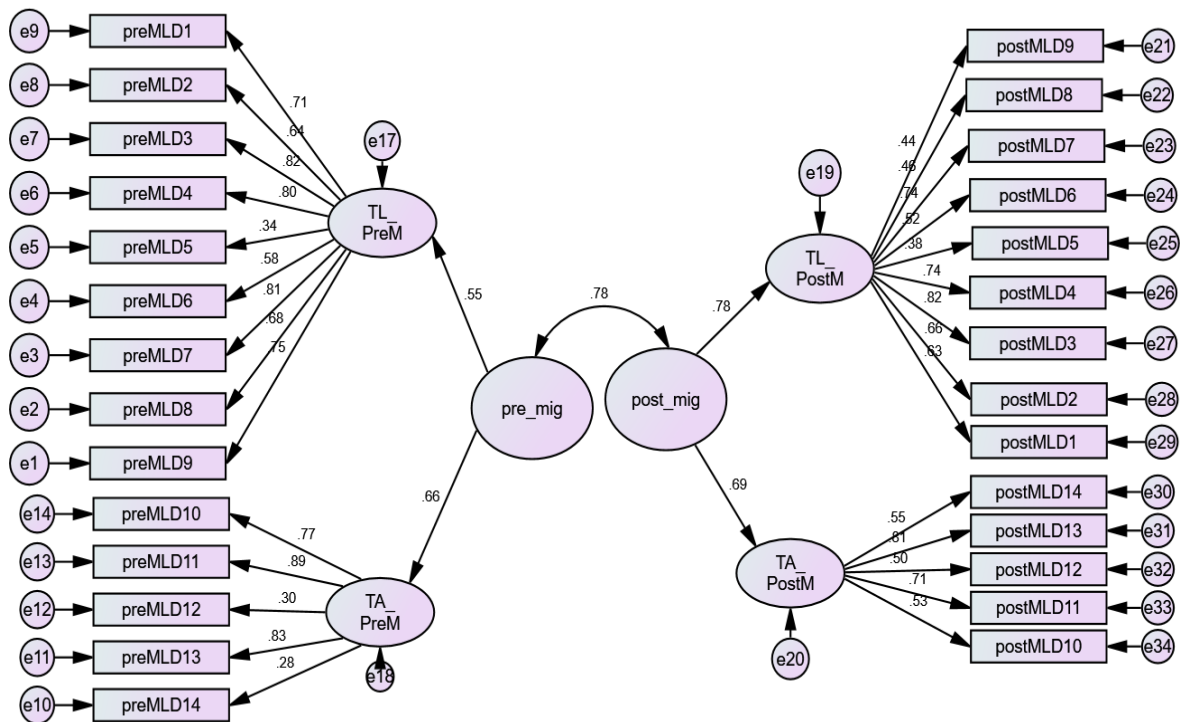
Note: I-CVI (item level content Validity Index); S-CVI (Scale Level content Validity Index)

The item Level Content Validity Index (I-CVI) for each item of FAST was found to be 1, which makes the overall Scale Level Content Validity Index to be 1 (see Table-10).

5.2.2 Measurement of exposure variables

The exposure variable in the present study is cumulative trauma. It contextually refers to the cumulative stressful experiences in those refugees have been experienced during pre-migration and post-migration periods, and it was assessed by pre and post migration living difficulties checklist. CFA analysis for the pre-migration living difficulties checklist in the main study (n=562) has demonstrated that the two factor structure of this measure has shown acceptable fit to the present data: chi-square (χ^2)=172.444; chi-square to degree of freedom (χ^2/df)= 2.874; Comparative Fit Index (CFI) =0.971; Tucker Lewis Index (TLI) =0.951; Root Mean Square Error of Approximation(RMSEA)=0.058(90%CI=0.048, 0.068); Standardized Root Mean Residual (SRMR) = 0.0402. In this model the first factor, threat for life (9-items), and the second factor, threat for abuse (5-items), had good internal consistency (Cronbach's alpha=0.88 and 0.82, respectively). Similarly, for the second sub-scale (post-migration living difficulties checklist) two factor structure demonstrated acceptable fit to the present data: χ^2 =202.576; χ^2/df =3.554; CFI=0.950; TLI=0.919; RMSEA= 0.067(90%CI= 0.058, 0.078). The first factor, threat for life (9-items) and the second factor, threat for abuse (5-items) demonstrated moderate internal consistency (Cronbach's alpha values 0.68 and 0.72, respectively). CFA analysis for the first-order two with second-order common factors model of the pre and post-migration living difficulties checklist, as a measure of cumulative trauma, indicated close fit to the present data (see Figure-7).

Figure-7: Two correlated second-order factor structure for the pre and post-migration living difficulties checklist



TL_PreM (Threat for Life in Pre-migration);TA_PreM (Threat for Abuse in Pre-migration); TL_PostM (Threat for Life in Post-migration); TA_PostM (Threat for Abuse in Post-migration); preMLD (Pre-migration living Difficulties checklist); postMLD (Post-migration living difficulties checklist).

Model fit: $\chi^2=2329.421$; $\chi^2/df=6.752$; CFI=0.736; TLI=0.711; RMSEA=0.101 (90%CI= 0.097, 0.105); SRMR= 0.1038.

5.2.3. Measures of mediating factors

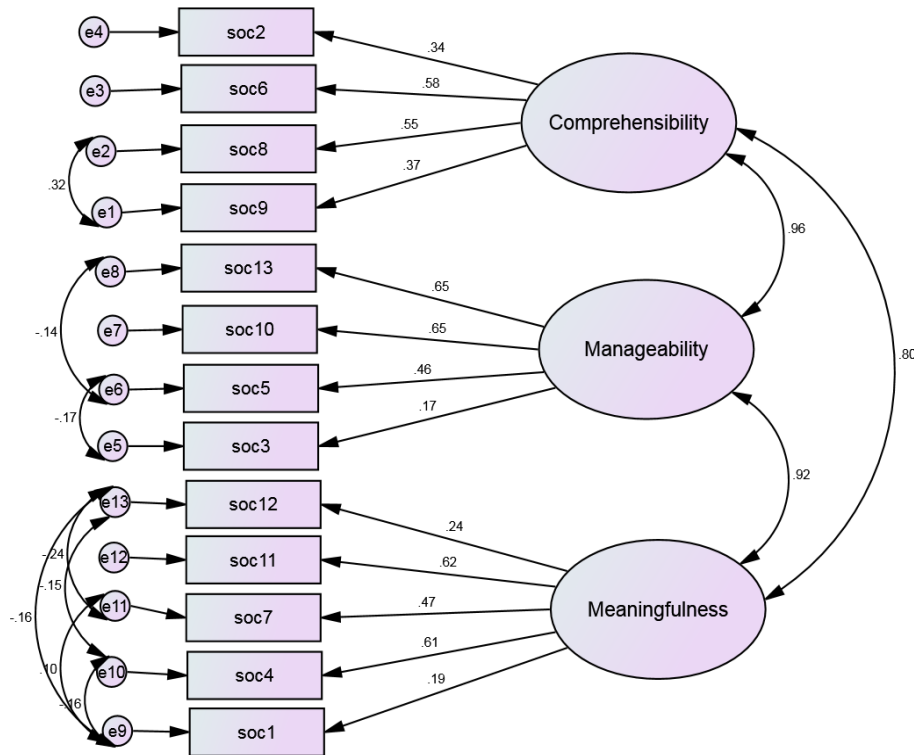
Based on previous evidence from the reviewed literature, sense of coherence and social support were hypothesized to serve as mediating factors in the present study.

5.2.3.1 Sense of Coherence Scale (SoC-13)

Preliminary test of assumptions for the thirteen items of the Tigrigna version of sense of coherence (SoC-13) scale indicated that the value of KMO is 0.820; Bartlett's test of sphericity was significant ($\chi^2=1467.7$, $df =78$, $p<0.001$) and the minimum required sample size was met ($n=562$). Despite the conflicting findings regarding the dimensionality of SoC-13, our data in the present study fitted well onto a single factor structure, except for item-2. For the thirteen items of SoC scale, Cronbach's alpha value for internal consistency in the pilot study ($n=52$) and in the main study ($n=562$) were 0.67 and 0.74, respectively.

Examination of the present data in light of plausible computing measurement models of SoC-13 indicated that the three correlated factors model of SoC-13 demonstrated poor fit (CFI=0.786; TLI= 0.702; RMSEA=0.098) (see Figure-8).

Figure 8: Three correlated factors of SoC-13, with correlated error terms



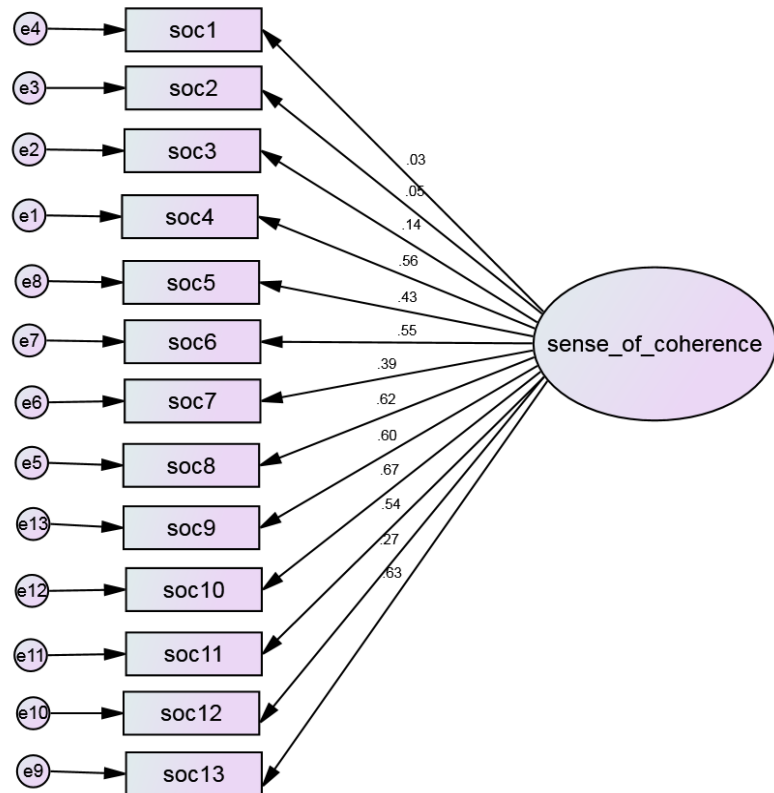
Legend: Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent factor loadings; double headed arrows (right) represent co-variances between latent factors; double headed arrows (left) represent co-variances between error terms; circles represent error (disturbance) terms for each item.

Model fit: $\chi^2 = 356.54$; $\chi^2/df = 6.368$; CFI= 0.786; TLI= 0.702; SRMR= 0.0928; RMSEA=0.098

Single factor structure of SoC-13, uncorrelated error terms, poorly fitted the current data (CFI< 0.95; RMSEA>0.05) (see Figure-9).

However, after re-specification of the model based on the modification index (MI), allowing error terms to correlate and trimming item-2 with insignificant loading ($\beta = 0.062$, $p > 0.05$), the one factor structure of SoC with twelve items best fitted the present data compared to plausible models tested (see Figure-10). Therefore, of all the models tested, the one latent factor structure of SoC with 12-items has demonstrated superior fit indices: CFI= 0.982; RMSEA=0.035(90%CI=0.018, 0.50) (see Table-11, model-3).

Figure 9: Single factor model of SoC-13 with uncorrelated error terms



Legend: Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent factor loadings; circles represent error terms (e) for each item.

Model fit: $\chi^2=412.363$; $df=65$; $\chi^2/df=6.34$; CFI= 0.752; TLI= 0.703; GFI= 0.889; RMSEA= 0.107; SRMR= 0.0791.

Table 11: Comparison of fit indices for computing factor structures of SoC-13 and their modifications

Proposed Models for SoC-13	χ^2	χ^2/df	CFI	GFI	TLI	SRMR	RMSEA	P-value
1. Single factor SoC-13 model, uncorrelated error terms	412.363	6.34	.752	.889	.703	.0791	.107	p<.001
2. Single factor SoC-13 model, correlated error terms	110.31	2.40	.954	.971	.922	.0428	.050	p<.001
3. Single factor model with correlated error terms, modified (SoC-13)	57.54	1.692	.982	.983	.964	.0280	.035	P<.01
4. Three correlated factors (SoC-13), correlated error terms	356.54	6.368	.786	.912	.702	.0928	.098	p<.001

Note: χ^2 =Chi-square; χ^2/df =Chi-square to degree of freedom; CFI=Comparative Fit Index; TLI=TuckerLewis Index; SRMR=Standardized Root Mean Residual; RMSEA= Root Mean Square Error of Approximation

Figure 10: One factor model of SoC-12, with correlated error terms



Legend: Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent factor loadings; circles represent error terms for each item (e), double headed arrows (right) represent co-variances between latent factors; double headed arrows (left) represent co-variances between error terms. Model fit: $\chi^2=57.54$; $\chi^2/df=1.692$; CFI= 0.982; TLI= 0.964; SRMR= 0.0280; RMSEA=0.035

The internal consistency Cronbach's alpha values of SoC-13 in the pilot study (n=52) and in the main study (n=562) were found to be 0.67 and 0.74, respectively. When the three theoretical sub-scales were considered, the corresponding Cronbach's alpha values in the main study in each sub-scale diminish to 0.56 or less compared to 0.74 for the total 13-items (see ST-2 in appendix). The internal consistency improved (Cronbach's Alpha ≥ 0.74) on condition that item1, item-2 and item-12 are discarded (ST-2 in appendix). The internal consistency of twelve items (except for item-2), which are significantly loading on a single latent factor ($p < 0.05$) resulted in 0.75, and hence internal consistency remain stable with the omission of a single item.

A comparison of item loadings regarding each of the thirteen item of SoC-13 of Eritrean refugee sample in current study was made with findings of previous CFA studies done across cultures on different populations are summarized in Table-12.

Table 12: Comparison of item loadings of each item of SoC-13 in Eritrean sample with evidence of previous studies

Author	SoC-13 Items		1	2	3	4	5	6	7	8	9	10	11	12	13	Best fitting structure of SoC-13
Present study	Eritrean refugees (n=562)	1 factor	0.18	n.s.	0.14	0.56	0.43	0.60	0.40	0.59	0.57	0.70	0.57	0.31	0.59	One factor SoC-12, correlated error terms (CFI=0.98; RMSEA=0.035)
		3 factors	0.19	0.34	0.17	0.61	0.46	0.58	0.47	0.55	0.37	0.65	0.62	0.24	0.65	
Bonacchi, et.al.(2012)	*Italian sample(n=372)	1 factor	0.30	0.28	0.37	0.48	0.41	0.60	0.43	0.67	0.50	0.55	0.30	0.62	0.66	One factor SoC-13, correlated error terms (CFI=0.93; RMSEA=0.05)
LuyckxK, et.al.(2012)	*Dutch speaking Belgians (n=2781)	Three factors	0.38	n.s.	n.s.	0.31	0.28	0.43	0.52	0.76	0.76	0.79	0.60	0.32	0.69	First-order three correlated factors model & second-order model of SoC-11 (CFI=0.93; RMSEA=0.06)
Saravia, et.al.(2014)	*Peruvian Sample (n=448)	1 factor	0.35	0.27	0.37	0.44	0.36	0.47	0.40	0.68	0.70	0.61	0.37	0.66	0.61	Three correlated model of SoC-13 (CFI= 0.92; RMSEA=0.06)
		3 factors	0.38	0.29	0.41	0.50	0.38	0.48	0.50	0.69	0.72	0.63	0.36	0.77	0.64	

Foot note:

n.s.=not significant (items are discarded if not significant)

*Saravia JC, Iberico C, Yearwood K: Validation of Sense of Coherence (soc) 13-item scale in a Peruvian Sample. *Journal of Behavior, Health & Social Issues* 2014; 6(2): 35-44.

*Bonacchi, A., Miccinesi, G., Galli, S., Chiesi, F., Martire, M., Guazzini, M., et.al. The dimensionality of the Sense of Coherence Scales, an investigation on Italian sample. *TPM* 2012; 19(2): 115-134.

*Luyckx K, Goossens E, Apers S, et al: The 13-Item Sense of Coherence scale in Dutch-speaking Adolescents and young adults: Structural validity, age trends, and chronic disease. *Psychologica Belgica* 2012; 52(4): 351-368.

As indicated in Table-12, twelve items have significantly loaded onto a single latent factor, with standardized path coefficients ranging from 0.14 (item-3) to 0.70 (item-10). When evaluated for the strength and adequacy of item loadings, Item-1, item-2, item-3 and item-12 are weak items, because they demonstrated poor convergent validity ($\beta < 0.40$) to the expected latent factor.

In the three factors model of SoC-13 (Figure-8), however, all the thirteen items significantly loaded onto their respective factors although the model demonstrated poor fit. In addition, there is a significant positive correlation of SoC-13 to related measures. Specifically, SoC-13 positively and significantly correlated with Oslo Social Support Scale (OSS-3) $r = 0.363$ $p < .001$. SoC-13 also demonstrated weak, but positive association with task oriented coping ($r = 0.089$, $p < 0.001$).

Divergent validity of SoC-13

The Pearson's correlation (r) between SoC-13, and different constructs measuring adverse conditions, demonstrated an association to the expected direction. Thus, the association between SoC-13 and measures for adversities is inverse and significant. Specifically, SoC-13 is inversely and significantly related to PC-PTSD ($r = -0.433$, $p < 0.001$), CES-D ($r = -0.597$, $p < 0.001$), pre-migration living difficulties ($r = -0.265$, $p < 0.001$), post-migration living difficulties ($r = -0.249$, $p < 0.001$). Besides, it has demonstrated significant but weak negative association with FAST ($r = -0.105$, $p < 0.001$).

Discriminant validity of SoC-13

Examination of the co-variances between the three latent factors indicate that the standardized coefficients for the three latent factors were found greater than or equal to 0.80 (above the maximum threshold of correlation coefficient to discriminate between factors) (see Figure-8).

5.2.3.2. Oslo Social Support Scale (OSS-3)

The item total correlation in the pilot study ($n = 52$) ranged from 0.61 to 0.72 whereas the range for main study sample ($n = 562$) is 0.71 to 0.78. The Cronbach's alpha value for pilot and main studies resulted in 0.39 and 0.58 respectively (see Table-13). The basic assumptions to run factor analysis for the Tigrigna version of Oslo Social Support Scale (OSS-3) were

met. Specifically, KMO was 0.621; Bartlett's test of sphericity was significant ($\chi^2=150.410$, $P<.001$). When tested for CFA, all items are adequately loaded onto a single latent factor (standardized coefficient >0.40). Specifically, all the items significantly and adequately loaded onto a single factor ranging from 0.49 to 0.68, with fit indices of $\chi^2=4.233$, $\chi^2/df=4.233$, CFI=0.978, TLI=0.934, RMSEA=0.076 (90% CI=0.014, 0.156). All the items received I-CVI of 1, which makes S-CVI to be 1 for the total scale (Table-13).

Table 13: Internal consistency, item-total correlation and content validity of the Tigrigna version of Oslo Social Support, three items (OSS-3)

Items	Item –total Correlation		I-CVI (n=562)
	Pilot study (n=52)	Main Study (n=562)	
OSS-1	0.677	0.722	1
OSS-2	0.613	0.705	1
OSS-3	0.717	0.777	1
*Cronbach's Alpha	0.385	0.575	S-CVI=1

Note: OSS-3 (Oslo Social support Scale, 3-items); I-CVI (item level content Validity Index); S-CVI (Scale Level content Validity Index)

5.2.3.2. Coping style scale

In the present study, the internal consistency Cronbach's alpha value was found to be 0.61 in the pilot study (n=50) and 0.48 in the main study (n=562). The three factors of coping have demonstrated reasonable fit to the present data with exclusion of item-8 ($\beta = 0.014$, $p > 0.05$). The remaining 9-items also have shown close fit to the data: $\chi^2=54.549$; $\chi^2/df=2.273$; CFI=0.901; TLI= 0.851; RMSEA=0.048 (90% CI=0.031, 0.064).

In summary, detailed description regarding the basic psychometric properties of the Tigrigna version of each measure adapted in the present study with respect to internal consistency, the best fitting factor structure (model) from among theoretically plausible models, and the range of item loadings to the respective latent factors are summarized in Table-14.

Table 14: Internal consistency, factor structure and item loadings of measures in pilot and main studies

Measure	Number of items	study	Internal consistency (Cronbach's alpha)	Best fitting factor structure	Item loadings (range)
Pre and post Migration Living difficulties check list	14	Pilot(n=50)	0.86		
(pre-migration experiences)		Main(562)	0.88	Two factors: CFI=0.971; RMSEA=0.058(90%CI=0.048, 0.068)	0.21 to 0.83
(Post-migration experiences)		Pilot(n=50)	0.88		
		Main(n=562)	0.85	Two factors: CFI=0.950; RMSEA=0.067(90%CI= 0.058, 0.078)	0.31 to 0.70
Center for Epidemiologic Depression Scale (CES-D)	20	Pilot(n=50)	0.92		
		Main(n=562)	0.91	Two factors: CFI=0.975; RMSEA=. (90%CI=0.032, 0.047)	0.46 to 0.76
Primary Care PTSD Screener (PC-PTSD)	4	Pilot(n=50)	0.68		
		Main(n=562)	0.70	One factor CFI=0.963;RMSEA=0.117(90%CI=0.070, 0.17)	0.43 to 0.78
Coping style scale	10	Pilot(n=50)	0.61		
		Main(562)	0.48	Three factors(9-items) CFI=0.901; RMSEA=0.048(90%CI=0.031, 0.064).	0.15 to 0.53
Sense of Coherence Scale (SoC-13)	13	Pilot(n=52)	0.67		
		Main(562)	0.74	One factor(12-items) CFI=0.98; RMSEA=0.035(90%=0.18-50)	0.12 to 0.70
Oslo Social Support Scale (OSS-3)	3	Pilot(n=52)	0.39		
		Main(n=562)	0.58	One factor: CFI=0.978; RMSEA=0.076(90%CI =0.014, 0.156).	0.49 to 0.60
Fast Alcohol Screening Test (FAST)	4	Pilot(n=52)	0.73		
		Main(n=562)	0.86	One factor: CFI=0.995;RMSEA= 0.115; (90%CI=0.053, 0.192)	0.45 to 0.96

Note: CFI=Comparative Fit Index; RMSEA=Root Mean Square Error of Approximation

5.3. Associates of PTSD and depression

The data for the two primary outcome measures (i.e. PTSD and depression) were normally distributed. There was no evidence of multi co-linearity among independent variables as evidenced with values of Variance Inflation Factor (VIF) less than 10 and values of tolerance greater than 0.1. These are minimal preconditions that should be satisfied to carry out multiple linear regression analysis. The findings from regression analysis are summarized in Table-15 for short term residents (n=287) and in Table-16 for long term residents (n=275).

Table 15: Associates of PTSD and depression symptoms in multiple linear regression models for short term residents (n=287)

Predictors	Model-A <i>PTSD symptoms as an outcome</i>				Model-B <i>Depression symptoms as an outcome</i>			
	R ²	Adj. R ²	SE	p-value	R ²	Adj. R ²	SE	p-value
	0.382	0.339	1.11	<0.001	0.630	0.604	7.58	<0.001
	Standardized Estimate (β)	Unstandardized Estimate (95%, CI)	p-value		Standardized Estimate (β)	Unstandardized Estimate (95%, CI)	p-value	
Gender: Male (ref.)								
Female	0.12	0.03 (-0.27, 0.34)	0.832		-0.01	-0.26 (-2.36, 1.83)	0.804	
Age (in years)	0.11	0.02 (-0.01, 0.04)	0.139		-0.11	-0.14 (-0.28, 0.002)	0.053	
Frequency of prayer	0.11	0.18 (0.01, 0.35)	0.040		0.01	0.17 (-1.01, 1.34)	0.778	
Employment opportunity:								
No(ref.)								
Yes	0.09	0.35(-0.02, 0.73)	0.067		-0.01	-0.35 (-2.94, 2.24)	0.791	
Marital status:								
Unmarried (ref.)								
Married	0.05	0.13 (-0.21, 0.46)	0.464		-0.01	-0.21 (-2.48, 2.07)	0.860	
Divorced	-0.07	-0.46 (-1.22, 0.30)	0.235		0.02	0.94 (-4.26, 6.15)	0.722	
Widowed	-0.01	-0.07 (-0.97, 0.82)	0.875		0.02	1.20 (-4.87, 7.28)	0.697	
Education background								
Non-literate (ref.)								
Elementary school	0.11	0.30 (-0.17, 0.77)	0.211		-0.03	-0.66 (-3.87, 2.56)	0.688	
Secondary school	0.20	0.57 (0.06, 1.08)	0.028		-0.02	-0.54 (-4.03, 2.94)	0.760	
College graduate & above	0.11	0.88 (-0.02, 1.77)	0.055		-0.08	-5.35 (-11.43, 0.74)	0.085	
Religion: Orthodox (ref.)								
Protestant	-0.03	-0.24 (-1.16, 0.69)	0.613		-0.03	-2.30 (-8.57, -3.97)	0.471	
Catholic	0.03	0.19 (-0.52, 0.90)	0.600		0.08	4.71 (-0.09, 9.50)	0.054	
Muslim	0.04	0.24 (-0.43, 0.91)	0.487		-0.05	-2.78 (-7.34, 1.77)	0.230	
Pre-migration difficulties	0.04	0.01 (-0.01, 0.02)	0.573		0.37	0.39 (0.29, 0.49)	<0.001	
Post-migration difficulties	-0.03	-0.01 (-0.03, 0.02)	0.626		0.14	0.31 (0.13, 0.49)	0.001	
PTSD	NA				0.22	1.90 (1.11, 2.19)	<0.001	
Depression	0.37	0.04 (0.02, 0.06)	<0.001		NA			
Coping style	-0.01	-0.01 (-0.08, 0.07)	0.877		0.01	0.03 (-0.47, 0.53)	0.125	
Sense of Coherence	-0.20	-0.03 (-0.06, -0.01)	0.002		-0.35	-0.51 (-0.64, -0.38)	<0.001	
Social support	-0.14	-0.09(-0.16, -0.02)	0.010		-0.17	-0.74 (-1.21, -0.29)	0.002	

Legend: Independent variables entered in model-A and model-B: gender, age, frequency of prayer, marital status, educational background, religion, pre-migration living difficulties, post-migration living difficulties, coping styles, sense of coherence and social support; depression(for model-A), PTSD (for model-B).

There was a significant difference in the pre-migration living difficulties mean score of long term resident refugees (mean=33.59, sd=11.66) and short term residents (mean = 31.48,

sd=11.33) (t=2.182, df=560, p=0.030 (95%CI for mean difference: 0.21, 4.02). However, the difference in mean score of post-migration living difficulties was not statistically significant.

Table 16: Associates of PTSD and depression symptoms in multiple linear regression models for long term residents (n=275)

Predictors	Model-C <i>PTSD symptoms as an outcome</i>				Model-D <i>Depression symptoms as an outcome</i>			
	R ²	Adj. R ²	SE	p-value	R ²	Adj. R ²	SE	p-value
	0.354	0.306	1.22	<0.001	0.648	0.621	8.34	<0.001
	Standardized Estimate (β)	Unstandardized Estimate (95%, CI)	p-value		Standardized Estimate (β)	Unstandardized Estimate (95%, CI)	p-value	
Gender: Male (ref.)								
Female	0.04	0.13 (-0.24, 0.50)	0.496		-0.03	-0.68 (-3.21, 1.86)	0.599	
Age (in years)	-0.002	0.00 (-0.02,, 0.02)	0.980		-0.04	-0.05 (-0.18, 0.08)	0.424	
Frequency of prayer	0.08	0.16 (-0.07, 0.39)	0.178		-0.09	-1.79 (-3.36, -0.22)	0.026	
Employment opportunity:								
No(ref.)								
Yes	0.003	0.07(-0.31, 0.33)	0.964		-0.02	-0.56 (-2.75, 1.64)	0.618	
Marital status: Unmarried (ref.)								
Married	0.09	0.28 (-0.14, 0.69)	0.186		-0.09	-2.61 (-5.43, 0.20)	0.069	
Divorced	0.06	0.36 (-0.38, 1.09)	0.341		-0.08	-4.32 (-9.31, 0.67)	0.089	
Widowed	0.01	0.09 (-0.96, 1.15)	0.863		0.004	.30 (-6.88, 7.49)	0.934	
Education background								
Non-literate (ref.)								
Elementary school	0.15	0.44 (-0.10, 0.98)	0.110		-0.11	-3.16 (-6.84, 0.52)	0.092	
Secondary school	0.13	0.37 (-0.20, 0.94)	0.201		-0.13	-3.39 (-7.25, 0.47)	0.085	
College graduate & above	0.08	0.51(-0.33, 1.36)	0.231		-0.03	-1.81 (-7.56, 3.95)	0.537	
Religion: Orthodox (ref.)								
Protestant	-0.05	-0.37 (-1.20, 0.47)	0.385		-0.09	-6.14(-11.78, -0.51)	0.033	
Catholic	0.04	0.29 (-0.47, 1.04)	0.443		0.03	1.73 (-3.34, 6.84)	0.504	
Muslim	0.02	0.09 (-0.40, 0.57)	0.731		-0.01	-0.27 (-3.60, 3.06)	0.874	
Pre-migration difficulties	0.18	0.02(0.01, 0.04)	0.006		0.24	0.28 (0.17, 0.39)	<0.001	
Post-migration difficulties	-0.07	-0.01 (-0.04, 0.01)	0.292		0.27	0.51 (0.34, 0.68)	<0.001	
PTSD	NA				0.24	2.17 (1.37, 2.97)	<0.001	
Depression	0.43	0.05 (0.03, 0.07)	<0.001		NA			
Coping style	-0.08	-05 (-0.13, 0.02)	0.152		0.04	0.27(-0.22, 0.77)	0.276	
Sense of Coherence	-0.14	-0.02(-0.04, -0.001)	0.039		-0.30	-0.44 (-0.57, -0.31)	<0.001	
Social support	-0.01	-0.01 (-0.08, -0.06)	0.849		-0.11	-0.60 (-1.06, -0.13)	0.013	

Legend: independent variables entered in model-C and model-D: gender, age, frequency of prayer, marital status, educational background, religion, pre-migration living difficulties, post-migration living difficulties, coping styles, sense of coherence and social support; depression(for model-C) and PTSD (for model-D)

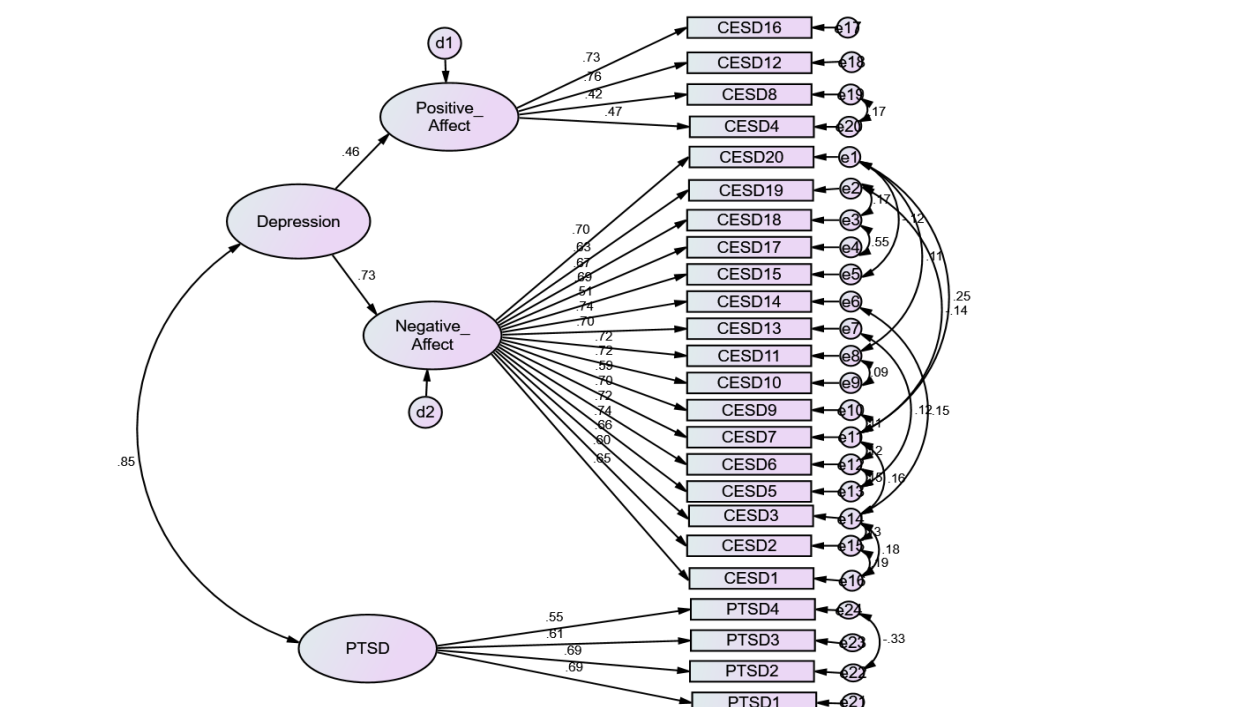
PTSD symptoms were significantly and positively associated with depressive symptoms ($\beta = 0.37$, $p < 0.001$) among short term residents, while sense of coherence ($\beta = -0.20$, $p < 0.01$) and social support ($\beta = -0.14$, $p < 0.05$) were inversely related to PTSD symptoms (Table-15, model-A). In this model, being literate (secondary school complete) was significantly and positively associated with PTSD symptoms compared to being non-literate ($\beta = 0.20$, $p < 0.05$). Increased frequency of prayer showed a significant positive relationship with PTSD ($\beta = 0.11$, $p < 0.05$).

Out of the total variability in depressive symptoms for participants of short term residents (n=287), 63% was explained by the regression model (Table-15, model-B), while 64.8% of depressive symptoms was explained by the regression model (Table-16, model-D) for long term residents (n=275). For the latter group, increased depressive symptoms were positively associated with symptoms of PTSD ($\beta = 0.24$, $p < 0.001$), pre-migration living difficulties ($\beta = 0.24$, $p < 0.00$) and post-migration living difficulties ($\beta = 0.27$, $p < 0.001$). On the other hand, good sense of coherence ($\beta = -0.30$, $p < 0.001$) and social support ($\beta = -0.11$, $p < 0.05$) were significantly and inversely associated with depressive symptoms for this sub-sample. Among socio-demographic variables, increased frequency of prayer ($\beta = -0.09$, $p < 0.05$) and being a protestant Christian ($\beta = -0.09$, $p < 0.05$) were significantly associated with reduced symptoms of depression for long-term residents (see Table-16, model-D).

5.4. Symptom covariance between depression and PTSD

Structural Equation Modeling (SEM) showed that there was 85% co-variance between the latent factors of PTSD and depression. After allowing selected error terms to correlate, this structural model had excellent fit to the data (CFI=0.953; RMSEA=0.046 (95%CI=0.041, 0.052) (Figure-11).

Figure- 11: Structural model depicting symptom co-variance between PTSD and depression

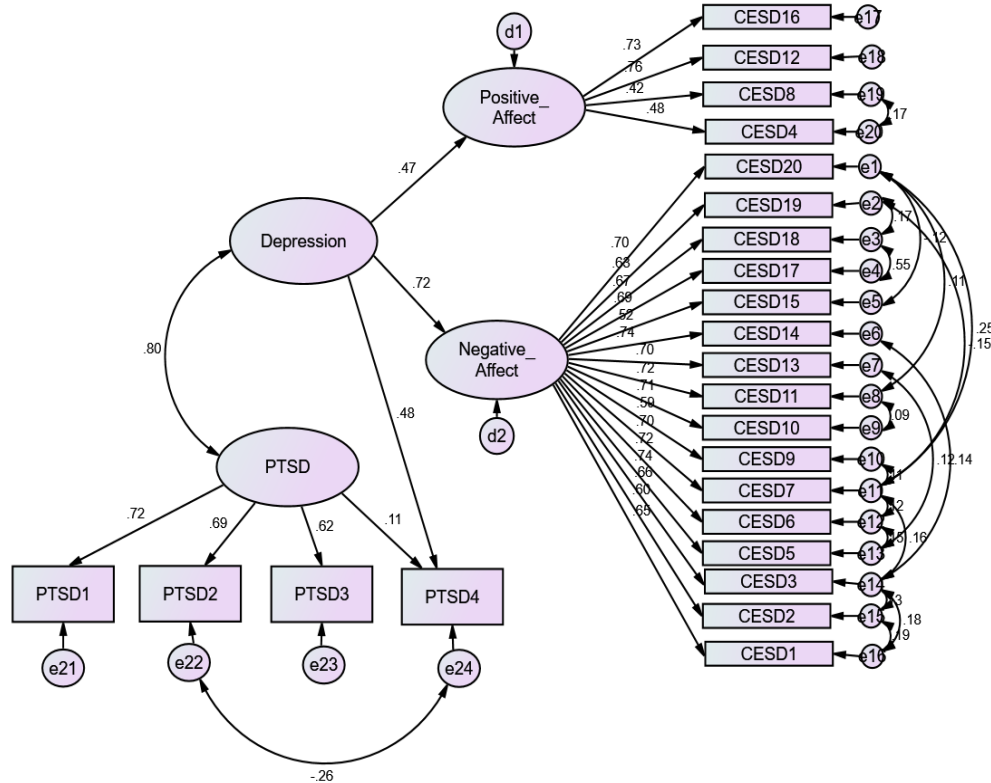


Note: PTSD1 (Re-experiencing); PTSD2 (Avoidance); PTSD3 (Arausal); PTSD4 (Numbing)

$\chi^2=510.033$; $\chi^2/df=2.198$; $df=232$; CFI=0.953; TLI= 0.943; GFI= 0.929; RMSEA=0.046 (90%CI=0.041,0.052)

After pre-specifying ‘numbing’ as an indicator variable for both PTSD and depression, there was 80% co-variance between the two latent factors of PTSD and depression, and the fit indices remained the same (CFI= 0.954; TLI= 0.949; RMSEA= 0.046; SRMSR= 0.0434). The numbing item significantly loaded onto both PTSD and depression, explaining 11% of the variance of the PTSD latent factor and 48% of the variance of the depression latent factor (Figure-12).

Figure 12: Numbing as a common indicator symptom in structural model of symptom co-variance and overlap between PTSD and depression.



PTSD1 (Re-experiencing); PTSD2 (Avoidance); PTSD3 (Arousal); PTSD4 (Numbing)

Model fit: $\chi^2=500.285$; $DF=231$; $\chi^2/df=2.166$; CFI= 0.954; TLI= 0.949; RMSEA= 0.046; RMSR= 0.0434

5.5. Correlates of refugees' alcohol use

The overall the prevalence of alcohol use in the present study, based on the recommended cut-off point is ≥ 3 in FAST, is 19.4% for the total sample, which is 27.52% for males and 12.5% for females. Test results for assumptions of normality for the FAST indicate that our data was not normally distributed (see supplementary Figure 5 and supplementary Figure-6 in appendices). Hence logistic regression model was found ideal to identify correlates of refugees' alcohol misuse. In the multivariable logistic regression model (Table-17), findings suggested that being female was inversely associated with risk of alcohol misuse,

which showed 70% decreased odds of alcohol misuse for females compared to males (Adj. OR = 0.30 [95%, CI= 0.17 0.55], $p < 0.001$) Participants aged 25-34 (Adj. OR = 0.40 [95%, CI =0.20, 0.80], $p < 0.05$) and those within age group of 45-54 (Adj. OR =0.14 [95% CI=0.02, 0.78], $p < 0.05$) were less likely in using alcohol compared to the younger refugees aged 18-24.

Table 17: Correlates of refugees' alcohol use in the logistic regression model

Independent Variables		Number (%)	Number (%) (≥ 3 cut-off points)	Adj. OR (95%, CI)
Gender:	Male (ref.)	258(45.9)	71(27.52)	1.00
	Female	304(54.1)	38(12.5)	0.30*** (0.17, 0.55)
Age:	18-24 (ref.)	205(36.5)	53(9.4)	1.00
	25-34	219(39.0)	32(5.7)	0.40** (0.20, 0.80)
	35-44	89(15.8)	19(3.4)	0.77 (0.31, 1.89)
	45-54	29(5.2)	2(0.4)	0.14* (0.02, 0.78)
	55-64	15(2.5)	2(0.4)	0.61(0.10, 3.77)
	65-74	5 (0.9)	1(0.2)	2.12 (0.16, 28.41)
Marital Status:	Unmarried (ref.)	189(33.6)	51(9.07)	1.00
	Married	327(58.2)	55(9.8)	1.10 (0.57, 2.07)
	Divorced	29(5.2)	2(0.4)	0.33 (0.60, 1.88)
	Widowed	17(3.0)	1(0.2)	0.21 (0.02, 2.15)
Employment opportunity:				
	No (ref.)	398(70.8)	77(13.70)	1.00
	Yes	164(29.2)	32(5.7)	1.30 (0.70, 2.39)
Education:	Non-literate (ref.)	67(11.9)	5(0.9)	1.00
	- Elementary school	232(41.3)	60(10.68)	2.44 (0.80, 7.46)
	- Secondary school	238(42.3)	39(6.94)	1.08 (0.34, 3.48)
	-College graduate or above	25(4.5)	5(0.9)	0.82 (0.17, 4.08)
Frequency of prayer				0.51*** (.37, 0.70)
Duration of stay				0.91 (.82, 1.01)
Pre-migration difficulties				1.09*** (1.03, 1.08)
Post-migration difficulties				0.98(0.93, 1.02)
Task-oriented coping				1.07 (.87, 1.32)
Avoidance-oriented coping				0.77 (.57, 1.03)
Emotion-oriented coping				1.63** (1.15, 2.32)
Sense of Coherence				0.97 (0.94, 1.01)
Social support				1.03 (.91, 1.16)
Total		562(100%)	109 (19.4)	

*** $p < .001$, ** $p < .01$, * $p < .05$

Legend: independent variables entered in the model: gender, age, marital status, educational background, frequency of prayer, duration of stay, pre-migration living difficulties, post-migration living difficulties, task-oriented coping, avoidance-oriented coping, emotion-oriented coping, sense of coherence and social support.

Frequency of prayer was associated with decreased odds of alcohol use (Adj. OR = 0.51 [95%, CI= 0.37, 0.70], $p < .001$). Use of emotion oriented coping style was associated with higher odds of alcohol use (Adj. OR=1.63 [95% CI=1.15, 2.32], $p < 0.01$). Exposure to pre-

migration living difficulties was associated with higher odds of alcohol use (Adj. OR = 1.09 [95%, CI =1.03, 1.08] $p < 0.001$) (see Table-17).

5.6. Direct and mediating associates of PTSD and depression

The path model presented in Figure-13 fitted to the data well (CFI=0.985; TLI= 0.972; RMSEA=0.034 [90% CI=0.013, 0.053]; $p=0.022$). Both pre-migration ($\beta=-0.19$, $p<0.001$) and post-migration ($\beta = -0.15$, $p<0.001$) traumatic events were significantly associated with sense of coherence. Sense of coherence in turn was significantly and negatively associated with symptoms of PTSD ($\beta = -0.16$, $p<0.001$) and depression ($\beta= -0.40$, $p<0.001$). Pre-migration living difficulties were directly associated with symptoms of PTSD ($\beta=0.09$, $p < 0.05$) and with depression ($\beta= 0.35$, $p < 0.001$). It was also indirectly associated with depression via sense of coherence and post-migration living difficulties. Post-migration living difficulties were directly associated with depression ($\beta= 0.23$, $p<0.001$) and indirectly associated with PTSD via sense of coherence, symptoms of depression, and task-oriented coping style.

Duration of stay in the refugee camp, sense of coherence, post-migration living difficulties, task-oriented coping style and depression together mediated the association between pre-migration living difficulties and PTSD symptoms (standardized indirect coefficient = 0.26, $p < 0.01$). Similarly, task-oriented coping style, sense of coherence and depression together mediated the association between post-migration living difficulties and PTSD symptoms (standardized indirect coefficient= 0.13, $p<0.01$) (see Table-18).

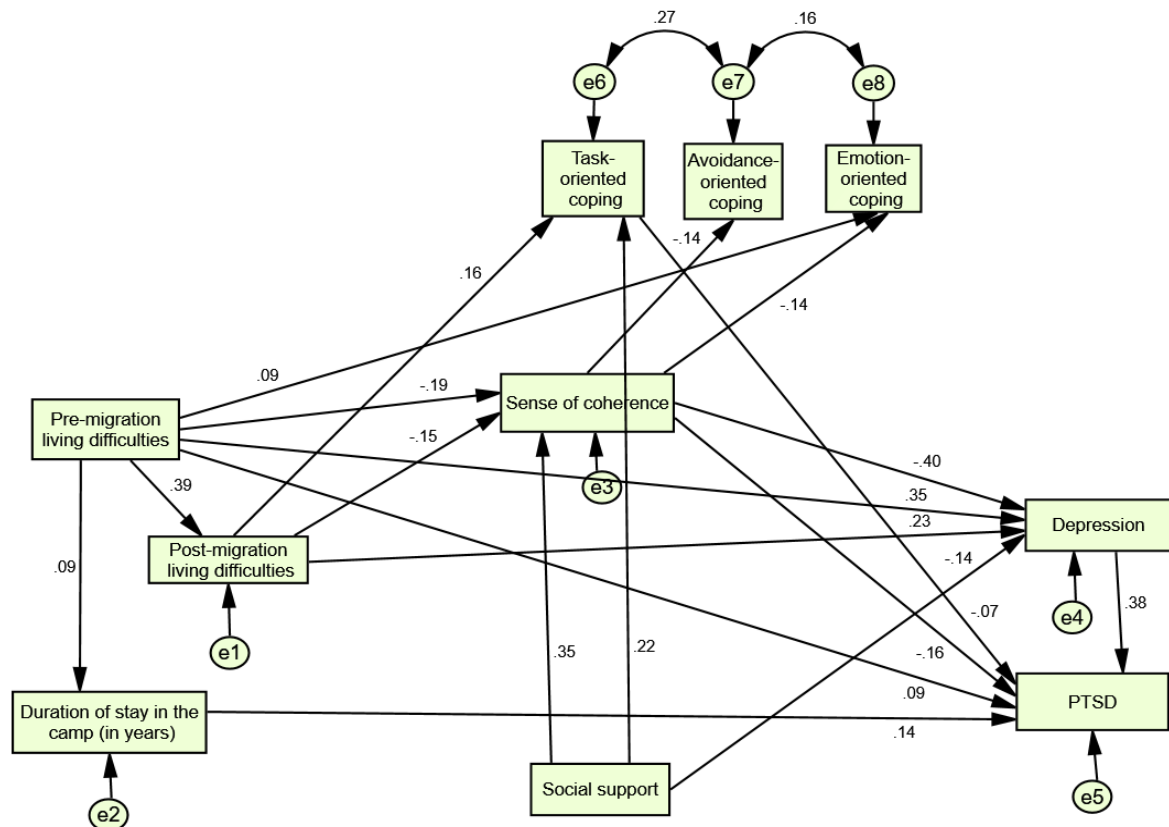
Table 18: Mediation analysis between exposure to trauma during pre and post-migration period and symptoms (PTSD and depression)

Hypothesized relationship	Mediating variables	Standardized Direct Effect	Standardized Indirect Effect	Result
1. Pre-migration living difficulties → PTSD	Duration of stay in the camp, sense of coherence, post-migration living difficulties, task-oriented coping, depression	0.09*	0.26**	Partially mediated
Post-migration living difficulties → PTSD	Task-oriented coping, sense of coherence and depression	-0.05(n.s)	0.13**	Partially mediated
Pre-migration living difficulties → Depression	Sense of coherence and post-migration living difficulties	0.35***	0.19**	Partially mediated
Post-migration living difficulties → Depression	Sense of coherence	0.23***	-0.06**	Partially mediated

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; n.s = not significant

Pre-migration and post migration living difficulties were not significantly associated with social support implying that social support is not a significant mediator for the association between exposure to trauma and symptoms (Figure-13).

Figure-13: Path model depicting direct and indirect (mediated) association between exposure to trauma and mental health outcomes



Legend: Rectangles represent indicator items; single headed arrows along with standardized weights represent path weights (equivalent to regression beta weights); circles represent error terms (e). Model fit: $\chi^2=39.97$; $df = 24$; $\chi^2/df = 1.67$; CFI=0.985; TLI= 0.972; SRMR=0.05; RMSEA=0.034 (90% CI=0.013, 0.053); $p=0.022$

The association between pre-migration living difficulties and depression was partially mediated and strengthened by exposure to post-migration living difficulties, where the latter two variables demonstrated positive association ($\beta= 0.23$, $p< 0.001$). Pre-migration living difficulties were significantly and positively associated with emotion-oriented coping style ($\beta= 0.09$, $p < 0.05$) as well as post-migration living difficulties ($\beta=0.39$, $p < 0.001$). On the other hand, post-migration living difficulties were positively associated with task-oriented coping style ($\beta=0.16$, $p<0.001$). Depression partially mediated and strengthened the

association between post-migration traumatic events and symptoms of PTSD such that the direct positive association between depression and PTSD, after accounting variables in the path model, was fairly strong ($\beta = 0.38$, $p < 0.001$) (see Figure-13).

5.7 Moderators of exposure to traumatic events

Test for moderation (interaction effect) (Table-19) illustrated that sense of coherence and task-oriented coping style did not moderate the effect of pre-migration living difficulties and post-migration living difficulties on both PTSD and depression ($p > 0.05$). However, the interaction between social support and post-migration living difficulties was inversely associated with depression ($\beta = -0.106$, $p < 0.05$), and hence social support seemed to moderate the effect of post-migration living difficulties on depression.

Table 19: Moderation analysis for sense of coherence, task-oriented coping style and social support

Model	Main and interaction predictors	Standardized path coefficient to PTSD (n=562)	Standardized path coefficient to depression (n=562)
1	Pre-migration living difficulties	0.248***	0.440***
	pre-migration living difficulties x Sense of coherence	0.057	0.022
	Sense of coherence	-0.372***	-0.513***
2	Post-migration living difficulties	0.103**	0.371***
	Post-migration living difficulties x Sense of coherence	-0.036	0.053
	Sense of coherence	-0.407***	-0.536***
3	Pre-migration living difficulties	0.353***	0.547***
	pre-migration living difficulties x Task-oriented coping	0.027	-0.004
	Task-oriented coping	-0.092*	-0.012
4	Post-migration living difficulties	0.221***	0.466***
	Post-migration living difficulties x task-oriented coping	-0.019	-0.061
	Task-oriented coping	-0.076	0.000
5	Pre-migration living difficulties	0.327***	0.536***
	pre-migration living difficulties x social support	0.037	-0.006
	social support	-0.249***	-0.295***
6	Post-migration living difficulties	0.193***	0.445***
	Post-migration living difficulties x social support	-0.029	-0.106*
	Social support	-0.253***	-0.259***

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Emotion-oriented coping style seemed to have a moderating effect upon PTSD when interacting with threat for life sub-scale of pre-migration for both females ($\beta = -0.120$, $p < 0.05$) ($n=304$) and males ($\beta = -0.114$, $p < 0.05$) ($n=258$) (Table-20). It was also associated with reduced symptoms of PTSD and depression when interacting with threat for abuse sub-scale of pre-migration living difficulties. More specifically, the interaction between emotion-oriented coping styles with threat for abuse sub-scale of pre-migration trauma is negatively

and significantly associated both with PTSD and depression (Table-20: model-6). Sub-group analysis by gender (Table-20: models 7-12) showed that exposure to post-migration trauma was associated with symptoms of PTSD only in females ($p < 0.001$).

Table 20: Main and interaction effect of predictors on symptoms of PTSD and depression

Model	Main and interaction predictors	Standardized path coefficient to PTSD			Standardized path coefficient to Depression		
		Total (n=562)	Female (n=304)	Male (n=258)	Total (n=562)	Female (n=304)	Male (n=258)
1	Threat for life (Pre-migration)	.362***	.052***	.421***	.483***	.720***	.484***
	Threat for life(pre-m) x Task-oriented coping	.035	.085	.026	.026	.206	.057
	Task-oriented coping	-.089*	-.055	-.094	.009	.768	-.044
2	Threat for life (Pre-migration)	.362***	.317***	.428***	.492***	.514***	.494***
	Threat for life(pre-m) x Avoidance-oriented coping	-.069	-.048	-.059	-.046	-.021	-.030
	Avoidance-oriented coping	.021	.081	-.038	.028	.115	-.044
3	Threat for life (Pre-migration)	.362***	.319***	.422***	.483***	.514***	.484***
	Threat for life(pre-m) x Emotion-oriented coping	-.127**	-.120*	-.114*	-.047	-.060	-.015
	Emotion-oriented coping	.001	.006	-.020	.053	.067	.021
4	Threat for Abuse (Pre-migration)	.203***	.224***	.181**	.504***	.538***	.461***
	Threat for Abuse(pre-m) x Task-oriented coping	.010	.019	-.002	-.079*	-.098	-.060
	Task-oriented coping	-.066	-.069	-.064	-.012	.015	-.038
5	Threat for Abuse (Pre-migration)	.195***	.206***	.180**	.490***	.530***	.450***
	Threat for Abuse(pre-m) x Avoidance-oriented coping	-.025	-.006	-.024	-.005	.030	-.017
	Avoidance-oriented coping	.034	.077	-.002	.030	.089	-.014
6	Threat for Abuse (Pre-migration)	.238***	.227***	.269***	.517***	.543***	.495***
	Threat for Abuse(pre-m) x Emotion-oriented coping	-.180***	-.133*	-.240***	-.116**	-.093	-.154**
	Emotion-oriented coping	-.009	.011	-.036	.006	.030	-.024
7	Threat for life (Post-migration)	.190***	.293***	.078	.449**	.502***	.400***
	Threat for life(post-m) x Task-oriented coping	-.035	-.009	-.034	-.070*	-.056	-.090
	Task-oriented coping	-.073	-.072	-.069	.002	.063	-.061
8	Threat for life (Post-migration)	.182***	.281***	.067	.453***	.522***	.382***
	Threat for life(post-m) x Avoidance-oriented coping	-.019	-.013	-.016	.029	.045	.017
	Avoidance-oriented coping	.037	.083	-.002	.050	.114*	-.007
9	Threat for life (Post-migration)	.182***	.281***	.063	.452***	.521***	.382***
	Threat for life(post-m) x Emotion-oriented coping	.004	.034	-.040	.008	.000	.012
	Emotion-oriented coping	.022	.023	.020	.075**	.061	.088
10	Threat for Abuse (Post-migration)	.206***	.281***	.106	.328***	.380***	.280***
	Threat for Abuse(post-m) x Task-oriented coping	.004	.029	-.034	-.054	-.107*	-.002
	Task-oriented coping	-.061	-.072	-.061	.038	.078	-.006
11	Threat for Abuse (Post-migration)	.199***	.276***	.093	.329***	.387***	.273***
	Threat for Abuse(post-m) x Avoidance-oriented coping	.024	.025	.049	.033	.040	.023
	Avoidance-oriented coping	.052	.097	.013	.069	.126*	.014
12	Threat for Abuse (Post-migration)	.201***	.272***	.111	.331***	.384***	.278***
	Threat for Abuse(post-m) x Emotion-oriented coping	-.005	-.018	.003	-.033	-.014	-.052
	Emotion-oriented coping	.040	.050	.027	.109*	.111*	.106*
13	Task oriented coping	-.049	-.025	-.072	.038	.114*	-.039
	Task-oriented coping x Emotion –oriented coping	-.025	.014	-.067	-.125**	-.115*	-.148*
	Emotion-oriented coping	.033	.043	.035	.098*	.077	.125*

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Task-oriented coping style was independently and negatively associated with PTSD (Table-20: model-1), while emotion-oriented coping style showed positive association with depression (Table-20: models 9, 12 and 13) independently. On the contrary, the interaction

between emotion-oriented and task-oriented coping styles were negatively and significantly associated with depression for females ($\beta = -0.12$, $p < 0.05$) and males ($B = -0.15$, $p < 0.05$). Emotion-oriented coping style had inverse association with symptoms when interacting with other variables (Table-20: Model-3, 6 & 13), but it demonstrated a positive association with psychological symptoms when tested for independent prediction. Avoidance-oriented coping style was positively associated with symptoms of depression for females when tested as independent predictors (Table-20: models-8 & 11).

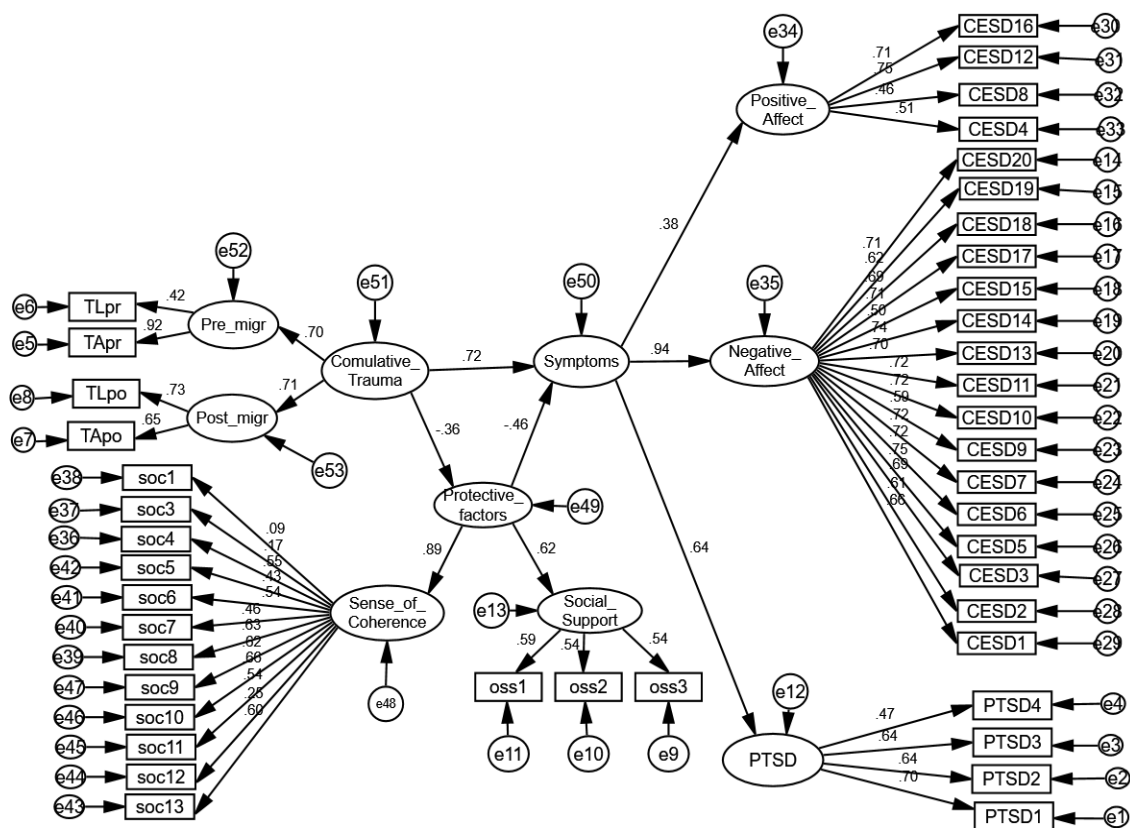
5.8. Structural Model

Before running analysis of structural equation modeling (SEM), Pearson's correlation matrix was carried out to evaluate the interrelationship among variables of research interest, and hence expected correlation coefficient was obtained with variables of the research interest (see appendix table-4). Then possible violation of multivariate normality for model-A due to outliers were evaluated using Mahalanobi's distance, which recommended critical value ($p < 0.001$), and resulted in two potential outliers. Hence, these two observations were excluded from the analysis for model-A (Figure-14). Then, we rerun the analysis with sample of ($n=560$) for model-A. In addition, for the second model, the potential outliers having above the critical value of Mahalanobi's distance ($p < 0.001$) were 11 observations. We rerun the analysis with the reduced sample ($n=551$) to obtain optimal estimate for model-B (Figure-15).

Model-A (Figure-14) depicts direct and indirect structural relationships between second-order composite latent factor of cumulative trauma (accountable for first-order pre-migration and post-migration living difficulties) and psychological symptoms (a common latent factor for PTSD and depression). Analysis of the first SEM model (Figure-14) with the reduced sample ($n=560$) has not achieved minimum requirements for analysis, because of negative definitiveness across the matrix in the latent factors. However, constraining of the unstandardized estimates for additional two paths has resulted in the achievement of minimum requirement to run the model properly with indices of CFI=0.778; RMSEA=0.066(90%CI=0.063, 0.068). After allowing error terms to correlate, the modified model has shown close fit to the present data (CFI=0.865; TLI=0.850, SRMR=0.07, RMSEA=0.053 (0.050, 0.055) (see Table-21: model-A, correlated error terms).

The result of SEM analysis (Figure-14) indicated that the two constructs significantly loaded onto a second order common factor. Specifically, two first-order latent factors of depression (i.e. negative affect and positive affect) explain 94% and 38% of variance to the common factor (psychological symptoms); whereas 64% of this common factor, psychological symptoms, is explained by first order single factor of PTSD. Cumulative trauma has directly predicted psychological symptoms ($\beta=0.72$, $p<0.001$).

Figure 14: Full structural model depicting direct and indirect association between cumulative trauma and symptoms

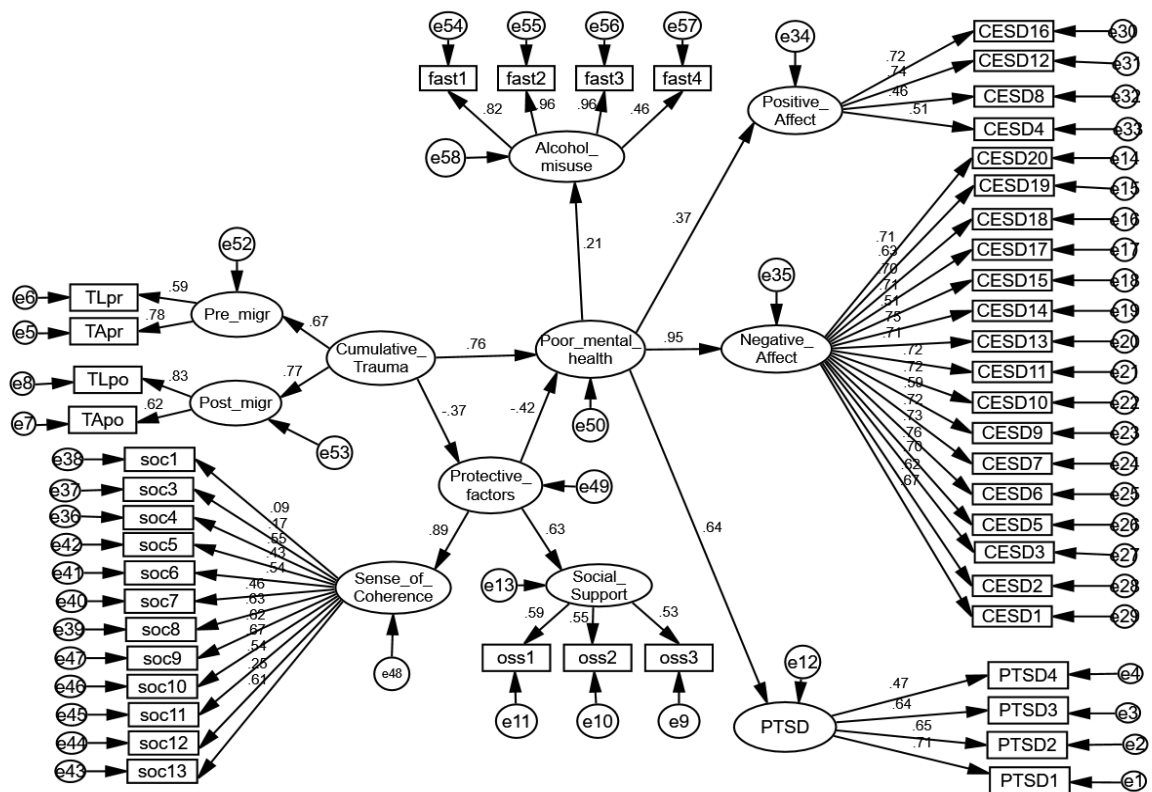


Note: Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent item and factor loadings; circles represent error terms (e); TLpr(threat for life in premigration);TApr(threat for abuse in premigration);TLpo(threat for life in post migration);TApo(threat for abuse inpostmigration); Pre_mig (premigration living difficulties);Post_mig(postmigration living difficulties);soc(sense of coherence); oss(oslo social support); PTSD (post traumatic stress disorder);CESD (center for epidemiologic studies depression scale).

In the second SEM model indicated by Figure-15, assuming that alcohol misuse accompanies psychological crisis for Eritrean refugees in the context of Ethiopia refugee

camp based on previous literature and theory, alcohol misuse was added as a secondary co morbid disorder by pre-specifying it to load onto a second-order common factor together with symptoms of PTSD and depression.

Figure 15: Full structural model depicting direct and indirect association between cumulative trauma and poor mental health



Note: Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent factor loadings; circles represent error terms (e); TLpr(threat for life in premigration);TApr(threat for abuse in premigration);TLpo(threat for life in post migration);TApo(threat for abuse inpostmigration); Pre_mig (premigration living difficulties);Post_mig(postmigration living difficulties);soc(sense of coherence); oss(oslo social support); PTSD (post traumatic stress disorder);CESD (center for epidemiologic studies depression);FAST(fast alcohol screening test).

Table 21: Comparison of fit indices for plausible structural models to the present data of Eritrean refugee sample

Models		χ^2	χ^2/df	CFI	TLI	SRMR	RMSEA(90%CI)	p-value	Observations adjusted for outliers
Model-A	(uncorrelated error terms)	2916.807	3.423	0.778	0.765	0.0830	0.066(0.063,0.068)	p<0.001	(n=560)
	(correlated error terms)	2068.584	2.548	0.865	0.850	0.0700	0.053 (0.050, 0.055)	p<0.001	(n=560)
Model-B	(uncorrelated error terms)	3288.591	3.212	0.799	0.788	0.0822	0.063(0.061,0.065)	p<0.001	(n=551)
	(correlated error terms)	2467.558	2.508	0.868	0.855	0.0730	0.052(0.055, 0.066)	p<0.001	(n=551)

Note: χ^2 =Chi-square; χ^2/df =Chi-square to degree of freedom; CFI=Comparative Fit Index; TLI= Tucker Lewis Index; SRMR=Standardized Root Mean Residual; RMSEA= Root Mean Square Error of Approximation

Therefore, adding alcohol misuse as a secondary co-morbid mental health problem of refugees in the model (Table-21: model-B, uncorrelated error terms) resulted in slight improvement of the fit of the model, compared with model-A (with uncorrelated error terms), with fit indices of CFI= 0.799; RMSEA=0.063(90%CI=0.061,0.065). After allowing error terms to correlate the modified model (Table-21: model-B, correlated error terms) has shown slight, but not substantially different fit indices to the current data compared to all models tested (χ^2/df =2.508, CFI=0.868; TLI=0.855, RMSEA= 0.052(90%CI=0.055, 0.066). In the unmodified model (Table-21: model-B uncorrelated error terms), alcohol misuse significantly loaded onto the second-order common factor (β =0.21, p<0.001) with symptoms of PTSD and depression, which in the present study was referred to as ‘poor mental health’. It means 21% of variance for the second-order common factor (poor mental health) is accounted by refugees’ alcohol misuse.

In the second SEM model (Table-21: model-B uncorrelated error terms), cumulative trauma had two options to associate with a common latent factor representing poor mental health (i.e. co-morbid PTSD, depression, and alcohol misuse). One is through the direct path (β = 0.76, p<.001). The second is via protective factors (indirect standardized coefficient=0.153, p=.002). Indeed, the standardized total effect of cumulative trauma on co-morbid psychological symptoms and alcohol misuse is high (i.e. indirect effect + direct effect) =0.913. It means, 91.3% of the variance for the co morbid disorders (i.e. symptoms of PTSD

and depression and alcohol misuse together) was accounted by cumulative trauma, and hence only 8.7% of this latent factor (co morbid poor mental health) was unexplained by the model.

6. Discussion

In this section, key findings of the study are discussed with the aim of providing plausible explanations to unique findings in light of existing knowledge. Presentation of this section is organized by integrating findings reported in separate papers, each of which addressed key research questions. Hence, findings are discussed under the following major themes: findings on psychometric properties of measures; trauma related and socio-demographic factors as predictors of PTSD, depression symptoms, and alcohol misuse; direct, mediating and moderating effects in the relationship between exposure to traumatic events and psychological symptoms, and the co-morbidity of alcohol misuse and its structural relationship between cumulative trauma and poor mental health.

6.1. Validity of Center for Epidemiologic Depression Scale (CES-D)

Findings regarding the validity of CES-D indicated that first-order two factors with second-order single factor model of CES-D demonstrated a reasonable fit to the data with all the twenty items sufficiently loading onto their respective latent factors. There is a substantial improvement in the fit indices in the two models after allowing error terms to correlate. In addition, findings regarding the psychometric properties of SoC-13 showed acceptable psychometric properties with the exception of item-2. The remaining twelve items showed significant loadings to a single common factor, with good internal consistency, divergent and convergent validity, implying the potential use of this measure in the context of Eritrean refugees. In other words, after permission of error terms to correlate, a 5-point response format, single latent factor model of SoC with 12-items best fitted the current data.

The fit of our data with two factors structure of CES-D supported previous findings in the African context, such as evidence from a study in South Africa (71), and from the sample of genocide survivors in Rwanda (55), non-institutionalized civilian Puerto Ricans living on the Islands (70), and elderly Mexicans in the United States (67). It can be inferred that depression, as measured by CES-D, is best presented in terms of two factors instead of four factor structure proposed by the original scale developer (68) as well as demonstrated in Eritrean refugees in United States (56). Our finding come up with a contrasting finding regarding factor structure of depression for the same people who are living in different

geographical and social environment, which underlines prevailing current culture as more determinant for symptom expression of depression than ethnicity.

Unlike the evidence from Puerto Ricans, which indicates two factors structure of CES-D was non-invariant between males and female (70), the overall first-order two factors with second-order single factor model of CES-D (uncorrelated error terms) is invariant between male and female refugees in the present study. This is because chi-square differences ($\Delta\chi^2$) for measurement weight, measurement intercept, and structural covariance and measurement residuals were not statistically significant ($p > 0.05$).

The Cronbach's alpha value of 0.91 obtained for the whole scale as a measure of internal consistency in the present study is comparable with previous findings in African settings, such as 0.86 in Rwanda and 0.90 in South Africa (156). Item-8, (*I felt hopeful about the future*), and item-4 (*I felt that I was just as good as other people*) showed the lower item-total correlation both in the pilot and in the main studies. This weaker correlation of item-4 in the present study supported previous evidence reported in cross cultural studies in Latin America, Spain and Mexico (62). The association between CES-D and other measures of adverse conditions in the current study including PC-PTSD, pre and post-migration living difficulties checklist, and FAST indicate a significant positive relationship. This implies that there is acceptable convergent validity between CES-D and measures of theoretically related constructs.

Test for discriminant validity in the present study between four latent correlated factors, in light of the proposed Sheehan's item allocation (61), demonstrated that there is strong co-variance among the three factors of depressive affect, somatic vegetative and interpersonal problems ($r \geq 0.94$, $p < 0.001$). This correlation is greater than 0.80 which is the maximum cut-off value for a factor to be significant for discriminant validity (153). This may imply that the factors may stand to measure similar or the same construct. However, there is a satisfactory discriminant validity below the threshold cut-off point ($r < 0.80$) demonstrated between positive affect and each of the three latent factors (i.e. depressive affect, somatic vegetative and interpersonal problems) with standardized co-variance of 0.37, 0.29 and 0.31, respectively. This indicates that the coefficients for the three former highly correlated factors indicate above the maximum threshold of discriminant validity. This may imply that the three correlated sub-scale factors (i.e. depressive affect, somatic vegetative and interpersonal

problem) measure similar or same factor, while the later absence of positive affect may represent the second distinct factor for depression construct.

6.2. Validity of sense of Coherence (SoC-13)

The psychometric properties of SoC-13 showed the potential benefit of this measure in the context of Eritrean refugees. SoC with 12-items best fitted the current data: compared to computing factor structures of SoC-13 in the literature. However, uncorrelated model of SoC-13 has demonstrated poor fit to the present data compared to the fit indices of the same scale with specified model in sample from South Africa (157). Hence, the Cronbach alpha value after deleting item-2 hasnot deminished (i.e.Cronbach's $\alpha = 0.748$) for SoC-12 compared to the SoC-13, which resulted in alpha value of 0.736. Therefore, item- 2 which stated as: *"Has it happened in the past that you were surprised by the behavior of people whom you thought you knew well?"* has demonstrated poor item in its present translation, because it didn't demonstrate significant loadings, indicating poor convergent validity. Although item-2 may get improved after paraphrasing and substituting the item with a Tigrigna translation, which can capture cultural idioms in Eritrea reflecting the same notion.

The present CFA finding has supported a substantial body of literature regarding the dimensionality of SoC-13, including the one factor solution proposed by the scale developer, Anthonovsky (140), and with the other evidence from Italian sample (103). However, our finding is not in line with previous findings, which supported a three factor model of SoC-13 in Peruvian sample (104) and Dutch speaking Belgians (106).

The current finding with respect to lower item loading of item-1 can be justified by evidence from previous qualitative investigation of how displaced Eritreans reacted to each items of sense of coherence (83). Their findings indicate that Eritrean participants reacted to item-1: *"do you have feeling that you don't really care about what goes on around you?"* by interrogating to the question itself with feelings of surprise saying: *"how can you ask such a question? I wouldn't be human if I didn't care about what goes on around me..., this is not in our culture ... of course, I care and try to do something about it, if can."*(Alemdom,2007; p.97) (83). It means Eritreans value in a strong social life such that life for them is entirely interdependent in contrast to people from Western cultural background, who may have grown in a culture of a society where individualistic culture is so deep rooted. For item-3, which reads: *"Has it happened that people whom you counted on disappointed you?"* the relatively lower item loading onto a single latent factor has a similar justification as in the

case for item-1. Hence the deep rooted trust on others, as a matter of shared cultural norm for Eritreans, may best justify the lower convergent validity of this item too.

However, the weaker item loadings of the first three items seen in Eritrean refugee sample in the present study are not unique to the type of population as well as study context. Cross comparison of item loadings across studies for the observed weaker loadings of item-1, item-2 and item-3 indicated that these items also demonstrated relatively weaker convergent validity (weaker loadings with $\beta < 0.40$) in previous studies done in western as well as non-western settings from student samples, such as CFA studies conducted in Italy (103), Belgium (106) as well as a non-western setting, such as Peru (104).

Achieving a better fit for a model through model modification and omission of an item or few items is also a practice of amending measures to be valid in studies conducted in different cultural settings (103, 106, 148). For example, only 11 item sense of coherence scale was suggested as justifiable measure of capturing what SoC-13 can perform in Dutch speaking Belgians after disregarding the two items (i.e. item-2 and item-3) having insignificant loadings (106) (see Table-12). Similar to our model, error terms were also allowed to correlate in a one factor model of SoC-13 suggesting a best fit to the data of the Italian sample (103).

However, when comparison of the current data with previous studies done across cultures were made, differences were observed on the strength of loadings for item-12, which asks: *“How often do you have the feeling that there’s little meaning in the things you do in your daily life?”*. The item loading for this item onto both the one factor as well as the three factors model of SoC-13 is poor ($\beta < 0.40$) in the current study while this item has sufficiently loaded onto one factor as well as three factors in Peruvian sample (104) (see Table-12).

The fact that the present study demonstrated very high co-variances in the three correlated latent factors (i.e. comprehensibility, manageability and meaningfulness) among each other ($r > 0.80$, $p < 0.001$) indicates that the standardized coefficient for co-variance are above the maximum cut-off point for the three latent factors to signify a discriminant validity as indicated in the literature (153). This may imply that the factors seem to measure similar or same construct in the context of Eritrean refugees living in Ethiopia (see Figure-8).

The current evidence suggests that the mean for refugees' sense of coherence is relatively lower (mean=39.91) compared to the mean for Eritrean internally displaced people (IDPs) and non-displaced people (mean score of 48.94 and 54.84 respectively) reported in the previous studies (83) (see Supplement table-3 in appendix). This indicates that sense of coherence is compromised by being a refugee. The internal consistency Cronbach's alpha value found in the present study for SoC-13 (Cronbach's alpha= 0.736), as well as the internal consistency for SoC-12 (alpha=0.748), which can be taken as fairly good in relation to fewer number of items, and hence it is within the range of alpha values reported in previous reported review of literature, which range from 0.74 to 0.91(84).

Although only item-2 has demonstrated non-significant loading to a one factor model, three other items namely, item-1, item-3 and item-12 have demonstrated weaker loadings. These four items loaded below the minimum threshold for an item to load adequately (standardized coefficient < 0.40) in both models (one factor structure as well as three correlated factors structure of SoC-13. This implies that these four items are less important in the Eritrean culture, and hence further qualitative study is warranted in the future regarding Eritrean idiomatic expressions on these problematic items of Antonovsky in order to correctly rephrase the items.

6. 3. Socio-demographic and trauma related factors as associates of symptoms of PTSD and depression

The study showed significant association between exposure to pre and post-migration traumatic events and current symptoms of PTSD, and this is consistent with previous studies (1, 3, 7, 14, 23, 34, 72). It was also shown that displacement related trauma is the factor strongly associated with PTSD and depression symptoms, which is consistent with findings from Ethiopian and Eritrean internally displaced persons who lived in temporary shelters (23, 34). The negative association between sense of coherence and PTSD in the context of humanitarian settings is in agreement with previous reports from non-Western settings (83, 84). The inverse association between sense of coherence and depression was also reported in a previous study conducted in China (158). Likewise, the negative association between social support and psychological symptoms in the present study is also consistent with findings from other studies (142-144). The possible explanation for the inverse association between social support and psychological symptoms may be the strong and intact social network and support to one another among Eritreans in the camp. Financial and material support available for some refugees from family members and friends in the diaspora might have lowered the

occurrence of PTSD and depression symptoms in this community. Conversely, those refugees with higher symptoms of depression and PTSD may find it difficult to make smooth social connections to obtain the expected social support from others, which is crucial resource to cope with their current distress. This is due to possible reverse causality because of the cross-sectional nature of the study design.

Gender-based increased vulnerability to post-migration traumatic events (violation of rights) seen in female participants which showed association with their current symptoms of PTSD in the current study supports the reports from previous gender-focused studies among Ethiopian and Eritrean displaced people and refugees (23, 25,26). Exposure to post-migration trauma in this study was directly associated with depression, but indirectly associated with PTSD. Our finding can be justified by the less hazardous nature of traumatic events refugees are likely encountering in the post-migration period in order for them directly triggering the onset of PTSD. The association between post-migration living difficulties and PTSD is mediated by personal attributes like refugees' use of task-oriented coping style and sense of coherence, which is evident in the present study.

Consistent with a previous study on internally displaced Eritreans (23), PTSD symptoms did not vary across age and gender in the present study. The association between increasing symptoms of PTSD and higher educational attainment seems to contradict previous findings. This finding may be explained by a more likely exposure of educated Eritreans to traumatic risk factors like military service, imprisonment, and other risky migration endeavors. The association between frequency of attendance of religious sessions and PTSD seen among the short term resident sample is in agreement with a previous study, where increased level of distress leads to increased religious activities as a coping strategy (14, 50, 159, 160). On the other hand, the inverse association between frequency of prayer and decreased symptoms of depression among the long-term resident sample shows the potential benefit of spiritual coping. In a society where religion appears a primary source of healing from illness and mental distress, seeking solutions from frequent prayer seen in this study is consistent with expectations and practices of such communities. The importance of spiritual coping style in times of distress is not unique to Eritrean refugees; it was also a common practice by Ethiopian immigrants in Canada (50), East African immigrants and refugees in Australia

(159), Ethiopian immigrants in Israel (14), and Ethiopian women returnees from the Middle Eastern countries (160).

Our attempt to identify the extent of symptom co-variance and possible symptom overlap between PTSD and depression resulted in findings which are in agreement with studies conducted on the co-morbidity of the two psychiatric conditions. The association between depression and PTSD symptoms found in this study, after adjusting for demographic variables and other potential confounders, is in agreement with cross-cultural studies on the relevance and co-morbidity of PTSD and depression among diverse ethnic groups, including Ethiopian and Eritrean asylum seekers in Canada (7). Many studies on the mental health of refugees reported high co-morbidity in symptoms of these disorders (3, 5,7). In addition, the high co-variance (85%) between the latent factors of PTSD and depression goes with a previous report that came out from deployed veterans in the United States (161), which again shows that symptoms of the two constructs are highly related and overlapping. The fact that the numbing item of PC-PTSD loaded more strongly onto the depression latent factor than onto the PTSD latent factor calls for the need for conducting further qualitative investigation of the phenomenology of PTSD and depression in humanitarian settings.

6.4. Correlates of refugees' alcohol misuse

Factors which are positively associated with refugees' alcohol use in this study were exposure to pre-migration living difficulties and use of emotion-oriented coping style (table-17), symptoms of depression (suppliment table-7), and this finding is in agreement with reports of previous studies (27, 28). Being female, older age and frequency of prayer (table-17) and sense of coherence (suppliment table-7), were negatively associated with alcohol misuse in Eritrean refugees which is also in line with previous studies (162). The likely explanation for this is in order to forget (cope up with) recurrent anxiety that accompanies memory of traumatic events; refugees may use alcohol as part of their coping strategy. The possible justification on the positive association observed between refugees' use of emotion-oriented coping style and the corresponding odds of increase in alcohol misuse in the context of these Eritrean refugees may be increased reliance on fantasy and positive emotion to deal with their distress following use of alcohol or vice-versa.

The overall prevalence of alcohol misuse obtained in this study among Eritrean refugees (19.4%) is much higher than prevalence of alcohol misuse (2.9%) in Somali refugee living in Ethiopia (163). It is also much higher compared to samples from Butanes refugees where the

prevalence of hazardous drinking as measured by Alcohol Use Disorder Identification Test (AUDIT) score >7 was reported to be 2.8% (specifically, 5.1% for males and 0.6% for females) (164). The current prevalence rate is in line with a systematic review of studies addressing harmful drinking in refugee camp context (165). The range of hazardous/harmful drinking ranged from 17% to 36% in refugee camp settings compared to the prevalence rates of 4% to 7% in a community setting (165). Though not comparable, the prevalence of alcohol use in the current study is close to the prevalence of hazardous alcohol misuse (21%) reported from a rural community study in Ethiopia (166). In the current study, the prevalence of alcohol misuse in males was twice higher than that of females.

Our findings with respect to gender difference in alcohol consumption is in line with previous report from a study in Ethiopia, a country which share similar socio-cultural context with the target of the present study, where alcohol consumption is reported more than twice for males compared to females (i.e. 31 % in males and 10.4 % in females) (166). Hence, differential integrated treatment for inclusion of alcohol abuse shall focus male Eritrean refugees. The negative relationship between frequency of religious practices and refugees' alcohol use in this study is in the expected direction. For devoted religious followers who frequently go to church or mosque, doctrines of their religion may have played a prohibitive role from excess use of alcohol. Our finding with respect to the inverse association of religiosity and refugees' alcohol misuse is in agreement with the finding of previous study in Latino immigrants in the USA (167). Findings from SEM analysis in Latino sample reported that participants with higher levels of positive religious coping showed lower scores on the alcohol use (167). Reduced vulnerability to alcohol misuse with increased age can best be explained by peer pressure. Adolescents and young adults are more prone to problematic drinking partly due to peer pressure. In addition, the likely explanation that adolescents aged 18 to 24 are having relatively higher odds of alcohol misuse compared to refugees within older age group is that they don't have family responsibility and they have to deal with anxiety associated with adaptation difficulties of the harsh refugee environment for this age group.

6.5. Direct, mediating and moderating associates of PTSD and depression

The finding in this study that duration of stay in the refugee camp seems to exacerbate symptoms is consistent with previous findings in Australia (168). In that study, it was reported that prolonged detention and temporary protection of refugees contribute substantially to the risk of PTSD and depression as well as other mental health-related

disabilities. The likely explanation for the mediating effect of increased duration of stay for exacerbating the effect of exposure to pre-migration traumatic events on symptoms of PTSD is that the more refugees stay in the refugee camp, the greater chance they are exposed to post-migration stressors and traumatic abuses. Such exposure to extra post-migration abuses may worsen the effect of pre-migration stressors that Eritrean refugees' had already encountered in their home country. Meager support, limited resources and being in this situation for a prolonged period are also other stressors that could lead them to experience some form of psychological symptoms.

An increase in the magnitude of emotion-oriented and task-oriented coping styles with increased exposure to pre-migration and post-migration living difficulties respectively, is in line with previous findings of a study conducted among Tibetan refugees in India (77). The indirect (mediated) effect of pre-migration living difficulties on depression and PTSD via the path of post-migration living difficulties has theoretical support in the literature (72, 86). The association between pre-migration living difficulties and PTSD was partially mediated by post-migration living difficulties among Zimbabwean refugees in South Africa (72). A recent study has also reported that post-migration stressors have accounted for greater variance in levels of depression and anxiety compared to experiences of trauma and loss (86). This implies that being exposed to pre-migration alone is not a sole factor that account for current status of refugees' mental wellbeing, and hence post-migration stressors likely play an intervening (mediating) role. The mediating role of post-migration living difficulties in the present study can be best explained by the continuous exposure to stressful conditions of the camp life in Ethiopia, like poverty and economic dependency, limited employment opportunity, poor and overcrowded housing.

The association between sense of coherence and reduced symptoms of PTSD and depression in this study is in line with the literature. Previous studies found negative association between sense of coherence and psychological distress in many cultural contexts (75, 83, 84, 96). On the other hand, we found that sense of coherence mediates the association between traumatic events and psychological symptoms which is again in agreement with findings from previous studies (75, 76). Nevertheless, the moderating role of sense of coherence in the association between exposure to trauma and psychological symptoms reported in another study (78) was not replicated in this study.

The finding with regard to the moderating role of social support is in line with a previous study among Eritrean and Sudanese asylum seeker refugees in Israel (73). However, unlike our finding, which showed that social support has moderating effect in the relationship between exposure to post-migration trauma and symptoms of depression, the study cited above found that perceived social support has a moderating effect in the relation between exposure to trauma and symptoms of PTSD (73). The absence of the mediating role of social support in the relationship between exposure to trauma and symptoms of PTSD and depression is in agreement with the finding in a study among African Americans aged between 18 and 54 from the National Comorbidity Study (170). That study reported that social support did not mediate the effect of financial strain or traumatic events on psychological symptoms.

Task-oriented coping style mediated the relationship between exposure to post-migration trauma and symptoms of PTSD, which signifies the importance of this coping strategy for Eritrean refugees. This finding is also consistent with a finding in a study among Tibetan refugees in India (77). Avoidance-oriented coping style was not found beneficial in this study unlike what was reported in previous studies from Ethiopia (24) and Democratic Republic of Congo (79). The likely explanation for this is the composition of refugee participants in the current study where most of them were literate, having urban-orientation, and the relatively assertive culture of Eritreans.

Gender specific analysis of the current findings demonstrated that PTSD symptoms are differentially associated with exposure to post-migration trauma in females, unlike male counterparts. This implies the ongoing gender-based vulnerability of female refugees to post migration abuses in the refugee camps, which are also reported in previous studies conducted in refugee camps in Ethiopia (25, 26). Specifically, evidence from Shimelba refugee camp in Northern Ethiopia has indicated that Eritrean female refugees were suffering from gender based physical violence (25). Additional evidence from a refugee camp in South Eastern Ethiopia indicated that Somali female refugees were vulnerable to rape during transit and abduction in the refugee camp (26). The pre/post-migration living difficulties in the context of Eritrean refugees who crossed only short distance travel to cross the border to a neighboring country (Ethiopia), which has a relatively similar culture should be understood differently. The essence of pre/post migration living difficulties of refugees described in the literature may denote those refugees who had traveled long distances and those who had come to entirely different culture in comparison with the culture of the host country.

The association between emotion-oriented coping style and reduced symptoms of PTSD, when it interacts with threat for life sub-scale of pre-migration difficulties may imply that this coping style has a potential benefit for those persons who encountered life threatening trauma. This coping strategy may help to release long held traumatic memories, thereby reducing PTSD symptoms. The moderating effect of emotion-oriented coping strategy for pre-migration abuse (sexual and physical) in reducing symptoms (PTSD and depression) may show its potential use for refugees who had experienced abuse in Eritrea to deal with symptoms of both conditions.

6.6. Cumulative Trauma and Refugee Alcohol use

The findings regarding the direct positive association between cumulative trauma and co morbid psychological symptoms has supported evince from previous literature in people exposed to cumulative trauma, such as Iraqi refugees (27), Ethiopian immigrants in Israel (14) and Somali refugees in the United States (114). Cumulative trauma has predicted poor mental health (composite latent factor for symptoms of PTSD, depression and alcohol use) both directly and indirectly through a second-order protective factors (defined by first-order latent factor of sense of coherence and social support together). In this regard, our findings supported a previous study on mediation analysis of cumulative trauma and the consequent psychological distress in relation to multiple psychological resources in vulnerable women patients in South Africa (74). The combined effect of sense of coherence and social support as a sources of personal strength and social resources, respectively, have a mediating effect in predicting poor mental health in emergency settings for Eritreans.

Our finding regarding 21% explanation of the variance of the latent common factor of poor mental health by alcohol use ($p < .001$) is in general agreement with the co morbidity of alcohol misuse which is consistently reported in people affected by trauma in settings of humanitarian crisis (74, 37, 27). Specifically, our findings supported the finding from a study among Iraq veterans who were exposed for war trauma (74). To explain the present findings on the co-morbidity of alcohol use and traumatic experiences, one possible explanation from the literature is that a misuse of alcohol follow in people who were exposed to traumatic events, because it may help them to dampen their nightmares about the disaster, and reduce their avoidance; conversely increased severity of PTSD symptoms may be caused by heavy drinking if continues drinking maintains or exacerbates symptoms of PTSD (74). Alternative neuropsychiatric explanation on the mechanism underlying the co morbidity between PTSD and alcohol use is also established in the literature (171). It is argued that when trauma is

over, endorphin levels gradually diminish and eventually withdraw, causing the emotional distress and contribute to other symptoms of post traumatic stress disorder (PTSD) and therefore, in order to mitigate the associated emotional distress and compensate loss of endorphin withdrawal, people tend to drink following exposure to trauma. Our finding regarding the co-morbidity of PTSD and problem in alcohol use is also in line with previous findings which reported that combat veterans with PTSD had a concurrent diagnosis of substance abuse disorder at a rate of 22% as compared to veterans without PTSD at 1.1% (122).

Although some socio-demographic variables, which demonstrated differential correlation with refugees' alcohol use inform to consider these factors while planning specific intervention to deal with problematic alcohol use, common associates for alcohol use, PTSD and depression necessitates the need for planning an integrated (holistic) intervention. For example, in recent publications extracted from the present study, exposure to pre-migration traumatic events are found to be common associates of PTSD and depression for Eritrean sample (17), where as depression has demonstrated a significant correlation with problems of refugees' alcohol use (172). Our findings indicated existence of common sources of stress triggering the onset of these three psychiatric problems. The fact that refugees' sense of coherence has demonstrated a significant inverse relationship with PTSD (17), depression (17,172) and alcohol misuse (123) provides an insight in the existence of common protective factors to be considered in intervention endeavors of different mental health problems in the context of Eritrean refugees. Indeed, our findings provided useful information on the importance of dealing with common stressors in refugees as well as strengthening common forms of their resilience which is helpful to consider in planning mental health intervention. Furthermore, our findings provided supportive evidence with respect to absence of a mediating role by social support to previous findings from displaced Ethiopians (173); where as the current findings on positive association between avoidance-oriented coping and depression contradicts what was evidenced in the aforementioned Ethiopian study. The current prevailing diplomatic relationship between Eritrea and Ethiopia is a promising future for refugees' mental wellbeing compared to the condition in the recent past. Nearly for two decades in the past, the relationship between Ethiopia and Eritrea was characterized by a state of isolation, which was described as "no peace no war" (179). The initiatives undertaken by leaders of the two countries for the renewal of the relationship for mutual benefit could lay a promising foundation for revitalizing the age long brotherhood between people of the two nations, and restore a lasting peace in the region (22). It is evident that such evacuation of

tension and restoration of peaceful diplomatic ties between the two countries would reverse the lives of refugees, including their mental health to some extent, and it may open a new chapter to their lives.

6.7. Validity and generalisability of findings for refugees' health care

Having individual differences in mind, since refugees living in a host country are likely exposed to similar post-migration stressful situations such as specific refugee laws, administrative regulations and meager sources of support and poor and overcrowded housing, our findings on salient factors affecting the mental health of refugees can be fairly generalized to other refugees living in similar circumstances in Ethiopian refugee camps. The findings regarding associates of refugees' mental health may be generalized to some extent to the mental health of refugees living in poor income countries (especially in Africa) who resettled in fragile temporary refugee camps in their neighboring countries. However, Eritrean refugees, all of whom belong to a distinct cultural unit and originated from the same country having similar or common reasons, are likely to be similar in terms of their socio-demographic characteristics as well as their exposure to common forms of tragedies (traumatic events) they encountered during pre-migration, transit as well as post-migration periods. Therefore, taking into account the shared commonality for exposure to similar sources of stress and protective factors, which is contextual and culture dependent, our findings specific to the validity of measures, could be fairly generalisable to Eritrean refugees living in refugee camps of Ethiopia.

Since our study was cross-sectional by design, it is difficult to hypothesize the causal direction in the association seen between some variables in the present study. For example, the direction of association between elevated symptoms of depression and PTSD cannot be inferred from their mere significant association demonstrated in the regression and path analysis alone because of the possibility of reverse causality. For example, we have tried to explain that strong sense of coherence may increase individuals' chance to cope up with their psychological distress effectively. On the other hand, presence of severe PTSD and depression may weaken individuals' sense of coherence. Post-migration living difficulties were associated with PTSD in females, but not in males. This signifies that there is increased vulnerability in females for current distress compared to male refugees. It is plausible to think that this might be because women experience sexual trauma more often than men while living in the camp in the post-migration period.

7. Strengths and Limitations of the study

In the face of paucity of evidence about the state of mental health in Eritrean refugees, our findings provide some evidence for policy makers, health care providers and researchers who wish to devise and implement interventions to alleviate mental health problems in this population. Adaptation of measures to Tigrigna version in Eritrean dialect along with measures of adversities following rigorous procedures of translation and back translation can be taken as strength of the present study. Equally ratings of items for all measures are the strength of the study, because it provides additional dimension of validity on content relevance. The current evidence regarding the validity and factor structure of depression in the Eritrean refugee community can be taken as the strength of this study because this is the least researched topic in most cultures of Africa. Making a comparative analysis of measurement studies of SoC-13(123) and CES-D (172) with other previous CFA studies done on SoC-13 and CES-D respectively across cultures with findings of the present study can also be taken as the strength of the study, because comparison of data across the studies gives the reader a clear picture of contrast to the relative relevance of best fitting factor structure across cultures and type of population. The closer field supervision and monitoring undertaken during data collection by the Principal Investigator (PI) has served to avoid missing data, which can be taken as strength of the study.

However, this study is not without limitations: the inherent limitation with cross-sectional studies would have same implication in this study where inference cannot be made regarding causality or the direction of relationship between exposure and outcome variables. In the adaptation process of CES-D and other scales, other structured interviews using diagnostic measures like Schedule for Clinical Assessment in Neuropsychiatry (SCAN) or Composite International Diagnostic Interview (CIDI) would have been concurrently administered in order to estimate predictive validity of the the Tigrigna version of measures.

8. Conclusions implications of findings and recommendations

8.1. Conclusions

Although a direct significant relationship was not observed between exposures to post-migration traumatic events with symptoms of PTSD as well as refugees' alcohol use, post-migration difficulties are indirectly and significantly associated with PTSD through multiple environmental and personal mediating variables. While duration of stay, exposure to post migration living difficulties and depression exacerbated the effect of exposure to pre-

migration living difficulties on PTSD symptom severity. Sense of coherence and task oriented coping together partially mediated the association between exposure to pre-migration traumatic events and symptoms of PTSD. Emotion-oriented coping style moderated the effect of pre-migration traumatic events on PTSD and depression, whereas social support moderated the effect of post-migration living difficulties on depression. The evidence of co morbidity in the present study strongly suggests the importance of considering alcohol misuse as an integral part of intervention in the mental health care endeavors for Eritrean refugees. The findings regarding refugees' longer duration of stay in the camp for mediating the effect of exposure to pre-migration traumatic experiences on PTSD informs the need for their acceleration of repatriation, resettlement or integration with the host society. The current finding regarding significant positive correlates of alcohol use (such as pre-migration trauma, depression, emotion-oriented coping, and younger age) and significant negative correlates (such as being female in gender, sense of coherence and frequency of prayer) provide useful information specific to intervention of alcohol misuse in Eritrean refugees. Cumulative trauma strongly associated with poor mental health. Furthermore, there is evidence of partially mediated association between cumulative trauma and poor mental health through a combined effect of social support and sense of coherence

8.2. Implications of the findings

Findings imply on the importance of considering differential intervention for female refugees when planning an intervention to post migration abuses. Other factors which should be considered in the intervention/ treatment plan and having clinical significance include: exposure to traumatic events, prolonged duration of stay in the camp, as well as use of maladaptive coping strategies, such as avoidance coping and alcohol misuse, which are directly and positively associated with depression. On the other hand, promoting resilience factors such as fostering sense of coherence, emotion-oriented coping and seem to benefit refugees to maintain their mental wellbeing, because these factors partially mediated the relationship between exposures to pre-migration traumatic episodes on the current status of psychological symptoms; whereas increased levels of social support and emotion oriented coping and social support moderated the impact of pre-migration and post-migration traumatic events on refugees mental health problems (PTSD and depression).

The high co-variance between depression and PTSD evidenced in the present study lends strong theoretical as well as practical significance for intervention of mental health care.

Furthermore, the fact that alcohol misuse demonstrated significant loading on a common latent factor together with PTSD and depression lend a theoretical support on the co morbidity of alcohol misuse with psychological problems reported in humanitarian settings. This finding necessitates the importance of launching an integrated approach which commonly address target multiple mental health problems of refugees of refugees in a cost-effective manner.

The present finding with respect to factor structure of depression indicates that there is variation in symptom presentation of depression for people with the same ethnic background, but who are living in different socio-cultural and geographical settings. Adaptation of tools/measures to the Eritrean local culture and language is useful for assessment of depression, PTSD, alcohol misuse, resilience and coping from Eritreans in emergency context both in clinical and non clinical settings ; evidence regarding predictors of poor mental health (PTSD, depression and alcohol misuse) is useful for planning an intervention and making informed decision in clinical decisions (i.e. rendering evidence-based psychiatric or psychotherapeutic services) as well as psycho-social interventions in community setting. In addition, estimating the extent of symptom overlap will enable unnecessary mislabeling of symptoms.

Information about direct, mediating and moderating predictors is having vital contribution to devise evidence-based clinical and psycho-social intervention. Furthermore, the current evidence on the co-morbidity of alcohol misuse and its correlates provides useful information for inclusion of problematic drinking as one among prime targets of integrated intervention for refugees' mental health care.

8.3.Recommendations

Based on the findings of the present study and conclusions drawn, the following are our recommendations to concerned bodies to make informed decision for planning interventions in clinical and community-based mental health care for Eritrean refugees. National and international policy makers and other stakeholders working to safeguard Eritrean refugees' mental health may also find these recommendations useful for their intervention. Future researchers will also benefit from the findings of this study.

- The finding that duration of stay in the refugee camp, which partially mediated and exacerbated the effect of exposure to pre-migration traumatic experiences on symptoms of PTSD calls for the need accelerating resettlement, repatriation or

integration of refugees with the host society. In this regard, detention of refugees has a counter-productive effect on the mental health of the refugees and hence Ethiopian Government, UNHCR, WHO, IOM, IRC or other concerned humanitarian organizations should work towards facilitating conditions for the inclusion of the Eritrean refugees with the Ethiopian host society and involve them in the socio-economic participation, because long stay in the refugee camp seems to worsen the effect of past trauma exposure on the current symptoms of PTSD. In this regard special attention should be given to females because it is evident from this study that there was differential associations of post migration living difficulties and possibly violation of their rights in the camp with their current symptoms of PTSD compared to males.

- Fostering social support, facilitating conditions to achieve strong sense of coherence, and preventing post-migration abuse in female refugees need to be given particular consideration when planning an intervention.
- Identification of factor structure for CES-D basically provides insight into how Eritrean refugee community in Ethiopia present symptoms of depression, which is so vital to ease patient-vis-à-vis health provider communication, and facilitating conditions to plan for intervention. Similarly, findings on the high symptom covariance and symptom overlap between depression and PTSD informs mental healthcare providers, such as nurses, psychologists, social workers and psychiatrists to take care of mislabeling of refugees based on few symptoms to either of the conditions. The finding that there is 85% of symptom covariance demonstrated in our study between depression and PTSD informs the need to devise and implement intervention strategy, which can commonly address both conditions in a cost-effective manner rather than designing intervention for symptoms of depression and PTSD differently.
- The current findings regarding the validity of CES-D as psychometrically sound instrument to measure depression as a dimensional construct in Eritrean community provides a supporting evidence for prior validity study made on Eritrean refugees in United States. Although the present Tigrigna version of CES-D can be employed for assessment of depression from Eritrean sample, further validation study is needed to norm the cut-off points by concurrently administering structured interviews such as CIDI and SCAN or other gold standard measures of depression to enable the diagnostic utility of CES-D in this community.

- Cultivating personal attributes, strengthening sources of resilience that would help them to develop effective coping strategies such as religious and task-oriented coping styles, social support from family friends and the neighborhoods that would lead to strong sense of coherence should be part of any psychosocial interventions in this refugee community.
- The current evidence on the co-morbidity of alcohol use necessitates the importance of considering refugees' alcohol use as an integral part of intervention in refugees' mental health care. Since the majority of those who reported to have problematic drinking are the younger refugees, alternative methods of mitigating such problems should be designed. Creation of alternative play grounds, recreational centers, and libraries may lessen the probability of spending leisure time in bars on the part of the young refugees. Furthermore, provision of psycho-education on the side-effects of substance abuse in general and problematic drinking in particular shall also be an integral part of intervention. Those refugees who are having problematic drinking may benefit from spiritual counseling as well as integration of religious coping in the mental health care intervention plan, because the current finding has demonstrated an inverse association between frequency of prayer and decreased odds of alcohol misuse.
- The present findings on the mental health of Eritrean refugees, who crossed an international border, are compounded by multiple complex factors. Specifically exposure to both pre-migration and post-migration stressful events , and perhaps traumatic memories, in interaction with their personal , family, social, and cultural resources as well as environmental, economic, political and international (global) realities of the surrounding life in refugees. The implication of these for our recommendation is that in order to fully address the overall mental health of Eritrean refugees, prevention and intervention strategies should transcend beyond the provision of community-based psycho- social intervention for refugee mental care alone in a limited scope. It is also vital to address other pressing needs such as respect for basic human rights violations of refugees' rights as an integral part of intervention. International organizations like UN, WHO, UNHCR, IOM jointly with local governments and their partner organizations should work towards preventive measures such as: prevention of human right violations, trauma or creating stressful situations on refugees both by refugee sending and receiving countries.

- In order to acquire useful information about the mental wellbeing of Eritreans in humanitarian settings, assessment should also gear towards alternative use of sense of coherence scale with 12 items. The adapted Tigrigna version of this tool can be used as a measure of sense of coherence in this community as well as a proxy measure of resilience and mental wellbeing. The assessment data using this tool may be helpful as an additional (complimentary) source of information for clinical decision.
- Future studies should focus on prospective cohort as well as longitudinal study designs to replicate the present findings from Eritrean samples in humanitarian settings in a way direction of association can then be estimated.

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APPENDICES

Appendix I

**Addis Ababa University, College of Health Sciences,
Department of Psychiatry, PhD Program in Mental Health Epidemiology
Information Sheet**

Principal investigator-Berhanie Getnet

Aim-Little is known about the experience of trauma, conceptualization of Post Traumatic Stress Disorder and depression and source of coping and healing among Eritrean refugees in Ethiopian camps. Therefore, the present study is principally aimed at understanding the lived experiences about reactions to traumatic experiences, sources of coping and cultural healing (ritual as well as spiritual) so that it is possible to make important recommendation for designing culturally appropriate trauma intervention for this target community. Although the study is devoted entirely for academic purpose (PhD thesis), the summary of the outcomes of this study will be shared to important stake holders and service providers thinking that there will be improvement in the service with respect to trauma intervention to the refugee community. Since your genuine responses are highly vital for the success of this study, I would like thank you for your genuine and active participation in anticipation.

Expectation of the participant-We are expecting you to respond anonymously to questions of survey about your personal details, why you come to Ethiopia, your pre-migration, transit and post -migration experiences of trauma, perceived experiences of coping and healing which will take no more than an hour.

Voluntary Participation-Participation in this study is completely voluntary and therefore, you have the right to terminate your participation. You have also the right to skip from giving response to some questions if you felt embarrassed or not willing to share.

Confidentiality-Your formation obtained during data collection will be completely kept confidential at the process of research as well as after completion of the study. Your names will remain anonymous while reporting the results of the study, and hence we would like you ensure that your names will not appear in any publications of research.

Harm - Unless carefully managed, we believe that the side effects (i.e. harm) of collecting data using instruments that asks refugee participants to recollect past and current stressful life events and present feelings of distress will potentially trigger unnecessary discomfort and negative emotional feelings during the process of data collection.

Benefit

Refugees are among a high risk of special population who are more likely prone to multiple emotional, sexual and physical abuses, and hence great care will be taken to safeguard your emotional safety while collecting data. Although this study may provoke some discomfort while remembering and discussing some stressful memories and your current psychological distress, it has an immediate as well as long run benefits. Those few participants who felt overwhelmed by the questionnaire or interview as well as have shown acute symptoms of distress will be given the necessary counseling emotional debriefing, referral to counselors as well as medications, according to the nature and severity of their problem. The outcome of the study will be shared to important governmental as well as humanitarian stakeholders (including UNHCR, IOM and ARRA) for the ultimate benefit of improving the mental health services.

Questions about Research-If you would like to ask any further information about this research, or would like to obtain further clarification about its purpose, methods and procedures, questionnaire items, you may contact to the principal investigator, Berhanie Getnet via email as well as mobile telephone. My email is berhanie.getnet.bg@gmail.com and mobile telephone is (+251)911-33-62-95. In case you need more information about this study you can also directly contact the Institute of Review Board (IRB) in Addis Ababa University, College of health sciences with an address of office telephone (+251)118961396 or p.o.b.1176, Addis Ababa.

Appendix II

Addis Ababa University, College of Health Sciences,

Department of Psychiatry, PhD Program in Mental Health Epidemiology

Consent form

**Principal
Getnet**

Investigator-

Berhanie

I read the information sheet and understand the purpose of this research and I hereby give my consent to participate in this study having in mind that I agree on the following points:

Please, check in the boxes

1. For my questions and doubts which I need further clarity, I was given sufficient clarifications. ☐
2. I fully understand that participation is completely voluntary and I am free to terminate my participation and demand to cancel the Information I gave in case I feel it put my health as well as legal rights at risk. ☐
3. I understand that information regarding my name and personal details will be kept confidential in security key and only accessed by the investigators. ☐
4. I agree that the researchers can use the information I will give anonymously when making scientific report. ☐
5. I give my consent to be audio taped, photographed or video recorded while I will provide the interview. ☐
6. I am volunteer to take part in this study and express my consent by my Signature below. ☐

Name of the participant _____ Signature _____ Date _____

Name and signature of the person asking consent

Name _____ Signature _____ Date _____

Appendix III

Addis Ababa University, College of Health Sciences,

Department of Psychiatry, PhD Program in Mental Health Epidemiology

Survey Instruments, English version

I. Basic Demographic Information, English version

INSTRUCTION: Below are list of questions asking about your personal information. We would like to request you to provide us your genuine responses to the personal questions, and we appreciate you for devoting your time in participating in this study.

1. What is your Nationality? ☐ Eritrean ☐ Non-Eritrean

If you are non-Eritrean, stop responding to the rest of the questions & thank you for your participation.

2. Gender ☐ 0 Male ☐ 1 Female

3. What is your exact age? _____ years old

4. Are you married? ☐ 0 Unmarried ☐ 1 Married ☐ 2 Divorced
☐ 3 Widowed

5. To which ethnic group do you belong to?

☐ 1 Tigriya ☐ 4 Saho ☐ 7 Tigre ☐ 10 other _____
☐ 2 Afar ☐ 5 Bilen ☐ 8 Rashaida
☐ 3 Kunama ☐ 6 Hidareb ☐ 9 Jebelti

6. What is your current educational status?

☐ 0 Can't read and write ☐ 3 College graduate
☐ 1 Elementary school complete ☐ 4 Masters Degree and above
☐ 2 Secondary school complete

7. What is your religion?

☐ 0 Orthodox

☐ 1 Protestant

☐ 2 Catholic

☐ 3 Muslim

☐ 4 Jehovah's Witness

☐ 5 Other_____

8. How often do you go to a praying center or do a prayer?

☐ 0 Never

☐ 1 Rarely

☐ 2 Sometimes

☐ 3 Always

9. Have you got employment or study opportunity in the refugee camp?

☐ 0 No

☐ 1 Yes

10. What was your occupation in the past while you were living in Eritrea?

☐ 0=Student

☐ 1=Farmer

☐ 2=Administrative worker

☐ 3=Educator

☐ 4=Military

☐ 5=Home maid

☐ 6=Daily laborer

☐ 7. Health worker

☐ 8=Technician

11. For how long do you stayed in the refugee camp? Write the exact duration of your stay in the camp. _____ year/s _____ month/s.

II: Pre and post migration difficulties checklist (Idemudia, et al., 2013)

INSTRUCTION: Below are list of events, which you might encounter either while you were living in Eritrea; after you migrate to Ethiopia, or in both periods. Give your responses in terms of ‘strongly disagree, disagree, neutral, agree or strongly agree’, according to your feelings of agreement of exposure to the events.

	Item	Experienced the stress in Eritrea					Experienced the stress in Ethiopia				
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	I had a threat to my life	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2	I had a threat to member of family life	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3	I almost died due to the threat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4	I was beaten and harassed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
5	I had a death of family life member	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
6	I was forced to separate from/leave family members	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
7	I almost died	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
8	The police and the military were following/ beating me	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
9	I was harassed by the police	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
10	Someone raped/assaulted me before age 18 years	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

11	I was forced to have sex since 18 years	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
12	I was forced to sell my body for money or cross border	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
13	I was sexually harassed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
14	I was physically beaten all the time	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

III: Primary Care PTSD Screener (PC-PTSD, Prins, et al., 2003)

Instruction	Question Items	Yes (1)	No(0)
In your life, have you ever had any experience that was so frightening, horrible, or upsetting that, in the past month, you:	1. Have had nightmares about it or thought about it when you did not want to?	[1]	[0]
	2. Tried hard not to think about it or went out of your way to avoid situations that reminded you of it?	[1]	[0]
	3. Were constantly on guard, watchful, or easily startled;	[1]	[0]
	4. Felt numb or detached from others, activities, or your surroundings?	[1]	[0]

IV: Center for Epidemiologic Depression Scale (CES-D Scale), English Version

For each Statement below check the box, which best describes how often you felt or behaved this way-DURING THE PST WEEK INCLUDING TODAY.

Question items	None of the time	A little of the time	A moderate amount of time	Most of the time
DURING THE PAST WEEK:				
1. I was bothered by things that usually do not bother me.....	☐ 0	☐ 1	☐ 2	☐ 3
2. I do not feel like eating; my appetite was poor..	☐ 0	☐ 1	☐ 2	☐ 3
3. I felt that I could not shake off the blues even with help from my family or friends.....	☐ 0	☐ 1	☐ 2	☐ 3
4. I felt that I was as just as good as other people....	☐ 3	☐ 2	☐ 1	☐ 0
5. I had trouble keeping my mind on what I was doing.....	☐ 0	☐ 1	☐ 2	☐ 3
6. I felt depressed.....	☐ 0	☐ 1	☐ 2	☐ 3
7. I felt that everything I did was an effort.....	☐ 0	☐ 1	☐ 2	☐ 3
8. I felt hopeless about the future.....	☐ 3	☐ 2	☐ 1	☐ 0
9. I thought my life had been a failure.....	☐ 0	☐ 1	☐ 2	☐ 3
10. I felt fear full.....	☐ 0	☐ 1	☐ 2	☐ 3
11. My sleep was restless.....	☐ 0	☐ 1	☐ 2	☐ 3
12. I was happy.....	☐ 3	☐ 2	☐ 1	☐ 0

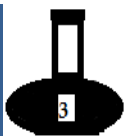
13. I talked less than usual.....	☐ 0	☐ 1	☐ 2	☐ 3
14. I felt lonely.....	☐ 0	☐ 1	☐ 2	☐ 3
15. People were unfriendly.....	☐ 0	☐ 1	☐ 2	☐ 3
16. I enjoyed life.....	☐ 3	☐ 2	☐ 1	☐ 0
17. I had crying spells.....	☐ 0	☐ 1	☐ 2	☐ 3
18. I felt sad.....	☐ 0	☐ 1	☐ 2	☐ 3
19. I felt that people disliked me.....	☐ 0	☐ 1	☐ 2	☐ 3
20. I could not “get going”.....	☐ 0	☐ 1	☐ 2	☐ 3

V: Coping Style Scale

Below are two scenarios along with the respective list of alternative coping styles by some people. For all these list of plausible coping styles, we would like you to respond in terms of ‘This is not like me’ or ‘This is like me’.

Question Items	<i>This is not like me</i>	<i>This is like me</i>
Imagine that someone is spreading damaging gossip about you:		
1. Some people would try to find the person who began the gossip and discuss it with him/her	☐ 0	☐ 1
2. Some people would get angry with the person who told them about the gossip.....	☐ 0	☐ 1
3. Some people would avoid other people until the gossip died down.	☐ 0	☐ 1
4. Some people would provide facts which show that the gossip is false.....	☐ 0	☐ 1
Imagine that some property of yours, money, food or object of value is lost or stolen:		
5. Some people would avoid thinking about the loss or theft.	☐ 0	☐ 1
6. Some people would discuss the problem with a person.....	☐ 0	☐ 1
7. Some people would ignore the loss or theft.	☐ 0	☐ 1
8. Some people would try to get their property back.....	☐ 0	☐ 1
9. Some people would replace the loss or theft.....	☐ 0	☐ 1
10. Some people would wish they had never left their home country.....	☐ 0	☐ 1

VI: Alcohol unit reference in Fast Alcohol Screening Test (FAST), adapted for Eritrean culture, English version

							
A bottle of whisky/Vodka/Jean	1 small bottle of local honey beer	A single measure of local alcohol	1 small glass of wine	A bottle of beer	1 big glass of draft beer	A bottle of wine	
(1 Tirmuz whisky/vodka/jean)	(1 Birle mes)	(1 Maekeni areke)	(1 Birchiko weyni)	(1 Tirmuz bira)	(1 Jambo draft)	(1 Tirmuz weyni)	

Questions		Scoring system					Your score
		0	1	2	3	4	
		Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
1	How often do you have 8 units (men) / 6 units (women) or more on one occasion?						
If you scored zero above, then FAST is negative and you may stop. If you scored 1-4 then carry on.							
2	How often in the last year have you not been able to remember what happened when drinking the night before?						
3	How often in the last year have you failed to do what was expected of you because of drinking?						
4	Has relative/friend/doctor/ health worker been concerned about your drinking or advised you to cut down?	No		Yes, but not in the last year		Yes, during the last year	
Scoring: An overall total score of 3 or above is FAST positive and may indicate hazardous or harmful drinking.							

Note: The English and corresponding Tigrigna names for the local alcohol unit references are given.

VII: The 13-item Sense of Coherence Questionnaire (SOC-13)

Here is a series of questions relating to various aspects of your lives. Each question has five possible answers. Please mark the number, which expresses your answer, with number 1 and 5 being the extreme answers. If the words under 1 are right for you, circle 1: if the words under 5 are right for you, circle 5. If you feel differently, circle the number which best expresses your feeling. Please give only one answer to each question.

*1 Do you have feeling that you don't really care about what goes on around you?

very seldom or never	1	2	3	4	5	very often
----------------------	---	---	---	---	---	------------

*2. Has it happened in the past that you were surprised by the behavior of people whom you thought you knew well?

never happened	1	2	3	4	5	always happened
----------------	---	---	---	---	---	-----------------

*3. Has it happened that people whom you counted on disappointed you?

never happened	1	2	3	4	5	always happened
----------------	---	---	---	---	---	-----------------

4. Until now your life has had:

no clear goals or purpose at all	1	2	3	4	5	very clear goals and purpose
----------------------------------	---	---	---	---	---	------------------------------

5. Do you have the feeling that you're being treated unfairly?

very often	1	2	3	4	5	very seldom or never
------------	---	---	---	---	---	----------------------

6 Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

very often	1	2	3	4	5	very seldom or never
------------	---	---	---	---	---	----------------------

*7 Doing the thing you do every day is:

a source of deep pleasure and satisfaction	1	2	3	4	5	a source of pain and boredom
--	---	---	---	---	---	------------------------------

8. Do you have very mixed-up feelings and ideas?

very often	1	2	3	4	5	very seldom or never
------------	---	---	---	---	---	----------------------

9. Does it happen that you have feelings inside you would rather not feel?

very often	1	2	3	4	5	very seldom or never
------------	---	---	---	---	---	----------------------

*10. Many people – even those with a strong character – sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past?

never	1	2	3	4	5	Very often
-------	---	---	---	---	---	------------

11. When something happened, have you generally found that :

you overestimated or underestimated its importance	1	2	3	4	5	you saw in the right proportion
--	---	---	---	---	---	---------------------------------

12. How often do you have the feeling that there's little meaning in the things you do in your daily life?

very often	1	2	3	4	5	very seldom or never
------------	---	---	---	---	---	----------------------

13. How often do you have feelings that you're not sure you can keep under control?

very often	1	2	3	4	5	very seldom or never
------------	---	---	---	---	---	----------------------

*Reverse score: Items 1, 2, 3, 7 and 10

VIII: The Oslo 3-items social support scale				
Circle or underline the correct answer that applies for you				
1	How easy can you get help from neighbours if you should need it?	Very easy	5	OSAS
		Easy	4	
		Possible	3	
		Difficult	2	
		Very difficult	1	
2	How many people are so close to you that you can count on them if you have serious problems?	None	1	OSCRS
		1-2	2	
		3-5	3	
		5+	4	
3	How much concern do people show in what you are doing?	A lot	5	OSNPS
		Some	4	
		Uncertain	3	
		Little	2	
		No	1	

Appendix IV

ዩኒቨርሲቲ ኣዲስ ኣበባ ፡ኮሌጅ ጥዕና ሳይንስ ፡ክፍሊ ትምህርቲ ሕክምና ኣእምሮ፡ ኣዲስ ኣበባ

ናይ ሓበሬታ ወረቐት (Information sheet, Tigrigna version)

ጽንዓት መጽናዕይ - ብርሃኔ ጌትነት

ዕላማ - ብዛዕባ ተጓንፎ ናይ ስነ ኣእምሮ ስቓይ፣ መረዳኢታ ናይ ድሕሪት ስንብራት ዝገደፈ ሕማቕ ተጓንፎ ዘስዕሮም ከም ከቢድ ጭንቀትን ጽቕጥን ዝኣመሰሉ ናይ ኣእምሮ ጸገማት ከምኡውን ፍልፍላት/ሚላታት ምክልኻልን ምሕዋይን ኣብ መዕቀቢ ስደተኛታት እትዮጲያ ዝርከቡ ኤርትራውያን ስደተኛታት ብውሑዱ እዮም ዝፈልጡ። ስለዚ እዚ ናይ ሕጂ መጽናዕቲ ብቐንዲ ዓሊምዎ (መዲብዎ) ዘሎ ነቶም ሕጂ ኣብ መሬት ዘለዉ ንተጓንፎ ናይ ስነ ኣእምሮ ስቓይ ዝውሃቡ ምላሻት፣ መፍትሒ ሚላታትን ባህላዊ መሕወዪ ሚላታትን/ስነ ስርዓታት ወይ መንፈሳዊ/ ንምርዳእን በዚ ኣቢልካ ድማ ነቶም ዝተገለጹ ማበረሰብ ቦቲ ባህሊ ተቐባኝነት ዘለዎም ቅኑዓት ካብ ናይ ስነ ኣእምሮ ስቓይ ናይ ምሕዋይ መንገዲታት ንምሕባር ምእንታን ክክኣል እዩ። ዋላ እኳ እዚ መጽናዕቲ ብቐንዲ ንትምህርት /ንPhD መማልኢ ጽንዓት/ ተዓሊሙ ዝተዳለወ እንተኾነ፣ መጠቓለሊ ናይ ውጽኢት ናይዚ መጽናቲ ግን ንስደተኛታት ብዛዕባ ናይ ስነ ኣእምሮ ስቓይ ዝውሃብ ኣገልግሎት ኣብ ምምሕያሽ ይሕግዝ እዩ ተባሂሉ ስለዝሕሰብ ንኣገደስቲ ሰብ ብጽሒት ኣካላትን ኣገልግሎት ወሃብቲ ትካላትን ክውሃብ እዩ። ቅኑዕን ሓቀኛን ምላሽኩም ኣብ ዕውትነት እዚ መጽናዕቲ ኣዝዩ ኣገዳሲ ስለዝኾነ ኣብዚ መጽናዕቲ ንምስታፍ ስለዝተሰማማዕኩም ብጣዕሚ ከመስግነኩም እፎቱ።

ካብ ተሳተፍቲ ዝግበር ትጽቢት - ንሕና ካብኩም ንጽበዮ ነገር ንሕድ ሕድ ሕቶ መጽናዕቲ ብታኣማንነትን ብቅንዕናን መልስኩም ምሃብ እዩ። እቲ መጽናዕቲ ዝሓቶ ውልቃዊ መንነትካ፣ ንምንታይ ናብ ኢትዮጵያ ከምዝመጸእካ፣ ናይ ቅድሚ ምስዳድካ፣ ኣብ ምስጋር ዶብ ወይ ድሕሪ ምስዳድካ ዘጋጠመካ ከቢድ ዘስካሕክሕ ተጓንፎ፣ ዝተገንዘብካዮ ነቲ ጸገም ናይ ምፍታሕን ምሕዋይን ልምዲ እዩ ንሕና ክትገልጽዩልና ንደልዮ። እዚ ድማ ካብ ሓደ ስዓት ንላዕሊ ዝወስድ ኣይኮነን።

ወለንታዊ ተሳትፎ - ተሳታፎ ኣብዚ መጽናዕቲ ሙሉእ ብሙሉእ ብድሌት እዩ። ስለዚ ተሳትፎካ/ኪ ናይ ሙቁራጽ ሙሉእ መሰል ኣለኻ/ሺ። ከምኡውን ክትምለስ ዘይትደልዮ ሕቶ ናይ ዘይምምላስ መሰልኩም ሕልው እዩ።

ሚስጥር ምዕቃብ - ኣብ ግዜ ምእካብ ሓበሬታታት ዝተኣከበ ሓበሬታ ክሳብ እቲ መጽናዕቲ ዝውዳእን ብድሕሪኡን ብምሽጥር ዝተሓዘ እዩ። ኣስማትኩም እዉን መጽናዕቲ ክቐርብ ከሎ ከም ዘይግለጽን ከምኡውን ኣብ ምሕታም እቲ መጽናዕቲ ከም ዘይግለጽን ብሙሉእ ልቦና ክነረጋጸልኩም ንደሊ።

ጉድኣት - ብጥንቃቄ እንድሕርዘይተኣልዮም ናይ ስደተኛታት ተሳትፎ ብዝሓቱ መሳርሒታት ብዛዕባ ሕሉፍን ናይ ሕጂን ኣጸገምቲ ኩነታት ሂወትን ናይ ሕጂ ናይ ስቓይ ስምዒታትን መረዳኢታ ምእካብ ዘዩድሊ ምኽፋእን ኣሉታዊ ውሽጣዊ ስምዒታትን ከምኡውን ኣብ ከይዲ እቲ ምእካብ መረዳኢታ ጸገም ናይ ምፍጣር ጎናዊ ጽልዋታት /ማለት ጉድኣት/ ከስዕብ ይኸእል እዩ ኢልና ንኣምን።

ረብሐ - ስደተኛታት ካብቶም ንተደራረብቲ ስምዒታዊ፣ ጾታዊን አካላዊን ግህሰታት ብዝለዓለ ብርኪ ዝተቐልፀ ክፋላት ማሕበረሰብ እዮም። ብምኃኑ እዉን ኣብ እዋን ምእካብ መረዳኢታ ንናይ ውሽጣዊ ስምዒት ድሕነትኩም ንምሕላው ልዑል ጥንቃቄ ክግበር እዩ። ዋላኳ እዚ መጽናዕቲ ነቲ ናይ ሕሉፍ ጸቕጢ ዝፈጥር ተዘክሮን ናይ ሕጂ ስነ ልቦናዊ ጸገማት ምዝካርን ሓሳብ ምልውዋጥን ቁሩብ ዘጸግም ኩነታት ዝፈጥር እንተኾነ፣ ናይ ቀረባን ናይ ነዊሕን እዋን ረብሐታት ዝሓዘ እዩ። እዞም በቲ ጽሑፋዊ ምሕትት ወይ ቃለ ምሕትት ዝተጨናነቁ ከምኡዉን ርኡይ/አጸገምቲ ምልክታት ናይ ስቓይ ዝርእዮም ዝተወሰኑ ተሳተፍቲ ከከም ክብደትን ተፈጥሮን ናይ ጸገሞም ኩነታት እናተርአየ ኣድላዪ ምምኽኻር /ካውንስሊንግ/፣ ናይ ስምዒት ምግላጽ መደባት፣ ናብ ኣማኸርቲ ሪፈር ምባልን ሕክምና ምሃብን ክህሉ እዩ። ውጽኢት ናይቲ መጽናዕቲ ኣብ ምምሕያሽ ኣገልግሎታት ጥዕና አእምሮ ዝለዓለ ረብሐ ንምምጻእ ተባሂሉ ኣገደስቲ ንዝኾኑ መንግስታዊን ሰብኣዊን ሰብ መዚ ኣካላት /ዩ ኤን ኤች ሲ ኣርን ኣራን ሓዊሱ/ ክውሃብ እዩ።

ሕቶ ብዛዕባ እቲ መጽናዕቲ - ዝኾነ ሕቶ ኣብ ላዕሊ እዚ መጽናዕቲ እንተሃልይኩም ወይ እዉን ስፍሕ ዝበለ መብራህርሂ እንተደሊኩም ወይ ግልጺ ንክኮነልኩም እትደልይዎ ከም ዕላማ፣ ሚላታትን ኣካይዳን፣ ሕቶታት ኣብቲ ጽሑፋዊ ምሕትት እንተሃልዩኩም ምስ መካየዲ እቲ መጽናዕቲ ዝኮኑ ኣቶ ብርሃነ ጌትነት ብኤሚል ከምኡዉን ብሞባይል ክትራከቡ ትክእሉ ኢኩም ።ኢሜል - berhanie.getnet.bg@gmail.com ቁጽሪ ስለኪ - +251911336295. ምናልባሽ ብዛዕባ እቲ መጽናዕቲ ተወሳኺ ሓበሬታ ንምርካብ እንተደሊኹም ኣብ አዲስ አበባ ዩኒቨርሲቲ ኮሌጅ ሳይንስ ጥዕና ብቐጥታ ንኢንስቲትዩት ቦርድ ዳህሳስ /IRB/ ብቐጽሪ ቴለፎን - +251118961396 ምሕታት ይከኣል።

Appendix V

ዩኒቨርሲቲ ኣዲስ አበባ ፡ኮሌጅ ጥዕና ሳይንስ ፡ክፍሊ ትምህርቲ ሕክምና ኣእምሮ ፡

ኣዲስ አበባ

ናይ ስምምዕነት ቕጥሒ (Consent Form, Tigrigna version)

ጽንዓት መጽናዕይ - ብርሃኔ ጌትነት

ነዚ ናይ ሓበሬታ ወረቐት ብምንባብ ረብሓ ናይዚ መጽናዕ ተረ጑ኡ ኣለኹ፤ ብምዃኑ ኣነ እዞም ዝስዕቡ ነጥቢታት ብምቕባል ኣብዚ መጽናዕቲ ንምስታፍ ከምዝሰማማዕ እገልጽ፡፡

ብኸብረትኩም ኣብተን ሳናዱቕ ምልክት ግበሩ

1. ተወሳኺ መብርሂ ንዘድልዮም ሕቶታትን ግልጺ ዘይኮኑ ሓሳባትን እኹል. ☐
ገለጻ ተዋሂቡኒ እዩ፡፡
2. ተሳትፎይ ሙሉእ ብሙሉእ ወለንተኛ ከምዝኾነን ኣብ ዝኾነ እዋን ተሳትፎይ ከቋርጽ ናጻ ከምዝኾንኩን እቲ ዝሃብኩዎ ሓበሬታ ንጥዕናይ ከምኡዉን ንሕጋዊ መሰላተይ ኣብ ሓደጋ ዘውድቕ መሲሉ እንተተሰማሂዑኒ ክድምሰሰለይ ክሓትት ከምዝኸእልን ሙሉእ ብሙሉእ እርዳእ እዩ፡፡ ☐
3. ብዛዕባ ሽመይን ውልቃዊ ዝርዝር ሓበሬታይን ዝተሓሳሰሩ መረዳእታታት ብምሽጥር ኣብ ውሑስ ቁልፊ ከምዝቐመጥን በቶም መጽናዕቲ ጥራሕ ከምዝርእዩን እርዳእ እዩ፡፡ ☐
4. እቶም መጽናዕቲ ሳይንሳዊ ሪፖርት እንተቐርቡ ነቲ ዝህቦ ሓበሬታ ብምሽጥር (ሽም ከይጸርሑ) ክጥቀሙሉ ከምዝኸእሉ እሰማማዕ፡፡ ☐
5. እቲ ቃላዊ መሕትት እንትካየድ ድምጺይ ክቕዳሕ፤ ፎቶግራፍ ክሰኣል ወይ ቪዲዮ ክቕረጽ እሰማማዕ፡፡ ☐
6. ኣብቲ መጽናዕቲ ንምስታፍ ወለንተኛ እዩ፡፡ ስለዚ ሙሉእ ፍቓደይ/ስምምዕነተይ ኣብ ታሕቲ ብዝርከብ ፌርማይ የረጋግጽ ኣለኩ፡፡ ☐

ሽም _____ፊርማ_____ዕለት _____

ሽምን ፊርማን መጽናዕይ

ሽም _____ፊርማ_____ዕለት _____

Appendix VI

የንብርሶቲ አዲስ አበባ ኮሌጅ ጥዕና ሳይንስ ፡ክፍሊ ትምህርቲ ሕክምና አእምሮ ፡

አዲስ አበባ

ሕቶታት (Survey Instruments, Tigrigna version)

1. መሰረታዊ ስእላዊ ሓበሬታ (Basic Socio-demographic Information, Tigrigna version)

እዞም ኣብ ታሕቲ ተዘርዚሮም ዘለዉ ሕቶታት ናይ ውልቀኹም ሓበሬታታትን ኩነታት ናይ ስደት ሂወትኩምን ዝድህስሱ ሕቶታት እዮም፡፡ ነቶም ሕቶታት እትህብዎም ሓቀኛ መልስታት ነቲ ዝግበር መጽናዕቲ ዝላዓለ ጥቕሚ ስለዘለዎም ንተሳትፎኩም ኣቐዲመ ከመስግን እፎቱ፡፡

1. ዜግነትካ/ኪ እንታይ እዩ? ☐ ኤርትራዊ/ት ☐ ዘይኤርትራዊ/ት

ኤርትራዊ እንተ ዘይ ኮይንካ/ኪ ነቶም ዝቐጽሉ ሕቶታት ኣይትመልስ/ሲ፡፡ ንተሳትፎኹም ነመስግን፡

2. ጾታ ☐ 0 ተባ ☐ 1 ኣን

3. ትክክለኛ ዕድመካ/ኪ ክንደይ እዩ? ____ ዓመት

4. ናይ ሓዳር ኩነታትካ/ኪ እንታይ ይመስል? ☐ 0 ኣይተመርዓኩን ☐ 1 ተመርዖ ☐ 2 ተፋቲዞ ☐ 3 ብሞት ተፋላፊና

5. ኣበየናይ ብሔር ትምደብ?

☐ 1 ትግርኛ ☐ 4 ሳዞ ☐ 7 ትግረ ☐ 10 ኣብ ካልእ _____
☐ 2 ዓፋር ☐ 5 ብሌን ☐ 8 ራሻይያ ☐ 9 ጀበልቲ
☐ 3 ኩናማ ☐ 6 ሕዳርብ

6. ናይ ትምህርቲ ደረጃካ/ኪ ኣብዚ ሕጂ ሰዓት እንታይ ይመስል?

☐ 0 ምንባብን ምጽሓፍን ዘይክእል ☐ 4 ናይ ኮሌጅ ምሩቅ
☐ 1 ናይ ቀዳማይ ደረጃ ወዲኤ ☐ 5 ማስተርን ካብኡ ንላዕልን
☐ 2 ናይ ካልኣይ ደረጃ ወዲኤ

7. ሃይማኖት/ኪ እንታይ እየ?

- ☐ 0 ኦርቶዶክስ ☐ 1 ፕሮቴስታንት ☐ 2 ኮቶሊክ
☐ 3 ኢስላም ☐ 5 ካሊእ_____

8. ክንደይ ዝኣክል ጸሎት ትገብር/ሪ ወይ ናብ ቤት ጸሎት ትክይድ/ዲ

- ☐ 0 ብድርሽ ☐ 1 ወዝቢ ☐ 2 ሓደ ሓደ ጊዜ ☐ 3 ኩሉ ግዜ

9. ኣብዚ ዘለካ/ኪ መዕቆቢ ስደተኛታት ናይ ትምህርቲ ኾነ ናይ ስራሕ ዕድል ረኺቡካ/ኪ ዶ?

- ☐ 0 ኣይፋል ☐ 1 እወ

10. ኣብ ኤርትራ ከለኻ/ኺ ስራሕካ/ኪ እንታይ ነይሩ?

- ☐ 0 ተመሃራይ/ት ☐ 3 ምሁር ባዓል ሞያ ☐ 6 መዓልታዊ ስራሕተኛ ☐ 9 ናይ ሕጊ ባዓል ሞያ
☐ 1 ሓረስታይ ☐ 4 ወተሃደር ☐ 7 ናይ ጥዕና ባዓል ሞያ ☐ 10 ካሊእ_____
☐ 2 ናይ ምምሕዳር ☐ 5 ናይ ገዛ ስራሕተኛ ☐ 8 ቴክኒሻን ባዓል ሞያ

11. መዓዝ ናብ እዚ መዕቆቢ ስደተኛታት ኣቲካ/ኪ? ንክንደይ ግዜ ዝኣክልክ ጸንሕካ /ኪ?

ትክክለኛ ዝኾነ ናብዚ መዕቆቢ ስደተኛታት ዝመጽኹምሉን ንክደይ ዝኣክል ግዜ ከ ጸኒሕካ/ኪ? _____ ዓመት _____ ወርሒ

II: ቅድምን ድሕርን ስደት ዘጋጠሙ ጸገማት መዐቀኒ ቸክሊስት

Pre and post migration difficulties checklist, Tigrigna version

መምርሒ:- ካብዚ ንታሕቲ ኣብ ኤርትራ እናሃለኹም፣ ድሕሪ ናብ ኢትዮጵያ ምምጻኹም ወይ ድማ ኣብ ክልቲኡ እዋናት ኢጋጢሞምኹም ክኾኑ ዝኸለሉ ኩነታት ተዘርዚሮም ኣለዉ። መልስኹ በዞም ዝስዕቡ መልስታት መሰረት ሃቡ:- ፍጹም ኣይሰማዕማዕን፣ ኣይሰማዕማዕን፣ ማእከላይ፣ እሰማዕማዕ እየ፣ ብጣዓሚ እሰማዕማዕ እየ።

	ሕቶታት	እቲ ጭንቀት ኣብ ኤርትራ የጋጥመኒ ነይሩ					እቲ ጭንቀት ኣብ ኢትዮጵያ የጋጥመኒ ነይሩ				
		ፍጹም ኣይሰማዕማዕ ን	ኣይሰማዕ ማዕን	ማእከላይ	እሰማዕ ማዕ እየ	ብጣዓሚ እሰማዕማዕ ዕ እየ	ፍጹም ኣይሰማዕ ማዕን	ኣይሰማዕ ማዕን	ማእከላይ	እሰማዕ ማዕ እየ	ብጣዓሚ እሰማዕማዕ እየ
1	ንሂወተይ ዘስግእ ኩነታት ነይሩ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2	ንኣባላት ስድራቤተይ ዘስግእ ኩነታት የጋጥሞም ነይሩ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3	ብምኽንያት እቲ ዘስግእ ኩነታት ዳርጋ ሞይተ ነይረ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4	ተሃሪመን ተሃዲደን	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
5	ሞት ኣባል ስድራ ቤት ኢጋጢሙኒ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
6	ካብ ቤተሰብይ ብሓይሊ ተፈልየ ነይረ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
7	ዳርጋ ሞይተ ነይረ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
8	ፖሊስን ወተሃደራትን ይከታተሉኒ/ይሃርሙኒ ነይሮም	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

የንብርሱት አዲስ አበባ ፡ኮሌጅ ጥዕና ሳይንስ ፡ክፍል ትምህርቲ ሕክምና አእምሮ፡ አዲስ አበባ

9	ፖሊስ የጋፍፅኒ ነይሮም	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
10	ዝኾነ ሰብ ቅድሚ 18 ዓመተይ ተጋሰሱኒ ነይሩ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
11	ድሕሪ 18 ዓመተይ ጾታዊ ርክብ ንኸገብር ይግደድ ነይረ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
12	ዝነበረኒ አማራጺ ፤ ተገዲደ ሰውነተይ ንገንዘብ ምሻጥ ወይካኣ ስደት(ዶብ ምቁራጽ)ነይሩ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
13	ጾታዊ ግህሰት የጋጥመኒ ነይሩ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
14	አካላዊ ማህረምቲ ኩሉ ግዜ የጋጥመኒ ነይሩ	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

III: ንመሰረታዊ አጋባብ አታካላልያ ድሕሪ ነውጺ ናይ አእምሮ ዝመጽ ጭንቀት ዝምልከት ሕቶታት (PTSD) ዝተመረጹ (PC-PTSD)

Primary Care PTSD Screener, Tigrigna version

መምርሒ	ሕቶታት	መማረጽን አመላኻቲ
አብ ሂወትካ /ኪ/ ዘፍርሕ ፤ ዘስካሕክሕ፤ ዘሕርቅ፤ ነገር አጋጢሙካ/ኪ ይፈልጥ' ዶ? አብዛ ዝሓለፈት ወርሒ:-	1. ብዛዕባዚ ትሓልሞ (ትብህርሮ)ወይ ከይደለኻዮ/ክዮ ትሓስብ/ቢ “ዶ ኔርካ/ኪ?	☐ 1 እወ ☐ 0 ኣይፋል
	2. ነዚተሞክሮ ዘበራብሩ ኩነታትን አጋጣሚታትን ንዘይምዝካር ፍሉይ ጻዕሪ ትገብር/ሪ 'ዶ ኔርካ/ኪ ?	☐ 1 እወ ☐ 0 ኣይፋል
	3. አብተጠንቀቅ አብ ቀረባ ወይ ብቀሊሉ ትስንብድ/ዲ 'ዶ ኔርካ/ኪ?	☐ 1 እወ ☐ 0 ኣይፋል
	4. ናይ ምፍዛዝ ወይ ተነጽሎ ካብ ሰባትን ከባብን ስምዒት የጋጥመካ/ኪ ኔሩ 'ዶ?	☐ 1 እወ ☐ 0 ኣይፋል

IV: Center for Epidemiologic Depression Scale (CES-D), Tigrigna Version, Moges, 2011

አብ ታሕቲ ተዘርዚሮም ዘልው ምሉእ ሓሳባት፡ ካብ ዝሓለፈ ሰሙን ክሳብ ሎሚ መዓልቲ አብ ዘሎ ጊዜ፡ ንዝተሰማዓካ/ኪ ወይ ዘንጸባረቅካ/ኪ ባህርያት ክሳብ ኪንደይ ክምዝገልጽዎ ንምሕባር፡ ብ የማን ካብ ዝርከባ ሰናደቅ ሓንቲ እንዲመረጽካ/ኪ ሓንጽጽ/ጺ።

	ሕቶታት	ብፍጹም (ትሕቲ 1 መዓልቲ)	አዝዩ ውሑድ ጊዜ (1-2 መዓልቲ)	ብመጠኑ (3-4 መዓልቲ)	መብዛሕታ ኡ ጊዜ (5-7 መዓልቲ)
1	አሻቕሎሙኒ ዘይፈልጡ ነግራት የሻቕሎኒ ነይሮም	☐ 0	☐ 1	☐ 2	☐ 3
2	ሸውሃተይ ተዓጽዮ፡ ናይ መግቢ-ድልይተይ ዱኩም ነይሩ	☐ 0	☐ 1	☐ 2	☐ 3
3	ወላ ብሓገዝ ቤተሰብ ይኩን መቅርብ ካብ ጭንቀት ኪናገፍ አይክኣልኩን	☐ 0	☐ 1	☐ 2	☐ 3
4	ማዕረ ሰበይ እየ ዝብል ስምዒት የሕዲረ	☐ 3	☐ 2	☐ 1	☐ 0
5	ትኩረት ሂበ ክሰርሕ አይክኣልኩን	☐ 0	☐ 1	☐ 2	☐ 3
6	ቃዚኔ	☐ 0	☐ 1	☐ 2	☐ 3
7	ነብስ ወክፍ ንጥፈት ዓብዪ ብድሆ ኮይኑኒ	☐ 0	☐ 1	☐ 2	☐ 3
8	ብዛዕባ መጻእየይ አተስፋው ነይረ	☐ 3	☐ 2	☐ 1	☐ 0
9	ሕሉፍ ሂወተይ ዘይዕዉት ኮይኑ ተራእዩኒ	☐ 0	☐ 1	☐ 2	☐ 3
10	ፍርሒ ተሰማሀኒ	☐ 0	☐ 1	☐ 2	☐ 3

የንብርሱት አዲስ አበባ ፡ኮሌጅ ጥዕና ሳይንስ ፡ክፍሊ ትምህርቲ ሕክምና አእምሮ፡ አዲስ አበባ

11	ድቃሰይ ምግልባጥ ዝበዝሐ ነይሩ	☐ 0	☐ 1	☐ 2	☐ 3
12	ሕጉስ ነይረ	☐ 3	☐ 2	☐ 1	☐ 0
13	ከም ወትሩ የዕልል አይነበርኩን	☐ 0	☐ 1	☐ 2	☐ 3
14	ጸምዩኒ፡ ጸግዒ አልቦ ዝኾንኩ ኮይኑ ተሰሚዑኒ	☐ 0	☐ 1	☐ 2	☐ 3
15	ሰባት ሕያውነት አይልግሱለይን	☐ 0	☐ 1	☐ 2	☐ 3
16	ጽቡቅ ህይወት አሕሊፈ	☐ 3	☐ 2	☐ 1	☐ 0
17	ዘብኩይ ኩነታት ነይሩኒ	☐ 0	☐ 1	☐ 2	☐ 3
18	ሓዘን ተሰሚዑኒ	☐ 0	☐ 1	☐ 2	☐ 3
19	ሰባት ዝጸልኡኒ ኮይኑ ተሰሚዑኒ	☐ 0	☐ 1	☐ 2	☐ 3
20	ሰልኻዩኒ	☐ 0	☐ 1	☐ 2	☐ 3

V: መዐቀኒ ሚላታት መጽዋር/ Coping Style Scale, Tigrigna version

ትሕት ኢሉ ክልተ ሰባት ተኸእሎታት ንምጽዋር ወይ ንምክልኻል ዝጥቀሙሎም ሚላታትን ተዘርዚሮም አለው። ተመኩሮኻ/ኸ ምስ ዞም አብ ታሕቲ ተዘርዚሮም ዘለው ሚላታት ምጽዋር/ምክልኻል ብምግንዛብ ተሞኩረይ ነዚ ይመስል ወይ ተመኩረይ ነዚ አየመስልን ብምባል መልስ/ሲ።

	ሕቶታት	ተመኩረይ ነዚ አይመስልን	ተመኩረይ ነዚ ይመስል
ንበል ሓደ ሰብ ብዛዕባካ/ኪ ዝነድእ ሓሜት ይነዝሕ አሎ፡-			
1	ገሊኦም ሰባት ነዚ ቤላ ቤሎዉ ዝነዝሕ ዘሎ ሰብ ቀጥታ ብምርካብ ብዛዕባ እቲ ጉዳይ ይረዳድኡ።	☐ 0	☐ 1
2	ገሊኦም ሰባት ምስቲ ወረ ዝነዝሕ ዘሎሰብ ይበኣሉ።	☐ 0	☐ 1
3	ገሊኦም ሰባት እቲ ቤላ ቤሎዉ ክሳብ ዝነዝሕ ካብ ሕብረተሰብ ይኸወሉ።	☐ 0	☐ 1
4	ገሊኦም ሰባት ነዚ እቲ ቤላ ቤሎ ሓሶት ምኻኑ መርትዖ የቐርቡ።	☐ 0	☐ 1
ንኣብነት ፤ ናትካ ዝኾነ ንብረት ገንዘብ መግቢ ወይ ኣቅሓ ተሰሪቁ ወይ ጠፊኡ ንበል፡-			
5	ገሊኦም ሰባት ብዛዕባ እቲ ዝጠፈኦ ምሕሳብ ዝን ይብሉ።	☐ 0	☐ 1
6	ገሊኦም ሰባት ብዛዕባ እቲ ዘጋጠመ ጉዳይ ምስ ሰባት ይመያየጥሉ።	☐ 0	☐ 1
7	ገሊኦም ሰባት ነቲ ዘጋጠመ ተመኩሮ የወግድዎ።	☐ 0	☐ 1
8	ገሊኦም ሰባት ነቲ ዝጠፈኦ ክመልስዎ ይፍትኑ።	☐ 0	☐ 1
9	ገሊኦም ሰባት ነቲ ዝጠፈኦ ይትክእዎ።	☐ 0	☐ 1
10	ገሊኦም ሰባት ካብ መበቆል ሃገሮም እንተዘይወጹ ኔሮም ይምነዩ።	☐ 0	☐ 1

VI. Fast Alcohol Screening Test (FAST), Tigrigna version

							
1 ጥርመዝ ወስኪ/ፑድካ/ጂን	1 ብርሊ ሜዝ	1 መጥቀ አረቂ	1 ብርጫቆ ወይኒ	1 ጥርመዝ ቢራ	1 ጃምብ ድራፍት	1 ጥርመዝ ወይኒ	1 ታኒካ ሰዋ

		አገባብ አወሃህባ ነጥቢ					ናሃትካ ውጽኢት
		0	1	2	3	4	
		ዋላ ሓደ	ትሕቲ ሓደ ግዜ ኣብ ወርሒ	በቢ ወርሒ	በቢ ሰሙን	በቢ መዓልቱ ወይ ዳርጋ በቢ መዓልቱ	
1	በቢ ክንደይ እዋን ልዕሊ 8 መዐቀኒ ንሰብኡት፡ ልዕሊ 6 መለክዒ ንደቂ ኣንስቲዮ ትሰትዩ/ያ?						
		ኣብቲ ላዕለዋይ መዐቀኒ ውጽኢትኩም ባዶ(0) እንተኾይኑ፡ ፋስት ሕቶታት ኣሉታ ስለዝኾውን ክተቋርጹዎ ትኽእሉ ኢኹም፤ ካብ 1-4 እንተረኺብኩም ድማ ናብ ዝስዕብ ቀጽሉ፡፡					
2	ኣብ ዝሓለፈ ዓመት እንዳሰተኻ ከለኻ በስንኪ መስተ ምብዛህካ ዘጋጠመካ እትዝክረሉ ዘይትኽል ደረጃ ዝበጸሕካሉ ክንደይ ግዜ እዩ?						
3	ኣብ ዝሓለፈ ዓመት ክትፍጽምዎ ዝግባእ ግን ድማ ብምኽንያት መስተ ዘይሰራሕኩምዎ ስራሕ ክንደየናይ ተደጋጋሚ ነይሩ?						
4	ዘመድ/መሓዛ/ ዶክተር/ናይ ጥዕና በዓል ሞያ ናሃትኩም ናይ ምስታይ ልምዲ ኣገዲሱዎም ወይ ክትንክዩ ኣማኸሮምኹም ይፈልጡ ዶ?	ኣይፋል		እወ፡ ግን ኣብ ዝሓለፈ ዓመት ኣይኮነን		እወ፡ ኣብ ዝሓለፈ ዓመት	
ውጽኢት = _____ ድማር ውጽኢት 3 ወይ ካብ 3 ንላዕሊ እንተኾይኑ ኣደገኛ ወይ ጎዳኢ ኣሰታትያ የመልክት							

VII. 3 ሕቶታት ብዛዕባ ግብረ-መልሲ ስምዒት / 13-Items Sense of Coherence Scale (SOC-13)

ካብዚ ንታሕቲ ብዛዕባ ናይ ህይወትካ አነባብራ ሕቶታት ኣሎ። ነፍሲ-ወከፍ ሕቶ ሓሙሽተ መልሲ ክኾኑ ዝኸኣሉ ኣሎዉ። ብኸብረትኩም እቲ ቀንዲ ንመልሰኹም ክገልፅ ዝኸኣል 1-5 ምልክት ይግበረሉ። ኣብ ትሕቲ ቁፅሪ 1 ዘሎ ንዓኻ ዝገልፅ እንትኾይኑ ንቁፅሪ 1 ኣኸብበሉ። ወይ ድማ ኣብ ትሕቲ ቁፅሪ 5 ኣኸብብ። ካብኡ ወፃኢ እንተኾይኑ ውን እቲ ቀንዲ ንስምዒትካ ዝገልፅ ቁፅሪ ኣኸብበሉ። ንሓደ ሕቶ ሓደ መልሲ ጥራሕ ኣኻ

1. ብዛዕባ ኣብ ከባቢኻ ዝካየድ ነገራት ፍፁም ኣይግድስካን ድዩ?

ኣዝዩ ሳሕቲ	1	2	3	4	5	መብዛሕቱኡ ጊዜ ወይ ብጭራሽ ኣይግድስካን
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2. ብዛዕባ ቅድሚ ሕጂ ኣፀቢኻኹም እትፈልጥዎ ሰብ ባህርያት ምልዋጥ ኣገሪሙኩም ይፈልጥ ዶ?

ፈፃሙ ኣየጋጠመኝን	1	2	3	4	5	ወትሩ የጋጥመኒ
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3. ዝኣመንካዮም ሰባት ኣቐይሞሙኻ ይፈልጡ ዶ?

ፈፃሙ ኣየጋጠመኝን	1	2	3	4	5	ወትሩ የጋጥመኒ
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4. ክሳብ ሕጂ ዘሎ ህይወትካ፡

ምንም ንፁር ዝኾነ ዕላማ ወይ ሽቶ የለን	1	2	3	4	5	ንፁር ዝኾነ ዕላማን ሽቶን ኣሎኒ
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5. ንስኻ ብግቡእ ኣይተኣለኹን ኢልካ ትሓሰብ ዶ?

ኣዝዩ ቡዙሕ ጊዜ	1	2	3	4	5	ሳህቲ ወይ ብጭራሽ
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6. ኣብ ጋሻ ኩነታት ከምዘሎኻ ተሰሚዑኻ እንታይ ክትገብር ከምዘሎኻ ደንፁዩኻ ይፈልጥ ዶ?

ኣዝዩ ቡዙሕ ጊዜ	1	2	3	4	5	ሳህቲ ወይ ብጭራሽ
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7. መዓልታዊ እትሰርሖ ሰራሕቲ፡

ናይ ፍፁም ፍስሃን ሓጎስን ምንጪ	1	2	3	4	5	ናይ ስቅያትን ምስልቻውን ምንጪ
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8. ኣዝዩ ዝተሓዋወሰ ሓሳባትን ስሚዒታትን ኣሎኻ ዶ?

ኣዝዩ ቡዙሕ ጊዜ	1	2	3	4	5	ኣዝዩ ሳሕቲ ወይ ብጭራሽ
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9. ክስማዓካ ዘይቲደልዮ ናይ ውሽጢ ስሚዒት የጋጥመኻ ዶ?

ኣዝዩ ቡዙሕ ጊዜ	1	2	3	4	5	ሳህቲ ወይ ብጭራሽ
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10. መብዛሕቶኦም ሰባት ዋላ እቶም ፅኑፅ ባህርያት ዘሎዎም፡ ሓደ ሓደ ጊዜ ኣብ ሓደ ሓደ ኩነታት ተሰዓርቲ ኮይኖም ይስማዖም። ንዓኻኽ ኣብ ሕሉፍ ጊዜ ክንደይ ጊዜ ዝኸውን ከምዚ ስምዒት ኣጋጢሙኻ?

ኣዝዩ ቡዙሕ ጊዜ	1	2	3	4	5	ሳህቲ ወይ ብጭራሽ
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11. ሓደ ነገር ምስተኸስተ ኣጠቓላሊ ምስ ግምትካ ከመይ ረኺብካዮ?

ረብሕኡ ወይ ኣጋኒንካዮ ወይ ድማ ኣናኢስካዮ	1	2	3	4	5	ብልክዕነት ብተመጣጣኒ ዓይኒ ረኢኻዮ
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12. መዓልታዊ እትሰርሖ ሰራሕቲ ኣብ መዓልታዊ ህይወትካ ንኡሽቶይ ትርጉም ኣሎዎም ኢልካ ክንደይ ጊዜ ትሓሰብ?

ኣዝዩ ቡዙሕ ጊዜ	1	2	3	4	5	ሳህቲ ወይ ብጭራሽ
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13. ስሚዒትካ ንምቁፅፃር ክንደይ ጊዜ ኢኻ ርግፀኛ ዘይኮንካ?

ኣዝዩ ቡዙሕ ጊዜ	1	2	3	4	5	ሳህቲ ወይ ብጭራሽ
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VIII. ዓቕን ማሕበራዊ ደገፍ ብመንጽር 3 ዓይነት ሕቶታት ኦስሎ

(The Oslo 3-items social support scale, Tigrigna version)

ቅነዕ መልሲ እዩ ዝበልካዮ ኣኽብበሉ ወይ ኣስምረሉ።

1	ካብ ኅረቤትኩም ሓገዝ ከድልየኩም እንተተሎ፡ ነቲ ሓገዝ ምርካብ ክሳብ ክንደየናይ ቀሊል እዩ?	ኣዝዩ ቀሊል	5
		ቀሊል	4
		ዝከኣል	3
		ከቢድ	2
		ኣዝዩ ከቢድ	1
2	ከቢድ ሽግር እንተተዘጋጥመኩም ናተይ ናይ ቀረባ እዮም፤ ክሕግዙኒ ይኽእሉ እዮም ኢልኩም እትኣምኑዎም ብቐጽሪ ክንደይ ሰባት ኣለዉ?	ዋላ ሓደ	1
		1-2	2
		3-5	3
		5+	4
3	ኣብቲ ንሰኹም እትሰርሕዎ ዘለኹም ሰራሕ ሰባት ክንደየናይ ተገዳስነት የርእዩ?	ብዙሕ	5
		ወሱን/ደሓን	4
		ርግጽኛ ኣይኮንኩን	3
		ወሑድ	2
		ዋላ ሓንቲ	1

Appendix IX: Expert comments on translation of measure

Suppliment Table-1: Expert comments and consensus on discrepancies of phrases/ words in the two translations for each item of SoC-13

Item	Key word/ phrase of difference in translation-1	Key word/ phrase of difference in translation-2	Key word/ phrase selected for consensus
1	ዝካየድ ፍፁም ሳህቲ (አማራጭ)	ንዘሎ ብሐቂ እዝዩ ስሕት ኡሉ(አማራጭ)	ዝካየድ እዝዩ ስሕቲ (አማራጭ)
2	እገሪሙዎም ብጭራሽ (አማራጭ)	ዘይተፀበኻዮምኻን ፈጊሙ(አማራጭ)	እገሪሙዎም ፈጊሙ (አማራጭ)
3	ዝንመንካዮም ብጭራሽ (አማራጭ)	ብዙሕ ፈጊሙ ካብዝተፀበኻዮም	ዝንመንካዮም ፈጊም
4	ሕጀ ምንም ንፁር (አማራጭ)	ሎሚ (ሀ/ቲ ፡ ሕጀ) ንፁር (አማራጭ)	ሕጀ ምንም ንፁር (አማራጭ)
5	ንስኻ ብእግባቡ አይተአለኩን ኢልካ ትሓሳብ ዶ? መብዛሕትኡ ጊዜ (አማራጭ)	እንብእግባቡ አይተአለኹን ኢልካ ዝብል አሎካ ዶ? እዝዩ መብዛትኡ ጊዜ (አማራጭ)	እንብእግባቡ አይተአለኹን ኢልካ ዝብልስምኢት አሎካ ዶ? እዝዩ መብዛትኡ ጊዜ (አማራጭ)
6	ጋሻ ኩነታት	ዘይፈልጥካዮ(ዘለመድካዮ)	ጋሻ ኩነታት
7	ናይ ፍፁም ፍሰህን ሓጎስን ምንጪ ናይ ድህን ስቅያትን ምንጪ እዩ (አማራጭ)	ምንጪ ዕሙቅዝብል ዕግበት ሓጎስን ምንጪ ስቅያትትን ምስለቻውን (አማራጭ)	ናይ ዕሙቅ ዝብል ዕግበትን ሓጎስን ምንጪ ናይ ስቅያትን ምስለቻውን ምንጪ ሓጎስን (አማራጭ)
8	መብዛሕትኡ ጊዜ(አማራጭ)	እዝዩ ቡዙሕ ጊዜ(አማራጭ)	እዝዩ ቡዙህ ጊዜ(አማራጭ)
9	ንምግላፅ ተሸጊርካ ትፈልጥ ዶ?	ውሽጣዊ ስሚዒት	ውሽጢ ስሚዒት
10	እቶም ብርቱዕ ባህርያት እብ ሓደ ሓደ ነገራት ተሰዓርቲ ኮይኖም	እቶም ፅኑዓት እብ ሓደ ሓደ ኩነታት ዘጥፉ/ ዝኸሰሩ	እቶም ፅኑዕ ባህርያት እብ ሓደ ሓደ ኩነታት ተሰዓርቲ ኮይኖም
11	ሓደነገር ምስተኸሰተ	ሓደ ነገር ምስተኸሰተ	ሓደ ነገር ምስተኸሰተ
12	መዓለታዊ እትሰርሖ ሰራህቲ	የብሉን	መዓለታዊ እትሰርሖ ሰራህቲ
13	ስሚዒትካ ንምቁፅፃር ክንደይ	ንህወትካ (ንዓርኻ አብምቁፅፃር	ስሚዒትካ ንምቁፅፃር ክንደይ

Appendix X: Supplemental Tables and Figures

Supplement Table-2: Item- total correlation and Item level Content Validity Index (I-CVI) for each items of SoC-13 scale

SoC-13 Items		1	2	3	4	5	6	7	8	9	10	11	12	13
Item- total Correlation	Pilot study (n=52)	0.27	0.32	0.37	0.53	0.48	0.65	0.41	0.50	0.58	0.63	0.45	0.10	0.52
	Main study(n=562)	0.24	0.26	0.36	0.57	0.45	0.58	0.47	0.64	0.65	0.66	0.56	0.33	0.63
Alpha if item deleted	Main study(n=562)	0.76	0.75	0.73	0.71	0.72	0.71	0.72	0.70	0.70	0.70	0.71	0.74	0.70
I-CVI	Main study (n=562)	1	1	1	1	0.86	1	1	1	1	1	1	1	1

Note: Item level Content Validity Index (I-CVI)=.86-1 ;

CVI-S-Scale level Content Validity Index (S-CVI)= 0.92;

Average Scale- Level Content Vaidity Index (S-CVI/Ave) = 0.989

Supplement Table-3: Mean score comparison of SoC-13 between two studies from Eritrean sample

Study	Participants	Sample size	Mean(SD)	Median	Range	Reliability Alpha	Split half reliability
Present Study	Eritrean Refugees in Ethiopia	Total sample (n=562)	38.91(8.66)	38	15- 63	0.74	0.69
		Male(n=258)	39.89(8.73)	40	18-60	0.72	0.71
		Female(n=304)	38.08(8.53)	37.5	15-63	0.75	0.66
Alemdom, et al.,2007*	Eritrean IDP	Total sample (n=72)	48.94				
		Male(n=40)	52.5				
		Female(n=32)	41.18				
	Eritrean Non-displaced	Total sample (N=193)	54.84				
		Male(n=63)	53.61				
		Female(n=130)	54.66				

Note: IDP (Internally Displaced Persons); shaded= not reported

*Alemdom A, Tesfamichael B, Saeed Z, et al: use of 'sense of coherence (SoC)' scale to measure resilience in Eritrea: Interrogating both the data and the scale. J.biosoc.Sci, 2007; 39, 91–107

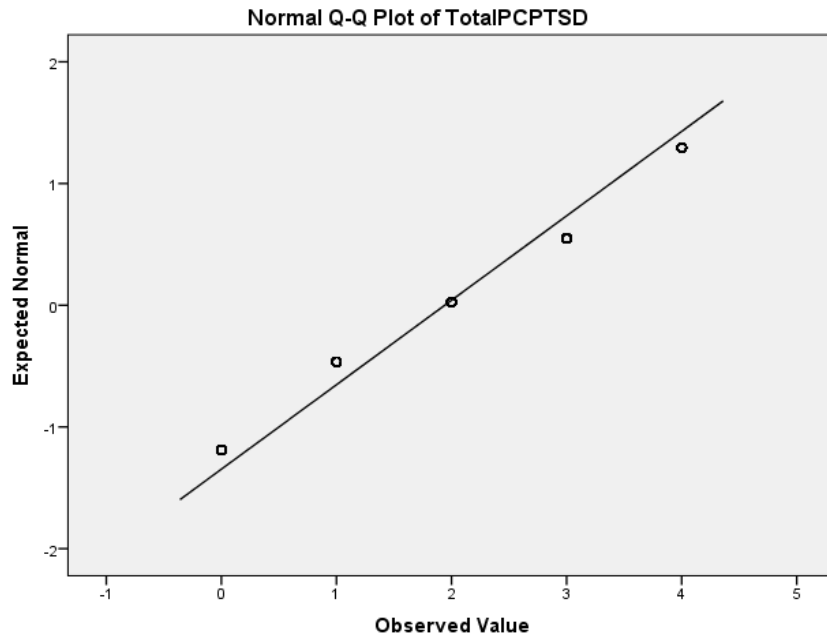
Supplementary Figure-1: Box plot for test of normality of Primary Care PTSD screener(PC-PTSD)



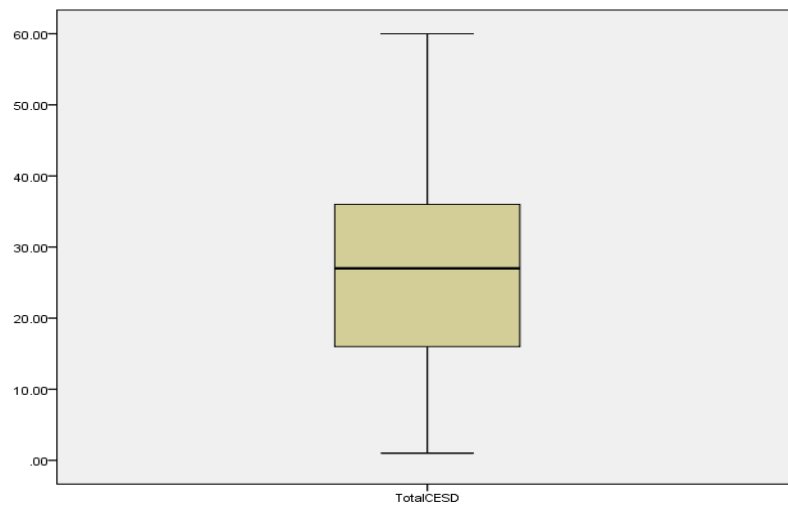
Supplement Table-4: Descriptive statistics for Primary Care PTSD screener(PC-PTSD)

			Statistic	Std. Error
TotalPCPTSD	Mean		1.9413	.06079
	95% Confidence Interval for Mean	Lower Bound	1.8219	
		Upper Bound	2.0607	
	5% Trimmed Mean		1.9348	
	Median		2.0000	
	Variance		2.077	
	Std. Deviation		1.44110	
	Minimum		.00	
	Maximum		4.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		.024	.103
	Kurtosis		-1.332	.206

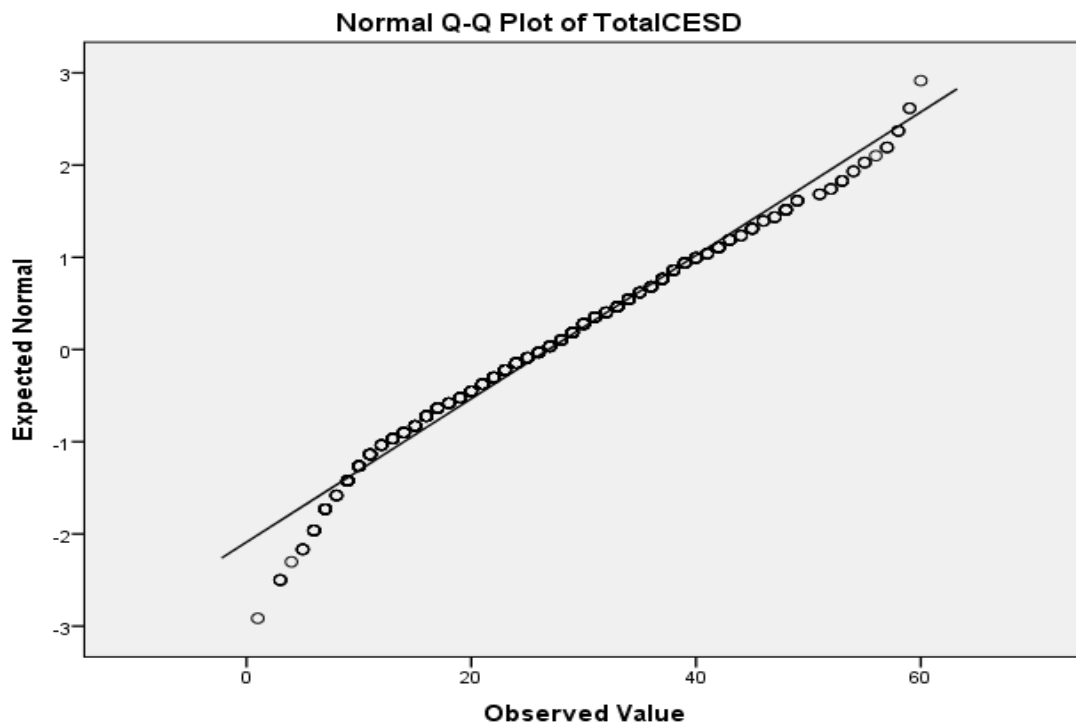
Supplimentary Figure-2: Q-Q plot of Primary care PTSD screener(PC-PTSD)



Supplimentary Figure-3: Box plot for test of normality of Center for Epidemiologic Studies Depression (CES-D) scale



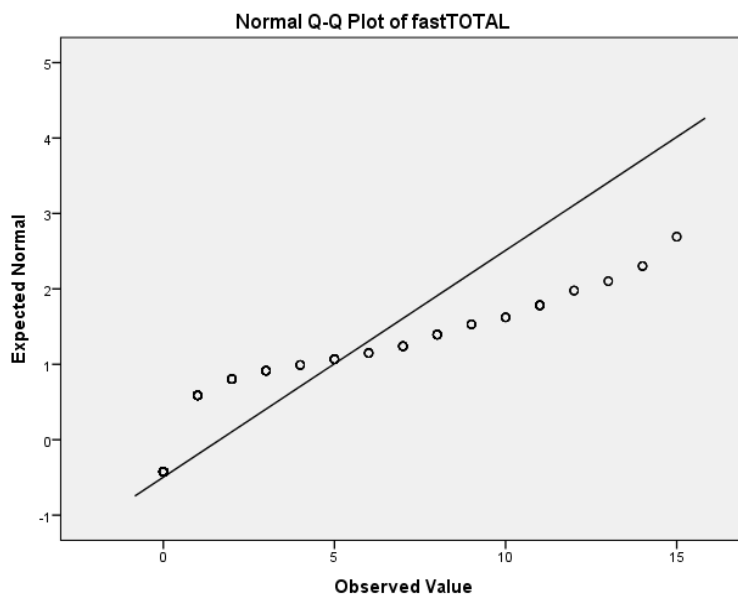
Supplimentary Figure-4: Q-Q plot of Center for Epidemiologic Studies Depression (CES-D) scale



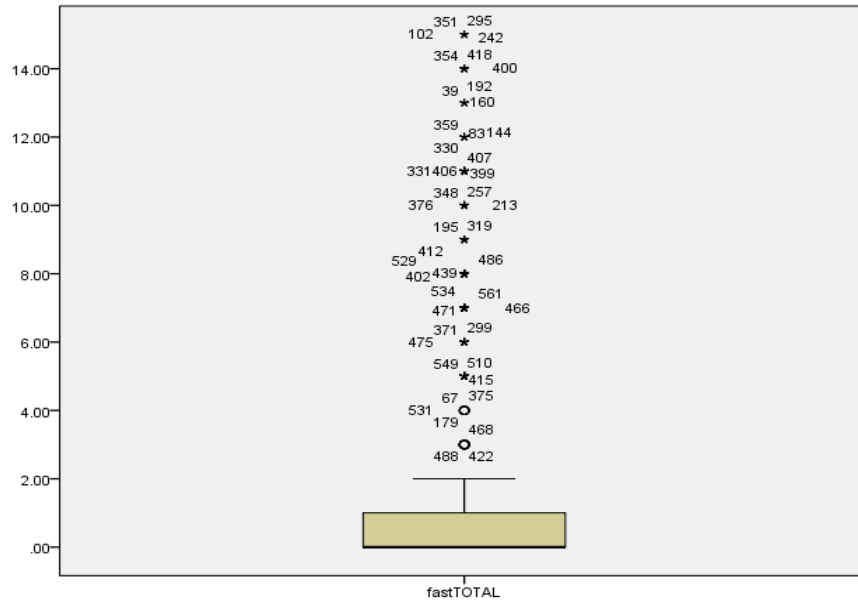
Supplement Table-5: Descriptives statistics of Center for Epidemiologic Studies Depression(CES-D) scale

		Statistic	Std. Error
TotalCESD	Mean	26.8719	.54263
	95% Confidence Interval for Mean	Lower Bound 25.8061 Upper Bound 27.9377	
	5% Trimmed Mean	26.5152	
	Median	27.0000	
	Variance	165.477	
	Std. Deviation	12.86380	
	Minimum	1.00	
	Maximum	60.00	
	Range	59.00	
	Interquartile Range	20.00	
	Skewness	.301	.103
	Kurtosis	-.545	.206

Supplementary Figure-5:Q-Q plot of Fast Alcohol Screening Test (FAST) scale



Supplimentary Figure-6: Box plot for test of normality of Fast Alcohol Screening Test (FAST)



Supplement Table-6: Descriptive statistics of Fast Alcohol Screening Test(FAST)

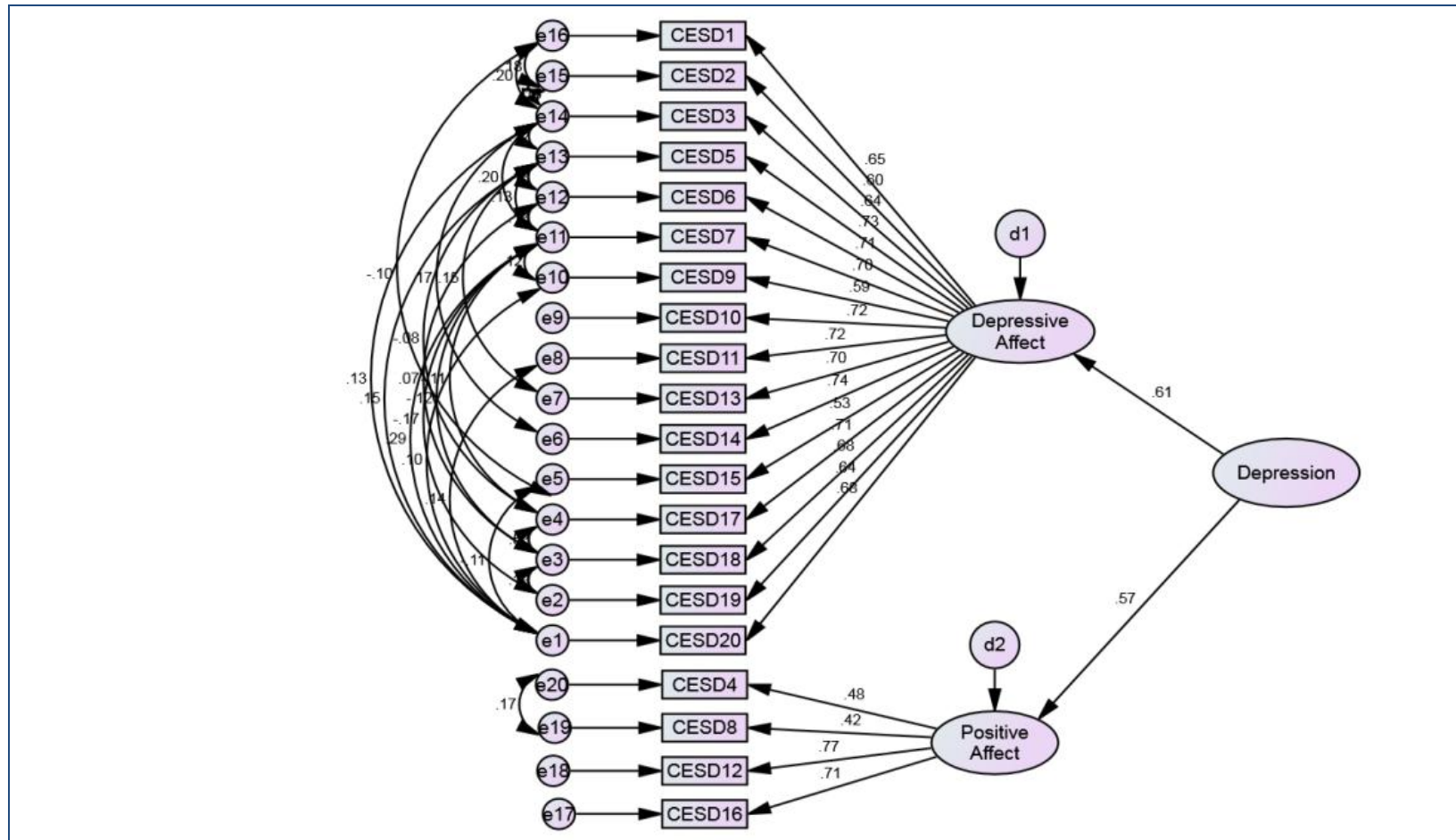
		Statistic	Std. Error
fastTOTAL	Mean	1.6495	.14032
	95% Confidence Interval for Mean	Lower Bound	1.3738
		Upper Bound	1.9251
	5% Trimmed Mean	1.1526	
	Median	.0000	
	Variance	11.066	
	Std. Deviation	3.32654	
	Minimum	.00	
	Maximum	15.00	
	Range	15.00	
	Interquartile Range	1.00	

Skewness	2.219	.103
Kurtosis	4.060	.206

Supplement Table-7: Pearson's correlation matrix among variables of interest in Eritrean refugee sample (n=562)

	Pre migration living difficulties	Post migration living difficulties	PTSD	Depression	Task-oriented coping	Avoidance-oriented coping	Emotion-oriented coping	Alcohol misuse	Sense of coherence	Social support
Pre migration living difficulties	1									
Post migration living difficulties	.391**	1								
PTSD	.342**	.212**	1							
Depression	.545**	.470**	.538**	1						
Task-oriented coping	.157**	.144**	-.041	.075	1					
Avoidance-oriented coping	.078	.034	.048	.065	.268**	1				
Emotion-oriented coping	.128**	.021	.031	.096*	.035	.191**	1			
Alcohol misuse	.299**	.052	-.040	.197**	.065	.035	.219***	1		
Sense of coherence	-.265**	-.249**	-.433**	-.597**	.089*	-.125**	-.165**	-.105*	1	
Social support	-.048	-.068	-.265**	-.319**	.227**	.025	-.015	.034	.363**	1

Supplement Fig-7: Two factor structure of CES-D second order, correlated error terms



Legend: Rectangles represent indicator items; ovals represent latent factors; single headed arrows along with standardized weights represent factor loadings; circles represent error terms for each item (e), and disturbance terms of each latent factors (d), double headed arrows represent co-variances between error terms. Model fit: $\chi^2=271.65$; $df=144$ $\chi^2/df=1.886$; CFI= 0.975; TLI= 0.967; RMSEA= 0.040

Appendix X: Permission letters

1. Permission letter granted from Administration of Refugee and Returnees Affairs (ARRA) to conduct this study

ADDIS ABABA UNIVERSITY

FACULTY OF MEDICINE,
DEPARTMENT OF PSYCHIATRY

ጤና ሳይንስ ኮሌጅ
የአእምሮ ሕክምና ት.ክፍል

ቁጥር: MF/PSY/ 144 /2006
ቀን : የካቲት 11/2006

**ለ- ስደተኞችና ከስደት ተመላሾች ጉዳይ አስተዳደር (ARRA)
አዲስ አበባ**

ጉዳዩ:- ለ PhD ትምህርት የመመረቂያ ጥናት ተማሪው መረጃ እንዲሰጠው ፈቃድ ስለመጠየቅ:-

ተማሪ ብርሃኔ ጌትነት በ Mental Health Epidemiology የ2ኛ ዓመት የ PhD ተማሪ ሲሆን "Contextual Relevance of Post Traumatic Stress Disorders and Depression among Eritrean Refugees in Ethiopia Camps: Implications for culturally sensitive Intervention" በሚል ርዕስ ላይ የPhD ጥናቱን እያከናወነ ይገኛል። ስለሆነም ተማሪው የሚያጠናው የጥናት ዉጤት በሃገራችን ለሚገኙ ስደተኞች የአእምሮ ጤና ችግሮችና መፍትሄዎች ላይ ወደፊት ለሚደረጉ ጥናቶች አይነተኛ አስተዋፅኦ ከማድረጉም በላይ በስደተኞች ጤና ላይ ትኩረት አድረገው ለሚሰሩ የሃገር ውስጥም ሆነ አለም አቀፍ ተቆማት ጥናቱ ትልቅ ድርሻ አለው። የጥናቱን አላማ እና ዝርዝር በጥልቀት ማየት ካስፈለገም ተማሪው በተጠየቀ ጊዜ የሚያቀርብ ይሆናል። ስለሆነም ተማሪ ብርሃኔ ጥናቱን ወደሚያደርግበት ካምፕ ሄዶ በከፍተኛ ሃላፊነት መረጃ ማግኘትና ከአንዳንድ ፍቃድ እና አስፈላጊው ትብብር ይደረግለት ዘንድ በትልቅ አክብሮት እንዲቃለሁ።

ከሰላምታ ጋር

ዶ/ር የናስ ባህረጥበብ
የአእምሮ ትምህርት ክፍል

የአእምሮ ሕክምና ት/ክፍል
ሕክምና ፋኩልቲ
Department of Psychiatry
Faculty of Medicine

4ክስ/Fax: 251-011-551-33-99 P.O.Box 9086 TEL.: 251-011-896-20-52

መልስ በሚሰጡበት ጊዜ የእኛን የደብዳቤ ቁጥር ይጥቀሱ
IN REPLY REFER TO OUR RE.NO.

አማላጊ ገጽ 1
አማላጊ ገጽ 2
አማላጊ ገጽ 3

አማላጊ ገጽ 4
አማላጊ ገጽ 5
አማላጊ ገጽ 6

2. Ethical clearance from Institutional Review Board (IRB) of college of Health Sciences, Addis Ababa University

	Addis Ababa University College of Health Science Institutional Review Board	SOP# AAUMF 008 Version 2.0 Effective date: 1 Feb. 2009 Page 13 of 13
	Title: 3.2. Use of Study Assessment Form	

ANNEX 3
Form AAUMF 03-008

IRB's Decision

Meeting No:001/15

Date: January, 2015

Protocol number: 052/14/Psy

Assigned No.....

Protocol Title: Post-traumatic stress disorder & depression among Eritrean refugees in an Ethiopian camp. Their contextual relevance and implication for intervention

Principal Investigators:	Berhanie Getnet	
Institute:	CHS-AAU	
Elements Reviewed (AAUMF 01-008)	☒ Attached	☐ Not attached
Review of Revised Application ☐ Yes ☐ No	Date of Previous review:	
Decision of the meeting:	☒ Approved ☐ Approved with Recommendation ☐ Resubmission ☐ Disapproved	

I.Elements approved-

1. Protocol Version No.
2. Protocol Version Date.....
3. Informed consent Version No.
4. Informed Consent Version Date

II. Obligations of the PI-

1. Should comply with the standard international & national scientific and ethical guidelines
2. All amendments and changes made in protocol and consent form needs IRB approval
3. The PI should report SAE within 10 days of the event
4. End of the study, including manuscripts and thesis works should be reported to the IRB

III. TO ESTM ☐

Institution Review Board (IRB) Approval: Period from **02/02/2015** to **01/02/2016** _

Follow up report expected in

3 Months _____ 6 months _____ 9 months _____ one year _____

Chairperson, IRB

Dr. Yimtubezinash Woldeamanuel

Signature _____

Date: **02/02/2015** _____

Associate Dean for

Postgraduate and Research

Signature _____

Date _____

