Prevalence and predictors for post-traumatic stress disorder, depression and general health in a population from six villages in South Lebanon

Laila F. Farhood & Hani Dimassi

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Abstract

Objective   To determine the prevalence and predictors of psychiatric disorders in a general population from South Lebanon, an area that was under military occupation for more than 20 years.

Method   This study assessed post-traumatic stress disorder (PTSD) and depression thresholds along with general health (GHQ) among 625 citizens in six villages in South Lebanon using a cross-sectional design through random sampling.

Results   The prevalence ranged from 17.6 to 33.3% for PTSD and from 9.2 to 19.7% for depression. GHQ total score was found to be 6.7 significantly greater than the internationally established mean score of 5.0. Social support, financial resources, gender, and war exposure were significantly related to PTSD and depression thresholds.

Conclusion   The results strongly suggest that the general population in South Lebanon suffer from mental health disorders calling for appropriate psychiatric interventions and development planning.

Keywords   Psychiatric disorder · PTSD · Depression · General health · South Lebanon

L. F. Farhood
Psychiatry-Mental Health Nursing, Hariri School of Nursing, American University of Beirut, Beirut, Lebanon

L. F. Farhood (✉)
Psychiatry Department, American University of Beirut,
P.O.Box 11-0236, Riad El-Solh, Beirut 1107 2020, Lebanon
e-mail: lf00@aub.edu.lb

H. Dimassi
School of Pharmacy, Lebanese American University,
Jbeil, Lebanon

Introduction and background

The South of Lebanon has experienced continuous conflicts since 1975. It has been under occupation for over two decades until occupying forces withdrew in the year 2000. The occupation of the south and all the accompanying military escalations has left its psychological impact on the inhabitants [1, 4]. The continuous war activity in Lebanon has greatly affected the health and well-being of the population.

After exposure to a traumatic event, some individuals develop symptoms of posttraumatic stress disorder (PTSD). Although the majority of studies on PTSD have been conducted in high income countries amongst Western populations, some studies have performed similar assessments in post-conflict societies. For example, the prevalence of PTSD was found to be 20.4% in Eastern Afghanistan [46] and 23.5% in Kosovo [16]. These figures are considerably higher than prevalence studies on the general population in countries without recent conflict. In Sweden, the life-time prevalence of PTSD was found to be 5.6%, and in Australia the 12-month prevalence was 1.3% [14, 21]. The World Mental Health survey found that the 12-month prevalence of any anxiety disorder including PTSD was 11.2% in Lebanon [52]. A random sample of civilians from Beirut showed a lifetime PTSD prevalence rate of 11.7% [31]. In addition, a study conducted on Lebanese civilians exposed to a church explosion, PTSD was found to be present in 17.2% in the total sample and 39% in the victims group [19].

Several studies have also investigated the associations between different predictor variables and PTSD in various populations. Studies have found that female gender, low level of education, young age and having children are positively associated with PTSD [16, 22, 35, 45]. Further, it

seems that those with PTSD exercise less, and are more prone to nicotine dependence, alcohol and substance abuse [7, 10, 26, 37]. A pre-trauma diagnosis or use of psychotropic medication is also associated with increased risk of PTSD [12, 15, 35, 39]. There is also some evidence that non-traumatic stressful life events might worsen psychiatric symptoms [15, 17, 45]. However, the variable associated with the presence and severity of PTSD that seems to have the most support in literature is the degree of exposure to one or more traumatic events [9, 16, 35, 42, 44].

A characteristic of PTSD is co-morbidity with depression [21, 34]. A study conducted on a Lebanese population showed a life-time prevalence ranging from 16.3 to 41.9% for major depression [32]. In 1993, a study by Farhood et al. [19] with a sample of 1,500 civilians residing in Beirut reported that the 6 months prevalence rate of depression was 9.9%. Furthermore, a study on PTSD, depression, and health status in Lebanese civilians exposed to a church explosion found depression to be present in 41.9% in the total sample and in 51% of the victims group [18]. Post-war rates of PTSD and depression for combat troops who returned 3–4 months after deployment were 11.5 and 14.2% in Afghanistan and 18.0 and 15.2% in Iraq, respectively [29]. Variability in prevalence rates in these studies may be attributed to geographic location, intensity of exposure and time of study with regards to PTSD and depression.

Social support plays a crucial role in the recovery from a traumatic event and can mediate the impact of exposure. Hobfoll [28, pg. 121] defines social support as "social interactions or relationships that provide individuals with actual assistance or that embed individuals within a social system believed to provide love, caring, or sense of attachment to a valued social group or dyad". Several studies have found social support to be a protective factor [17, 19, 20, 36, 45]. Norris and Kaniasty [44] examined received and perceived social support following community wide disasters and found a close relationship between perceived support and mental health. In a summary of contemporary theories, the authors concluded that the effect of perceived support on mental health "occurs because strong social networks provide people with ongoing positive experiences and stable, rewarding roles" [44]. Loss in social support as a perceived resource could aid in predicting the psychological effects of trauma in conflict societies such as in Lebanese populations [17]. According to the authors Freddy, Hobfoll and Ribbe [23], this may indicate the intensity of psychological impact of exposure since loss of resources is associated with an increase in distress. If resources are perceived as stable, then individuals are protected from the effects of trauma [23].

Ahern et al. [2] found that social support had a greater protective effect on women than men. However, this could be because of differences in earlier trauma exposure and not gender itself [30]. In addition, victims who can verbalize their experiences and emotions of the traumatic event are less likely to have severe psychological problems [43, 51]. In addition to social support and gender, the characteristics of the event itself, age, socio-economic status, earlier trauma and pre-existing psychological disorders can further intensify the development of psychological symptoms resulting from exposure [8, 18]. Religion and spirituality may aid as a protective factor for mental health. Hill and Pargament [27] reviewed the advances in conceptualization and measurement of the health effects of religion concluding that a direct relationship exists between them; however, the link is still unknown. In a study on a population in Eastern Afghanistan following a war, Scholte et al. [46] noted that along with family support, religion was perceived as a major resource in coping with tragic events.

The population in the south of Lebanon experiences ongoing instability and violence [19, 20]. The volatile nature of the area exposes communities to various traumas with the experienced conflict occurring at different levels of duration and intensity that is unique to anywhere else. Studies assessing the mental health of the southern civilians are few. One was implemented by the authors of the current study and revealed that 97.7% of the sample had experienced, witnessed, or heard of a war-related traumatic event with a third of the participants having PTSD [20]. The aim of the current study was to determine the prevalence and factors associated with PTSD, depression and general health in populations from South Lebanon 5 years after the Israeli withdrawal.

Method

Design and procedure

Participants were selected from six villages in South Lebanon. The selection was based on the religious background and perceived military involvement so as to represent the diversity of areas and to establish level of exposure. Originally, the two major Christian villages were selected based on perceived military involvement, however, at a later stage for comparison reasons, four more villages were added based on similar selection criteria. The villages were as follows: two Christian (JM and QM), three Muslim Shiite (KH, D, and B), and one mixed Druze and Muslim Sunni population (H). The selected villages were diverse in terms of population size, educational background, and socio-economical status. They were also characterized by geographical diversity such as mountainous, sloping topology, and having different shapes (e.g., oval, elongated, etc.). Involvement of the inhabitants with the

military occupation ranged from collaboration with the occupying forces, to very limited involvement, and to military resistance. The houses were selected from a centrally located round-about whereby a pen was spun to determine the direction of sampling. Every second house on the left and every second house on the right side of the road were chosen. Every time, it was possible to take a new turn the pen was spun again [20, pg. 335].

One adult from each eligible household was selected for participation. The participants were interviewed in their homes and workplaces by trained graduate students from the American University of Beirut (AUB). Since there very little data on population size and demographics on the villages exists, quotas established by the UN population statistics for Lebanon (2002) were introduced to increase sample representation with regards to age and gender [40]. Adults (above age 20), who were permanent residents for at least 24 months, were selected using a random selection approach with quotas. Previous experience in the area has validated the importance of creating quotas as a method to insure accurate representation of men and younger groups.

The sample size was based on a 20% (CI = 15–25%) expected prevalence of mental health outcome [15, 39]. The calculated sample size required was 125 per village. This was found to yield a power of 80% allowing for a 5% risk of Type I error. The analysis for sample size was calculated using the PASS software which is part of the NCSS statistical package [13]. The sample size was increased for villages H and KH to 150. Due to the close similarities in villages B and D, the samples were combined reducing the total sample size to 75.

The participants were asked for oral informed consent and remained anonymous throughout the study. There was no financial compensation for participation. The ethical approval for the study was granted by the American University of Beirut Institutional Review Board.

Instruments

Exposure and PTSD

The Arabic version of the Harvard Trauma Questionnaire (HTQ) was used to assess exposure to traumatic events and symptoms of PTSD and has been used in Arabic speaking populations. The respondent was scored on the 16 PTSD symptom items with scores exceeding the 2.5 cut-off point yielding a PTSD threshold. The HTQ psychometric properties are as follows: inter-rater reliability $r = 0.93$ for the traumatic events, $r = 0.98$ for symptoms and on-week test–retest reliability $r = 0.89$, $p < 0.0001$ for traumatic events, and $r = 0.92$, $p < 0.0001$ for trauma symptoms [41]. Cronbach's alpha was calculated to be 0.87 for the symptom part of the Arabic version. The extent of exposure

was quantified according to the HTQ manual so that each participant received a total "exposure" score. HTQ was validated in other war conflict areas such as Kosovo [38].

Beck depression inventory

The Beck depression inventory (BDI) is a 21-item rating inventory measuring characteristics, attitudes, and symptoms of depression [6]. The participant chooses one out of four answers for each item. The questions address symptoms such as sadness, being pessimistic about the future, feeling bad, crying, loss of appetite, loss of weight, and change in sexual activity. A score was calculated for each participant who was considered as having symptoms of depression based on a cutoff point of 9 (i.e., mild depression threshold and higher). The internal consistency ranges from 0.73 to 0.92 with a mean of 0.86 [5]. It has a split-half reliability co-efficient of 0.93, as well as a high internal consistency with alpha coefficients of 0.86 and 0.81 for psychiatric and non-psychiatric populations, respectively [5]. BDI has been used extensively on the Lebanese population [19, 20]. The measure was introduced at a later stage in the study and was used in H, KH, and BD villages.

General psychiatric morbidity

General psychiatric morbidity was measured using the General Health Questionnaire-28 (GHQ-28) consisting of four scales: somatic symptoms, anxiety and insomnia, social dysfunction and severe depression [24]. Multiple international assessments have demonstrated structural consistency in different settings and languages [50]. The validity and reliability of the Arabic GHQ-28 were addressed in the previous research studies. The specificity, sensitivity and internal consistency were found to be 0.87, 0.49, and 0.93, respectively [48]. It has been widely used on Arab and specifically Lebanese populations [3, 19, 20]. The Cronbach's alpha for this study was 0.87. Items belonging to the same subscales were scored and added to the total score. Goldberg et al. [25] reported varying thresholds over 15 sites worldwide. Thresholds represented the 60th and 80th percentiles ranging from scores 3 to 8 with a mean score of 5.

Demographic and life-style variables, social support and life events

Demographic characteristics including age, gender, socio-economic status and lifestyle practices were included. Participants were asked about their educational level, marital status, smoking (e.g., cigarettes, water pipe or "argileh"), alcohol consumption, drug or tranquilizer consumption, current psychiatric treatment, exercise (type,

frequency), sleep hours, working hours/day (including domestic work). A specific section measured social support with eight items denoting available social support. This section included questions such as whether they had somebody to rely on, or if they felt needed and respected. The answers were coded 1 and 0, and added to yield a social support score ranging from 0 (absence of social support) to a maximum score of 8 (strong social support). The life events section on social problems had four items addressing conflicts with friends, family, or at work (possible score: 0–4). The section on financial problems (possible score: 0–4) asked about job loss, job searching, major change in income, and payment obligations.

Data analysis

Data were analyzed using the SPSS 15. Initially, the villages were compared in terms of mental health outcomes and war exposure. In addition to these comparisons, differences among villages with regard to socio-demographic characteristics, social support, and life events were addressed. At a second level, a bivariate analysis was carried out to depict factors associated with PTSD and depression

thresholds. Finally, multivariate logistic regression models, once with PTSD and once with depression as an outcome, were carried out to partition out the effect of covariates from that of village. In these models, if village effect lost its significance, it would mean that the difference in mental health outcomes observed initially can be attributed to the covariates controlled for in the model. The bivariate analysis was carried out using the Pearson Chi-square, Fisher exact test, independent t test, and ANOVA f-test. Odds ratios (OR) with respective 95% confidence intervals (CI) was reported along with p values. All analyses were done at the 0.05 level.

Results

Demographic, socioeconomic and life style characteristics of the sample

The selected villages were similar with regard to age, gender, and marital status distribution. However, there was statistical difference in terms of education and employment ($p < 0.001$ and $p = 0.026$, respectively) (Table 1). Also,

Table 1 Distribution of the profile of the sample by area

Sample size	JM N (%) 128	QM N (%) 127	H N (%) 152	KH N (%) 149	BD N (%) 76	Total N (%) 632	p value
Age							
20–29	39 (30.7)	39 (31.0)	39 (25.7)	42 (28.2)	22 (28.9)	181 (28.7)	0.993
30–39	31 (24.4)	30 (23.8)	40 (26.3)	36 (24.2)	15 (19.7)	152 (24.1	
40–49	24 (18.9)	24 (19.0)	28 (18.4	24 (16.1)	15 (19.7)	115 (18.3)	
50–59	11 (8.7)	15 (11.9)	15 (9.9)	16 (10.7)	10 (13.2)	67 (10.6)	
60+	22 (17.3)	18 (14.3)	30 (19.7)	31 (20.8)	14 (18.4)	115 (18.3)	
Gender							
Male	61 (47.7)	58 (45.7)	77 (50.7)	76 (51.0)	37 (48.7)	309 (48.9)	0.9
Female	67 (52.3)	69 (54.3)	75 (49.3)	73 (49.0)	39 (51.3)	323 (51.1)	
Marital status							
Single	43 (33.6)	47 (37.0)	47 (31.1)	41 (27.5)	21 (27.6)	199 (31.5)	0.777
Married	80 (62.5)	72 (56.7)	95 (62.9)	98 (65.8)	51 (67.1)	396 (62.8)	
Other	5 (3.9)	8 (6.3)	9 (6.0)	10 (6.7)	4 (5.3)	36 (5.7)	
Education[a]							
Level 1	13 (10.2)	22 (17.3)	26 (17.1)	34 (22.8)	23 (30.3)	118 (18.7)	<0.001
Level 2	40 (31.3)	43 (33.9)	78 (51.3)	72 (48.3)	35 (46.1)	268 (42.4)	
Level 3	75 (58.6)	62 (48.8)	48 (31.6)	43 (28.9)	18 (23.7)	246 (38.9)	
Employment							
Employed	56 (43.8)	49 (38.6)	84 (55.3)	76 (51.0)	30 (39.5)	295 (46.7)	0.026
Unemployed	21 (16.4)	20 (15.7)	8 (5.3)	12 (8.1)	12 (15.8)	73 (11.6)	
Housewife	36 (28.1)	39 (30.7)	44 (28.9)	50 (33.6)	26 (34.2)	195 (30.9)	
Other	15 (11.7)	19 (15.0)	16 (10.5)	11 (7.4)	8 (10.5)	69 (10.9	

[a] Level 1: below primary education, Level 2: not completed secondary education, Level 3: secondary education or more completed

cigarette smoking as well as alcohol consumption was reported at significantly different rates among the villages ($p < 0.001$ and $p = 0.005$). Eight percent (8.33%) of the sample reported using tranquilizers and 1.4% reported using illicit drugs with no differences among the villages. It is worth noting that 9.7% of the participants reported having received one type of psychiatric treatment.

Social support, stressors, war exposure and mental health

All villages had a mean social support score of above 6 with the exception of QM (mean = 5.7, $p = 0.015$). There were no differences among villages regarding social problems (overall mean = 0.4). The highest score for financial problems was observed in QM (mean = 1.8) followed by JM (mean = 1.6) ($p = 0.003$) (Table 2). War events were reported as either being witnessed or experienced. When asked about events that were witnessed or experienced the distribution varied ($p = 0.002$ and <0.001, respectively). The highest number of witnessed events was reported in QM (mean = 4.6) and the lowest was in H (mean = 2.8). H had the lowest mean of experienced events (mean = 3.5) similar to that of JM, whereas the highest mean was in BD (mean = 7.0). PTSD and depression thresholds along with GHQ scores were also statistically different among the villages. For PTSD thresholds, the overall rate was 24.1% with a rate as high as

33% in QM compared to 17.6% in H ($p = 0.033$). The total GHQ-28 mean score was 10.1 and 8.9 in QM and JM, respectively, with a much lower scores elsewhere ($p < 0.001$). The average score for the villages was 6.7, which is higher than the suggested cut-point of 5. Depression was not assessed in JM and QM as discussed earlier. Rates of depression thresholds were 19.7 and 16.1% in BD and KH, as compared to 9.2% in H ($p = 0.06$) (Table 2). It is worth noting that the GHQ severe depression section for JM and QM (0.5 and 1.0, respectively) were comparable if not higher than the other villages (0.4, 0.5, 0.6, and 0.7). Thus, it can be concluded that had the BDI been used in these two villages the rates of depression thresholds would be similar to that in BD and KH.

Factors correlating with PTSD and depression

Tables 3 and 4 represent the factors associated with PTSD and depression at the bivariate level. Participants identified with PTSD thresholds were mostly women, married, had more children, unemployed, had a lower educational level, not exercising, smoking cigarettes, using tranquilizers, had less social support, more financial problems, have witnessed/experienced more war events, and had higher GHQ-28 scores. Participants identified with depression thresholds were more likely to be female, unemployed, using tranquilizers, had lower social support, more

Table 2 Sample characteristics by social support, live events, traumatic events, PTSD, GHQ, and depression

	Theoretical range	JM N = 128	QM N = 127	H N = 152	KH N = 149	BD N = 76	Total N = 632	p value
Social support score: mean (SD)		6.1 (1.3)	5.7 (1.6)	6.3 (1.4)	6.2 (1.7)	6.2 (1.4)	6.1 (1.5)	0.015
Life events: mean (SD)								
Social problems	0–4	0.4 (0.9)	0.4 (0.7)	0.4 (0.6)	0.4 (0.7)	0.3 (0.5)	0.4 (0.7)	0.846
Financial problems	0–4	1.6 (1.2)	1.8 (0.9)	1.5 (0.9)	1.3 (1.0)	1.5 (0.9)	1.5 (1.0)	0.003
Traumatic events: mean (SD)								
Events witnessed	0–25	4.1 (4.4)	4.6 (4.3)	2.8 (3.5)	4.1 (3.6)	4.3 (3.9)	3.9 (4.0)	0.002
Events experienced	0–25	3.5 (3.2)	4.7 (3.6)	3.5 (3.9)	4.8 (4.1)	7.0 (5.0)	4.5 (4.1)	<0.001
PTSD								
Above threshold		31 (25.2%)	42 (33.3%)	26 (17.6%)	31 (20.8%)	20 (26.3%)	150 (24.1%)	0.033
GHQ-28 score: mean (SD)								
Total	0–28	8.9 (4.7)	10.1 (5.5)	4.6 (5.3)	5.0 (5.4)	5.0 (5.3)	6.7 (5.7)	<0.001
Somatization	0–7	2.0 (1.7)	2.3 (1.8)	1.4 (1.9)	1.6 (2.1)	1.5 (2.0)	1.78 (1.9)	<0.001
Anxiety	0–7	1.9 (2.2)	2.4 (2.3)	1.5 (2.0)	1.5 (1.9)	1.6 (2.0)	1.78 (2.1)	0.001
Social dysfunction	0–7	4.4 (1.4)	4.3 (1.6)	1.3 (1.5)	1.3 (1.6)	1.2 (1.4)	2.5 (2.1)	<0.001
Severe depression	0–7	0.5 (1.1)	1 (1.6)	0.4 (0.9)	0.5 (1.1)	0.7 (1.5)	0.6 (1.2)	0.002
Depression								
Above threshold (moderate to severe)		NA	NA	14 (9.2)	24 (16.1)	15 (19.7)	53 (14.1)	0.06

PTSD assessed using the Harvard Trauma Questionnaire (HTQ), *GHQ-28* The general Health Questionnaire 28 items version, *Depression* assessed using the Beck Depression Scale, *NA* the Beck Depression scale was not used in these villages

Table 3 Frequency and percentage distribution of PTSD and depression by individual characteristics

	PTSD-threshold N (%)	p value	Depression-threshold N (%)	p value
Gender				
Male	46 (15.2)		23 (12.1)	0.271
Female	104 (32.6)	<0.001	30 (16.0)	
Marital status				
Single	32 (16.5)		11 (10.1)	0.264
Married	107 (27.3)		36 (14.8)	
Other	11 (31.4)	0.009	5 (21.7)	
Employment				
Employed	51 (17.7)		23 (12.1)	0.043
Unemployed	21 (28.8)		9 (28.1)	
Housewife	65 (33.7)		19 (15.8)	
Other	13 (19.1)	<0.001	2 (5.7)	
Education[a]				
Level 1	34 (29.3)		15 (10.9)	
Level 2	71 (27.0)		29 (15.7)	
Level 3	45 (18.5)	0.029	9 (8.3)	0.103
Exercise				
Yes	40 (17.2)	0.002	15 (10.9)	0.189
No	110 (28.2)	0.002	38 (15.8)	
Cigarette				
Non-user	79 (18.8)	<0.001	33 (12.6)	0.149
User	67 (34.9)		20 (18.3)	
Nargileh				
Non-user	133 (25.0)	0.044	46 (14.6)	0.714
User	12 (14.8)		7 (12.7)	
Alcohol				
Non-user	127 (24.1)	0.653	47 (14.1)	0.780
User	19 (21.8)		6 (15.8)	
Tranquilizer				
Non-user	115 (20.4)	<0.001	39 (11.5)	<0.001
User	31 (59.6)		14 (43.8)	

[a] Level 1: below primary education; Level 2: not completed secondary education; Level 3: secondary education or more completed

financial problems, experienced more war events, and had higher GHQ-28 score. PTSD and depression were co-morbid in 59.6% of the sample ($p < 0.001$).

Multivariate logistic regression models

At the multivariate level, five factors were associated with PTSD thresholds while controlling for village differences (Table 5). Females were found to be about seven times more likely to report PTSD symptoms than males ($p < 0.001$, 95% CI 4.05–11.67). Smoking cigarettes were found to be positively associated with PTSD (OR = 2.69, $p = <0.001$). The OR for social support was 0.73 (95% CI 0.63–0.84), meaning for every item answered positively on the social support scale the participant was found to have a 27% decrease in the odds of having PTSD thresholds. Furthermore, for every ten units increase in the war exposure score (e.g., corresponding to

experiencing two events and witnessing one, or hearing and witnessing two events) there was a 56% associated increase in the odds of having PTSD thresholds ($p < 0.001$). No differences among villages were noted at the multivariate level suggesting that differences seen at the bivariate level can be explained by the factors reported above.

War exposure was not found to be statistically significant in modeling depression. Similar to what was reported for PTSD, social support was found to have a negative association with depression with 35% decrease in the odds of having depression thresholds for every positively answered item (OR = 0.65, 95% CI 0.53–0.79, $p = <0.001$). There was a 70% increase in odds of having depression thresholds for each additional financial problem reported ($p = 0.0002$). No difference in depression threshold rates was noted between the three villages where depression was measured (BD, H and KH) (Table 6).

Table 4 Mean and standard deviations of sample characteristics by PTSD and depression

	PTSD-threshold			Depression-threshold		
	Below	Above	*p* value	Below	Above	*p* value
Number of children	3.41 (1.93)	4.17 (2.14)	0.001	3.66 (2.28)	3.90 (1.76)	0.509
Social support score	6.24 (1.44)	5.67 (1.58)	<0.001	6.38 (1.42)	5.31 (1.66)	<0.001
Social problems	0.3 (0.66)	0.67 (0.86)	<0.001	0.30 (0.60)	0.79 (0.88)	<0.001
Financial problem	1.44 (0.97)	1.82 (1.00)	<0.001	1.35 (0.90)	1.83 (1.01)	<0.001
Traumatic events						
Events heard	6.96 (5.26)	8.89 (5.76)	<0.001	7.15 (5.81)	7.30 (5.56)	0.861
Events witnessed	3.42 (3.44)	5.75 (4.89)	<0.001	4.21 (4.21)	3.53 (3.56)	0.213
Events experienced	3.86 (3.53)	6.73 (4.78)	<0.001	4.35 (4.12)	7.15 (5.21)	<0.001
HTQ manual score	29.2 (20.2)	47.3 (27.4)	<0.001	31.77 (22.53)	44.17 (27.39)	<0.001
GHQ-28						
Total	4.97 (4.33)	12.24 (6.15)	<0.001	3.69 (4.17)	11.77 (6.28)	<0.001
Somatization	1.21 (1.45)	3.62 (2.17)	<0.001	1.13 (1.72)	3.81 (2.06)	<0.001
Anxiety	1.14 (1.59)	3.79 (2.26)	<0.001	1.17 (1.67)	3.64 (2.25)	<0.001
Social dysfunction	2.26 (2.09)	3.34 (2.11)	<0.001	1.08 (1.35)	2.51 (1.99)	<0.001
Severe depression	0.35 (0.88)	1.49 (1.76)	<0.001	0.31 (0.82)	1.81 (1.79)	<0.001

Table 5 Logistic regression model for PTSD-threshold

Variable	OR	95% CI	*p* value
Gender: Female versus male	6.88	(4.05, 11.67)	<0.001
Cigarette smoking			
Users versus non-users	2.69	(1.66, 4.36)	<0.001
Social support score (per 1 unit)	0.73	(0.63, 0.84)	<0.001
HTQ- manual score	1.05	(1.03, 1.06)	<0.001
(per 5 units increase)	1.25	(1.18, 1.32)	
(per 10 units increase)	1.56	(1.40, 1.74)	
Village			
QM versus H	0.68	(0.35, 1.35)	0.274
JM versus H	0.53	(0.23, 1.20)	0.129
KH versus H	1.32	(0.68, 2.55)	0.406
BD versus H	1.07	(0.54, 2.12)	0.836

HTQ Harvard Trauma Questionnaire

Table 6 Logistic regression model for depression-threshold

Variable	OR	95% CI	*p* value
Social support score	0.65	(0.53, 0.79)	<0.001
Financial problem (per 1 unit increase)	1.70	(1.21, 2.40)	0.002
HTQ- manual score	1.02	(1.00, 1.03)	0.018
(per 5 units increase)	1.08	(1.01, 1.15)	
(per 10 units increase)	1.16	(1.03, 1.31)	
Village			
KH versus H	1.60	(0.75, 3.42)	0.227
BD versus H	1.95	(0.82, 4.62)	0.131

The depression scale was not used in KM and JM

Discussion

The present study examined psychiatric morbidity in South Lebanon before the July 2006 war. Due to the long standing conflicts in the area, assessing the mental health status in citizens of the South was of great importance. The study showed the presence of negative stressors 5 years after the Israeli withdrawal. Findings suggest that war trauma has a significant relationship with high thresholds of PTSD and depression, somatization in general health, anxiety, insomnia, social dysfunction and severe depression as reported by the GHQ. These observations were made on an association level and did not account for causal relationships.

A high threshold of PTSD and depression was observed in the general population. The majority of participants had been exposed to several war events as well as financial problems and loss of property. Prevalence rates in this study were higher than compared to the WHO Mental Health Survey 12-month rate of 11.2% [52]. This could be because of the time of assessments and the cumulative effect of chronic exposure in the south (i.e. Israeli occupation). Karam (2006) noted that lower prevalence rates in previous Lebanon studies were because assessments were made during peacetime, whereas the current study took place in a highly volatile area. The authors also found that an increase in prevalence of individuals not receiving treatment is associated with an increase in mental disorders [33]. This may also be a factor in the south as access to treatment and the culture of not seeking help for psychological problems may also contribute to high prevalence

rates. Context as a determinant of mental health may be a more significant issue and further research is needed to understand this relationship in civilians exposed to mass violence and instability.

It was observed that villages had a high variation in PTSD and depression thresholds along with GHQ scores. For example, village H consistently scored lower on PTSD and depression thresholds and GHQ scores, whereas village QM, and to some extent JM, had the highest levels of PTSD and depression thresholds and GHQ scores. A closer look at the villages revealed that village H had the highest level of social support whereas QM had the lowest. Further differences were observed, such as, QM reporting the highest level of financial problems and village H having the lowest average number of war events witnessed and experienced. This could be explained by the proximity of village H to the border of Lebanon and Israel thus increasing the level of war exposure and military involvement. This variation in levels of exposure to traumatic events may explain the differences in thresholds and scores. In addition, village BD had the highest level of war exposure and also the highest level of depression thresholds. In this study, PTSD and depression were co-morbid in 59.6% of the sample population which may explain the high depression threshold. The same relationship existed between general health scores. The GHQ average score was 6.7, higher than the suggested cut-off point of 5 indicating distress [17, 26]. Statistical differences were observed in villages QM (10.1) and JM (8.9) as well as high thresholds of PTSD.

With regards to methodology, the multivariate analysis was used to partition out the effects of social and financial problems as well as exposure to war from that of individual villages. Ability to explain variations in village thresholds and scoring pose a limitation to the study design as differences inherent to each village were not measured thus causal effects cannot be determined. Furthermore, the logistic regressions show no significant effect of village signifying that the differences in PTSD and depression thresholds can be explained by the group covariates. For example, intensity of conflict may have varied in some villages resulting in differences in reporting. Furthermore, community cohesiveness, in terms of providing communal coping, may have aided in individual protective factors. This may have been stronger in some villages than others which may account somewhat for the variations.

This study did find associations in participants reporting greater symptoms of PTSD. Prevalence rates were significantly higher among females, older adults, those with a low education level, married with children and had experienced severe war events. Though age was a factor in exposure to traumatic events, it could be that the nature of exposure itself contributed to the increase in PTSD symptoms over

time. An association to PTSD symptoms was observed in individuals who did not exercise, had financial problems, used tranquilizers and smoked cigarettes. Factors associated with an increase in symptoms of depression were observed in individuals who were female, unemployed, using tranquilizers, experienced more war events and had financial problems. In addition, low social support and poor general health were reported in individuals with high thresholds of both PTSD and depression.

Gender was observed as a major effect in PTSD thresholds. Females scored exceptionally high for PTSD (32.6%) compared to males (15.2%). Female risk factors have been widely documented in the literature contributing to a higher vulnerability for mental health related disorders following trauma exposure [2, 11, 20, 49, 54]. In a meta-analysis of risk factors for PTSD in adults exposed to trauma, Brewin et al. [11] found that risks included female gender, education level, previous trauma, psychiatric history, age of trauma, and race with effect sizes of factors becoming stronger after a traumatic event, such as, severity of trauma, lack of social support and additional life stressors. In this study, possible explanations for such high PTSD thresholds in female participants could be due to a cumulative effect (e.g., exposure to traumas over the course of a 20-year occupation, previous trauma and negative life events). In addition, there was a higher female participation in military activities, such as, providing protection to male family members during searches and caring for victims of attacks, which could have increased psychological distress resulting in higher PTSD thresholds. Disruptions to daily functions due to the occupation (e.g,. check points, curfews, instability in flow of goods and services) could have also put females at further risk of having high PTSD thresholds. Social support has been found to be a major protective factor against PTSD symptoms in trauma-exposed females [2]. Further research is needed to identify risk status and enhancing protective factors in female civilian populations residing in high conflict areas.

One of the questions arising from this study is why some individuals experience symptoms of PTSD and depression and what protective factors are present in those who do not. Previous studies conducted in Lebanon reveal that social support (e.g., close family relationships) protects against PTSD and depression [17, 19, 20]. In addition to cohesive family structures aiding as social support, the cohesiveness in some villages in this study are historically rooted in religion where individuals identify strongly with their respective religious backgrounds. This may have been an additional protective factor as cohesiveness of each community could have been made stronger during times of conflict through shared religious beliefs [46]. Further investigations are needed to explore possible relationships

between religiosity and mental health in the studied villages. Though studies have found a direct relationship, further assessments are needed to establish measurements that better identify the impact religion plays on physical and mental health [27] as well as socio-cultural factors in diverse populations [7].

Limitations

The current study was a descriptive community study not seeking a clinical diagnosis. Further research should be conducted to compare these findings to structured clinical interviews [47]. Another limitation to this study is the lack in deducing causality from the models making it possible to assume causal relationships (i.e., lack of social support is a predictor of PTSD symptoms). Though religious background was used in the selection criterion to establish diversity amongst villages, this study did not account for its effect on trauma exposure, social support, etc. Further methodological issues may include gender differences in symptom reporting. Studies have shown that females tend to disclose more than males resulting in designating higher PTSD prevalence rates [11]. In addition, participants were interviewed based on the retrospective accounts and recall may have biased symptom reporting.

Conclusion

The challenge is to identify factors that predispose civilians to PTSD, depression and other psychiatric disorders following traumatic war events. The current design examined the entire sample and did not consider individual village characteristics that accounts for such diversity in the area. An examination of village characteristics may shed light on the role of socio-cultural contexts and religion on perceptions of traumatic events and mental illness. Such findings could aid in better mental health assessments and implementation of community-specific mental health support. With regards to this sample, we suggest emphasizing the family support structure within the Lebanese context since it has shown to mediate the impact of trauma [18, 20]. In addition, more attention should be placed on understanding female risk factors and how to mitigate those risks in conflict-prone areas.

It was observed that mental health interventions in the affected villages are greatly needed to meet the mental health needs of individuals in the south during times of conflict and peace. One example is providing mental health education to trauma workers which may facilitate the natural recovery process, an endeavor taken upon the World Health Organization after the July 2006 war [53].

The authors are currently working on a follow-up study in the same villages post July 2006 war, an aim at comparing the results to findings of this study. Pre and post July war findings are targeted at identifying the effects of intensified war events and cumulative traumas on civilian populations. The authors hope to look at this additive effect specifically on PTSD, depression and general health of civilians in post conflict areas.

References

1. Adwan C (2005) Corruption in reconstruction: the cost of 'National Consensus' in Post-War Lebanon. http://www.gdnet.org/fulltext/adwan.pdf
2. Ahern J, Galea S, Fernandez WG, Koci B, Waldman R, Vlahov D (2004) Gender, social support and posttraumatic stress in postwar Kosovo. J Nerv Ment Dis 192:762–770
3. Alqahtani MM, Salmon PD (2008) Prevalence of somatisation and minor psychiatric morbidity in primary healthcare in Saudi Arabia: a preliminary study in Asia region. J Fam Commun Med 15(1):27–33
4. Amnesty International (2006) Out of all proportion- civilians bear the brunt of the war. http://news.bbc.co.uk/1/shared/bsp/hi/pdfs/21_11_06_amnesty.pdf
5. Beck AT, Steer RA, Garbin MG (1988) Psychometric properties of the Beck, Depression Inventory: twenty-five years of evaluation. Clin Psychol Rev 8:77–100
6. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J (1961) An inventory for measuring depression. Arch Gen Psychiat 4:561–571
7. Bhui K, Craig T, Mohummud S et al (2006) Mental disorders among Somali refugees: developing culturally appropriate measures and assessing socio-cultural risk factors. Soc Psychiatry Psychiatr Epidemiol 41:400–408
8. Boscarino JA, Adams RE, Figley CR (2004) Mental health service use 1-year after the World Trade Center disaster: implications for mental health care. Gen Hosp Psychiat 26:346–358
9. Breslau N, Chilcoat HD, Kessler RC, Davis GC (1999) Previous exposure to trauma and PTSD effects of subsequent trauma: results from the Detroit area survey of trauma. Am J Psychiat 156:902–907
10. Breslau N, Davis GC, Schultz LR (2003) Posttraumatic stress disorder and the incidence of nicotine, alcohol, and other drug disorders in persons who have experienced trauma. Arch Gen Psychiat 60:289–294
11. Brewin CR, Andrews B, Valentine JD (2000) Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. J Consult Clin Psychol 68(4):748–766
12. Bromet E, Sonnega A, Kessler RC (1998) Risk factors for DSM-II-R Posttraumatic stress disorder: findings from the National Comorbidity Survey. Am J Epidemiol 147:353–361
13. Cohen J (1988) Statistical power analysis for the behavioral sciences, 2nd edn. Academic Press, New York
14. Creamer M, Burgess P, McFarlane AC (2004) Post-traumatic stress disorder: findings from the Australian National survey of Mental Health and Well-being. Psychol Med 31:1237–1247
15. De Jong JM, Komproe IH, Ommeren M, El Masri M, Araya M, Khaled N, Van De Put W, Somasundaram D (2001) Lifetime

events and posttraumatic stress disorder in 4 postconflict settings. J Am Psychiatr Assoc 286:555–562

16. Eytan A, Gex-Fabry M, Toscani L, Deroo L, Loutan L, Bovier PA (2004) Determinants of postconflict symptoms in Albanian Kosovars. J Nerv Ment Dis 192:664–671

17. Farhood L, Zurayk H, Chaya M, Saadeh F, Meshefedjian G, Sidani T (1993) The impact of the war on the physical and mental health of the family: the Lebanese experience. Soc Sci Med 36(12):1555–1567

18. Farhood L (1999) Testing a model of family stress and coping based on war and non-war stressors, family resources and coping among Lebanese families. Arch of Psychiatr Nurs XIII(4): 192–203

19. Farhood L, Noureddine S (2003) PTSD, depression, and health status in Lebanese civilians exposed to a church explosion. Int J Psychiat Med 33:39–53

20. Farhood L, Dimassi H, Lehtinen T (2006) Exposure to war-related traumatic events, prevalence of PTSD, and general psychiatric morbidity in a civilian population from southern Lebanon. J Transcult Nurs 17(4):333–340

21. Frans Ö (2003) Posttraumatic stress disorder (PTSD) in the general population. Unpublished doctoral dissertation. Uppsala University, Uppsala

22. Frans Ö, Rimmö P-A, Åberg L, Fredrikson M (2005) Trauma exposure and post-traumatic stress disorder in the general population. Acta Psychiat Scand 111:291–299

23. Freddy JR, Hobfoll SE, Ribbe D (1994) Life events, war, and adjustment: lessons for the Middle East. Anxiety Stress Copin 7:191–203

24. Goldberg DP, Hillier VF (1979) A scaled version of the General Health Questionnaire. Psychol Med 9:139–145

25. Goldberg DP, Gater R, Sartorius N, Ustun TB, Piccinelli M, Gureje O, Rutter C (1997) The validity of two versions of the GHQ in the WHO study of mental illness in general health care. Psychol Med 27:191–197

26. Hapke U, Schumann A, Rumpf H-J, John U, Konerding U, Meyer C (2005) Association of smoking and nicotine dependence with trauma and posttraumatic stress disorder in a general population sample. J Nerv Ment Dis 193:843–846

27. Hill PC, Pargament KI (2003) Advances in the conceptualization and measurement of religion and spirituality: Implications for physical and mental health research. Am Psychol 58:64–74

28. Hobfoll SE (1988) The ecology of stress. Hemisphere, Washington

29. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL (2004) Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. New Engl J Med 351:13–22

30. Johnson H, Thompson A (2008) The development and maintenance of post-traumatic stress disorder (PTSD) in civilian adult survivors of war trauma and torture: a review. Clin Psychol Rev 28:36–47

31. Karam EG (1992) PTSD and the Lebanon Wars: criteria & prevalence stress, psychiatry and War. Ed. C. Douthau World Psychiatric Association, Paris, Val-de-Grace

32. Karam EG, Howard DB, Karam AN, Ashkar A, Shaaya M, Melhem N, El-Khoury N (1998) Major depression and external stressors: the Lebanon wars. Eur Arch Psychiatry Clin Neurosci 248:225–230

33. Karam EG, Mneimneh ZN, Karam AN, Fayyad JA, Nasser SC, Chatterji S, Kessler RC (2006) Prevalence and treatment of mental disorders in Lebanon: a national epidemiological survey. Lancet 367:1000–1006

34. Kessler RC, Sonnega A, Bromet E, Hughes M, Nilson CB (1995) Posttraumatic stress disorder in the National Comorbidity Survey. Arch Gen Psychiat 52:1048–1060

35. Koenen KC, Harley R, Lyons MJ, Wolfe J, Simpson JC, Goldberg J, Eisen SA, Tsuang M (2002) A twin registry study of familial and individual risk factors for trauma exposure and posttraumatic stress disorder. J Nerv Ment Dis 190:190–218

36. Kotler M, Iancu I, Efroni R, Amir M (2001) Anger, impulsivity, social support, and suicide risk in patients with posttraumatic stress disorder. J Nerv Ment Dis 189(3):162–167

37. Lang AJ, Rodgers CS, Laffaye C, Satz LE, Dresselhaus TR, Stein MB (2003) Sexual trauma, posttraumatic stress disorder, and health behavior. Behav Med 28(4):150–158

38. Lopes Cardozo B, Vergara A, Agani F, Goway CA (2000) Mental health, social functioning, and attitudes of Kosovar Albanians following the war in Kosovo. JAMA 284(5):569–577

39. Lopez Cardozo B, Bilukha OO, Gotway Crawford CA, Shaikh I, Wolfe MI, Gerber ML, Anderson M (2004) Mental health, social functioning, and disability in postwar Afghanistan. J Am Psychiatr Assoc 292:575–584

40. Miller KE, Weine SM, Ramic A, Brkic N, Djuric Bjedi Z, Smajkic A, Boskailo E, Worthungtron G (2002) The relative contribution of war experiences and exile-related stressors to levels of psychological distress among Bosnian refugees. J Traum Stress 15:377–387

41. Mollica RF, Caspi-Yavin Y, Bollini P, Truong T, Tor S, Lavelle J (1992) The Harvard Trauma Questionnaire: Validating a cross-cultural instrument for measuring torture, trauma, and posttraumatic stress disorder in Indochinese refugees. J Nerv Ment Dis 180:111–116

42. Neuner F, Schauer M, Karunakara U, Klaschik C, Robert C, Elbert T (2004) Psychological trauma and evidence for enhanced vulnerability for posttraumatic stress disorder through previous trauma among West Nile refugees. BMC Psychiat 4(34). http://www.biomedcentral.com/1471-244X/4/34

43. Nolen-Hoeksema S, Davis CG (1999) Thanks for sharing that: ruminators and their social support networks. J Pers Soc Psychol 77:801–814

44. Norris FH, Kaniasty K (1996) Received and perceived social support in times of stress: a test of the social support deterrence deterrence model. J Pers Soc Psychol 71(3):498–511

45. Norris FH, Friedman MJ, Watson PJ, Byrne CM, Diaz E, Kaniasty K (2002) 60,000 Disaster Victims Speak: Part I. An empirical review of the empirical literature, 1981–2001. Psychiatry 65 (3):207–239

46. Scholte WF, Olff M, Ventevogel P, de Vries GJ, Jansveld E, Lopez Cardozo BL, Gotway Crawford CA (2004) Mental health symptoms following war and repression in eastern Afghanistan. J Am Psychiatr Assoc 292:585–593

47. Silove et al (2007) Screening for depression and PTSD in a Cambodian population unaffected by war: comparing the Hopkins Symptom Checklist and Harvard Trauma Questionnaire with the Structured Clinical Interview. J Nerv Ment Dis 195: 152–157

48. Thabet AA, Vostanis P (2005) The validity and reliability of Arabic Version of General Health Questionnaire in the Gaza Strip. Palestinian Med J 1(1):33–36

49. Thapa SB, Hauff E (2005) Psychological distress among displaced persons during an armed conflict in Nepal. Soc Psychiatry Psychiatr Epidemiol 40:672–679

50. Werneke U, Goldberg P, Yalcin I, Ustun BT (2000) The stability of the factor structure of the General Health Questionnaire. Psychol Med 30:823–829

51. Wolff AC, Ratner PA (1999) Stress, social support, and sense of coherence. Western J Nurs Res 21:182–197

52. World Health Organization. World Mental Health surveys. http://www.who.int/mediacentre/news/notes/2004/np14/en/index.html

53. World Health Organization (2006) Project report on: mental health and psychosocial care—Postwar Lebanon, 2006: Phase I—Training of Primary Health Care Providers. Prepared by Dr. Laila Farhood

54. Yahov R, Cohen M (2007) Symptoms of acute stress in Jewish and Arab Israeli citizens during the Second Lebanon War. Soc Psychiatry Psychiatr Epidemiol 42:830–836