

Chemical, Environmental, and Trauma Exposures and Corresponding Health Symptoms Among Iraqi American Women

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Central nervous system disorders such as fibromyalgia (FM) and chronic fatigue immune dysfunction syndrome (CFIDS) have been recognized for decades but remain misunderstood by researchers and practitioners alike, thus belying clear etiological definition, diagnoses, and treatment planning. The aftermath of the Gulf War brought with it a worldwide phenomenon of symptoms characterizing such dysfunctions. This trend shifted the demographic profiles of those typically presenting FM and CFIDS, which in the past had included higher prevalence among women and people increasing with age to a primarily military-aged and male population. The present study examines through logistic regression exposure to chemical and environmental toxins and psychological traumas as risk factors for FM- and CFIDS-related health symptoms. Chemical exposure emerged as a statistically significant risk factor. Implications for research and practice were presented.

The etiology of central nervous system (CNS) disorders such as fibromyalgia (FM) and chronic fatigue immune dysfunction syndrome (CFIDS) has long been debated by medical and psychological researchers and practitioners (Friedberg & Jason, 2001). Explanatory models have included immune defects, sleep disturbances, neuroendocrine abnormalities, personality predispositions, and symptom avoidance. Differential diagnoses have included somatization disorder, anxiety, and activity-induced chronic fatigue (Friedberg & Jason); posttraumatic stress (Brunet, Akerib, & Birmes, 2007; Van Houdenhove & Luyten, 2006; Walen, Oliver, Groessl, Cronan, & Rodriguez, 2001); and depression (Albrecht & Wallace, 1998; Friedberg & Jason; Roy-Byrne, Smith, Goldberg, & Afari, 2004). Among the general population, FM is more prevalent among women and increases with age. Features are similar among the general community and clinical

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populations, with symptoms and pain levels more severe among the latter (Wolfe, Ross, Anderson, Russell, & Hebert, 1995). CFIDS follows the same patterns, with women four times more likely to have the illness and being most common among White women aged 50 to 59 (Reyes et al., 2003). [5]

Since the early 1990s, Gulf War (GW) veterans have reported CNS dysfunction symptoms upon their return to their home countries. Some researchers report deployment stress as contributing to health risks among this population (e.g., Joellenbeck, Landrigan, & Larson, 1997; Kang, Natelson, Mahan, Lee, & Murphy, 2003; Kelsall et al., 2004); others have focused on chemical and environmental contaminants (Gray, Kaiser, Hawksworth, Hall, & Barrett-Connor, 1999; Kroenke, Koslowe, & Roy, 1998) in the GW region as well as associated psychological stressors (IGWSG, 1997). Thus, they have focused on a new set of considerations for these disorders among the GW population, sometimes grouped under an umbrella term of GW syndrome. [6] [7]

Despite research conducted with various populations to examine the explanations for dysfunctional CNS responses to chemical, environmental, and psychological stressors, the results are, as yet, inconclusive. Our study is unique in that we examined, among a sample of Iraqi American women, indices for both chemical and environmental exposures along with psychological stressors to predict outcomes such as FM and chronic fatigue-related health symptoms. We will present previous empirical work that provided a basis for our current study, our methodology and results, and a discussion of implications for future research and practice.

Previous Undergirding Research

Both CFIDS and FM have been elusive with regard to definition, assessment and diagnosis, and treatment. A definition from a Web-based medical dictionary describes FM as “a syndrome characterized by chronic pain, stiffness, and tenderness of muscles, tendons, and joints without detectable inflammation” (MedicineNet, 1996–2008a). Although it is not a form of arthritis, it does present with some similar symptoms. There is, as yet, no specific medical test to verify incidence of FM; the diagnosis is clinical, based on persistent (i.e., at least 3 months) pain, along with tenderness in a minimum of 11 or 18 specific tender point sites. While there is no known cause of FM, its onset may be associated with psychological distress, trauma, and infection (MedicineNet). Effective treatment is noted as including elements of education, stress reduction, exercise, and medication. [8]

CFIDS can be defined as “a debilitating and complex disorder characterized by profound fatigue of six months or longer that is not improved by bed rest and that may be worsened by physical or mental activity” (MedicineNet, 1996–2008b). Corresponding nonspecific symptoms reported include weakness, muscle [9]

pain, memory or cognitive impairment, insomnia, and post-exertional fatigue in excess of 24 hours. Currently, there are no diagnostic tests available because of the wide array of overlap of its symptoms with those of other illnesses, and CFIDS continues to represent a diagnosis of exclusion, meaning that all other known conditions must be excluded prior to arriving at CFIDS diagnosis. Its etiology also remains unknown, but its onset may be associated with a cold, bronchitis, hepatitis, intestinal virus, infectious mononucleosis, or periods of high stress (MedicineNet). Although there is no clear treatment for CFIDS, health experts suggest that nutrition, rest, moderate exercise, antidepressants, anti-inflammatories, and other medications, along with cognitive behavioral and other mental health therapies.

Although FMS and CFIDS present different symptoms, they are believed by some researchers and clinicians to represent members of the same family of CNS dysfunctions (Starlanyl & Copeland, 2001). Both these dysfunctions, however, are controversial within the medical community in terms of their credibility, often linked to the difficulties described earlier in diagnosis and treatment. Likewise, medical insurance companies may be reluctant to cover medical and other treatment for such nebulously defined disorders (Starlanyl & Copeland).

Explanatory Models and Differential Diagnoses

In their seminal work on clinical assessment and treatment of chronic fatigue syndrome (CFS) and FM, Friedberg & Jason (2001) identified various explanatory models to which the medical and related communities may subscribe. These five etiological models include immune deficits, sleep disturbances, neuroendocrine abnormalities, “predisposing personalities,” and symptom avoidance. None of these models account for severe trauma, sometimes characterized by PTSD reactions, *per se*. The research of other scholars, however, implicates both depression and PTSD as comorbidly existing with FM and CFS (Albrecht & Wallace, 1998; Roy-Byrne et al., 2004; Van Houdenhove & Luyten, 2006). These differential psychological diagnoses may go underdiagnosed, indicating a need for specialized assessment (Roy-Byrne et al.; Van Houdenhove & Luyten).

As mentioned earlier, the onslaught of GW veterans presenting with FM and CFIDS symptom clusters has initiated a new area of inquiry among the medical and other scientific communities. Ironically, GW syndrome (GWS) has emerged as an equally controversial diagnosis among this population. Similar to FM and CFIDS, GWS involves a constellation of illnesses along with an uncertain etiology. GWS sufferers reportedly present symptoms overlapping those of both FM and CFIDS (Starlanyl & Copeland, 2001) such as fatigue, joint pain, sleep and cognitive disturbances (Joseph, 1997). U.S. government-sponsored inquiry into this major GW veteran health issue has been criticized by some scholars on the basis of inherent researcher bias as well as a lack of available objective

information (Joellenbeck et al., 1997). Nevertheless, a considerable body of scientific research on GWS and other related conditions has emerged in the recent decade. This literature is important to review in an effort to integrate with and contribute to the current state of knowledge about FM and CFS. ¹³

Military Populations. Prominent researchers (e.g., Haley & Kurt, 1997; Iowa Persian Gulf Study Group, 1997) cite an elevated prevalence of medical ailments among GW veterans. Deployment has been cited as a critical factor in identifying resultant symptomology of war veterans (Joellenbeck et al., 1997). The Veterans Administration has recognized the importance of making such distinctions in developing effective treatment and prevention strategies, and has cited occurrences among deployed versus non-deployed veterans, for example, as 14% versus 1.6% reporting CFS and 10.1% versus 3.2% reporting PTSD (Feussner, 2002). Research by Kang et al. (2003) also supported the notion that both CFS and PTSD increase by deployment versus non-deployment status among GW veterans. Moreover, Australian GW veterans appear to follow the same pattern of higher reported health symptoms among deployed versus non-deployed status groups (e.g., Kelsall et al., 2004). ¹⁴

In terms of general health issues, a study on veterans deployed to several combat areas during the same time span indicated that although all cohorts indicated problematic health issues, GW veterans yielded the highest odds ratios for these presenting issues (Unwin, Blatchley, Coker, Ferry, Hotopf, Hull, Ismail, Palmer, David & Wessely, 2006). These findings point to environmental factors, indicating a need for further research on the effects of vaccination against biological warfare, which among veteran groups, GW veterans are most likely to have received. In fact, deployment status in general may impact the vaccination factor, given that those deployed, versus their non-deployed counterparts, are most likely to have been immunized. ¹⁵

Moreover, a study conducted with Iraqi American GW veterans, all of whom were presumably deployed, suggested higher incidences of health problems in general (Jamil, Nassar-McMillan, Salman, Tahar, & Jamil, 2006). In that study, despite a small sample size, a significant number of participants reported distress from specific pain that they did not encounter prior to the GW. Additionally, significant numbers perceived their health status as having decreased over the past year. In that study, participants classified as having PTSD reported more health and medical issues in general, especially symptoms of specific pain often associated with FM, and lower levels of health status and quality of life. ¹⁶

Amidst a host of other studies indicating parallel increases in psychological ailments (e.g., Barrett et al., 2001) among GW veterans, such as PTSD, depression, anxiety, some do suggest comorbidity with CFS (e.g., Kang et al., 2003) and FM (Jamil et al., 2006). Conflicting findings of other research, however, point to

PTSD as being independent of both comorbid conditions and environmental exposures (Engel, Liu, McCarthy, Miller, & Ursano, 2000; Proctor et al., 2000). ¹⁷

With regard to exposures to chemical and other environmental toxins, a lack of self-reported exposures by GW veterans may indicate toxin exposure as a less likely precursor for some of the maladies in question (Kroenke et al., 1998) or at the very least, may call into question the accuracy of self-reported data. On the other hand, still, others, particularly a group of researchers focused on GW Navy veterans, identified symptom clusters associated with exposures although were not able to implicate a specific or unique group of exposures (Gray et al., 1999). Others of the same group, through multivariate modeling identified exposure to munitions fumes as having the highest odds ratio for GWS and even more noteworthy, identified reserve and enlisted female officers as being most likely to meet a working case definition of GWS (Gray, Reed, Kaiser, Smith, & Gastanaga, 2002). ¹⁸

It is clear that there is still much to be learned about FM and CFS among the general as well as specialized populations. The prevalence of these CNS dysfunctions among a GW military population challenges assumptions previously made in identifying demographic and other characteristics associated with them. While our review of extant literature reiterates the inconclusive status of both assessment and etiology of FM and CFS, several issues emerge as particularly salient. GW syndrome, reported by vast numbers of veterans of the GW, has characteristics overlapping both those of FM and CF, representing an epidemiological health issue for this population. Moreover, those veterans actually deployed to the GW present a variety of health maladies at higher rates than their non-deployed counterparts, including but not limited to GWS, CF, FM, and PTSD. Those veterans deployed in the GW were most likely to be exposed to chemical and other environmental toxins, including vaccinations against biological warfare. Research results have been mixed in terms of determining conclusive associations between trauma and chemical and environmental contaminants and CNS illnesses such as FM and CFS. Finally, although this population of GW veterans is predominantly male, one study linked gender (i.e., female) as being most likely to present with GWS.

Our study focuses on Iraqi American women because of their unique exposures to psychological trauma and chemical and other environmental toxins, relative to their gender. We compare various groups, paying particular attention to wave of immigration, which isolates the factor of whether or not they were present in the GW theatre (i.e., Iraq, Kuwait) during the time of the 1990–1991 GW. We hypothesized that immigration after the GW, exposure to chemical and other environmental toxins, and exposure to psychological trauma will progressively increase the incidence of FM-related health symptoms and that psychological trauma and chemical and other environmental toxin exposure will be associated with FM-related health symptoms. Likewise, we hypothesized that

immigration after the GW, exposures to chemical, environmental, and psychological stressors will progressively increase the incidence of CFS-related health symptoms and that psychological trauma and chemical and other environmental toxin exposure will be associated with CFS related health symptoms.

Method

Participants

Two groups of women representing different immigration waves (and varying levels of exposure and stressors) were interviewed and examined to determine levels of self-reported illnesses and other diagnoses (*n* = 154) as part of a larger study (Jamil, Nassar-McMillan, Lambert, & Hammad, 2006).

The respondents were classified into two groups, those who immigrated before 1991 (pre-GW; *n* = 64%) and those who came in 1991 or later (*n* = 36%). Nearly 38% self-defined as Chaldean (vs. Arab or Kurdish). Table 1 includes the percentage of the sample in each of these and other demographic categories.

Instruments

The comprehensive instrument was initially developed through a collaborative effort between the Iowa Persian Gulf War Study Group and the Center for Disease Control to assess a wide range of health issues among U.S. veterans from the GW (IPGSG, 1997) and was later adapted for use with Iraqi veterans in

Table 1

Background Characteristics of the Sample

Characteristic	<i>n</i> (%)	Mean	<i>SD</i>	Minimum	Maximum
Wave I—pre-1991	55 (35.7)				
Wave II—1991+	99 (64.3)				
Chaldean	58 (37.7)				
Married	120 (77.9)				
Smoker	134 (87.0)				
Age		45.30	7.75	32	57
Chemical exposures		0.63	1.33	0	10
Psychological stressors		1.95	2.26	0	7

small pilot studies on Iraqi American veterans of the same war (Jamil, Nassar-McMillan, & Lambert, 2004; Jamil et al., 2006) as well as subsequent research on a broader civilian population of Iraqi Americans across three waves of immigration with a focus of inquiry of psychological outcomes (Jamil, Nassar-McMillan, & Lambert, 2007).

The interview includes questions regarding chemical exposures during the GW, and those are the focus of our current study. The respondents may have been exposed to any of these stressors during the war between Iran and Iraq, the first GW, or the second GW currently underway. Questions include the following stem: "During the Gulf War did you have direct contact with the following exposure?" (e.g., depleted uranium, oil fire smoke, nerve gas). The respondents were classified as either having been or not having been exposed to and becoming ill from at least one of these chemical risks. There were a total of 14 such items. A scale score was created by summing across the responses to these items and the score represented the total number of reported exposures ($M = .63$, $SD = 1.33$). Almost one-third of the respondents (30.5%) reported exposure to at least one of the chemical stressors. The reliability for this scale score based on Cronbach's alpha was .741 for the current sample. The distribution of reported exposures was very positively skewed with the majority of the respondents reporting no chemical exposures. Therefore, the researchers decided to enter this potential risk factor into the logistic regression models as a dichotomous variable, the presence or absence of at least one chemical exposure.

Another set of questions focuses on psychological stressors (e.g., "came under small arms fire," "witness anyone dying"). The respondents were classified as having experienced at least one of these stressors or not. There were a total of nine such items. A scale score was created by summing across the responses to these items and the score represented the total number of reported exposures ($M = 1.95$, $SD = 2.26$). Half (50.0%) reported exposure to at least one of the psychological stressors. The reliability for this scale score based on Cronbach's alpha was .835 for the current sample. The distribution of reported exposures was very positively skewed with close to half of the respondents reporting no psychological exposures. Therefore, the researchers decided to enter this potential risk factor into the logistic regression models also as a dichotomous variable, the presence or absence of at least one psychological exposure.

The presence or absence of FM-related symptoms was determined by using three criteria based on the Iowa study scoring protocol. If the respondent met any of the three criteria, they were classified in the FM group and all of the criteria were based on self-report. The first criterion was met if the respondent reported that he or she had suffered from a disease of the muscles or tendons in the past 12 months and had received for medical treatment for the condition. The second criterion was met if the respondent answered affirmatively to two questions regarding overall body pain. The third criterion was met if the respondent

answered affirmatively to all four questions regarding pain in specific areas of the body. These criteria were also based on the diagnostic criteria from the Iowa study. The presence or absence of CFS-related health symptoms was determined based on self-report. The questionnaire includes a question that addresses whether the respondent has suffered CFS in the past 12 months.

Analyses

The analysis was conducted in two phases—initially, the degree of association between wave of immigration, exposure to chemical and psychological risks, and contracting either FM or CFS. Next, logistic regression analyses were performed to estimate the extent of the risk for FM and CFS presented by exposure to chemical, environmental, or psychological stressors. These analyses were conducted with and without the following covariates: age, wave of immigration, Chaldean heritage, marital status, and being a smoker.

Results

The respondents were initially classified into groups based on wave of immigration, and chemical and psychological exposure status for descriptive purposes. Five groups were created: group 1—immigrated prior to 1991, group 2—immigrated during or after 1991 and had no exposures, group 3—experienced psychological stressors, Group 4—experienced chemical stressors, and group 5—experienced both psychological and chemical stressors. There was a statistically significant association between group membership and FM ($p < .002$) and it appeared largely in the predictable order. A total of 47.7% participants met the diagnostic criteria for FM, distributed across the groups: group 1—28.8%, group 2—40.0%, group 3—51.4%, group 4—85.7%, and group 5—65.0%. There was also a statistically significant association between group membership and CFS ($p < .002$) and it appeared largely in the predictable order. A total of 26.0% of the women in the study met the diagnostic for CFS: group 1—20.0%, group 2—6.7%, group 3—18.9%, group 4—14.3%, and group 5—50.0% (see Table 2).

The logistic regression indicated chemical exposure as a statistically significant risk factor for FM (odds ratio = 2.740, $p = .014$), while psychological stressor exposure was not statistically significant (odds ratio = 1.740, $p = .138$). This same pattern of results was found when the aforementioned covariates were included (see Table 3). Chemical exposure was again a statistically significant risk factor for FM (odds ratio = 2.722, $p = .038$), while psychological stressor exposure was not a statistically significant risk factor (odds ratio = .851, $p = .771$).

The logistic regression results indicated that chemical exposure was also a statistically significant risk factor for CFS (odds ratio = 2.950, $p = .013$), while

Table 2
Reported Prevalence of Chronic Fatigue Syndrome and Fibromyalgia by Exposure Level

Exposure	Total	FM <i>n</i> (%)	CF <i>n</i> (%)
Wave I—pre-1991	55	15 (27.3)	11 (20.0)
Wave II—1991+	99	57 (57.6)	29 (29.3)
	χ^2	13.042**	1.588
No psychological Trauma	77	27 (35.1)	13 (16.9)
Psychological Trauma	77	45 (58.4)	27 (35.1)
	χ^2	8.451*	6.619*
No chemical exposures	107	40 (37.4)	19 (17.8)
Chemical exposures	47	32 (68.1)	21 (44.7)
	χ^2	12.365**	12.312**
Wave I—pre-1991, no exposures	55	15 (27.3)	11 (20.0)
Wave II—1991+, no exposures	15	6 (40.0)	1 (6.7)
Psychological trauma only	37	19 (51.4)	7 (18.9)
Chemical exposures only	7	6 (85.7)	1 (14.3)
Both psychological and chemical	40	26 (65.0)	20 (50.0)
	χ^2	17.393*	18.591**

Note. * $p < .01$. ** $p < .001$.

psychological stressor exposure was not a statistically significant risk factor (odds ratio = 1.651, $p = .256$). This same pattern of results was found when the same covariates were included (see Table 4). Chemical exposure was again a statistically significant risk factor for FM (odds ratio = 4.060, $p = .009$), while psychological stressor exposure was not (odds ratio = 4.558, $p = .062$).

Discussion and Implications

The first three hypotheses were focused primarily on FM-related health symptoms as an outcome variable. Hypothesis one, which is group membership would

Table 3

Logistic Regression Results for Fibromyalgia

Explanatory variable	Odds ratio	95% LL	95% UL
Model without covariates			
Chemical exposure	2.740*	1.225	6.127
Psychological stressors	1.740	0.837	3.614
Model with covariates			
Chemical exposure	2.722*	1.058	7.004
Psychological stressors	0.851	0.285	2.534
Wave	2.101	0.625	7.057
Age	1.084**	1.027	1.143
Chaldean	0.372*	0.144	0.962
Married	0.435	0.178	1.061
Smoker	4.592*	1.216	17.349

Note. * $p < .05$. ** $p < .01$.

be positively associated with FM, was supported. Hypothesis two, which is traumatic psychological exposures would be positively associated with FM, was not supported. Hypothesis three, w chemical and environmental exposures would be positively associated with FM, was supported.

Hypotheses four, five, and six were focused on CF-related health symptoms. Hypothesis four, which is group membership and CF would be positively associated, was supported. Hypothesis five, which is traumatic psychological exposure would be positively associated with CF, was not supported. Hypothesis six, which is chemical and environmental exposure would be positively associated with CF, was supported.

Both of our hypotheses about group membership and association with the outcome variables (FM, CF) were supported as predicted. For those in the post-1991 immigration group (i.e., those who were in the Gulf Theatre during the 1991 GW) and with chemical exposures, 85.7% met our diagnostic criteria for FM-related health symptoms as compared with the 51.4% from the same immigration group that only had the traumatic psychological exposures. Moreover, in comparison to those who, again, met the FM-related health symptoms diagnostic criteria, only 65.0% from the same immigration group with *both* psychological *and* chemical were represented. Because we used a sum score rather than testing

Table 4

Logistic Regression Results for Chronic Fatigue Syndrome

Explanatory variable	Odds ratio	95% LL	95% UL
Model without covariates			
Chemical exposure	2.950*	1.257	6.925
Psychological stressors	1.651	0.695	3.921
Model with covariates			
Chemical exposure	4.060*	1.424	11.580
Psychological stressors	4.558	0.926	22.449
Wave	0.168	0.028	1.001
Age	1.040	0.983	1.100
Chaldean	0.583	0.213	1.599
Married	0.876	0.338	2.272
Smoker	1.959	0.509	7.539

Note. * $p < .05$.

specific chemical or psychological traumas, it is difficult to make specific comparisons on that basis. On the other hand, for FM-related health symptoms, chemical exposure is clearly indicated as a culprit.

In contrast, 50% of the post-1991 immigration group that had exposures to both psychological trauma and chemicals met our diagnostic criteria for CF as compared with far fewer in the same immigration group that were exposed to only one or the other. Thus, for CF-related health symptoms, it appears that combined exposures serve as the greatest risk factor.

Clearly, group membership emerged as a salient factor in predicting both FM- and CF-related health symptoms for this sample. Our unique sample, representing both women and, in part, those who were present at the time of and in the region of the GW, amidst circumstances known to have presented environmental contaminants, spans the diversity in populations sampled by previous research (e.g., clinical and community samples of women; military GW veteran populations). Although CF symptoms were prevalent at only half of the level of FM in the total sample (26.5% vs. 47.7%), both diagnoses were present in substantial numbers. Thus, it seems that chemical exposures need to be added to the etiology models for both FM and CF, particularly for this and similar populations. Moreover, more research on comorbidity among these diagnoses is needed

as is continued identification of relative contributions of chemical and other environmental exposures along with other possible risk factors. Also needed is deeper inquiry into teasing out specific environmental exposures (e.g., chemical) that may be present and contributing to the respective etiologies. Scientific calls for accurate assessment (e.g., Albrecht & Wallace, 1998) span both research and practice and have far wider reaching implications than military populations. For example, disability assessment, as well as environmental workforce assessment in general, need to carefully consider such potential contaminants in their broader contextual data-gathering efforts (Raymond & Bergland, 1994; Riberto, Pato, & Battistella, 2006). ²²

Moreover, previous psychosomatic etiological explanations may need to be reexamined. Previous omissions of chemical and environmental contaminants in some of the contemporary etiological models may have inadvertently contributed to underdiagnosis of FM and CF or caused “it is all in your head” assessments to have been rendered in any number of population groups. ²³

With regard to our psychological trauma exposure hypotheses not being supported, we believe that further inquiry is needed in order to be more conclusive. For example, our questions were related specifically to experiencing traumatic war-related event traumas, and may have not been widely experienced by the sample of Iraqi American women who were present but not literally deployed into combat. Future research may need to focus on measurement of the types of trauma that were experienced by this population. Additional research is needed into which of those specific psychological trauma and traumatic exposures may indeed be linked to FM and CF and their related health symptoms. Indeed, the fact that PTSD often goes underdiagnosed when comorbid with such conditions (Brunet et al., 2007) suggests that there may indeed be psychological trauma associated with them as previous research with Iraqi American populations also has revealed (e.g., Jamil et al., 2007).

Conclusions

The increased incidence of FM- and CF-related health symptoms among those women immigrating to the United States after the GW suggests that their experiences during the GW may have contributed to their subsequent self-reported CNS diagnoses. This finding is important in that it is incongruent with previously developed etiological models for FM and CF among women in community or clinical samples. Rather, the finding seems to support the characterizations and explanations for various medical outcomes by exposures (e.g., chemical/environment and psychological) applied to GW veteran populations.

This finding has substantive implications for future research. In particular, research on both community and clinical populations including both women and men need to further investigate the possible etiological models of chemical/

environmental contaminants as well as acute stress or other trauma exposure as CNS responses such as FM and CF and corresponding health symptoms.

Immigrants from Iraq, because of their potential fragility related to both chemical/environmental exposures and accompanying risks along with acculturation stresses and traumas, are in need of culturally competent mental health clinical services. Moreover, they are in need of appropriate health-care policy and advocacy measures. Community-based interventions may provide the most promise for comprehensive and effective assessment and treatment of this population and others who suffer from FM and CF (Walen et al., 2001) and corresponding health symptoms.

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