Soc Psychiatry Psychiatr Epidemiol (2012) 47:409–418
DOI 10.1007/s00127-011-0341-4

ORIGINAL PAPER

Anxiety and depression in a post-September 11 sample of Arabs in the USA

Mona M. Amer · Joseph D. Hovey

Received: 27 December 2010 / Accepted: 4 January 2011 / Published online: 2 February 2011
© Springer-Verlag 2011

Abstract
Objective Scant research has examined the mental health of Arab Americans. This study aimed to determine the levels of anxiety and depression in a sample of Arab Americans and compare the rates to normative community samples and samples of other minority ethnic/racial groups.
Methods A non-probability sampling approach resulted in 601 adult Arab American respondents from 35 US states. Respondents completed anxiety and depression questionnaires at a form-based Internet site.
Results One-fourth of participants reported moderate to severe anxiety levels as measured by the Beck Anxiety Inventory (BAI), and one-half reported depression scores that met clinical caseness as assessed by the Center for Epidemiologic Studies-Depression Scale (CES-D). The present sample of Arab Americans reported significantly higher levels of anxiety and depression compared to standardization samples and community samples of four other minority groups.
Conclusions Arab Americans may be at risk for anxiety and depression. Further studies should be conducted to replicate and validate these results, identify stressors that affect this population, and develop recommendations for clinical interventions.

Keywords Arab American · Beck Anxiety Inventory · Center for Epidemiologic Studies-Depression Scale · Anxiety · Depression · Ethnicity

M. M. Amer
The American University in Cairo, Cairo, Egypt

M. M. Amer
Yale University School of Medicine, New Haven, CT, USA

J. D. Hovey
Program for the Study of Immigration and Mental Health, The University of Toledo, Toledo, OH, USA

M. M. Amer (✉)
SAPE-Psychology Unit, c/o The American University in Cairo NY Office, 420 Fifth Ave., 3rd Floor, New York, NY 10018, USA
e-mail: monaamer@aucegypt.edu

Introduction

People have emigrated from Middle Eastern and North African countries to the USA since the late 1800s [3, 48]. Notwithstanding historical, cultural, linguistic, religious, and political differences among people from these countries, they are often referred to as "Arabs," with those living in the US referred to as "Arab Americans" [1, 2]. Although the 2000 US census estimated 1.2 million Americans of Arab ethnicity, due to census classification methods some Arab country origins were excluded [21]. Other estimates based on rigorous fieldwork, national polling, and historical trends indicate the population to be >3.5 million [11].

Literature prior to the World Trade Center (WTC) tragedy suggested that Arab Americans may be at risk for mental health problems. In a 1989 health needs assessment of 47 Christian and Muslim Arab immigrants in northern California [40], two of the top five health problems endorsed were emotional problems (17%) and social or family stress (13%). Based on a combination of data-gathering techniques including community forums, key informants, government health data, and surveys, the authors concluded that Arab Americans were at risk due to immigration stressors including trauma, adjustment to American culture, intercultural childrearing challenges,

loss of social support, and limited knowledge about the American health system.

Other authors [2] reported a critical need for mental health practitioners to attend to the psychological concerns of Arab Americans after the Gulf War. Individuals who sought help were often refugees suffering posttraumatic stress disorder or Arab students and second-generation Arab Americans who experienced anxiety, fear, and guilt. Other presenting complaints identified by the authors included identity confusion, cultural agoraphobia, intergenerational conflict, parenting difficulties, physical abuse, and loss of the extended family support system.

Since 11 September 2001, Arab Americans have experienced significant increases in societal stressors such as ethnic-based harassment, discrimination, and hate crimes that may have further increased their risk for psychological distress. A 2002 Human Rights Watch report on post-September 11 violence toward Arabs and Muslims stated, "Unlike previous hate crime waves…, the September 11 backlash distinguished itself by its ferocity and extent [60, pp. 14–15]." The American-Arab Anti-Discrimination Committee reported a fourfold increase in employment discrimination, illegal removal of over 80 passengers from airplanes, and other service and housing discrimination [36]. The Federal Bureau of Investigation reported that anti-Muslim crimes increased by 1,700% during 2001 [60]. Other ongoing pressures have included interrogations, arrests, and detentions of tens of thousands of Middle Eastern men without being charged of a specific crime, deportations on minor visa violations, and discriminatory visa and immigration screenings [34, 36, 60]. Despite the perception that the backlash was a temporary phenomenon, according to the Council on American Islamic relations, discriminatory acts have increased with each successive year since 2001 [19].

A few researchers have linked the hostile post-September 11 socio-political climate—in particular, increased experiences of anti-Arab hate rhetoric and discrimination—to mental health concerns of Arab Americans. Among Arab American participants of a qualitative focus group study in New York City, the WTC attacks compounded their historical traumas and the subsequent hostile environment provoked increased distress such as fears and anxiety over the future [4]. A study published in 2004 reported that the level of experienced discrimination among 108 Arab Americans in Florida was associated with psychological distress, with sense of personal control partially mediating this relationship [45]. Authors of a pilot study of 30 Arab Muslim women in the USA [32] argued that this population was at risk for acculturative stress, discrimination, and related psychological distress. Of the participants, 63% reported increased discrimination post-September 11, 25% obtained clinically significant scores on the Beck Depression Inventory, 40% met the cutoff for clinically significant depression on the CES-D, and anxiety scores were significantly higher than those in the general population. A larger study of 350 Muslim Arab Americans found significantly high levels of depression and post-traumatic stress disorder, which authors attributed to the post-September 11 anti-Muslim and anti-Arab backlash experienced by the majority of participants [5]. A study of 152 Muslim Americans, in which 44% of the sample was of Arab origin, found that perceived religious discrimination was associated with subclinical paranoia [56]. Furthermore, a survey study of 62 mosques published in 2005 showed that imams (religious leaders) found it increasingly necessary to counsel their congregants for discrimination and anxiety following the WTC attacks, especially at mosques with high percentages of Arab congregants [7].

Notwithstanding the few studies described above, empirical research on the status of Arab American mental health—and how it may compare to other ethnic minority groups—has remained largely absent [24, 50]. Previous studies have utilized primarily qualitative methods or small sample surveys. Such paucity of empirical literature further demonstrates the marginality of this group [57]. Moreover, the Arab American and Muslim American populations have been conflated in previous studies, so Christian Arab Americans have often been excluded from the samples.

One of the primary challenges in conducting research with this population is that they are an invisible minority: people of Arab descent are categorized as "White" or "Caucasian" by the American government [47], and often do not choose to identify themselves as Arabs on census forms. This renders it generally unfeasible to develop a national random sample frame or extract group-specific data from public mental health databases. Many US states contain small populations of Arab Americans who are geographically dispersed; so, attaining a sufficient sample is logistically challenging using community-based methods. As mentioned by previous researchers [12, 38], even when convenience sampling is used, potential research respondents are often unwilling to participate due to concerns about anonymity and whether the research will be used to harm their community. Furthermore, many measurement tools are not culturally sensitive or have not been validated for this population, rendering it even more challenging to study those community members who are willing to participate in research. For example, Arabs tend to experience mental health distress with somatic complaints [10, 58], which are often not captured in Western-based instruments.

The purpose of the present study was to contribute to the scant mental health literature on Arab Americans by investigating levels of anxiety and depression within this population. Our first aim was to compare results to

normative samples to gauge the severity of distress in our sample. Based on studies discussed above that highlighted the increased risk for mental health symptoms in this population, we expected that Arab Americans would endorse greater levels of anxiety and depression compared to normative samples. Secondly, to further place the results in context, we aimed to compare levels of anxiety and depression among Arab Americans to other ethnic minority groups in the USA. We anticipated that levels of psychological distress would be comparable to other minority or ethnic/racial groups that similarly suffer acculturation stressors such as immigration trauma and/or racial/ethnic discrimination.

To address the research barriers mentioned above, our goal was to obtain a larger and more demographically diverse sample that could lend greater confidence in generalizability compared to previous studies. To achieve this goal, we utilized Internet survey methodology to administer measures that have been shown to be culturally sensitive to this population. Internet designs have numerous benefits including access to demographically and geographically diverse samples, potential for larger sample sizes, inexpensiveness, time effectiveness, and efficiency in processing data. A previous study of Arab Americans [12] found no significant differences in acculturation scores obtained by community and Internet methods. Rather, participants preferred the greater anonymity and increased participant–researcher alliance offered by Internet methods, while showing reluctance and suspiciousness of researcher's motives in the community survey. Although concerns with Internet research include difficulty controlling the context and quality of participant responses, Internet samples have not been found to differ from traditional samples in psychological adjustment, and research findings such as personality or self-esteem have been consistent with traditional samples [30, 39].

Methods

Procedures and participants

All Internet procedures and forms in this study followed the guidelines for protection of human participants as reviewed and approved by the University of Toledo's Institutional Review Board. Participants completed the study at a secure (SSL) form-based Web site (http://www.formsite.com) over a span of 2 months in 2004. As mentioned previously, random sampling was not attainable as Middle Easterners and North Africans are classified as "White" or "Caucasian". Therefore, we used non-probability convenience sampling to obtain participants. We sent a total of 1,718 e-mail invitations to Arab American personal contacts, Web communities, cultural and professional organizations, churches, and university clubs with instructions to forward the message to potential respondents. Response rates cannot be determined as it was not possible to track which e-mail invitations were received, read, and forwarded by the intended e-mail owner. As an incentive, a total of $1,000 in cash rewards was provided to 20 randomly selected respondents.

The study procedures resulted in responses from 601 Arab Americans residing in 34 US states and the District of Columbia. Of these 62% ($n = 366$) were female and 38% ($n = 224$) were male. Ages ranged from 18 to 81 ($M = 29.3$; SD = 11.1). Over half (54.1%, $n = 325$) were single and nearly one-third (31.6%, $n = 190$) were married. The majority (70.4%, $n = 423$) were Muslim; the second largest religious affiliation was Christianity (22.0%, $n = 132$). About 60% had completed a bachelors degree or equivalent (28.3%, $n = 170$), or a postgraduate degree (30.9%, $n = 186$). Annual family income ranged from <$15,000 (8.8%, $n = 53$) to >$150,000 (11.0%, $n = 66$), with more than half of the sample (54.9%, $n = 330$) listing an annual income of >$50,000.

Nineteen Arab states were represented in the sample. The largest subgroups were Palestinian (24.5%, $n = 147$), Egyptian (19.8%, $n = 119$), Lebanese (16.1%, $n = 97$), Syrian (6.8%, $n = 41$), and Iraqi (5.0%, $n = 30$). A total of 15% of participants reported that their parentage was from more than one Arab state. Generational status of participants included temporary sojourners (9.0%, $n = 53$), first-generation immigrants (36.0%, $n = 212$), US-born second-generation (37.5%, $n = 221$), third- and later-generation individuals (7.3%, $n = 43$), and persons of mixed generation status (10.2%, $n = 60$).

Measures

Participants completed a series of questionnaires related to acculturation, social support, and mental health at the study's Internet web form. All participants completed the questionnaires in the same order. For the purpose of this paper, only results from the anxiety and depression questionnaires are reported. The final section of the Web form contained socio-demographic questionnaires including age, gender, religious affiliation, marital status, educational level, income level, national heritage, and generational status. A summary of these results are described above.

Anxiety was measured with the Beck Anxiety Inventory (BAI) [13], which is a 21-item questionnaire listing symptoms of anxiety. Participants rated the extent to which they were bothered by these symptoms over the previous week using a 4-point scale ranging from 0 = "not at all" to 3 = "severely (I could barely stand it)." The BAI has demonstrated acceptable reliability in previous studies of

Arabs living in the Middle East and North America [8, 9]. One of the main advantages of the BAI is that items emphasize physiological symptoms of anxiety. This is culturally appropriate for Arabs, who tend to experience psychological experiences as somatic complaints [9, 10, 58]. Due to technical difficulties with the Internet form, the 21st item was not administered. To compare current scores to previous studies, a person mean substitution approach was used to create a 21st item response for each participant. This is a common missing data imputation technique that produces results that are similar to an intact data set, particularly if the missing values are "Missing Completely at Random". However, with higher proportions of missing data, scale reliability may be inflated [22, 35]. Cronbach's alpha for the first 20 items was 0.933; when including the imputed 21st item, the alpha was 0.939.

The Center for Epidemiologic Studies-Depression Scale (CES-D) [55] was administered to assess depressive symptoms. The CES-D was developed as an epidemiological research tool to assess depression in community samples and consists of 20 items [59]. Participants rated these items based on how they felt over the previous week using a 4-point scale ranging from 1 = "rarely or none of the time (less than one day a week)" to 4 = "most or all of the time (5–7 days)". The CES-D has demonstrated strong reliability and validity in previous Arab samples [28, 65]. Cronbach's alpha for the present study was 0.91.

Analyses

Because approximately 60% of the sample was female, we first examined the data for sex differences. There were no significant differences between male and female respondents on their scores on the BAI or CES-D. Therefore, further analyses were conducted on the whole sample. For the results in this study, one-sample *t* tests were conducted to compare the current mean anxiety and depression scores to means reported in previous studies. All significance values reported are two tailed.

Results

Mental health scores compared to normative studies

The mean BAI score in this study was 12.78 (SD = 12.25), which falls in the "mild to moderate" range of anxiety per the guidelines recommended by Beck and Steer [14]. About half of the total study sample (52.7%, $n = 317$) scored within the "normal" range with scores of 0–9; 22.2% ($n = 134$) scored in the "mild to moderate/'' range with scores of 10–18; 13.8% ($n = 83$) scored in the "moderate to severe" range with scores of 19–29; and 11.1% ($n = 67$) scored in the "severe" range with scores of 30–63.

Table 1 lists descriptive data for the BAI from the current study, as well as from normative studies. The BAI was initially developed for a clinical population of persons receiving outpatient psychiatric services [13]. The mean score in the current study was significantly lower than that of the clinical sample [$t\ (600) = -19.15, p < 0.001$]. After Beck and colleagues' initial study [13], additional studies attempted to establish normative data for levels of anxiety in non-clinical community samples. The mean score in the current study was significantly higher than scores in Osman et al.'s study [53] of non-clinical adult community members [$t\ (600) = 2.49,\ p = 0.013$] and Gillis et al. [29] census-matched normative community sample [$t\ (600) = 12.37, p < 0.001$].

With respect to depression, the mean CES-D score in the current study was 17.26 (SD = 11.74), which falls above Radloff's [55] suggested score of 16 for clinical caseness. Over half of the respondents (50.1%; $n = 301$) obtained a total CES-D score of 16 or higher. This differs from

Table 1 BAI descriptive statistics for the present and normative studies

Study and sample	Descriptive characteristics of BAI				Comparison to present study ($df = 600$)	
	n	Mean	SD	α	*t*	*p*
Present study	601	12.78	12.25	0.94	–	–
Beck et al. [13]						
Outpatient psychiatric patients at a cognitive therapy center in Pennsylvania	160	22.35	12.36	0.92	−19.15	<0.001
Osman et al. [53]						
Non-patient community adult volunteers from randomly selected residential areas in Midwest	225	11.54	10.26	0.92	2.49	0.013
Gillis et al. [29]						
Non-probability quota community sample matching census demographic profile, Washington, DC	242	6.60	8.1		12.37	0.001

Table 2 CES-D descriptive statistics for present and normative study

Study and sample	Descriptive characteristics of CES-D				Comparison to present study ($df = 600$)	
	n	Mean	SD	α	*t*	*p*
Present study	601	17.26	11.74	0.91	–	–
Radloff [55]						
Probability sample: Whites in representative households in Missouri and Maryland	2,514	9.25	8.58	0.85	16.74	<0.001
Standardization sample: White Americans in Maryland	1,060	8.17	8.23	0.85	18.99	<0.001
Reinterview (retest) of the probability samples	1,422	7.94	7.53	0.84	20.33	<0.001

Table 3 BAI descriptive statistics for non-clinical samples with different ethnic groups

Study and sample	Descriptive characteristics of BAI				Comparison to present study ($df = 600$)	
	n	Mean	SD	α	*t*	*p*
Present study	601	12.78	12.25	0.94	–	–
Contreras et al. [18]						
Latino college students in San Diego, California	1,110	9.86	8.50	0.89	5.85	<0.001
Caucasian college students in San Diego, California	2,703	9.05	8.30	0.89	7.47	<0.001
De Coteau et al. [20]						
Native American adults at a reservation in Nebraska	120–144[a]	7.82	8.96	0.93	19.72	<0.001

All samples reported used the English version of the BAI

[a] Exact sample size for De Coteau's study was not reported but ranged from 120 to 144

previous literature indicating that approximately 20% of any non-clinical sample would be expected to report scores of 16 or higher [6]. Ghubash et al. [28] recommended a caseness cutoff of 21 for Arab samples based on their study of females in the United Arab Emirates. For the present study, 34.1% ($n = 205$) of respondents obtained scores of 21 or higher.

Table 2 lists descriptive data for the CES-D in the current study, as well as from Radloff's [55] initial normative samples. The mean score in the current study was significantly higher than Radloff's probability sample [$t\,(600) = 16.74$, $p < 0.001$], standardization sample [$t\,(600) = 18.99$, $p < 0.001$], and probability samples retest [$(t\ (600) = 20.33$, $p < 0.001$].

Mental health scores compared to studies with ethnic/racial minority groups

There is limited research focused on the utilization of the BAI for adult non-clinical ethnic/racial minority groups. Table 3 lists two studies that reported the psychometric properties of the BAI. The mean score in the current study was significantly higher than those reported in previous studies.

The CES-D has been widely used in studies with ethnic/racial minority groups. Table 4 lists descriptive characteristics of the original 20-item CES-D in community-based studies with non-clinical North American adults from ethnic/racial minority groups published over a 20-year period (1986–2006). We limited the list to studies that aimed to establish prevalence rates of depression or to examine the psychometric properties of the CES-D with these minority groups. Because the present study was community based, we did not include studies that were conducted in other settings such as high schools, colleges, or medical clinics. The mean depression score in the current study was significantly higher than those reported in all the previous studies listed.

Discussion

Consistent with expectations, Arab Americans in this study demonstrated significantly higher levels of anxiety and depression compared to normative samples. According to normative guidelines, one-fourth of this sample (25.0%) reported moderate or severe anxiety and one-half (50.1%) reported depression scores above clinical caseness. These results are striking considering that the current sample was well educated with high incomes, and that about half was born and raised in the USA and therefore would not have faced additional immigration stressors. It is, moreover, surprising given that Arab Americans are reluctant to admit

Table 4 CES-D descriptive statistics for non-clinical samples with different ethnic groups

Study and sample, ordered by date of publication	Descriptive characteristics of CES-D				Comparison to present study ($df = 600$)	
	n	Mean	SD	α	*t*	*p*
Present study	601	17.26	11.74	0.91	–	–
American Indian/Native American						
Chapleski et al. [16]						
Older (above 55) American Indians in Michigan	309	9.49	8.53		16.23	<0.001
Somervell et al. [61]						
Members of a coastal tribe in Washington—males	56	10.2		0.86 (total sample)	14.75	<0.001
Members of a coastal tribe in Washington—females	64	9.0		0.86 (total sample)	17.26	<0.001
African American						
Iwata et al.[c] [37]						
Randomly selected African American young adults in Florida	434	14.01	0.40[a]		6.79	<0.001
Conerly et al. [17]						
Survivors of cancer across the USA	216	15.7	11.89	0.90	3.26	0.001
Foley et al. [26]						
Older (ages 59–96) community members in North Carolina	217	7.99	7.95	0.86	19.37	<0.001
McCallion and Kolomer [43]						
Primary caregiver grandmothers in New York City	393	15.9	9.5		2.85	0.005
Asian American						
Gupta and Yick [31]						
Older (ages 50–86) Chinese immigrants in Los Angeles	75	11.7	4.6	0.64	11.62	<0.001
Noh et al. [51]						
Random sample of Korean immigrants to Canada	860	14.71			5.33	<0.001
Ying [66]						
Chinese Americans in San Francisco	360	11.55	8.23	0.77	11.93	<0.001
Hispanic/Latino						
Iwata et al.[c] [37]						
Randomly selected US-born Hispanic young adults in Florida	493	13.20	0.37[a]		8.49	<0.001
Randomly selected Hispanic immigrant young adults in Florida	395	13.31	0.42[a]		8.26	<0.001
Falcón and Tucker [25]						
Puerto Rican elders in Massachusetts	429	16.17			2.28	0.023
Dominican elders in Massachusetts	128	13.2			8.49	<0.001
Other Hispanic elders in Massachusetts	149	11.7			11.62	<0.001
Alderete et al. [6]						
Mexican migrant farm workers in rural central California	1,001	10.8		0.82	13.50	<0.001
Potter et al. [54]						
Puerto Ricans in New York City, New Jersey and Connecticut, ages 20–74	1,140	12.36	11.11–13.61[b]		10.24	<0.001
Vera et al. [64]						
Puerto Ricans in New York City	1,267	12.31	0.43[a]		10.34	<0.001
Narrow et al. [49]						
Cuban and Cuban Americans in Florida (ages 20–74)	808	5.47	0.26[a]		24.63	<0.001
Garcia and Marks [27]						
Mexican Americans in five southwestern states	3,084	7.94			19.47	<0.001
Mościcki et al. [46]						
National sample of Mexican American adults	3,118	7.8	0.3[a]		19.76	<0.001
Mahard [42]						
Elderly Puerto Ricans in New York City	30	16.2	10.6	0.87	2.22	0.027

Table 4 continued

Study and sample, ordered by date of publication	Descriptive characteristics of CES-D				Comparison to present study ($df = 600$)	
	n	Mean	SD	α	t	p
Mendes et al. [44]						
Mexican American families in San Antonio						
Younger generation (median age = 26)	348	8.8			17.68	<0.001
Middle generation (median age = 49)	363	8.6			18.09	<0.001
Older generation (median age = 74)	363	10.6			13.92	<0.001
Vega et al. [63]						
Mexican immigrant women in San Diego California	1,825	15.71	11.46		3.24	0.001

Some participants in Gupta and Yick [31] and Ying [66] completed the CES-D in Mandarin or Cantonese. Participants in Noh et al. [51] completed the CES-D in Korean. Some participants in Alderete et al. [6] completed the CES-D in Spanish. Participants in Narrow et al. [49], Potter et al. [54], Vega et al. [63], Vera et al.[64], and Mościcki et al. [46] answered the questionnaire in Spanish

[a] Standard error

[b] 95% confidence interval

[c] Means are gender- and age adjusted

to psychiatric symptoms due to stigma, beliefs that it is a sign of shame and weakness, and suspicions that the researcher may use the data to harm their community [2, 12, 50, 57].

Arab Americans may experience greater anxiety and depression compared to normative samples as a result of the stressors they face [32]. As with other Americans, stressors may include daily life pressures, group-specific acculturation challenges, national challenges such as fears of terrorism, and response to natural disasters. However, unlike other groups, these stressors are uniquely compounded by the heightened and ongoing pressures directed against Arab Americans, especially Muslims. Examples include profiling, discrimination, and biased anti-Arab media. As shown in previous studies [4, 5, 45], such experiences of perceived hostility and discrimination were associated with greater psychological distress. However, because previous research on this group has been minimal, it is not possible to determine if the current levels of psychological distress mark an increase from rates prior to the World Trade Center attacks.

Previous literature [e.g., 33, 41, 52, 62] suggests that immigrant and minority groups are at risk for mental health problems due to acculturation stressors. The significantly higher anxiety and depression scores for participants in the present study compared to community-based studies with other ethnic/racial groups were surprising. The significant differences were reliable despite comparing current scores to results from numerous studies conducted in various locations with different ethnic/racial groups comprising different generational statuses and age ranges. The present study was not meant to include an exhaustive review of previous studies, and the demographic characteristics of our sample were not matched to those in the previous studies. Thus, without direct group comparison, it is not possible to determine the exact differences in anxiety and depression rates between Arab Americans and other ethnic/racial groups. Nevertheless, the present results lend evidence of a singularly high amount of psychiatric distress that Arab Americans may be experiencing.

Implications for research

In light of the considerable socio-political stressors that render Arab Americans vulnerable to mental health problems, as well as the high rates of anxiety and depression found in this study, it is remarkable that research on this group has remained stagnant. It is imperative that more efforts be made to increase research related to this group. Further research can establish more accurate prevalence rates of psychiatric disorders and assess the specificity and sensitivity of psychological questionnaires. Such research can determine if the high scores in the present study were inflated by Arab-specific test-taking behaviors or other measurement artifacts. Comparisons to samples based in the Arab world may shed valuable information on these questions.

Additional research should be conducted to: identify the specific acculturative and psychosocial risk factors that predict psychiatric distress of Arab Americans, explore differences among socio-demographic subgroups, as well as identify coping factors that are associated with better mental health. Mental health research on Arab American youth and older adults are other further areas that deserve

attention. Such research can help inform prevention and intervention programs.

The present study featured a large geographically and socio-demographically diverse sample. However, it is one of the first studies of its kind to assess self-reported levels of anxiety and depression among Arab Americans; so, results should be interpreted with caution. Utilizing similarly large and diverse samples in future research is vital to increase confidence in generalizability and external validity. This is particularly important in light of challenges in attaining probability samples as discussed above. As a reflection of the Internet methodology, the current sample appeared to be younger, better educated, and more affluent than the larger Arab American population [15, 23]. Finally, the study omitted significant subgroups including monolingual Arabic speakers, refugees (especially the recent influx of Iraqi and Somali refugees), and persons who refused to participate in the study because they did not self-identify as "Arab", such as some Egyptian Copts and Chaldeans from Iraq. As such, future research should address these limitations.

Conclusions

To our knowledge, the present study introduces the largest and most demographically diverse sample to date examining levels of anxiety and depression among Arab Americans. Based on comparisons to non-clinical standardization samples and community-based samples from research with other ethnic/racial minority groups, it is evident that Americans of Middle Eastern and North African descent are at risk for psychological distress. Future research should aim at replicating and validating these results, and identifying the psychosocial stressors that may be contributing to the levels of distress. Such stressors may include discrimination, and for immigrants the pre-migration and post-migration pressures. The minimal mental health research conducted with Arab Americans is illustrative of their marginalized status in the USA. It is imperative that further research identify the risk and protective factors specific to Arab Americans. Findings from these studies can be used in developing culturally tailored services that address the mental health needs of this group.

References

1. Abudabbeh N (1996) Arab families. In: McGoldrick M, Giordano J, Pearce JK (eds) Ethnicity and family therapy, 2nd edn. Guilford, New York
2. Abudabbeh N, Nydell MK (1993) Transcultural counseling and Arab Americans. In: McFadden J (ed) Transcultural counseling: bilateral and international perspectives. American Counseling Association, Alexandria
3. Abu-Laban B, Suleiman MW (eds) (1989) Arab Americans: continuity and change. Association of Arab-American University Graduates, Belmont
4. Abu-Ras W, Abu-Bader SH (2008) The impact of the September 11, 2001, attacks on the well-being of Arab Americans in New York City. J Muslim Ment Health 3:217–239
5. Abu-Ras W, Abu-Bader SH (2009) Risk factors for depression and posttraumatic stress disorder (PTSD): the case of Arab and Muslim Americans post-9/11. J Immigr Refugee Stud 7:393–418
6. Alderete E, Vega WA, Kolody B, Aguilar-Gaxiola S (1999) Depressive symptomatology: prevalence and psychosocial risk factors among Mexican migrant farm workers in California. J Commun Psychol 27:457–471
7. Ali OM, Milstein G, Marzuk PM (2005) The imam's role in meeting the counseling needs of Muslim communities in the United States. Psychiatr Serv 56:202–205
8. Al-Issa I, Al Zubaidi A, Bakal D, Fung TS (2000) Beck Anxiety Inventory symptoms in Arab college students. Arab J Psychiatry 11:41–47
9. Al-Issa I, Bakal D, Fung T (1999) Beck Anxiety Inventory symptom comparisons between students in Lebanon and Canada. Arab J Psychiatry 10:24–30
10. Al-Krenawi A, Graham JR (2000) Culturally sensitive social work practice with Arab clients in mental health settings. Health Soc Work 25:9–22
11. Arab American Institute (2003) First census report on Arab ancestry marks rising civic profile of Arab Americans [press release]. Arab American Institute, Washington
12. Barry DT (2001) Assessing culture via the Internet: methods and techniques for psychological research. J CyberPsychol Behav 4:17–21
13. Beck AT, Epstein N, Brown G, Steer RA (1988) An inventory for measuring clinical anxiety: psychometric properties. J Consult Clin Psychol 56:893–897
14. Beck AT, Steer RA (1990) Beck Anxiety Inventory manual. The Psychological Corporation/Harcourt Brace Jovanovich, San Antonio
15. Brittingham A, de la Cruz GP (2005) We the people of Arab Ancestry in the United States, Census 2000 brief no. C2KBR-23. U.S. Census Bureau, Washington
16. Chapleski EE, Lamphere JK, Kaczynski R, Lichtenberg PA, Dwyer JW (1997) Structure of a depression measure among American Indian elders: confirmatory factor analysis of the CES-D scale. Res Aging 19:462–485
17. Conerly RC, Baker F, Dye J, Douglas CY, Zabora J (2002) Measuring depression in African American cancer survivors: the reliability and validity of the Center for Epidemiologic Study-Depression (CES-D) Scale. J Health Psychol 7:107–114
18. Contreras S, Fernandez S, Malcarne VL, Ingram RE, Vaccarino VR (2004) Reliability and validity of the Beck Depression and Anxiety Inventories in Caucasian Americans and Latinos. Hispanic J Behav Sci 26:446–462
19. Council on American Islamic Relations (2005) Unequal protection: the status of Muslim civil rights in the United States 2005. Council on American Islamic Relations, Washington
20. De Coteau TJ, Hope DA, Anderson J (2003) Anxiety, stress, and health in northern plains Native Americans. Behav Ther 34:365–380
21. de la Cruz GP, Brittingham A (2003) The Arab Population: 2000, Census 2000 Brief No. C2KBR-23. U.S. Census Bureau, Washington
22. Downey RG, King CV (1998) Missing data in Likert ratings: a comparison of replacement methods. J Gen Psychol 125:175–191

23. El-Badry S (1994) The Arab-American market. Am Demogr 16:22–30
24. Erickson CD, Al-Timimi NR (2001) Providing mental health services to Arab Americans: recommendations and considerations. Cult Divers Ethnic Minor Psychol 7:308–327
25. Falcón LM, Tucker KL (2000) Prevalence and correlates of depressive symptoms among Hispanic elders in Massachusetts. J Gerontol Soc Sci 55B:S108–S116
26. Foley KL, Reed PS, Mutran EJ, DeVellis RF (2002) Measurement adequacy of the CES-D among a sample of older African-Americans. Psychiatry Res 109:61–69
27. Garcia M, Marks G (1989) Depressive symptomatology among Mexican-American adults: an examination with the CES-D scale. Psychiatry Rev 27:137–148
28. Ghubash R, Daradkeh TK, Al Naseri KS, Al Bloushi NBA, Al Daheri AM (2000) The performance of the Center for Epidemiologic Study Depression Scale (CES-D) in an Arab female community. Int J Soc Psychiatry 46:241–249
29. Gillis MM, Haaga DAF, Ford GT (1995) Normative values for the Beck Anxiety Inventory, Fear Questionnaire, Penn State Worry Questionnaire, and Social Phobia and Anxiety Inventory. Psychol Assess 7:450–455
30. Gosling SD, Vazire S, Srivastava S, John OP (2004) Should we trust Web-based studies? A comparative analysis of six preconceptions about Internet questionnaires. Am Psychol 59:93–104
31. Gupta R, Yick A (2001) Validation of CES-D scale for older Chinese immigrants. J Ment Health Aging 7:257–272
32. Hassouneh DM, Kulwicki A (2007) Mental health, discrimination, and trauma in Arab women living in the US: a pilot study. Ment Health Relig Cult 10:257–262
33. Hovey JD, King CA (1997) Suicidality among acculturating Mexican-Americans: current knowledge and directions for research. Suicide Life Threat Behav 27:92–103
34. Howell S, Shryock A (2003) Cracking down on diaspora: Arab Detroit and America's "War on Terror". Anthropol Quart 76:443–462
35. Huisman M (2000) Imputation of missing item responses: some simple techniques. Qual Quant 34:331–351
36. Ibish I (ed) (2003) Report on hate crimes and discrimination against Arab Americans: the post-September 11 backlash. American-Arab Anti-Discrimination Committee, Washington
37. Iwata N, Turner RJ, Lloyd DA (2002) Race/ethnicity and depressive symptoms in community-dwelling young adults: a differential item functioning analysis. Psychiatry Res 110:281–289
38. Jana-Masr A, Priester PE (2007) The development and validation of a Qur'an-based instrument to assess Islamic religiosity: the Religiosity of Islam Scale. J Muslim Ment Health 2:177–188
39. Kraut R, Olson J, Banaji M, Bruckman A, Cohen J, Couper M (2004) Psychological research online: Report of Board of Scientific Affairs' Advisory Group on the conduct of research on the Internet. Am Psychol 59:105–117
40. Laffrey SC, Meleis AI, Lipson JG, Solomon M, Omidian PA (1989) Assessing Arab-American health care needs. Soc Sci Med 29:877–883
41. Lee JS, Koeske GF, Sales E (2004) Social support buffering of acculturative stress: a study of mental health symptoms among Korean international students. Int J Intercult Relat 28:399–414
42. Mahard R (1988) The CES-D as a measure of depressive mood in the elderly Puerto Rican population. J Gerontol Psychol Sci 43:P24–P25
43. McCallion P, Kolomer SR (2000) Depressive symptoms among African American caregiving grandmothers: the factor structure of the CES-D. J Ment Health Aging 6:325–338
44. Mendes de Leon CF, Markides KS (1988) Depressive symptoms among Mexican Americans: a three-generational study. Am J Epidemiol 127:150–160
45. Moradi B, Hasan NT (2004) Arab American persons' reported experiences of discrimination and mental health: the mediating role of personal control. J Couns Psychol 51:418–428
46. Mościcki EK, Locke BZ, Rae DS, Boyd JH (1989) Depressive symptoms among Mexican Americans: the Hispanic Health and Nutrition Examination Survey. Am J Epidemiol 130:348–360
47. Naber N (2000) Ambiguous insiders: an investigation of Arab American invisibility. Ethn Racial Stud 23:37–61
48. Naff A (1985) Becoming American: the early Arab immigrant experience. Southern Illinois University Press, Carbondale
49. Narrow WE, Rae DS, Moscicki EK, Locke BZ, Regier DA (1990) Depression among Cuban Americans: the Hispanic Health and Nutrition Examination Survey. Soc Psychiatry Psychiatr Epidemiol 25:260–268
50. Nassar-McMillan SC, Hakim-Larson J (2003) Counseling considerations among Arab Americans. J Couns Dev 81:150–159
51. Noh S, Avison WR, Kaspar V (1992) Depressive symptoms among Korean immigrants: assessment of a translation of the Center for Epidemiologic Studies-Depression Scale. Psychol Assess 4:84–91
52. Organista PB, Organista KC, Kurasaki K (2003) Overview of the relation between acculturation and ethnic minority mental health. In: Chun KM, Organista PB, Marín G (eds) Acculturation: advances in theory, measurement, and applied research. American Psychological Association, Washington
53. Osman A, Barrios FX, Aukes D, Osman JR, Markway K (1993) The Beck Anxiety Inventory: psychometric properties in a community population. J Psychopathol Behav Assess 15:287–297
54. Potter LB, Rogler LH, Moscicki EK (1995) Depression among Puerto Ricans in New York City: the Hispanic Health and Nutrition Examination Survey. Soc Psychiatry Psychiatr Epidemiol 30:185–193
55. Radloff LS (1977) The CES-D scale: A self-report depression scale for research in the general population. Appl Psychol Meas 1:385–401
56. Rippy AE, Newman E (2006) Perceived religious discrimination and its relationship to anxiety and paranoia among Muslim Americans. J Muslim Ment Health 1:5–20
57. Salari S (2002) Invisible in aging research: Arab Americans, Middle Eastern immigrants, and Muslims in the United States. Gerentol 42:580–588
58. Sayed MA (2003) Conceptualization of mental illness within Arab cultures: meeting challenges in cross-cultural settings. Soc Behav Person 31:333–342
59. Shaver PR, Brennan KA (1991) Measures of depression and loneliness. In: Robinson JP, Shaver PR, Wrightsman LS (eds) Measures of personality and social psychological attitudes, vol 1. Academic Press, San Diego
60. Singh A (2002) We are not the enemy: hate crimes against Arabs, Muslims, and those perceived to be Arab or Muslim after September 11. Human Rights Watch 14(6, G) http://www.hrw.org/legacy/reports/2002/usahate/
61. Somervell PD, Beals J, Kinzie JD, Leung P, Boehnlein J, Matsunaga D, Manson SM (1993) Use of the CES-D in an American Indian village. Cult Med Psychiatry 16:503–517
62. Thoman LV, Surís A (2004) Acculturation and acculturative stress as predictors of psychological distress and quality-of-life functioning in Hispanic psychiatric patients. Hispanic J Behav Sci 26:293–311
63. Vega WA, Kolody B, Valle R, Hough R (1986) Depressive symptoms and their correlates among immigrant Mexican women in the United States. Soc Sci Med 22:642–645

64. Vera M, Alegría M, Freeman D, Robles RR, Ríos R, Ríos CF (1991) Depressive symptoms among Puerto Ricans: Island poor compared with residents of the New York City area. Am J Epidemiol 134:502–510
65. Waszak C, Severy LJ, Kafafi L (2001) Fertility behavior and psychological stress: the mediating influence of gender norm beliefs among Egyptian women. Psychol Women Q 25:197–208
66. Ying Y (1988) Depressive symptomatology among Chinese-Americans as measured by the CES-D. J Clin Psychol 44:739–746