J Med CBR Def | Volume 8, 2011
Submitted 19 October 2010 | Accepted 26 July 2011 | Final Revision 26 July 2011 | Published 13 September 2011

Comparing Quality of Life Between Survivors of Chemical Warfare Exposure and Conventional Weapons: Results of a National Study from Iran

Batool Mousavi[1]*, Shahriar Khateri[1], Mohammadreza Soroush[1], Reza Amini[1], Mehdi Masumi[1], and Ali Montazeri[2]

1. Janbazan Medical and Engineering Research Center (JMERC), no.16, Farid Afshar st. Dastgerdi Ave. Tehran – Iran
2. Department of Mental Health, Iranian Institute for Health Sciences Research, ACECR, Tehran, Iran. montazeri@acecr.ac.ir

* Corresponding Author: Batool Mousavi
Tel: +98-21-23992287 | Fax: +9821- 23992094 | E-mail: bmousavi@jmerc.ac.ir, mousavi.b@gmail.com

Suggested citation: Mousavi B, Khateri S, Soroush MR, Amini R, Masumi M, and Montazeri A., "Comparing Quality of Life Between Survivors of Chemical Warfare Exposure and Conventional Weapons: Results of a National Study from Iran", JMedCBR 8, 29 September 2011, http://www.jmedcbr.org/issue_0801/BMousavi/BMousavi_9_11.html

ABSTRACT

Background: More than 55,000 Iranians suffer from complications due to chemical warfare agent (CWA) exposure, which occurred during 8 years of conflict between Iran- Iraq. Limited studies have addressed the impact of this exposure to CWA on the quality of life of these victims.

Purpose: The aim of this study was to compare health related quality of life between survivors of CWA exposure to those exposed only to conventional weapons.

Methods: A group of war survivors (n=1006) were divided into those exposed to CWA (n=414) and those not exposed to CWA, but who experienced major disabilities (n=592). The quality of life of all participants was measured using the 36-item short Form Health Survey (SF-36) and these scores were compared within groups, between groups, and to those of the general public participating in a national health-monitoring program.

Results: Survivors of CWA exposure scored significantly lower in all SF-36 domains when compared with war survivors not exposed to CWA ($p<0.05$). The quality of life among war survivors was significantly lower than the general public ($p<0.05$).

Conclusion: The study findings demonstrate the unquestionable poorer health related quality of life survivors of CWA compared with survivors of conventional weapons.

INTRODUCTION

Armed conflict causes an enormous amount of death and disability worldwide. It destroys families, communities, and cultures and disrupts the social infrastructure of health support. This has an even more profound effect on low to middle income countries [Sidel, 2008]. During the eight years of Iran-Iraq war (1980-1988), the human cost to Iran included more than 220,000 lives lost and more than 400,000 peopled injured [Zargar et al., 2007]. War veterans not only suffer from poorer health conditions than non-veterans [Babic-Banaszak et al., 2002; Kazis et al., 1998; DeSalvo et al., 2005; Rogers et al., 2004; Voelker et al., 2002], but they also have a greater illness burden and higher mortality rates, resulting in a substantial increase in their need for health care facilities [Babic´-Banaszak et al., 2002; Rogers et al., 2004; Kang et al., 1996].

Health related quality of life (HRQOL) has been measured in various groups of veterans in different settings [Babic-Banaszak et al., Buckley et al., 2004; 2002; Kazis et al., 1998; DeSalvo et al.,2005; Rogers et al., 2004; Voelker et al., 2002; Mansell et al., 1994; Singh et al., 2005; Ahroni et al., 2000; Eisen et al.,

2005; Mousavi et al., 2008; Mousavi, 2007], but few surveys were performed concerning veterans exposed to CWA and their health related quality of life [Mousavi et al., 2009a]. Veterans exposed to CWA face a variety of complications and disabilities due to sulfur mustard gas exposure [Balali-Mood, 2006].

Almost 20 years after the end of war, approximately 50,000 people have been registered as receiving care for chronic complication due to CWA exposures, such as sulfur mustard and nerve agents [Zargar et al., 2007], more than 12,000 people receive care for amputations [Soroush et al., 2008], and about 500 receive care for bilateral blindness [Amini , 2008].

The Health Assessment Study of Iranian Survivors of Iran-Iraq War is a study to examine and compare all complications due to CWA exposures and with those due to conventional weapons among both veterans and civilians. This paper compares health related quality of life among the study populations and the burden of chemical warfare agents.

MATERIALS AND METHODS

Each injured survivor (both civilians and veterans) of the Iran–Iraq war is given a severity index (disability rate) in the Veterans and Martyrs Affair Foundation (VMAF), based on their clinical problems and severity of the injury or injuries. Most injured survivors are registered within the Foundation and all the survivors' demographic and clinical information are kept in VMAF database [Mousavi et al., 2009b]. We extracted the data for all cases that had complications due to exposure to sulfur mustard gas agent, as well as other conventional weapons during the eight years of the Iran-Iraq war. We approached 1006 war survivors from all provinces in Iran, including those who had been exposed to CWA and those not exposed, but with severe disabilities from conventional weapon injuries. The participants gave informed consent and enrolled in the study. The survivors of CWA exposure (n=414) had severe ophthalmologic or respiratory complications and survivors of conventional weapons (n=592) were a group suffering from bilateral lower extremity amputation or bilateral blindness. In order to collect data, three trained assessors conducted semi-structured interviews. Each patient was interviewed separately face to face, for about 15-20 minutes.

Data typical of the general Iranian population (civilians and war veterans) were derived from a population-based study with a random sample of the males aged 15 years and over living in Tehran, Iran [Montazeri et al., 2005]. There were 1997 males in our data sample.

Quality of life measure

Quality of life was measured using the 36-item Short Form Health Survey (SF-36v1). The SF-36 is a generic tool that can be used for the general population and different patients groups. The questionnaire consists of 36 questions that measure eight health-related domains. It also provides two summary scales: Physical Component Summary (PCS) and Mental Component Summary (MCS). Scores on each of the subscales range from 0 to 100, with 0 representing the worst health-related quality of life and 100 representing the best [Ware et al., 1998]. The psychometric properties of the Iranian version of the SF-36v1 are well documented [Montazeri et al., 2005].

Demographic data were collected with regard to age, sex, level of education, marital status, employment status and co-morbidity for the victims. In addition to descriptive statistics, the patients' scores on the SF-36 were compared with those of a general Iranian population using one sample t-test. We also used independent t-test and ANOVA to compare the quality of life of the chemical and non-chemical survivors, with significance considered at $p< 0.05$.

RESULTS

Patients' characteristics

The mean age of the participants for chemical and non-chemical warfare survivors were 46.1±8.5 and 42.5±7.2 respectively. Survivors with severe respiratory (n=265) or ophthalmologic (n=149) injuries due to chemical warfare exposure constituted 41.1% (n=414) of the study sample and war survivors with disabilities due to conventional weapons constituted 58.8% (n=592) and included bilateral lower limb amputation (n=335) and bilateral blind (n=257)The relevant socio-demographic and clinical characteristics of the survivors are shown in table 1.

Comparison of the SF-36 scores

All those (civilians and war veterans) with a history of exposure to mustard gas had significantly lower scores on all measures compared to their counterparts (figure 1) ($p<0.05$). The mean scores of the chemical and non-chemical warfare survivors are compared with general Iranian male population in figure 2. The mean scores of the victims on the SF-36 were significantly lower than the general Iranian population on all measures. Results from one-way analysis of variance (ANOVA) showed that there were significant difference between chemical warfare survivors, bilateral blind, bilateral lower limb amputees and general population (figure 3) ($p<0.05$). The analysis also showed that the mean scores of all 8 SF-36 subscales were significantly lower in chemical warfare survivors with ophthalmologic complications compared to their counterparts with bilateral blindness (figure 4) ($p<0.05$). There were no significant differences in chemical warfare survivors with ophthalmologic or lung complications.

DISCUSSION / CONCLUSION

This survey evaluated long-term impact of war-related major disabilities on quality of life, 20 years after disability. A few studies have looked at the health related quality of life in survivors of Iran-Iraq war [Mousavi et al., 2008; Mousavi et al., 2009a; Mousavi et al., 2009b], but this survey is the first to compare the health related quality of life for survivors of CWA and conventional warfare. The study revealed that in general, the health related quality of life of Iranian survivors of the Iran-Iraq war was poor. The study also showed that the survivors exposed to CWA suffered a lower quality of life compared to those with major disabilities from conventional warfare.

Survivors scored worse on role physical, role emotional and bodily pain (figure1). Pain, especially chronic pain, plays an important role on quality of life [All et al., 2000]. The finding indicated that majority of the cases had problems with work and daily activity, as well as problems interfacing with normal social activities. The same result was found in an earlier study [Ware, 2000].

Although the survivors of CWA exposure were less educated compared to other survivors, all other socio-demographic data were similar in both groups. The majority of the cases in both groups were married and unemployed. The higher rate of unemployment was due to the major disabilities of the study population. The survivors with major disability usually use VMAF for all their expenses and their health care needs, and since the study groups had major disability the rate of unemployment was high. Two-thirds of the cases suffered from additional war related injuries, but the rate was similar in both chemical and conventional warfare survivors. Similar results were seen in other studies [Mousavi et al.,2008; Mousavi et al.,2009a; Mousavi et al.,2009b].

Survivors exposed to CWA had a poorer quality of life compared to those not exposed to CWA. In some domains the mean scores were sometimes two or three times lower, especially in role physical, role emotional, general health, bodily pain and vitality. These domains are correlated with mental and physical components of health related quality of life-SF36 [Montazeri et al., 2005]. Sulfur mustard has serious and toxic effects on skin, eyes and respiratory system [Emad, 1997], which play an important role in decreasing quality of life in for these survivors. The findings indicate the necessity to provide support for all individuals in both physical and psychological needs, especially for those exposed to CWA.

Survivors of CWA exposure with ophthalmologic complications suffered poorer health related quality of life compared to bilateral blind survivors. In general, the impact and burden of blindness is too high [Smith, 1996], but in this survey, the burdens seen in victims of bilateral blindness were less severe than those seen in survivors of CWA with ophthalmologic complications. A qualitative study might help to understand the reason for the poorer quality of life in survivors exposed to CWA with ophthalmologic complications who were not blind.

There were some limitations to the survey. First, although we focused on evaluating the impact of major war related disabilities on health related quality of life of the survivors with co-morbidity, we did not control for the potential presence of the types and severity of this additional morbidity. Second, the cases were extracted through a health assessment program, so the survivors who did not attend the program, including spinal cord injured or upper limb amputees, did not have a chance to enroll in the study.

The study findings demonstrate that survivors of CWA exposure unquestionably have a poorer health related quality of life compared to those with major disabilities who were not exposed to CWA. This should encourage health policy makers to improve the health care facilities, as well as focus on the need for resumption of research to find those factors affecting those with CWA exposures.

TABLES

TABLE 1: Demographic characteristics of Iranian chemical and conventional warfare survivors (n=1006)

	Chemical survivors (n= 414)		Non chemical survivors (n= 592)	
	Number	percentage	Number	percentage
Age				
Mean (SD)	46.1±8.5		42.5±7.2	
Educational level				
Less than 12 years	207	50	225	38
12 years and above	207	50	367	62
Marital status				
Never married	4	1	18	3
Married	405	97.8	570	96.3
Divorced	1	0.2	3	0.5
Widowed	4	1	1	0.2
Employment				
Employed	113	27.8	170	28.8
Unemployed	294	72.2	421	71.2
Co-morbidity				
No	97	23.4	159	26.9
Yes	317	76.6	433	73.1

FIGURES

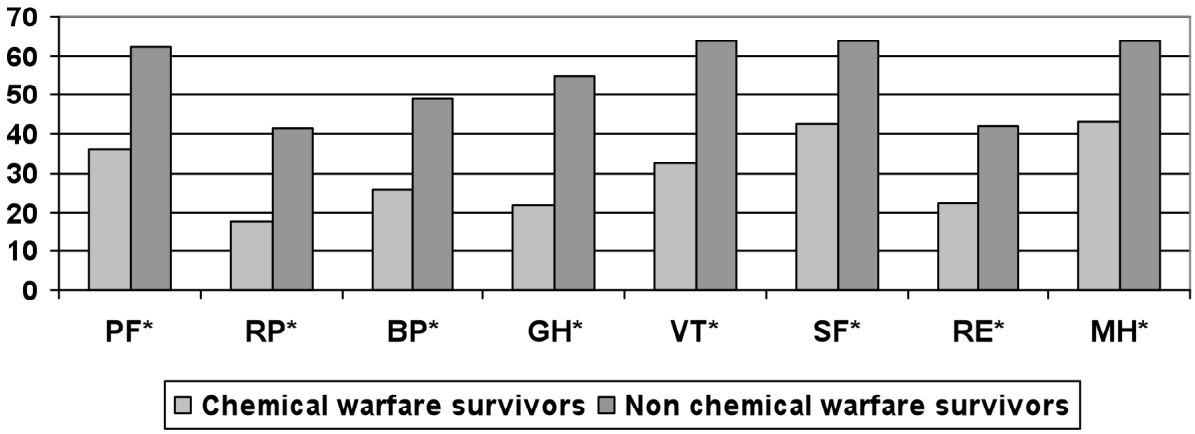

Figure 1. Comparison of the SF-36 scores between chemical (n=414) and non-chemical warfare survivors (n=592)*

* $p<0.05$;

(PF: Physical functioning, RF: Role physical, BP: Bodily pain, GH: General Health, VT: Vitality, SF: Social functioning, RE: Role emotional, MH: Mental health).

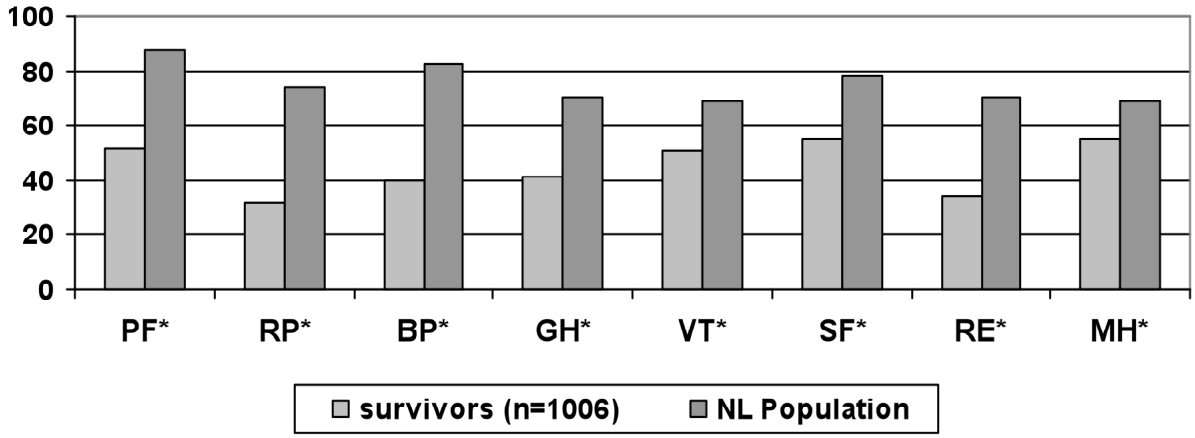

Figure 2. Comparison of the SF-36 scores between survivors of the war (n=1006) and the general population (n=1997*)
* p<0.05; **Derived from [Montazeri et al., 2005].
(PF: Physical functioning, RF: Role physical, BP: Bodily pain, GH: General Health, VT: Vitality, SF: Social functioning, RE: Role emotional, MH: Mental health).

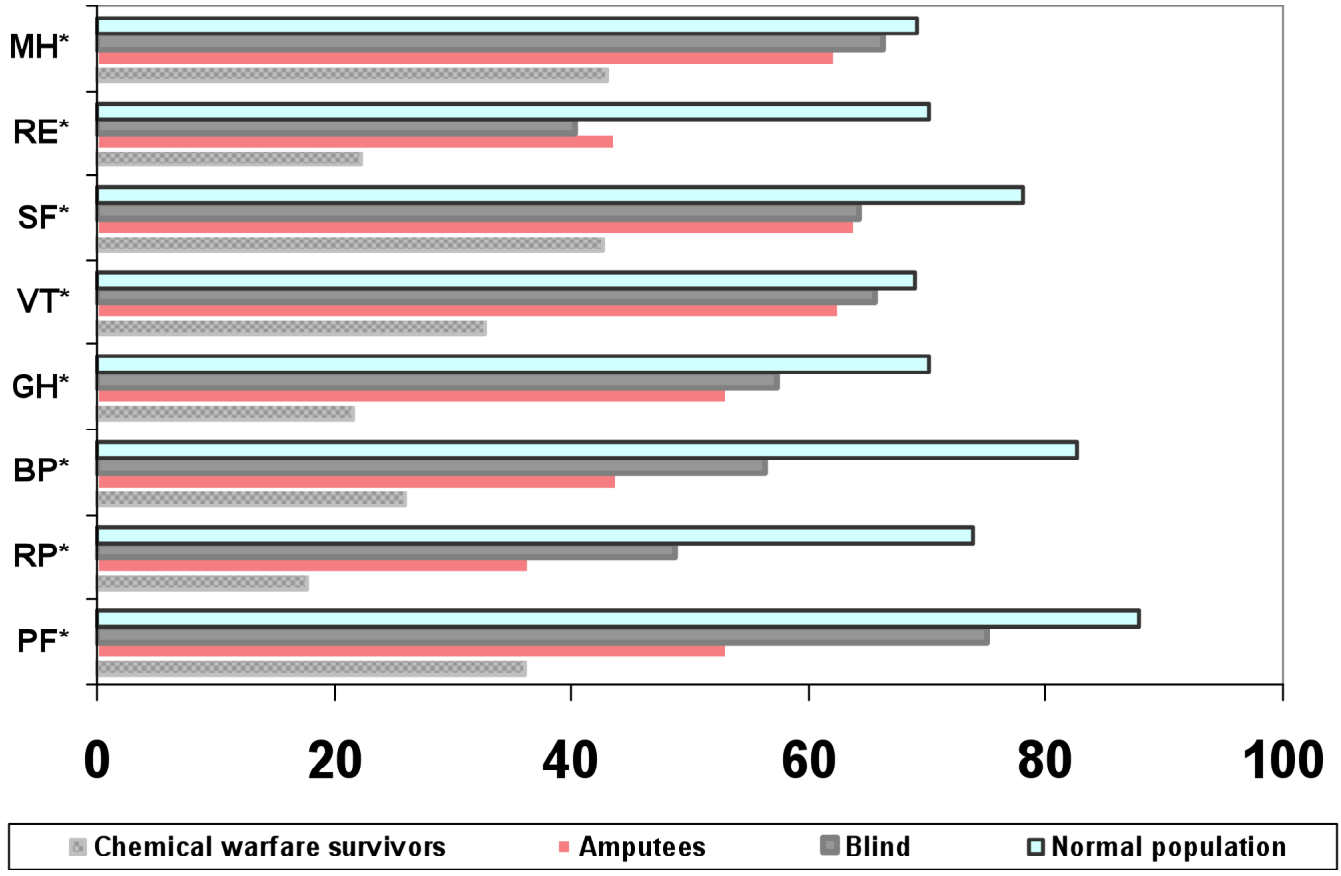

Figure 3. Comparison of the SF-36 scores between chemical warfare survivors (n=414), bilateral blind (n=257), Bilateral lower limb amputees (n=335) and general population (n=1997)**
* p<0.05; **Derived from [Montazeri et al., 2005].
(PF: Physical functioning, RF: Role physical, BP: Bodily pain, GH: General Health, VT: Vitality, SF: Social functioning, RE: Role emotional, MH: Mental health).

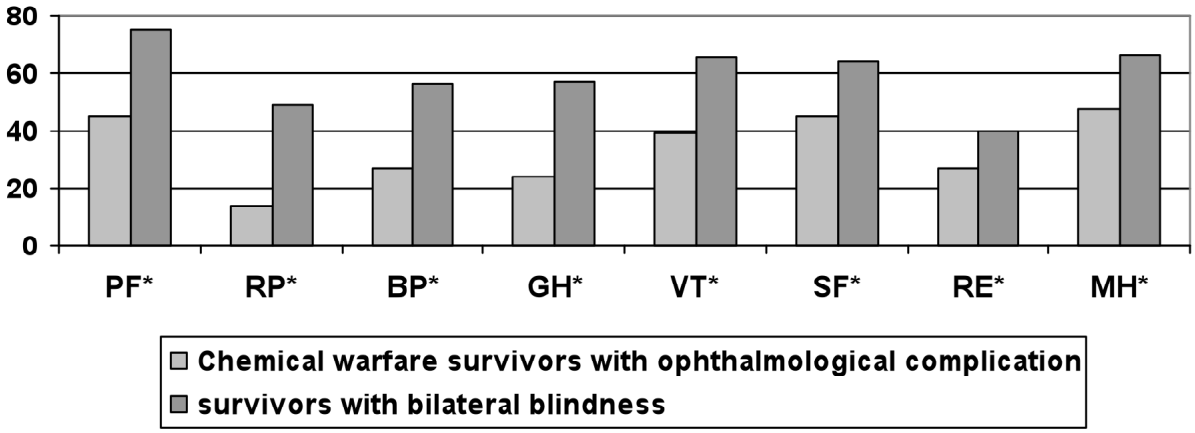

Figure 4. Comparison of the SF-36 scores between chemical warfare survivors with ophthalmologic complications (n=149) and bilateral blind with no exposure to chemical agent (n=257)
* $p<0.05$. (PF: Physical functioning, RF: Role physical, BP: Bodily pain, GH: General Health, VT: Vitality, SF: Social functioning, RE: Role emotional, MH: Mental health).

REFERENCES

Ahroni, J.H., Boyko, E.J. (2000) Responsiveness of the SF-36 among veterans with diabetes mellitus. J Diabetes Complications. 14, 31-39.

All, A.C., Freid, J.H., Wallace, D.C. (2000) Quality of Life, Chronic Pain, And Issues for Healthcare Professionals in Rural Communities. Online Journal of Rural Nursing and Health Care. 1, 19-33.

Amini, R. (2008) Health Needs Assessment methodology report in blind veterans. Iranian Journal of War and Public Health. 1, 45-54. [abstract in English]

Babic-Banaszak, A., Kovačic, L., Kovačevic, L., Vuletic, G., Mujkic, A., Ebling, Z. (2002) Impact of war on health related quality of life in Croatia: population study. CMJ. 43, 396-402.

Balali-Mood, M., Hafezi, M. (2006) Comparison of early and late toxic effects of sulfur mustard in Iranian veterans. Basic Clin Pharmacol Toxicol. 99, 273-82.

Buckley, T.C., Mozley, S.L., Bedard, M.A., Dewulf, A.C., Greif, J. (2004) Preventive health behaviors, health-risk behaviors, physical morbidity, and health-related role functioning impairment in veterans with post-traumatic stress disorder. Military Medicine. 169, 536-540.

DeSalvo, K.B., Fan, V.S., McDonell, M.B., Fihn, S.D. (2005) Predicting mortality and healthcare utilization with a single question. Health Serv Res. 40, 1234-1246.

Eisen, S.A., Kang, H.K., Murphy, F.M., Blanchard, M.S., Reda, D.J., Henderson, W.G., Toomey, R., Jackson, L.W., Parks, B.J.A., Klimas, N., Hall, C., Pak, H.S., Hunter, J., Karlinsky, J., Battistone, M.J., Lyons, M.J. (2005) Gulf War veterans' health: medical evaluation of a U.S. cohort. Annals Internal Medicine. 142, 881-890.

Emad, A., Rezaian, G.R. (1997) The diversity of the effects of sulfur mustard gas inhalation on respiratory system 10 years after a single, heavy exposure. Chest. 112, 734-738.

Kang, H.K., Bullman, T.A. (1996) Mortality among U.S. veterans of the Persian Gulf War. J New England. 335, 1498-1504.

Kazis, L.E., Miller, D., Clark, J., Skinner, K., Lee, A., Rogers, W.H., Spiro, A., Payne, S.M.C., Fincke, G., Selim, A., Linzer, M. (1998) Health-related quality of life in VA patients: results of the Veterans Health Study. Arch Internal Medicine. 158, 626-632.

Khateri, S., Ghanei, M., Keshavarz, S., Soroush, M., Haines, D. (2003) Incidence of lung, eye, and skin lesions as late complications in 34,000 Iranians with wartime exposure to mustard agent. J Occup Environ Med. 45, 1136-1143.

Mansell, D., Kazis, L., Miller, D., Skinner, K., Spiro, A., Clark, J. (1994) Quality of life in veterans with alcohol disorders and post traumatic stress disorder. AHSR FHSR Annu Meet Abstr Book. 11, 140-141.

Montazeri, A., Goshtasebi, A., Vahdaninia, M., Gandeck B. (2005) The Short Form Health Survey (SF-36): translation and validation study of the Iranian version. Quality Life Res. 14, 875-882.

Mousavi, B. (2007) Quality of life in war related bilateral lower limb amputation and their spouses. The Asian Symposium on Safe Community Congress, Thailand.

Mousavi, B., Montazeri, A., Soroush, M.R. (2007) Comparing quality of life in war related spinal cord injured female and their spouses. The 4th National Congress on Spinal cord Injuries, Iran. 59.

Mousavi, B., Montazeri, A., Soroush, M.R. (2009b) Quality of life in war related bilateral lower limb amputees. Journal of Iranian Institute for Health Sciences Research. 8, 303-311. [abstract in English].

Mousavi, B., Soroush, M.R., Montazeri, A. (2008) Quality of life in war related spinal cord Injured female. Journal of Iranian Institute for Health Sciences Research. 7, 75-81. [abstract in English]

Mousavi, B., Soroush, M.R., Montazeri, A. (2009a) Quality of life in chemical warfare survivors with ophthalmologic injuries: the first results from Iran Chemical Warfare Victims Health Assessment Study. Health and Quality of Life Outcomes. 7, 2 doi:10.1186/1477-7525-7-2.

Rogers, W.H., Kazis, L.E., Miller, D.R., Skinner, K.M., Clark, J.A., Spiro, A., Fincke, R.G. (2004) Comparing the health status of VA and non-VA ambulatory patients: the veterans' health and medical outcomes studies. J Ambul Care Manage. 27, 249-62.

Sidel, V.W., Levy B.S. (2008) The health impact of war. International journal of injury control and safety promotion. 15, 189-195.

Singh, J.A., Borowsky, S.J., Nugent, S., Murdoch, M., Zhao, Y., Nelson, D.B., Petzel, R., Nichol, K.L. (2005) Health-related quality of Life, functional impairment, and healthcare utilization by veterans: Veterans' Quality of Life Study. J Am Geriatrics Society. 53, 108-113.

Smith, A.F., Smith, J.G. (1996) The economic burden of global blindness: a price too high. Br J Ophthalmol. 80, 276-277. doi:10.1136/bjo.80.4.276v

Souroush, M.R., Masumi, M., Mousavi, B., Almassi, F., Honari, G. (2009) Skin Disorders Associated with Bilateral Lower Extremity Amputation. Pakistan Journal of Biological Sciences. 12, 1381-1384.

Voelker, M.D., Saag, K.G., Schwartz, D.A., Chrischilles, E., Clarke, W.R., Robert, F., Woolson, R.F., Doebbeling, B.N. (2002) Health-related quality of life in Gulf War era military personnel. Am. J. Epidemiol. 155, 899-907.

Ware, J.E. (2000) SF-36 Health Survey update. Spine 25, 3130-3139.

Ware, J.E., Kosinski, M., Gandek, B., Aaronson, N.K., Apolone, G., Bech, P., Brazier, J., Bullinger, M., Kaasa, S., Leplège, A., Prieto, L., Sullivan, M. (1998) The factor structure of the SF-36 Health Survey in 10 countries: results from the IQOLA Project. International Quality of Life Assessment. J Clin Epidemiol. 51, 1159-65.

Zargar, M., Araghizadeh, H., Soroush, M.R., Khaji, A. (2007) Iranian casualties during the eight years of Iraq-Iran conflict. Rev. Saúde Pública; 41:6.