

Health-Related Quality of Life in Patients with Systemic Lupus Erythematosus and Rheumatoid Arthritis Compared to the Healthy Population in Shiraz, Iran

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Abstract

Background: Systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA) are chronic and complex autoimmune diseases, involving multiple organs. Therefore, quality of life (QoL) in SLE and RA patients can be affected. The current study aimed to compare SLE and RA patients with the healthy population in terms of health-related QoL (HRQoL) in Shiraz, Iran.

Methods: The present cross sectional, analytical study was performed on 100 SLE patients, 100 RA patients, and 200 healthy controls, who were referred to the rheumatology clinics (Motahari and Hafez clinics) of Shiraz University of Medical Sciences. Demographic data including age, gender, educational level, and disease duration were evaluated. The Persian-translated version of 36-item short-form health survey (SF-36) was used as a tool for evaluating HRQoL. For statistical analysis, Pearson's correlation test, t-test, and ANOVA were performed, using SPSS.

Results: Comparison of SLE and RA patients with healthy controls showed that the control group obtained higher scores in 8 subscales of SF-36 questionnaire. Based on the findings, RA patients had the lowest scores between the groups. Age and disease duration had a significant negative linear correlation with HRQoL, while educational level had a significant positive linear correlation with HRQoL. Nevertheless, there was no significant correlation between gender and HRQoL.

Conclusions: HRQoL was lower in RA patients in comparison with the SLE group. In fact, RA patients, who suffered from body pain and disability, obtained lower scores in both physical and mental domains. Therefore, promoting the patients' health literacy, as an empowerment strategy, plays a key role in improving HRQoL.

Keywords: Health-Related Quality of Life (HRQoL), Systemic Lupus Erythematosus (SLE), Rheumatoid Arthritis (RA), SF-36

1. Background

In recent decades, there has been a growing interest in the evaluation of quality of life (QoL), as a treatment outcome, especially in patients with chronic diseases. Systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA) are chronic and complex autoimmune inflammatory diseases, involving multiple organs. These diseases influence the patients' QoL due to the diversity of symptoms, medication-related complications, and psychotic and social dysfunctions. Also, SLE and RA patients experience various limitations, including physical, psychological, and social disabilities, which can affect different aspects of health-related QoL (HRQoL) (1, 2).

Generally, 36-item short-form health survey (SF-36), which is a multi-dimensional questionnaire, has been used to assess HRQoL in patients. This questionnaire is a stan-

dard tool for the measurement of QoL and includes 36 items in 8 domains: physical functioning, role limitations due to physical problems, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems, and mental health.

It is obvious that HRQoL in SLE and RA patients is lower than the general population. Overall, SF-36 questionnaire has been used to measure and compare the impact of different diseases and effectiveness of various treatments. Considering the treatable morbidities of SLE and RA, it is important to assess the patients' HRQoL in 8 subscales of SF-36 (3, 4).

Several studies have revealed the lower QoL of SLE and RA patients, using SF-36 questionnaire in Brazil, Thailand, USA, Iran, and India (5-9). Therefore, the present study was designed to compare SLE and RA patients with healthy controls in terms of HRQoL and identify the status of HRQoL

dimensions in these populations. In fact, this is the first study, evaluating HRQoL in RA and SLE patients in the current clinical care setting of Shiraz, Iran.

2. Methods

This cross sectional study was carried out at the departments of community medicine and internal medicine of Shiraz University of Medical Sciences. A total of 400 participants, who met the inclusion criteria, were enrolled in the study (100 SLE patients, 100 RA patients, and 200 healthy controls). We used SF-36 questionnaire to evaluate HRQoL in SLE and RA patients. This questionnaire is a standard tool for the assessment of HRQoL in patients and includes 36 items and 8 domains. The patients' scores were within the range of 0 - 100 in each domain. A higher score in each domain was associated with a higher HRQoL. We compared 3 groups of SLE patients, RA patients, and healthy controls and evaluated the HRQoL domains.

Patients, who were referred to the rheumatology clinics of Shiraz University of Medical Sciences (Motahari and Hafez clinics) with a confirmed diagnosis of SLE or RA, were asked to participate in the study. Diagnosis of SLE was confirmed in patients who met at least 4 out of 11 classification criteria, designed by the American college of rheumatology (ACR). Also, diagnosis of RA was confirmed in patients who met at least 4 out of 7 classification criteria, proposed by ACR. An expert rheumatologist confirmed the diagnosis in these patients. Healthy controls were selected among the patients' family members, who were accompanying them at Motahari and Hafez clinics.

An informed consent form was obtained from each participant before enrollment in the study. Data were collected between March 2010 and February 2011. The patients were included in the study according to the following criteria: (1) confirmed SLE or RA diagnosis, (2) age above 18 years, and (3) consciousness to answer the self-report questionnaire. We excluded patients with other chronic deteriorative diseases.

As mentioned earlier, we used the SF-36 questionnaire to evaluate the patients' HRQoL (8). Demographic data including age, gender, disease duration, and educational level were recorded in the data collection form. We classified all the participants, based on the educational level into 3 groups: under high school diploma, high school diploma, and above diploma.

For statistical analysis, we used Chi-square test (or Fisher's exact test) to compare categorical variables in the univariate analysis. For the comparison of SF-36 scores between the groups, we used one-way analysis of variance (ANOVA). Categorical data were reported as percentage, while continuous quantitative data were reported as mean

± standard deviation (SD). We also used Pearson's correlation test to evaluate the relationship between continuous variables. Moreover, Kolmogorov-Smirnov test was used to evaluate the normal distribution of continuous variables (age and SF-36 domain scores). P-value less than 0.05 was considered statistically significant.

3. Results

In this study, we analyzed 100 SLE patients (91 females and 9 males), 100 RA patients (10 males and 90 females), and 200 controls (124 females and 76 males). Since SLE and RA are more frequent in females than males, the majority of patients were female; accordingly, we allocated more women to the healthy control group. Table 1 summarizes the demographic data of the participants. The effects of demographic characteristics, including age, gender, educational level, and duration of disease, were evaluated. Based on the findings, there was no significant difference in demographic characteristics, including age, gender, or educational level between the patients and the controls ($P = 0.18, 0.27, \text{ and } 0.12$, respectively).

Table 2 presents the comparison of HRQoL among SLE, RA, and control groups in terms of age. Statistical analysis identified a significant negative linear relationship between the age of SLE and RA patients and physical functioning, vitality, bodily pain, mental health, and general health perceptions. Also, a significant linear relationship was found between age and social functioning in RA patients. In addition, the results in the control group revealed a negative linear relationship between age and all domains of SF-36 questionnaire.

No significant difference was observed between men and women with SLE in 8 domains of HRQoL. In fact, both men and women with SLE obtained the highest scores in social functioning and the lowest scores in the domain of mental health. Also, the only significant difference between female and male RA patients was with respect to the domain of vitality; both genders obtained the highest scores in social functioning. On the other hand, the lowest scores of females and males with RA were related to the domains of physical functioning and vitality, respectively. In the control group, men and women showed no significant difference in any of the domains of HRQoL. Table 3 shows HRQoL among SLE and RA patients and the controls according to gender.

Analysis of variance (ANOVA) was used to evaluate possible differences between educational level and HRQoL. Statistical analysis identified a significant correlation between the educational level of SLE patients and physical functioning ($P = 0.000$), role limitations due to physical problems ($P = 0.014$), bodily pain ($P = 0.005$), gen-

Table 1. Sociodemographic Characteristics of SLE, RA, and Control Groups Including the Mean Age, Gender, and Educational Level

Variables	SLE Group (n: 100)	RA Group (n: 100)	Control Group (n: 200)	P Value
Age, y	33.73 ± 11.7	39.47 ± 13.8	46.08 ± 19.2	0.18
Gender				0.27
Female	91 (0.91)	90 (0.9)	124 (0.62)	
Male	9 (0.09)	10 (0.1)	76 (0.38)	
Educational level				0.12
Under high school diploma	36 (0.36)	46 (0.46)	42 (0.21)	
High school diploma	37 (0.37)	30 (0.3)	70 (0.35)	
Academic education	27 (0.27)	24 (0.24)	88 (0.44)	

Table 2. Analysis of HRQoL Among SLE, RA, and Control Groups According to Age

Variables	SLE group (n = 100)	RA group (n = 100)	Control group (n = 200)
PF	r: -0.536 P: 0.000	r: -0.579 P: 0.000	r: -0.569 P: 0.000
Age, y	35.41 ± 10	35.1 ± 12.94	47.13 ± 18.1
RF	r: -0.166 P: 0.098	r: -0.029 P: 0.77	r: 0.536 P: 0.000
Age, y	33.16 ± 11.7	40.33 ± 13.7	44.28 ± 19.1
BP	r: -0.359 P: 0.000	r: -0.388 P: 0.000	r: -0.720 P: 0.000
Age, y	34.58 ± 11.8	49.83 ± 14.2	45.29 ± 18.9
GH	r: -0.249 P: 0.012	r: -0.240 P: 0.016	r: -0.582 P: 0.000
Age, y	32.8 ± 10.84	39.41 ± 13.74	43.12 ± 19.8
VT	r: -0.326 P: 0.000	r: -0.318 P: 0.000	r: -0.288 P: 0.000
Age, y	33.91 ± 10.96	37.2 ± 14.1	44.6 ± 20.1
SF	r: -0.129 P: 0.201	r: -0.366 P: 0.000	r: -0.653 P: 0.000
Age, y	32.25 ± 10.9	38.53 ± 13.9	48.21 ± 20
RE	r: -0.115 P: 0.254	r: -0.012 P: 0.90	r: -0.663 P: 0.000
Age, y	34.9 ± 11.7	33.58 ± 13.68	49.22 ± 20.1
MH	r: -0.236 P: 0.018	r: -0.209 P: 0.037	r: -0.564 P: 0.000
Age, y	33.06 ± 10.63	42.81 ± 14.2	48.34 ± 19.43

Abbreviations: BP, Bodily Pain; GH, General Health Perceptions; MH, Mental Health; PF, Physical Functioning; RE, Role Limitations Due to Emotional Problems; RF, Role Limitations Due to Physical Problems; SF, Social Functioning; VT, Vitality.

eral health perceptions ($P = 0.031$), and vitality ($P = 0.022$). Also, there was a significant association between the educational level of RA patients and physical functioning ($P = 0.000$), bodily pain ($P = 0.004$), general health perceptions ($P = 0.004$), vitality ($P = 0.008$), social functioning ($P = 0.07$), and mental health ($P = 0.006$).

Comparison of the overall quality of life in the groups showed the highest scores in the control, SLE, and RA

groups, respectively. As a basis for calculating the scores, the control group obtained the highest score of vitality (89), while RA patients had the lowest score of vitality (48.2) in HRQoL. According to Table 4, a significant difference was found between physical functioning, general health perceptions, vitality, role limitations due to emotional problems, and mental health ($P < 0.05$).

Table 5 presents the comparison of HRQoL among SLE, RA, and control groups according to disease duration. Statistical analysis identified a significant negative linear relationship between disease duration in SLE patients and the 8 domains of HRQoL. Also, in RA patients, a linear relationship was found between disease duration and physical functioning, bodily pain, general health perceptions, vitality, social functioning, and mental health.

4. Discussion

In the present study, we analyzed 100 SLE patients (91 females and 9 males), 100 RA patients (10 males and 90 females), and 200 controls (124 females and 76 males). We compared RA and SLE patients with the healthy controls in terms of HRQoL. Also, we assessed HRQoL in the 3 groups regarding age, sex, level of education, and duration of disease.

As expected, the control group had higher scores, compared to SLE and RA patients, respectively. The control group obtained higher scores on physical performance, such as physical function and general health. Also, SLE patients had higher scores in HRQoL in comparison with RA cases. In fact, RA patients obtained the lowest HRQoL scores in the physical dimension among the 3 groups. In other words, these patients suffered from numerous physical problems, as they were unable to work for long periods of time and had more limitations in physical activity. Overall, these patients are unable to perform activities such as

Table 3. HRQoL Among SLE, RA, and Control Groups According to Gender^a

Variables	Gender (N)	SLE Group	P Value	RA Group	P Value	Control Group	P Value
PF	M:	69.28 ± 26.83	0.620	52.00 ± 25.40	0.9	79.56 ± 21.54	0.657
	F:	63.84 ± 27.96		51.88 ± 26.49		80.93 ± 20.42	
RF	M:	71.42 ± 48.79	0.716	60.00 ± 51.63	0.365	70.98 ± 27.09	0.498
	F:	64.56 ± 47.88		73.61 ± 44.08		68.21 ± 29.60	
BP	M:	64.28 ± 22.84	0.681	54.30 ± 22.64	0.978	57.70 ± 20.49	0.693
	F:	60.19 ± 25.40		54.05 ± 26.55		56.51 ± 20.89	
GH	M:	50.42 ± 26.23	0.913	60.30 ± 16.2	0.186	79.83 ± 25.78	0.816
	F:	51.45 ± 23.56		51.44 ± 20.31		78.94 ± 27.17	
VT	M:	52.85 ± 20.17	0.790	56.00 ± 12.64	0.041	87.90 ± 32.18	0.524
	F:	51.20 ± 15.37		47.33 ± 12.54		90.78 ± 29.10	
SF	M:	80.35 ± 26.86	0.417	75.00 ± 21.24	0.71	73.61 ± 15.86	0.833
	F:	72.80 ± 23.39		71.80 ± 26.06		74.10 ± 16.16	
RE	M:	71.42 ± 48.79	0.506	60.00 ± 51.63	0.9	83.54 ± 32.24	0.886
	F:	58.60 ± 49.02		60.37 ± 48.93		84.21 ± 30.48	
MH	M:	53.14 ± 20.74	0.512	57.60 ± 15.10	0.313	84.27 ± 36.13	0.941
	F:	57.27 ± 15.63		53.02 ± 13.37		83.88 ± 36.67	

Abbreviations: BP, Bodily Pain; GH, General Health Perceptions; MH, Mental Health; PF, Physical Functioning; RE, Role Limitations Due to Emotional Problems; RP, Role Limitations Due to Physical Problems; SF, Social Functioning; VT, Vitality.

^aValue are expressed as Mean ± SD.

Table 4. Comparison of HRQoL Among SLE, RA, and Control Groups

Variables	Groups			P Value (ANOVA)
	SLE	RA	Control	
PF	63.85 ± 27.67	52.90 ± 26.26	80.08 ± 21.08	0.000
RF	64.75 ± 48.81	72.25 ± 46.79	69.93 ± 28.03	0.358
BP	59.90 ± 25.61	54.08 ± 26.08	57.25 ± 20.60	0.212
GH	51.90 ± 23.42	52.30 ± 20.04	79.00 ± 26.25	0.000
VT	50.95 ± 15.90	48.20 ± 12.76	89.00 ± 31.00	0.000
SF	73.70 ± 23.41	72.12 ± 25.55	73.00 ± 15.94	0.802
RE	59.30 ± 48.91	60.33 ± 48.93	83.80 ± 31.51	0.000
MH	56.68 ± 15.93	53.48 ± 13.54	84.12 ± 36.24	0.000

Abbreviations: BP, Bodily Pain; GH, General Health Perceptions; MH, Mental Health; RE, Role Limitations Due to Emotional Problems; RP, Role Limitations Due to Physical Problems; SF, Social Functioning; PF, Physical Functioning; VT, Vitality.

running, climbing the stairs, lifting heavy objects, or walking.

Based on the present findings, the control group obtained the highest scores in psychological domains, such as vitality, social functioning, and mental health, compared to SLE and RA patients. RA patients mostly complained of disappointment, nervousness, sadness, fatigue, and lack of energy. Evaluation of social functioning showed no significant difference between the 3 groups regarding aspects such as relationship with family, friends, or community members.

In cases with disease exacerbation, there were more complaints of mental health deterioration, particularly de-

pression. In this regard, Bazilchi et al. reported similar results in 93 RA patients and indicated that depressive moods are significantly associated with dysfunctions, except social functioning (8). Khanna et al. also reported similar results in SLE patients, who obtained the lowest scores in terms of physical and mental performance in the exacerbation period; however, there was no significant difference in social functioning (9).

In the current study, the quality of life decreased with advancing age in the 3 groups. In agreement with the present findings, Doria et al. reported that with increasing age, SLE patients obtained lower scores in the physical and mental dimensions of QoL (10). In addition, Elhone

Table 5. Comparison of HRQoL Among SLE, RA, and Control Groups According to Disease Duration

Groups Variables	SLE group			RA group		
	P Value	r	Disease Duration, y	P Value	r	Disease Duration, y
PF	0.000	-0.438	10.61 ± 0.83	0.000	-0.479	10.76 ± 0.86
RF	0.001	-0.315	11.3 ± 0.84	0.175	-0.137	11.08 ± 0.82
BP	0.000	-0.374	9.15 ± 0.69	0.001	-0.325	10.19 ± 0.85
GH	0.008	-0.263	5.35 ± 0.78	0.003	-0.295	5.23 ± 0.65
VT	0.018	-0.236	4.46 ± 0.54	0.003	-0.295	5.21 ± 0.56
SF	0.026	-0.222	4.23 ± 0.34	0.000	-0.354	5.13 ± 0.47
RE	0.052	-0.195	7.07 ± 0.56	0.12	-0.156	8.15 ± 0.23
MH	0.009	-0.259	4.68 ± 0.45	0.000	-0.261	5.17 ± 0.34

Abbreviations: BP, Bodily Pain; GH, General Health Perceptions; MH, Mental Health; RE, Role Limitations Due to Emotional Problems; RP, Role Limitations Due to Physical Problems; SF, Social Functioning; PF, Physical Functioning; VT, Vitality.

et al. performed a study on QoL in lupus patients during 15 years and concluded that age was negatively associated with QoL, especially the physical dimension (11).

In the present study, no significant association was observed between gender and HRQoL in patients and healthy controls. In this regard, Wallenius et al. demonstrated that work disability in both genders reduced the patients' QoL. Furthermore, they showed that females with RA had a four-fold increased risk of work disability in comparison with men (12). It should be noted that the majority of women in the present study were unemployed and were financially supported by their husbands or parents; therefore, compared with men, the disease had less impact on their QoL. However, since the number of male participants was substantially low, the results regarding gender differences should be interpreted cautiously.

In the present study, it was found that HRQoL in RA and SLE patients is associated with disease duration. In fact, HRQoL decreased as the disease duration increased. Monjamed et al. reported similar results in RA patients (13). Also, Freire EA et al. showed a significant negative correlation between disease duration and HRQoL in SLE patients. It was determined that general health and social functioning dimensions are associated with disease duration (14).

According to the current study, higher educational level was associated with higher HRQoL scores among all the participants. This finding is in agreement with the data reported by Wallenius and colleagues. These results can in fact illustrate the role of patients' knowledge about their condition. Also, more educated people have a better socioeconomic status and cultural background (12). However, in a previous study, Shakeri et al. did not find a significant relationship between educational level and HRQoL in SLE patients (15).

The present research had a number of limitations, such as the study design (cross sectional). Also, the participants were fairly homogeneous, as the majority of the participants were female. Overall, evaluation of QoL is of importance for the assessment of treatment outcomes and patients' complications. The present study has certain advantages for the improvement of HRQoL in patients and can minimize damage during treatment. It seems that complementary studies are required in the future to provide more help for the patients.

4.1. Conclusion

As chronic diseases play an important role in decreasing HRQoL among patients, more attention should be paid to the physical, mental, and social aspects. Improvement of patients' health literacy, as an empowerment strategy, plays a key role in improving HRQoL. Patients need psychological and social support, which is provided by medical teams, including psychiatrists, psychologists, and social workers. Due to the direct and indirect costs imposed on patients, providing insurance facilities can be very useful, as well.

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Footnote

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References

1. Longo D, Fauci A, Kasper D, Hauser S, Jameson J, Loscalzo J. Harrison's principles of internal medicine. 18ed ed. Mc Graw-Hill; 2012.
2. Kanecki K, Tyszko P, Wislowska M, Lyczkowska-Piotrowska J. Preliminary report on a study of health-related quality of life in patients with rheumatoid arthritis. *Rheumatol Int*. 2013;**33**(2):429–34. doi: [10.1007/s00296-012-2421-5](https://doi.org/10.1007/s00296-012-2421-5). [PubMed: 22453529].
3. Davatchi F, Jamshidi AR, Banihashemi AT, Gholami J, Forouzanfar MH, Akhlaghi M, et al. WHO-ILAR COPCORD Study (Stage 1, Urban Study) in Iran. *J Rheumatol*. 2008;**35**(7):1384. [PubMed: 18464299].
4. ten Klooster PM, Vonkeman HE, Taal E, Siemons L, Hendriks L, de Jong AJ, et al. Performance of the Dutch SF-36 version 2 as a measure of health-related quality of life in patients with rheumatoid arthritis. *Health Qual Life Outcomes*. 2013;**11**:77. doi: [10.1186/1477-7525-11-77](https://doi.org/10.1186/1477-7525-11-77). [PubMed: 23651685].
5. dos Reis MG, da Costa IP. Health-related quality of life in patients with systemic lupus erythematosus in Midwest Brazil. *Rev Bras Reumatol*. 2010;**50**(4):408–22. [PubMed: 21125176].
6. Barnado A, Wheless L, Meyer AK, Gilkeson GS, Kamen DL. Quality of life in patients with systemic lupus erythematosus (SLE) compared with related controls within a unique African American population. *Lupus*. 2012;**21**(5):563–9. doi: [10.1177/0961203311426154](https://doi.org/10.1177/0961203311426154). [PubMed: 22031537].
7. Montazeri A, Goshtasebi A, Vahdaninia M, Gandek B. The Short Form Health Survey (SF-36): translation and validation study of the Iranian version. *Qual Life Res*. 2005;**14**(3):875–82. doi: [10.1007/s11336-004-1014-5](https://doi.org/10.1007/s11336-004-1014-5). [PubMed: 16022079].
8. Bazzichi L, Maser J, Piccinni A, Rucci P, Del Debbio A, Vivarelli L, et al. Quality of life in rheumatoid arthritis: impact of disability and lifetime depressive spectrum symptomatology. *Clin Exp Rheumatol*. 2005;**23**(6):783–8. [PubMed: 16396695].
9. Khanna S, Pal H, Pandey RM, Handa R. The relationship between disease activity and quality of life in systemic lupus erythematosus. *Rheumatology (Oxford)*. 2004;**43**(12):1536–40. doi: [10.1093/rheumatology/keh376](https://doi.org/10.1093/rheumatology/keh376). [PubMed: 15342925].
10. Doria A, Rinaldi S, Ermani M, Salaffi F, Iaccarino L, Ghirardello A, et al. Health-related quality of life in Italian patients with systemic lupus erythematosus. II. Role of clinical, immunological and psychological determinants. *Rheumatology (Oxford)*. 2004;**43**(12):1580–6. doi: [10.1093/rheumatology/keh392](https://doi.org/10.1093/rheumatology/keh392). [PubMed: 15367746].
11. McElhone K, Abbott J, Teh LS. A review of health related quality of life in systemic lupus erythematosus. *Lupus*. 2006;**15**(10):633–43. doi: [10.1177/0961203306071710](https://doi.org/10.1177/0961203306071710).
12. Wallenius M, Skomsvoll JF, Koldingsnes W, Rodevand E, Mikkelsen K, Kaufmann C, et al. Comparison of work disability and health-related quality of life between males and females with rheumatoid arthritis below the age of 45 years. *Scand J Rheumatol*. 2009;**38**(3):178–83. doi: [10.1080/03009740802400594](https://doi.org/10.1080/03009740802400594). [PubMed: 18991183].
13. Monjamed Z, Varaei SH, Kazemnejad A, Razavian F. Quality of life in rheumatoid arthritis patients. *J hayat*. 2007;**13**(3):57–66.
14. Freire EA, Maia IO, Nepomuceno JC, Ciconelli RM. Damage index assessment and quality of life in systemic lupus erythematosus patients (with long-term disease) in Northeastern Brazil. *Clin Rheumatol*. 2007;**26**(3):423–8. doi: [10.1007/s10067-006-0517-6](https://doi.org/10.1007/s10067-006-0517-6). [PubMed: 17216369].
15. Shakeri H, Arman F, Hossieni M, Omrani HR, Vahdani A, Shakeri J. Depression, Anxiety and Disease-Related Variables and Quality of Life Among Individuals With Systemic Lupus Erythematosus Living in Kermanshah Province, Iran. *Iran Red Crescent Med J*. 2015;**17**(12):ee31047. doi: [10.5812/ircmj.31047](https://doi.org/10.5812/ircmj.31047). [PubMed: 26756021].