Systematic Review

Quality of Life of patients with chronic kidney disease in Iran: Systematic Review and Meta-analysis

Bahareh Ghiasi, Diana Sarokhani[1], Ali Hasanpour Dehkordi[2,3], Kourosh Sayehmiri[4], Mohammad Hossein Heidari[5]

Department of Nephrology, Faculty of Medicine, [1]Psychosocial Injuries Research Center, Ilam University of Medical Science, Ilam, [2]Social Determinants of Health Research Center, Shahrekord University of Medical Sciences, Shahrekord, [3]Department of Medical-Surgical ,Faculty of Nursing and Midwifery, Shahrekord University of Medical Sciences, Shahrekord, Iran, [4]Department of Biostatistics, Psychosocial Injuries Research Center, Ilam University of Medical Science, Ilam, [5]Proteomics Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract

Introduction: Renal diseases are among the major health problems around the world that cause major changes in patients' lifestyle and affect their quality of lives. The aim of this study was to evaluate the quality of life of patients with chronic kidney disease (CKD) in Iran through a meta-analysis. **Materials and Methods:** This study was conducted using authentic Persian and English keywords in the national and international databases including IranMedex, SID, Magiran, IranDoc, Medlib, Science Direct, Pubmed, Scopus, Cochrane, Embase, Web of Science, and Medline. The data were analyzed using meta-analysis (random effects model). Heterogeneity of studies was assessed using I2 index. In this study, SF-36: 36-Item Short Form health-related quality of life (HRQOL), kidney disease quality of life-SF (KDQOL-SF), KDQOL and KDQOL-SFTM questionnaires were used. Data were analyzed using STATA Version 11 software. **Results:** A total of 17200 individuals participated in 45 reviewed studies, and the mean score of CKD patients' quality of life was estimated by SF-36 (60.31), HRQOL (60.51), and KDQOL-SF (50.37) questionnaires. In addition, meta-regression showed that the mean score of CKD patients' quality of life did not significantly decrease during the past years. **Conclusion:** The mean score of quality of life of patients with CKD was lower in different dimensions in comparison with that of normal people. Therefore, interventional measures should be taken to improve the quality of life of these patients in all dimensions.

Keywords: Iran, kidney patients, meta-analysis, quality of life, renal patients

Introduction

Quality of life is an important criterion that illustrates the effectiveness of health care, health level, and well-being. It is a multidimensional concept that includes ability, function, health, well-being, and psychological state, which is defined by the World Health Organization as values, goals, standards, and individual interests.[1-4] There is a relationship between diseases and quality of life. Quality of life can have a direct impact on physical performance, emotional, and physical problems, fatigue, mental health, social performance, physical pain, and general health.[5-10] Therefore, knowledge about chronic diseases, especially chronic kidney diseases (CKD) is very important in the evolution of patients' health problems.[11-14]

CKD is one of the major public health problems worldwide.[15-17] The incidence of chronic renal failure in the world is 242 cases per a million people, and 8% is added to this population each year.[18,19] The population of patients with renal failure in Iran is 320,000.[20,21] One of the ways to improve the condition of patients with chronic renal failure is hemodialysis.[18,22] In addition to hemodialysis, peritoneal dialysis and kidney transplantation are the common alternative treatments.[23] The patients undergoing dialysis have to spend several hours of their lives in dialysis sessions (2–3 sessions each week), and these constraints affect the living conditions of these patients.[18,24] In general, patients with CKD are affected by a wide range of physical, psychological, economic, and social problems[11,25-29] which ultimately influence their quality of lives.[30]

Considering the contradictory results of previous studies and the importance of "quality of life" and its effects on the

Access this article online

Quick Response Code:

Website: www.jpalliativecare.com

DOI: 10.4103/IJPC.IJPC_146_17

Address for correspondence: Dr. Mohammad Hossein Heydari, Proteomics Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
E-mail: mhheidari@sbmu.ac.ir

How to cite this article: Ghiasi B, Sarokhani D, Dehkordi AH, Sayehmiri K, Heidari MH. Quality of life of patients with chronic kidney disease in Iran: Systematic Review and Meta-analysis. Indian J Palliat Care 2018;24:104-11.

personal and social life in patients with CKD, the present study was carried out through meta-analysis to provide a general assessment of the quality of life of CKD patients in Iran.

Materials and Methods

Search strategy

In this study, the quality of life in patients with CKD in Iran was examined using a systematic review and meta-analysis. To access the relevant Persian and English articles, national and international databases including IranMedex, SID, Magiran, IranDoc, Medlib, ScienceDirect, Pubmed, Scopus, Cochrane, Embase, Web of Science, and Medline were searched using related Persian keywords and their English equivalent ("Iran," "CKD Patients," "CKD," "Quality of Life") along with the logical combinations of these keywords. The Google Scholar search engine was also used to find relevant articles. References of related articles were searched to come up with an exhaustive search.[11,25-29] The search was done on databases from 2005 to May 2017.

Inclusion and exclusion criteria

The inclusion criteria referred to the quality of life in patients with CKD in Persian and English from 2000 to 2017. The exclusion criteria included nonrandom sampling, insufficient data, and statistical population other than in patients with CKD.

In the first stage, 231 articles on the quality of life in patients with CKD were found. After reviewing the titles, 113 articles were excluded due to the problem of duplication. The abstracts of all remaining articles were reviewed, and 39 irrelevant articles were omitted. The full texts of the remaining articles were reviewed, and 34 articles were excluded in conformity with the exclusion criteria. In the end, 45 articles entered the qualitative assessment process [Chart 1].

Qualitative assessment of studies

To assess the quality of studies, the preferred reporting items for systematic review and meta-analysis,[31] which is a checklist specifically designed for meta-analyses and systematic reviews, were used.

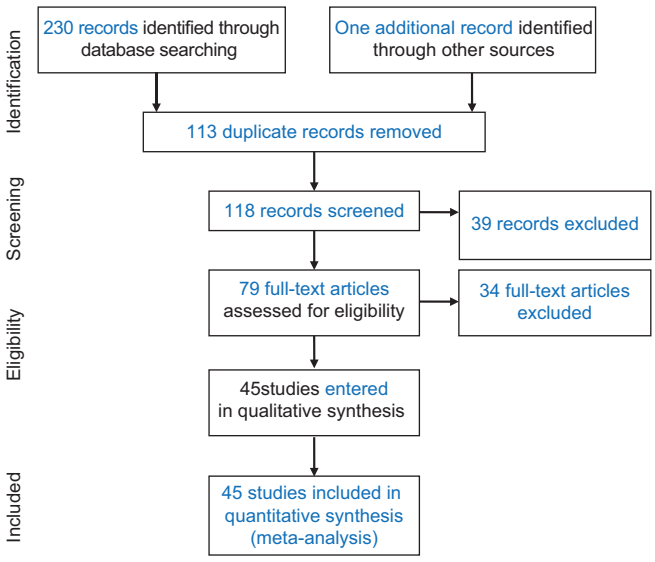

Chart 1: Flowchart of steps involved in entering the studies into the systematic review and meta-analysis process

Data extraction

Two researchers independently extracted the data from the sources to minimize the errors in data reporting, and thereby increase the accuracy of the gleaned data. The researchers designed a checklist for extracting data from the sources (the items of researcher-made checklist were the name of the first author, the purpose of the study, the number of samples, the year and place of research, the type of kidney disease, the type of quality of life questionnaire, the average age of the individuals, and mean and standard deviation (SD) of different dimensions of the quality of life in in patients with CKD). Questionnaires used in the studies included the following:

SF-36 standard questionnaire

This is a short 36-item form consisting of two parts; the first part comprises demographic information, and the second part contains 11 questions that examine different aspects of health pertaining to quality of life. In fact, the second part of theSF-36 questionnaire is the same as health-related quality of life (HRQOL). These aspects include social function, limitations in the role due to physical problems, pain, mental health, limitations in the role due to emotional problems, and overall understanding of general health. Questions were rated by Likert Scale and ranged from 0 to 100, where higher points indicate a more favorable situation.[32-35]

The kidney disease quality of life-short form (KDQOL-SF) questionnaire, which is a multidimensional questionnaire that includes SF-36 questions and questions on CKD. The questionnaire assesses 12 factors of health and quality of life, including physical function, general health, the effects of CKD on life, imposed conditions, pain, sleep, social function, social support, energy, emotional roles, sexual function, and patient's satisfaction. Questions were rated from 0 to 100, where higher points indicate more favorable conditions.[36,37]

Kidney disease quality of life-short form ™ questionnaire

This questionnaire is a specific tool for assessing the quality of life in hemodialysis patients and includes two general and specific scales on the quality of life. The general quality of life scale consists of two subscales of physical conditions and emotional conditions. The physical subscale contains four areas of general health (with 6 items), physical function (10 items), playing physical role (including 4 items), and physical pain (including 3 items). The subscale comprised emotional conditions comprising three areas of playing emotional role (3 items), social function (including 2 items), and mental health (including 8 items). The specific dimension of the research tool consisted of nine areas including CKD-related constraints (11 items), health-related mental problems (6 items), health-related physical function (12 items), general health (3 items), health-related family satisfaction (4 items), sleep status (score from 0 to 100), health-related occupational status (3 items), sexual issues (2 items), and satisfaction with

care and ward staff (3 items). Each area has 100 points. This questionnaire is a multidimensional, valid, and reliable tool that addresses all aspects of the SF-36 questionnaire.[38]

Statistical analysis

The reviewed studies were combined based on the number of samples, mean, and SD. The standard error of the mean was calculated using SD/sqrt (n) equation according to the normal distribution. To evaluate the heterogeneity of the studies, Q test and I^2 index were used. Due to the heterogeneity in the studies, the random-effects model was used to combine the results of the studies. The significance level of the test was considered $P < 0.05$. Data were analyzed using Stata is a general-purpose statistical software package created in 1985 by StataCorp. Most of its users work in research, especially in the fields of economics, sociology, political science, biomedicine and epidemiology

Results

In 45 studies with a sample size of 17,200 people, the mean score of "quality of life" in CKD patients based on SF-36 questionnaire was 60.31% (95% confidence interval [CI]: 69.00%–51.62%), it was 51.60% (95% CI: 53.45%–49.75%) according to HRQOL questionnaire and 50.37% (95% CI: 54.77%–45.96%) based on KDQOL-SF questionnaire. Considering the heterogeneity of the studies in focus, the CI for each study based on the random effects model is presented in Figure 1 and Tables 1,2.

Discussion

In 45 studies with a sample size of 17,200 people, the mean score of the quality of life in patients with CKD based on SF-36, HRQOL, and KDQOL-SF questionnaires was 60.31, 51.60, and 50.37%, respectively. However, the mean score of the "quality of life" based on KDQOL-SF™ and KDQOL questionnaires was not calculated since each of them was only used in a single study

According to meta-regression diagram, there is no significant relationship between the quality of life in patients with CKD and the number of research samples, that is, with an increase in the number of research samples, the mean score of the quality of life in patients with CKD decreased, but this reduction is not statistically significant ($P = 0.502$). In the above diagram, the size of the circle shows the magnitude of the sample size [Figure 2]. In Figure 3, meta-regression model showed that there is no significant relationship between the quality of life in patients with CKD and the year of study. In other words,

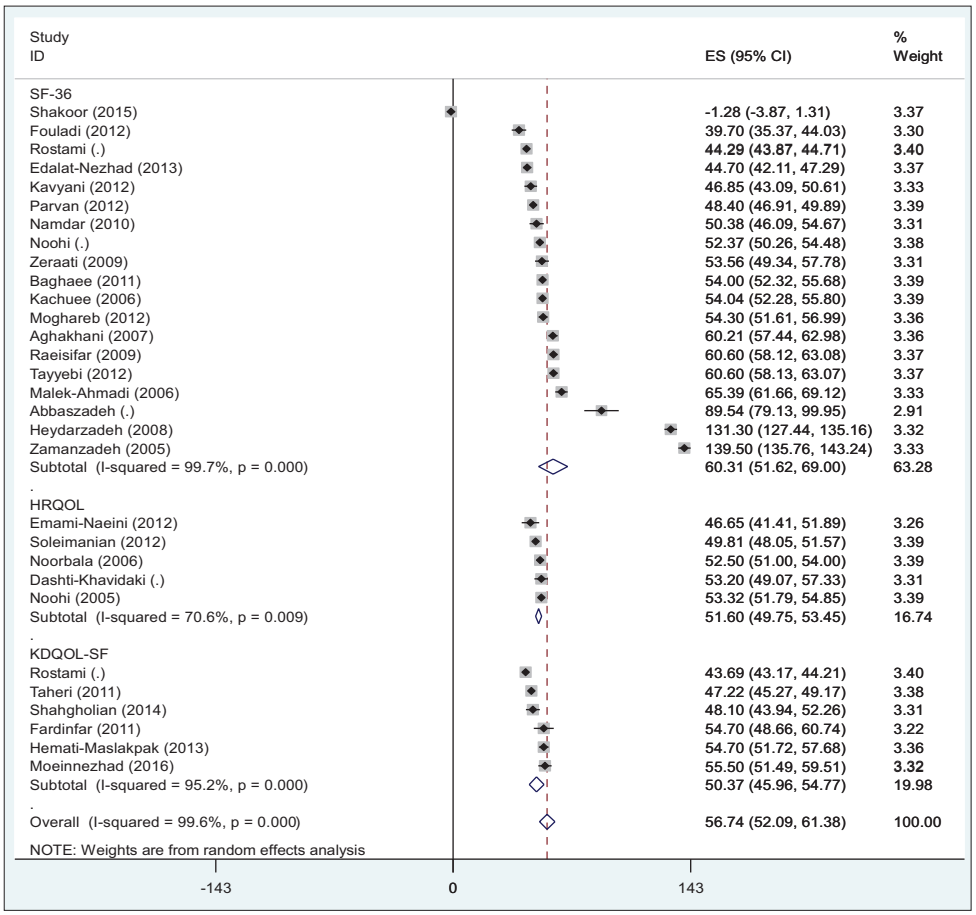

Figure 1: Average quality of life in patients with chronic kidney disease in Iran (95% confidence interval) based on questionnaire according to random effects model. The middle point of each segment shows the quality of life score in chronic kidney disease patients in each study

Table 1: Specifications of the articles reviewed on quality of life in chronic kidney diseases patients in Iran

References	Author	Year	City	Age mean	Type of questionnaire	Type of disease	Sample size	QOL mean	QOL SD
[39]	Zargooshi	1989-2000	Kermanshah	33	SF-36	Donors and patients underwent nephrectomy	400	-	-
[40]	Nourbala *et al*.	2006	Tehran	49.53	HRQOL	Kidney recipients	164	52.5	9.79
[41]	Noohi *et al*.	2005	Tehran	43.37	HRQOL	Kidney transplant	162	53.32	9.95
[42]	Kachuee *et al*.	2006	Tehran	42	SF-36	Kidney transplant	125	54.04	10.05
[43]	Noohi *et al*.	2005-2006	Tehran	42.05	SF-36	Kidney transplant	88	52.37	10.12
[44]	Baghaei *et al*.	2011	Guilan	>18	SF-36	Hemodialysis	241	54	13.33
[45]	Taheri *et al*.	2011	Khorramshahr-Abadan	47.43	KDQOL-SF	Hemodialysis	80	47.22	8.89
[46]	Yekaninejad *et al*.	2012	Sari-Zanjan-Tehran	57.5	KDQOL-SF	Hemodialysis	212	-	-
[47]	Shakoor and Hassan Sadeghi	2015	Shiraz	20-50	SF-36	Kidney transplant	44	-1.28	8.78
[48]	Kaviani *et al*.	2012	Ahvaz	56	SF-36	End stage patients and hemodialysis	122	46.85	21.2
[49]	Baljani *et al*.	2014	Urmia	47.08	KDQOL-SF™	Hemodialysis	82	-	-
[50]	Hadi *et al*.	2010	Shiraz	-	SF-36	CKD under hemodialysis	120	-	-
[51]	Fardinmehr *et al*.	2011	Isfahan	52.7	KDQOL-SF	End stage renal disease	50	54.7	21.8
[52]	Ramezani Badr *et al*.	2011	Zanjan	51.8	KDQOL	Hemodialysis	74	-	-
[53]	Fallahzadeh *et al*.	2011	Shiraz	38.35	SF-36	Kidney donors	144	-	-
[54]	Pakpour *et al*.	2012	Qazvin-Tehran	57.8	SF-36	Hemodialysis	512	-	-
[55]	Malekahmadi *et al*.	2006	Tehran	14.2	SF-36	Kidney recipients	55	65.39	14.11
[56]	Raiisifar *et al*.	2009	Tehran	41	SF-36	Kidney transplant	218	60.6	18.7
[21]	Abbaszadeh *et al*.	2008-2009	Kerman	41.98	SF-36	Kidney transplant and hemodialysis	120	89.54	58.16
[57]	Tayyebi *et al*.	2008	Tehran	44.88	SF-36	Kidney transplant and hemodialysis	76	-	-
[58]	Moeinzadeh *et al*.	2016	Isfahan	58.05	KDQOL-SF	Hemodialysis	52	55.5	14.75
[59]	Aghakhani *et al*.	2007	Urmia	38.72	SF-36	Hemodialysis	166	60.21	18.21
[60]	Rostami *et al*.	2010-2011	-	55	KDQOL-SF	Hemodialysis patients with viral hepatitis	4101	43.69	16.99
[61]	Hemmati Maslakpak and Shams	2013	Urmia	47.03	KDQOL-SF	Hemodialysis	120	54.7	16.63
[62]	Parvan *et al*.	2012	Tabriz	58.03	SF-36	Hemodialysis	245	48.4	11.9
[63]	Emami Naeini *et al*.	2012	Isfahan	52.78	HRQOL	Hemodialysis	51	46.65	19.08
[64]	Rostami *et al*.	2010-2011	-	54.4	SF-36	Hemodialysis	6930	44.29	17.7
[65]	Taheri-Kharameh *et al*.	2012-2013	Qom	50.4	SF-36	Hemodialysis	95	-	-
[66]	Heidarzadeh *et al*.	2008	Bonab	50.2	SF-36	Hemodialysis	115	131.3	21.1
[67]	Aghakhani *et al*.	2012	Urmia	45.2	SF-36	Hemodialysis	70	-	-
[68]	Shahgholian *et al*.	2014	Isfahan	50.4	KDQOL-SF	Hemodialysis	25	48.1	10.6
[69]	Hajian-Tilaki *et al*.	2014	Babol	54.2	SF-36	Hemodialysis	154	-	-
[70]	Pakpour *et al*.	2008	Tehran	53.63	SF-36	Hemodialysis	250	-	-
[71]	Tayyebi *et al*.	2012	Tehran	41.24	SF-36	Kidney transplant	220	60.6	18.7
[72]	Arab *et al*.	2011	Mashhad	18-70	SF-36	Hemodialysis	93	-	-
[73]	Dashti-Khavidaki *et al*.	2010-2011	Tehran	53.6	HRQOL	Hemodialysis	92	53.2	20.2
[22]	Zamanzadeh *et al*.	2005	Tabriz	51.9	SF-36	Hemodialysis	164	139.5	24.46
[74]	Sharif and Vedad	2007	Shiraz	>15	SF-36	Hemodialysis	90	-	-
[75]	Moghareb *et al*.	2012	Birjand	18-70	SF-36	Kidney transplant and hemodialysis	118	54.3	14.89
[76]	Edalat Nejad and Qlich Khani	2013	Arak	63	SF-36	Hemodialysis	115	44.7	14.15
[77]	Baraz *et al*.	2004-2005	Tehran	61.4	SF-36	CKD	85	-	-
[10]	Soleymanian *et al*.	2012	Tehran	56	HRQOL	Hemodialysis	532	49.81	20.66
[78]	Zeraati *et al*.	2009	Mashhad	47.22	SF-36	Hemodialysis	80	53.56	19.26
[79]	Fouladi *et al*.	2012	Isfahan	54.5	SF-36	Hemodialysis	96	39.7	21.64
[80]	Namdar *et al*.	2010	Jahrom	56.48	SF-36	Dialysis	52	50.38	15.8

SF-36: 36-Item short form, HRQOL: Health-related QOL, KDQOL-SF: Kidney disease QOL-SF, QOL: Quality of life, SD: Standard deviation, CKD: Chronic kidney diseases

Table 2: The mean score of the quality of life in patients with chronic kidney diseases in Iran based on the type of questionnaire

Type of questionnaire	Subgroups	Number of study	Sample size	QOL mean
QOL in CKD patients based on SF-36	Total	19	9314	60.31 (51.62-69)
	Physical	28	11,097	50.59 (45.67-55.51)
	Mental-psychological	23	10,543	47.32 (40.84-53.81)
	Social and occupational	27	10,585	52.85 (41.57-64.14)
	Vitality	23	10,146	46.64 (34.48-58.79)
	General health	24	10,236	46.15 (40.48-51.82)
	Physical pain	24	10,236	52.35 (42.28-62.42)
	Playing a physical role	9	8319	37.14 (25.07-49.20)
	Emotional	10	8560	47.68 (42.57-52.79)
	Role limitation for physical causes	14	1841	42.99 (28.87-57.11)
	Role limitation to emotional causes	12	1577	46.21 (27.14-65.28)
	Mental health	4	361	51.38 (43.67-59.10)
QOL in CKD patients based on HRQOL	Total	5	1001	50.37 (45.96-54.77)
	Physical	4	909	57.30 (45.23-69.16)
	Mental-psychological	4	909	50.50 (45.98-55.02)
	Social and occupational	3	858	49.83 (48.36-51.31)
	Vitality	2	694	44.28 (36.76-51.81)
	General health	3	784	47.73 (45.71-49.75)
	Physical pain	3	784	43.24 (25.32-61.17)
	Playing a physical role	1	532	48.61 (46.00-51.22)
	Emotional	1	532	56.14 (53.12-59.16)
	Role limitation for physical causes	2	326	62.16 (58.26-66.07)
	Role limitation to emotional causes	2	326	63.04 (60.19-65.88)
	Mental health	2	326	44.34 (43.36-45.33)
QOL in CKD patients based on KDQOL-SF	Total	6	4428	50.37 (45.96-54.77)
	Physical	4	4443	38.28 (32.80-43.75)
	Mental-psychological	3	4363	52.52 (47.20-57.84)
	Social and occupational	4	4443	55.90 (53.11-58.69)
	Vitality	4	4443	44.51 (40.4048.62)
	General health	5	4563	43.69 (41.41-45.97)
	Physical pain	4	4443	54.61 (48.09-61.13)
	Playing a physical role	2	4181	39.48 (12.02-66.95)
	Emotional	2	4181	34.30 (33.15-35.44)
	Role limitation for physical causes	2	262	23.09 (18.75-27.44)
	Role limitation to emotional causes	2	262	37.28 (15.58-58.97)

KDQOL-SF: Kidney disease QOL-SF, CKD: Chronic kidney diseases, HRQOL: Health-related QOL, SF-36: 36-Item short form, QOL: Quality of life

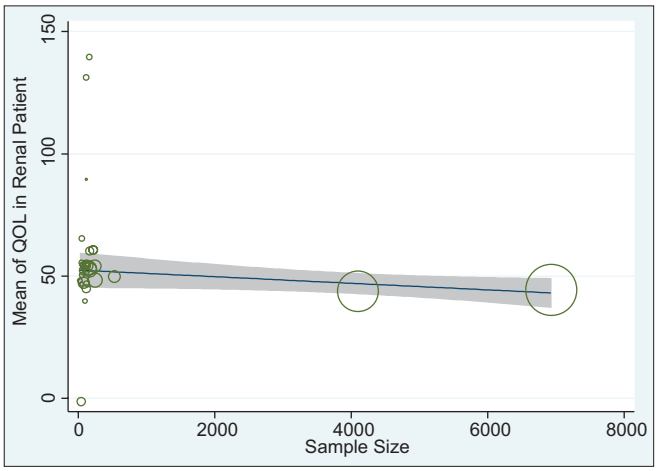

Figure 2: The relationship between quality of life in chronic kidney disease patients and number of research samples using meta-regression

during the studied years, the quality of life in patients with CKD in Iran has decreased, but this decline is not statistically significant ($P = 0.07$).

Different studies show that quality of life in patients undergoing dialysis in Iran is lower than that of other chronic diseases.[81] In a study by Vázquez *et al*. in 2004, there were clear differences between men and women with CKD compared to the normal population in terms of quality of life (physical function, limited role due to mental problems, social function, and general health), while women had a worse situation.[82] In another study, among hemodialysis patients in Saudi Arabia in 2011, AL-Jumaih *et al*. showed that the majority of patients had limited physical role, emotional role, job status, and cognitive function and had poor quality of life.[83] In a study by Nonoyama *et al*. in Toronto, Canada, it was found that the majority of hemodialysis patients had average quality of

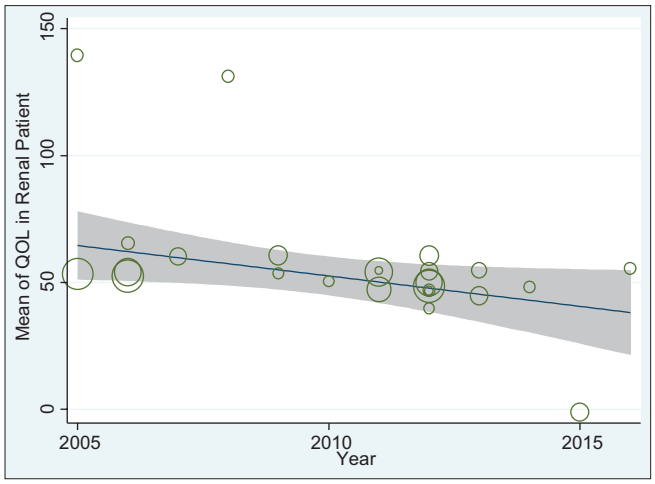

Figure 3: The relationship between quality of life in patients with chronic kidney disease and years of research using meta-regression

life.[84] In a study by Chow and Wong, dialysis patients had the lowest quality of life scores in terms of physical health, social function, and dimensions of CKD including job status and burden of the disease.[85] In studies conducted by Cleary and Drennan and Vasilieva, the mean score for physical and mental health was low and patients had poor quality of life.[86,87]

The mean score of diabetic patients' quality of life in Iran estimated by SF-36 was 59.94 (CI 95%: 36.78–83.10).[88] The mean score of heart patients' quality of life in Iran was 42.09 (CI 95%: 19.90–64.29).[89] Among 17 accomplished studies in Iran with the sample size of 1476 from 2003 to 2015, the average quality of life score for patients with cancer in Iran was 42 (CI 95%: 34.05–49.96).[90]

In other studies conducted in Iran, people over 50 had significantly lower scores in physical, psychological, and renal domains compared with younger people.[91] In the study of Baraz *et al*., the highest scores of quality of life before intervention were related to physical function (60.3%) and social function (60%). The lowest scores were those of emotional role (41.9%) and health perception (43.5%).[92] A study by Namadi and Movahhedpour demonstrated that 52.1% of hemodialysis patients had a moderate quality of life.[93] In a study by Raiisifar *et al*., the quality of life in patients who underwent kidney transplantation in Tehran in 2009 was assessed; they found that the mean and SD of quality of life was 60.6%.[56] Considering the different accessible data for the quality of life in patients with CKD, we used the meta-analysis method to obtain an accurate estimate of the quality of life in these patients.

Limitations of the study

Due to the different types of questionnaires used in the reviewed articles, the difference in scoring the questions of the respective questionnaires, and the difference in the number of questions in questionnaires, we could not combine the results of different questionnaires and report accurate statistics on the quality of life in patients with CKD in general and for various dimensions. Because of the variety of questionnaires, we did not manage to estimate the average score of the quality of life in patients with CKD in terms of type of disease, age, and place of research.

Conclusion

The mean score for quality of life of patients with CKD was estimated by SF-36 (60.31), HRQOL (60.51), and KDQOL-SF (50.37) questionnaires. In addition, meta-regression showed that the mean score of these patients' quality of life has not significantly decreased during the past few years. The mean score of quality of life for patients with CKD was lower in different dimensions in comparison with that of normal people. The mean score of quality of life of patients with CKD in Iran was more than those of patients with heart diseases, diabetic patients, and patients with cancer.[94,95] Therefore, interventional measures should be taken to improve the quality of life of these patients in all dimensions.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Unruh ML, Weisbord SD, Kimmel PL. Health-related quality of life in nephrology research and clinical practice. Semin Dial 2005;18:82-90.
2. Isikhan V, Güner P, Kömürcü S, Ozet A, Arpaci F, Oztürk B, *et al.* The relationship between disease features and quality of life in patients with cancer – I. Cancer Nurs 2001;24:490-5.
3. The World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. Soc Sci Med 1995;41:1403-9.
4. Forouhari S, Safari Rad M, Moattari M, Mohit M, Ghaem H. The of education on quality of life in menopausal women referring to Shiraz Motahhari clinic in 2004. J Birjand Univ Med Sci 2009;16:39-45.
5. Hasanpour-Dehkordi A, Dehghani A, Solati K. A comparison of the effects of pilates and McKenzie training on pain and general health in men with chronic low back pain: A Randomized trial. Indian J Palliat Care 2017;23:36-40.
6. Hasanpour-Dehkordi A, Khaledi-Far A, Khaledi-Far B, Salehi-Tali S. The effect of family training and support on the quality of life and cost of hospital readmissions in congestive heart failure patients in Iran. Appl Nurs Res 2016;31:165-9.
7. Hassanpour-Dehkordi A, Jalali A. Effect of progressive muscle relaxation on the fatigue and quality of life among Iranian aging persons. Acta Med Iran 2016;54:430-6.
8. Asadi Noghabi AA, Zandi M, Mehran A, Alavian SM, Dehkordi AH. The effect of education on quality of life in patients under interferon therapy. Hepat Mon 2010;10:218-22.
9. Noghani F, Seyedfatemi N, Karimirad MR, Akbarzadeh A, Hasanpour-Dehkordi A. Health related quality of life in family caregivers of patients suffering from mental disorders. J Clin Diagn Res 2016;10:VC05-9.
10. Soleymanian T, Kokabeh Z, Ramaghi R, Mahjoub AR, Argani H. Clinical outcomes and quality of life in hemodialysis diabetic patients versus non diabetics. J Nephropathol 2017;6:81-9.
11. Amiri M. Aggravation of chronic kidney disease by inflammatory factors; a narrative review on current concepts. J Renal Endocrinol 2016;2:e05.
12. Dehkordi AH, Heydarnejad MS. Effect of booklet and combined method on parents' awareness of children with beta-thalassemia major disorder. J Pak Med Assoc 2008;58:485-7.
13. Kari J. Epidemiology of chronic kidney disease in children.

J Nephropathol 2012;1:162-3.
14. Nasri H. Ischemic nephropathy; new concepts on its pathophysiology. Angiol Persica Acta. 2016;1:e03
15. Johnson CA, Levey AS, Coresh J, Levin A, Lau J, Eknoyan G, *et al.* Clinical practice guidelines for chronic kidney disease in adults: Part I. Definition, disease stages, evaluation, treatment, and risk factors. Am Fam Physician 2004;70:869-76.
16. Vafaei AA, Nobahar M. The care preferences of patients under hemodialysis. J Renal Inj Prev. 2017; 6:210-215.
17. Tamadon MR, Zahmatkesh M. World kidney day 2015. J Parathyr Dis 2015;3:34-6.
18. Xue JL, Ma JZ, Louis TA, Collins AJ. Forecast of the number of patients with end-stage renal disease in the United States to the year 2010. J Am Soc Nephrol 2001;12:2753-8.
19. Snyder JJ, Foley RN, Collins AJ. Prevalence of CKD in the United States: A sensitivity analysis using the National Health and Nutrition Examination Survey (NHANES) 1999-2004. Am J Kidney Dis 2009;53:218-28.
20. Ghaffari A. Seminar of kidney transplantation report. Mohandesi Pezeshki 2008;6:73.
21. Abbaszadeh A, Javanbakhtian R, Salehee S, Motvaseliyan M. Comparative assessment of quality of life in hemodialysis and kidney transplant patients. J Shahid Sadoughi Univ Med Sci 2010;18:461-8.
22. Zamanzadeh V, Heydarzadeh M, Eeshvandi KH, Lakdizaji S. Relationship between quality of life and social support in hemodialysis patients in Imam Khomeini and sina educational hospitals of Tabriz university of medical science. Med J Tabriz Univ Med Sci 2007;29:49-54.
23. Monfared A, Orang Pour R, Kohani M. Evaluation of hemodialysis A dequacy on patients undergoing hemodialysis in Razi hospital in Rasht. J Guilan Univ Med Sci 2007;17:44-9.
24. Lindqvist R, Carlsson M, Sjödén PO. Coping strategies and health-related quality of life among spouses of continuous ambulatory peritoneal dialysis, haemodialysis, and transplant patients. J Adv Nurs 2000;31:1398-408.
25. Baradaran A. Administration of herbal drugs in geriatric individuals;trends on its helps and hazards. Geriatr Persia. 2017; 1:e01.
26. Assadi F. The epidemic of pediatric chronic kidney disease: The danger of skepticism. J Nephropathol 2012;1:61-4.
27. Assadi F. Psychological impact of chronic kidney disease among children and adolescents: Not rare and not benign. J Nephropathol 2013;2:1.
28. Nasri H. World lupus day 2016. Immunopathol Persa. 2015; 1(1):e06.
29. Gheissari A, Hemmatzadeh S, Merrikhi A, Fadaei Tehrani S, Madihi Y. Chronic kidney disease in children: A report from a tertiary care center over 11 years. J Nephropathol 2012;1:177-82.
30. Tavallaii SA, Einollahi B, Azizabadi Farahani M, Namdari M. Socioeconomic links to health-related quality of life, anxiety, and depression in kidney transplant recipients. Iran J Kidney Dis 2009;3:40-4.
31. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, *et al.* Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev 2015;4:1.
32. Sayin A, Mutluay R, Sindel S. Quality of life in hemodialysis, peritoneal dialysis, and transplantation patients. Transplant Proc 2007;39:3047-53.
33. Safi Zadeh H, Garoosi B, Afsharpoor S. Quality of life in hemodialysis patients. Payesh 2005;5:29-35.
34. Fujisawa M, Ichikawa Y, Yoshiya K, Isotani S, Higuchi A, Nagano S, *et al.* Assessment of health-related quality of life in renal transplant and hemodialysis patients using the SF-36 health survey. Urology 2000;56:201-6.
35. Virzì A, Signorelli MS, Veroux M, Giammarresi G, Maugeri S, Nicoletti A, *et al.* Depression and quality of life in living related renal transplantation. Transplant Proc 2007;39:1791-3.
36. Rahimi A, Ahmadi F, Gholyaf M. Effects of applying continuous care model on quality of life in hemodialysis patients. Razi J Med Sci 2006;13:123-34.
37. Korevaar JC, Merkus MP, Jansen MA, Dekker FW, Boeschoten EW, Krediet RT, *et al.* Validation of the KDQOL-SF: A dialysis-targeted health measure. Qual Life Res 2002;11:437-47.
38. Hays RD, Kallich JD, Mapes DL, Coons SJ, Carter WB. Development of the kidney disease quality of life (KDQOL) instrument. Qual Life Res 1994;3:329-38.
39. Zargooshi J. Quality of life of iranian kidney "donors". J Urol 2001;166:1790-9.
40. Nourbala MH, Hollisaaz MT, Nasiri M, Bahaeloo-Horeh S, Najafi M, Araghizadeh H, *et al.* Pain affects health-related quality of life in kidney transplant recipients. Transplant Proc 2007;39:1126-9.
41. Noohi S, Khaghani-Zadeh M, Javadipour M, Assari S, Najafi M, Ebrahiminia M, *et al.* Anxiety and depression are correlated with higher morbidity after kidney transplantation. Transplant Proc 2007;39:1074-8.
42. Kachuee H, Ameli J, Taheri S, Assari S, Riahipour F, Khedmat H, *et al.* Sleep quality and its correlates in renal transplant patients. Transplant Proc 2007;39:1095-7.
43. Noohi S, Karami GR, Lorgard-Dezfuli-Nejad M, Najafi M, Saadat SH. Are all domains of quality of life poor among elderly kidney recipients? Transplant Proc 2007;39:1079-81.
44. Baghaei M, Rahimi S, Adib M, Kazemnejad Leili E, Monfared A. Redictive personal factors of quality of life in hemodialysis patient. J Holist Nurs Midwifery 2015;24:9-19.
45. Taheri N, Kamangar S, Cheraghian B, Mousavi S, Solaimanzadeh M. Quality of life hemodialysis patients. Knowl Health 2013;8:119-24.
46. Yekaninejad MS, Mohammadi Zeidi I, Akaberi A, Golshan A, Pakpour A. Validity and reliability of the kidney disease quality of life-short form (KDQOL-SF™ 1.3) in Iranian patients. J North Khorasan Univ Med Sci 2012;4:261-73.
47. Shakoor E, Hassan Sadeghi EK. The effects of 10 weeks concurrent aerobic and strength exercise on quality of life and resilience of kidney transplant patients. Int J Appl Exerc Physiol 2015;4:1-8.
48. Kaviani K, Khalafi A, Ghorbanibirgani A, Haghighat M. Life quality and health status correlation in hemodialysis patients with end-stage renal disease from Ahvaz university of medical sciences affiliated hospitals, 2012. Jundishapur J Chronic Dis Care 2013;2:39-47.
49. Baljani E, Rahimi Z, Sasan A. The effect of self management programs on the quality of life in patients under going hemodialysis. J Urmia Nurs Midwifery Fac 2014;12:815-24.
50. Hadi N, Rahmani Z, Montazeri A. Health-related quality of life in chronic renal failure patients receiving hemodialysis. Payesh 2010;9:349-54.
51. Fardinmehr O, Farajzadegan Z, Naini A, Mortazavi M, Gholamrezaei A. The validity and reliability of the persian version of kidney disease quality of life questionnaire-short form (KDQOL-SF) in Iranian patients. J Isfahan Med Sch 2012;29:1-10.
52. 52-Ramezani Badr F, Moien V, Nematikhah M, Shiri Gheydari P,Akhlaghi M, Tahrekhani, MQuality of life and related factors in hemodialysisPatients referred to teaching hospitals in Zanjan. J Neyshabur Univ Med Sci 2016; 4:57-64.
53. Fallahzadeh MK, Jafari L, Roozbeh J, Singh N, Shokouh-Amiri H, Behzadi S, *et al.* Comparison of health status and quality of life of related versus paid unrelated living kidney donors. Am J Transplant 2013;13:3210-4.
54. Pakpour AH, Kumar S, Fridlund B, Zimmer S. A case-control study on oral health-related quality of life in kidney disease patients undergoing haemodialysis. Clin Oral Investig 2015;19:1235-43.
55. Malekahmadi MR, Rahimzadeh S, Dezfuli Nejad ML, Lankarani MM, Einollahi B, Assari S, *et al.* Importance of socioeconomic, clinical, and psychological factors on health-related quality of life in adolescents after kidney transplant. Exp Clin Transplant 2011;9:50-5.
56. Raiisifar A, Tayyebi A, Ebadi A, Najafi S, Hashemi S, Asiyabi M. An investigation of quality of life in kidney transplant patients. Iran J Crit Care Nurs 2011;4:149-52.
57. Tayyebi A, Salimi S, Mahmoudi H, Tadrisi S. Comparison of quality of life in hemodialysis and renal transplantation patients. Iran J Crit Care Nurs 2010;3:7-8.
58. Moeinzadeh F, Shahidi S, Mortazavi M, Dolatkhah S, Kajbaf M, Haghjooy Javanmard S, *et al.* Effects of omega-3 fatty acid supplementation on serum biomarkers, inflammatory agents, and quality of life of patients on hemodialysis. Iran J Kidney Dis 2016;10:381-7.
59. Aghakhani N, Sharif Nia H, Samad Zadeh S, Toupchi V, Toupchi S, Rahbar N, *et al.* Quality of life during hemodialysis and study dialysis treatment in patients referred to teaching hospitals in Urmia-Iran in 2007. Caspian J Intern Med 2011;2:183-8.

60. Rostami Z, Lessan Pezeshki M, Soleimani Najaf Abadi A, Einollahi B. Health related quality of life in Iranian hemodialysis patients with viral hepatitis: Changing epidemiology. Hepat Mon 2013;13:e9611.
61. Hemmati Maslakpak M, Shams S. A comparison of face to face and video-based self care education on quality of life of hemodialysis patients. Int J Community Based Nurs Midwifery 2015;3:234-43.
62. Parvan K, Lakdizaji S, Roshangar F, Mostofi M. Assessment of quality of life in patients undergoing continuous hemodialysis in four hospitals of East Azarbayjan, in 2012. Razi J Med Sci 2014;21:19-28.
63. Emami Naini A, Moradi M, Mortazavi M, Amini Harandi A, Hadizadeh M, Shirani F, *et al.* Effects of oral L-carnitine supplementation on lipid profile, anemia, and quality of life in chronic renal disease patients under hemodialysis: A Randomized, double-blinded, placebo-controlled trial. J Nutr Metab 2012;2012:510483.
64. Rostami Z, Einollahi B, Lessan-Pezeshki M, Soleimani Najaf Abadi A, Mohammadi Kebar S, Shahbazian H, *et al.* Health-related quality of life in hemodialysis patients: An Iranian multi-center study. Nephrourol Mon 2013;5:901-12.
65. Taheri-Kharameh Z, Zamanian H, Montazeri A, Asgarian A, Esbiri R. Negative religious coping, positive religious coping, and quality of life among hemodialysis patients. Nephrourol Mon 2016;8:e38009.
66. Heidarzadeh M, Atashpeikar S, Jalilazar T. Relationship between quality of life and self-care ability in patients receiving hemodialysis. Iran J Nurs Midwifery Res 2010;15:71-6.
67. Aghakhani N, Samadzadeh S, Mafi TM, Rahbar N. The impact of education on nutrition on the quality of life in patients on hemodialysis: A comparative study from teaching hospitals. Saudi J Kidney Dis Transpl 2012;23:26-30.
68. Shahgholian N, Eshghinezhad A, Mortazavi M. The effect of tai chi exercise on quality of life in hemodialysis patients. Iran J Nurs Midwifery Res 2014;19:152-8.
69. Hajian-Tilaki K, Heidari B, Hajian-Tilaki A. A comparison of health-related quality of life in patients with renal failure under hemodialysis and healthy participants. Saudi J Kidney Dis Transpl 2017;28:133-40.
70. Pakpour AH, Saffari M, Yekaninejad MS, Panahi D, Harrison AP, Molsted S, *et al.* Health-related quality of life in a sample of Iranian patients on hemodialysis. Iran J Kidney Dis 2010;4:50-9.
71. Tayyebi A, Raiesifar A, Najafi Mehri S, Ebadi A, Einolahi B, Pashandi S, *et al.* Measuring health related quality of life (hrqol) in renal transplant patients: Psychometric properties and cross-cultural adaptation of kidney transplant questionnaire (ktq-25) in persian. Nephrourol Mon 2012;4:617-21.
72. Arab Z, Shariati AR, Asayesh H, Vakili MA, Bahrami-Taghanaki H, Azizi H, *et al.* A sham-controlled trial of acupressure on the quality of sleep and life in haemodialysis patients. Acupunct Med 2016;34:2-6.
73. Dashti-Khavidaki S, Sharif Z, Khalili H, Badri S, Alimadadi A, Ahmadi F, *et al.* The use of pharmaceutical care to improve health-related quality of life in hemodialysis patients in iran. Int J Clin Pharm 2013;35:260-7.
74. Sharif F, Vedad F. The relationship between mental health and quality of life of hemodialysis patients referred to hospitals affiliated to Shiraz university of medical sciences. IJN 2007;20:61-9.
75. Moghareb M, Sharifzadeh GH, Moghareb M, Sorouri M. Quality of life in hemodialysis and kidney transplantation patients in Birjand, 2012. Mod Care J 2014;11:127-35.
76. Edalat Nejad M, Qlich Khani M. Quality of life and sleep in hemodialysis patients. Saudi J Kidney Dis Transpl 2013;24:514-8.
77. Baraz S, Mohammadi E, Broumand B. Correlation of quality of sleep or quality of life and some of blood factors in hemodialysis patients. J Shahrekord Univ Med Sci 2008;9:67-74.
78. Zeraati AA, Naghibi M, Mojahedi MJ, Ahmadzade SH, Hassan Zamani B. Comparison of quality of life between hemodialysis and peritoneal dialysis patients in Imam Reza and Ghaem hospital dialysis centers in Mashhad. Med J Mashhad Univ Med Sci 2010;53:169-76.
79. Fouladi Z, Ebrahimi A, Manshaei G, Afshar H, Fouladi M. Investigation of relationship betweenpositive psychological variables (spirituality and hope) psychopathology (depression, stress, anxiety) and quality of life inhemodialysis patients Isfahan – 2012. J Res Behav Sci 2014;11:567-77.
80. Namdar A, Beigizadeh SH, Najafipour S. Health related quality of life in dialysis patients. J Jahrom Univ Med Sci 2013;10:19-27.
81. Zamanzadeh V, Heidarzadeh M, Oshvandi KH, Argani H, Abedi Azar S. Effect of physical exercises on quality of life in hemodialysis patients. Med J Tabriz Univ Med Sci 2008;30:51-5.
82. Vázquez I, Valderrábano F, Fort I, Jofré R, López-Gómez JM, Moreno F, *et al.* Differences in health-related quality of life between male and female hemodialysis patients. Nefrologia 2004;24:167-78.
83. AL-Jumaih A, Al-Onazi K, Binsalih S, Hejaili F, Al-Sayyari A. A study of quality of life and its determinants among hemodialysis patients using the KDQOL-SF instrument in one center in Saudi Arabia. Arab J Nephrol Transplant 2011;4:125-30.
84. Nonoyama M, Brooks D, Ponikvar A, Vanita Jassal S, kontos P, Devins G, *et al*. Exercise program to inhance physical performance and quality of life of older hemodialysis patients: A feasibility study. Int Urol Nephrol 2010;42:1125-30.
85. Chow SK, Wong FK. Health-related quality of life in patients undergoing peritoneal dialysis: Effects of a nurse-led case management programme. J Adv Nurs 2010;66:1780-92.
86. Cleary J, Drennan J. Quality of life of patients on haemodialysis for end-stage renal disease. J Adv Nurs 2005;51:577-86.
87. Vasilieva IA. Quality of life in chronic hemodialysis patients in Russia. Hemodial Int 2006;10:274-8.
88. Soleimannejad K, Sarokhani D, Sarokhani M, Sayehmiri K, Ahmadi N. Quality of life in diabetes patients in Iran: A systematic review and meta-analysis method. Int J Pharm Technol 2016;8:21608-18.
89. Mohsenzadeh Y, Sarokhani D, Hemmati F, Sarokhani M, Akbarzadeh Baghban A, Sayehmiri K. Quality of life in heart patients in Iran: A systematic review and meta-analysis method. Pharma Chem 2016;8:27-34.
90. Saroukhani D, Omidi K, Norouzi R, Zali H, Sayehmiri K, Forozeshfard M. The quality of life in cancer patients in Iran: A systematic review by using meta-analysis. Koomesh 2016;18:1-12.
91. Lessan Pezeshki M, Rostami Z. Contributing factors in health-related quality of life assessment of ESRD patients: A single center study. Nephrourol Mon 2009;1:129-36.
92. Baraz S, Mohammadi E, Broumand B. The effect of self care educational program on decreasing the problems and improving the quality of life of dialysis patients. Hayat 2005;11:51-62.
93. Namadi M, Movahhedpour A. Quality of life in patients after renal transplantation in comparison with intermittent hemodialysis. J Ardabil Univ Med Sci 2009;9:171-9.
94. Naderifar M, Zagheri Tafreshi M, Ilkhani M, Kavousi A. The outcomes of stress exposure in hemodialysis patients. J Renal Inj Prev 2017;6:275-81.
95. Shahdadi H, Balouchi A, JahantighHaghighi M. Comparison of two interventions of increased blood f low rate and high-f lux filters on hemodialysis adequacy and complications; a quasi-experimental study. J Renal Inj Prev 2017;6:247-52.