Health-related Quality of Life in Patients on Hemodialysis and Peritoneal Dialysis

A Meta-Analysis of Iranian Studies

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Introduction. Health-related quality of life (HRQOL) is an index to calculate wellbeing of patients and is an important concept in patients with end-stage renal disease. There are many studies calculating HRQOL for patients on different treatment modalities of end-stage renal disease. Pooling reports from Iran, this systematic review aimed to measure the HRQOL in patients on hemodialysis and peritoneal dialysis using meta-analysis techniques.
Materials and Methods. Four databases including PubMed and Scopus in English and the SID and IranMedex in Persian were searched. Based on the inclusion criteria, 26 English and Persian-language articles reporting HRQOL in the scales between zero and 100 (or scales convertible to this range) for hemodialysis or PD were included in the meta-analysis.
Results. The mean HRQOL scores ranged between 34.40 and 69.16 for hemodialysis reports and between 38.00 and 65.70 for PD reports. The pooled quality of life scores for hemodialysis and PD were 52.257 and 52.722, respectively (t = 0.928, P = .36).
Conclusions. The results showed that HRQOL in patients using hemodialysis and peritoneal dialysis were not significantly different. Similar studies in other countries had found similar results.

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INTRODUCTION

Health-related quality of life (HRQOL) is an index to calculate wellbeing. It is a multidimensional concept. It is related to physical, emotional, mental, and social functioning of people or patients. Health-related quality of life is used to measure the effects of diseases and treatment methods on wellbeing of people. There are many scales and methods for calculating HRQOL. One of the most famous methods is the HRQOL scales, which are usually scored between zero and 100, that indicates death and complete health status respectively.[1,2] One of the advantages of the HRQOL scales is that they give numerical scales to health and interventions so that they could be compared to each other.[3]

End-stage renal disease is a chronic condition with a progressive loss in kidney function over a period of months or years.[4,5] If not treated immediately, it will lead to uremia and death. Three methods are used to treat end-stage renal disease. First is kidney transplantation, which is a permanent treatment and patients do not need to be treated again in most of cases. Second is hemodialysis, which is the most widespread method in Iran and it is provided in most of Iranian hospitals. Third is the peritoneal dialysis (PD), in which the patient does not need to go to hospitals for treatment and it is famous for its ease of use. Each of these methods has their own benefits and costs. Kidney transplantation is a good method and is always advised for patients

in Iran. People using this method do not need to go to hospitals for continuing treatment and often are treated like a healthy individuals. The HRQOL of patients using these treatments are measured in many studies.

In many systematic reviews, it is confirmed that kidney transplant patients' HRQOL is better than those on dialysis.[6-9] Kidney transplantations are limited and depend on the number of kidney donations. Patients must wait for find donors who accept to donate their kidney. As opposed to the clear results of kidney transplantation, there are variations in HRQOL reported for patients on hemodialysis and PD. While in some studies, the HRQOL of hemodialysis was better than that of PD or vice versa, in some other studies, no differences were found. In addition, there is no pooled evidence to compare the quality of life in patients using PD and hemodialysis in Iran. In this study, using meta-analysis, we pooled studies which assessed the HRQOL in hemodialysis and PD patients in Iran and compared these two modalities of treatment.

MATERIALS AND METHODS

Search Strategy

The international databases PubMed and Scopus were searched for English abstracts of the studies on HRQOL of Iranian dialysis patients. In addition, Persian-language databases of SID and IranMedex were searched for Persian keywords. The search was through September 30, 2014. The following combinations were used for PubMed search: (1) "Dialysis"[MeSH] or "Renal Dialysis"[MeSH] or "Hemodialysis, Home"[MeSH] or "Peritoneal Dialysis"[MeSH]; (2) "Quality of life" (title/abstract) or "QOL" (title/ abstract) or "wellbeing" (title/ abstract); and (3) "Iran" (all fields). The search was not restricted by publication time. Other database search strategies are described in Table 1. Abstracts of all retrieved publications were obtained. After deleting duplicates, 260 English-language and 203 Persian-language articles were collected for review (Figure 1). At the end of the search, the bibliographic information of recently published studies (since 2010) were reviewed and no new studies were found.

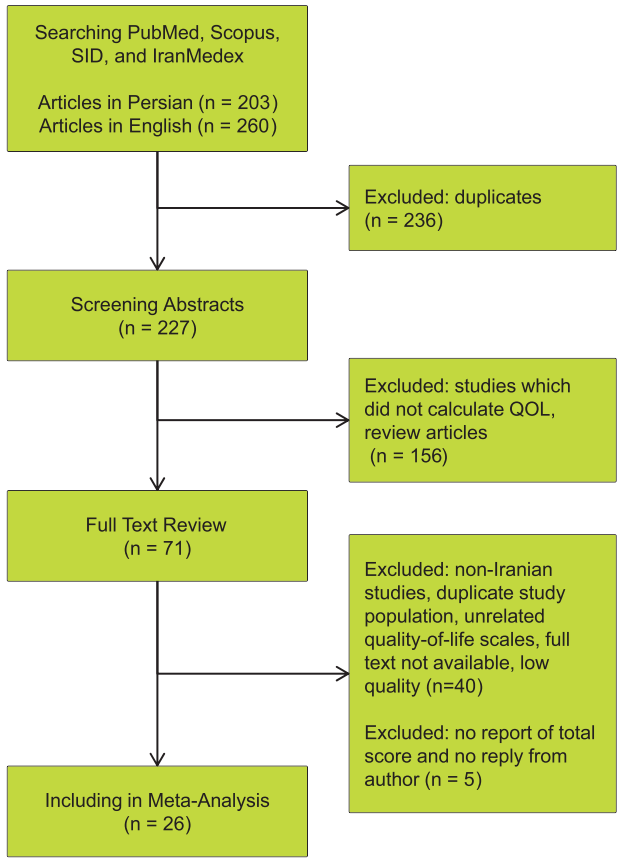

Figure 1. Selection of studies for meta-analysis.

Inclusion and Exclusion Criteria

For inclusion of articles in this study, they had to meeting the following criteria: (1) being a cross-sectional study, (2) calculating HRQOL, (3) being done in Iran, (4) being done on end-stage renal disease patients on hemodialysis or PD, and (5) calculating quality of life using scales with the scores between zero and 100 or scales convertible

Table 1. Other Search Strategies

Database	Search Strategy
Scopus	Iran AND TITLE-ABS-KEY ("*dialysis" OR "hemodialysis" OR "peritoneal dialysis") AND TITLE-ABS-KEY ("quality of life" OR "QOL" OR "wellbeing")
PubMed (alternative search)	Quality of Life"[Mesh]) OR qol[Title/Abstract]) OR quality of life[Title/Abstract])) AND "Renal Dialysis"[Mesh]) AND Iran
SID	کیفیت زندگی همودیالیز، کیفیت زندگی پریتونئال، کیفیت زندگی صفاقی، کیفیت زندگی دیالیز
IranMedex	کیفیت زندگی همودیالیز، کیفیت زندگی پریتونئال، کیفیت زندگی صفاقی، کیفیت زندگی دیالیز

to this range of scores. The following articles were excluded: (1) those presented the results about quality of life after medical or psychological interventions; (2) longitudinal studies; and (3) those that used quality of life questionnaires which were not designed for health and wellbeing or were not in numerical scales.

Selection of Studies and Data Extraction

After excluding duplicates, 227 articles (116 English-language and 111 Persian-language articles) were screened for relevance by title and abstract by 2 independent researchers (EHR, SD), and 71 were selected with an agreement of about 90%. The eligible studies were 49 Persian- and 22 English-language articles.

A checklist was designed to assess the full texts of the articles. Twenty-one Persian and 14 English articles were excluded from the study based on the inclusion criteria. In addition, in 5 articles, the quality of life values were calculated using the Ferrans and Powers Quality of Life Index Dialysis Version or other questionnaires that did not meet the inclusion criteria. In 4 studies, the authors published their study results in several papers and only one of them was included in meta-analysis. In 7 articles, the required parameters for meta-analysis were not reported so their corresponding author was asked to send the information via email. For admissibility, the World Health Organization Quality of Life-BREF questionnaire results were transformed to zero to 100 scores linearly.

Finally, 26 articles remained for meta-analysis.[4,10-34] Figure 1 shows the selection process. Data were extracted from the papers including authors' name, study title, year of study, sample size for hemodialysis and PD patients, HRQOL questionnaire, sex distribution, age range, means and standard deviations of HRQOL scores, study location, and study type.

Data Analysis

Quality of life mean value and standard deviations were used for meta-analysis. Using a random effect estimator we corrected the differences in quality of life scores in hemodialysis and PD patients. The Cochrane Q test for heterogeneity, I^2 statistics, and τ^2 statistics were estimated as well. The Stata (version 11.0, StataCorp LP, College Station, TX, USA) was used for conducting meta-analysis.

RESULTS

Selected Studies

The pooled data consisted of 1891 hemodialysis and 321 PD patients. Characteristics of selected 26 observational studies for meta-analysis (6 articles in English and 20 in Persian language) are shown in Table 2. These studies were done in 13 provinces of Iran. Five of the 26 studies were done in Tehran. In 5 studies, the correlation between HRQOL and other variables were assessed. In all of the studies, both men and women were included, while pediatric patients were excluded. Six studies compared the HRQOL between hemodialysis and PD users. Other studies assessed only the HRQOL for hemodialysis users. The majority of the studies used the Short Form-36 questionnaire and most of them were published after 2010.

Figures 2 and 3 demonstrated the combined HRQOL results across the reports on hemodialysis and PD patients. The mean HRQOL scores ranged between 34.40 and 69.16 for hemodialysis reports and between 38.00 and 65.70 for PD reports. Table 3 shows the results of the random effect meta-analysis for hemodialysis and PD studies. The pooled quality of life scores for hemodialysis and PD were 52.257 and 52.722, respectively (t = 0.928, P = .36). The asymptotic test showed whether a true pooled effect is zero or not. As shown in the table, the null hypotheses of being zero for both hemodialysis and PD patients were rejected, and therefore, the results of the meta-analysis were significant.

Heterogeneity Testing

The results of Q Cochrane tests for heterogeneity are shown in Table 3. The chi-square statistic of this test for hemodialysis studies was 42.554 with 26 degrees of freedom. For PD studies, the chi-square statistic was 10.834 with 5 degrees of freedom. For hemodialysis studies, the results were inconsistent. The I^2 results indicated that there was moderate heterogeneity in the studies. The τ^2 was 53.1603 and 56.6933 for hemodialysis and PD, respectively.

DISCUSSION

Pooling the studies on the quality of life showed for the first time that PD and hemodialysis patients in Iran did not have different quality of life scores. Patients on PD do not need to go to dialysis centers for their treatment and can save lots of

Table 2. Summary of Studies Included in Meta-Analysis*

ID	Authors	Publication Year	Language	Province	Sample Size	Females, %	Age (Mean or Range)	Dialysis Modality	HRQOL Scale
1	Abedini et al[31]	2009	Per	Hormozgan	82	NA	> 18	Hemodialysis	WHOQOL-BREF
2	Aghakhani et al[13]	2011	En	West Azerbaijan	455	21	15 to 65	Hemodialysis and PD	SF-36
3	Amirkhani et al[4]	2014	Per	Kerman	150	44	18 to 70	Hemodialysis and PD	SF-36
4	Ashrafi et al[32]	2014	Per	Semnan	72	47	> 12	Hemodialysis	SF-36
5	Baraz et al[23]	2007	Per	Tehran	85	NA	24 to 50	Hemodialysis	SF-36
6	Edalat-Nejad et al[28]	2013	En	Markazi	115	50	> 19	Hemodialysis	SF-36
7	Fardinmehr et al[11]	2011	Per	Esfahan	26	65	52.7	Hemodialysis and PD	KDQOL-SF
8	Fouladi et al[29]	2013	Per	Esfahan	96	41	54.5 ± 15.1	Hemodialysis	SF-36
9	Javanbakhtian Ghahfarokhi et al[15]	2012	Per	Kerman	60	52	> 18	Hemodialysis	SF-36
10	Hadi et al[21]	2013	Per	Fars	120	42	NA	Hemodialysis	SF-36
11	Moghareb et al[30]	2014	Per	North Khorasan	60	NA	NA	Hemodialysis	SF-36
12	Namdar et al[16]	2012	Per	Fars	52	42	22 to 86	Hemodialysis	SF-36
13	Noshad et al[10]	2009	En	East Azerbaijan	60	NA	NA	Hemodialysis and PD	GHQ-28
14	Pakpour et al[26]	2010	En	Tehran	250	44	> 18	Hemodialysis	SF-36
15	Parvan et al[17]	2014	Per	East Azerbaijan	245	36	20 to 87	Hemodialysis	SF-36
16	Rostami et al[24]	2013	En	Overall Iran	6930	43	54.4	Hemodialysis	SF-36
17	Saffari et al[27]	2012	En	Tehran	362	60	57.81	Hemodialysis	EQ-5D-3L
18	Shafipour et al[18]	2009	Per	Mazandaran	100	NA	NA	Hemodialysis	SF-36
19	Sharif et al[19]	2007	Per	Fars	90	44	> 15	Hemodialysis	SF-36
20	Sharifnia[34]	2006	Per	West Azerbaijan	130	75	18 to 65	Hemodialysis and PD	SF-36
21	Tahery et al[20]	2013	Per	Khuzestan	80	48	12 to 83	Hemodialysis	KDQOL-SF
22	Tayyebi et al[25]	2010	Per	Tehran	43	77	54	Hemodialysis	SF-36
23	Tol et al[33]	2011	Per	Tehran	100	53	51.58	Hemodialysis	WHOQOL-BREF
24	Zamanzadeh et al[22]	2006	Per	East Azerbaijan	164	44	51.9 ± 15.5	Hemodialysis	SF-36
25	Zeraati et al[12]	2010	Per	Khorasane-Razavi	40	58	> 15	Hemodialysis and PD	SF-36
26	Sharifnia et al[4]	2012	Per	West Azerbaijan	60	NA	18 to 65	Hemodialysis	SF-36

*ID indicates identification number; En, English; Per, Persian; PD, peritoneal dialysis; NA, not available; HRQOL, health-related quality of life; SF-36, Short Form-36; GHQ-28, General Health Questionnaire-28; WHOQOL-BREF, World Health Organization Quality-of-Life Scale; and KDQOL-SF, Kidney Disease Quality of Life Short Form.

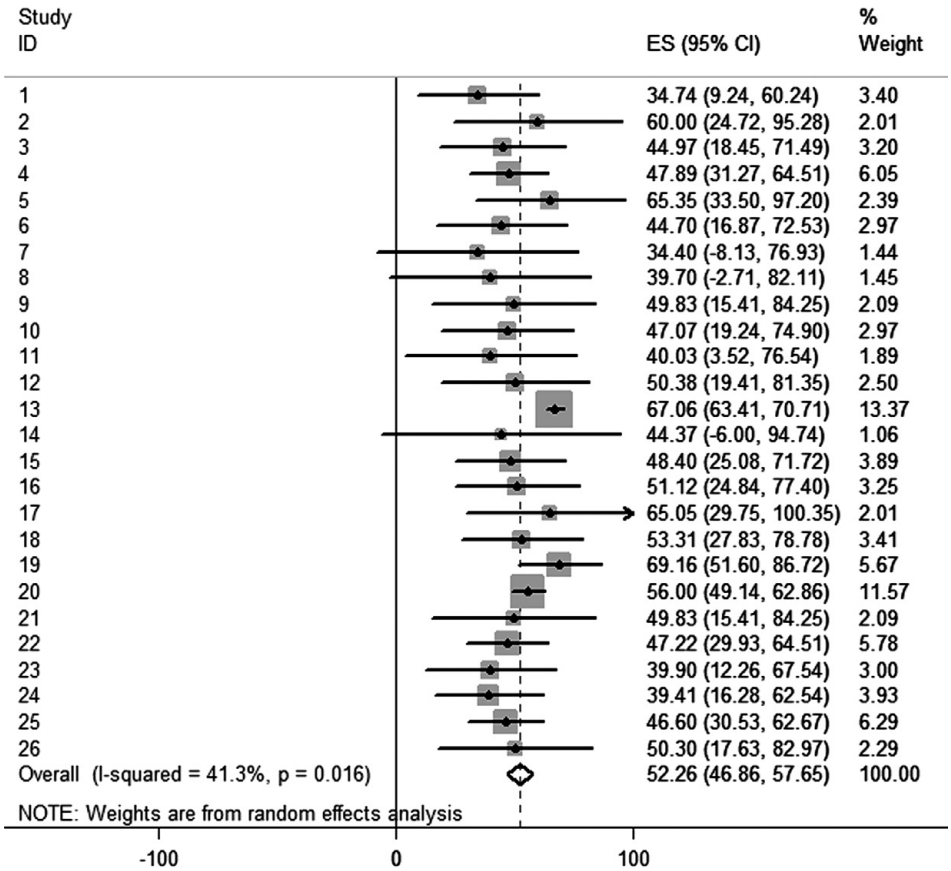

Figure 2. Health-related quality of life of hemodialysis Patients in Iran. ID indicates identification number (see Table 2); ES, effect size (quality of life score); and CI, confidence interval.

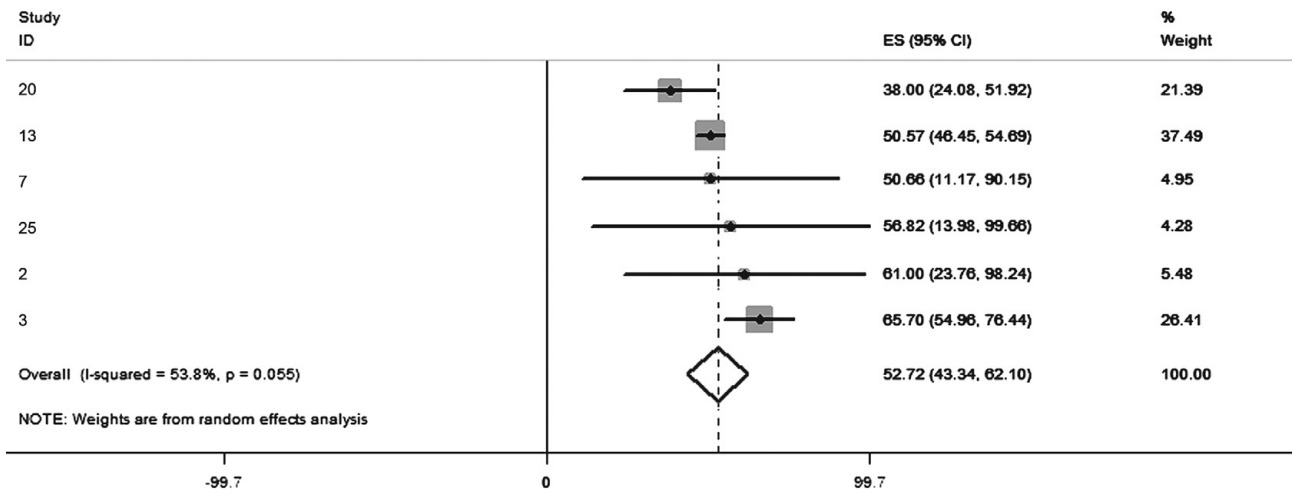

Figure 3. Health-related quality of life of peritoneal dialysis patients in Iran. ID indicates identification number (see Table 2); ES, effect size (quality of life score); and CI, confidence interval.

Table 3. Random Effect Meta-Analysis and Asymptotic Significance, Cochrane Q, and I^2 Statistics of Studies on Hemodialysis and Peritoneal Dialysis

Modality	Pooled Estimate	Asymptotic Z	Asymptotic *P*	Heterogeneity Q	I^2	I^2 Significance
Hemodialysis	52.257	18.992	< .001	42.554	41.3%	< .001
Peritoneal dialysis	52.722	11.016	< .001	10.834	53.8%	< .001

money and time. Learning how to use the PD is easy and patients do not face troubles during the treatment. In spite of the advantages of PD, only few clinics deliver these services in Iran and it is limited to some larger cities. The infrastructures required for providing patients with the peritoneal dialysis solution at home are not available in smaller cities. Moreover, the peritoneal dialysis solution is produced by only one pharmaceutical company in limited amounts. Many dialysis patients live in small regions where do not have any hemodialysis centers. In these regions, because of the small numbers of patients with end-stage renal disease, establishment of hemodialysis centers are not cost-effective. These patients have to travel to other cities to receive hemodialysis services. Peritoneal dialysis modality can be effective for these patients. Because of the advantages of PD, health policy makers have to consider encouraging PD solution production and increasing the distribution system of PD in the country.

Leim and colleagues[6] pooled outcomes of quality of life in a meta-analysis of end-stage renal disease treatments in 2007. They assessed 52 studies which had used the Short Form-36 questionnaire for evaluating QOL and compared the 8 dimensions of the scale separately. They found that hemodialysis and PD did not have any significant differences in quality of life.[6] In another study, Leim and colleagues[7] pooled studies that had used time trade-off, EQ-5D, standard gamble, and health utility index to find the differences between quality of life associated with kidney failure treatment methods. Combining across 27 reports, they found that kidney transplant patients had a higher quality of life in comparison with dialysis patients. Similar to their previous study, they did not find significant differences between hemodialysis and PD.[7] Selags and colleagues compared mortality in hemodialysis and PD patients in a meta-analysis in 2001. The main aim of this study was to find potential differences in outcomes between these two therapies in elderly people. This pooling suggested that the hospitalization rate and mortality of elderly people treated with PD was similar to elderly hemodialysis patients.[8]

There were moderate heterogeneities between studies. The heterogeneity was probably due to the different methods used for calculating HRQOL. The differences in the studied populations' characteristics such as mean age and sex distribution might have also led to this heterogeneity. These differences could be converged by increasing the sample size of the studies. Studies including PD were more homogenous.

The studies included in this meta-analysis may suffer from selection bias and confounder bias. Because of the smaller number of PD users, the researchers have done minimum efforts to randomize the patients in their studies. In some cases, they studied all of the available patients. In some observational studies, no evidence was available about sex and the mean age of the patients, and because of lack of information, we could not pool some variables like age range, number of females, and treatment duration to show the differences between the two groups. In addition, in only 6 studies, the PD was compared to hemodialysis. In these studies no case-control methods were used and the authors limited their studies to descriptive results. In addition, in many studies, there were no reports about the scores in each dimension of the quality of life; as a result, we were not able to compare the dimensions of the two methods with each other.

CONCLUSIONS

This systematic review pooled HRQOL studies in hemodialysis and PD treatments for end-stage renal disease patients. There were no agreements about the HRQOL of patients using hemodialysis and PD in Iran. These findings showed that there were no significant differences in the HRQOL of patients using these two methods. These findings are useful for Iranian health policy makers and clinicians.

CONFLICT OF INTEREST

None declared.

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