UNIVERSITY OF GÄVLE

FACULTY OF HEALTH AND OCCUPATIONAL STUDIES
Department of Health and Caring Sciences

NURSING DEPARTMENT,
MEDICINE AND HEALTH COLLEGE
Lishui University, China

Quality Of Life of Kidney Transplant Patients —— A descriptive literature review

Yin Jiali (Amanda)

Shao Qilu (Jessica)

2018

Student thesis, Bachelor degree, 15 credits

Nursing

Degree Thesis in Nursing

Supervisor: Tao Ran

Examiner: Maria Engström

Abstract

Background: As the number of kidney transplant patients increases, quality of life (QoL) after kidney transplantation is a topic that is gaining importance.

Aim: To sum up the instruments measuring QoL of kidney transplant patient; To describe the QoL of kidney transplant patient; To describe the participants' characteristics in the article the authors found.

Methods: A descriptive literature review, 10 quantitative articles were selected in PubMed according selection criteria.

Results: The results showed Short-Form 36 Health Survey Questionnaire (SF-36), Kidney Transplant Questionnaire (KTQ), and The Kidney Disease and Quality of Life Short Form (KDQOL-SF) were the main instruments used to measure kidney transplant patient's QoL. Comparing with the SF-36 norms, kidney transplant patient's QoL score was lower than the normal population in these dimensions: Role physical (RP), General health (GH), Social functioning (SF), and Role emotional (RE).

Conclusion: Patients' QoL after kidney transplant for some dimensions is lower than normal population. For low dimensions, nurses can use Knowledge- Attitude- Practice Model (KAP Model) to do targeted health education for kidney transplant patient, and then slowly improve patient's QoL.

Key words: Health education, Kidney transplantation, Quality of life, Surveying instruments.

摘要

背景：随着肾移植患者数量的增加，肾移植术后的生活质量成为一个越来越重要的话题。

目的：归纳肾移植术后病人生活质量的测量工具；描述肾移植术后病人的生活质量；描述所选文章参与者特征。

方法：一篇描述性文献综述，根据筛选标准，在 PubMed 上选取了 10 篇符合条件的量性文章。

结果：结果显示，SF-36 量表(SF-36)、肾脏移植问卷(KTQ)、肾脏疾病及生活质量量表(KDQOL-SF)是测量肾移植患者生活质量的主要工具。和 SF-36 量表的常模比较后，作者发现肾移植患者在这些维度上的生活质量评分明显低于正常人：角色生理、一般健康、社会功能、角色情感。

结论：肾移植术后患者的生活质量在一些维度上低于正常人。针对生活质量低的维度，护士可以运用知信行模式(KAP 模型)对肾移植患者进行针对性健康教育，从而逐步提高病人的生活质量。

关键词：健康教育，肾移植，生活质量，测量工具。

Content

1. Introduction

1.1 Background

Chronic kidney disease (CKD) is a major global health burden due to its high prevalence and associated risk of end-stage renal disease (ESRD), cardiovascular disease (CVD), and premature death (Fujisawa *et al.*, 2000; Jha *et al.*, 2013; Go, Chertow, Fan, Mcculloch & Hsu, 2004; Matsushita *et al.*, 2010). With the increase of population and the population aging of society, the incidence of kidney disease is also increasing year by year, CKD was ranked as the 19th highest cause of years of life lost in 2013 (Naghavi *et al.*, 2014). If a variety of CKD developed into ESRD, drug treatment is ineffective, only dialysis or kidney transplant surgery can save lives. It has been shown that Kidney transplantation was the preferred mode of treatment for ESRD, as it offered superior quality of life (QoL) and improved life expectancy compared to chronic dialysis (Evans *et al.*, 1985; Laupacis *et al.*, 1996; Dew *et al.*, 1997;). As the number of kidney transplant patients increases, QoL after kidney transplantation is a topic that is gaining importance (Evans *et al.*, 1985).

1.2 Kidney transplantation

Kidney transplantation or renal transplantation is the organ transplant of a kidney into a patient with end-stage kidney disease. In other words, when the patient get a kidney transplant, a healthy kidney is placed inside his/her body to do the work his/her own kidneys can no longer do. Kidney transplantation is typically classified as deceased donor (someone who died and donated a healthy kidney) or a living donor (a blood relative or non-blood relative) (National Kidney Foundation, 2017). Living-donor kidney transplants are further characterized as genetically related (living-related) or non-related (living-unrelated) transplants, depending on whether a biological relationship exists between the donor and recipient. Therefore, before the kidney transplantation, many tests should be done, the main four tests are ABO compatibility blood testing, the tissue (HLA) typing, Percent Reactive Antibody (PRA), Serum Crossmatch (National Kidney Foundation, 2017).

1.3 Quality of life

World Health Organization (WHO, 1997) defines QoL as individual's awareness of their position in life in the context of the culture and value systems in which they live and relate to their goals, hopes, standards and concerns. It is a broad ranging concept

which is affected by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment in a complex way.

1.4 Knowledge- Attitude- Practice Model (KAP Model)

The KAP Model (Cleary & Dowling, 2009) explains how personal knowledge and beliefs affect the most commonly used patterns of healthy behavior change, this model believe that the Knowledge, Attitude, and Practice are three consecutive processes. The "Knowledge" means correct understanding of basic knowledge, the "Attitude" means establishment of correct beliefs and positive attitudes, and the "Practice" means development of healthy scientific behavior. This model can guide staff to change the patient's health belief by health education, establish a positive attitude to fight with the disease, and eventually make them to be willing to take active measures to help them recover. In recent years, the KAP model has been applied in many fields of medical care, which had achieved obvious results (Pärna *et al.*, 2005; Pfeil, Mutsch, Hatz & Szucs, 2010; Dawaki *et al*., 2015).

1.5 Problem statement

With the increase of kidney diseases around the world, more and more attention has been paid to patient's QoL after kidney transplantation, and there are many qualitative and quantitative studies that have been carried out on it (Evans *et al.*, 1985). However, systematic review of QoL of patients after kidney transplantation is rare, most of these reviews only focus on one perspective, existing research trends towards complications after kidney transplantation (Singh, Ng & Unruh, 2016), or the comparison of QoL in patients with kidney replacement therapy (Purnell *et al.*, 2013), and there lacks of systematic reviews to guide the nurse in clinical practice. In quantitative articles, in order to measure the patient's QoL, many measuring instruments were used, but most of these articles refer to only one measurement instrument (Terada & Hyde, 2002; Laupacis, Muirhead, Keown & Wong, 1992; Hays, Kallich, Mapes, Coons & Carter, 1994), and there is no article that sums up the instruments for measuring the QoL of kidney transplantation patients. As a nurse who fully understands the life status of patients after kidney transplantation, they can better put forward nursing diagnosis and implement interventions to improve patient's QoL, realize nursing value. Therefore, it is of great importance to explore the QoL of kidney transplant patient.

1.6 Aims and specific questions

The aims of the literature review were to sum up the instruments measuring QoL of kidney transplant patient, to describe the QoL of kidney transplant patient, to describe the participants' characteristics in the article the authors found, with the help of following research questions:

Question 1:

Which instrument is used to measure patient's quality of life in the included scientific articles?

Question 2:

How do kidney transplant patients describe their quality of life?

Question 3:

What are the characteristics of participants in the included scientific articles?

2. Method

2.1 Design

The authors conducted a descriptive literature review (Polit & Beck, 2017).

2.2 Databases

The authors mainly used PubMed to find the articles. PubMed is a medical literature search site. When researchers import some key words in the search box, the suggested results would appear. This allowed researchers to find articles in a more time-saving and labor-saving way. PubMed has a control vocabulary called MeSH, which can be used to search medical article more accurately (Polit & Beck, 2017).

2.3 Search terms, Search strategy and Outcome of database searches

Articles found by searching in the databases PubMed, with certain limits, search terms, number of hits and chosen sources are shown in Table 1.

PubMed has a control vocabulary called MeSH, which can be used to search the medical articles more accurately. The authors used the terms kidney transplant [MeSH] and Quality of life [MeSH] to search articles in the PubMed. When combining search terms, the Boolean term AND would be used. In PubMed the following limits were used: 10 years, Humans, English, Adult: 19+ years. The titles and abstracts of 318 articles were skim-read, to determine whether those articles respond research aims and answer questions. After cutting off the articles beyond our goal, 38 articles that deemed to be of potential interest for the literature review were selected.

Table 1 Results of database searches

Database + Date of search	Limits	Search terms	Number of hits	Potential articles
Medline through PubMed 2017-09-06	10 years, Humans, English, Adult: 19+ years	Kidney transplantation[MeSH]	14971	
Medline through PubMed 2017-09-06	10 years, Humans, English, Adult: 19+ years	Kidney transplantation[MeSH] and Quality of life[MeSH]	318	318
				Total：318

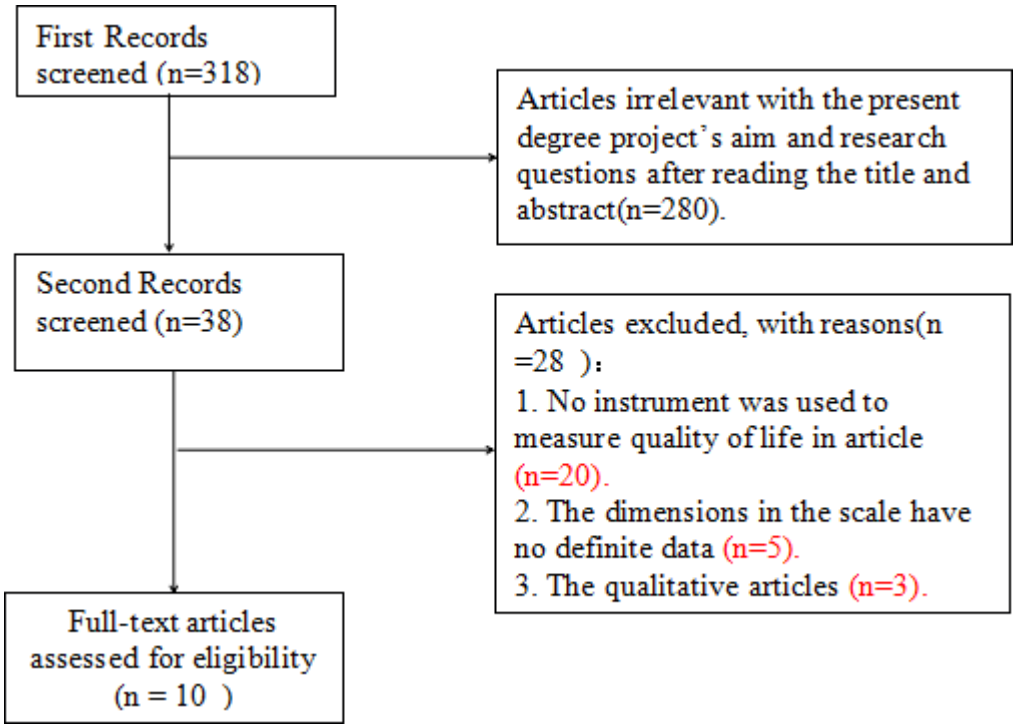

Figure 1. Flowchart for search strategy and search process

2.4 Selection criteria

According to Polit and Beck (2017), the exclusion criteria and inclusion criteria can specify population characteristics. Our inclusion and exclusion criteria are as follows:

Inclusion criteria for articles were relevant for the aim of the review study (that is, they should be about the patients describing their QoL), and empirical scientific articles using a quantitative approach. All articles are directed at humans, in English, and no more than ten years, which include patients QoL after kidney transplantation.
Exclusion criteria were articles that only focus on the transplant patient under 19 years old, cancer treatment patients and other review studies. At the same time, articles that did not use quality of life measurement instruments and did not have the definite data of corresponding dimension were excluded.

2.5 Selection process

After identifying 38 potential full articles, the authors began to read the articles separately, discussed on areas of disagreement actively, and then selected articles that could eventually be used in the review. The authors excluded 28 articles with three reasons: 1. No instrument was used to measure quality of life in article (n=20); 2. The dimensions in the scale have no definite data (n=5); 3. The qualitative articles (n=3). At last, the authors got 10 full-text articles assessed for eligibility. The total selection process for the review is presented in Figure 1.

2.6 Data analysis

The 10 selected articles were processed in relation to research question 1, question 2, and question 3. All articles were read separately by each author, and then discussed together for reaching a consensus, showing as the tables presented in Appendix 1 and Appendix 2, with all the potential useful material extracted.

By reading 10 articles, the authors used different tables, which helped make data clear and easy for gaining views of the selected articles. Appendix 1 summarized the selected articles' authors, title, design, participants, data collection method(s) and method(s) of data analysis. Appendix 2 summarized the selected articles' authors, title, aims and results.

Based on the two appendixes, we summarized and summed up the content related to our research questions, and present them in two tables (Table 2 and Table 3).

2.7 Ethical considerations

The authors would read and understand the article from an objective point of view, and would not misinterpret the article by their subjective feelings. The results would be fully

presented and without being altered according to the authors' wishes. There would be no plagiarism in the degree project.

3. Results

In results, total of 10 articles published in range of 2007 to 2016 were included. The articles had a quantitative approach and were from China, Poland, America, Norway, Hungary and Turkey. These 10 articles mainly use three instruments to measure kidney transplant patient's QoL, they are Short-Form 36 Health Survey Questionnaire (SF-36), Kidney Transplant Questionnaire (KTQ) and The Kidney Disease and Quality of Life Short Form (KDQOL-SF). The most common used instrument to measure QoL was SF-36, and used in 6 articles.

3.1 Surveying instruments of kidney transplant patient's QoL

3.1.1 Short-Form 36 Health Survey Questionnaire (SF-36)

It is a short questionnaire, with 36 items scoring 8 dimensions as follows:

1) Physical functioning (PF) - the level of limitation in carrying out a range of physical works from low exertion to high exertion - 10 items; 2) Role physical (RP) - helps measure the limitations of patient-specific physical activity caused by health problems - 4 items; 3) Body pain (BP) - 2 items; 4) General health (GH) - 5 items; 5) Vitality (VT) - measurement of energy and fatigue - 4 items; 6) Social functioning (SF) - defines the level of social life limitations caused by physical and emotional discomfort - 2 items; 7) Role emotional (RE) - 3 items; 8) Mental health (MH) - defines the level of psychological stress and well-being - 5 items.

The scores obtained for each dimension are transformed into a scale of 0 to 100, with a score of 100 indicating optimum health. Cronbach's alpha is in range of 0.6 to 0.9. Six articles used this scale to assess the quality of life of the patient after kidney transplantation, as shown in table 2.

3.1.2 Kidney Transplant Questionnaire (KTQ)

The instrument has 25 items grouped into five dimensions: Physical symptoms - 6 items; Fatigue - 5 items; Uncertainty/fear - 4 items; Appearance - 4 items and Emotional - 6 items. All the dimensions use a 7-point Likert scale, with the score of 7 indicating the best health status and the score of 1 indicating the worst possible state. For the analysis, all scores in each dimension are added together and divided by the number of items in that dimension. The highest score represent the highest quality of life. Cronbach's alpha

is in range of 0.7 to 0.9. One article used this scale to assess the quality of life of the patient after kidney transplantation, as shown in Table 2.

3.1.3 The Kidney Disease and Quality of Life Short Form (KDQOL-SF)

The KDQOL-SF consists of 80 items, including 36 items (8 dimensions) of SF-36; it also has 43 items (11 dimensions) as kidney disease-target items. The kidney disease-target items include: 1) symptom list - 12 items; 2) effects of kidney disease - 4 items; 3) work status - 2 items; 4) burden of kidney disease - 4 items; 5) cognitive function - 3 items; 6) quality of social interaction - 3 items; 7) sexual function - 2 items; 8) sleep - 4 items; 9) social support - 2 items; 10) dialysis staff encouragement - 2 items; 11) patient satisfaction - 1 item. The SF-36 is the eight dimensions described above. The score is linearly converted to a 0-100 range, with higher values representing a higher quality of life. Cronbach's alpha is higher than 0.7. Four articles used this scale to assess the quality of life of the patient after kidney transplantation, as shown in Table 2.

Table 2 The instrument used to measure patient's QoL

The style of scale	Author	Title	Dimensions	Score
Short-Form 36 Health Survey Questionnaire (SF-36)	Czyżewski Ł. , Resmer J. S. , Wyzgał J. , and Kurowski A.	Assessment of Health-Related Quality of Life of Patients after Kidney Transplantation in Comparison with Hemodialysis and Peritoneal Dialysis	1.Physical functioning(PF) 2.Role physical(RP) 3.Body pain(BP) 4.General health(GH) 5.Vitality(VT) 6.Social functioning(SF) 7.Role emotional(RE) 8.Mental health(MH)	KTx 3th month: 1.Physical functioning:71.7±19.3; 2.Role physical: 41.7±48.5; 3.Body pain: 78.1±23.7; 4.General health：45.0±24.2; 5.Vitality：57.8±20.2; 6.Social function:70.1±31.0; 7.Role emotional:64.8±46.4; 8.Emotional well-being:63.6±22.6; KTx 12th month: 1.Physical functioning:76.4±23.4 2.Role limitations-physical:50.0±46.1; 3.Body pain: 66.8±29.5 4.General health：43.8±22.1 5.Vitality：55.7±22.2 6.Social function:69.6±26.4 7.Role emotional:65.1±47.7 8.Emotional well-being:63.4±20.8

Virzì A. , Signorelli M.S. , Veroux M. , Giammarresi G. , Maugeri S. , Nicoletti A. and Veroux P.	Depression and Quality of Life in Living Related kidney Transplantation	1.Physical activity:76.7±15.6 2.Physical role: 58.2±21.7 3.Pain: 21±17.2 4.Health: 77.7±12.3 5.Vitality: 63.4±8.4 6.Social activity: 61.7±15.9 7.Mental health: 76.8±8.5
Zheng X.Y. , Han S., Wang L.M. , Zhu Y.H. , Zeng L. , and Zhou M.S	Quality of Life and Psychology After Living-related Kidney Transplantation From Donors and Recipients in China	1.PF:80.1±10.4 2.RP: 73.8±30.3 3.BP: 72.1±16.6 4.GH:66.6±18.2 5.VT:64.4±13.5 6.SF:74.8 ±22.6 7.RE:77.4±29.6 8.MH:72.5±13.7
Aasebø W. , Vesteraas N. A. H. , Hartmann A. , and Stavem K.	Life situation and quality of life in young adult kidney transplant Recipients	1.PF: 86.6 2.RP: 74.2 3.BP: 76.4 4.GH: 60.2 5.VT:55.8 6.SF: 80.0 7.RE:75.5 8.MH:76.7
Weng L. C. , Dai Y. T. , Huang H. L. and Chiang Y. J.	Self-efficacy, self-care behaviours and quality of life of kidney transplant	1.PF: 82.5 2.RP: 62.2 3.BP: 84.9 4.GH:59.3 5.VT: 60.2

		recipients		6.SF:78.2 7.RE:70.7 8.MH:67.4
	Wei T. Y., Chiang Y. J., Hsieh C. Y., Weng L.C., Lin S. C. and Lin M. H.	Health Related Quality of Life of Long-Term Kidney Transplantation Recipients		1.PF:80.2±21.0 2.RP: 67.9 ± 40.2 3.BP: 82.5±19.1 4.GH:59.4±21.6 5.VT:61.4±17.1 6.SF:76.5±18.5 7.RE:70.0±40.4 8.MH:68.4±16.9
Kidney Transplant Questionnaire(KTQ)	Wei H., Guan Z., Zhao J., Zhang W. , Shi H. , Wang W. , Wang J., Xiao X. , Niu Y., and Shi B.	Physical Symptoms and Associated Factors in Chinese kidney Transplant Recipients	1.physical symptoms 2.fatigue 3.uncertainty/fear 4.appearance 5.emotional	1.physical symptoms:5.3（4.29-6.33） 2.fatigue:5.0（4.2-5.8） 3.uncertainty/fear:4.63（3.5-5.5） 4.appearance:6.5（6.0-7.0） 5.emotional:5.33（4.3-6.3）
The Kidney Disease and Quality of Life Short Form (KDQOL-SF)	Abacı S.H. , Alagoz S. , Salihoglu A. , Yalin S.F. , Gulcicek S. , Altiparmak M.R. , and Seyahi N.	Assessment of Anemia and Quality of Life in Patients With kidney Transplantation	Kidney disease-targeted items: 1. symptom list 2. effects of kidney disease 3. burden of kidney disease 4. work status 5. cognitive function 6. quality of social interactions 7. sexual function 8. sleep 9. social support	1.symptom and problem list: 87.1±12.2 2.Effects of kidney disease:89.8±12.9 3.Burden kidney disease:64.7±27.3 4.SF-12 mental health component:46.0±9.5
	Czyżewski Ł. , Resmer J. S. , Wyzgał J. , and Kurowski	Assessment of Health-Related Quality of Life of Patients after Kidney Transplantation in		KTx 3th month: 1. symptom list:84.9±13.2 2. effects of kidney disease:75.7±18.1 3. burden of kidney disease:48.3±30.5

	A.	Comparison with Hemodialysis and Peritoneal Dialysis	10. dialysis staff encouragement 11. patient satisfaction 36-item health survey: 1.physiological function 2.physiological role/role physical 3.physical pain/body pain 4.general health 5.vitality 6.social function 7.role emotional 8.mental health	4. work status:25.0±35.4 5. cognitive function:68.9±23.0 6. quality of social interactions:70.0±20.6 7. sexual function:66.7±33.5 8. Sleep:69.0±16.2 9. social support:78.7±23.4 10. dialysis staff encouragement:/ 11. patient satisfaction:/ KTx 12th month: 1. symptom list:83.4±14.0 2. effects of kidney disease:78.8±19.4 3. burden of kidney disease:56.0±29.8 4. work status:42.9±45.5 5. cognitive function:70.5±23.4 6. quality of social interactions:74.9±18.3 7. sexual function:66.5±38.4 8. Sleep:71.9±16.8 9. social support:70.0±21.4 10. dialysis staff encouragement:/ 11. patient satisfaction:/
	Kostro J. Z. Hellmann A. , Kobiela J. , Skóra I. , Niemierko M. L. , Slizien A. D. , Sledzinski Z.	Quality of Life After Kidney Transplantation: A Prospective Study		Kidney disease-targeted items:(group 1;group2) 1. symptom list:85;81 2. effects of kidney disease:78;81 3. burden of kidney disease:39;38 4. work status:33;30 5. cognitive function:77; 74 6. quality of social interactions:79; 78 7. sexual function:72; 77 8. Sleep:69; 70

		9. social support:83; 83 10. dialysis staff encouragement:83; 83 11. patient satisfaction:57; 60 SF-36 (group 1;group2): 1. physical functioning:74; 68 2. role limitations caused by physical health problems:52; 46 3. role limitations caused by emotional health problems:65; 68 4. social functioning:54; 54 5. emotional well-being:63; 63 6. Pain:67; 70 7. energy/fatigue:60; 58
Kovacs A. Z. , Molnar M. Z. , Szeifert L , Ambrus C. , Varga M. M. ,	Sleep disorders, depressive symptoms and health-related quality of life—a cross-sectional comparison between kidney transplant recipients and waitlisted patients on maintenance dialysis	1. Physical functioning: 70 2. General health perceptions: 35 3. Emotional well-being: 72 4. Energy/fatigue: 60 5. Symptoms/problems: 82 6. Burden of kidney disease: 50 7. Effects of kidney disease: 69 8. Sleep: 65

Abbreviations: PF, physical functioning; RP, role physical; BP, body pain; GH, general health; VT, vitality; SF, social functioning; RE, role emotional; MH, mental health

3.2 Quality of life of kidney transplant patients

In the articles that used the SF-36 to measure the QoL, the score of PF was in the range of 72 to 87; the score of RP was in the range of 42 to 74; the score of BP was in the range of 21 to 85. The QoL score of BP in Virzì *et al.*'s (2007) article was especially low; the score of GH was in the range of 44 to 78; the score of VT was in the range of 56 to 64; the score of SF was in the range of 61 to 80; the score of RE was in the range of 65 to 77; the score of MH was in the range of 67 to 77. The article which used the KTQ to measure the QoL, the score of physical symptoms was 5.3; the score of fatigue was 5.0; the score of uncertainty/fear was 4.63; the score of appearance was 6.5; the score of emotional was 5.33. The article which used the KTQOL to measure the QOL, the score of symptom list was in the range of 82 to 87; the score of effects of kidney disease was in the range of 69 to 90; the score of burden of kidney disease was in the range of 38 to 90; the score of work status was in the range of 25 to 43; the score of cognitive function was in the range of 69 to 77; the score of quality of social interactions was in the range of 70 to 79; the score of sexual function was in the range of 66 to 77; the score of sleep was in the range of 65 to 72; the score of social support was in the range of 70 to 83; The score of physical functioning was in the range of 68 to 74; the score of emotional well-being was in the range of 63 to 72; the score of energy/fatigue was in the range of 58 to 60. All the specific scores of each dimension of the three instruments of patients after kidney transplantation are shown in Table 2.

3.3 The characteristics of participants

Based on the articles, the authors found common grounds in the article as follows: Year; Country; Gender; Age; Creatinine; Glomerular filtration rate (eGFR); Dialysis (months), mean; Transplant (months), mean. Among them, four articles were participants from China, two articles were participants from Poland, and the participants in the other four articles were part from the America, Norway, Hungary and Turkey. Only the article by Virzì *et al.* (2007) was not detailed, the other nine articles included males and females. The other characteristics were as shown in detail in Table 3.

Table 3 Characteristics of participants in the included scientific articles

	Authors	Title	Year	Country	Gender	Age	Creatinine	eGFR	Dialysis (months)	Transplant (months),
1	Virzì A. , Signorelli M.S. , Veroux M. , Giammarresi G. , Maugeri S. , Nicoletti A. and Veroux P.	Depression and Quality of Life in Living Related kidney Transplantation	2007	America		Mean age was 41.1 years (range 18 to 63 years)				≥ 6 months
2	Aasebø W. , Vesteraas N. A. H. , Hartmann A. , and Stavem K.	Life situation and quality of life in young adult kidney transplant Recipients	2008	Norway	Male：57 Female:74	Transplant recipients (*n* = 131): 29.8			>1 year dialysis 54 (19%)	Median：4.9
3	Weng L. C., Dai Y. T. , Huang H. L. and Chiang Y. J.	Self-efficacy, self-care behaviours and quality of life of kidney transplant recipients	2009	China:Taiwan	Male: 73(48.7%) Female: 77(51.3%)	Mean: 41.8		Mean: 54.5		Time since kidney Transplant：at least 6 months and no longer than 10 years prior（mean：4.6 years）
4	Kovacs A. Z. , Molnar M. Z. , Szeifert L , Ambrus C. ,	Sleep disorders, depressive symptoms and health-related quality of life—a	2010	Hungary	Male: 515 (58%)	Transplanted patients (Tx) (n = 888)：49 ± 13；		Transplanted patients (Tx) (n = 888)：49 ± 19；	Mean: 54	54

	Varga M. M.	cross-sectional comparison between kidney transplant recipients and waitlisted patients on maintenance dialysis								
5	T. Y., Chiang Y. J., Hsieh C. Y., Weng L.C., Lin S. C. and Lin M. H.	Health Related Quality of Life of Long-Term Kidney Transplantation Recipients	2012	China: Taiwan	Male: 40(45.5%) Female: 48(54.5%)	49.1 (Mean)	1.5mg/dl (Mean)			14.8year (Mean)
6	Czyżewski Ł. , Resmer J. S. , Wyzgał J. , and Kurowski A.	Assessment of Health-Related Quality of Life of Patients after Kidney Transplantation in Comparison with Hemodialysis and Peritoneal Dialysis	2014	Poland	Male:26; Female:21	18–80 years	<2.5 mg/dl	>30ml/min/1.73 m2,	> 6 months	in the 3th and 12th month after transplant
7	Zheng X.Y. , Han S., Wang L.M. , Zhu Y.H. , Zeng L. , and Zhou M.S.	Quality of Life and Psychology After Living-related Kidney Transplantation From Donors and	2014	China	Male: 42(38.2%); Female:68 (61.8)	Recipient (n = 124)： 34.3± 9.7 (16-55)	Recipient (n = 124)： 122.7 ± 56.1 mmol/L		> 3 months	

		Recipients in China								
8	Abacı S.H. , Alagoz S. , Salihoglu A. , Yalin S.F. , Gulcicek S. , Altiparmak M.R. , and Seyahi N.	Assessment of Anemia and Quality of Life in Patients With kidney Transplantation	2015	Turkey	Male: 128 (64%); Female: 72 (36%)	All Patients (n=200)：39.2±11.5；	All Patients (n=200):71.7±24.9	All Patients(n=200):70.0±25.6		
9	Kostro J. Z. Hellmann A. , Kobiela J. , Skóra I. , Niemierko M. L. , Slizien A. D. , Sledzinski Z.	Quality of Life After Kidney Transplantation: A Prospective Study	2015	Poland	(M/F) Group 1 (HD=44): 30/14 Group 2 (PD=25): 14/11	Group 1 (HD=44): 49 Group 2 (PD=25): 42	Group 1 (HD=44): 1.6 ± 0.4 Group 2 (PD=25): 1.5± 0.6	Group 1 (HD=44):6 0 ± 18 Group 2 (PD=25): 58± 22	Group 1 (HD=44): 23months (Mean) Group 2 (PD=25): 26months (Mean)	> 12 months
10	Wei H., Guan Z., Zhao J., Zhang W. , Shi H. , Wang W. , Wang J., Xiao X. , Niu Y., and Shi B.	Physical Symptoms and Associated Factors in Chinese kidney Transplant Recipients	2016	China	Male: 176(64.23%) Female: 98(35.77%)	44.3± 11.53 years			Duration of dialysis (mo）：≤10: 128 (46.72%)；＞10 146 (53.28%)	Median period after kidney transplantation was 3.15 years

4. Discussion

4.1 Main results

In this descriptive literature review, SF-36, KTQ, KDQOL-SF were the main instruments used to measure patient's QoL, and the last two instruments were specific for kidney transplant patients. According to above survey instruments, QoL of kidney transplantation patients was described with the following dimensions: PF, RP, BP, GH, VT, SF, RE, MH, appearance, fear, symptom list, effects of kidney disease, burden of kidney disease, work status, cognitive function, quality of social interactions, sexual function, sleep, social support, dialysis staff encouragement. For the characteristics of participants, except for age and race, the Creatinine and the eGFR should be paid more attention, because these two indices represent the patient's kidney function, which is the key to the success of kidney transplantation.

4.2 Results discussion

4.2.1 The scores comparing with the norm

For these three instruments, the authors found several articles about validations or norms which can help to compare with results in the present review. For SF-36, it was originally developed in the USA, which was constructed by Ware et al. (1998) during the Medical Outcomes Survey (1985–1992) and is currently used worldwide. Its popularity is endorsed by the fact that had been translated into 55 languages (Czyżewski, Resmer, Wyzgał & Kurowski, 2014). The authors found two articles, and both of them used SF-36 to measure normal population. Frieling *et al.* (2013) used the SF-36v2 and SF-12v2 health surveys in New Zealand, and drew a conclusion of the norms in New Zealand about the QoL of SF-36, and compared it with American and South Australian norms. Kaasa and Loge (1998) used a SF-36 health survey in Norway, and obtained the norm of Norwegian SF-36. The present review's results found that kidney transplant patients' QoL score was lower than the normal population in the following dimensions: RP, GH, SF, and RE. For more information, see Table 4.

The Kidney Transplant Questionnaire (KTQ) was developed by Laupacis *et al.* (1993), which are a HRQOL assessment instrument specific for kidney transplant patients (Rebollo *et al.,* 2003). The questionnaire offers good levels of validity and reliability (Tayyebi *et al.*, 2012; Rostami, Tavallaii, Jahani & Einollahi, 2011). For the KTQ, Rebollo *et al.* (2003) interviewed 42 patients who received a first kidney transplant, the interview was carried out at the first, third, and sixth and twelfth month after the date of

transplantation, and then they drew a conclusion about the norm in Spain. The authors in the present review used data 12 months after the transplant to compare with Wei *et al.* (2016) in results. The authors found that the dimensions of Appearance's score were higher than those Spanish kidney transplant patients, while the others were lower. For more information, see Table 5.

The KDQOL-SF is a multi - dimensional, reliable, effective disease - specific life quality scale for the cross - sectional evaluation of HRQOL in renal replacement treatment (RRT) patients. Based on SF-36, it was designed in 1994 (Czyżewski et al., 2014). For the KTQOL-SF, the authors found two articles to study its validation, though they were in different countries. One article was study on its validation of Korea dialysis patient (Park *et al*., 2007), and another article was validation study of Netherlands dialysis patient (Korevaar *et al.*, 2002). The authors compared the quality of life in the 4 articles the authors found with these two articles. In other words, the authors compared the quality of life of patients after kidney transplantation with the quality of life of patients undergoing dialysis, as shown in Table 6. In the following dimensions, the scores of kidney transplant patients were higher than those kidney dialysis patients: symptom list, work status, sleep, physical functioning and emotional well-being.

Table 4 The score of SF-36 compare with the norms of US, New Zealand and South Australia

dimension	US (SD)	New Zealand (SD)	South Australia(SD)	Article in results
PF	83.3 (23.8)	85.9 (21.8)	84.6 (21.9)	71.67- 86.6
RP	82.5 (25.5)	85.7 (23.2)	84.4 (25.1)	41.67 - 74.2
BP	71.3 (23.7)	75.3 (24.2)	76.5 (21.2)	21 - 84.9
GH	70.8 (21.0)	74.5 (19.7)	71.9 (21.9)	48.31 - 77.7
VT	58.3 (20.0)	64.0 (18.4)	61.1 (20.8)	55.71 - 64.39
SF	84.3 (22.9)	88.4 (20.5)	86.2 (22.3)	61.4 - 80
RE	87.4 (21.4)	93.7 (15.0)	91.6 (17.5)	65.08 - 77.35
MH	75.0 (17.8)	82.3 (13.2)	80.6 (17.0)	67.4 - 76.8

Table 5 The score of KDQOL-SF compare with the norms of Spain

dimension	Spain (SD)	China (Interquartile Range)
Physical symptoms	5.79 (1.49)	5.3（4.29-6.33）
Fatigue	6.12 (1.18)	5.0（4.2-5.8）
Uncertainty/fear	5.76 (1.21)	4.63（3.5-5.5）
Appearance	6.20 (0.98)	6.5（6.0-7.0）
Emotional	6.03 (1.04)	5.33（4.3-6.3）

Table 6 The score of KDQOL-SF compare with the norms of Korea and Netherlands

dimension	Korea (SD)	Netherlands (SD)	Article in results
symptom list	76.73 (16.72)	76.4 (16.1)	82-87.1
effects of kidney disease	67.25 (19.11)	74.7 (18.6)	69-89.8
burden of kidney disease	28.32 (23.45)	47.3 (25.6)	38-64.7
work status	22.19 (37.09)	21.7 (32.0)	25.0 - 42.86
cognitive function	82.85 (16.71)	76.6 (19.9)	68.89 -77
quality of social interactions	65.75 (19.08)	80.6 (15.8)	70.0 -83
sexual function	76.56 (27.97)	60.6 (34.8)	66.45 -77
sleep	63.54 (16.98)	61.1 (20.3)	65-71.90
social support	66.46 (23.12)	82.5 (22.2)	70.00 -83
Physical functioning	64.93 (26.63)		68-74
emotional well-being	50.92(45.56)		63-72

4.2.2 Health education according KAP Model

According to the KAP Model, nurses can take lifestyle intervention to improve QoL by health education. For “Knowledge” aspect, nurses should make patients know some basic knowledge about their disease such as the right time to take drugs and side effects, the necessary of exercise, and so on. At the same time, health education must be given according to the patient's receptive ability and education level. If patients have something that he or she cannot understand, nurses need to be active in helping them. Of course, while carrying out health education to the patients, nurses also should increase their knowledge of nursing care and nursing education after kidney transplantation. For “Attitude” aspect, nurses should keep a good relationship with patient, and then help patients establish correct beliefs and positive attitudes. But it's also important to ensure patients' privacy is not disclosed. For “Practice” attitude, in order to maintain a better quality of life after kidney transplantation, patients must have a suitable life style. What nurses can do is to help them develop a reasonable daily life plan, give them relevant advice, and offer a good education. In the results, the authors concluded that kidney transplant patient’s QoL score was lower than the normal population in these dimensions: RP, GH, SF, and RE, and the authors divided the health education of kidney transplant patients into four parts: diet intervention, exercise intervention, controlling and managing emotions, self-health monitoring.

Diet intervention------For the dimension of GH

Firstly, eat less amount of salt. There was one article saying that eating less salt can reduces blood pressure, and then protects patient’s cardiovascular system and kidneys (Suckling & Swift, 2015). According to a web about kidney transplantation (National Kidney Foundation, 2016), the patients need to limit the salt intake every day after kidney transplantation. It is recommended that kidney transplant patients should take 3-4 grams of salt a day (Tritt, 2004).

Secondly, it is important to avoid patients from taking certain food. In terms of meat, patient should avoid poultry and fish. In terms of seafood, prawns or shrimp, crayfish, crab, squid, clams, oysters, and mussels are not suitable for patients to eat. Speaking of vegetable and fruit, patient should avoid in taking grapefruit or grapefruit juice and pomegranate or pomegranate juice; unwashed raw fruits and raw vegetables or salads; unpasteurized juices or ciders; sprouts; salad from salad bars or delicatessens (National Kidney Foundation, 2016).

Exercise intervention------For the dimension of GH and RP

Exercise after kidney transplant is necessary. Firstly, nurses are supposed to tell patients why they need to do exercise. Doing some suitable exercises can help patient keep a healthy weight in order to; prevent many diseases such as diabetes, heart disease and kidney disease. Exercise also can help patient control blood pressure and cholesterol. Then the patient will have motivation to do exercise.

Secondly, nurses also need to tell patients what exercise they can have a try. They can tell patients that they can do a walk after dinner. They can do some housework and glow some flowers on a rest day. They also can do some aerobic exercise, such as brisk walking, dancing, jogging, skiing, cycling, using exercise equipment like a treadmill or exercise bike, and swimming (National Kidney Foundation, 2014).

Controlling and managing emotions------For the dimension of SF and RE

Talk and Share: nurses need to encourage patients to talk to someone they trust. Maybe that person is their friend, their social worker, school counselor, or even their parents. Don't be afraid to tell others how they feel and ask for help and support when needed.

Be prepared: Before patients do the surgery and during the postoperative recovery period, nurses can help them do some early preparation. The patient can be relaxed after dinner. Maybe they can keep a journal, call a friend up, exercise, read, or listen to music.

Do something favorite: When things get difficult, nurses can encourage patient do something they favor. Some ideas are watching favorite TV show, playing favorite game, taking a walk, or reading favorite magazine or book.

Control: Tell patient living with kidney disease doesn't mean they must give up their goals and dreams. They may just need to change the way to do them. They can move toward their goals step by step (National Kidney Foundation, 2016).

Self-health monitoring------For the dimension of GH and RP

Recent studies have shown that remote monitoring via mobile health technology (mHealth) is an effective strategy for facilitating patient provider communication, improving health outcomes, increasing adherence to medical regimens and reducing costs in some chronic illnesses, meanwhile protecting patient privacy (Browning, McGillicuddy, Treiber & Taber, 2016). A great deal of research has shown people with ESRD tend to have a lot of underlying diseases, and a lot of drugs are needed to help with the treatment after kidney transplantation, the QoL after kidney transplantation are negatively impacted by poor medication adherence and suboptimal control of common comorbid medical conditions (underlying diseases), such as hypertension and diabetes (Geest *et al*., 1995; Nevins, Kruse, Skeans & Thomas, 2001; Vlaminck *et al.*, 2004;

Desmyttere, Dobbels, Cleemput & Geest, 2005). In other words, because of the lack of medication in time, or the blood pressure and blood sugar are not regularly tested, these can significantly affect the QoL and even restrict the daily activities. Self -health monitoring according to mHealth is important in order to keep track of the health changes, including pulse, blood pressure, blood sugar, so patients can remind self of taking medicine, which contributes to the recovery of the disease. Knowing the health in a timely manner can also increase confidence, so patients can take an active part in social activities and not worry about fainting at social events.

4.3 Methods discussion

In this review, the authors only searched for articles in one database ---PubMed. Therefore, the authors only found 10 articles they could use. The participants in these articles come from different countries, and the population characteristics are not representative enough. All of the articles the authors chose were quantitative articles, without any qualitative article, which may influence the results. For these ten articles, the authors' analysis was relatively simple. At the same time, the authors focused on the patient older than 19 years old, and didn't do research on patient younger than or equal to the age of 19 years.

4.4 Clinical implications for nursing

In this review, the authors summed up and introduced the instruments measuring QoL of kidney transplant patients, which can give advice to further researchers who study on QoL of kidney transplant patients. And then the authors summarized all dimensions of QoL, compared with norm, then combined with the KAP Model, put forward the targeted nursing intervention for the low dimensions, which is helpful for the nursing care of kidney transplant patients in clinical. In clinical work, the nurse can use the KAP model to give more health education to the kidney transplant patients, especially in developing good eating habits (Suckling & Swift, 2015; National Kidney Foundation, 2016), keeping proper physical exercise (National Kidney Foundation, 2014), guiding patients to do self-health monitoring (Browning, McGillicuddy, Treiber & Taber, 2016), and managing their emotions well (National Kidney Foundation, 2016).

4.5 Suggestions for future research

In future research, the authors suggest that number of participants and the scope of the survey can be expanded, more databases can be selected, and more kidney transplantation QoL measurement instruments should be researched. At the same time,

the authors think it is meaningful to pay attention to QoL kidney transplant patients who is less than or equal to 19 year old. It will help to make the results more comprehensive and representative, which is helpful for nurse to better understand the QoL of kidney Transplant Patients.

5. Conclusion

In this review, the authors finally found the patient's QoL after kidney transplant is lower than normal population for some dimensions. For the kidney transplantation patient, on the basis of understanding each QoL dimension's score, nurses can use the KAP Model to do targeted health education according to their actual situations. At the same time, nurses can provide more support to help patient adjust diet, do suitable exercise, manage emotions and do self-health monition, which help slowly improve their QoL.

References

Aasebø, W., Vesteraas, N. A. H., Hartmann, A., & Stavem, K. (2009). Life situation and quality of life in young adult kidney transplant recipients. *Nephrology Dialysis Transplantation, 24*, (1), 304–308.

Abacı, S. H., Alagoz, S., Salihoglu, A., Yalin, S. F., Gulcicek, S., Altiparmak, M. R., & Seyahi, N. (2015). Assessment of Anemia and Quality of Life in Patients With Renal Transplantation. *Transplantation Proceedings*, *47*, 2875-2880.

Browning, R. B., McGillicuddy, J. W., Treiber, F. A., & Taber, D. J.(2016). Kidney transplant recipients' attitudes about using mobile health technology for managing and monitoring medication therapy. *Journal of The American Pharmacists Association, 56*, (4), 450-454.

Cleary, A., & Dowling, M. (2009). Knowledge and attitudes of mental health professionals in Ireland to the concept of recovery in mental health: a questionnaire survey. *Journal of Psychiatric and Mental Health Nursing, 16*, (6), 539-545.

Czyżewski, Ł., Resmer, J. S., Wyzgał, J., & Kurowski, A. (2014). Assessment of Health-Related Quality of Life of Patients after Kidney Transplantation in Comparison with Hemodialysis and Peritoneal Dialysis. *Annals of Transplantation. 19*, 576-585.

Dawaki, S., Al-Mekhlafi, H. M., Ithoi, I., Ibrahim, J., Abdulsalam, A.M., Ahmed, A.,

… Atroosh, W. M. (2015). The Menace of Schistosomiasis in Nigeria: Knowledge, Attitude, and Practices Regarding Schistosomiasis among Rural Communities in Kano State. *PLOS ONE, 10*, (11).

Geest, S. D., Borgermans, L., Gemoets, H., Abraham, I., Vlaminck, H., Evers, G., & Vanrenterghem, Y. (1995). Incidence, determinants, and consequences of subclinical noncompliance with immunosuppressive therapy in renal transplant recipients. *Transplantation, 59*, (3), 340–347.

Desmyttere, A., Dobbels, F., Cleemput, I., & Geest S.D. (2005). Noncompliance with immunosuppressive regimen in organ transplantation: is it worth worrying about? *Acta Gastro-enterologica Belgica, 68*, (3), 347−352.

Dew, M.A., Switzer, G.E., Goycoolea, J.M., Allen, A.S., DiMartini, A., Kormos, R. L., & Griffith, B. P. (1997). Does transplantation produce quality of life benefits? A quantitative analysis of the literature. *Transplantation. 64*, (9), 1261 - 1273.

Evans, R.W., Manninen, D.L., Garrison, L.P., Hart, L.G., Blagg, C. R., Gutman, R. A., …, Lowrie, E. G. (1985). The quality of life of patients with end-stage renal disease. *The New England journal of medicine. 312*, (9), 553 - 559.

Frieling, M. A., Davis, W. R., & Chiang, G. (2013). The SF-36v2 and SF-12v2 health surveys in New Zealand: norms, scoring coefficients and cross-country comparisons. *Australian and New Zealand Journal of Public Health, 37*, (1), 24-31.

Fujisawa, M., Ichikawa, Y., Yoshiya, K., Isotani, S., Higuchi, A., Nagano, S., …, Kamidono, S. (2000). Assessment of health-related quality of life in renal transplant and hemodialysis patients using the SF-36 health survey. *Adult Urology, 56*, (2), 201-206.

Go, A. S., Chertow, G. M., Fan, D., Mcculloch, C. E., & Hsu, C. Y. (2004). Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. *The new England journal of medicine. 351*, (13), 1296-1305.

Hays, R. D., Kallich, J. D., Mapes, D. L., Coons, S. J., & Carter, W. B. (1994). Development of the kidney disease quality of life (KDQOL) instrument. *Quality of Life Research, 3*, (5), 329-338.

Jha, V., Garcia, G.G., Iseki, K., Li z., Naicker, S., Plattner, B., Saran, R., …, Yang, C.W. (2013). Chronic kidney disease: global dimension and perspectives, *Lancet, 382*, (9888), 260–272.

Kaasa, S., & Loge, J. H. (1998). Short Form 36 (SF-36) health survey: normative

data from the general Norwegian population. *Scandinavian journal of social medicine*, *26*, (4), 250-258.

Kovacs, A.Z., Molnar, M.Z. , Szeifert, L., Ambrus, C., Varga, M.M., Szentkiralyi, A., …, Novak, M. (2011), Sleep disorders, depressive symptoms and health-related quality of life—a cross-sectional comparison between kidney transplant recipients and waitlisted patients on maintenance dialysis. *Nephrology Dialysis Transplantation. 26*, 1058–1065.

Korevaar, J.C., Merkus, M.P., Jansen, M.A.M., Dekker, F.W., Boeschoten, E.W., & Krediet, R.T. (2002). Validation of the KDQOL-SFTM: A dialysis-targeted health measure. *Quality of Life Research. 11*, (5), 437–447.

Kostro, J. Z., Hellmann, A., Kobiela, J., Skóra, I., Niemierko, M.L., Slizien, A.D., & Sledzinski, Z. (2016). Quality of Life After Kidney Transplantation: A Prospective Study. *Transplantation Proceedings*, *48*, (1), 50-54.

Laupacis, A., Keown, P., Pus, N., Krueger, H., Ferguson, B., Wong, C., & Muirhead, N. (1996). A study of the quality of life and cost-utility of renal transplantation, *Kidney International. 50*, (1), 235 - 242.

Laupacis, A., Muirhead, N., Keown, P., & Wong, C. (1992). A disease-specific questionnaire for assessing quality of life in patients on hemodialysis. *Nephron*, *60*, (3), 302-306.

Laupacis, A., Pus, N., Muirhead, N., Wong, C., Ferguson, B., & Keown, P. (1993). Disease-specific questionnaire for patients with a renal transplant. *Nephron*, *64*, (2), 226 - 231.

Matsushita, K., Velde, M.V.D., Astor, B. C., Woodward, M., Levey, A.S. Jong, P.E.D., …, Manley T. (2010). Association of estimated glomerular filtration rate and albuminuria with all-cause and cardiovascular mortality in general population cohorts: a collaborative meta-analysis, *The Lancet. 375*, (9731), 2073–2081.

Naghavi, M., Wang, H. D., Lozano, R., Davis, A., Liang, X. F., Zhou, M. G., …, Marry, C.J.L. (2015). Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet*, *385*, (9963), 117-171.

National Kidney Foundation. (2017). Blood Tests for Transplant. Retrieved 2017 May 06 from https://www.kidney.org/atoz/content/BloodTests-for-Transplant

National Kidney Foundation. (2014). Exercise: What You Should Know. Retrieved 2018 Mar 21 from https://www.kidney.org/atoz/content/exercisewyska

National Kidney Foundation. (2016). Foods to Avoid After Transplantation Retrieved 2018 Mar 21 from https://www.kidney.org/atoz/content/foods-avoid-after-transplantation

National Kidney Foundation. (2017). Kidney Transplant. Retrieved 2017 May 07 from https://www.kidney.org/atoz/content/kidney-transplant

National Kidney Foundation. (2016). Managing Your Emotions While Living with Kidney Disease. Retrieved 2018 Mar 21 from https://www.kidney.org/atoz/content/managing-your-emotions-while-living-kidney-disease

Nevins, T. E., Kruse, L., Skeans, M. A., & Thomas, W. (2001). The natural history of azathioprine compliance after renal transplantation. *Kidney International*. *60*, (4), 1565–1570.

Pärna, K., Rahu, K., Barengo, N.C., Rahu, M., Sandström, P. H., Jormanainen, V. J., & Myllykangas, M. T. (2005). Comparison of knowledge, attitudes and behaviour regarding smoking among Estonian and Finnish physicians, *Public Health in Eastern Europe*, *50*, (6), 378-388.

Park, H.J., Kim, S., Yong, J.S., Han, S.S., Yang, D. H., Meguro, M., …, Kohzuki, M. (2007). Reliability and Validity of the Korean Version of Kidney Disease Quality of Life Instrument (KDQOL-SF). *Tohoku Journal of Experimental Medicine. 211*, (4), 321-329.

Polit, D.F., & Beck, C.T. (2017). (current edition) *Nursing Research. Generation and Assessing Evidence for Nursing Practice.* Wolters Kluwer/ Lippincott Williams & Wilkins.

Pfeil, A., Mutsch, M., Hatz, C. & Szucs, T.D., (2010). A cross-sectional survey to evaluate knowledge, attitudes and practices (KAP) regarding seasonal influenza vaccination among European travellers to resource-limited destinations. *Bmc Public Health*, *10*, (1), 1-7.

Purnell, T. S., Auguste, P., Crews, D. C., Lamprea-Montealegre, J., Olufade, T., Greer, R., …, Boulware, L.E. (2013). Comparison of Life Participation Activities Among Adults Treated by Hemodialysis, Peritoneal Dialysis, and Kidney Transplantation: A Systematic Review. *American Journal of Kidney Diseases, 62*, (5), 953-973.

Rebollo, P., Ortega, F., Ortega, T., Valdés, C., Mendoza, M. G., & Gómez, E. (2003). Spanish validation of the "Kidney Transplant Questionnaire": a useful instrument

for assessing health related quality of life in kidney transplant patients. *Health and Quality of Life Outcomes. 1*, (1), 1-9.

Rostami, Z., Tavallaii, S.A., Jahani, Y., & Einollahi, B., (2011). Assessment of quality of life in a single-center transplantation population using the Kidney Transplant Questionnaire-25 questionnaire. *Transplantation Proceedings .43*, (2), 590-591.

Singh, P., Ng, Y. H., & Unruh, M., (2016). Kidney Transplantation Among the Elderly: Challenges and Opportunities to Improve Outcomes. *Advances in Chronic Kidney Disease. Advances in chronic kidney disease, 23*, (1), 44-50.

Suckling, R. S., & Swift, P. A. (2015). The health impacts of dietary sodium and a low-salt diet. *Clinical Medicine. 15*, (6), 585-588.

Tayyebi, A., Raiesifar, A., Najafi, M. S., Ebadi, A., Einolahi, B., & Pashandi, S. (2012). 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. *Nephro-Urology Monthly*, *4*, (4), 617-621,

Terada, I., & Hyde, C., (2002). The SF-36: an instrument for measuring quality of life in ESRD patients. *Journal of Renal Care. 28*, (2), 73-76

Tritt, L. (2004). Nutritional assessment and support of kidney transplant recipients. *Journal of infusion nursing. 27*, (1), 45-51.

Virzì, A., Signorelli, M.S., Veroux, M., Giammarresi, G., Maugeri, S., Nicoletti, A., & Veroux, P. (2007). Depression and Quality of Life in Living Related Renal Transplantation. *Transplantation Proceedings. 39*, (6), 1791−1793.

Vlaminck, H., Maes, B., Evers, G., Verbeke, G., Lerut, E., Van, D.B., & Vanrenterghem, Y. (2004). Prospective study on late consequences of subclinical non-compliance with immunosuppressive therapy in renal transplant patients. *American Journal of Transplanation. 4*, (9), 1509 – 1513.

Ware, JE. Jr., Gandek, B., Kosinski, M., Aaronson, N. K., Apolone, G., Brazier, J., …, Thunedborg, K. (1998). The Equivalence of SF-36 Summary Health Scores Estimated Using Standard and Country-Specific Algorithms in 10 Countries: Results from the IQOLA Project. *Journal of Clinical Epidemiology, 51*, (11), 1167-1170.

Wei, T. Y., Chiang, Y. J., Hsieh, C. Y., Weng, L.C., Lin, S. C., & Lin, M. H. (2013). Health Related Quality of Life of Long-Term Kidney Transplantation Recipients. *Biomedical Journal. 36*, (5), 243-251.

Wei, H., Guan, Z., Zhao, J., Zhang, W., Shi, H., Wang, W., …, Shi, B. (2016).

Physical Symptoms and Associated Factors in Chinese Renal Transplant Recipients. *Transplantation Proceedings. 48*, (8), 2644-2649.

Weng, L.C., Dai, Y.T., Huang, H.L., & Chiang, Y.J. (2010). Self-efficacy, self-care behaviors and quality of life of kidney transplant recipients. *Journal Of Advanced Nursing. 66*, (4), 828-838.

World Health Organization. (1997). Measuring Quality of Life. Retrieved 2017 May 05 from http://www.who.int/mental_health/media/68.pdf

Zheng, X.Y., Han, S., Wang, L.M., Zhu, Y.H., Zeng, L., & Zhou, M.S. (2014). Quality of Life and Psychology After Living-related Kidney Transplantation From Donors and Recipients in China. *Transplantation Proceedings*. *46*, (10), 3426-3430.

Appendix 1

Table 7. Overview of selected articles.

	Authors	Title	Design(possibly approach)	Participants	Data collection method(s)	Method(s) of data analysis
1	Virzì A. , Signorelli M.S. , Veroux M. , Giammarresi G. , Maugeri S. , Nicoletti A. and Veroux P.	Depression and Quality of Life in Living Related Renal Transplantation （2007）	a prospective, longitudinal study	In the study period, 48 donor-recipient pairs consented to participate: 32 pairs were parent to adult child; 12 spousal; and four siblings. Only adult subjects (18 years) were included in this study as agreed with the local ethics committee.	Using a clinical interview, according to the Diagnostic and Statistical Manual of Mental Disorders Criteria and the structured interview for renal transplantation. They were also evaluated with psychodiagnostic tests: mini-	

			mental state; Hamilton Rating Scale for Depression, Hamilton Anxiety Scale; Self-Rating Anxiety Scale (SAS); Short-Form 36 Health Survey Questionnaire (SF-36). The structured Interview for renal transplantation, both for recipients and for donors;

2	Aasebø W. , Vesteraas N. A. H. , Hartmann A. , and Stavem K.	Life situation and quality of life in young adult kidney transplant Recipients（2009）	Survey	The questionnaire were mailed to all 280 renal transplant recipients in Norway between 18 to 35 years of age at the time of investigation of whom 131 (47%) responded. For comparison, they used 2,360 respondents aged 18 to 35 years from a general population survey in one Norwegian county.	Questionnaire, including items on life situation, lifestyle, and the SF-36 HRQoL questionnaire	Results are presented with the mean (SD), median (25th–75th percentile), or number and percent. They compared groups using a two-sample t-test or Fisher′s exact test, or the Mann–Whitney U-test.
3	Weng L. C. , Dai Y. T. , Huang H. L. and Chiang Y. J.	Self-efficacy, self-care behaviours and quality of life of kidney transplant Recipients（2010）	an exploration study	Patients who had received kidney transplants were recruited from the outpatient clinic of a 3,000-bed tertiary	a self-administered questionnaire(SF-36, Kidney Transplantation Self-	Data were primarily analysed by path analysis. Hypothesized relationships among variables were examined by multiple linear

		private hospital in northern Taiwan. To be included in the study, they had to (i) have received a KT at least 6 months and no longer than 10 years prior; (ii) be at least 18 years old; (iii) be in a stable medical condition; and (iv) agree to participate. The final sample included 150 KT recipients (150/155, 96.8%).	Management Scale, Kidney Transplantation Self-Care Self-Efficacy Scale, 21-item Chinese version of the Beck Depression Inventory.). Clinical data were retrieved from participants′ medical records.	regression analysis. The measurement of self-efficacy was based on the data collected at the first point in time, while the measurement of self management and QOL was based on data collected at the second point.Other data, which served as control variables, were used for the first-time data in the regression model.

4	Kovacs A. Z. , Molnar M. Z. , Szeifert L , Ambrus C. , Varga M. M. , Szentkiralyi A. , Mucsi I. and Novak M.	Sleep disorders, depressive symptoms and health-related quality of life—a cross-sectional comparison between kidney transplant recipients and waitlisted patients on maintenance dialysis （2011）	A cross-sectional study	Eight hundred and eighty-eight prevalent Tx patients followed at a single outpatient transplant clinic and 187 WL patients treated with maintenance dialysis. The Tx patients are greater than 18 years old and in stable period. The dialysis patient who had been receiving dialysis for at least 1 month is included.	Demographic information and medical history, Laboratory data, Medical records, KDQoL-SFTM questionnaire, Center for Epidemiologic Studies Depression (CES-D) questionnaire, RLS questionnaire (RLSQ), Athens Insomnia Scale (AIS), Berlin Sleep Apnoea Questionnaire	Use the Student's t-test or the Mann-Whitney U-test to compare continuous variables between the Tx vs WL groups. Categorical variables were analysed with the chi-square test. Use Mann–Whitney U-test to compare QoL scores between WL vs Tx groups. Use multiple linear regression models to assess the independent association between quality of life scores and RRT. The skewed QoL scores were natural log-transformed. Independent variables were entered in blocks.

5	Wei T. Y., Chiang Y. J., Hsieh C. Y., Weng L.C., Lin S. C. and Lin M. H.	Health Related Quality of Life of Long-Term Kidney Transplantation Recipients （2013）	a cross-sectional and correlational design	In Northern Taiwan from November 2009 to September 2010Be recruited by convenience sampling, all of them received kidney transplants. Inclusion criteria: (1) have received a kidney transplant before 1998; (2) be at least 18 years old at the time of data collection; (3) have a functional graft; (4) be in stable medical condition; (5) regularly follow up at the study unit.Of these patients, 140 fit the inclusion criteria.A total of 88 patients were interviewed during the data collection period, other 52 patients be excluded by did not return to the clinic, changed follow-up hospital, or had not returned the questionnaire after	Medical Outcome Survey (MOS SF-36) questionnaire; participants′ medical records; A self-administered questionnaire	The demographic characteristics, disease-related factors, and HRQOL were described by descriptive statistics (e.g., means, standard deviations, frequencies, percentages), Independent-sample *t*-tests were used to determine differences in HRQOL based on demographic data. Pearson correlations were used to analyze the relationship between the study variables. One sample *t* -test was used to compare the HRQOL between this study finding and the general population. The multiple linear regression plus forced enter method was used to examine the influential factor of HRQOL.

		being reminded.participants group VS general group: in average of age (years) (49 vs. 50, p = 0.56), gender (number of male) (40 vs. 27, p = 0.57), mean serum creatinine level (mg/dl)(1.49 vs. 1.36, p = 0.19), or average years after transplantation (14.4 vs. 14.7, p = 0.64)

6	Czyżewski Ł. , Resmer J. S. , Wyzgał J. , and Kurowski A.	Assessment of Health-Related Quality of Life of Patients after Kidney Transplantation in Comparison with Hemodialysis and Peritoneal Dialysis (2014)	Survey	120 patients divided into 3 groups depending on RRT method: 30 peritoneal dialysis (PD) patients, 40 hemodialysis (HD) patients, and 47 post-kidney transplantation (KTx) patients	disease history; KDQOL-SF; SF-36	Results from quantitative variables are presented as average values±standard deviation (SD) Comparative description of HRQOL of patients in the 3rd and 12th month after KTx use the t-test for connected variables Pearson correlation analysis was used to compare HRQOL and results of laboratory and anthropometric Measurements The single-variation ANOVA and post-hoc NIR test were used to compare HRQOL measurements between PD, HD, and KTx groups For statistical analysis, Statistica 10 was used.

7	Zheng X.Y. , Han S., Wang L.M. , Zhu Y.H. , Zeng L. , and Zhou M.S.	Quality of Life and Psychology After Living-related Kidney Transplantation From Donors and Recipients in China （2014）	RCT	169 pairs of living-related kidney donors and recipients(control group); 100 patients undergoing maintenance hemodialysis(randomized)； Inclusion criteria: older than 18 years of age; have been on hemodialysis for duration of more than 3 months; have an awareness of the situation; have no serious heart, brain, or lung complications; have no difficulty in reading and comprehension; and that the patients have volunteered to participate in the survey.	a self-made socio-demographic questionnaire, the short-form 36 health survey (SF-36), Zung self-rating anxiety (SAS) and depression scales (SDS)	The quantitative data were described as mean values± standard deviations, and the qualitative data were expressed as the number of cases and percentage. Intergroup comparison was performed by the Student t-test.
8	Abacı S.H. , Alagoz S. , Salihoglu A. , Yalin S.F. , Gulcicek	Assessment of Anemia and Quality of Life in Patients	Survey	In the study only renal transplant patients were included----200	Questionnaire and patient interview, by	Data were expressed as mean values standard deviation. Parametric

	S. , Altiparmak M.R. , and Seyahi N.	With Renal Transplantation (2015)	consecutive renal transplant recipients followed up at the Transplantation Outpatient Clinic of Cerrahpasa Medical Faculty, Istanbul University, were examined, Amputees, hemiplegic or paraplegic patients, patients with hematologic or solid organ. malignancies, dementia, impaired cognitive function, and those who did not give consent were excluded.	using the Kidney Disease and Quality of Life Short Form (KDQOL-SF).	variables were compared by the independent samples t-test, and nonparametric variables by the chi-square test. The relationship between the parametric variables was analyzed by using the Pearson correlation test. Factors affecting anemia were assessed by the multivariate logistic regression analysis, using forward selection method.

9	Kostro J. Z. Hellmann A. , Kobiela J. , Skóra I. , Niemierko M. L. , Slizien A. D. , Sledzinski Z.	Quality of Life After Kidney Transplantation: A Prospective Study (2016)	A prospective, single-center, 2-year study	A total of 162 patients operated during these 2 years were screened, yielding an enrollment of 69 KTx patients. Patients with ESRD were divided into 2 groups: those previously treated with HD (n ¼ 44 patients; group 1) or PD (n ¼ 25 patients; group 2).	KDQOL-SFtm questionnaire	The scoring procedure for the KDQOL-SFtm first transformed the raw pre-coded numeric values of times to a 0- to 100-point scale. With higher scores reflecting a better QoL. Use the Kolmogorov-Smirnov test for normality to analyse all the comparisons. Results were presented as an average value and standard deviation.
10	Wei H., Guan Z., Zhao J., Zhang W. , Shi H. , Wang W. , Wang J., Xiao X. , Niu Y., and Shi B.	Physical Symptoms and Associated Factors in Chinese Renal Transplant Recipients（2016）		From April 2013 to July 2014, in the organ transplant center of the General Hospital of the Chinese People's Armed Police Forces, a total of 274 consecutive renal transplant recipients were enrolled using a convenience sampling method. Inclusion criteria: age≥ 18 years old, primary	Using a general situation questionnaire, the Kidney Transplant Questionnaire, the Perceived Health Competence	Quantitative variables were expressed as medians and interquartiles (25^{th}-75th percentiles). Categorical variables were reported as numbers and percentages. Between-group differences were tested for significance using the Mann-Whitney test and Kruskal-Walls test. Correlations

		renal transplantation, duration from transplantation >3 months, and stable renal allograft function; the patient were capable of reading and understanding the questionnaire supplied and were willing to voluntarily participate this study. Excluded criteria: Patients who received ≥2 organ transplants or artificial organs, or had serious complications such as heart, brain, lung, and psychiatric disorders.	Scale	between self-efficacy and symptom distress in kidney transplant recipients were analyzed using Spearman's rank correlation test.

Appendix 2

Table 8. Overview of selected articles.

	Authors	Title	Aim	Results	QoL
1	Virzì A. , Signorelli M.S. , Veroux M. , Giammarresi G. , Maugeri S. , Nicoletti A. and Veroux P.	Depression and Quality of Life in Living Related Renal Transplantation (2007)	The present study was designed specifically to evaluate the anxious and depressive symptom frequency and prevalence among recipients and living donors as well as how they may influence postoperative compliance and	Physical activity 72±24.3 vs 76.7±15.6 . Physical role 38±30.7 vs 58.2±21.7 . Pain 32.3±15.5 vs 21±17.2 . Health 70.3±13.6 vs 77.7±12.3 . Vitality 56±15.3 vs 63.4±8.4 . Social activity 49.3±14.8 vs 61.7±15.9 . Mental health 60.1±13.6 vs 76.8±8.5 .	Physical activity; Physical role; Pain; Health; Vitality; Social activity; Mental health

			quality of life.		
2	Aasebø W. , Vesteraas N. A. H. , Hartmann A. , and Stavem K.	Life situation and quality of life in young adult kidney transplant Recipients （2009）	The aim of this study was to describe the life situation, lifestyle and common activities of daily life in young adult kidney transplant recipients aged 18–35 years.	Physical functioning 86.6 (1.5) vs 94.1 (0.2) Role limitations—physical 74.2 (3.0) vs 89.7 (0.5) Bodily pain 76.4 (2.3) vs 80.1 (0.5) General health 60.2 (1.4) vs 80.8 (0.4) Vitality 55.8 (1.9) vs 60.7 (0.4) Social functioning 80.0 (2.2) vs 89.4 (0.4) Role limitations—emotional 75.5 (3.1) vs 90.0 (0.5) Mental health 76.7 (1.5) vs 80.1 (0.3)	Physical; bodily pain; general health; vitality; social functioning; role limitations—physical; role limitations—emotional and mental health.
3	Weng L. C. , Dai Y. T. , Huang H. L. and Chiang Y. J.	Self-efficacy, self-care behaviours and quality of life of kidney transplant	The aim of the study was to explore the effects of self-efficacy and different dimensions of self-	Physical function 82.5 ±17.5 Role-physical 62.2 ± 39.2 Bodily pain 84.9 ± 18.7 General health 59.3 ± 20.4 Vitality 60.2 ± 18.3 Social function 78.2 ± 18.9	Physical function; Role-physical; Bodily pain; General health; Vitality; Social function; Role-emotional; Mental health.

		Recipients (2010)	management on quality of life among KT recipients.	Role-emotional 70.7 ± 37.0 Mental health 67.4 ± 18.0	
4	Kovacs A. Z. , Molnar M. Z. , Szeifert L , Ambrus C. , Varga M. M. , Szentkiraly i A. , Mucsi I. and Novak M.	Sleep disorders, depressive symptoms and health-related quality of life—a cross-sectional comparison between kidney transplant recipients and waitlisted patients on	Tested if Tx patients have better HRQoL compared to waitlisted (WL) patients treated with dialysis after extensive adjustment for covariables.	Table 1: Tx patients had significantly longer cumulative ESRD‘vintage’, higher Hb and higher serum albumin compared to the WL group. Sleep disorders were more frequent among WL compared to Tx patients, except high risk of OSAS(obstructive sleep apnoea), as reported by our group. WL patients had higher CES-D scores compared to the Tx group, indicating more severe depressive symptomatology. Table 2: The WL and Tx patients were have big differences when using SF-36 in terms of: physical functioning (70 vs 80; P-value=0.001; Cohen’s d=0.24), General health perception (35 vs 30; P-value<0.001, Cohen’s d=0.65), Emotional well-being (72 vs 36; P-value=0.003; Cohen’s d=0.25), Energy/fatigue (60 vs 35; P-value<0.001; Cohen’s	1. General health perception kidney disease-targeted domains: 2. Symptoms/problems 3. Burden of kidney disease 4. Effects of kidney disease

		maintenance dialysis (2011)		d=0.32). In kidney disease-targeted domains: Symptoms/problems (82 vs 23; P-value<0.001; Cohen's d=0.41), Burden of kidney disease (50 vs 38; P-value<0.001; Cohen's d=0.90), Effects of kidney disease (69 vs 28; P-value<0.001; Cohen's d=0.70), Sleep (65 vs 30; P-value<0.001; Cohen's d=0.32).The effect sizes were small for the SF-36 domains, except for the 'general health perceptions'sub-scale, which was 0.65, and medium–big for the kidney disease-targeted domains, except for 'sleep', which was 0.32.	
5	Wei T. Y., Chiang Y. J., Hsieh C. Y., Weng L.C., Lin S. C. and Lin M. H.	Health Related Quality of Life of Long-Term Kidney Transplantation Recipients (2013)	To describe the long-term (10-year) Health related quality of life (HRQOL) of KT recipients.	Our long-term KT patients, in comparison to the general population, had significantly lower mean scores on seven subscales: PF (80.2 vs. 92.2), RP (67.9 vs. 83.6), GH (59.4 vs. 69.2), VT (61.4 vs. 68.2), SF (76.5 vs. 86.8), RE (70.0 vs. 79.4) and MH (68.4 vs. 73.0). This indicates that the HRQOL of long-term KT patients was poorer than that of the general population. Mean scores on the remaining	1. Physical function 2. Role physical 3. Bodily pain 4. General health perception 5. Vitality 6. Social function 7. Role-emotion

				subscale, BP, were similar to those of the general population (82.5 vs. 84.8). Whether female or male, long-term KT recipients experience more limited well-being in terms of physical functioning, role functioning, health perceptions, vitality and social functioning. In summary, the HRQOL of long-term KT patients is poorer than that of the general population, except in regard to bodily pain (BP subscale).	8. Metal health
6	Czyżewski Ł. , Resmer J. S. , Wyzgał J. , and Kurowski A.	Assessment of Health-Related Quality of Life of Patients after Kidney Transplantation in Comparison	To compare the health-related quality of life (HRQOL) of end-stage renal disease (ESRD) patients depending on renal replacement therapy(RRT) method.	The evaluation of PCS by HD and PD patients was poorer compared to patients in the 3rd and 12th month after KTx (34.7±7.4 vs. 37.51±10.63 vs. 45.01±9.43 vs. 45.55±8.62; respectively), including physical functioning (49.78±25.37 and 52.14±18.58 vs.71.67±19.33 and 76.43±23.35; $p < 0.05$; respectively), bodily pain (45.50±29.79 and 65.89±28.09 vs.78.06±23.69 and 66.79±29.48; $p<0.05$), General health(28.00±12.29 and 42.14±19.29 vs.45.00±24.19 and 43.81±22.13,	Physical functioning; Pain; General health; Effects of kidney disease; Burden of kidney disease; Work status; Quality of social interaction; Sleep; Overall health

		with Hemodialysis and Peritoneal Dialysis （2014）		p<0.05), Quality of social interaction(72.00±15.96 and 85.13±11.27 vs. 70.00±20.61 and 74.92±18.25, p<0.05), effects of kidney disease (53.97±19.64 and 65.11±12.77 vs.75.69±18.14 and 78.79±19.44; p<0.05; respectively), burden of kidney disease (30.00±20.79 and 54.33±20.63 vs. 48.26±30.53 and 55.95±29.81; p<0.05; respectively), work status (44.44±46.40 and 28.57±37.80 vs. 25.00±35.36 and 42.86±45.51; p<0.05; respectively), sleep (56.67±19.76 and 68.27±18.85 vs. 69.03±16.18 and 71.90±16.78; respectively), and overall health (42.22±13.02 and 57.14±17.73 vs. 61.67±20.65 and 65.24±16.32; p<0.05; respectively).	
7	Zheng X.Y. , Han S., Wang L.M. , Zhu Y.H. , Zeng L. , and Zhou	Quality of Life and Psychology After Living-related Kidney Transplantati	To investigate the donation experience, the postoperative QOL, and the psychological status of living-	Comparison of the SF-36 scores from the recipients with hemodialysis patients is presented in Table 3: physiological function (80.11±10.44 vs 67.90±19.18); physiological role (73.78±30.33 vs 34.77±27.05); physical pain (72.08±16.64 vs 61.53±20.26); general health (66.57±18.20 vs 39.68±18.40); vitality (64.39± 13.49 vs	1. physiological function 2. physiological role 3. physical pain 4. general health 5. Vitality 6. social function 7. emotional role 8. mental health 9. anxiety and depression

M.S.	on From Donors and Recipients in China (2014)	related kidney donors and recipients.	46.23±17.16); social function (74.80±22.55 vs 54.92±23.56); emotional role (77.35±29.59 vs 42.48± 32.27); mental health (72.46±13.70 vs 58.60±15.09). There was no significant difference in demographic data between the recipients and the hemodialysis patients who had been on hemodialysis for 3w83 months (median time of 37 months). The results showed that the scores of the recipients were significantly higher than those of the hemodialysis patients in both physical health and psychological health (P < .001). The postoperative SAS scores of the recipients were 25w61 (mean, 37.89 9.43), which were significantly higher than that of the Chinese norm (29.78 0.46) [9] (P < .01), but lower than those of the hemodialysis patients. (50.27±12.11; P < .01). The postoperative SDS scores of the recipients were 25w58 (mean, 42.35±10.68), which showed no significant differences compared to the Chinese

				norm, but they were significantly lower than those of the hemodialysis patients (51.36 11.63; P < .01).	
8	Abacı S.H. , Alagoz S. , Salihoglu A. , Yalin S.F. , Gulcicek S. , Altiparmak M.R. , and Seyahi N.	Assessment of Anemia and Quality of Life in Patients With Renal Transplantation (2015)	To identify the frequency of anemia and associated factors and demonstrate its implications on the quality of life in renal transplant patients.	According to the KDQOL-SF, SF-12 mental health component scores of those with anemia was significantly lower than those without anemia(42.2 ± 11.4 vs 46.9 ±8.9, P = 0.024), no difference was noted between the two groups in terms of quality of life measure.	Anemia→ mental health
9	Wei H., Guan Z., Zhao J., Zhang W. , Shi H. , Wang W. ,	Physical Symptoms and Associated Factors in Chinese	To investigate physical symptoms in renal transplant recipients as well as the correlation between self-	Only 27 cases (9.85%) reported a symptom distress score of <3.5, a cutoff score that indicated a serious level of distress that was related to a worse quality of life in renal transplant recipients. The median score for the distress caused by physical symptoms was 5.33 (interquartile range [IQR], 4.29e6.33),	1. Physical symptom distress 2. Fatigue 3. Uncertainty/fear 4. Appearance 5. Emotional

	Wang J., Xiao X. , Niu Y., and Shi B.	Renal Transplant Recipients (2016)	efficacy and symptom distress.	suggesting that the perceived physical symptoms or problems did not bring serious distress in the overall patient population. Among the 5 KTQ dimensions, the uncertainty/fear dimension showed the lowest median score of 4.63 (IQR, 3.5e5.5), and 61 patients (22.27%) reported a score of <3.5, making uncertainty/fear the most important factor that affects the quality of the life of renal transplant recipients. On the contrary, the appearance dimension exhibited the highest median score of 6.5 (IQR, 6.0e7.0), and only 5 transplant recipients reported a score of <3.5. Thus, appearance seemed to be the factor that contributed the least to a poor quality of life.	
10	Kostro J. Z. Hellmann A. , Kobiela J. , Skóra I. , Niemierko	Quality of Life After Kidney Transplantation: A Prospective	To evaluate the quality of life in patients with ESRD who were previously treated with hemodialysis	Effects of kidney disease(52 and 56 vs. 78 and 81, p<0.001), cognitive function(67 and 77 vs. 59 and 74, p<0.05), quality of social interaction(72 and 69 vs. 79 and 78, p<0.05), sexual function(54 and 61 vs.72 and 77, p<0.05), sleep(51 vs. 69 and 70, p<0.05), social support(69 vs. 83, p<0.001), patient	effects of kidney disease, cognitive function, quality of social interaction, sexual function, sleep, social support, patient satisfaction, general health

	M. L. , Slizien A. D. , Sledzinski Z.	Study （2016）	(HD) or peritoneal dialysis (PD) before KTx and then after kidney transplantation both transversely and longitudinally	satisfaction(41 and 46 vs. 57 and 60, p<0.05), physical functioning(58 and 55 vs. 74 and 68, p<0.05), physical role(15 and 23 vs. 52 and 46, p<0.05), pain(52 and 56 vs. 67 and 70, p<0.05), General health(32 vs. 40, p=0.045), emotional well-being(45 and 44 vs. 63, p<0.001), emotional role(30 and 45 vs. 65 and 68, p<0.05), and energy/fatigue(41 and 43 vs. 60 and 58, p<0.05).	status, physical functioning, physical role, pain, emotional well-being, emotional role, and energy/fatigue,General health