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Observational Study of Changes in Psychosocial Quality of Life in Older Hemodialysis Patients in a Tertiary Care Hospital

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Abstract

India has a significant elderly population, with statistics highlighting its size and importance. As of 2021, the elderly population (aged 60 years and above) in India numbered around 139 million, accounting for approximately 10% of the total population. The country is witnessing a gradual rise in the proportion of elderly citizens due to increased life expectancy and declining birth rates. This demographic shift poses challenges and opportunities, including healthcare and social welfare needs. Adequate attention and policies are crucial to address the evolving requirements of this growing elderly population in India. (Liyanage, T., 2022). Chronic illness like end-stage renal failure has a significant detrimental effect on patients' health-related Almost all aspects of their everyday lives have been severely limited or impaired, which has a negative impact on their quality of life. Although hemodialysis therapy has come a long way, patients still face physical, psychological, economic, and social issues that lower their quality of life. (Hamer, R.A. and El Nahas, A.M., 2006, 563).

Keywords: Health-related quality of life (HR-QOL), Hemodialysis, Elderly Patients

1. Introduction

India has a significant elderly population, with statistics highlighting its size and importance. As of 2021, the elderly population (aged 60 years and above) in India numbered around 139 million, accounting for approximately 10% of the total population. The country is witnessing a gradual rise in the proportion of elderly citizens due to increased life expectancy and declining birth rates. This demographic shift poses challenges and opportunities, including healthcare and social welfare needs. Adequate attention and policies are crucial to address the evolving requirements of this growing elderly population in India. (Liyanage, T., 2022). Chronic illness like end-stage renal failure has a significant detrimental effect on patients' health-related Almost all aspects of their everyday lives have been severely limited or impaired, which has a negative impact on their quality of life. Although hemodialysis therapy has come a long way, patients still face physical, psychological, economic, and social issues that lower their quality of life. (Hamer, R.A. and El Nahas, A.M., 2006, 563).

ESRD and the experience of undergoing dialysis can have significant psychological effects on patients. Some of these stressors may include financial burden of dialysis, time commitment for dialysis, feeling like a burden to

others, fearing that dialysis may cause pain, unable to have restful sleep, changes in employment and eating restrictions. (Robinson, B.M., 2014, 158).

Health-related quality of life (HR-QOL) is a critical measure of overall well-being and functional status in patients undergoing hemodialysis, a treatment for end-stage renal disease (ESRD). (Rao, M.,1998, 2494). Hemodialysis patients often experience multiple physical and psychological burdens, affecting their HR-QOL. Studies have shown that these patients commonly report impaired HR-QOL, including decreased physical functioning, increased fatigue, and emotional distress. Factors influencing HR-QOL in hemodialysis patients include treatment adherence, comorbidities, dialysis adequacy, social support, and socioeconomic status. Addressing these factors through comprehensive care and support services, including psychological counseling, physical rehabilitation, and patient education, can significantly improve HR-QOL outcomes for hemodialysis patients. (Chen, S.S., Al Mawed, S. and Unruh, M., 2016, 218).

Despite advances in dialysis procedures, death rates are still significant, particularly for elderly patients. Additionally, mortality risk is very high wherever soon after hemodialysis begins. In older patients as opposed to younger ones, the functional impairment of the illness is more directly associated with early mortality. This study is aimed to assess the health-related quality of life and its changes in older hemodialysis patients to demonstrate characteristics associated with health-related quality of life. (Manavalan, M., 2017, 37)

2. Objectives

1. To study the changes in health-related quality of life in older hemodialysis patients diagnosed as chronic kidney disease. The Kidney Disease Quality of Life Short Form (KDQOL-SF) questionnaire is a widely used scale to assess health-related quality of life (HR-QOL) in older hemodialysis patients. The KDQOL-SF is a specific tool designed to measure the impact of kidney disease and its treatment on patients' physical, mental, and social well-being.
2. To assess the distribution of co-morbid conditions according to the age groups.
3. To find the association between age group and able to work.
4. To find the comparison of age groups with respect to BMI, Blood Flow Rate, HB, Urea, Creatinine, Albumin, KT/V.
5. To find the comparison of age groups with respect to PCS and MCS

3. Methods

The KDQOL-SF combines the generic Short Form Health Survey (SF-36) and the kidney disease-specific components. (Lowrie, E.G., Curtin, R.B., LePain, N. and Schatell, D., 2003, 1286). It consists of various domains, including physical functioning, role limitations, emotional well-being, social functioning, burden of kidney disease, symptom/problem list, and dialysis staff encouragement. These domains provide a comprehensive assessment of different aspects of HR-QOL relevant to hemodialysis patients. (Perl, J., and Karaboyas, 2017, 521)

By using the KDQOL-SF questionnaire, healthcare providers can gather valuable information about the patient's perceptions and experiences related to their health and well-being. This information aids in understanding the impact of kidney disease and dialysis treatment on various aspects of a patient's life and can guide healthcare interventions and support services to improve HR-QOL outcomes in older hemodialysis patients. (Pisoni, R.L., 2004, 7). The study was performed in the HD unit of Saveetha Medical College hospital, Chennai between September 2021 and February 2022 (6 months). The study has been approved by the Institutional Review Board (IRB), Saveetha College of allied health science. All patients aged more than 58 years, who were able to respond appropriately to the question about time to recover from dialysis session and who were on MHD for at least 1 year were included in the study. The 60 patients undergoing MHD at our unit were screened for eligibility in the first 2 weeks of the study period. A total of 54 patients were identified and informed consent was obtained for participation in the study. Later, patient recruitment and data collection were completed for all patients over 5 months.

All patients were maintained on conventional in-centre HD at least twice per week either through the arteriovenous fistula (AVF) or internal jugular venous catheter (IJVC) and were dialysed using Fresenius 4008S machines with NIPRO-ELISIO 15 M polynephron dialyser with dialyser surface area of 1.5 m2. The dry weight was fixed for

each patient every month. The blood flow rate was usually fixed at 300 mL/min for AVFs and 250–300 mL/min for IJVC with dialysate flow rate fixed at 800 mL/min. Demographic and clinical data collected included age, gender, body mass index (BMI), employment status, co-morbidities, dialysis vintage, duration of chronic kidney disease CKD. Pre-HD blood samples were collected before the 1st dialysis session and laboratory parameters like haemoglobin, urea, creatinine, serum albumin was measured. Dialysis related parameters like blood flow rate, KT/V, PCS, MCS are recorded. (Mapes, D.L., 2003, 339). All patients were asked to complete the Kidney Disease Quality of Life Short Form (KDQOL- SF) V. 1.3 questionnaire to assess the HRQOL. It is a validated questionnaire that combines the generic SF-36 with a kidney disease-specific instrument. This study was a prospective Observational Study. The questionnaire has been validated in the Indian population and a study with a translated Tamil version. Sample was collected in the Dialysis unit, Department of Nephrology at Saveetha Medical College and Hospital Thandalam.60 patients were selected for this study depending on the inclusion criteria. 1 patient dropped out of the study and 5 patients died during the study process.

Inclusion Criteria:

a) ESRD patients age of 58> on maintenance hemodialysis.
b) Minimum period for which the patients are on regular hemodialysis is 1 year.
c) Patients who give a valid consent and willing to participate in the study.

Exclusion Criteria:

a) Past history of any primary psychiatric illness
b) Critically ill patients.
c) Patients with dependence pattern of substance abuse within this past 6-month period

4. Results

A total of 60 participants were in included in the study, in that 1 patient was drop out and 5 patients were declared during the study process. A sample of 54 patients was selected in different age groups and PCS and MCS scores were recorded and compared. The following tables and figures represent the observation, results and discussion.

Table 1: Distribution of Gender

Gender	Number of Respondents	Percentage
Male	44	81.5
Female	10	18.5
Total	54	100

It is observed from the Table 1 that 81.5% of the patients are male and 18.5% of the respondents are female.

Table 2: Distribution of age

Age group	Number of Respondents	Percentage
58-67 years	33	61.1
68-77 years	15	27.8
Above 78 years	6	11.1
Total	54	100

It is observed from the Table 2 that 61.1% of the patients are in the age group of 58-67 years, 27.85% of the patients belongs to the age group of 68-77 years and 11.1% of the patients belong to the age group of above 78 years.

Table 3: Distribution of Co-Morbid conditions according to the age groups

			Age group			Total
			58-67 years	68-77 years	Above 78 years	
	Cardio Vascular Disease	N	4	1	1	6
		%	12.1	6.7	16.7	100
	Diabetes	N	14	10	3	27
		%	42.4	66.7	50.0	100
	DM, Cerebrovascular disease	N	1	0	0	1
		%	3.0	-	-	100
	Hypertension	N	3	1	1	5
		%	9.1	6.7	16.7	100
	Hyperthyroidism	N	1	0	0	1
		%	3.0	-	-	100
	NIL	N	10	3	1	14
		%	30.3	20	16.7	100
Total		N	33	15	6	54
		%	61.1	27.8	11.1	100

Table 3 depicts the Co-Morbid conditions according to the age groups. It is noted that in the age group of 58-67 years, 42.4% of them are reported with Diabetes, 12.1% of them are reported with cardiovascular disease, 9.1% reported with Hypertension,30.3% of them are reported with no comorbidities and remaining are affected by other comorbidities. It is noted that in the age group of 68-77 years, 66.7% of them are reported with Diabetes, 20% of them are reported with no comorbidities and remaining are affected by other comorbidities. It is observed that 50% of them are reported with Diabetes, 16.7% of them are not reported with any of the comorbidities and remaining is affected by other comorbidities.

Association Between Age Group and Able to Work

To assess the association between Age group and Able to work, Chi-square test is performed to identify the association between Age group and Able to work. The cross tabulation between type of Age group and Able to work is presented in the Table 4. Null hypothesis H01: There is no significant association between Age group and Able to work.

Table 4: Association between Age group and Able to work

			Age group			**Total**	**Chi-Square**
			58-67 years	**68-77 years**	**Above 78 years**		
Able to Work	Yes	N	27	11	3	41	4.011* (p=.026)
		%	65.9	26.8	7.3	100	
	No	N	6	4	3	13	
		%	46.2	30.8	23.1	100	
Total		N	33	15	6	54	
		%	61.1	27.8	11.1	100	

* Significant at 5% level

From the Table-4 it is observed that there is significant association between Age group and Able to work. Chi-square value (4.011) shows that the null hypothesis H01 is rejected at 5% level. Hence it is concluded from the analysis that increasing Age group and Able to work are well associated. From the Table-8, it is evident that most of the patients in the age group of 58-67years (65.9%) are able to work. Also, it is noted that only 7.3% of the patients in the age group of above 78 years are able to work.

Comparison of age groups with respect to BMI, Blood Flow Rate, HB, Urea, Creatinine, Albumin, KT/V

A sample of 54 patients was selected. BMI, Blood Flow Rate, HB, Urea, Creatinine, Albumin, KT/V were recorded with three different age groups 58-67 years, 68-77 years and above 78 years. To compare different age groups with respect to BMI, Blood Flow Rate, HB, Urea, Creatinine, Albumin, KT/V one–way ANOVA is used. The results are displayed in the Table-5. Null hypothesis H02: There is no significant difference between age groups with respect to (i) BMI (ii) Blood Flow Rate (iii) HB (iv) Urea (v) Creatinine (vi) Albumin (vii) KT/V.

Table 5: Difference between age groups with respect to BMI, Blood Flow Rate, HB, Urea, Creatinine, Albumin, KT/V.

	Classification	**Mean**	**S D**	**F-value**
BMI	58-67 years	22.22	4.245	1.887 (p=.162)
	68-77 years	19.86	2.648	
	Above 78 years	21.91	4.843	
Blood Flow Rate	58-67 years	245.45	22.925	0.371 (p=.692)
	68-77 years	252.00	27.825	
	Above 78 years	250.00	31.622	
HB	58-67 years	9.15	1.478	0.648 (p=.527)
	68-77 years	8.87	1.773	
	Above 78 years	8.41	1.271	
Urea	58-67 years	99.30	25.864	1.943 (p=.154)
	68-77 years	100.66	19.945	
	Above 78 years	119.33	5.955	
Creatinine	58-67 years	8.39	2.078	0.379 (p=.687)
	68-77 years	8.96	3.007	
	Above 78 years	8.25	0.668	
Albumin	58-67 years	3.78	0.633	0.766 (p=.470)
	68-77 years	3.50	1.084	
	Above 78 years	3.81	0.213	
KT/V	58-67 years	1.09	0.112	0.303 (p=.740)
	68-77 years	1.06	0.115	
	Above 78 years	1.06	0.150	

** Significant at 1% level

It is noted from the above table-5 that there is no significant difference between age groups with respect to BMI, Blood flow rate, Hb, Urea, Creatinine, Albumin, KT/V. Out of total 54 participants 42.5% has normal BMI, 29.6% has underweight BMI, 18.5% has over weight and 9.2% were with obesity.

Comparison of age groups with respect to PCS and MCS

A sample of 54 patients was selected. Physical Component Summary (PCS) And Mental Component Summary (MCS) Scores were recorded with three different age groups 58-67 years, 68-77 years and above 78 years. To compare different age groups with respect to PCS and MCS, one–way ANOVA is used. The results are displayed in the Table-6.

Null hypothesis H03: There is no significant difference between age groups with respect to (i) PCS (ii) MCS

Table-6

Difference between age groups with respect to PCS and MCS

	Classification	**Mean**	**S D**	**F-value**
PCS	58-67 years	13.60	3.991	3.839* (p=.028)
	68-77 years	11.00	5.084	
	Above 78 years	9.16	3.430	
MCS	58-67 years	15.33	2.857	0.940 (p=.397)
	68-77 years	14.26	4.078	
	Above 78 years	13.83	2.041	

** Significant at 1% level

Physical Component Summary (PCS)

It is noted from the Table-6, that the F-value 3.839 (p=.028) is significant at 5% level, the null hypothesis H03(i) is rejected. It is noted that the patients in the age group of 58-67 years have scored the highest mean PCS value of 13.60 and the lowest mean PCS (9.16) value is scored by the patients in the age group of above 78 years. It is concluded that the persons with lesser age are better with PCS.

Mental Component Summary (MCS)

It is noted from the Table-6, that the F-value 0.940 (p=.397) is insignificant at 5% level, the null hypothesis H03(ii) is accepted. This shows that there is no significant difference between age groups with respect to MCS.

Relationship between Dialysis vintage (in years) and PCS in different age groups

To test the Relationship between Dialysis vintage (in years) and PCS in different age groups, Bi-variate correlation is applied. The results are displayed in the Table-7**.** Null hypothesis H04: There is no Relationship between Dialysis vintage (in years) and PCS in different age groups

Table-7

Relationship between Dialysis vintage (in years) and PCS in different age groups

Parameter	**Dialysis vintage (in years)**		
	58-67 years	68-77 years	Above 78 years
PCS	r =.026 (p=.869)	r = -0.198* (p=.019)	r= -0.237* (p=.011)

*Significant at 5% level

It is noted that there is no significant relationship r=.026 (p=.869) exist between Dialysis vintage and PCS in the age group of 58-67 years, in this case H04 is accepted. This shows that Dialysis vintage and PCS are not significantly related in the age group of 58-67 years

It is observed that there is significant negative relationship r= -0.198 (p=.019) exist between Dialysis vintage and PCS in the age group of 68-77 years, in this case H04 is rejected. This shows that as Dialysis vintage increases the PCS in the age group of 68-77 years decreases.

It is observed that there is significant negative relationship r= -0.237 (p=.011) exist between Dialysis vintage and PCS in the age group of above 78 years, in this case H04 is rejected. This shows that as Dialysis vintage increase the PCS in the age group of above 78 years decreases.

5. Discussion

Hemodialysis Is Considered as The Main treatment option for end stage renal disease patient method could cause severe physical and mental problems. These physical, mental and social problems could decrease the level of Quality of life in patients undergoing Hemodialysis.

In this study out of 54 participants were included in that 81.5% were male participant and 18.5% were female participants. In this study there are three age groups which is 58-67years, 68-77 years, above 78 years. 61.1% of the patients are in the age group of 58-67 years, 27.85% of the patients belongs to the age group of 68-77 years and 11.1% of the patients belong to the age group of above 78 years. This study shows that maintenance hemodialysis patients who were 68-77 and 78 above years old had lower PCS scores compared with those who were 58-67 years old, while the MCS scores were not significantly different with age categories. As dialysis vintage lengthened, the PCS significantly decreased, whereas dialysis vintage was not associated with the change in the MCS score. This result correlated well with the substantial decline with older age in the rate of patients who could work without assistance. (Kurella, M., 2005, 2127). It has been reported that low muscle mass is associated with worse physical QOL domains. (Giglio, J., 2018, 197). This observation suggest that older patients are more restricted in their physical function than mental function, which is compatible with data world-wide DOPPS reported in 2011. (Canaud, B., 2011,1651)

Different approaches are needed for individual variations in characteristics in older people. Older people tend to present with multiple comorbidities, Frail adults with ESRD are more likely to experience worsening HR-QOL. (McAdams-DeMarco, 2016, 174). The fact that PCS and MCS scores declined in one-quarter of hemodialysis patients aged older than 80 years in our present study indicates the need for social and mental support by both medical staff and families with the advance of age.

Able to work according to the age groups is noted that 81.8% of people from the age group of 58-67 years are able to work and 18.1% of people are not able to do work. 73.3% of people from the age group 68-77 years are able to work and 26.6% of people are not able to do work.50% of the people from the age group 78 years above are able to work and 50% of people are not able to do work.

A sample of 54 patients was selected BMI, Blood flow rate, HB, urea, creatinine, albumin, kt/v were recorded and compared with three different age groups 58-67years, 68-77years and 78years above that there is no significant difference between age groups with respect to BMI, Blood flow rate, Hb, Urea, Creatinine, Albumin, KT/V. PCS is noted that the patients in the age group of 58-67 years has scored the highest mean PCS value of 13.60, 11.00 is the mean value of 68-77 years age group and the lowest mean value 9.16 is scored by the patients in the age group of above 78 years. MCS is noted that there is no significant difference between the age groups with respect to MCS. It is concluded that the persons with lesser age are better with PCS. HR-QOL of dialysis patients is lower than that of the general population or patients who undergo kidney trans- plantation (Liem, Y.S., 2007, 390), (Alvares, J., 2012, 983). A low HR-QOL in dialysis patients is also associated with decreased survival and more frequent hospitalization (Kalantar-Zadeh, K., 2001, 2797), (Lopes, A.A., 2003, 605). As per the study results of Mapes et al. (Mapes, D.L., 2003, 339). reported that with each 10-point decrease in the HR-QOL score, mortality risk increased 25% for the PCS and 13% for the MCS. For hospitalization, risk increased 15% for the PCS and

6% for the MCS. The associations between HR-QOL and outcomes were reported to be stronger in India than in Euro-DOPPS or in the United States. Measurement of HR-QOL is important because earlier recognition of low HR-QOL may allow healthcare providers to identify potentially vulnerable patients who are at an increased risk of death. In addition, independent of its strong association with death, HR-QOL itself is a main outcome measure in ESRD care.

Dialysis vintage and PCS are not significantly related in the age group of 58-67 years whereas dialysis vintage increases the PCS in the age groups of 68-77years and above 78 years is decreased. In our present study, changes in physical and mental QOL among older dialysis patients were affected by hemodialysis vintage and age, respectively. Because the bur- den of symptoms in those on dialysis is high (Murtagh, F.E., 2007, 1266). QOL is often poor and satisfaction with life falls after dialysis initiation (Da Silva-Gane, M., 2012, 2002). Our study results are in line with study done by Perl et al. (Perl, J., and Karaboyas, 2017, 521) reported slightly more variability in change in MCS than in PCS regardless of hemodialysis vintage. Functional dependencies among elderly people on hemodialysis increase with older age (Cook, W.L. and Jassal, S.V., 2008, 1289) which might be related to the decline in HR-QOL observed in our study.

Intervention to improve HR-QOL in older hemodialysis patients is not necessarily a simple issue. Hemodialysis patients spend 9–15 h per week on dialysis and those with more active intradialytic activities are reported to have better mental and kidney disease-specific HR-QOL. (Kurella Tamura, 2009,1539), (Warsame, F., 2018, 181). Furthermore, a large international study demonstrated that social support enhances physical QOL. (Untas, A, 2011,142). Improving individual QOL and the physical and mental health of older hemodialysis patients will eventually reduce a substantial and growing burden on society, exemplified by rapidly increasing medical care costs and number of healthcare providers. (Finnegan-John, J. and Thomas, V.J., 2013).

Addressing the psychological effects of ESRD and dialysis is essential for comprehensive patient care. Psychological support, counseling services, and support groups can help patients cope with the emotional challenges, enhance their resilience, and improve their overall well-being. Collaborative care involving healthcare professionals, mental health specialists, and family support systems is crucial to address the psychological impact of ESRD and dialysis on patients' lives.

References

1. Hamer, R.A. and El Nahas, A.M., (2006). The burden of chronic kidney disease. Bmj, 332(7541), pp.563-564.
2. Liyanage, T., Toyama, T., Hockham, C., Ninomiya, T., Perkovic, V., Woodward, M., Fukagawa, M., Matsushita, K., Praditpornsilpa, K., Hooi, L.S. and Iseki, K., (2022). Prevalence of chronic kidney disease in Asia: a systematic review and analysis. BMJ global health, 7(1), p.e007525.
3. Robinson, B.M., Zhang, J., Morgenstern, H., Bradbury, B.D., Ng, L.J., McCullough, K.P., Gillespie, B.W., Hakim, R., Rayner, H., Fort, J. and Akizawa, T., (2014). Worldwide, mortality risk is high soon after initiation of hemodialysis. Kidney international, 85(1), pp.158-165.
4. Rao, M., Juneja, R., Shirly, R.B. and Jacob, C.K., (1998). Haemodialysis for end-stage renal disease in Southern India--a perspective from a tertiary referral care centre. Nephrology, dialysis, transplantation: official publication of the European Dialysis and Transplant Association-European Renal Association, 13(10), pp.2494-2500.
5. Chen, S.S., Al Mawed, S. and Unruh, M., (2016). Health-related quality of life in end-stage renal disease patients: how often should we ask and what do we do with the answer?. Blood Purification, 41(1-3), pp.218-224.
6. Manavalan, M., Majumdar, A., Kumar, K.H. and Priyamvada, P.S., (2017). Assessment of health-related quality of life and its determinants in patients with chronic kidney disease. Indian journal of nephrology, 27(1), p.37.
7. Perl, J., Karaboyas, A., Morgenstern, H., Sen, A., Rayner, H.C., Vanholder, R.C., Combe, C., Hasegawa, T., Finkelstein, F.O., Lopes, A.A. and Robinson, B.M., (2017). Association between changes in quality of life

and mortality in hemodialysis patients: results from the DOPPS. Nephrology Dialysis Transplantation, 32(3), pp.521-527.

8. Lowrie, E.G., Curtin, R.B., LePain, N. and Schatell, D., (2003). Medical outcomes study short form-36: a consistent and powerful predictor of morbidity and mortality in dialysis patients. American Journal of Kidney Diseases, 41(6), pp.1286-1292.
9. Pisoni, R.L., Gillespie, B.W., Dickinson, D.M., Chen, K., Kutner, M.H. and Wolfe, R.A., (2004). The Dialysis Outcomes and Practice Patterns Study (DOPPS): design, data elements, and methodology. American Journal of Kidney Diseases, 44, pp.7-15.
10. Mapes, D.L., Lopes, A.A., Satayathum, S., McCullough, K.P., Goodkin, D.A., Locatelli, F., Fukuhara, S., Young, E.W., Kurokawa, K., Saito, A. and Bommer, J., (2003). Health-related quality of life as a predictor of mortality and hospitalization: the Dialysis Outcomes and Practice Patterns Study (DOPPS). Kidney international, 64(1), pp.339-349.
11. Giglio, J., Kamimura, M.A., Lamarca, F., Rodrigues, J., Santin, F. and Avesani, C.M., (2018). Association of sarcopenia with nutritional parameters, quality of life, hospitalization, and mortality rates of elderly patients on hemodialysis. Journal of Renal Nutrition, 28(3), pp.197-207.
12. Canaud, B., Tong, L., Tentori, F., Akiba, T., Karaboyas, A., Gillespie, B., Akizawa, T., Pisoni, R.L., Bommer, J. and Port, F.K., (2011). Clinical practices and outcomes in elderly hemodialysis patients: results from the Dialysis Outcomes and Practice Patterns Study (DOPPS). Clinical Journal of the American Society of Nephrology, 6(7), pp.1651-1662.
13. Murtagh, F.E., Addington-Hall, J.M., Edmonds, P.M., Donohoe, P., Carey, I., Jenkins, K. and Higginson, I.J., (2007). Symptoms in advanced renal disease: a cross-sectional survey of symptom prevalence in stage 5 chronic kidney disease managed without dialysis. Journal of palliative medicine, 10(6), pp.1266-1276.
14. Da Silva-Gane, M., Wellsted, D., Greenshields, H., Norton, S., Chandna, S.M. and Farrington, K., (2012). Quality of life and survival in patients with advanced kidney failure managed conservatively or by dialysis. Clinical Journal of the American Society of Nephrology, 7(12), pp.2002-2009.
15. Cook, W.L. and Jassal, S.V., (2008). Functional dependencies among the elderly on hemodialysis. Kidney international, 73(11), pp.1289-1295.
16. Liem, Y.S., Bosch, J.L., Arends, L.R., Heijenbrok-Kal, M.H. and Hunink, M.M., (2007). Quality of life assessed with the Medical Outcomes Study Short Form 36-Item Health Survey of patients on renal replacement therapy: a systematic review and meta-analysis. Value in Health, 10(5), pp.390-397.
17. Alvares, J., Cesar, C.C., de Assis Acurcio, F., Andrade, E.I.G. and Cherchiglia, M.L., (2012). Quality of life of patients in renal replacement therapy in Brazil: comparison of treatment modalities. Quality of Life Research, 21, pp.983-991.
18. Kalantar-Zadeh, K., Kopple, J.D., Block, G. and Humphreys, M.H., (2001). Association among SF36 quality of life measures and nutrition, hospitalization, and mortality in hemodialysis. Journal of the American Society of Nephrology, 12(12), pp.2797-2806.
19. Lopes, A.A., Bragg-Gresham, J.L., Satayathum, S., McCullough, K., Pifer, T., Goodkin, D.A., Mapes, D.L., Young, E.W., Wolfe, R.A., Held, P.J. and Port, F.K., (2003). Health-related quality of life and associated outcomes among hemodialysis patients of different ethnicities in the United States: the Dialysis Outcomes and Practice Patterns Study (DOPPS). American Journal of Kidney Diseases, 41(3), pp.605-615.
20. Kurella, M., Chertow, G.M., Fried, L.F., Cummings, S.R., Harris, T., Simonsick, E., Satterfield, S., Ayonayon, H. and Yaffe, K., (2005). Chronic kidney disease and cognitive impairment in the elderly: the health, aging, and body composition study. Journal of the American Society of Nephrology, 16(7), pp.2127-2133.
21. McAdams-DeMarco, M.A., Ying, H., Olorundare, I., King, E.A., Desai, N., Dagher, N., Lonze, B., Montgomery, R., Walston, J. and Segev, D.L., (2016). Frailty and health-related quality of life in end stage renal disease patients of all ages. The Journal of frailty & aging, 5(3), p.174.

22. Kurella Tamura, M., Covinsky, K.E., Chertow, G.M., Yaffe, K., Landefeld, C.S. and McCulloch, C.E., (2009). Functional status of elderly adults before and after initiation of dialysis. New England Journal of Medicine, 361(16), pp.1539-1547.
23. Warsame, F., Ying, H., Haugen, C.E., Thomas, A.G., Crews, D.C., Shafi, T., Jaar, B., Chu, N.M., Segev, D.L. and McAdams-DeMarco, M.A., (2018). Intradialytic activities and health-related quality of life among hemodialysis patients. American journal of nephrology, 48(3), pp.181-189.
24. Untas, A., Thumma, J., Rascle, N., Rayner, H., Mapes, D., Lopes, A.A., Fukuhara, S., Akizawa, T., Morgenstern, H., Robinson, B.M. and Pisoni, R.L., (2011). The associations of social support and other psychosocial factors with mortality and quality of life in the dialysis outcomes and practice patterns study. Clinical Journal of the American Society of Nephrology, 6(1), pp.142-152.
25. Finnegan-John, J. and Thomas, V.J., (2013). The psychosocial experience of patients with end-stage renal disease and its impact on quality of life: findings from a needs assessment to shape a service. International Scholarly Research Notices, 2013.