Health Related Quality of Life among Patients with Chronic Kidney Disease in Sri Lanka; a Review

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Abstract: Chronic Kidney Disease (CKD) gives a considerable burden to the Sri Lankan health care delivery system. Prevalence of CKD rise due to the high prevalence of non-communicable diseases and unknown aetiologies. Health Related Quality of Life (HRQOL) reduced with the initiation and progression of the disease. Many factors significantly influenced HRQOL of CKD patients. This study reviews the state of HRQOL among Sri Lankan CKD patients and factors associated with the HRQOL. The search was done via PubMed, CINAHL, Web of Science, and Google Scholar according to the predefined criteria. Selected articles were reviewed and extracted the data which were relevant to the study. Extracted data were entered into the summary table and organized according to the research objectives. Seven articles selected for the final analysis. All the studies were cross-sectional studies. Sample size range from 120 to 1174. Haemoglobin level, being employed, high education level, and advanced stages of CKD were identified as factors that positively influenced HRQOL in CKD patients. Depression, psychological distress, symptom burden, and age negatively influenced on HRQOL. Depression and psychological distress are common among Sri Lankan patients with CKD. Impaired social support, perception of low social support, economic burden, high out pocket expenditure, unemployment are the main causes for the depression and psychological distress among patients with CKD in Sri Lanka. Health care professionals need to pay more attention on HRQOL and factors associated with HRQOL among patients CKD.

Keywords: Chronic Kidney Disease, Quality of life, Health related Quality of Life, Sri Lanka

Introduction:

Chronic kidney disease (CKD) is a global health burden and it affects the physical, psychological cultural, and socio-economic status of the current global population (S. Senanayake, Gunawardena, Palihawadana, Bandara, *et al.*, 2017) with many adverse events such as CVD and death (Levey *et al.*, 2005). chronic kidney disease is one of the major suffering problem in Sri Lanka in the present time due to chronic kidney disease unknown etiology(CKDu) (Rajapakse, Shivanthan and Selvarajah, 2016; Wimalawansa, 2016). With the time, prevalence of non- communicable diseases such as hypertension and diabetes mellitus are increasing and those are the other causes for rising CKD in Sri Lanka (Rajapakse, Shivanthan, and Selvarajah, 2016). CKDu is prominent in north-central province in Sri Lanka and most of the affected individuals are farmers, agricultural field workers, or people who live around the agricultural area (Wimalawansa, 2016). In some Districts, CKDu prevalence is 15.1%-22.9%; especially in rural Dry zones of Sri Lanka (Rajapakse, Shivanthan and Selvarajah, 2016). CKD classified according to the estimated Glomerular Filtration Rate (eGFR): Stage 1; renal damage with normal or high eGFR: >90ml/min/1.73m^2, Stage 2; renal damage

with mild reduced eGFR: 60-89ml/min/1.73m^2, Stage 3; moderately reduced eGFR: 30- 59ml/min/1.73m^2, Stage 4; severely impaired eGFR: 15-29ml/min/1.73m^2, Stage 5; renal failure: <15 ml/min/1.73m^2 or with dialysis (Levey *et al.*, 2005). Stage one accompanied with perceived glomerular filtration rate and protein urea and end stage renal disease accompanied with impaired or absence urine filtration and entire renal sclerosis, interstitial fibrosis, and interstitial inflammation with high protein urea. Most of the people who are affected with renal disease identified at the end stage/ End Stage Renal Disease (ESRD) (Rajapakse, Shivanthan and Selvarajah, 2016). CKD patients experience reduced life expectancy and patients who progress to ESRD (End Stage Renal Disease) reduced their life expectance 20 times compared to the age and sex matched individuals with ordinal kidney function (Liyanage *et al.*, 2017). Diabetes mellitus type II and chronic hypertension associated with chronic kidney disease record all over the country

Health-related quality of life (HRQOL) is a subjective indicator of an individual's health status which depends on beliefs, experiences, perceptions, expectations, present health status, and their influences on the enjoyment of life (Khatib *et al.*, 2018). Physical, psychological, and lifestyle disturbances along with physical and emotional symptoms directly affect on HRQOL among patients with renal replacement therapy (Unruh, Weisbord and Kimmel, 2005). Identification of HRQOL status and factors associated with HRQOL are important because it is a tool to improve clinical care and it provide information for clinical decision making (Unruh, Weisbord and Kimmel, 2005). Generic and disease-specific tools can be used to measure HRQOL. SF 36, WHOQOL BREF, and EQ 5D/EQ 5D 3L/EQ 5D 5L are generic tools and KDQOL is a disease specific tool to measure HRQOL among patients with CKD.

This study aims to review the quality of life among CKD patients in Sri Lanka and factors associated with their HRQOL. Sri Lanka is a middle-income country and the burden of CKD is considerable with the increased CKD affected population.

Methods:

Inclusion criteria;

Original studies published in English and examine QOL through the standard validated instrument (SF 36, EQ 5D 5L/EQ 5D 3L or KDQOL/KDQOL-SF, WHOQOL BREF have to be used in each study to assess HRQOL) in diagnosed patients with CKD.

Participants' age more than 18 years old.

The geographical location of the study: studies should be done in Sri Lanka.

Published year: after 2000

Exclusion criteria;

Study design; qualitative studies, case reports, personal opinions, conference presentations, books, review articles.

Studies with insufficient data and incomprehensive methodology.

Search strategy;

Original English publications were searched via: PubMed, CINAHL, Web of science, and google scholar. Keywords were quality of life, chronic kidney disease, CKD, Sri Lanka, End Stage Renal Disease, Health related quality of life. Keywords were combined through Boolean operators ("and", "or"). The search was limited to the studies published after 2000. Reference lists and citations of the identified articles were reviewed for additional resources.

Evaluation and data extraction

Identified study abstracts were screen two times to confirm incompatibility with the study. Eleven articles were selected for final review. From that, 4 studies were excluded;

two article findings were incompatible with the objectives of the study and another two were conference abstracts. Duplications were merged by using Mendeley. Remained 7 articles were individually appraised by the principal author and supervisor. Discrepancies and gaps were identified and discussed. Expert opinion was taken when data extraction could not obtain through discussion.

Study method, sample size, participant's demographic and clinical characteristics, Quality of life (QOL) instruments, QOL scores were extracted separately and recorded.

Results:

Table 1: Study Characteristics

Author and year	Study design	Sample size and characteristics	Participant's characteristics
(Abeywickrama et al., 2020)	Descriptive cross-sectional Study	120, CKDu	Male; 83, Female; 37, Mean age; 61.87±11.31
(Senanayake et al., 2020)	Descriptive cross-sectional study	1174, CKD+ CKDu	Male; 681, Female; 398, Mean age; 58.3±10.7
(Premadasa et al., 2019)	Descriptive cross-sectional study	250, CKD+ HD more than 3 months	Male; 184, Female; 66, Median age; 30-49
(Senanayake et al., 2019)	descriptive cross-sectional study	1036, CKD	Male; 646, Female; 390
(Kularatna et al., 2019)	Descriptive cross-sectional	1096, CKD	Male; 686, Female; 410
(Senanayake et al., 2018)	Descriptive cross-sectional	1174, CKD	Male; 701, Female; 417
(S. Senanayake et al., 2017)	Descriptive cross-sectional	250, CKD	Male;105, Female; 145, Mean age; 57.7 years

HRQOL among Sri Lankan CKD patients were explained by seven articles in here (see Table 1). Sample size range from 120 to 1174. Other than HRQOL assessment tools, CES D (Centre for Epidemiological Depression Scale) to measure depression, GHQ 12 (General Health Questionnaire 12) to measure psychological distress, IPAQ (International Physical Activity Questionnaire) to measure physical activity level had been used in some studies. KDQOL SF had been used in 3 articles. Mean Kidney disease summary component (KDSC) scores range from 81.57±5.86 (Abeywickrama *et al.*, 2020) to 58.7±7.7 (Senanayake *et al.*, 2020). Physical component summary (PCS) scores rage from 68.63±19.58 (Abeywickrama *et al.*, 2020) to 35.5±15 (Senanayake *et al.*, 2020) and Mental component summary (MCS) range from 78.53±18.78 (Abeywickrama *et al.*, 2020) to 39.6±12.3 (Senanayake *et al.*, 2020). Abeywickrama *et al.,* 2020 was indicated the age and symptom burden score as independent predictors which negatively influenced all summary scores (KDSC, PCS, and MCS). However, in Senanayake *et al.,* 2020, Age was negatively correlated with KDSC, PCS and it was not an independent predictor of MCS scores. (Abeywickrama *et al.*, 2020; Senanayake *et al.*, 2020). And it identified that Haemoglobin (Hb) level as a positive indicator of high PCS (P<0.05, beta; 0.177) score (Abeywickrama *et al.*, 2020). Senanayake *et al*., 2020 found several independent predictors of KDQOL SF summary scores. High educational status independently predicts the high KDSC and MCS scores, being employed independently improves KDSC and PCS scores. Advanced stages of CKD, psychological distress and depression independently reduce all summary component's scores (Senanayake *et al.*, 2020).

Senanayake *et al.,* 2019 assessed the relationship between HRQOL, depression, and the psychological distress of patients with CKD. EQ 5D 3L index score, Visual analogue scale (VAS), PCS, and MCS score values were significantly different between patients with and without depression (P<0.001). And the same findings were noted for the patients with and without psychological distress (P<0.001) (Senanayake *et al.*, 2019). Senanayake *et al.*, 2018 indicated that KDSC, PCS, and MCS were negatively correlated with depression; Spearman correlations were r;-0.544, r;-0.285, r; -0.339 respectively, and the relationship was statistically significant (P<0.001). Also, KDSC PCS and MCS were negatively significant with psychological distress; Spearman correlations were respectively r; 0.373, r; -0.383, r;-0.373 (P<0.001) (Senanayake *et al.*, 2018). In Senanayake *et al.*, 2017, KDSC's highest score was reported in hospital staff encouragement while the lowest score was reported in the work status. In PCS, the highest was physical functioning and the lowest was role physical. In MCS, the highest was social functioning and the lowest was role emotional (S. Senanayake, Gunawardena, Palihawadana, Kularatna, *et al.*, 2017). Premadasa *et al.*, 2019 indicated that the majority of the HD population report their overall perception on QOL as "neither poor nor good" (54%), only 2.4% were reported as "very good". And this study revealed that education level, average monthly income were significant with overall QOL which were identified as independent predictors of HRQOL in the previous study (Senanayake *et al.*, 2020). And HD duration also significant with overall QOL among chronic haemodialysis patients (Premadasa *et al.*, 2019).

Discussion:

Several factors which effect on Health-Related Quality of Life have been identified through the subjective articles. Health interventions and support systems can target factors effect on HRQOL to improve the HRQOL of the CKD patients. It's a known phenomenon, HRQOL of the CKD patients were lowers than the general population and related factors aid on the improvement or reduction of QOL. Therefore, health professionals can make decisions based on factors that influenced HRQOL in CKD patients.

Depression and psychological distress are the most common psychological disorders among the CKD population (Sumanathissa, De Silva, and Hanwella, 2011). It is negatively associated with HRQOL of the affected individuals (Senanayake, 2016; Senanayake *et al.*, 2018) and there are many factors associated with depression and psychological distress among patients with CKD in Sri Lanka. The mode of renal replacement therapy is a factor that affects an individual's depression level. Patients who are undergoing dialysis have been reported higher depression status compared to the patients without dialysis. Some studies indicated that depression was prominent among HD patients than the PD (Chilcot *et al.*, 2008; Ozcan *et al.*, 2015; Hiramatsu *et al.*, 2019) and transplant patients were reported the lowest depression score (Ozcan *et al.*, 2015). Indian study indicated, age below 60, absence of treatment funding, education less than grade 12, monthly income, CKD stage, patient on haemodialysis and associated comorbidities more than 3 were associated with higher depression scores. In Sri Lanka, several studies had been done to assess depression and psychological distress among CKD patients. Poor social support, low satisfaction with social support received, within one year of diagnosis, low monthly income, high out pocket expenditure, being a female, unemployment has a positive relationship with distress (Hettiarachchi and Abeysena, 2018; Senanayake *et al.*, 2018). Female sex, unemployment, being dialysed, advanced age, and presence of comorbidities are positively significant with depression (Senanayake *et al.*,

2018). But another study indicated that the age, gender, income, employment status, and education were not significant with depression and the patient's understanding of prognosis is the only significant associated factor that affects depression among CKD patients (Sumanathissa, De Silva and Hanwella, 2011). Factors associated with depression and distress can be directly or indirectly associated with HRQOL among CKD individuals as there is a negative correlation between HRQOL vs depression and psychological distress. In Sri Lanka, most of the affected people are male farmers and with the disease progression, they have low monthly income and high out pocket expenditure. Most of the affected people engaged in the earning process and with the disease they cannot engage with their jobs as usual. In Sri Lanka, out pocket expenditure for each dialysis episode in a government hospital is Rs 595 (415-995) and for the transportation, they have to pay Rs. 320 (IQR 320-500) per one episode. Patients have to go 2 or 3 times per week for dialysis. Transportation expenses are considerable (S. J. Senanayake *et al.*, 2017). Therefore, the government has to pay much attention to initiate a well-designed insurance system and patients should be released from transportation expenses, and a well-improved transportation system should be established for Sri Lankan CKD patients. Having an occupation is positively correlated with HRQOL (Blake *et al.*, 2000; Tamura *et al.*, 2018) and unemployment was significantly reduced the HRQOL (Lopes *et al.*, 2007). Having an occupation improves of economic stability of affected individuals and it improves physical functioning.

Conclusion:

This study aimed to identify the state of HRQOL among patients with CKD and Factors associated with their HRQOL. HRQOL is subjective in nature and various prominent factors were identified in this review.

Psychological burden is a considerable issue among patients with CKD as they experience many psychological symptoms. Many factors seems to be associated with depression and distress and those were directly or indirectly associated with HRQOL. Especially, Educational level, monthly income are associated with HRQOL among patients with CKD in Sri Lanka. Interventions need to be planed based on research evidence to improve HRQOL.

The identified factors that have an effect on HRQOL seems to be interrelated. When improving HRQOL, health professionals should follow a holistic approach. It reduces the socio-economic and public health burden due to chronic kidney disease.

References:

Abeywickrama, H.M., Wimalasiri, S., Koyama, Y., Uchiyama, M., Shimizu, U., Kakihara, N., Chandrajith, R. and Nanayakkara, N., 2020. Quality of Life and Symptom Burden among Chronic Kidney Disease of Uncertain Etiology (CKDu) Patients in Girandurukotte, Sri Lanka. *International Journal of Environmental Research and Public Health*, *17*(11), p.4041.

Blake, C., Codd, M.B., Cassidy, A. and O'Meara, Y.M., 2000. Physical function, employment and quality of life in end-stage renal disease. *Journal of nephrology*, *13*(2), pp.142-149.

Chilcot, J., Wellsted, D., Da Silva-Gane, M. and Farrington, K., 2008. Depression on dialysis. *Nephron Clinical Practice*, *108*(4), pp.c256-c264.

Hettiarachchi, R. and Abeysena, C., 2018. Association of poor social support and financial insecurity with psychological distress of chronic kidney disease patients attending national nephrology unit in Sri Lanka. *International journal of nephrology*, *2018*.

Hiramatsu, T., Okumura, S., Asano, Y., Mabuchi, M., Iguchi, D. and Furuta, S., 2020. Quality of life and emotional distress in peritoneal dialysis and hemodialysis patients. *Therapeutic Apheresis and Dialysis*, *24*(4), pp.366-372.

Khatib, S.T., Hemadneh, M.K., Hasan, S.A., Khazneh, E. and Sa'ed, H.Z., 2018. Quality of life in hemodialysis diabetic patients: a multicenter cross-sectional study from Palestine. *BMC nephrology*, *19*(1), p.49.

Kularatna, S., Senanayake, S., Gunawardena, N. and Graves, N., 2019. Comparison of the EQ-5D 3L and the SF-6D (SF-36) contemporaneous utility scores in patients with chronic kidney disease in Sri Lanka: a cross-sectional survey. *BMJ open*, *9*(2), p.e024854.

Liyanage, T, Ninomiya, T, Perkovic, V, Woodward, M, Stirnadel-Farrant, H, Matsushita, K, Iseki, K, Seong, HL, Monaghan, H & Jha, V 2017, 'Chronic kidney disease in Asia: Protocol for a collaborative overview', Nephrology, vol. 22, no. 6, pp. 456-462.

Lopes, A.A., Bragg-Gresham, J.L., Goodkin, D.A., Fukuhara, S., Mapes, D.L., Young, E.W., Gillespie, B.W., Akizawa, T., Greenwood, R.N., Andreucci, V.E. and Akiba, T., 2007. Factors associated with health-related quality of life among hemodialysis patients in the DOPPS. *Quality of life research*, *16*(4), p.545.

Moe, S., Drueke, T., Cunningham, J., Goodman, W., Martin, K., Olgaard, K., Ott, S., Sprague, S., Lameire, N. and Eknoyan, G., 2005. Kidney disease: Improving global outcomes (kdigo). definition and classification of chronic kidney disease: a position statement from kidney disease: Improving global outcomes (kdigo). *Kidney Int*, *67*, pp.2089-2100.

Ozcan, H., Yucel, A., Avşar, U.Z., Çankaya, E., Yucel, N., Gözübüyük, H., Eren, F., Keles, M. and Aydınlı, B., 2015, June. Kidney transplantation is superior to hemodialysis and peritoneal dialysis in terms of cognitive function, anxiety, and depression symptoms in chronic kidney disease. In *Transplantation proceedings* (Vol. 47, No. 5, pp. 1348-1351). Elsevier.

Premadasa, M.A.S.S., Hulangamuwa, H.G.I.M., Wijesooriya, W.A.D.H. and Amarasekara, T.D., 2019. Quality of Life Among Patients With Chronic Kidney Disease Who are Undergoing Haemodialysis at Two Selected Teaching Hospitals in Sri Lanka. *OUSL Journal*, *14*(2).

Rajapakse, S., Shivanthan, M.C. and Selvarajah, M., 2016. Chronic kidney disease of unknown etiology in Sri Lanka. International journal of occupational and environmental health, 22(3), pp.259-264.

Senanayake, S., Gunawardena, N., Palihawadana, P., Bandara, P., Haniffa, R., Karunarathna, R. and Kumara, P., 2017. Symptom burden in chronic kidney disease; a population based cross sectional study. *BMC nephrology*, *18*(1), p.228.

Senanayake, S., Gunawardena, N., Palihawadana, P., Kularatna, S. and Peiris, T.S.G., 2017. Validity and reliability of the Sri Lankan version of the kidney disease quality of life questionnaire (KDQOL-SF™). *Health and quality of life outcomes*, *15*(1), p.119.

Senanayake, S., Gunawardena, N., Palihawadana, P., Senanayake, S., Karunarathna, R., Kumara, P. and Kularatna, S., 2020. Health related quality of life in chronic kidney disease; a descriptive study in a rural Sri Lankan community affected by chronic kidney disease. *Health and quality of life outcomes*, *18*, pp.1-9.

Senanayake, S., Gunawardena, N., Palihawadana, P., Suraweera, C., Karunarathna, R. and Kumara, P., 2018. Depression and psychological distress in patients with chronic renal failure: Prevalence and associated factors in a rural district in Sri Lanka. *Journal of psychosomatic research*, *112*, pp.25-31.

Senanayake, S., Mahesh, P.K.B., Gunawardena, N., Graves, N. and Kularatna, S., 2019. Validity and internal consistency of EQ-5D-3L quality of life tool among pre-dialysis patients with chronic kidney disease in Sri Lanka, a lower middle-income country. *PloS one*, *14*(6), p.e0211604.

Senanayake, S.J., 2016. Health status, quality of life and household cost of CKD patients living in Anuradhapura.doi.10.13140/RG.2.2.32599.11682

Senanayake, S.J., Gunawardena, N.S., Palihawadana, P., Bandara, S., Bandara, P., Ranasinghe, A.U., Karunarathna, R.H. and Kumara, G.P., 2017. Out-of-pocket expenditure in accessing healthcare services among Chronic Kidney Disease patients in Anuradhapura District. *Ceylon Medical Journal*, *62*(2), pp.100-103.

Sumanathissa, M., De Silva, V.A. and Hanwella, R., 2011. Prevalence of major depressive episode among patients with pre-dialysis chronic kidney disease. *The International Journal of Psychiatry in Medicine*, *41*(1), pp.47-56.

Tamura, Y., Urawa, A., Watanabe, S., Hasegawa, T., Ogura, T., Nishikawa, K., Sugimura, Y., Komori, T.

and Okada, M., 2018, October. Mood status and quality of life in kidney recipients after transplantation. In *Transplantation proceedings* (Vol. 50, No. 8, pp. 2521-2525). Elsevier.

Unruh, M.L., Weisbord, S.D. and Kimmel, P.L., 2005, March. Psychosocial factors in patients with chronic kidney disease: Health-related quality of life in nephrology research and clinical practice.

In *Seminars in dialysis* (Vol. 18, No. 2, pp. 82-90). Oxford, UK: Blackwell Science Inc.

Wimalawansa, S.J., 2016. The role of ions, heavy metals, fluoride, and agrochemicals: critical evaluation of potential aetiological factors of chronic kidney disease of multifactorial origin (CKDmfo/CKDu) and recommendations for its eradication. *Environmental geochemistry and health*, *38*(3), pp.639-678.