Quality of life and associated factors among chronic kidney disease patients at Zewditu Memorial and Tikur Anbessa Specialised Hospitals, Ethiopia: a cross-sectional study design

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ABSTRACT

Introduction Chronic kidney disease (CKD) is associated with significant morbidity, mortality, healthcare cost and reduced health-related quality of life (HRQoL). This study aimed to assess HRQoL and associated factors among patients with CKD at both Zewditu Memorial and Tikur Anbessa Specialised Hospitals, Ethiopia.

Method A cross-sectional study design was performed. All patients who visited the renal clinics in both hospitals from March to July 2019 were targeted, and data were collected using interviews and medical records. HRQoL was assessed using the Kidney Disease and Quality of Life-36 tool. Normality assessment was done for HRQoL subscales. Descriptive statistics, logistic regression, t-test and one-way analysis of variance were performed.

Result A total of 300 patients with CKD were included. Around 62% of them were in either stage 3 or 4 CKD. The mean domain scores of physical component summary (PCS), mental component summary (MCS), burden of kidney disease, effect of kidney disease and symptoms and problems of kidney disease (SPKD) subscales were 50.4, 59.5, 63.1, 74.6 and 80.4, respectively. The lowest HRQoL was seen in the PCS scale, while the highest was in SPKD. In addition, the study revealed that a lower level of education, elevated serum creatinine and a history of smoking were significantly associated with poor PCS score. Further, the presence of three or more comorbidities, CKD-related complications and a lower haemoglobin level were significantly associated with poor MCS.

Conclusion The overall mean scores of PCS and MCS were low, below the standard level. Level of education, serum creatinine and smoking history were significantly associated with PCS, while the presence of comorbidity, complications and haemoglobin level were significantly associated with MCS. Stakeholders working on CKD management should design a relevant strategy targeting patients, patients’ care providers and healthcare professionals to improve HRQoL of patients.

INTRODUCTION

Chronic kidney disease (CKD) is a 21st century healthcare delivery. A global report indicated that 10% of the world’s population has CKD, and 1.2 million people died of it. Its prevalence has steadily increased over the last few decades due to the rapid rise of common risk factors such as diabetes and hypertension. CKD is often associated with serious consequences, such as increased risk of morbidity, mortality, risk of cardiovascular disease (CVD), acute kidney injury and healthcare costs, and reduced quality of life.

Due to the increasing number of patients with diabetes, obesity, vascular disease, hypertension and diabetes mellitus, CKD is now a growing public health problem in low-income and middle-income countries. Although...
there is no conclusive report on the extent of CKD in Ethiopia, the estimated prevalence of CKD among patients with diabetes was 35.52% (95% CI 25.9% to 45.45%, I²=96.3%) for CKD stages 1–5 and 14.5% (95% CI 10.5% to 18.49%, I²=91.1%) for CKD stages 3–5.8

CKD care is often complex and difficult due to multiple comorbidities, polypharmacy and abnormal medicine handling by the failed renal system.9 10 In resource-poor nations, such as Ethiopia, the problem is intensified due to additional factors. Studies revealed that over half of patients with CKD who require renal replacement therapy died due to lack of access to dialysis or transplantation service.11 12 If it exists, the care is expensive and unaffordable.13 In addition, low socioeconomic status, low literacy level, reduced health-seeking behaviour and poor compliance to treatment regimens were frequent.14 15

Studies revealed that health-related quality of life (HRQoL) is significantly reduced among patients with CKD.16–19 Due to the above-mentioned problems, HRQoL is expected to be low in low-income countries, Ethiopia. HRQoL is defined as ‘how well a person functions in their life and his or her perceived well-being, physical, mental and social domains of health’.20 In Ethiopia, there is no summarised information on the quality of life among patients with CKD. However, there are few published studies in different localities. Kefale et al21 reported that reduced HRQoL is common across all CKD stages, despite the study was conducted in a single centre. On the other hand, other studies targeted only patients with dialysis and they were in a single centre.22 23 Furthermore, there is a lack of data on both Zewditu Memorial Hospital (ZMH) and Tikur Anbessa Specialised Hospital (TASH), which are the highest referral CKD centres in Ethiopia. Therefore, this study aims to assess HRQoL and its associated factors among patients with CKD.

METHODOLOGY

Study setting

The study was conducted in the renal clinic of both ZMH and TASH located in Addis Ababa, Ethiopia. Both ZMH and TASH are the largest referral hospitals in Ethiopia and have more than 1500 beds. They deliver inpatient, outpatient and emergency services to patients coming from every corner of the country. They also render service to patients with CKD. The study was conducted from 20 March 2019 to 15 July 2019.

Patient and public involvement

Patients or the public did not participate in the initial conception and design of the study. In addition, they were not engaged in the recruitment and actual conduction of our study. Some necessary changes in the data abstraction tool and data collection procedure were done as per the pretest (5% of the sample size) results. The findings will be disseminated to study participants in any gatherings that target patients with CKD, such as conferences, mornings and using leaflets.

Study design and population

A cross-sectional study design was used. All patients with CKD aged ≥18 years who attended the renal clinic at ZMH and TASH during the data collection periods (4 months), and those who were willing to participate in the study were included. While patients with incomplete medical records and patients with cognitive impairment (unable to communicate) were excluded. Hoping patients cannot have appointment time longer than 4 months, all patients who visited renal clinics in both hospitals during 20 March 2019 to 15 July 2019 were targeted. A convenient sampling technique was used.

Data collection tool and procedure

A structured questionnaire was developed based on the standard questionnaire and available published studies. The sociodemographic and clinical characteristics were retrospectively collected from patients’ medical records. HRQoL is assessed using the Kidney Disease and Quality of Life (KDQOL-36) tool. The KDQOL tool is a kidney-specific measure of HRQoL with five subscales. The first version contained the Medical Outcomes Study 36 (SF-36) as a generic chronic disease core, and add items relevant to patients with kidney disease, such as symptoms, burden of illness, social interaction, staff encouragement and patient satisfaction.24 The Short Form (SF)-12 measures physical component summary (PCS) and mental component summary (MCS) functioning (1–12), which have items about general health, activity limits, ability to accomplish desired tasks, depression and anxiety, energy level, and social activities. Burden of Kidney Disease subscale (BKD) (13–16) involves items about how much kidney disease interferes with daily life, takes up time, causes frustration or makes the respondent feel like a burden. Symptoms and Problems of Kidney disease (SPKD) subscale (17–28b) consists of items about how bothered a respondent feels by sore muscles, chest pain, cramps, itchy or dry skin, shortness of breath, faintness/dizziness, lack of appetite, feeling washed out or drained, numbness in the hands or feet, nausea or problems with dialysis access. Effects of kidney disease (EKD) on daily life subscale (29–36) involves items about how bothered the respondent feels by fluid limits, diet restrictions, ability to work around the house or travel, feeling dependent on doctors and other medical staff, stress or worries, sex life and personal appearance.

The tool was translated to the Amharic version and back to English to check for consistency. A pretest was done on 15 study participants to check for completeness before the actual data collection. Based on the results obtained from the pretest, amendment was done to the data abstraction tool.

Variables

HRQoL was the dependent variable, while sociodemographic characteristics (sex, age, marital status, educational status, income status, religion and residency),
clinical characteristics and complications were the independent variables.

Data analysis
Data were entered, cleaned and analysed by using the SPSS V.23. Descriptive statistics including mean and SD for continuous variables, and frequency and percentage for categorical data were performed. The main continuous variables were tested for normality. Student’s t-test, one-way analysis of variance and bivariate logistic regression analysis were then performed. A p≤0.05 was considered statistically significant in all tests of significance.

Operational definition
End-stage renal disease is considered when patients require dialysis irrespective of glomerular filtration rate and patients on CKD stage 5 (estimated glomerular filtration rate less than 15 mL per min).

The KDQOL-36 has 5 scales, involving 2 generic HRQoL scales from the SF-12 version 1 (12 items total) and 3 kidney-specific scales (24 items total). The kidney-targeted scales include BDK (4 items), SPKD (12 items) and EKD (8 items). Each of the KDQOL-36 kidney-targeted scales is scored by transforming all items linearly to a 0–100 possible range.

If a patient has got a summary result of PCS or MCS HRQoL ≥75%, it is considered to be good. Otherwise, it is poor.

RESULT
Demographic and clinical characteristics of patients
There were a total of 312 patients with CKD in both hospitals during the data collection period. However, due to unwillingness, incomplete medical records and difficulty in communication, 12 patients were excluded. Hence, a total of 300 patients with CKD who fulfilled the inclusion criteria were included. More than half of them (59.7%, 179) were males. The age range of patients was 18–87 years. Around half (50.3%) of them were married, and over three-fourths (81%) of patients with CKD lived in an urban area (table 1). More than one-third (38.3%) of the patients were in CKD stage 3 (30–59 mL/min/1.73 m²), followed by stage 4 (15–29 mL/min/1.73 m²) (23.7%) and stage 5 CKD (<15 mL/min/1.73 m²) (9.3%). The mean GFR was 45.41 (SD±26.56) mL/min/1.73 m². The mean duration of the disease (CKD) was 4.61 years (SD±3.09) ranging from 0.5 to 16 years. In addition, two-thirds of the patients (67%) were diagnosed with CKD within the last 5 years, and 24.7% of them had a history of hospitalisation due to CKD. Further, the mean systolic blood pressure (SBP) was 130.16 (SD±63) mm Hg.

Around half (50.3%) of patients developed complications. Fluid overload (32%), CVD (26%), anaemia (21%), osteodystrophy (12.3%) and hyperkalaemia (6.3%) were the frequent complications. Further, one in five patients (20.7%) were got polypharmacy (table 2).

KDQOL-36 domains across CKD stages
PCS mean score declined from the early stage of CKD to more advanced stages of CKD (p<0.001). On the other hand, MCS mean score showed a progressive decline in the mean score of the patients across the stages although it was not statistically significant (p=0.05). The highest
and lowest mean scores of KDQOL™-36 domains across the CKD stages were, PCS (71.92±19.83 stage 1) and (36.60±29.01 stage 5); MCS (72.09±16.55 stage 1) and (51.61±19.94 stage 5); BKD (67.11±21.42 stage 1) and (57.74±25.29 stage 3). In addition, the highest and lowest mean scores of SPKD and EKD were (86.80±9.45 stage 1) and (74.97±16.08 stage 4); and (80.29±13.30 stage 1) and (67.93±17.12 stage 4), respectively (figure 1).

Relation between HRQoL measures with sociodemographic and clinical characteristics

According to this study, SPKD (80.4±14.5) and EKD (74.62±16.6) were the highest measures, while PCS (50.5±27.4) was the lowest HRQoL measure. There was no significant mean difference between females and males in the KDQOL™-36 scale composite scores except for SPKD. Except for BKD, age group and marital status showed a significant mean difference in all scales of KDQOL™-36. Regarding educational status, a significant difference was seen in all HRQoL measures, while PCS and MSC revealed a significant difference in patient residency (online supplemental table 1).

CKD stage, number of comorbidities and polypharmacy prescription showed significant differences in PCS, MCS, SPKD and EKD scales, while all HRQoL measures revealed significant differences with the presence of complications. In addition, patients with CKD stage 5 had the highest SPKD and lowest PCS measures, while stage 1 patients had the highest SPKD and lowest BKD measures. Further, the presence of complications, polypharmacy and patients with ≥3 comorbidities had the highest SPKD and lowest PCS HRQoL measures (online supplemental table 2).

Predictors of poor HRQoL measures: PCS and MCS

In the multivariate analysis, rural residents’ PCS is lowered by 90% than urban residents (AOR 0.10, 95% CI (0.02 to 0.64, p=0.015)). In addition, patients who previously smoke were 1.7 times more at risk of having poor PCS than those who were not previous smokers (AOR (adjusted odds ratio) 1.74,95% CI 0.03 to 0.98, p=0.05). Further, patients who cannot read and write were 6.5 times more at risk of poor PCS than those with a higher level of education (AOR 6.48,95% CI 0.79 to 59.27, p=0.004) (table 3).

Considering MCS measures, rural residents’ MCS measure was reduced by 60% than urban residents (AOR, 0.40, 95% CI 0.16 to 1.02, p=0.050). On the other hand,
patients with CKD with three or more comorbidities were 4.2 times risk of having poor MCS than those who had less than three comorbidities (AOR 4.21, 95% CI 1.5 to 11.80, p=0.006). Further, patients with CKD with Hg level ≤11 g/dL was 2.43 times risk of having poor MCS HRQoL than patients with CKD with >11 g/dL Hg level (AOR 2.43, 95% CI 0.99 to 5.98, p=0.050) (Table 4).

**DISCUSSION**

HRQoL is a key determinant outcome in chronic disease management, particularly in CKD. The purpose of this study was to assess the HRQoL of patients with CKD attending ZMH and TASH. According to this study, SPKD and PCS were the highest (80.4±14.5) and lowest (50.5±27.4) HRQoL measures, respectively. On the other hand, in Kim et al study,26 SPKD and MCS were the highest and lowest quality measures, respectively. However, our result is in line with a study conducted in the USA indicating the highest mean (SD) score in the SPKD subscale and comparable mean score of other domains to our study.27 In addition, Alam et al reported that the lowest and highest mean scores of HRQoL were SPKD (16.93±13.0) and BDK (81.09±13.14), respectively.28 This difference may be due to various rates of complication, CKD stages, different socioeconomic statuses and the number of medications used. In addition, the performance scale was not be performed in our study.

In our study, hypertension was the most common comorbidity (80%). This was in line with the Stefanski et al study.29

<table>
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<tr>
<th>Variables</th>
<th>Poor MCS N (%)</th>
<th>Good MCS N (%)</th>
<th>COR (95% CI) P value</th>
<th>AOR (95% CI) P value</th>
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<td>Rural</td>
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<td>Previous smoker</td>
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<tr>
<td>Yes</td>
<td>32 (16.3)</td>
<td>6 (5.8)</td>
<td>3.18 (1.3 to 7.89)</td>
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<tr>
<td>Can’t read and write</td>
<td>19 (9.7)</td>
<td>6 (5.8)</td>
<td>0.59 (0.22 to 1.65)</td>
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<td>Primary</td>
<td>73 (37.2)</td>
<td>36 (34.6)</td>
<td>0.94 (0.51 to 1.71)</td>
<td>2.08 (0.63 to 6.98)</td>
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<td>Secondary</td>
<td>49 (25)</td>
<td>33 (31.7)</td>
<td>0.93 (0.51 to 1.70)</td>
<td>6.44 (1.82 to 22.80)</td>
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<td>29 (27.9)</td>
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<td>Scr (gm/dL)</td>
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<td>&gt;1.2</td>
<td>160 (83.8)</td>
<td>72 (70.6)</td>
<td>0.47 (0.26 to 0.82)</td>
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<td>≤1.2</td>
<td>31 (16.2)</td>
<td>30 (29.4)</td>
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</table>

AOR, Adjusted Odds Ratio; CKD, chronic kidney disease; COR, Crude Odds Ratio; PCS, physical component summary; Scr, serum creatinine; TASH, Tikur Anbessa Specialised Hospital; ZMH, Zewditu Memorial Hospital.
In this study, 24.3% of the study participants had one or more hospitalisation due to CKD. This was lower than a study conducted in the USA (64.6%) and Japan (34%). This discrepancy may be due to the variable health-seeking behaviour of patients, being lowest in Ethiopia. In addition, there is best healthcare delivery system and reporting in the two countries than in Ethiopia. Further, the high rate of incomplete medical records and failure to memorise their hospitalisation episode are frequent problems in Ethiopian patients.

Concerning factors associated with poor PCS, multivariate analysis demonstrated that patients with CKD who were from urban areas had better PCS and MCS domains. PCS in rural residents was reduced by 90% compared with the urban residents (AOR 0.10, 95% CI 0.02 to 0.64, p=0.015). This is in agreement with a study conducted in Pakistan. The plausible reason may be the difference in their utilisation of medical care and health literacy level. In addition, patients with a higher level of education had better PCS than patients with lower education levels (AOR 6.48, 95% CI 0.79 to 59.27, p=0.004). This finding was similar to other previous studies. Educated patients have greater access to information about their disease, have better economic conditions, and have better health-seeking behaviour. In contrast to a study by Allen et al., patients with elevated serum creatinine were 2.12 times more likely to have poor PCS HRQoL (95% CI 0.14 to 0.02, p=0.024). This discrepancy might be due to the difference in the serum creatinine-level proportionate to dietary protein intake and skeletal muscle mass of patients.

Regarding factors associated with MCS, in line with Perlman et al. study, a low haemoglobin level (<11 g/dL) was statistically related to poor MCS. The likely reason may be due to a low haemoglobin level may be associated with various complications which may result in impairment of physical and mental HRQoL. Similarly, patients with three or more comorbidities were 4.21 times more likely to have poor MCS HRQoL (95% CI 0.79 to 59.27, p=0.004). This finding was similar to other previous studies. Educated patients have greater access to information about their disease, have better economic conditions, and have better health-seeking behaviour. In contrast to a study by Allen et al., patients with elevated serum creatinine were 2.12 times more likely to have poor PCS HRQoL (95% CI 0.14 to 0.02, p=0.024). This discrepancy might be due to the difference in the serum creatinine-level proportionate to dietary protein intake and skeletal muscle mass of patients.

Confounding factors associated with MCS, in line with Perlman et al. study, a low haemoglobin level (<11 g/dL) was statistically related to poor MCS. The likely reason may be due to a low haemoglobin level may be associated with various complications which may result in impairment of physical and mental HRQoL. Similarly, patients with three or more comorbidities were 4.21 times more likely to have poor MCS HRQoL (95% CI 0.79 to 59.27, p=0.004). This finding was similar to other previous studies. Educated patients have greater access to information about their disease, have better economic conditions, and have better health-seeking behaviour. In contrast to a study by Allen et al., patients with elevated serum creatinine were 2.12 times more likely to have poor PCS HRQoL (95% CI 0.14 to 0.02, p=0.024). This discrepancy might be due to the difference in the serum creatinine-level proportionate to dietary protein intake and skeletal muscle mass of patients.

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CONCLUSION
In this study, the overall mean score of PCS and MCS was lower and below the standard. Living in an urban was a positive predictor of better PCS and MCS domains. Lower educational level, elevated serum creatinine and smoking history were significantly associated with poor PCS. In addition, the presence of three or more comorbidities, three or more CKD-related complications, and lower haemoglobin levels were significantly associated with poor MCS HRQoL. Hence, different stakeholders should work together to design relevant strategies to boost patients’ HRQoL.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Consent obtained directly from patient(s).

Ethics approval This study involves human participants and was approved by the Ethical Review Committee of the School of Pharmacy, Addis Ababa University (ERB/SOP/50/03/2019). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

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