



Assessment of management and quality of life among patients with chronic kidney disease at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia

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This is to certify that the thesis prepared by Belayneh Kefale, entitled “*Assessment of management and quality of life among patients with chronic kidney disease at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia*” and submitted in partial fulfillment of the requirements for the Degree of Master of Pharmacy in Pharmacy Practice complies with the regulations of the University and meets the accepted standards with respect to originality and quality

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Abstract

Assessment of management and quality of life among patients with chronic kidney disease at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia

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Management of co-morbidities and quality of life (QoL) among patients with chronic kidney disease (CKD) is an important issue for the delivery of optimum health care. Hence, the present study aimed to assess the management and QoL in patients with CKD at Tikur Anbessa Specialized Hospital (TASH). A cross sectional study was conducted at TASH from May to September 2017. About 256 patients were recruited through systematic random sampling technique and data were collected using data abstraction format designed for extraction of appropriate patient information as well as validated questionnaire, including, the 8-items Morisky Medication Adherence Scale and the Medical Outcomes Study Short Form 36-Items. About 55% patients with hypertension only were treated with non angiotensin converting enzyme inhibitor (ACEI) based regimens; 57.3% of diabetes mellitus with hypertension treated with combination of insulin and ACEI based regimens; and 44.4% diabetes mellitus only treated with insulin. About three-fourth of patients with anemia and osteodystrophy related complications were treated with iron and calcium based formulations. Adherence rate to CKD medications was found to be 61.3%. Very low income, increased number of prescribed medications and being a farmer were significantly associated with CKD medication non-adherence. Most of the patients missed their medications because of forgetfulness (79.8%). On the other hand, QoL decreased progressively across the stages of CKD. A reduction in physical functioning ($p=0.03$), bodily pain ($p=0.004$), vitality ($p=0.019$) and social functioning ($p=0.002$) was observed with stages of CKD. High income (β 2.6; 95%CI: 1.67-3.55), $p<0.001$) & educational status (β 1.12; 95%CI: 0.62-2.78, $p=0.024$), and hemoglobin ≥ 11 g/dl (β 8.36; 95%CI: 6.31-10.41, $p<0.001$) were predictors of better QoL in the physical component summary, whereas absence of CKD complications (β 2.75; 95%CI: 0.56-4.94, $p=0.014$), high income (β 1.64; 95%CI: 0.48-2.81, $p=0.006$) and hemoglobin ≥ 11 g/dl (β 4.54, 95%CI: 2.01-7.08, $p=0.001$) were predictors of mental component summary. Thus, the finding of this study

indicated that management practice and medication adherence was suboptimal. In addition, QoL decreased in all stages of CKD, which warrants the need for health care professionals engaged in renal care address these issue aggressively.

Keyword: Chronic kidney disease, management practice, medication adherence, quality of life, SF-36

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List of abbreviations

ACEI	Angiotensin Converting Enzyme Inhibitor
AOR	Adjusted Odds Ratio
ARB	Angiotensin Receptor Blocker
CCB	Calcium Channel Blocker
CI	Confidence Interval
CKD	Chronic Kidney Disease
COR	Crude Odds Ratio
CVD	Cardiovascular Disease
eGFR	Estimated Glomerular Filtration Rate
ESRD	End-Stage Renal Disease
GFR	Glomerular Filtration Rate
KDIGO	Kidney Disease: Improving Global Outcomes
KDOQI	Kidney Disease Outcomes Quality Initiative
MMAS-8	8-Item Morisky Medication Adherence Scale
QoL	Quality of Life
RAAS	Renin Angiotensin Aldosterone System
SPSS	Statistical Package for Social Sciences
TASH	Tikur Anbessa Specialized Hospital
USA	United States of America

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1. INTRODUCTION

1.1. Background

Chronic kidney disease (CKD) is defined as abnormal kidney structure or function persisting greater than 3 months (Hill *et al.*, 2016). This can be determined either by evidence of kidney damage (typically detected by presence of persistent albuminuria) or by decreased glomerular filtration rate (GFR). CKD is a progressive, irreversible deterioration in renal function in which the body's ability to sustain metabolic and fluid and electrolyte balance fails, resulting in uremia or azotemia (International Society of Nephrology, 2017). It is a complex health problem that tends to take dimensions of epidemic and has severe impact on quality of life (QoL) (MahboobLessan and Zohreh, 2009; Hill *et al.*, 2016).

CKD is categorized into stages 1 to 5 based on declining GFR, with each increasing number indicating a more advanced stage of the disease (International Society of Nephrology, 2017; Podymow and Turnbull, 2013). This classification system from the National Kidney Foundation's Kidney Dialysis Outcomes and Quality Initiative (K/DOQI) also accounts for structural evidence of kidney injury (Emara and Alzaylai, 2013). Throughout these stages, people suffering from CKD need to devote significant time to managing their health including modifying their diet and lifestyle, managing numerous medications, and attending medical appointments. All CKD stages are associated with increased risks of cardiovascular morbidity, premature mortality, and/or decreased QoL (Jha *et al.*, 2012). It is invariably asymptomatic in its early stages (Levey *et al.*, 2011; Hill *et al.*, 2016). Increasing prevalence of declining renal function, diabetes, hypertension, primary renal disorders and obesity (Eckardt *et al.*, 2013; Johnson *et al.*, 2013) has contributed to CKD becoming one of the most common chronic diseases (Osterberg and Blaschke, 2005).

There is a mixture of causes and the damage is usually irreversible and can lead to ill health (Combe *et al.*, 2004). Decisions regarding risk factor modification should be taken on an individual basis. CKD has a complicated interrelationship with other diseases, most commonly diabetes and hypertension (Snively and Gutierrez, 2004). Recent studies have reported that CKD is an independent and major risk factor for cardiovascular disease (CVD) (Mann *et al.*, 2001; Hill *et al.*, 2016). Attention to cardiovascular risk factors remains the cornerstone of

management to delay progression of CKD and prevent cardiovascular events. The direct management of CKD focuses on renin angiotensin aldosterone system (RAAS) blood pressure and glycemic control. Management also includes optimal management of common co-morbid conditions and addressing cardiovascular risk factors to decrease risk for CVD (Sarnak *et al.*, 2003). Thus, managing such co-morbid conditions, especially cardiovascular risk factors, is important to slow down its progression, reduce the risk of developing CVD for as long as possible (Sarnak *et al.*, 2003).

Self-management of CKD involves an individual taking responsibility for the day-to-day care of their illness. In order to minimize the impact of CKD upon the individual and slow progression of the disease, individuals must adhere strictly to the treatment regimens. A high level of adherence to the prescribed medication is essential to obtain the desired outcomes in patients with CKD. Studies demonstrated that CKD patients living with significant constraints and restrictions might have an impaired normal psychosocial development (Kalantar-Zadeh and Unruh, 2005). QoL is an independent risk factor for mortality in CKD patients particularly in end stage renal disease (ESRD). It is a multidimensional concept that reflects patient's well-being in both physical and mental aspects of health. Moreover, several factors such as disease related manifestations, side effects of treatments, and patient's quality of interaction with family members can influence QoL (Ayanda and Ajiboye, 2014; MahboobLessan and Zohreh, 2009).

1.2. Statement of the problem

CKD is a global public health problem due to the rapid rise of common risk factors such as diabetes and hypertension will result more profound burden that developing nations are not equipped to handle. Its burden on health care system is becoming immense with increasing prevalence, high costs, and poor outcomes (Jha *et al.*, 2012). It is associated with serious consequences, including, increased risk of mortality, ESRD, accelerated CVD, reduced cognitive function and increased risk of acute kidney injury (Hill *et al.*, 2016). Mortality from CVD is estimated to be at least 8 to 10 fold higher in CKD patients as compared to non-CKD patients (Jha *et al.*, 2012). Globally, 10% of the population is affected by CKD, and millions die each year due to high economic cost treatment (Hill *et al.*, 2016). It affects 10 - 15% (western countries) (Levey *et al.*, 2009), 17.2% (India) (Singh *et al.*, 2013), 14.82% (China) (Liu *et al.*, 2008) of the adult population, many of whom require costly treatments. With

increasing of aging population, elderly people are the highest risk group for CKD. Studies in US and China population showed that prevalence of CKD (US & China): stage 1 (1.8% & 3.33%), stage 2 (3.2% & 2.49%), stage 3 (7.7% & 7.07%) and stages 4 and 5 (0.35 % & 0.97%) (Hsu *et al.*, 2004; Liu *et al.*, 2008).

Incidence of the disease increases at an annual rate of 8%, and consumes up to 2% of the total global health expenditure (López-Novoa *et al.*, 2010). The treatment of CKD in developing countries is expensive, unaffordable, and unavailable (Okpechi *et al.*, 2017). Suboptimal management of co-morbid conditions, non-adherence to prescribed medication schedule and low QoL have been the major problems in CKD patients and their occurrence can adversely impact the course of the disease (Cruz *et al.*, 2011; Magacho *et al.*, 2011). According to World Health Organization, it is estimated that only 50% of people with chronic diseases take their medications consistently as prescribed because they consider them ineffective or experience untoward side effects (Burkhat and Sabaté, 2003). The pill burden in CKD patients is high, have to take on average around 8–10 tablets/day, due to coexisting diseases (Manley *et al.*, 2004). This imposes high personal and economic burden on patients and their families. Hence, management, adherence and QoL are the major concern in the treatment of CKD (McDonald *et al.*, 2002; Osterberg and Blaschke, 2005; Cruz *et al.*, 2011).

Therapeutic management for CKD patients is complicated due to co-morbidities and dominant risk factors of CKD (Johnson *et al.*, 2013). Due to the presence of co-morbidities, CKD patients belong to the group of subjects with one of the highest burdens of daily pill intake with up to >20 pills per day depending on severity of their disease (Burnier *et al.*, 2015). Though non-adherence to treatment is an increasing problem for patients with CKD and can impair the QoL, it has not been extensively studied in patients with CKD (Victoria *et al.*, 2015). Previous studies have reported that 24.8% (DiMatteo, 2004), 26–28% (Magacho *et al.*, 2011), 46.1% (Drenth-van Maanen *et al.*, 2015), 22% (Ahlawat *et al.*, 2016), 18.4% (Kugler *et al.*, 2011) and 23.8% (Fiseha *et al.*, 2014) of CKD patients were non-adherent in California, Brazil, the Netherlands, India, Germany and southern Ethiopia, respectively.

Patients with CKD have a reduced QoL and an increased frequency and severity of both symptoms and psychological distress, with the magnitude of these changes negatively correlated with GFR (Kalantar-Zadeh and Unruh, 2005; Ayanda and Ajiboye, 2014). Association of poorer QoL with preventable factors demonstrated that attention should be given

to psychosocial and medical interventions to improve QoL in CKD patients (MahboobLessan and Zohreh, 2009). The available data on QoL of patients on conservative treatment and the relationship between the QoL and GFR is limited (Cruz *et al.*, 2011, Magacho *et al.*, 2011). Even though patients with advanced renal insufficiency have a reduced QoL, some studies showed that QoL is decreased in the early stages of disease (Kimmel and Patel, 2006).

The incidence of CKD in Ethiopia is rising because of increased risk factors (Fiseha *et al.*, 2014). Evidence-based research that evaluates medication adherence and QoL among patients with CKD in developing countries is scanty (Awuah *et al.*, 2013). Thus, there should be a continuing need to routinely assess factors affecting adherence and QoL among patients with CKD in clinical practice (DiMatteo, 2004; MahboobLessan and Zohreh, 2009). This is especially important in resource-limited countries like Ethiopia, as the preponderance of economic instability, low literacy level, and restricted access to healthcare facilities, missed appointments, pill burden, side effects of medication, inadequate follow up and co-morbidities might have led to the increased incidence of medication non-adherence (Johnson *et al.*, 2004; Tuso, 2009). Hence, the present study was carried out to assess the management practice, medication adherence, QoL and factors affecting adherence and QoL in CKD patients at TASH.

1.3. Literature review

1.3.1. Management of chronic kidney disease co-morbidities and complications

The goal of management is to maintain kidney function and homeostasis by treating any underlying condition, slow down the progression, reduce the risk of developing CVD for as long as possible. All factors that contribute to CKD and that are reversible (such as obstruction) are identified and treated (De Zeeuw *et al.*, 2005). In early stages of CKD; there are usually asymptomatic to indicate the kidneys are damaged because kidneys do a good job even when they are not functioning at 100 percent. There is no cure for kidney disease, but it may be possible to halt its progress or at least slow down the damage. In many cases, the acceptable treatment and lifestyle changes can help keep a person and their kidneys healthier longer. In addition to eating right and taking prescribed medicines, exercising regularly and not smoking are helpful to prolonging kidney health (Stigant *et al.*, 2003).

CKD often coexists with CVD and diabetes and is recognized as a risk factor for all-cause mortality and CVD (Go *et al.*, 2004). Common co-morbid conditions among patients with CKD include diabetes, CVD, and hyperlipidemia. Managing these co-morbid conditions aggressively is important. Suboptimal control of these secondary conditions increases the risk for progression of CKD.

The management of CKD has focused on diagnosis and treatment of specific kidney diseases, and dialysis or transplantation for kidney failure. Evidence suggests that preventive strategies could substantially reduce the CKD burden, and there is evidence that such strategies are not yet in place (Sarnak *et al.*, 2003).

In the management of co-morbidity study conducted by Toto (2005) stated that ARBs or ACEIs are used in both diabetic and non-diabetic adults with CKD. KDIGO clinical practice guideline by Inker *et al* (2014) has consistently shown that reduction of proteinuria using RAAS interruption slows progression of both diabetic and non-diabetic nephropathy. ACEI or ARB based combination regimen was the first line antihypertensive therapy for CKD patients and is recommended for patients with albuminuria regardless of the need for blood pressure control. The combination of ACEI and spironolactone is commonly seen in patients with concomitant heart failure, but may also be considered for those with severe albuminuria with nephrology input (Levin *et al.*, 2008). If ACEI or ARB is not effective on its own to control BP, then a thiazide or calcium channel blocker (CCBs) may be added. It should be noted that CCBs should not be prescribed without the concomitant usage of ACEIs or ARBs. In advanced CKD thiazides are generally ineffective, and loop diuretics are usually needed to control volume-dependent hypertension (Levin *et al.*, 2008). Insulin is suitable for patients with renal impairment (Albers *et al.*, 2010; Dasari *et al.*, 2014). The American Family Physician update on the management of CKD reported that statins used in the treatment of dyslipidemia and in reducing cardiovascular risk may also have a role in preventing progression of kidney disease and reducing albuminuria (Dasari *et al.*, 2014).

In the management of CKD complications, a systematic integrative review of the literature reported that the use of ACEIs or ARBs appeared to be the most important methods to treat heart failure in CKD patients (Vassalotti *et al.*, 2016). A USA study on renal osteodystrophy in CKD reported aggressive use of non-calcium containing binders for treatment of osteodystrophy (Miller, 2014). Previous studies demonstrated that neuropathic pain can be

treated by membrane stabilizing agents like tricyclic antidepressants and maintaining potassium level in CKD patients can prevent peripheral nerve injury (Arnold and Krishnan, 2014).

1.3.2. Rate of medication adherence

Non-adherence to chronic drug therapy is known to significantly increase the disease burden in developing countries (Burnier *et al.*, 2015). Adherence problems are common in individuals with CKD treatment regimen, which makes difficult to maintain kidney function and homeostasis, slow down the progression and reduce the risk of developing CVD (Rifkin *et al.*, 2010; Sontakke *et al.*, 2015). Because the risk of complications can be reduced by proper adherence, patient non-adherence to treatment recommendations is often frustrating for health care providers (Magacho *et al.*, 2011).

Globally, adherence to drug therapy in CKD patients varies from as low as 38% to as high as 83% (Podymow and Turnbull, 2013; Salini and Sajeeth, 2013). A systematic study done on the prevalence of medication non-adherence varied from 12.5% to 98.6%, with widespread heterogeneity in measures and definitions employed (Ghimire *et al.*, 2015). A prospective study in CKD patients by Salini *et al* (2013) showed that 71% of patients were adherent to the prescribed medications. Moreover, different rates of medication adherence were reported by various studies conducted in India (78%) (Ahlawat *et al.*, 2016), Saudi Arabia (72.2%) (Burnier *et al.*, 2015), Italy (48%) (Neri *et al.*, 2011), Netherland (53.9%) (Drenth-van Maanen *et al.*, 2015), Spain (60%) (Arenas *et al.*, 2010), German (81.6%) (Kugler *et al.*, 2011), California (75.2%) (DiMatteo, 2004), USA (68.1%) (Kugler *et al.*, 2011), Australia (43.4%) (Ghimire *et al.*, 2017) and southern Ethiopia (76.2%) in CKD (Fiseha *et al.*, 2014). Various systematic and literature review studies showed that the average non-adherence to their medication were ranged from 3-80% (Schmid *et al.*, 2009), 3.9-85% (Griva *et al.*, 2014), 4.6%-100% (DiMatteo, 2004), 12.5-98.6% (Ghimire *et al.*, 2015), 22-74% (Karamanidou *et al.*, 2008) and 26.4-76% (Gonçalves *et al.*, 2016) in CKD patients.

1.3.3. Reasons for medication non-adherence

In the literature, a number of reasons are attributed to be reasons for medication non-adherence in CKD patients. A cross sectional study by Ahlawat *et al* (2016) revealed that forgetfulness, pill burden, side effects and high cost of treatment were the most common reasons for low rate of adherence. In addition, forgetfulness and pill burden were reported to be one of the major

non-intentional reasons for medication non-adherence in studies made in Brazil (Magacho *et al.*, 2011), Italy (Salini and Sajeeth, 2013), Germany (Ghimire *et al.*, 2015) and USA (Burnier *et al.*, 2015). A semi-structured interview study in Boston among older adults' reported that side effect and cost of medication were the major reasons for medication non-adherence (Rifkin *et al.*, 2010).

1.3.4. Quality of life

QoL can be defined as the physical, psychological, social and spiritual domains of health that are influenced by a person's experiences, beliefs, expectations and perceptions. QoL is increasingly being considered as an important measure of how disease affects patients' lives, especially for long-term diseases such as CKD (Perlman *et al.*, 2005). Even though there is no statistically significant association between stages of the disease and QoL, it is decreased in patients with CKD in the early stages of the disease (Cruz *et al.*, 2011). A study done by Perlman *et al.* (2005) showed that stage 4 CKD patients had lower QoL score than stage 5 CKD patients and hemoglobin was the predictor for both physical and mental domains of SF-36. Health related QoL is an independent risk factor for mortality in ESRD. Quantification of this relative risk of death has ranged from 1.25 – 2.02 for each 10-point reduction in such QoL domains as physical role and social functioning (Mapes *et al.*, 2003).

Lower eGFR, hemoglobin, and albumin values are independently associated with lower score of SF-36 of CKD patients based on physiological considerations and correlation with the disease burden (Perlman *et al.*, 2005). The presences of 3 or more co-morbidities are associated with older age, diabetes and unemployment status and have negative impact on the domains of physical function, physical role functioning and physical component summary resulted in decline in the QoL of patients (Cruz *et al.*, 2011).

CKD Patients' QoL score was less than that of the general population. SF-36, a generic instrument translated and validated scale in different languages including Amharic (Kebede *et al.*, 2004), and addresses the domains of QoL. It is a multi-item scale, not specific to any disease or treatment group. The SF-36 is covered by a conceptual model of health related QoL (Ware Jr and Sherbourne, 1992). The importance of QoL has been increasingly recognized by health care providers, regulatory agencies, and researchers, both within and outside the renal community (Kimmel and Patel, 2006; Cruz *et al.*, 2011).

1.3.5. Factors associated with medication non-adherence and quality of life

Non-adherence, poverty, lack of knowledge, and poor follow-up are the main factors observed in CKD (Reach, 2008). Knowledge regarding the different factors that may influence medication adherence is expanding. Lack of disease-specific knowledge and knowledge regarding the importance of adhering to CKD treatment has been shown to be associated with poor health outcomes (Bonner *et al.*, 2014). Knowledge of CKD among renal patients is low (Finkelstein *et al.*, 2008), with people reporting a lack of understanding of the importance of self-management (Johnson *et al.*, 2013). Moreover, even assuming adequate knowledge, not all people are equally motivated and able to self-manage their health. Lower eGFR and higher albuminuria are risk factors for ESRD, acute kidney injury and progressive CKD independent of each other and of cardiovascular risk factors (Shi *et al.*, 2016).

Many factors, including socio-demographic, cultural, socioeconomic, disease and treatment related factors have been reported in different literature. Risk factors of CKD like proteinuria, diabetes, hypertension, obesity and overweight are associated with medication non-adherence (Salini and Sajeeth, 2013). Age and ethnicity were those factors influencing adherence. The systematic study carried out by Ghimire, *et al* (2015) demonstrated that younger age, non-Caucasian ethnicity, illness interfering family life, being a smoker, and living single and being divorced or widowed were patient-related factors associated with non-adherence, which was also reported in Brazil (Magacho *et al.*, 2011) and India (Ahlawat *et al.*, 2016).

Disease-related factors include recurrent hospitalization and having co-morbidities like diabetes and hypertension and medication related factors such as daily tablet count, total pill burden and complexity of medication regimen were also associated with poor adherence (Salini and Sajeeth, 2013; Ghimire *et al.*, 2015). There is a linear trend of decreasing adherence with each increase in daily number of tablets (Salini and Sajeeth, 2013). The costs involved in treating ESRD are very high, imposing great difficulties on public health systems, particularly in countries with limited resources, such as Ethiopia.

On the other hand, in the factors affecting QoL, fewer studies are done on QoL of CKD patients prior to initiating dialysis therapy (Ayanda and Ajiboye, 2014). Pill burden was a factor mentioned in the literature which has a negative impact on medication adherence and QoL in CKD patients (Chiu *et al.*, 2009). A study done in Brazil showed that age and co-morbidity

were the main predictors of physical QoL, whereas socioeconomic issues especially determined mental QoL. The predictors of higher physical and mental component summary in SF-36 were: younger age (β -0.16; 95% confidence interval, CI: -0.27 to -0.05) and being employed (β 8.4; 95% CI: 1.7-15.1), being married or having a marriage-like relationship (β 4.56; 95% CI: 0.9-8.2), and not having high blood pressure (β 3.9; 95% CI: 0.3-7.6) (Bohlke *et al.*, 2008).

Poor QoL is associated with the risk of evolution to end-stage kidney disease and increased mortality in those end-stage patients. Various researches have documented different factors which predict less QoL; these include haemoglobin levels < 11.1 g/dL (Abu-Alfa *et al.*, 2008), male gender (Lew and Patel, 2007), the presence of co-morbidities, for example diabetes mellitus and hypertension, low socio-economic (Vazquez *et al.*, 2003) and educational status (Mapes *et al.*, 2004).

2. OBJECTIVES

2.1. General objective

- To assess management and QoL of CKD patients at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia

2.2. Specific objectives

- ✓ To evaluate the management practice of CKD
- ✓ To determine the rate of medication adherence among ambulatory patients with CKD
- ✓ To identify reasons contributing to CKD medications non-adherence
- ✓ To measure the QoL of patients with CKD
- ✓ To identify factors associated with medications non-adherence and QoL

3. METHODS

3.1. Study settings

The study was conducted in the renal ambulatory clinics of Tikur Anibesa Specialized Hospital (TASH), which is located in Lideta Sub-City, Addis Ababa, Ethiopia. TASH was established in 1972 and is affiliated with College of Health Sciences, Addis Ababa University. It serves as a training center for undergraduate and postgraduate medical students, pharmacists, dentists, nurses, midwives, medical laboratory technologists and radiology technologists. It is the largest general public hospital, where tertiary care is being provided in Ethiopia, with over 700 beds. It is also an institution where specialized clinical services that are not available in other public or private institutions are rendered to the whole nation. This hospital has more than 200 doctors, 84 pharmacists, 379 nurses and 115 other health professionals dedicated to providing health care services. The various departments, faculty members and residents under specialty training in the School of Medicine provide patient care in the hospital. It also has 950 permanent and contract support staff. In addition, almost all regional and federal hospitals in Addis Ababa use this hospital as referral unit and training sites.

TASH serves about 500,000 patients per year in its outpatient department and about 40,000 in the inpatient and same number in the emergency department. The renal Clinic has nephrologists, nurses and pharmacists. It provides treatment to different types of renal disease and its complications. The renal days are mainly Monday, Tuesday and Thursday, on an average, with a foot fall of 6, 12 and 12 CKD patients, respectively.

3.2. Study design and period

A cross-sectional study was conducted in two-phases. The first was a patient interview phase, while the second was a retrospective patient chart review. The two-phases were done for the same patient from May 1st – September 30th 2017 to assess management practice, adherence and QoL.

3.3. Sample size and sampling methods

The sample size was calculated using single population proportion formula (Pourhoseingholi *et al.*, 2013) as follows:

$$n = \frac{Z_{\alpha/2}^2 p(1 - p)}{d^2}$$

Where;

n = is desired sample size for population >10,000;

Z = is standard normal distribution usually set as 1.96 (which corresponds to 95% confidence level);

P = means that we use positive prevalence estimated, to maximize sample size. Negative prevalence = $1 - 0.5 = 0.5$,

d = degree of accuracy desired (marginal error is 0.05); then the sample size is

$$n = \frac{1.96^2 0.5(1-0.5)}{(0.05)^2} = 384.16 \approx 384$$

The expected number of source population in the study period (N), based on the average number of patients coming to the clinic three days in a week with a total of 20 weeks was 600 ($20*6+20*12+20*12$). The corrected sample size, using the following correction formula was $233.1 \sim 233$,

$$\text{Corrected sample size} = \frac{n \times N}{n + N}$$

Then 10% contingency was added on 233:

$$233 \times 10\% = 23$$

$$233 + \text{contingency} = Nf = \underline{\underline{256}}$$

A systematic random sampling method was used to recruit samples for the study in each day of the data collection process. The actual sampling fraction (k) varied in the different days of data collection as the total number of study population varied in different days. Hence, it was calculated through dividing the number of study population available each day by the maximum possible number of patients' that could be interviewed the same day. Then, every k^{th} patient was interviewed after physician visit.

3.4. Source and study population

All CKD patients attending the renal clinic of TASH during the study period were considered to be the source population. On the other hand, the study population was all CKD patients attending the clinic during the study period and that fulfilled the inclusion criteria.

3.5. Inclusion and exclusion criteria

3.5.1. Inclusion criteria

- All CKD ambulatory patients and on medications for more than 6 months;
- ≥ 18 years of age
- Patients who understood Amharic language

3.5.2. Exclusion criteria

- Patients refused to participate in the study
- Patients with cognitive impairment.

3.6 Data collection and analysis

3.6.1 Instruments

Data were collected using structured questionnaire (Annex I) and data abstraction form (Annex II) to extract information from the patients and medical records, respectively. The questionnaire for the interview contained socio-demographic characteristics, 8-item Morisky medication adherence scale, reasons for non-adherence to medications and The Medical Outcomes Study Short Form 36-Item Health Survey (SF-36)

I. Structured questionnaire

Structured questionnaire (Annex I) contains three parts as follows;

Patient interview questionnaire

This questionnaire is using to extract patients information and had three parts. Part I was aimed at collecting information on basic socio-demographic variables, which are also collected directly from patient medication charts. Part II consisted of questions required to gather information on the different patient disease related characteristics. Part III was about the different non-pharmacological approaches of CKD care.

Adherence assessment tool

A questionnaire containing the 8-item Morisky Medication Adherence Scale (MMAS-8), which is a validated scale, was utilized to collect information necessary to assess medication adherence and reasons contributing for non-adherence. MMAS-8 is part of the World Health Organization case management adherence guideline assessment tools and mostly used to classify patients on medication as ‘low’, ‘medium’, and ‘high’ on motivation and knowledge domain, thus a commonly used self-report method to assess patients’ adherence to existing therapy. MMAS-8 is a 7 items with yes/no response options and 1 item with a 5-point likert scale response option.

The Medical Outcomes Study Short Form 36-Item Health Survey (SF-36)

The Medical Outcomes Study Short Form 36-Item Health Survey (SF-36), a generic instrument translated and validated scale in Amharic (Kebede *et al.*, 2004), was utilized to collect information necessary to assess QoL. The 36-item short form questionnaire is a multi-item scale, not specific to any disease or treatment group. The SF-36 is covered by a conceptual model of QoL (Ware Jr and Sherbourne, 1992) and includes 36 items that yield an 8-dimension profile on a 100-point scale; a higher score indicates a better perceived health state. The eight dimensions are: Physical function (PF), Role limitations caused by physical problems (RP), Pain (BP), General health (GH), Vitality/energy (VT), Social function (SF), mental health/emotional well-being (MH) and Role limitations caused by emotional problems/mental health (RE). In addition it is used to estimate change in health status over the past year.

II. Chart review

Data abstraction format (Annex II) was prepared to extract information such as, management practices and clinical data including laboratory tests (serum creatinine, blood urea nitrogen, GFR, blood glucose, hemoglobin and blood pressure levels), co-morbidities, different complications and CKD stages.

3.6.2 Data collectors recruitment and training

Three nurses were recruited as data collectors. Training was given to them regarding appropriate use of the data collection instruments focusing on uniform interpretation of questions, strict use of study criterion, explanation of study objectives and getting verbal

consents from study participants, implementation of sampling technique and confidentiality of the collected data.

3.6.3 Data quality control

The data collection instrument which consisted of the questionnaire and the data abstraction format was assessed by an expert physician in the field of nephrology for clarity and comprehensiveness of its contents. Pre-testing was done on 5% (13) of the study participants before the start of the actual study. All the necessary modifications and adjustments were done before implementing in the main study. The principal investigator did close supervision throughout the data collection process. In order to ensure its completeness and consistency, maximum effort was done at the level of data entry, analysis, interpretation and representation in order to maintain the quality of the data.

3.6.4 Data analysis and interpretation

Data were sorted, cleaned, coded and entered into SPSS version-20.0 statistical software for management and analysis. Descriptive statistics including: frequency, mean and standard deviation were used to summarize patients' baseline socio-demographic data and evaluate distribution of responses. Bivariate analysis was conducted to see the existence of association between adherence and independent variables. All variables with $p < 0.2$ in the bivariate analysis were included in the multivariate binary logistic regression, which was performed to determine the potential predictors of non-adherence. Adjusted Odds Ratio (AOR) with its p-value and confidence interval (95%) was reported in each logistic regression analysis. Student's unpaired t-test and one-way ANOVA were conducted to compare two groups and three or more groups in the analysis of QoL, respectively. Whenever t-test & ANOVA result was statistically significant, multivariate linear regression was employed to identify the potential predictors of the physical and mental component summary. P-value < 0.05 considered as statistically significant.

3.7 Study variables

Independent variables

- Socio demographic variables (age, sex, educational level, monthly income, marital status, occupation, profession)
- Patient characteristics (presence of co-morbidities and complications, type and number of prescribed drugs, duration of CKD, stage of CKD, knowledge about CKD complications, etc).

Dependent variables

- Management practice
- Medication adherence
- Quality of life

3.8 Ethical consideration

Ethical clearance and approval of the study protocols was obtained from the Ethical Review Board of School of Pharmacy. In addition, permission was sought from the respective heads of Department of Internal Medicine and renal clinic to conduct the study in the clinic. Prior to data collection, individuals were informed about the study and verbal consent was obtained from the study participants. Each patient was informed about the objective of the study, procedures of selection and assurance of confidentiality. No identifiers were used to minimize social desirability bias and enhance anonymity. Individuals were free to withdraw from the study at any time. Patients did not face any harm nor received any monetary incentive for participating and it was solely voluntary based. The collected data was handled and secured with the principal investigator in every data collection day and the data generated was used for the purpose of this research only.

3.9 Operational definitions

High adherent to medications: A patient who scored 8 for the MMAS-8 said to be adherent to medications.

Medium adherent to medications: A patient who scored <8 and ≥ 6 for the MMAS-8 said to be Medium adherent to medications.

Poor adherent to medications: A patient who scored <6 for the MMAS-8 said to be poor adherent to medications.

Complex regimen: Number of medications (poly-pharmacy) and the number of times per day or doses that the patient takes a medication (multiple dosing schedules).

Laboratory tests/values represent the recent measurements taken during the study period

Adequate knowledge about CKD symptom: The knowledge regarding the symptom of CKD was considered adequate when a patient could mention $\geq 3/6$ symptom as mentioned in the data collection instrument.

Inadequate knowledge about CKD symptom: The knowledge regarding the symptom of CKD was considered adequate when a patient could mention $< 3/6$ symptom as mentioned in the data collection instrument.

Adequate knowledge about CKD cause: The knowledge regarding the cause of CKD was considered adequate when a patient could mention $\geq 4/7$ cause as mentioned in the data collection instrument.

Inadequate knowledge about CKD cause: The knowledge regarding the cause of CKD was considered adequate when a patient could mention $< 4/7$ cause as mentioned in the data collection instrument.

Adequate knowledge about CKD complications: The knowledge regarding the complications of CKD was considered adequate when a patient could mention $\geq 3/5$ complications as mentioned in the data collection instrument.

Inadequate knowledge about CKD complications: The knowledge regarding the complications of CKD was considered adequate when a patient could mention $< 3/5$ complications as mentioned in the data collection instrument.

4. RESULTS

4.1. Socio-demographic characteristics

Males comprised 58% of the sex category. Majority of the participants were in the age group of less than 61 years, which accounted for 54.3%. Mean age of the study population was 52.5 (SD=16.8) years (range 18 to 90 years). Married participants accounted for 69.9% and being retired (25.4%) and government employee (23.4%) accounted for the highest percentage of occupation. Education-wise, 34.4% and 27.7% attended primary and higher education, respectively. Majority of the participants were non-health professionals (97.3%). A significant proportion of the study participants (29.7%) had low level of monthly family income (Table 1).

Table 1: Socio-demographic characteristic of chronic kidney disease patients attending the renal clinic of Tikur Anbessa Specialized Hospital

Variables	Stage of CKD				
	1 & 2 (n=50)	3 (n = 88)	4 (n = 55)	5 (n = 63)	Total (n= 256)
Sex					
Male	25 (50)	60 (68.2)	31 (56.4)	33 (52.4)	149 (58)
Female	25 (50)	28 (31.2)	24 (43.6)	30 (47.6)	107 (42)
Age (years)					
≤60	38 (76)	41 (46.6)	28(50.9)	32(50.8)	139 (54.3)
>60	12(24)	47 (53.4)	27(49.1)	31(49.2)	117 (45.7)
Marital status					
Single†	14(28)	23(26.1)	20(36.4)	20(31.7)	77 (30.1)
Married	36(72)	65(73.9)	35(63.6)	43(68.3)	179 (69.9)
Occupation					
Farmer	6(12)	8(9.1)	4(7.3)	6(9.5)	24 (9.4)
Gov't employee	18(36)	19(25.6)	11(20)	12(19.1)	60 (23.4)
Merchant/trade	7(14)	5(5.7)	5(9.1)	6(9.5)	23 (9)
Daily laborer	2(4)	6(6.8)	4(7.3)	7(11.1)	19 (7.4)
House wife	7(14)	11(12.5)	8(14.5)	11(17.5)	37 (14.5)
Retired	6(12)	27(30.7)	18(32.7)	14(22.2)	65 (25.4)
Others*	4(8)	12(13.6)	5(9.1)	7(11.1)	28 (10.9)
Profession					
Health professional	3(6)	1(1.1)	2(3.6)	1(1.6)	7 (2.7)
Non-health professional	47(94)	87(98.9)	53(96.4)	62(98.4)	249 (97.3)
Educational status					
Cannot read and write	5(10)	11(12.5)	7(12.7)	7(11.1)	30 (11.7)
Primary	13(26)	31(35.23)	20(36.4)	24(38.1)	88 (34.4)
Secondary	10(20)	23(26.1)	19(34.5)	15(23.8)	67 (26.2)
Higher Education	22(44)	23(26.1)	9(16.4)	17(27)	71 (27.7)
Monthly family income (ETB)**					
Very low (≤860)	4(8)	10(11.4)	11(20)	15(23.8)	40 (15.6)
Low (861-1500)	13(26)	21(23.9)	17(30.9)	21(33.3)	72 (28.1)
Average (1501-3000)	10(20)	33(37.5)	18(32.7)	15(23.8)	76 (29.7)
Above average (3001-5000)	17(34)	20(22.7)	6(10.9)	8(12.7)	51 (19.9)
High (≥5001)	6(12)	4(4.5)	3(5.5)	4(6.4)	17 (6.7)

†Single, divorced and widowed; *students, driver, garage (mechanic), guard, teacher working in private school; ** Based on the Ethiopian Civil Service monthly salary scale for civil servants

4.2. Disease related characteristics

Overall, patients had been diagnosed with CKD for an average of 4.7 (SD=3.5) years, ranging from under five years (158, 61.7 %) through 5-10 years (75, 29.3%) to above ten years (23, 9%).

Close to half (48%) patients knew at least one symptom of CKD. Pain in the flank and difficulty in urination were the major symptoms, of which 78.1% and 51.2% of patients knew about it, respectively. Regarding to CKD cause and complications, 93.4% and 48.8% patients knew at least one CKD cause and complications, respectively. Among this, unmanaged hypertension (80.5%), unmanaged diabetes mellitus (60.6%) and poor habit of drinking water (60.6%) were the major causes of CKD. Further, fluid buildup (85.6%) and heart disease (44.8%) were the major complications of CKD recognized by the study participants. Overall, 49.2%, 19.9% and 15.6% of the participants had adequate knowledge about cause, symptom and complication of CKD, respectively (Table 2).

Table 2: Knowledge about chronic kidney disease among patients attending the renal clinic of Tikur Anbessa Specialized Hospital

Variables	Frequency	Percent
At least knows one symptom of CKD		
Yes	123	48
No	133	52
Knowledge on specific symptom of CKD (n=123)		
Pain in the flanks	96	78.1
Difficulty in urination	63	51.2
Change in smell/color of the urine	58	47.2
Urinating too little	24	19.5
Urinating too much	9	7.3
CKD can be asymptomatic until advanced stages	5	4.1
Category of knowledge about CKD symptom		
Adequate Knowledge	51	19.9
Inadequate Knowledge	205	80.1
At least knows one CKD Complication		
Yes	125	48.8
No	131	51.2
Knowledge on Specific CKD Complications (n=125)		
Fluid buildup	107	85.6
Heart disease	56	44.8
Hyperkalemia	38	30.4
Anemia	30	24
Osteodystrophy	26	20.8
Category of knowledge about CKD complications		
Adequate Knowledge	40	15.6
Inadequate Knowledge	216	84.4
At least knows one cause of CKD the patient thinks		
Unmanaged hypertension	206	80.5
Unmanaged diabetes	155	60.6
Poor habit of drinking water	155	60.6
Smoking	130	50.8
Do not know/no response	17	6.6
Others*	7	2.7
Category of knowledge about CKD cause		
Adequate Knowledge	126	49.2
Inadequate Knowledge	130	50.8

*being female, male and drinking too much water

About two-third (64.4%) of the study participants did not have long term complications. Cardiovascular disease and anemia accounted for the highest percentage among patients that had at least one long term CKD complications. Almost all (96.5%) patients had at least one co-morbid condition, hypertension being the major type of co-morbidity (91.1%) (Table 3).

Table 3: Presence of co-morbidities and complications among chronic kidney disease patients attending the renal clinic of Tikur Anbessa Specialized Hospital

Variables	Frequency	Percent
Co-morbidities		
Absent	9	3.5
Present	247	96.5
Specific Co-morbidities (n=247)		
Hypertension	225	91.1
Diabetes mellitus	114	46.2
Ischemic Heart Disease	33	13.4
Dyslipidemia	31	12.6
Stroke	10	4.1
Others*	22	13
Complications		
Absent	165	64.4
Present	91	35.6
Specific complications (n=91)		
Cardiovascular disease	29	31.9
Anemia	28	30.8
Osteodystrophy	23	25.2
Fluid build up	14	15.3
Hyperkalemia	10	11
Peripheral neuropathy	9	9.9

*Gouty arthritis, asthma, Parkinson, nephritic syndrome, pyelonephritis

4.3. Non-pharmacological management approaches

The present study revealed that diet restriction, exercise and no-smoking were the most commonly used non-pharmacological approaches. Agreed dietary plan was found to be present in most (68.8%) of the patients (Table 4).

Table 4: Non-pharmacological management approaches used among chronic kidney disease patients attending the renal clinic of Tikur Anbessa Specialized Hospital

Variables	Frequency	Percent
Dietary Approach		
Presence of agreed dietary plan with physician		
Yes	175	68.4
No	81	31.6
Salt restriction (n = 175)		
Yes	167	95.4
No	8	4.6
Cut off sweet carbohydrate meals (n=114)	114	100
Exercise		
Presence of agreed exercise plan with physicians		
Yes	130	50.8
No	126	49.2
Exercising according to plan (n=130)		
Yes	120	92.3
No	10	7.7
Days per week doing moderate intense exercise		
< 3 Days	7	5.4
≥3 Days	123	94.6
Duration of moderate intense exercise per week in minutes		
< 140 Minutes	64	49.2
≥140 Minutes	66	50.8
Cigarette		
Ever smoked		
Yes	28	10.9
No	228	89.1
Smoking now (n = 28)		
Yes	4	14.3
No	24	85.7

4.4. Profile of prescribed medications and management practice

4.4.1 Profile of prescribed medications

Table 5 presents medication profile of patients based on CKD stages. It revealed that enalapril (133, 52%) was the most commonly prescribed drug followed by furosemide (128, 50%) and amlodipine (124, 48.4%). Insulin and ASA (Acetyl Salicylic Acid) were found to be the major type of antidiabetic and cardiovascular medications which were prescribed for 69 (27%) and 70 (27.3%) patients, respectively. The average number of prescribed drugs per patient was 3.9 (SD=2.2) with a range of 0-12 drugs (Table 5).

Table 5: Profile of prescribed medications for chronic kidney disease patients attending the renal clinic of Tikur Anbessa Specialized Hospital

Variables	Stage of CKD				
	1 & 2 (n = 50)	3 (n = 88)	4 (n = 55)	5 (n = 63)	Total (n=256)
ACEI					
Enalapril	41 (82)	47 (53.4)	32(58.2)	28(44.4)	148 (57.8)
CCB					
Amlodipine	21(42)	41(46.6)	25(45.5)	37(58.7)	124 (48.4)
Nifedipine	8(16)	13(14.8)	17(30.9)	13(20.6)	51 (19.9)
Diuretics					
Furosemide	14(28)	38(43.2)	30(54.5)	46(73)	128 (50)
Hydrochlorothiazide	10(20)	23(26.1)	14(24.5)	22(34.9)	69 (27)
Spironolactone	4(8)	12(13.6)	4(7.3)	10(15.9)	30 (11.7)
β-blocker					
Atenolol	6(12)	13(14.8)	10(18.2)	20(31.7)	49 (19.1)
Metoprolol	4(8)	5(5.7)	3(5.5)	1(1.6)	13 (5.1)
Carvedilol	0(0)	4(4.5)	1(1.8)	2(3.2)	7 (2.74)
ARB					
Losartan	1(2)	2(2.3)	2(3.6)	0(0)	5(2)
Antidiabetic Medications					
Insulin	14(28)	14(15.9)	20(36.4)	21(33.3)	69 (27)
Metformin	9(18)	8(9.1)	4(7.3)	5(7.9)	26 (10.2)
Glibenclamide	1(2)	5(5.7)	2(3.6)	0(0)	8 (3.1)
Other medications					
ASA	8(16)	23(26.1)	20(36.4)	19(30.2)	70 (27.3)
Statins	9(18)	18(20.5)	8(14.5)	15(23.8)	50 (19.5)
Calcium supplement	1(2)	3(3.4)	6(10.9)	15(23.8)	25 (9.8)
Iron	0(0)	4(4.5)	9(16.4)	15(23.8)	28 (10.9)
Antibiotics	1(2)	5(5.7)	5(9.1)	5(7.9)	16 (6.3)
Others*	15(30)	23(26.1)	13(23.6)	17(27)	68 (26.6)
Number of medications	3.2 ± 1.6	3.5 ± 1.7	4.3 ± 2	4.9 ± 2.9	3.9 ± 2.2

* Phenobarbitone, Warfarin, Prednisolone, Antiretroviral therapy, Carbamazepine, Chlorpromazine

ACEI = angiotensin converting enzyme inhibitor, CCB = calcium channel blocker

ARB = angiotensin receptor blocker, ASA = Acetyl Salicylic Acid

4.4.2 Management practice for co-morbidities and complications

Respondents were placed on different medications for treatment of CKD co-morbidities or complications. Hypertension was managed by combination of drugs, non-ACEI based (55%) being the most commonly used combination followed by ACEI based (45%). Insulin and metformin were the most commonly prescribed drugs in the management of diabetes mellitus alone. In diabetes mellitus and hypertension co-morbidities, insulin and ACEI based combinations (57.3%) and ACEI based combinations (19.8%) were the two most commonly used combinations (Table 6).

Table 6: Types of regimens used in the management of chronic kidney disease co-morbidities patients attending the renal clinic of Tikur Anbessa Specialized Hospital

Co morbidities	Frequency	Percent (%)
Hypertension (n=129)		
ACEI based regimens	58	45
Non-ACEI based regimens	71	55
DM + HTN (n=96)		
Insulin + ACEI based regimens	55	57.3
ACEI based regimens	19	19.8
Metformin + ACEI based regimens	13	13.5
Insulin + Non-ACEI based regimens	5	5.2
Metformin + Non-ACEI based regimens	4	4.2
DM (n=18)		
Insulin	8	44.4
Metformin	6	33.3
Glibenclamide	3	16.7
Insulin + Glibenclamide	1	5.6
IHD (n=33)		
ASA + β -Blocker	33	100
Dyslipidemia (n=31)		
Statins	31	100
Stroke (n=10)		
ASA	10	100
Others* (n=12)		
ASA + others [‡]	7	58.3
Statins + others [‡]	5	41.7

DM = diabetes mellitus, HTN = hypertension, IHD = ischemic heart disease

ACEI = angiotensin converting enzyme inhibitor or an angiotensin receptor blocker

ASA = Acetyl Salicylic Acid, *Asthma, HIV/AIDS, gout, nephritic syndrome

[‡]Phenobarbitone, antibiotics, prednisolone, antiretroviral therapy, carbamazepine.

Types of regimens used in the management of complications of chronic kidney disease

ACEIs alone (18%) or in combination (52%) were the most commonly prescribed agent for treating CVD related complications. About three-fourth of anemia & osteodystrophy were treated with iron preparation & calcium based formulations, respectively. Likewise, 92.3% of fluid buildup, 40% of hyperkalemia and 88.9% of peripheral neuropathy were treated with furosemide, calcium gluconate and amitriptylin, respectively (Figure 1).

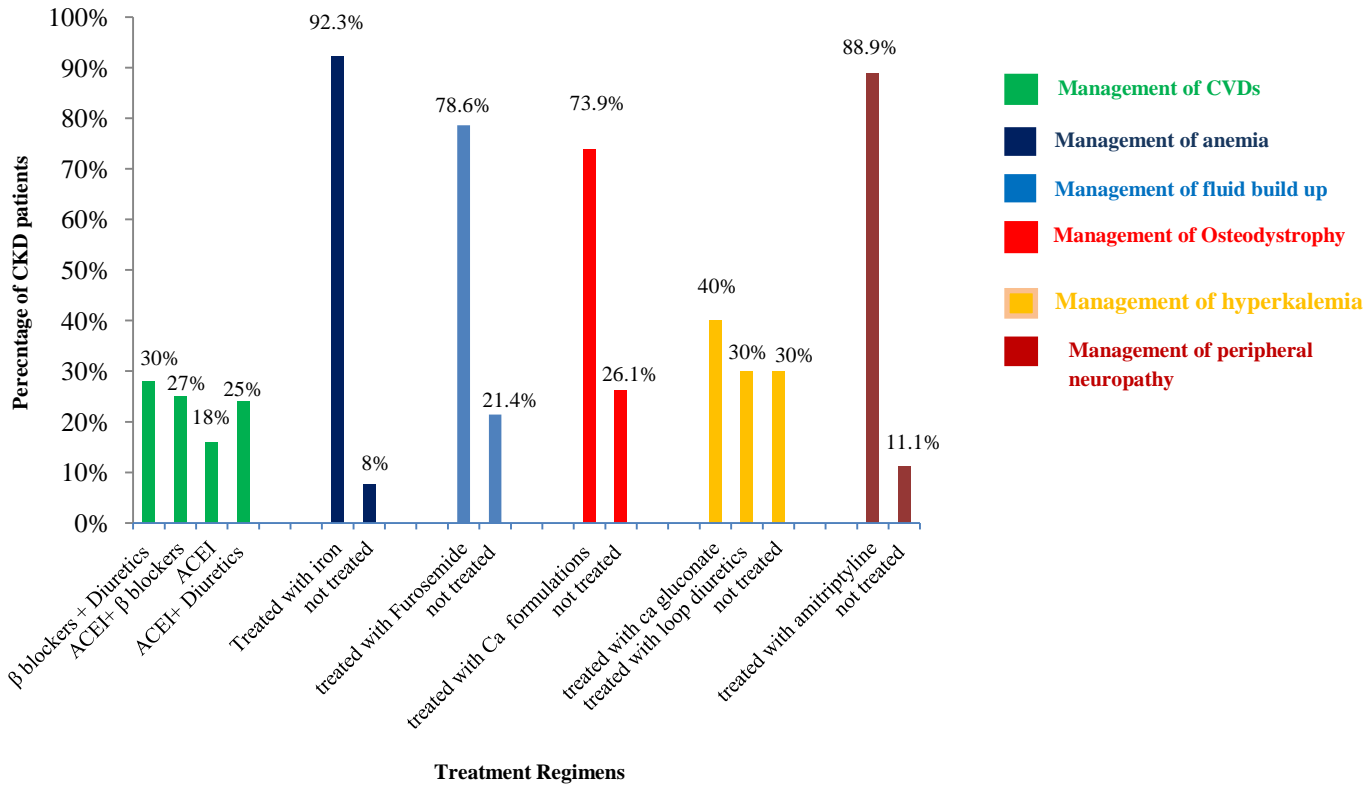


Figure 1: Management practice of complications among chronic kidney disease patients attending the renal clinic of Tikur Anbessa Specialized Hospital.

ACEI= angiotensin converting enzyme inhibitor

4.5. Rate of adherence and reasons for non-adherence

Assessment of patients' responses to the 8-item Morisky Medication Adherence scale showed that 157 (61.3%), 51(19.9%) and 48 (18.8%) patients exhibited high, medium and poor adherence to the prescribed regimens, respectively (Figure 2).

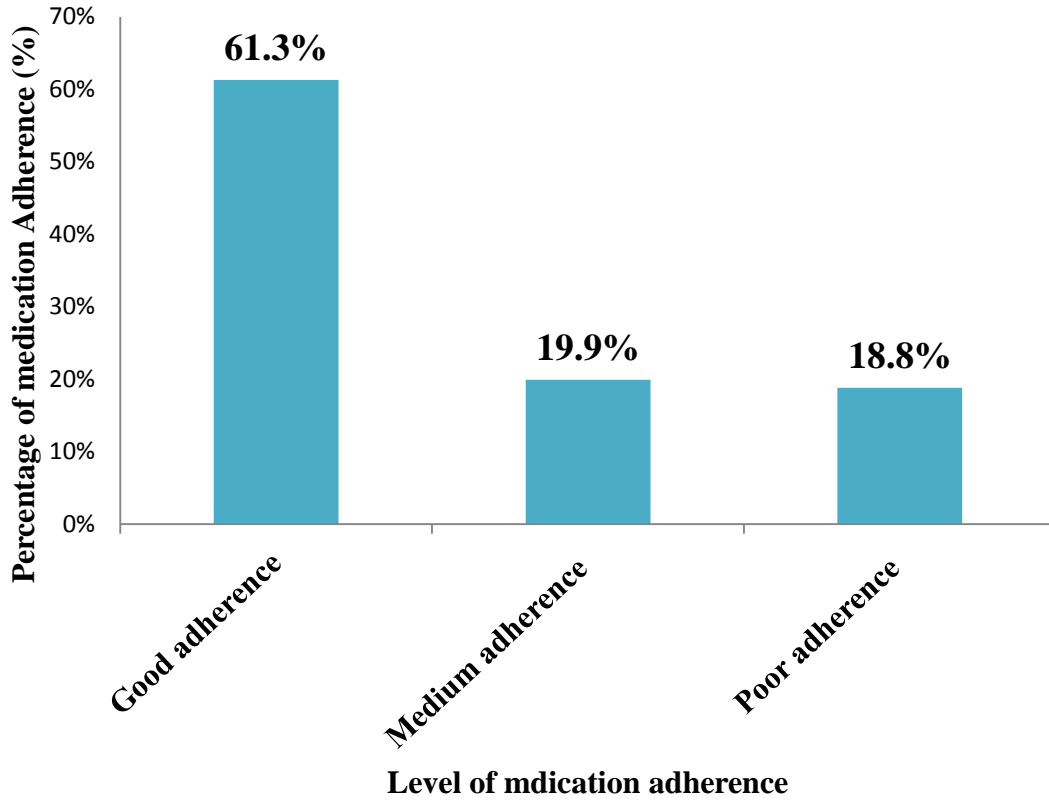


Figure 2: Rate of adherence to medications among chronic kidney disease patients in renal clinic of Tikur Anbessa Specialized Hospital.

Up on evaluation of the reasons for CKD medication non-adherence, it was identified that forgetfulness (79.8%) was the main reason for their non-adherence. Furthermore, side effects of the medications and high cost of medications accounted for 49.5% and 38.4% of medication non-adherence, respectively. Feeling well without treatment and physicians mode of approach were, however, the least common reasons for non-adherence (Figure 3).

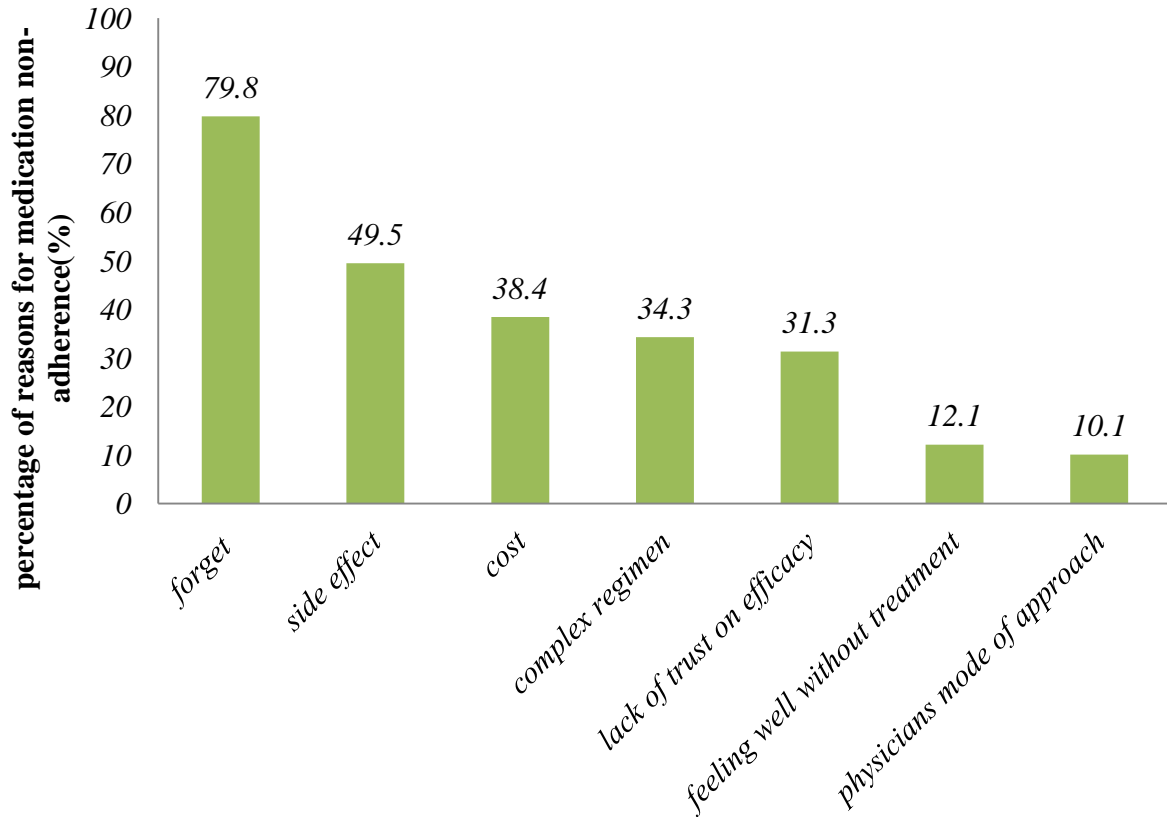


Figure 3: Reasons for medication non-adherence among chronic kidney disease patients attending the renal clinic of Tikur Anbessa Specialized Hospital.

4.6. Quality of life SF-36 domains and summary scores

QoL, as evaluated by the means of SF-36 domains, scores in all dimensions were impaired progressively and significantly ($p < 0.05$) across CKD stages and the lowest scores were found in stage 5 CKD patients except emotional role functioning in stage 4 ($p = 0.005$). As shown in Figure 4, the dimensions showing highest and least scores were emotional role functioning (78 ± 34.7) and bodily pain (59.3 ± 22.6) in stages 1 and 2, social functioning (68 ± 24.6) and physical role functioning (48.6 ± 40.4) in stage 3, mental health (55.6 ± 18.9) and physical role functioning (38.2 ± 40.2) in stage 4 and emotional role functioning (56.1 ± 45.6) physical role functioning (26.6 ± 40.4) in stage 5, respectively (Figure 4).

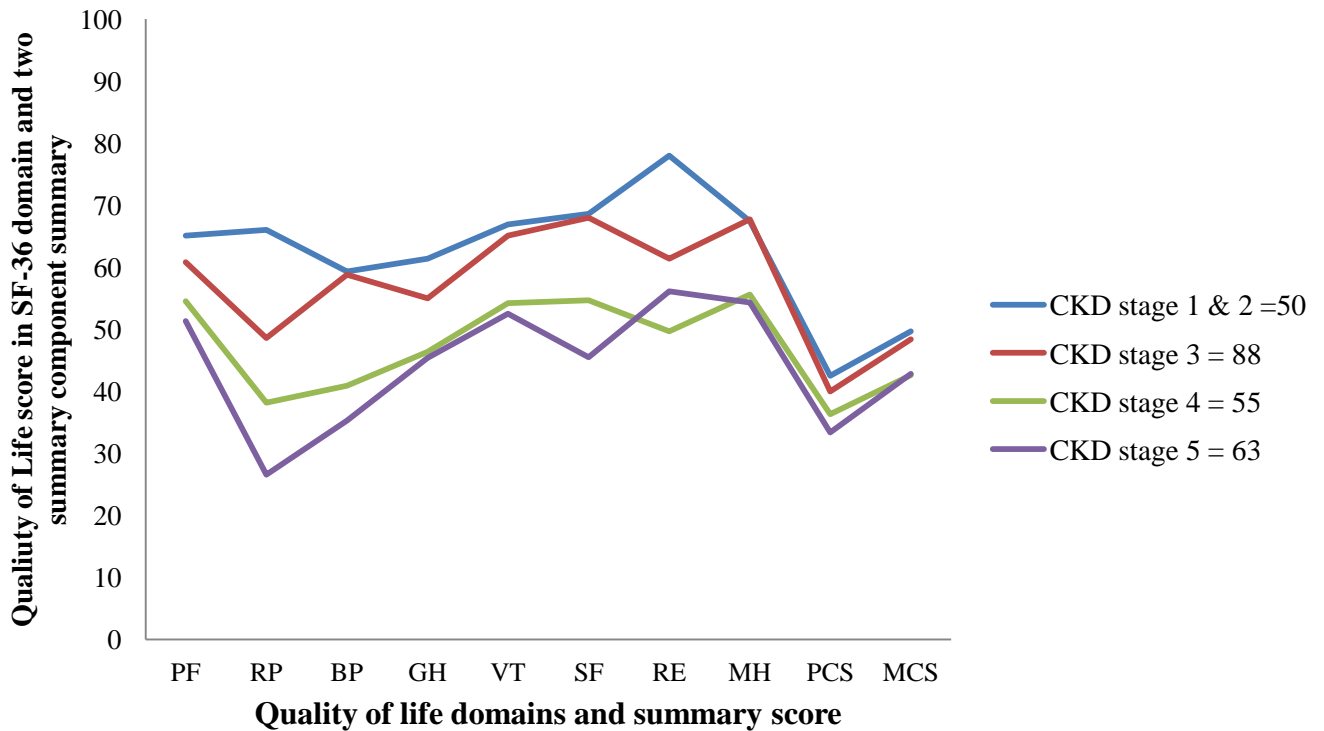


Figure 4: Quality of life domains and summary scores of patients in different stages of chronic kidney disease. PF = Physical functioning, RP = Physical role functioning, BP = Bodily pain, GH = General health, VT = Vitality, SF = Social functioning, RE = emotional role functioning, MH = Mental health, PCS = Physical summary scores, MCS = Mental summary scores.

Regarding to clinical and laboratory parameters, ≥ 3 co-morbidities (31.7%) and complications (6.9%) were commonly found in stage 5 CKD patients. Fasting blood sugar, serum creatinine and blood urea nitrogen increased, while hemoglobin decreased across the stages (Table 7).

Table 7: Clinical and laboratory parameters according to the stage of chronic kidney disease patients attending the renal clinic of Tikur Anbessa Specialized Hospital

Clinical/laboratory parameters	Stage of CKD				
	1 & 2 (n = 50)	3 (n = 88)	4 (n = 55)	5 (n = 63)	Total (n=256)
Number of co-morbidities					
≤ 2	43 (91.5)	77 (90.6)	46 (83.6)	41 (68.3)	207 (83.8)
3 or more	4 (8.5)	8 (9.4)	9 (16.4)	19 (31.7)	40 (15.6)
Number of complications					
≤ 2	9 (100)	29 (100)	23 (95.8)	27 (93.1)	88 (96.7)
3 or more	0	0	1 (4.2)	2 (6.9)	3 (3.3)
FBS	125 \pm 46	140 \pm 46	149 \pm 69	155 \pm 57	141 \pm 56
Scr	1.6 \pm 0.8	2.0 \pm 0.8	3.5 \pm 1.6	7.6 \pm 3.1	3.6 \pm 3
BUN	41 \pm 20	56 \pm 34	93 \pm 46	136 \pm 66	80 \pm 57
Hgb	16.0 \pm 18.9	13.6 \pm 14.1	10.5 \pm 2.6	10.3 \pm 2.8	12.6 \pm 12.0
MAP	104.9 \pm 12.2	101.7 \pm 9.6	104.3 \pm 14.3	103.6 \pm 14.3	103.4 \pm 12.4
GFR	74.7 \pm 15.4	43.3 \pm 8.4	23 \pm 4.8	10.4 \pm 2.9	37 \pm 24.2

FBS = fast blood sugar, Scr = serum creatinine, BUN = blood urea nitrogen, Hgb = hemoglobin, MAP = mean arterial pressure and GFR = glomerular filtration rate

4.7. Factors associated with medication adherence and quality of life

4.7.1. Factors associated with medication adherence

Based on the results of univariate binary logistic regression analysis, variables such as sex, age, occupation, educational status, family income, CKD stage, number of medications and co-morbidities were included in the multivariate logistic regression analysis. After controlling different demographic, economical and other factors through the use of multivariate logistic regression analysis, this study showed that only family income, total number of prescribed drugs and occupation had significant association with CKD medication adherence. Accordingly, patients who had an average and high family monthly income were about four (AOR=4.14, 95% CI: 1.45-11.84, p=0.008) and six (AOR=6.17, 95% CI: 1.02-37.46, p=0.048) times, respectively, more likely to adhere as compared to those who had very low income. During a multivariate logistic regression analysis, it was also found that, patients with other groups (students, driver, teacher working in private school) of occupation had a significant association with their adherence condition and were about seven (AOR=7.46, 95% CI: 1.49-37.26, p=0.014) times more likely to adhere compared with patients who were farmers. On the other hand patients who were prescribed with five and above drugs were 0.46 (AOR= 0.54, 95% CI: 0.27-1.10, p=0.049) times less likely to adhere compared to those prescribed with less than five drugs (Table 8).

Table 8: Univariate and multivariate binary logistic regression analysis of predictors of medication non-adherence

Variables	Adherence		COR , 95 % CI	AOR, 95% CI
	Low to moderate adherence	high adherence		
Sex				
Female	51	56	1.00	1.00
Male	48	101	1.92(1.15, 3.20)*	1.56(0.76, 3.2)
Age in years				
≤60	43	96	1.00	1.00
> 60	56	61	0.49(0.29, 0.81) *	0.64 (0.29, 1.42)
Occupation				
Farmer	13	11	1.00	1.00
Gov't Employee	20	40	2.36(0.90, 6.21)	1.14(0.30, 4.34)
Merchant/Trade	6	17	3.35(0.98, 11.45)	2.99(0.67, 13.36)
Daily Laborer	7	12	2.03(0.59, 6.93)	2.03(0.43, 9.52)
House wife	21	16	0.90(0.32, 2.53)	1.41(0.34, 5.88)
Retired	27	38	1.66(0.65, 4.27)	2.52(0.63, 10.13)
Others*	5	23	5.44(1.55, 19.11)*	7.46(1.49, 37.26)*
Educational status				
Cannot read & write	16	14	1.00	1.00
Primary	43	45	1.2(0.52, 2.74)	0.49(0.14, 1.68)
Secondary	24	43	2.05 (0.85, 4.91)	0.69(0.18, 2.69)
Higher Education	16	55	3.93(1.59, 9.74)*	1.14 (0.24, 5.38)
Family income category				
Very Low	25	15	1.00	1.00
Low	39	33	1.41(0.64, 3.1)	1.37(0.49, 3.85)
Average	19	57	5.0(2.19, 11.4)**	4.14(1.45, 11.84)*
Above Average	13	38	4.88(1.99, 11.96)**	3.39(0.91, 12.66)
High	3	14	7.78(1.92, 31.59)*	6.17(1.02, 37.46)*
CKD stage				
1 & 2	15	35	1.00	1.00
3	23	65	1.21(0.56, 2.61)	1.42(0.58, 3.47)
4	25	30	0.51 (0.23, 1.15)	0.68(0.27, 1.71)
5	36	27	0.32 (0.15, 0.70)*	0.45(0.18, 1.13)
Number of medications				
<5	57	120	1.00	1.00
≥ 5	42	37	0.42 (0.24, 0.72)*	0.54 (0.27, 1.10)*
Number of co-morbidity				
0-2	75	141	1.00	1.00
≥ 3	24	16	0.36(0.18, 0.71)*	0.85(0.35, 2.11)

COR=crude odd ratio, AOR=adjusted odd ratio, *Statistically Significant at $P \leq 0.05$ and **statistically significant at $p \leq 0.001$; *students, driver, garage (mechanic), guard, teacher working in private school

4.7.2. Factors associated with quality of life

The results of the comparative statistical analysis of the QoL domains of CKD patients according to the categorical socio-demographic variables are shown in Table 9. Among the domains that constitute the SF-36 physical and mental component summaries, higher scores in all SF-36 domains were observed in younger age ($p < 0.05$), higher education's ($p < 0.05$) and high family income ($p < 0.001$) groups. Regarding to gender, male participants had high score in general health ($p = 0.034$), vitality ($p = 0.038$), social functioning ($p = 0.011$) and mental health ($p = 0.018$). In addition, occupation had statistical significant difference with physical functioning ($p = 0.001$), physical role functioning ($p < 0.001$), bodily pain ($p = 0.007$) and vitality ($p = 0.026$) (Table 9).

Table 9: Comparative statistical analysis of mean scores of SF-36 domains among patients with chronic kidney disease, according to the categorical socio-demographic variables

	PF	RP	BP	GH	VT	SF	RE	MH	
Sex									
Female	54.9±23	41.1±42.4	46.6 ± 24	49.1±18.7	57.3 ± 16	55 ±24.5	59.5 ± 44.2	58.7±16.9	
Male	60.1±5.2	46.6 ± 41.5	51.2±7.6	54.1±18.3	61.9±8.3	63.2±5.6	61.8 ± 43.6	63.9±7.8	
p-value	0.093	0.299	0.158	0.034	0.038	0.011	0.683	0.018	
Age									
≤60	64.6±21.4	56.1 ± 41.4	53.6±25.8	55.2±17.6	63.3±15.9	63.6 ±3.9	67.6 ± 42	65 ±14.7	
>60	50 ± 25.4	30.3 ± 38	44 ± 25.8	48.3±19.1	56 ± 18.4	55.2± 26.5	52.7 ± 44.5	57.8 ±20	
p-value	<0.001	<0.001	0.004	0.003	0.001	0.008	0.006	0.001	
Occupation									
Farmer	57.7±24.8	39.6 ± 40.3	44.2 ±3.5	53.1±9.5	60.2 ±18	54.8±17.6	62.5±45.4	59.8±16.2	
Gov't employee	65.3±17.2	63.3 ±37.5	56.8±23.4	55.1± 19	65.1±15.4	62 ±22.2	71.2±39.5	66.5±12.9	
Merchant	62.6±25.5	52.2 ±43.9	53 ±27.7	56.3±16.9	64.3±18.1	60.5±27.8	59.4±42.6	65.6±16.7	
Daily laborer	70.8±22.2	51.3 ± 46	58.5±27.5	60.4±14.4	63.4±16.2	69.9±24.7	68.4±42.3	65.7±18.7	
House wife	53.6±2.4	23.1 ± 34	39.1 ±2.2	49.9±16.4	54.3 ± 12	54.6±23.4	63±45	58.3±12.7	
Retired	48.5±27.7	32.3 ± 40	44 .2± 28	47.2±19.7	56.3±19.3	58.6±29.6	48.7±45.3	57.9±22.1	
Others	57.1±24.6	52.7 ± 42.7	53.5±26.9	49.6±18.7	59.1± 10.1	60.9±27.5	58.4±45	60.9±19.4	
p-value	0.001	<0.001	0.007	0.057	0.026	0.412	0.163	0.076	
Education status									
Cannot read & write	48.2±24.4	18.3±30.7	41.3±27	46.4±18.1	53.7±19.1	43.5±21	48.9±46.1	52.7±16.6	
Primary	57.2±25.9	44.3±42.7	46.5±26.1	51.8±17.6	59.5±18.3	58.1±24.8	61±46.4	61.2±18.8	
Secondary	55.4±25.7	39.9±42.9	48.3±25	48±18.9	57.2±16.7	60.9±27.8	52.7±43.5	59.9±18.2	
Higher education	65.4±18.9	59.5±38.1	57±25.7	58.5±18.1	65.9±14.7	67.6±22.2	73.3±36.8	67.9±13.7	
p-value	0.006	<0.001	0.017	0.002	0.003	<0.001	0.015	<0.001	
Family income									
Very low	40.8±25.8	10.6±24.6	26.9±19.4	40.6±16.4	41.1±16.8	39.6±24.2	42.5±47.1	46.1±15.8	
Low	46.7±22.2	22.9±33	43.3±25.2	46.4±17.2	57.8±17.1	55±26.1	42.1±42	58.8±19.6	
Average	68.2±21.8	58.2±42.5	55.8±24.4	55.6±18.4	64.6±12.5	67.1±22.5	70.6±43.9	65.7±14.9	
Above average	69.6±15.5	71.1±33.3	60.6±22.7	60.2±16.1	67.8±14.7	66.8±21.4	83±29.4	70.4±12.7	
High	69.4±13.3	72.1±27.8	64.2±22.6	62.4±16.8	69.4±12.4	72.9±17.7	72.7±31.7	67.5±9	
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	

PF=Physical functioning, RP=Physical role functioning, BP=Bodily pain, GH=General health, VT=Vitality, SF=Social functioning, RE=Emotional role functioning, MH=Mental health

Comparative statistical analysis of the SF-36 domains of CKD patients according to the clinical & laboratory parameters are shown in Table 10. Among the domains that constitute the SF-36 physical and mental component summaries, lower scores in all SF-36 domains were associated with advanced stage of CKD ($p<0.05$), on five or more medications ($p<0.001$), having three or more co-morbidities ($p\leq 0.001$), presence of CKD complications ($p<0.001$), having hemoglobin ≤ 11 g/dl level ($p<0.001$) and being non-adherent to their medications ($p<0.05$). General health was low in patients having greater than 110 mmHg mean arterial pressure (Table 10).

Table 10: Comparative statistical analysis of the mean scores of SF-36 domains of patients with chronic kidney disease, according to the categorical clinical/laboratory parameters

Variables	PF	RP	BP	GH	VT	SF	RE	MH
CKD stage								
1 & 2	65.1±17.5	66±37.7	59.3±22.6	61.4±16.2	66.9±15.4	68.6±19.6	78±34.7	67.4±14.4
3	60.8±22.6	48.6±40.4	58.8±25	55±17	65.1±16.2	68±24.6	61.4±45.5	67.7±15.8
4	54.5±25.9	38.2±40.2	40.9±23.8	46.4±18.9	54.2±19.2	54.7±26.8	49.7±42.5	55.6±18.9
5	51.3±28.1	26.6±40.4	35.3±24.1	45.4±18.5	52.5±14.5	45.5±22.5	56±45.6	54.3±16.8
p-value	0.009	<0.001	<0.001	<0.001	<0.001	<0.001	0.007	<0.001
No of medications								
<5	64.1±21.6	51±40.9	52.9±26.1	54.9±17.9	62.2±16.1	64.2±24.6	64.2±42.6	64.7±15.7
≥5	44.1±24.7	29.4±40.4	41.1±24.7	45.6±18.5	55.1±19.4	50±24.4	46.4±43.2	55.1±19.8
p-value	<0.001	<0.001	0.001	<0.001	0.003	<0.001	<0.001	<0.001
Adherence rate								
Non adhered	49.3±24.6	24.8±36	38.1±23	43.6±16.9	52.8±17.8	49.8±24.7	52.2±45	54.9±18.3
Adhered	63.3±22.7	56.7±40.7	56.4±25.6	57.4±17.6	64.5±15.7	66±23.9	66.3±42.2	66.1±15.8
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.012	<0.001
No of co-morbidity								
0-2	62.2±22.1	49.5±42.1	51.6±25.9	54.3±17.6	61.5±17.3	62.7±24.6	65.8±43.3	64±16.8
≥3	34.6±23.1	16.3±26.9	36.9±24.6	40±19.1	52±16.2	43.6±23.6	34.1±36.6	49.4±17.1
p-value	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001
Complications								
Present	47.1±25	29.7±38.9	40.1±25.4	46.2±18.4	54±18	50.2±25.9	46.8±44.7	53.7±18.8
Absent	63.9±22	52.4±41.3	54.4±25.3	55.2±18	63.3±16.3	65±23.6	68.5±41.4	66.2±15.2
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hemoglobin								
≤11g/dl	40.6±21.7	12.1±24.4	32.5±21.6	41.1±16.9	50±17.2	46.7±25.4	36.1±42.5	51.9±17.9
>11g/dl	70.4±17.6	67.4±36.1	61.3±22.3	59.9±15.6	67.1±13.8	69.1±20.9	78.6±35.3	68.8±13.6
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MAP								
≤110 mmHg	58.2±24.8	45.4±41.4	50.6±26.2	53.1±18.8	60.6±17.6	60.2±25.8	60.5±43.6	62.2±17.7
>110 mmHg	56.6±22.6	39.2±44.3	43.2±25.4	47±16.6	56.9±16.6	57.6±23.8	62.1±45.3	59.5±17.1
p-value	0.690	0.373	0.089	0.046	0.201	0.542	0.828	0.362

P = Physical functioning, RP = Physical role functioning, BP = Bodily pain, GH = General health, VT = Vitality, SF = Social functioning, RE = Emotional role functioning, MH = Mental health, MAP = mean arterial pressure

According to the comparative statistical analysis of categorical socio-demographic variables across composite summary, higher scores in the physical and mental component summary were found among patients who were younger ($p < 0.001$, $p < 0.05$), had higher education ($p < 0.001$, $p < 0.001$) and high family income ($p < 0.001$, $p < 0.001$), respectively of CKD patients. Occupation had also statistically significant mean difference with physical component summary (Table 11).

Table 11: Comparative statistical analysis of the mean scores of physical and mental composite summaries of patients with chronic kidney disease, according to the categorical socio-demographic variables

Variables	PCS	p-value	MCS	p-value
Sex				
Female	36.9 ± 9.5		44.7 ± 9	
Male	38.9 ± 9.5	0.090	47 ± 9.1	0.051
Age				
≤60	40.7 ± 8.9		47.3 ± 8.1	
>60	34.9 ± 9.2	<0.001	44.5 ± 10	0.012
Occupation				
Farmer	37.1 ± 9.4		45.6 ± 8.1	
Gov't employee	41.7 ± 7.8		47.8 ± 8	
Merchant	40.5 ± 10.2		46.5 ± 9.3	
Daily laborer	42.5 ± 9.5		47.7 ± 8.6	
House wife	33.7 ± 8.5	<0.001	45.8 ± 7.2	0.538
Retired	34.9 ± 9.7		44.5 ± 11	
Others	39.3 ± 9		45.1 ± 10	
Education status				
Cannot read and write	33.6 ± 9.4		41.7 ± 8.3	
Primary	37.6 ± 9.7		45.8 ± 9.5	<0.001
Secondary	37.2 ± 9.4	<0.001	44.8 ± 9.6	
Higher Education	41.4 ± 8.5*		49.3 ± 7.5*	
Family income				
Very Low	29.7 ± 6.8		38.8 ± 9.2	
Low	33.5 ± 8.3		44.3 ± 9.1 ^α	
Average	41.7 ± 8.7 [†]		48 ± 8.6 [†]	
Above Average	43.3 ± 6.7 [†]	<0.001	50.3 ± 6.5 [†]	<0.001
High	45.1 ± 7 [†]		48.9 ± 6.8 [†]	

PCS = Physical summary scores, MCS = Mental summary scores, * $p < 0.001$ compared with cannot read and write, ^α $p = 0.004$ compared with very low family income, [†] $p < 0.001$ compared with very low family income

As per the comparative statistical analysis of clinical & laboratory parameters, lower scores in the physical and mental component summary were found among patients who were on advanced CKD stage ($p < 0.001$, $p < 0.001$), five or more medications ($p < 0.001$, $p < 0.001$), three or more co-morbidities ($p < 0.001$, $p < 0.001$) and had hemoglobin ≤ 11 g/dl level ($p < 0.001$, $p < 0.001$), respectively of CKD patients (Table 12).

Table 12: Comparative statistical analysis of mean scores of physical and mental composite summaries of patients with chronic kidney disease, according to the categorical clinical & laboratory parameters

Variables	PCS	p-value	MCS	p-value
CKD stage				
1 & 2	42.5 ± 7.5		49.7 ± 6.9	
3	40 ± 8.8		48.4 ± 8.9	
4	36.3 ± 9 [‡]	<0.001	42.6 ± 9.3*	
5	33.4 ± 10.1*		42.8 ± 8.9*	<0.001
Number of medications				
<5	40 ± 9		47.4 ± 8.2	
≥ 5	33.7 ± 9.3	<0.001	42.9 ± 10.3	<0.001
Adherence rate				
Non-adhered	33.2 ± 8.1		43.2 ± 9.6	
Adhered	41.2 ± 9	<0.001	47.8 ± 8.4	<0.001
Number of co-morbidity				
0-2	39.4 ± 9.1		47.1 ± 9	
≥ 3	30.7 ± 8.4	<0.001	40.3 ± 8	<0.001
Complications				
Present	34.3 ± 9.2		42.2 ± 9.3	
Absent	40.1 ± 9	<0.001	48.1 ± 8.4	<0.001
Hemoglobin				
Hgb ≤ 11g/dl	30.5 ± 6.5		41.1 ± 9.1	
Hgb > 11g/dl	43.5 ± 7.3	<0.001	49.5 ± 7.4	<0.001
MAP				
MAP ≤ 110 mmHg	38.5 ± 9.6		46.1 ± 9.2	
MAP > 110 mmHg	36 ± 8.9	0.112	45.68 ± 8	0.740

PCS = Physical summary scores, MCS = Mental summary scores, MAP = mean arterial pressure, * $p < 0.001$ compared with CKD stage 1 & 2, [‡] $p = 0.001$ compared with CKD stage 1 & 2

After adjustment through multivariate linear regression, higher family income status and greater than 11g/dl hemoglobin level were found to be predictors of all high score SF-36 domains. Being female, presence of complications, advanced stage of CKD, patients with five or more medications and three or more co-morbidities were predictors of low physical functioning. Being adherent to medications and absence of CKD complications were found predictors of better general health and mental health, respectively. Likewise, advanced CKD was a predictor of worse social functioning, vitality and bodily pain (Table 13). No associations were detected between any other socio-demographic or clinical variables and the scores of the SF-36.

Table 13: Adjusted analysis for predictors of SF-36 domains among chronic kidney disease patients

SF-36 domains	Coefficients (95% CI)	p-value
Physical functioning		
Male	5.0[0.28-9.72]	0.038
Absence of complications	5.05 [0.16-9.94]	0.043
≥ 3 co morbidity	-11.44 [-18.23-(-4.6)]	0.001
CKD stages	-2.5 [-4.24-(-0.75)]	0.03
Income status	4.85 [2.25-7.45]	<0.001
≥ 5 medications	-7.9 [-13.27-(-2.53)]	0.004
Hgb>11 g/dl	21.47 [15.8-27.14]	<0.001
Role Limitation physical		
Income status	11.55[7.13-15.97]	<0.001
Hgb>11 g/dl	37.42 [27.79-47.05]	<0.001
Bodily pain		
CKD stages	-4.03 [-6.72-(-1.33)]	0.004
Income status	6.45 [3.34-9.57]	<0.001
Hgb>11 g/dl	16.51 [9.72-23.3]	<0.001
General health		
Income status	2.99 [0.69 -5.29]	0.011
Hgb>11 g/dl	9.99 [4.98-15.00]	<0.001
Adhered	5.20 [0.68-9.73]	0.024
Vitality		
CKD stages	-2.22 [-4.06-6.32]	0.019
Income status	5.02 [2.89-7.15]	<0.001
Hgb>11 g/dl	7.90 [3.26-12.55]	0.001
Social functioning		
Occupation	1.70 [0.21-3. 2]	0.026
CKD stages	-4.36 [-7.0-(-1.52)]	0.002
Income status	4.36 [1.2-7.53]	0.007
Hgb>11 g/dl	9.15 [2.25-16.06]	0.01
Role emotional		
Income status	7.0 [1.32-12.67]	0.016
Hgb>11 g/dl	36.11 [23.74-48.48]	<0.001
Mental health		
Absence of complications	6.19 [2.12-10.26]	0.003
Income status	3.09 [0.93-5.26]	0.005
Hgb>11 g/dl	7.74 [3.02-12.45]	0.001

CI = confidence interval, CKD = chronic kidney disease, Hgb = hemoglobin

The present study revealed that only high family income & educational status and hemoglobin >11g/dl level were predictors of better QoL in the physical component summary, after adjustments through multivariate linear regression. The independent predictors of higher mental component summary were high family income, hemoglobin >11g/dl level and absence of CKD complications (Table 14).

Table 14: Adjusted analysis for predictors of physical and mental component summaries of the Short Form (SF-36) among chronic kidney disease patients

SF-36 component summary	Coefficients (95% CI)	p-value*
Physical component summary		
Educational status	1.12 [0.62 – 2.78]	0.024
Income category	2.6 [1.67-3.55]	<0.001
Hgb>11 g/dl	8.36 [6.31-10.41]	<0.001
Mental component summary		
Income category	1.64 [0.48-2.81]	0.006
Absence of complications	2.75 [0.56-4.94]	0.014
Hgb>11 g/dl	4.54 [2.01-7.08]	0.001

CI = confidence interval.

5. DISCUSSION

In the present study, different medications were used in the management of co-morbidities and complications of CKD. Enalapril and hydrochlorothiazide were prescribed in 50.8% and 32.7% of CKD stage 4 & 5 patients, although little robust evidence exists on the use of ACEIs in advanced CKD. ACEIs/ARBs increase potassium and decrease GFR (Hou *et al.*, 2006, Molnar *et al.*, 2014) and withdrawal of ACEIs/ARBs increase eGFR and hence, delay the onset of renal replacement therapy (Ahmed *et al.*, 2010). Hydrochlorothiazide was used inappropriately in advanced CKD patients, since thiazide diuretics are deemed ineffective (Agarwal and Sinha, 2012). Based on co-morbidity status, non-ACEI based combinations were the most commonly used treatment regimens in the management of hypertension alone. Contrastingly, various clinical guidelines done by Stevens and Levin (2013) and Bilo *et al* (2015) stated that ARBs or ACEIs are considered as the first line agents in both diabetic and non-diabetic patients with CKD. ARBs or ACEIs are used not only to decrease BP but also slow down the progression of CKD by reducing proteinuria (Toto, 2005; Inker *et al.*, 2014). The probable reason for this variation in TASH may be due to the absence of local standard treatment guideline for the management of CKD patients and lack of awareness of physicians practicing in the renal clinic. Besides, it might be due to difficulty in communication between physicians, shortage of multi-disciplinary care team and heavy workload on nephrologists. Coordinated multidisciplinary care team could improve management and outcomes of patients with CKD and essential for the appropriate management of CKD due to associated co-morbidities and complex regimens. Indeed, a systematic review showed that lack of awareness of evidence-based guidelines for CKD results in large variability in the treatment of CKD co-morbidities and complications (Nazar *et al.*, 2014). A deficiency in the nephrology workforce especially nephrologists for the provision of appropriate management is a critical problem in developing countries (Okpechi *et al.*, 2017). Hence, targeted training for physicians to raise awareness about the management of CKD and development of clinical guidelines should be emphasized.

Regarding the management of diabetes mellitus and hypertension, the present study revealed that combinations of insulin and ACEI based combinations were the most commonly used treatment regimens. This is in agreement with studies done by Levin *et al* (2008), Tomson & Baily (2011) and Bilo *et al* (2015), which stated that ACEIs based combinations were the first line regimens in the management of diabetes mellitus and hypertension co-morbidities in CKD

patients. Previous studies demonstrated that if ACEIs were not effective to control BP, then CCB might be added but not used alone since CCBs may lead to albuminuria and greater hyper-filtration (Levin *et al.*, 2008).

Insulin was the most widely used treatment agent in the management of diabetes alone comorbidity with CKD at TASH accounting for 44.4%. The finding of this study is comparable with similar studies by Albers *et al* (2010) and Dasari *et al* (2014), which indicated that renal patients with diabetes suitably managed with insulin. Though, metformin is an inexpensive and effective for type 2 diabetes mellitus there is much concern about the safety of metformin in advanced CKD, particularly the risk of lactic acidosis (Koro *et al.*, 2009; Dasari *et al.*, 2014). Hence, the frequent use of insulin as first line agent may probably be linked to this notion.

In the present study, statins were predominantly used for the treatment of dyslipidemia and reduction of the relative risk of cardiovascular events in CKD patients. Likewise, studies (Dasari *et al.*, 2014) and practice guidelines (Eknoyan *et al.*, 2013) have shown that statins are routinely used in the treatment of dyslipidemia and reduction of cardiovascular risk. This frequent usage might be due to the superior pharmacological effects of statins to reduce cardiovascular complications as compared to other lipid lowering agents. In addition, statins may have a role in preventing progression of kidney disease and reducing albuminuria (Fraser *et al.*, 2015). Thus, statins are the standard treatment of choice in the prevention of cardiovascular risks in patients with and without CKD (Rivera *et al.*, 2012). Furthermore, ASA and β -blocker combinations were predominantly used treatment regimens in ischemic heart disease. This finding is in agreement with a study (Dasari *et al.*, 2014) and practice guideline (Eknoyan *et al.*, 2013) that reported β -blockers should be initiated for the relief of symptoms and ASA in the primary prevention of cardiovascular events.

Regarding to the management of CKD complications, ACEI based combinations were the most commonly used treatment regimens in cardiovascular complications. This finding is in line with a systematic review that reported ACEIs or ARBs appeared to be the most commonly used regimens to treat heart failure in renal patients (Vassalotti *et al.*, 2016). The present study also revealed that iron preparations were predominantly used in the treatment of anemia in CKD patients. Contrastingly, various studies reported the use of erythropoietin stimulating agents with iron preparations were routinely used in the treatment of anemia in renal patients (Padhi *et al.*, 2015). Hence, the lesser usage of erythropoietin stimulating agent could probably be due to

the financial constraints and limited availability of this agent at TASH. Although Malluche *et al* (2008) & Miller (2014) demonstrated that the use of calcium-based phosphate binders have been associated with the development of low bone turnover, bone loss, and worsening of vascular calcifications; calcium containing phosphate binders were the most commonly used agents in the management of osteodystrophy at TASH. This could probably be due to the inaccessibility of new non-aluminum, non-calcium (sevelamer hydrochloride and lanthanum carbonate) phosphate binders in this setting, which have lower risk of vascular calcification (Mathew *et al.*, 2007).

Adherence to CKD medications was observed in 61.3% of the study participants. This finding is similar with previous studies conducted in Netherland (Drenth-van Maanen *et al.*, 2015), India (Sontakke *et al.*, 2015) & Spain (Arenas *et al.*, 2010) and different from other studies conducted in Saudi Arabia (Burnier *et al.*, 2015), India (Ahlawat *et al.*, 2016), German (Kugler *et al.*, 2011), southern Ethiopia (Fiseha *et al.*, 2014), Italy (Neri *et al.*, 2011), United States (Chiu *et al.*, 2009), and Australia (Ghimire *et al.*, 2017). This variation could be attributed to differences in the definition of non-adherence between studies. In addition, methodologies may differ between studies, contributing to variation in the data. For example, direct monitoring methods include drug concentration assays, use of pill markers and direct observation of pill taking, indirect methods include patient self-reports, structured interview, compliance ratings by nurses, prescription refills and pill counts (Schmid *et al.*, 2009).

Prevalence of adherence in the present study was below the recommended level in the literature to attain optimum outcomes (Roy *et al.*, 2013). In the light of poor management of CKD co-morbidities and alleged failure of therapeutic regimen, health care providers are urged to measure CKD patients' treatment adherence. Efforts are needed to increase the medication adherence of these patients so that they could realize the full benefits of prescribed therapies. When accurate and clear information on the importance of medication adherence is provided, patients are encouraged towards self-care and adherence to drug therapy. Healthcare professionals should be more vigilant towards identifying these concerns to address adherence issues. Non-adherence to drug therapy is detrimental and costly in renal patients (Ghimire *et al.*, 2015), as these patients have increased burden of co-existing illness and prescribed with multiple complex regimens to treat various co-morbidities (Rifkin *et al.*, 2010; Mason, 2011; Hsu *et al.*, 2015). Different studies demonstrated that medication non-adherence has been

associated with presence co-morbidity (Muntner *et al.*, 2010), increased risk of hospitalization, medication and hospitalization-related costs and death (Raymond *et al.*, 2011).

In this study, multivariate logistic regression analysis showed that total number of prescribed drugs, occupation and family income were found to be significantly associated with CKD medication adherence. As the number of prescribed drugs increased from <5 medication to ≥ 5 medication, the odds of being adherent was about 0.46 times less and this implies patients with ≥ 5 medication were found to be less likely to adhere to their medications. Numerous literatures support this finding, as pill burden negatively affects patient adherence to treatment. A study done in USA and Italy demonstrated that patients with high pill burden were more likely to be non-adherent (Chiu *et al.*, 2009; Neri *et al.*, 2011). Similar studies also reported that the number of prescribed medications had a significant inverse association with CKD medication adherence (Covic and Rastogi, 2013; Ghimire *et al.*, 2015; Ahlawat *et al.*, 2016). Moreover, occupation had significant association with CKD medication adherence. Patients who were students, drivers, and teachers working in private school were more likely to engage in adherence compared to those who were farmers. This could probably be due to the fact that farmers might be less aware of their disease and the importance of medication adherence when compared with students, driver and teacher working in private school and thus more likely to be more non-adherent.

On the other hand, monthly family income was significantly associated with medication adherence as the family income increased, patients were found to be more likely to adhere to their medications. This finding is in line with previous study, which reported that socioeconomic status had a significant association with medication adherence (Salini and Sajeeth, 2013). A qualitative study done in Australia to explore factors associated with medication adherence in ESRD patients indicated that financial constraints had contributed to medication non-adherence (Ghimire *et al.*, 2017). Income status has been implicated in non-adherence in several studies of renal patients. In addition, low socio-economic status has been significantly associated for medication non-adherence among CKD patients (Magacho *et al.*, 2011). Most CKD patients in developing countries have no access to health insurance and this makes care for CKD unaffordable and consequently affects their adherence rates to the prescribed treatment regimen. According to World Kidney Day (Garcia *et al.*, 2011), the majority of patients commencing dialysis in low income countries die or stop treatment within

three months of initiating dialysis due to cost constraints. Limited economic resources of patients in developing countries results in reduced frequency of dialysis and eventually discontinuation of therapy (Schieppati *et al.*, 2003).

In this study, patients with poor adherence reported several reasons for not adhering to their medications. The most common reasons were found to be forgetfulness, experiencing side effects, cost and complex regimen. Most of the patients missed their CKD medications due to forgetfulness which is similar with other studies (Ahlawat *et al.*, 2016; Ghimire *et al.*, 2017). A qualitative study by Lindberg & Lindberg (2008) revealed that forgetfulness and complex regimen due to polypharmacy were identified as the main obstacle for medication adherence.

Adherence to therapies is a primary determinant of treatment success. Failure to adherence is a serious problem, which not only affects the patient but also the health care system. Medication non-adherence in patients leads to substantial worsening of disease, death and increased health care costs. Varieties of factors are likely to affect adherence. This could be classified as patient centered, therapy related, social and economic, disease and health care system factors, with interactions among them. Identifying specific barriers for each patient and adopting suitable techniques to overcome them will be necessary to improve medication adherence. Health care professionals such as physicians, pharmacists and nurses have significant role in their daily practice to improve patient medication adherence (Jimmy and Jose, 2011). Even though a number of socio-demographic (age, sex & educational status) and clinical factors (number of co-morbidities & complications, severity of the disease and laboratory parameters) were found to be significantly associated with non-adherence in various studies (Jimmy and Jose, 2011; Ahlawat *et al.*, 2016; Ghimire *et al.*, 2017)), in this study were not statistically significant associated. The probable reason for this variation could be due to the sample size, methodological difference. Hence, prospective studies with multiple methods of adherence assessment may be required to identify different factors which affect medication adherence.

The present study revealed that QoL decreased across all CKD stages, which is similar with various studies (Cruz *et al.*, 2011; Pagels *et al.*, 2012). The domains which make up the physical QoL were more impaired than domains that constitute the mental QoL. This finding is in line with the results obtained from previous studies, which demonstrated poorer physical QoL in relation to mental QoL in renal patients (Bohlke *et al.*, 2008; Cruz *et al.*, 2011). This could probably be due to the chronic nature of the disease; patients may adapt not only to the

disease and its treatment but also psychologically to their situations that directly affect patients' QoL over time. The mean score of physical component summary was found to be (38.1 ± 9.5) . This finding is similar with previous findings in Canada & Denmark (Molsted *et al.*, 2007; Mujais *et al.*, 2009) and different from other studies in Brazil (Cruz *et al.*, 2011). On the other hand, mental composite summary was found to be 46 ± 9.1 . This finding is also in accordance with studies conducted in Brazil & Denmark (Molsted *et al.*, 2007; Cruz *et al.*, 2011) and different from studies conducted in Nigeria & USA (Ayanda and Ajiboye, 2014; Perlman *et al.*, 2005). This variation could be attributed to differences in socioeconomic status and management approaches between the countries, and sample size between studies. Socioeconomic status has been implicated in QoL in several studies of renal patients (Finkelstein *et al.*, 2009; Cruz *et al.*, 2011). CKD patients with low socioeconomic status could not afford the prescribed regimens for the management of various illness co-existed and this affects their QoL and adherence (Braga *et al.*, 2011). The finding of this study indicated that there were low QoL scores in all stages of CKD, which is associated with low socioeconomic status of the study participants. Besides, it also demonstrated a significant decrease in QoL progressively in the different stages of renal disease based on the mean values of the SF-36 scores, which were below 70 in all dimensions. However, normal healthy populations usually have scores above this level in most studies (Ware Jr and Sherbourne, 1992).

On the evaluation of socio-demographic and clinical variables, physical and mental component summary were found to be strongly associated with family income and hemoglobin level. This finding is in accordance with other studies. A prospective study conducted by Braga *et al.* (2011) revealed that higher socioeconomic level was significantly related to better QoL. Similarly, lower social status, characterized by lower education, worse financial situation, or lack of employment has also been consistently associated with impaired QoL (Dasari *et al.*, 2014). This could be due to the fact that people with low economic status do not access effective health care due to economic constraints. This might suppress utilization of good QoL, effective health care in developing countries including Ethiopia.

Besides, various studies revealed that hemoglobin ≥ 11 g/dl was associated with better QoL. A study in US indicated that hemoglobin level was positively associated with QoL (Perlman *et al.*, 2005). In different literatures, the impact of hemoglobin in CKD on QoL is well described (Lefebvre *et al.*, 2006; Finkelstein *et al.*, 2009). This may be due to the low level of

hemoglobin is associated with a greater risk of co-morbidities and results fatigue & reduced physical activities. Thus, it decreases QoL.

With regard to education, participants with a higher level of education had better physical component summary than patients with lower education level. This finding is similar to other previous studies which showed that participants with higher educational level have better QoL (García-Llana *et al.*, 2013; Fukushima *et al.*, 2016). The probable reason for this high QoL, educated participants has greater access to information about their disease, better economic conditions, and better capacity to evaluate traumatic phenomena. It is also assumed that CKD patients with higher education mainly participate in activities that require more intellectual over those that require greater physical effort. Thus, the association observed in this study, low educational status may attribute the poor QoL of CKD patients. Presences of CKD complications were found to be strongly associated with low score on mental composite summary in the present study. This is comparable to a study by Silverberg *et al* (2005) & Kimel *et al* (2008) where history of CVD and anemia were found to be negatively associated with QoL. The study participants in this study who have different complications scored low QoL. The possible reason for this finding may be due to CKD patients with different complications were more likely on many drugs at the same time and may also be at advanced stage of CKD (Padhi *et al.*, 2015). All these factors may constitute great burden for the patients and invariably reduce their QoL. All other variables like sex, co-morbidity status, CKD stage, occupation and pill burden were not statistically significant associated with quality of life, which were predictors of in various studies. This variation may be due to methodological difference and management approaches between studies in different countries.

6. LIMITATIONS OF THE STUDY

The cross-sectional nature of the study did not allow a follow up, which would have provided a better design for identifying the problem of management practice, non-adherence and poor quality of life. The interview used for assessing adherence might underestimate patients' non adherence status when compared to other conventional objective methods such as pill counts or biological assays. On the other hand, the quantitative nature of the data could not properly highlight the reasons for non-adherence from the patients' perspective. Thus, longitudinal studies that take into account qualitative assessments should be conducted to investigate the reasons for medication non adherence and seek a better understanding of the influence of the progression of CKD on QoL. Since self-report was used for the assessment of adherence, the present study was dependent on the assumption that patients who claimed to adhere to different treatment approaches to be actually adhered and getting optimal treatment for each approach. Since it is a single centered study, it may not be generalizable to the whole facilities of Ethiopia.

7. CONCLUSIONS

In summary, the present study showed that 55% of hypertensive patients treated with non-ACEI based regimens, which is inappropriate. Insulin and ACEIs based regimens were the most frequently used regimen in the management of diabetes mellitus and hypertension with diabetes co-morbidities. Calcium containing phosphate binders were used inappropriately in the management of osteodystrophy CKD complications. In addition, medication adherence in CKD patients at TASH was found to be suboptimal (61.3%). Socioeconomic status and pill burden had an important role in determining adherence rate to medications. Very low family income, increased number of prescribed drugs and being a farmer were significant predictor of medication non-adherence. Forgetfulness was the most important reason preventing optimal adherence to prescribed medications. Regarding QoL, it was impaired across the 5 CKD stages. Income status, educational level and hemoglobin level were significantly associated with physical component summary, while absence of CKD complication, income status and hemoglobin level were significantly associated with mental component summary.

8. RECOMMENDATIONS

- In the management practice of CKD co-morbidities and complications, guidelines need to be adapted to local situations in order to be acceptable and implemented.
- Since the prevalence of adherence is below the standard recommended level, renal care providers are urged to promote medication adherence, because it is indispensable for adequate management of CKD.
- In view of untoward complications of CKD which can lead to severe morbidity and increased mortality among the renal patients, a tight control of blood pressure and glucose level are mandatory. Thus the efforts of health professionals engaged in renal care should also gear towards ensuring patient's adherence to educate the patients on drug, disease state and other aspects of non-pharmacologic management plan, including dietary and exercise adherence, so as to optimize treatment outcomes.
- Prospective studies with multiple methods of adherence assessment, involving pill count and biological assay may be required to detect patient who report adherence but who may in fact be non-adherent to their medications.
- Mechanisms have to be devised to minimize forgetfulness like using reminder system, which was reported as the main reason for medication non-adherence.
- Longitudinal studies that take into account qualitative assessments should be conducted to seek a better understanding of the influence of the progression of CKD on QoL.
- Large studies are required to look the association between CKD medication adherence and quality of life in the study area.

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ANNEXES

Consent Form

Hello Dear Patient,

I am _____, who is part of this research project entitled with “*Assessment of management and quality of life of patients with chronic kidney disease at Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia*”. The objective of the research is assessing these issues in chronic kidney disease patients like you thereby major factors contributing to medication non-adherence and quality of life will be identified and accordingly ways of enhancing the adherence, management and quality of life can be recommended, hence patients can improve their treatment outcomes. In order to pursue this study and attain the set specific research objectives, the research project team found important that patient interviews and record reviews be conducted. This is the reason that you and others could be candidates for the study.

It is only through chance that you became part of the study like others; otherwise, if you do not want to be part of the study, you can refuse to participate. In doing so, you will not going to lose any service that you are getting from the clinic. Once after you decided to be part of the study and in case you don't want to continue, you still have the right to get out from the study at any time you want. In taking part to this study, you are not going to be compensated too, rather the findings from this study will enable us, we hope, to improve diabetes care outcomes in general, and hence you will be benefited then.

I will be very grateful if you are going to be willing to participate in this study and hence we, together can do something positive towards diabetes care outcomes. Finally, it is my great pleasure to forward you deepest gratitude in advance for your kind cooperation you are going to have during the interview by giving your time with genuine information to me. Once again, I am assuring you, by any means, your confidentiality will not be broken and be kept secret and the data generated will be used for the purpose of this research only.

Once again, thank you!

Correspondence:

Belayneh Kefale (B.Pharm)

Student, AAU, CHS, SOP, Department of Pharmacology & Clinical Pharmacy

Email: **bkefale5@gmail.com**

Annex I: Structured questionnaire

Part I: Socio-demographic Characteristics

1. Sex

A. Male B. Female

2. Age _____ Years

3. Marital Status

A) Single C) Divorced
B) Married D) Widowed

4. Occupation

A. Farmer E. House wife
B. Gov't Employee F. Retired
C. Merchant/Trade G. Others Specify _____
D. Daily Laborer

5. Profession

A. Health professional B. Non-health professional

6. Educational Status

A. Cannot read and write C. Secondary (9-12)
B. Primary (1-8) D. Higher Education

7. Monthly Family Income (in ETB) _____

A. Very Low (<600) D. Above Average (3501-5000)
B. Low (601-1500) E. High (>5001)
C. Average (1501-3500)

Part II: Disease related Characteristics

8. Duration of Chronic Kidney Disease _____ Years

A. < 1 C. >5
B. 1-5

9. Do you know the symptoms/signs that can be manifested in early stages of CKD?

A. Yes B. No

10. If yes to q. no 9, which of the following Chronic kidney disease symptoms/signs you know
(can tick more than once)

- A. Pain in the flanks;
- B. Difficulty in urination;
- C. Change in smell/color of the urine;
- D. Urinating too little;
- E. Urinating too much;
- F. CKD can be asymptomatic until advanced stages;

11. Presence of knowledge about chronic kidney disease complications

- A. Yes B. No

12. If yes to q. no 11, which of the following Chronic kidney disease complication you know
(can tick more than once)

- A. Heart disease
- B. Osteodystrophy
- C. Anemia
- D. Hyperkalemia
- E. Fluid buildup
- F. Others Specify _____

13. Which of the following diseases/conditions that you think are very likely to result CKD.

- A. Drinking low water;
- B. Smoking;
- C. Unmanaged diabetes;
- D. Unmanaged hypertension;
- E. Being male;
- F. Being female;
- G. Do not know/no response

Part III: Non-pharmacological Approaches of CKD Care

14. Diet

- A. Do you have dietary plan you set with your doctor? Yes No
- B. If yes to q. no 11.1, do you adhere to your plan? Yes No
- C. What type of dietary plan you have?
1. Sodium intake of <2 g per day. Yes No
2. Other plan, if any _____

15. Exercise

- A. Do you have exercise plan you set with your doctor? Yes No
- B. If yes to q. no 12.1, do you adhere to your plan? Yes No
- C. How many days per week you do moderate intensity exercise? _____ Day(s)
- D. How many minutes per day you do moderate intensity exercise? _____ Minutes
- E. Other forms of exercise, if any _____

Part V: Reasons for medication non-adherence (can tick more than once)

25. Which one of the following was the reason for your medication non adherence?

1. Cost of medication too expensive
2. Forgetfulness
3. Feeling well without medications
4. Complex regimen
5. Physicians mode of approach
6. Lack of trust on the efficacy of medications
7. Experiencing side effects
8. Other reason, if any _____

The Kidney Disease QOL (KDQOL) – Short Form 36 questionnaire

1. In general, would you say your health is:	Score
Excellent	1
Very good	2
Good	3
Fair	4
Poor	5
2. Compared to one year ago,	
Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much? (Circle One Number on Each Line)

Activities	Yes, Limited a Lot (1)	Yes, Limited a Little (2)	No, Not limited at All (3)
a. Vigorous activities , such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. Moderate activities , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing several flights of stairs	1	2	3
e. Climbing one flight of stairs	1	2	3
f. Bending, kneeling, or stooping	1	2	3
g. Walking more than a mile	1	2	
h. Walking several blocks	1	2	3
i. Walking one block	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**? (Circle One Number on Each Line)

Activities	Yes (1)	No (2)
a. Cut down the amount of time you spent on work or other activities	1	2
b. Accomplished less than you would like	1	2
c. Were limited in the kind of work or other activities	1	2
d. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2

5. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)? **(Circle One Number on Each Line)**

Activities	Yes	No
a. Cut down the amount of time you spent on work or other activities	1	2
b. Accomplished less than you would like	1	2
c. Didn't do work or other activities as carefully as usual	1	2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

Not at all	1
Slightly	2
Moderately	3
Quite a bit	4
Extremely	5

7. How much bodily pain have you had during the past 4 weeks?

None	1
Very mild	2
Mild	3
Moderate	4
Severe	5
Very severe	6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	1
A little bit	2
Moderately	3
Quite a bit	4
Extremely	5

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. **(Circle One Number on Each Line)**

9. How much of the time during the **past 4 weeks** . . .

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
a. Did you feel full of pep?	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
f. Have you felt downhearted and blue?	1	2	3	4	5	6
g. Did you feel worn out?	2	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
i. Did you feel tired?	1	2	3	4	5	6

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)? (Circle One Number)

All of the time	1
Most of the time	2
Some of the time	3
A little of the time	4
None of the time	5

11. How TRUE or FALSE is each of the following statements for you. (Circle One Number on Each Line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
a. I seem to get sick a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

Part III: Medications and Dietary/Exercise Plan

13. Total number of prescribed drugs _____ (In number)

14. List of prescribed medications

- | | | |
|------------------|-------------------|-----------------------|
| a. Metformin | i. Nifedipine | q. ASA |
| b. Glibenclamide | j. Amlodipine | r. Calcium supplement |
| c. Enalapril | k. Atenolol | s. Frusemide |
| d. Lisinopril | l. Metoprolol | t. Antibiotics |
| e. Insulin | m. Carvedilol | u. Others Specify |
| f. Statins | n. HCT | |
| g. Losartan | o. Spironolactone | |
| h. Valsartan | p. Iron | |

15. Non drug treatment recommendations

A. Dietary Plan: Present Absent

B. Exercise Plan: Present Absent

Part IV: Management Practice of CKD

1. Management of CKD with Hypertension_____

2. Management of CKD with DM_____

3. Management of CKD with DM and hypertension _____

4. Management of CKD with CVD_____

5. Management of CKD with other complications:

a. Hyperkalemia_____

b. Anemia _____

c. Acidosis_____

d. Fluid Build up_____

e. Heart disease_____

f. Bone disease_____

g. Others _____

በቃለ መጠይቅ ለመሳተፍ የፈቃደኝነት ቃል መቀበያ ቅጽ

ውድ የቃለ መጠይቁ ተሳታፊ፤

ስሜ _____ ይባላል። “በጥቁር አንበሳ ስፔሻላይዝድ ሆስፒታል የኩላሊት ህክምና ክሊኒክ ውስጥ በተመላላሽ ህክምና በቆየ(ስር የሰደደ) የኩላሊት ህመምተኞች የመድሃኒት አወሳሰድ ዝምድና፣ የህክምና አሰጣጥና እና የአኗኗር ሁኔታ ” የተሰኘ የድህረ ምረቃ የጥናት ስራ አባል ነኝ። ይህ የጥናት ስራ አላማ በዚህ ክሊኒክ በተመላላሽ ህክምና የቆየ የኩላሊት ህመምተኞች የመድሃኒት አወሳሰድ ዝምድና፣ የህክምና አሰጣጥና እና የአኗኗር ሁኔታን በመገምገም ህመምተኞች መድሃኒታቸውን ሁልጊዜ እንዲወስዱ የሚያደርጉ ዋና ዋና ምክንያቶችን ይለያል ፤ ህመምተኞች መድሃኒታቸውን ሁልጊዜ እንዲወስዱ የሚረዱ የመፍትሄ ሀሳቦችን ያመለክታል ፣ በመሆኑም ህመምተኞች የህክምና ሁኔታቸውን እንዲያሻሻሉ ይረዳል ተብሎ ይጠበቃል። የጥናቱን ስራ ለማካሄድና የተቀመጡ አላማዎችን ለማሳካት ይቻል ዘንድ ህመምተኞችን ቃለ መጠየቅ ማድረግና የግል የህክምና ማህደራቸውን ማየት በማስፈለጉ እርስዎ እና ሌሎች እንደ እርሶ ያሉ ህመምተኞችን ለማሳተፍ ችለናል።

እርስዎ የዚህ ጥናት አካል የሆኑትም በእድል ወይም በዕጣ ብቻ ነው። በጥናቱ መሳተፍ ካልፈለጉ ያለመሳተፍ መብት አለዎት።

ባለመሳተፍዎም በዚህ ክሊኒክ የሚያገኙትን ማንኛውንም የህክምና አገልግሎት አያሳጣዎትም። ስምምነትዎን ገልጸው በጥናቱ መሳተፍ ከጀመሩም በኋላ መቀጠል ባይፈልጉ በማንኛውም ጊዜ ከጥናት አካልነትዎ የመውጣት መብትዎ የተጠበቀ ነው። በዚህ ጥናት በመሳተፍዎ በቀጥታ የሚያገኙት ጥቅም ባይኖርም ከጥናቱ በሚገኙ ግኝቶች የኩላሊት ህመም ህክምና ውጤትን በተወሰነ መልኩ ለማሻሻል እንደሚቻል በመገመት፤ የዚያን ጊዜ እርስዎም የጥቅሙ ተቋዳሽ ይሆናሉ ብለን እናምናለን።

በጥናቱ ፈቃደኛ ሆነው በመሳተፍ በጋራ ሆነን አንዲትም ብትሆን አዎንታዊ ነገር ለኩላሊት ህመም ህክምና ውጤት የበኩላችንን ብናበረክት ደስተኛ ነኝ። አላማውን ተረድተውና ጊዜዎትን ሰውተው በዚህ ቃለ መጠይቅ ለመሳተፍና እውነተኛ መረጃ ለመስጠት ፈቃደኛ በመሆንዎ በቅድሚያ እያመሰገንሁ ማንኛውም የሚሰጡት መረጃ ለምርምሩ አላማ ብቻ የሚውልና ሚስጥራዊነቱም የሚጠበቅ መሆኑን ላረጋግጥልዎት እወዳለሁ።

በድጋሜ አመሰግናለሁ!

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ምዕራፍ አንድ፡ ቃለ መጠይቅ

ክፍል 1 ፡ አጠቃላይ መግለጫዎች

1. ጾታ ሀ. ወንድ ለ. ሴት
2. እድሜ _____ ዓመት(በቁጥር ይጻፍ)
3. የጋብቻ ሁኔታ
 ሀ. ያላገባ/ች/ ሐ. የተፋታ/ች/
 ለ. ያገባ/ች/ መ. ባል የሞተባት(ሚስት የሞተችበት)
4. የስራ ሁኔታ
 ሀ. አርሶ አደር ሠ. የቤት እመቤት
 ለ. የመንግስት ሰራተኛ ረ. ጡረተኛ
 ሐ. ነጋዴ ሰ. ሌላ ከሆነ ይገለጽ _____
 መ. የቀን ሰረተኛ
5. የሙያ ሁኔታ
 ሀ. የጤና ባለሙያ ለ. የጤና ባለሙያ ያልሆነ
6. የትምህርት ደረጃ
 ሀ. ያልተማረ/ች/ ሐ. ሁለተኛ ደረጃ (9-12)
 ለ. አንደኛ ደረጃ (1-8) መ. ከፍተኛ ደረጃ(ኮሌጅ፣ ዩኒቨርሲቲ)
7. ወርሀዊ የቤተሰብ ገብ (በብር) _____
 ሀ. በጣም ዝቅተኛ (<600) መ. ከአማካይ በላይ (3501-5000)
 ለ. ዝቅተኛ (601-1500) ሠ. ከፍተኛ (>5001)
 ሐ. መካከለኛ (1501-3500)

ክፍል 2፡ ህመም ነክ መግለጫዎች

8. የኩላሊት ህመምተኛ ከሆኑ ምን ያህል ጊዜ ሆነዎት _____ (ዓመት)
 ሀ. < 1 ለ. 1-5 ሐ. >5
9. የኩላሊት ህመም ቀዳሚ ምልክቶችን ያውቃሉ?
 ሀ. አዎ ለ. አላውቅም
10. ለተራ ቁጥር 9 መልስዎ አዎ ከሆነ ከሚከተሉት የቆዩ(ስር የሰደደ) የኩላሊት በሽታ ምልክቶች ውስጥ የትኞቹን ያውቃሉ? (ከአንድ በላይ መምረጥ ይችላሉ)
 ሀ. ሽንጥ አካባቢ የህመም ስሜት;
 ለ. መሽፍት መቸገር;

ሐ. የሽንት ሽታ ወይም ቀለም መቀየር;
 መ. በጣም ትንሽ መሸናት;
 ሠ. በጣም ብዙ መሸናት;

ረ. በጠና እስከሚያመኝ ድረስ ምልክት አልነበረውም
 ሰ. አላውቅም

11. የቆየ የኩላሊት ህመም ስለሚያስከትላቸው ውስብስብ የጤና ችግሮች ያውቃሉ

ሀ. አዎ

ለ. አላውቅም

12. ለተራ ቁጥር 11 መልስዎ አዎ ከሆነ ከሚከተሉት የቆይ/ስር የሰደደ የኩላሊት በሽታ የሚያስከትላቸው ውስብስብ የጤና ችግሮች ውስጥ የትኞቹን ያውቃሉ? (ከአንድ በላይ መምረጥ ይችላሉ)

ሀ. የልብ ህመም

መ. በደም ውስጥ የፖታሽየም ከመጠን በላይ መጨመር

ለ. የአጥንት መሳሳት

ሐ. የደም ማነስ

ሠ. የእግር መዳፍ፣ እግርና ቁርጭምጭሚት ማበጥ

ረ. ሌላ ካለ_____

13. ከሚከተሉት በሽታዎች ወይም ሁኔታዎች ውስጥ የቆየ የኩላሊት ህመም ሊያስከትሉ ይችላሉ ብለው የሚገምቱት የትኞቹ ናቸው?

ሀ. በጣም ብዙ ውሀ መጠጣት

ሠ. ከትትል ያልተደረገለት የደም ግፊት

ለ. ትንሽ ውሀ መጠጣት

ረ. ወንድ መሆን

ሐ. ማጨስ

ሰ. ሴት መሆን

መ. ከትትል ያልተደረገለት የስኳር ህመም

ሸ. አላውቅም

ክፍል 3: ከመድሀኒት ውጭ የሆነ የቆየ የኩላሊት በሽታ ህክምና

1. ምግብ

ሀ. ከህኪምዎ ጋር በመሆን ያዘጋጁት የአመጋገብ ፕሮግራም አለዎት? አዎ

የለኝም

ለ. ምላሽዎ አዎ ከሆነ፣ በአመጋገብ ፕሮግራም መሰረት ይመገባሉ? አዎ

አልመገብም

ሐ. ምን አይነት አመጋገብ ይከተላሉ?

1. በቀን የሚመገቡት የሶድየም(የጨው) መጠን ከ 2 ግራም በታች ነው አዎ

አይደለም

2. ሌላ ዓይነት አመጋገብ የሚከተሉ ከሆነ ይገለጽ_____

2. የአካል ብቃት እንቅስቃሴ(ወክ ማድረግን ጨምሮ የተለያዩ እንቅስቃሴዎች እንደ የአካል ብቃት እንቅስቃሴ ይቆጠራሉ)

2.1. ከህኪምዎ ጋር በመሆን ያዘጋጁት የአካል ብቃት እንቅስቃሴ ፕሮግራም አለዎት? አዎ

የለኝም

2.2. ለተራ ቁጥር 5.1 ምላሽዎ አዎ ከሆነ፣ በፕሮግራም መሰረት የአካል ብቃት እንቅስቃሴ ይሰራሉ?

አዎ

አልሰራም

2.3. በሳምንት ስንት ቀን መካከለኛ ደረጃ ያለው የአካል ብቃት እንቅስቃሴ ይሰራሉ? _____ ቀን

2. 4. በሳምንት ለምን ያህል ደቂቃ መካከለኛ ደረጃ ያለው የአካል ብቃት እንቅስቃሴ ይሰራሉ? _____ ደቂቃ

2. 5. ሌላ አይነት የአካል ብቃት እንቅስቃሴ ካለ ይገለጽ _____

3. ሲጋራ ማጨስ

- 3.1 ሲጋራ አጭሰው ያውቃሉ? አዎ አላውቅም
- 3.2 ምላሽዎ አዎ ከሆነ፣ አሁን ሲጋራ ያጨሳሉ? አዎ አላጨሰም
- 3.3 ለተ.ቁ. 6.2 ምላሽዎ አዎ ከሆነ በቀን ምን ያህል ሲጋራ ያጨሳሉ? _____ (መጠኑ ይጻፍ)
- ሀ. < 5 ሲጋራ ለ. 5-10 ሲጋራ ሐ. > 10 ሲጋራ

ክፍል 4: መድሀኒትን በተባለው ጊዜ ስለመጠቀም (8-item Morisky Medication Adherence Scale (MMAS-8) (ህመምተኞች ማስታወስ የሚጠበቅባቸው ላለፉት 4 ሳምንታት ብቻ ነው)

- አንዳንድ ጊዜ መድሀኒትዎን መውሰድ ይረሳሉ? አዎ እረሳለሁ አልረሳም
- መድሀኒቱን በሚወስዱበት ጊዜ የህመም ስሜት የተባባሰ ሲመስለዎት ሀኪሙን ሳያማክሩ መድሀኒቱን መውሰድ አቋርጠው ያውቃሉ? አዎ አቋርጬ አላውቅም
- አንዳንድ ጊዜ መድሀኒትዎን ለመውሰድ ጠንቃቃ ሳይሆኑ ቀርተው ያውቃሉ? አዎ አላውቅም
- ጉዞ ሲሄዱ ወይም ከቤተሰብ ሲወጡ መድሀኒትዎን ይዘው ለመሄድ ረስተው ያውቃሉ? አዎ አላውቅም
- ትናንት ሁሉንም የታዘዘለዎትን መድሀኒት ወስደዋል? አዎ አልወሰድኩም
- የተሻለዎት ሲመስለዎት መድሀኒት መውሰድ አቋርጠው ያውቃሉ? አዎ አቋርጬ አላውቅም
- አንዳንድ ሰዎች መድሀኒት በየቀኑ መውሰድ ምች አይሰጥም ይላሉ። እርስዎ ሁሉንም መድሀኒቶች በታዘዘለዎት መሰረት በየቀኑ በመውሰድ ዙሪያ ተማርረው ያውቃሉ? አላውቅም
- መድሀኒትዎን በስህተት አስታውሶ ለመውሰድ ምን ያህል ተቸግረው ያውቃሉ?

ሀ. ምንም ተቸግሮ አላውቅም ሐ. አንዳንድ ጊዜ

ለ. በትንሹ መ. ብዙ ጊዜ

ሠ. ሁልጊዜ

ክፍል 5: መድሀኒትን በተባለው ጊዜ ለመጠቀም የማያስችሉ ምክንያቶች (ከአንድ በላይ መምረጥ ይቻላል)

- መድሀኒትዎን በተባለው ጊዜ ላለመጠቀም እንደ ምክንያት የሚያነሱት ከሚከተሉት ውስጥ የትኛውን ነው?
 - መድሀኒት ለመጣዛት ውስን የገንዘብ አቅም
 - መድሀኒት ለመጠቀም መርሳት
 - ያለ መድሀኒት፣ የደህንነት ሁኔታ መሰማት
 - የተወሳሰበ እና አስቸጋሪ የመድሀኒት አጠቃቀም ሁኔታ
 - የሀኪሞች አቀራረብ ሁኔታ
 - በመድሀኒቱ ፈቃደኝነት ላይ እምነት ማጣት
 - የመድሀኒቱ የጎንዮሽ ጉዳት
- ሌላ ምክንያት ካለ ይገለጽ _____

ምዕራፍ 2 ቃለ መጠየቅ: የኩላሊት ህመምተኞች የአኗኗር ሁኔታ

1. በአጠቃላይ የጤናዎ ሁኔታ ምን ይመስላል	ነጥብ
እጅግ በጣም ጥሩ	1
በጣም ጥሩ	2
ጥሩ	3
መካከለኛ(በቂ)	4
ጥሩ አይደለም	5
2. ጤናዎ ከአንድ ዓመት በፊት ከነበረበት ጋር ሲነጻጸር ምን ይመስላል	
በጣም የተሻለ ነው	1
የተወሰነ የተሻለ ነው	2
ተመሳሳይ ነው	3
የተወሰነ የተባባሰ የጤና ችግር አለ	4
በጣም የተባባሰ የጤና ችግር አለ	5

3. የሚከተሉት በሆነ ቀን ሊሰሯቸው የሚችሉ እንቅስቃሴዎች (ስራዎች) ናቸው። እነዚህን ስታከናውኑ ያጋጠመዎት የጤና ውሳኔዎች ነበር? አጋጥሞዎት ከነበር ምን ያህል? (በእያንዳንዱ መስመር አንዱን ቁጥር ያክብቡ)

እንቅስቃሴዎች	አዎ፣ ብዙ ውስንነት አጋጥሞኛል (1)	አዎ፣ የተወሰነ ውስንነት አጋጥሞኛል (2)	የለም፣ ምንም ዓይነት ውስንነት አላጋጠመኝም (3)
ሀ) አድካሚ እንቅስቃሴዎች ለምሳሌ ሩጫ፣ ከባድ እቃዎችን ማንሳት፣ በአስቸጋሪ ስፖርታዊ እንቅስቃሴዎች መሳተፍ	1	2	3
ለ) መካከለኛ እንቅስቃሴዎች ለምሳሌ፣ ጠረንጴዛ ማንቀሳቀስ፣	1	2	3
ሐ) የምግብ ሸቀጣሽቀጦችን ሲሸከሙ	1	2	3
መ) ብዙ ደረጃዎች ሲወጡ	1	2	3
ሠ) አንድ ደረጃ ብቻ ሲወጡ	1	2	3
ረ) ሲያዘነብሉ፣ ሲንበረከኩ ወይም ሲያጎነብሉ	1	2	3
ሰ) ከአንድ ማይል (1.6ኪሎ ሜትር) በላይ ሲራመዱ	1	2	3
ሸ) ብዙ መሰናክሎችን ሲራመዱ	1	2	3
ቀ) አንድ መሰናክል ብቻ ሲራመዱ	1	2	3
በ) ገላዎትን ሲታጠቡ ወይም ልብስ ሲለብሱ	1	2	3

4. ባለፉት 4 ሳምንታት ውስጥ ከአካላዊ ጤንነት ችግሮች የተነሳ ስራዎትን ወይም የእለት ተእለት እንቅስቃሴዎትን በሚያከናውኑበት ወቅት የሚከተሉት ውስንነቶች አጋጥሞዎት ነበር? (በእያንዳንዱ መስመር አንድ ቁጥር ብቻ አክብቡ)

እንቅስቃሴዎች	አዎ(1)	የለም (2)
ሀ. ለስራ የሚያውሉት የጊዜ መጠን በፊት ከሚጠቀሙት ያነሰ ነው?	1	2
ለ. የሚፈጽሙት ማከናወን ከሚፈልጉት በታች ነው?	1	2
ሐ. ስራ ለመስራት ወይም ለሌሎች እንቅስቃሴዎች ውሳኔዎን አጋጥሞዎታል?	1	2
መ. ስራ መስራት ወይም ሌሎች ተግባራትን ማከናወን ያለመቻል ችግር አጋጥሞዎታል(ለምሳሌ ሌላ ተጨማሪ ጥረትና እገዛ አስፈልጎታል)	1	2

5. ባለፉት 4 ሳምንታት ውስጥ ከአእምሮዊ ጤንነት ችግሮች የተነሳ ስራዎትን ወይም የእለት ተእለት እንቅስቃሴዎትን በሚያከናውኑበት ወቅት የሚከተሉት ውስንነቶች አጋጥሞዎት ነበር? ለምሳሌ የድብርት ስሜት፣ መሸበር (በእያንዳንዱ መስመር አንድ ቁጥር ብቻ አክብቡ)

እንቅስቃሴዎች	አዎ(1)	የለም (2)
ሀ. ለስራ የሚያውሉት የጊዜ መጠን በፊት ከሚጠቀሙት ያነሰ ነው ?	1	2
ለ. የሚፈጽሙት ማከናወን ከሚፈልጉት በታች ነው?	1	2
ሐ. ስራዎትን ወይም ሌሎች እንቅስቃሴዎችን እንደተለመደው በጥንቃቄ ለመስራት ውሳኔዎን አጋጥሞዎታል?	1	2

6. ባለፉት 4 ሳምንታት ውስጥ የአካላዊ ጤንነትና አእምሮዊ ችግሮች ከቤተሰብ፣ ጓደኛ፣ ጎረቤት፣ ወዘተ ጋር በሚያደርጉት ማህበራዊ እንቅስቃሴ ዙሪያ ተጽእኖ(እንቅፋት) ነበሩ?

በፍፁም	1
በጣም በትንሹ	2
በትንሹ	3
በመጠኑ	4
እጅግ በጣም	5

7. ባለፉት 4 ሳምንታት ውስጥ ምን ያህል አካላዊ ህመም አጋጥሞዎት ነበር?

ምንም አላጋጠመኝም	1
በጣም ቀላል	2
ቀላል	3
መካከለኛ	4
ከባድ	5
በጣም ከባድ	6

8. ባለፉት 4 ሳምንታት ውስጥ ህመም ምን ያህል በመደበኛ ስራዎች ላይ እንቅፋት ሆኖብዎት ነበር (የቤት ውስጥና ከቤት ውጭ ያሉ ስራዎችን ጨምሮ)?

ምንም	1
በጣም በትንሹ	2
በትንሹ	3
በመጠኑ	4
በከፍተኛ	5

ከዚህ በታች ያሉት ጥያቄዎች ባለፉት 4 ሳምንታት ውስጥ ነገሮችን እንዴት አእንዳሳለፏቸውና የተሰማዎት ስሜት ምን እንደነበረ ለማወቅ የተዘጋጁ ናቸው፡፡ (በእያንዳንዱ መስመር አንድ ቁጥር ብቻ አክብቡ)

9. ባለፉት 4 ሳምንታት ጊዜ ውስጥ ምን ያህል :-

ለምን ያህል ጊዜ	ሁልጊዜ	ብዙ ጊዜ	አብዘሀኛውን ጊዜ	ለተወሰነ ጊዜ	ለትንሽ ጊዜ	ምንም
ሀ. ሙሉ ደስተኛ ሆነው ነበር?	1	2	3	4	5	6
ለ. ተጨንቀው ነበር?	1	2	3	4	5	6
ሐ. ምንም የሚያስደስተኝ ነገር የለም ብለው አስበው ነበር?	1	2	3	4	5	6
መ. ሰላም ያለውና ፀጥ ያለ ስሜት ተሰምቶዎት ነበር?	1	2	3	4	5	6
ሠ. የጥንካሬ ስሜት ነበረዎት?	1	2	3	4	5	6
ረ. የትካዜ ስሜት ነበረዎት?	1	2	3	4	5	6
ሰ. አልፎብኛል፣ ተሰፋ የለኝም፣ አልቆልኛል የሚል ስሜት ነበረብዎት?	2	2	3	4	5	6
ሸ. ደስተኛ ሰው ነበርክ/ሸ/?	1	2	3	4	5	6
ቀ. የድካም ስሜት ነበረብህ/ሽ/?	1	2	3	4	5	6

12. ባለፉት 4 ሳምንታት ውስጥ የአካላዊ ጤንነትና አእምሯዊ ችግሮች ከቤተሰብ፣ ጓደኛ፣ ጎረቤት፣ ወዘተ ጋር በሚያደርጉት ማህበራዊ እንቅስቃሴ ዙሪያ ለምን ያህል ጊዜ ተጽእኖ(እንቅፋት) ነበሩ(ለምሳሌ ጓደኞቻችንና ቤተሰቦችን ለመጠየቅ)?(አንዱን ብቻ ይምረጡ)

ሙሉውን ጊዜ	1
ብዙውን ጊዜ	2
አንዳንድ ጊዜ	3
አልፎ አልፎ	4
ምንም	5

13. ለእርሶዎ የሚከተሉት ሀሳቦች ምን ያህል እውነት እና ሀሰት ናቸው (በእያንዳንዱ መስመር አንድ ቁጥር ብቻ አክብቡ)

	በትክክል እውነት ነው	በአብዛሀኛው እውነት ነው	አላውቀውም	በአብዛሀኛው ሰህተት ነው	በትክክል ሀሰት ነው
ሀ. እኔ እንደሌሎቹ ሰዎች ህመም አይጠናብኝም	1	2	3	4	5
ለ. እኔ እንደማውቃቸው ሰዎች ሁሉ ጤነኛ ነኝ	1	2	3	4	5
ሐ. የኔ ጤና ችግር ይገጥመዋል ብዬ አጠብቃለሁ	1	2	3	4	5
መ. የእኔ ጤና እጅግ በጣም ጥሩ ነው	1	2	3	4	5