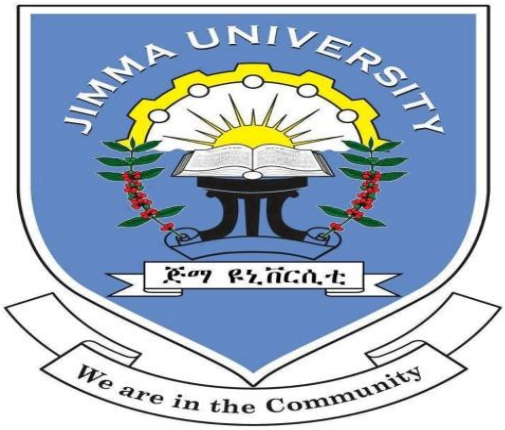
DRUG RELATED PROBLEMS AND ASSOCIATED FACTORS AMONG PATIENTS ADMITTED WITH CHRONIC KIDNEY DISEASE AT JIMMA UNIVERSITY MEDICAL CENTER, JIMMA ZONE, JIMMA, SOUTH WEST ETHIOPIA



BY: ASTER WAKJIRA (B.PHARM.)

A RESEARCH THESIS SUBMITTED TO THE SCHOOL OF PHARMACY, INSTITUTE OF HEALTH, JIMMA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF CLINICAL PHARMACY.

NOVEMBER, 2018

JIMMA, ETHIOPIA

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ABSTRACT

Background: Chronic kidney disease patients are at risk of drug related problems that are associated with increased morbidity, mortality, impaired quality of life and increased healthcare costs.

Objective: To determine prevalence of drug related problems and associated factors among chronic kidney disease patients admitted to Jimma university medical center from April to September 2018.

Methods: Prospective general cohort study study was conducted among 103 CKD patients admitted to Jimma university medical center from April to September 2018. Data regarding patient characteristics, medications, diagnosis, length of hospitalization and laboratory results were collected through review of patients' medical charts. Data were analyzed by using Statistical package for Social Science (SPSS) version 21.0. Univariate and multivariate logistic regression was utilized to assess the associations between dependent and independent variables. Statistical significance was considered at *p*-value <0.05.

Results: Out of 103 study participants, 81(78.6%) of patients had DRPs, on average 1.94 ± 0.873 DRPs per patient. The rate of overall DRPs was 30.95 DRPs per 100 medication orders. The most common DRPs among CKD patients were: need additional drug therapy 62 (31%), non-adherence 40(20%) and dose too low 36(18%). The most common causes of need additional drug therapy 52(26%) were because of untreated medical conditions, non-adherence 19(9.5%) the patient/caregiver forgets to take/give the medication and dose too low 29(14.5%) were because of the dose is too low to produce the desired response. Poly-pharmacy (AOR= 4.695, 95% CI: 1.370.-16.091), number of co morbidities (AOR=3.616, 95% CI: 1.015-1.8741), and stage of CKD (AOR= 3.941, 95% CI: 1.221-12.715) were independent predictors for DRPs.

Conclusions: Drug related problems were high among chronic kidney disease patients. The most common DRPs were need additional drug therapy and non-adherence. Poly-pharmacy and co morbidities were independent predictors for DRPs. Interdisciplinary health professionals should work to decrease the high prevalence of DRPs among chronic kidney disease patients.

Key Words: Chronic kidney disease, Drugs related Problems, Jimma University

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ABBREVIATION/ACRONOMIES

ADR	Adverse drug reaction
ACEIs	Angiotensin converting enzyme inhibitors
AKI	Acute kidney injury
CCB	Calcium channel blocker
AKI	Acute kidney injury
CKD	Chronic kidney disease
CVD	Cardiovascular disease
DRPs	Drug related problems
DDI	Drug drug interaction
ESRD	End-stage renal disease
GFR	Glomerular filtration rate
IWD	Indication without drug
JUMC	Jimma University Medical Center
KDIGO	Kidney disease improvement global outcome
RI	Renal impairment
SPSS	Statistical Package for social Sciences
SSA	Sub Saharan Africa
USA	United state America

1. INTRODUCTION

1.1. Background

Chronic kidney disease is one of the global health problems requiring early detection and treatment to prevent its progression [1]. Chronic kidney disease (CKD) is a major public health problem that is associated with increased morbidity, mortality, and healthcare costs for both individual patients and health care system [2]. The global prevalence of CKD is estimated to be 11%–13% [3].]. It has been estimated that more than 500 million individuals globally have CKD. CKD is a major public health problem due to its increasing incidence, prevalence and associated economic burden. In Sub Saharan Africa (SSA), CKD is estimated to be 3-4 folds more than in developed countries [4]. CKD is defined by either kidney damage or glomerular filtration rate (GFR) < 60 ml/min/1.73 m2 for ≥ 3 months, regardless of the cause [5]. Often co morbidity, implying concomitant use of many drugs, makes the management of these patients particularly challenging [6].

Drug related problems (DRPs) are major challenge to health care providers and it may affect morbidity, mortality and patients' quality of life. The CKD patients are on high risk for DRPs because of the poly-pharmacy, the impaired renal excretion and the number and complexity of drugs increase with the progression of the disease [7,8]. All patients' problems involving medications can be grouped into one of the seven types of DRPs. These include unnecessary drug therapy; need additional drug therapy, ineffective drug, dosage too low, adverse drug reactions (ADR), dosage too high, and non-compliance. DRPs may lead to reduced quality of life, increased hospital stay, increased overall health care cost and even increases the risk of morbidity and mortality [9]. There is an increased risk of DRPs such as the use of contraindicated medicines and inappropriate dosages, with potentially adverse outcomes in CKD patients [10].

DRPs are very common in patients with CKD. Identification, prevention and management of these problems require a comprehensive, interdisciplinary approach [11- 15]. It is estimated that the annual cost of drug-related morbidity and mortality is nearly 177 billion dollars in the United States. Twice as much money is used to solve DRPs and adverse drug events than on the drug themselves [16]. Many drugs are eliminated by the kidneys and therefore may require dose adjustment in patients with renal impairment [17]. The dosing of all drugs, including antibiotics

should be optimized and monitored so as to prevent ADR, avoid further renal injury and to facilitate treatment outcomes [18]. CKD stage 5 patients are known to suffer from numerous co morbidities and complications. As a result, the treatment needs a large number and variety of drugs, which are linked to a number of DRPs, high cost and short-term mortality [19,20].

Dosing errors are common in CKD patients, caused by advanced disease and ADR, particularly in older patients [21]. A high number of prescribed medications, poor medication adherence, and frequent dosage changes may contribute to drug-related morbidity and DRPs [22]. DRPs can be defined as events involving drug treatment that are actually or potentially harmful to a patient's health or prevent patients to optimally benefit from treatment [23]. Management of CKD patients often requires the use of multiple drugs due to a high number of co morbidities and complications associated with the disease [24, 25]. Factors associated with DRPs include: more than three concurrent disease states present; medication regimen changed four or more times during the past 12 months; five or more medications in present drug regimen; twelve or more medication doses per day; history of noncompliance; presence of drugs that require therapeutic monitoring, and presence of diabetes [26].

The clinical pharmacists play an important role in healthcare settings by reducing the burden of DRPs effectively [27]. Identifying DRPs is a major task which could be taken care of by a clinical pharmacist in coordination with other health care providers through medication reconciliation [28]. On the other hand, educational intervention at discharge and follow up of patients by the clinical pharmacists may also prevent adverse events, can improve a patient's awareness of their drug therapy which in turn would improve their adherence to drug therapy [29, 30]. The numbers of DRPs were found to be increasing with an increase in number of drugs per prescription [31]. CKD patients are at high risk for DRPs and have demonstrated poor adherence to key cardiovascular medications [32].

The prevalence of CKD cases found to be significant in Ethiopia. In developing country like Ethiopia, the role of clinical pharmacist is much needed as there is a need to seal the existing gap in healthcare settings of the country [33]. The clinical pharmacists play an important role in healthcare settings by reducing the burden of DRPs effectively. The aim of this study was to determine prevalence of DRPs and associated factors among CKD patients admitted to Jimma university medical center from April to September 2018

1.2. Statement of the problem

Drug related problems are of a major concern in health care because of increased cost, increased economic burden, an almost 2-fold increased risk of death, reasons for admission and long term-care admission [52]. The significance of CKD not only lies in the burden associated with the disease but also in the burden associated with the use of medications. Because patients with CKD require complex drug regimens to retard CKD progression and treat associated co morbidities, they are at a higher risk of developing DRPs than the average patient population. DRPs in patients with CKD contribute a significant challenge to healthcare providers and have been associated with morbidity, mortality, low quality of life and high healthcare costs [40].

CKD has begun to gain recognition as an important contributor to the burden of disease not only in high-income countries, but also in low-income countries in regions such as sub-Saharan Africa (SSA) [15]. In relation to CKD, a range of studies have reported that DRPs cases are considerably prevalent and attributed to significant implications [12, 13, 14, 15, 24]. Unlike in high income countries, there is a dearth of literature about prevalence of DRPs in CKD in low- and middle-income countries such as those in SSA. Furthermore, little is known about the specific predictors of DRPs in patients with CKD residing in Ethiopia. Because of differences in genetics and in socio-demographic characteristics among patients residing in different regions, findings of studies in other parts of the world may not reflect the true state of DRPs among patients with CKD in Ethiopia. Additional studies are therefore needed to investigate the prevalence and clinical relevance of DRPs in patients with CKD residing in this region.

Moreover, risk factors associated with DRPs in patients with CKD in JUMC has not been established. Therefore, this study aimed to `1 determine the prevalence of DRPs and associated factors among chronic kidney disease patients admitted to JUMC.

1.3. Significance of the study

Studies in high resource setting suggest a high prevalence of DRPs among patients with CKD. CKD represents a considerable health problem and is a growing cause of death in Ethiopia. It is one of the chronic illnesses that require continuing medical care and ongoing patient self-management education. However, there were no studies showed the prevalence of DRPs and associated factors among patients with CKD treated at JUMC. Therefore, it is important to establish the prevalence and types of DRPs, characterize pharmacists' interventions in its prevention, as well as identify various associated factors contributing to DRPs among patients with CKD. The study findings can assist health care providers to identify patients with CKD at risk of developing DRPs and institute appropriate intervention strategies. In addition, the study findings can also assist in policy formulation for management of patients with CKD and support to prevent acute and to reduce the risk of long-term complications. The result of this study can stimulate further research in this area.

2. LITERATURE REVIEW

2.1. Prevalence and types of drug related problems

Prospective observational study conducted in USA among 395 CKD patients; nearly 1600 DRPs were identified. The most frequently occurred were sub therapeutic dosage or over dosage 20.4%, lack of treatment for an indication 16.9%, medication treatment not warranted 14.9% and failure to receive medication accounted for 4.8% of problems [22]. Prospective observational Study conducted in USA showed that pharmacist reviewed 5,373 medication orders and identified 354 DRP in 66 CKD patients. The most common DRPs include dosing problems 33.5% and ADRs 20.7% of the time. Overall the DRP appearance rate was 0.68 ± 0.46 per patient [19].

Prospective study conducted in Midwestern America among 133 CKD patients, identified 475 DRPs, averaging 3.6 ± 1.8 DRPs per patient. DRPs were identified in 97.7% of patients. The most frequent DRPs were drug without indications 30.9%, indication without drug use 17.5% and dosing errors 15.4% [15]. Prospective study conducted among 67 CKD patients in French; registered 142 DRPs, in 93% of patients, which mainly concerned untreated indications 31.7% and incorrect dosages 19%. The most frequent pharmaceutical interventions concerned addition of drug 34% and adaptation of dose 25.5% [26]. Prospective, interventional study conducted in French, among 42 CKD patients identified 263 DRPs. Three hundred and fifty pharmaceutical consultations and 263 interventions were observed. The pharmaceutical interventions concerned: untreated indication 30%, under-dosage 25.9% and over-dosage 18.3%. The CP interventions consisted of: adapting doses 42.2% and adding treatments 31.9% [37].

Prospective observational study conducted among 478 patients in France; 311patients were reviewed by the pharmacist and 241 DRPs were identified. The most commonly identified DRPs were untreated indications 24.1%, dose too high 19.1%, improper administration 12.9% and drug interaction 9.5%. Interventions performed to adapt the dosage to the patient renal function 28.3%, improper drug administration 22.6 % and wrong route of administration 19.4 % [53]. A prospective interventional study conducted among 150 patients in India identified 213 DRPs. The most common DRPs were found to be ADRs (45%), needs additional drug therapy (26.8%), untreated indication (13.6%) and Drug-Drug Interactions (DDIs) (11.7%) [44].

A prospective study conducted in south India among 226 CKD patients showed that, a total of 183 cases were found to have DRPs. The most frequent DRPs identified were interactions with drug and food 91 (40.7%), lack of understanding 33(14.66%), lack of adherence to recommendation 25 (11.1%), difficulty in administration 12 (5.33%), economic reasons 16(7.11%), and treatment duplicity 5(2.2%). There was an average of 8.93 + 3.26 drugs per prescription with an average of 0.81 +0.896 DRPs per prescription [58]. Prospective interventional study conducted among 37 CKD patients in Canada, 39 DRPs were identified in 19 patients. The most common DRPs identified were drug interactions 10(25.64%), out of these 3 serious interactions and 7 moderate interactions were identified. Over dose was 9 (23.07%), sub-therapeutic dosage 3 (7.69%), Improper drug selection 3(7.69%), the patients failed to receive the prescribed drugs 7(17.94%) and ADR 4 (0.25%). Based on the identified DRPs, 39 necessary interventions were done. It was observed that nine suggestions were accepted and the drug therapy was changed [42].

Prospective study conducted among 67 CKD at University of Toronto, in Canada, a total of 199 DRPs were identified and 92% of the patients had at least one DRP identified on admission. The average number of DRPs per patient identified was 4.2 ± 2.2. The most common type of DRP identified on hospital admission was Drug use without indication 11 (5.5%), Improper drug selection 2 (1.0%), Over dosage 27 (13.6%), Sub-therapeutic dosage 27 (13.6%), Drug interaction 1 (0.5%), ADR 13 (6.5%), Indication for drug therapy 102 (51.3%), Failure to receive drug 16 (8.0%) [43]. A prospective observational study conducted among 105 CKD patients in Indonesia showed 2404 and 1026 medication orders and DRP respectively. The rate of overall DRPs was 42.7 DRPs per 100 medication orders and each patient in the study experienced ten DRPs during their hospitalization. Both treatment effectiveness and ADR domains contributed to the majority of DRPs with a similar proportion, whilst domain of treatment costs comprised around 7% of all DRPs. The selection of drug was the most prevalent cause of DRPs identified by the pharmacist. Further, dose selection was responsible for 37.7% of DRP [2].

Cross-sectional study conducted among 3807 older patients in Netherlands; a median of two DRPs was identified per patient. The DRP categories overtreatment (25.5 %) and under-treatment (15.9 %) were found most frequently. The other DRPs include drug not effective 8.5, difficulty using dosage form 6.6, interaction 5.8, non adherence 5.6, dose too low 5.4, dose too

high 5.0 and inappropriate dosage form 0.84. Six % of the proposed interventions to solve DRPs were implemented as proposed, 31.3 % of cases no intervention. [20]. Prospective study conducted among 145 patients in Swiss, 383 DRPs were identified. The most frequent DRPs were drug interactions (21%), untreated indications (18%), over dosages (16%) and drugs used without a valid indication (10%). The following interventions were selected: no intervention (51%), verbal advice of treatment optimization (42%), and written consultation (7%). The acceptance rate of prescribers was 84% and their satisfaction was high [47].

A prospective multicentre study conducted among 827 patients in Norway resulted in 2128 DRPs. On average 2.6 DRPs per patient were found. Physician immediate acceptance rates varied from 80% to 50%. High age, use of many drugs at admission, existence of many DRPs and many clinical/pharmacological risk factors for DRPs were associated with low immediate acceptance rate[46].Prospective multicentre study conducted among 827 CKD patients in Norway, showed that 81% of the patients had DRPs and an average of 2.1 clinically relevant DRPs was recorded per patient. The DRPs most frequently recorded were dose-related problems (35.1%), need for laboratory tests (21.6%), non-optimal drugs (21.4%), need for additional drugs (19.7%), unnecessary drugs (16.7%) and medical chart errors (16.3%) [46].

Prospective descriptive study conducted among 287 CKD patients in Nigeria identified, 234 DRPs. Ninety (38.46%) drug choice problem, 86 (36.75%), drug interactions; 47(20.09%), dosing problem, while 11 (4.70%) had drug use problem. Clinical interventions (459) were undertaken at prescriber level (78; 16.99%); patient/career level (211, 46.00 %) and drug level (170, 30.04 %). Pharmacists recommended 376 of the interventions for approval, out of which 310 (67.54%) were approved. Amongst the DRPs indentified, 47.86 % were successfully resolved [8]. A prospective observational study conducted among 308 CKD patients in Malaysia resulted in the most common DRP among the ESRD patients were: IWD (20.9%), IDS (20.7%) and DI (19.4%) [54].

Retrospective, cross-sectional study conducted among 347 patients in Singapore, identified 32 cases of DRPs. The most common DRPs identified need additional therapy (31.3%), non-compliance (28.1%), ADRs (25%), and inappropriate dosing (dose too low 12.5%, dose too high 3.1%). Of the 149 of inappropriate treatment identified during hospital stay, 118 (64.4%) had an untreated condition, 9 patients require additional drugs to improve the management of their

existing medical conditions. For patients receiving unnecessary drug therapies, 5 had no recorded medical indication for their prescribed medications and the remaining patients were prescribed duplicate therapies. The remaining 17 Patients taking drugs not recommended for their conditions. Of these, 82.4% was due to usage of a particular drug when contraindicated or when a particular drug was not even indicated for the condition [41].

Retrospective study conducted among 202 patients diagnosed with ESRD in Pakistan resulted in 946 total number of drugs prescribed to the patients, 501 DRPs were found in 202 cases with an average of 2.4 per prescription. The most common DRPs identified were inappropriate dosage 146(72.3%), contraindication 56(27.7%), treatment duplicity (43, 21.2%), need additional treatment (40, 19.8%), economical reasons (23, 11.3%), ADRs (18, 8.9%) and ineffective drug (13, 6.4% [7]. A prospective, observational and interventional study conducted among 373 patients in Pakistan; in which 184 profiles had DRPs. A total of 147 DRPs were identified in which major issue was related to ADRs 61(41.5%). The total numbers of causes which lead to these problems were 161, of which dosing error was found to be more prevalent 68(42.2%). Out of 161 recommendations given by clinical pharmacists, 86.33% (n=139) were successful in solving the problem while 6.83% of recommendations were termed ineffective as they failed to address their respective issues [34].

Prospective study conducted in Beirut; 90 patients presenting with DRPs were identified. The most commonly identified DRPs were drug interactions (37%), over-dosage (28%), contra-indications (23%), and under-dosage (10%). The clinical pharmacist's interventions consisted of dose adjustment (38%), addition drugs (31%), changes in drugs (29%) and optimization of administration (2%) [49].

2.2. Patterns and factors associated drug related problems

Study conducted in US shows that pharmacist reviewed 5,373 medication orders and identified 354 DRP in 66 CKD patients. DRP were classified according to medication class involved. Cardiovascular-related medications accounted for 29.7% of DRP: 13.3% cardiovascular medication; 8.2% cholesterol lowering medications and endocrine medications accounted for 15.5% of identified DRP and nephrology-specific medications (anemia and renal bone disease medications) accounted for 15% of DRP [19]

Prospective study conducted in America, among 133 CKD patients identified 475 DRPs. The number of DRPs in an individual patient increases as the number of co morbid conditions increases. DRPs correlated positively with number of patient co morbidities ($P < 0.001$) [15].

Prospective study conducted among 67 CKD patients in French; registered 142 DRPs, in 93% of patients. The main drugs involved concerned the cardiovascular (33%), digestive-metabolic (26.9%) and hematopoietic (19.9%) systems. DRPs correlated significantly with a higher number of medications ($p=0.049$) and with older patient age ($p=0.0027$) [26].

Prospective interventional study conducted in French, among 42 CKD patients identified 263 DRPs. The main drugs involved were cardiovascular (33.1%), digestive metabolic (28.6%) and hematopoietic (21.6%) systems [37]. A Prospective cross- sectional study conducted i in India among 150 CKD patients; 34% patients did not strictly follow medicine schedule as prescribed and 68% patients were not aware about the importance of each medicine they were taking. Not buying all medicines (24), not taking medicines for required duration (21), taking additional non prescribed medicines (21), not taking medicine at prescribed time (18) were the commonly reported non-adherence practices. High cost (62.74%), complex dosing schedule (58.82%), and fear of adverse effects (47.05%) were the common causes of non-adherence [35].

A prospective interventional study conducted among 150 in India, identified 213 DRPs. The drug class that was most involve in DRPs antihypertensive agents (41%). %). It was observed that number of co morbidities (AOR) = 3.68 ($p < 0.001$), geriatric population and polypharmacy were the major predictors. A significant statistical association was found in variables such as co morbidities ($p<0.01$), age ($p<0.01$) and number of drugs received ($p<0.01$) with DRPs [45]. Cross-sectional observational study conducted in India among 185 CKD patients; polypharmacy was executed in 83% of these patients. Hypertension (95%), diabetes (87%), and anemia (86%) are the most common co-morbidities. The five most frequently prescribed drugs were diuretics (100%), anti-ulcer agents like PPIs and H2 blockers (98%), anti-hypertensive (95%), vitamins and minerals supplements including calcium (92%), and helmentinics (85%). Infectious diseases like respiratory tract infection (37%) and UTI (34%) had shown to have a high prevalence in CKD patients [18].

Prospective interventional study conducted among 37 CKD patients in Canada; a total of 187 drugs were prescribed for 19 patients, ranging from 6-13 medications with a mean of 10.16 ± 1.353 SD per prescription. Among 187 drugs, maximum number of drugs prescribed were antihypertensive (n=57) 30.48%. Another widely prescribed class of drug was loop diuretics (n=12) 21.05% and 17 antibiotics were prescribed [42]. Cross-sectional study conducted among 3807 older patients in Netherlands; a median of two DRPs was identified per patient. Drug classes most frequently involved in overtreatment are drugs for PUD and GERD 10.2 % antithrombotic agents11.9%). The majority of the drugs for peptic ulcer and GORD involved in overtreatment were PPI, (281(94.9%) [16]. A prospective multicentre study conducted among CKD Patients in Norway shows that 201 CKD patients used a total of 2110 drugs. The commonest drug classes used in patients with RI stages 3, 4 and 5, and linked to DRPs were antibacterial (52), antithrombotic agents (44), followed by ACE inhibitors (32), opioids (20), NSAIDs (20). In patients with RI compared with patients with adequate renal function, the mean number of DRPs per patient was -significantly higher for the DRPs non-optimal drug 0.35 vs. 0.24 ($P = 0.03$), non-optimal dose 0.69 vs 0.42 ($P < 0.001$), drug interaction 0.33 vs. 0.18 ($P = 0.02$), ADR 0.15 vs. 0.07 ($P = 0.002$) and need for monitoring 0.44 vs. 0.22 ($P < 0.001$) [5].

Prospective multicentre study conducted among 827 CKD patients in Norway, showed that 81% of the patients had DRPs and an average of 2.1 clinically relevant DRPs was recorded per patient. A multivariate analysis showed that the number of drugs at admission and the number of clinical/pharmacological risk factors were both independent risk factors for the occurrence of DRPs, whereas age and gender were not. [45]. A prospective multicentre study design conducted among 827 CKD patients in Norway showed; the drug groups causing most DRPs were antithrombotic agents, NSAIDs, opioids and ACE inhibitor [46]. A prospective observational study conducted among 308 CKD patients in Malaysia showed; increased age, female gender, duration of hospitalization and duration of CKD were found to be significantly associated with the number of DRP [54].

A retrospective study employed among 205 CKD patients in Pakistan showed, 1534 drugs prescribed to CKD patients. It was observed that the majority N = 155 (75.6%) of patients had CKD stage 5, followed by nearly 15.1% who had CKD stage 4, and 9.3% patients had CKD stage 3. The Hypertension (69.3%), Diabetes (19.1%) and Hepatitis (4.8%) were observed as

three top most co morbidities in CKD patients. [11]. Prospective study conducted in the internal medicine ward of the University Hospital of Beirut; 90 patients presenting with DRPs were identified. Cardiovascular drugs were the most frequently implicated (44%), followed by anticoagulants (17%) and corticosteroids (14%).Thirty-two percent were hydro-electrolytic problems and 24% gastrointestinal [49].

2.3. Conceptual framework

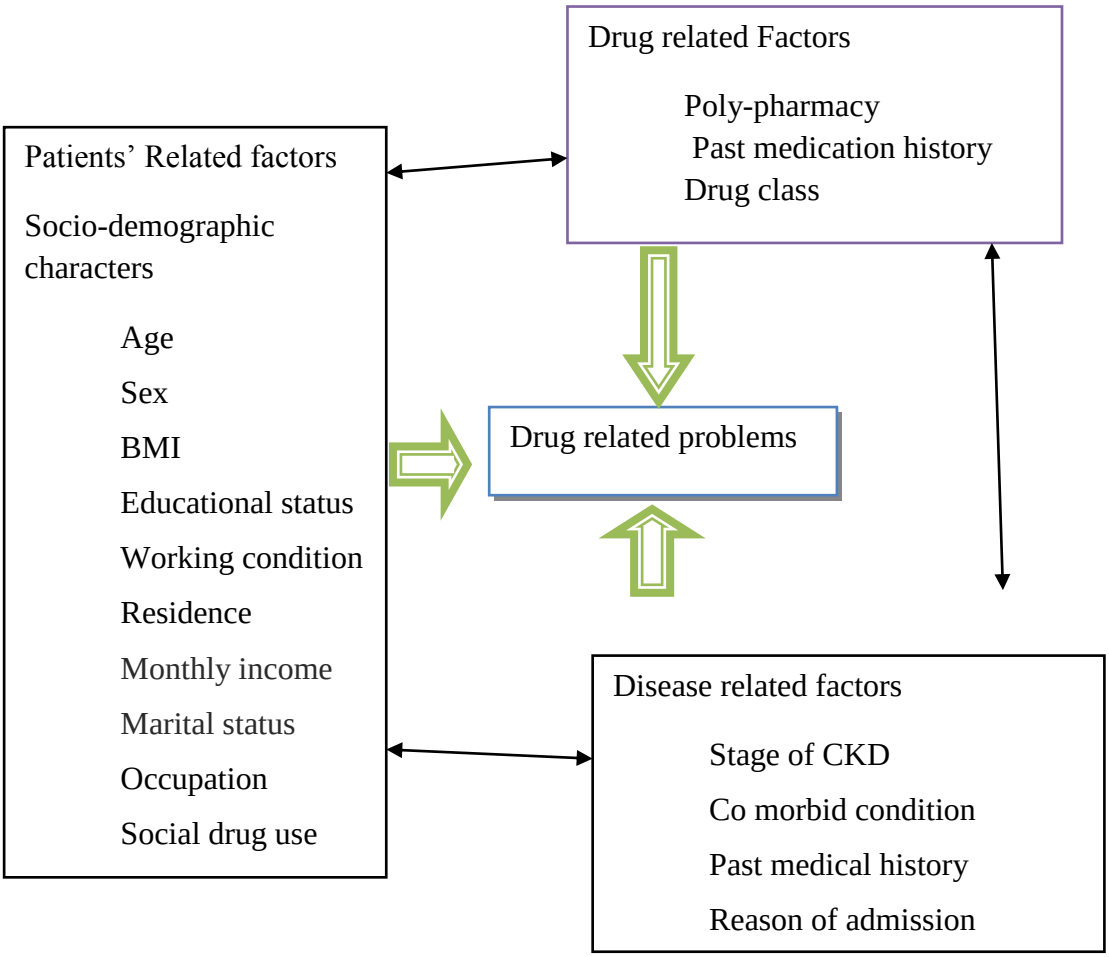

Figure 1. Conceptual frame work of drug related problems and associated factors among CKD patients

3. OBJECTIVES

3.1. General objective

To determine the prevalence of drug related problems and associated factors among chronic kidney disease patients admitted to JUMC from April to September 2018, Jimma Zone, Jimma, South west Ethiopia .

3.2. Specific objectives

- To determine prevalence of drug related problems among chronic kidney disease patients admitted to JUMC from April to September 2018.
- To identify types drug related problems among chronic kidney disease patients admitted to JUMC from April to September 2018.
- To identify causes of drug related problems among chronic kidney disease patients admitted to JUMC from April to September 2018.
- To identify factors associated with drug related problems among chronic kidney disease patients admitted to JUMC from April to September 2018.

4. METHODOLOGY

4.1. Study area and period

The study was conducted from April 1 to September 30, 2018 among CKD patients admitted to medical wards of Jimma University medical center (JUMC)**.** JUMC is the only teaching hospital in southwest Ethiopia with a bed capacity of 600. Geographically, it is located in Jimma town 352 km Southwest of Addis Ababa, the capital. It provides services for approximately 9000 inpatient and 80,000 outpatient clients per year with a catchment population of about 15 million people

4.2. Study design

A prospective general cohort study was employed.

4.3. Population

4.3.1. Source population

All chronic kidney disease patients admitted to JUMC during study period.

4.3.2. Study population

All adult chronic kidney disease patients who fulfilled the inclusion criteria were included.

4.3.3. Inclusion and Exclusion Criteria

4.3.4. Inclusion criteria

- CKD Patients ≥18 years
- Willing to Give their informed consent

4.3.5. Exclusion criteria

- Patients stay in hospital for ≤24 hours
- CKD patient with incomplete information

4.4. Sample size and sampling technique

4.4.1. Sample size determination

Single population proportion formula was used. The sample size was based on the study conducted in Nigeria among CKD patients with prevalence of DRPs 81.5% [8].Using Fisher's formula, the sample size was calculated as follows [51].

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

Where

n= Minimal sample size required.

P = Estimated prevalence of DRPs in CKD = 81.5% [8]

. $(^{Z\,\alpha}/_{2})^{2}$ = Standard normal deviate at 95% confidence interval corresponding to 1.96

d = Absolute error between the estimated and true population prevalence of CKD of 5%.

$$n = \frac{1.96^2 0.815(1-0.815)}{0.05^2}$$

The calculated sample size was n = 231patients.

Since the total population is <10,000 that is, 180 CKD patients were admitted during 2009 in JUMC, we use the correction formula to determine final sample size:

Nf=n/(1+ (n/N))

=231/(1+ (231 /180))

=101 CKD patients

Where N = final sample size when a population is < 10, 000, n is initial sample size when the population is >10,000, and Nf is estimated study population. Then 10% was added on 101 patients

101x10%=10

NF+non-response rate =111

From 111 CKD patients; six patients were not willing to give informed consent and two patients had no full information to identify DRPs.

4.4.2. Sampling technique

Consecutive sampling method was applied until the required sample sizes were achieved. Consecutively selects every accessible patient who met the inclusion criteria from the renal unit and internal medicine wards.

4.5. Study variables

4.5.1 Dependent variable

Drug related problems

4.5.2 Independent Variables

Patients' Related factors	Disease related factors
Age	Stage of CKD
sex	Length of hospital stay
BMI	Co morbid condition
Educational status	past medical history
Working condition	Reason of admission
Place of residence	**Drug related Factors**
Monthly income	Number of drugs per prescriptions
Marital status	past medication history
Occupation	drug class

4.6 Data collection procedures

4.6.1 Data collection instrument

Well designed questionnaires were prepared after reviewing different literatures. The questionnaire was translated from English to local language e.t Afan Oromo and Amharic and back translated to English to fit consistence by licensed linguistic. Data collectors included three senior hospital pharmacists. Information such as socio-demographic characters, past medication history, past medical history and social drug use were collected by data collectors using face to face interviews using semi-structured questionnaire.

4.6.2 Data collection process and management

First the patient chart was reviewed and the presence of CKD was confirmed. Semi structured interview was conducted to record patients' socio-demographic data, past medical history, past medication history, date of admission/discharge, allergy/ADR history and the patient chart to collect co morbidities, current medication profiles, discharge medications, laboratory investigations. All drugs which were prescribed for CKD patients were recorded, evaluated for presence, types and patterns of DRPs. Identified DRPs was recorded and classified using DRP registration format which was taken from Pharmaceutical care practice: the clinicians guide [9]. DRPs were categorized by type and medication class.

4.7 Data quality assurance

Pre test was done to ensure the validity of the tools. The questionnaire was translated from English to local language and back to English. The interviewers would discuss the questionnaire thoroughly among themselves before data collection to decrease interviewer bias. Training was given for data collectors on the objective of the study, each item of the questionnaires, their responsibility, and obligations. During data collection the investigator make tight supervision on whether the data collectors adhere to the research protocol or not and make immediate corrections. The collected data were also double checked for completeness.

4.8 Data processing and statistical analysis

The collected data were coded, cleared and checked for completeness and entered into a computer using EpiData version 4.2.0.0 software and exported to the Statistical package of Social Science (SPSS) version 21.0 for analysis. Results of the study were organized in the form of frequencies and percentages. The data were summarized and described using tables and figures. Binary logistic regression was used to see the association between independent and dependent variable. Those variables with a p value<0.25 in bivariate analysis was a candidate for multivariate analysis and those variables with a p value<0.05 were considered as significant in multivariate analysis. Odds ratio and confidence interval of 95% were used to see the strength of association. Medication adherence was assessed by using Morisky medication adherence scale (MMAS-8) [55]. ADR was assessed by using Naranjo Adverse Drug Reaction Probability Scale [56]. Subsequently, the appropriateness of drug therapy was evaluated using 2014 Ethiopian standard treatment guideline, Upto- date, Clinical Practice Recommendations for Primary Care

Physicians and Healthcare Providers, KDIGO 2012 Clinical Practice Guideline and world health organization (WHO) guideline. Identified DRPs was recorded and classified using DRP registration format which was taken from Pharmaceutical care practice [57]. Then the possible intervention measures were proposed and communicated to either the internist/resident/senior physician or the patient in order to resolve or prevent DRPs.

4.9 Ethical consideration

Initially Jimma University ethical Review Board (IRB), was approved the research. The letter was communicated to concerned officials. The hospital director was informed about the purpose of the study to get agreement and co-operation each of the respondents were received oral and written information about the study, the participants were signed an informed consent for their voluntary participation. Confidentiality of the patients' was kept by coding the questionnaires with card numbers.

4.10 Plan for dissemination and ensuring utilization of findings

The research was the first to be conducted in Ethiopia. The study was a requirement for partial fulfillment of the degree of masters of clinical pharmacy and will be submitted to school of pharmacy and Copies will be given to JUMC. Additionally, information will provided as necessary to other relevant bodies, and effort will made for possible publication

4.11 Operational definitions

Co-morbidity: Diseases or disorders that exist together with an index disease or co-occurrence of two or more diseases or disorders in an individual.

P**oly-pharmacy:** Use of five or more different drugs concomitantly**.**

Social drug use: Use of alcohol, cigarette smoking and Chew chat for one or more than one year.

5. RESULT

5.1. Socio Demographic Characteristics of the Study Participants

During six month study period, 103 CKD patients were included. Most of study participants were in age group of 18-40 years with mean age of 45.83 ± 17.7. Majority of the study participants 72 (69.9%) were males, 73(70.9%) were married, 65(63.5%) had no regular income and 66(64.1%) were living in rural area. Most of study participants were 53(51.5%) farmers and 34 (33.0%) had secondary educations [Table 1].

Table 1. Socio-demographic Characteristics of CKD patients at JUMC, Jimma Zone, Jimma, South west Ethiopia from April 01 to September 30, 2018.

Variable		Frequency (%), N=103
Age (in yrs)	18-40	46(44.7)
	41-60	31 (30.1)
	>60	26 (25.3)
Sex	Male	72(69.9)
	Female	31(30.1)
Marital status	Single	27(25.2)
	Married	73 (70.9)
Occupation	Farmer	53(51.5)
	Unemployed	31(30.1)
	Employed	12(11.7)
	Merchant	7(6.8)
Monthly income	No regular Income	65(63.1)
	≥1000	38(36.9)
Place of residence	Rural	66(64.1)
	Urban	37 (35.9)
	No formal education	32(31.1)
Educational Status	Primary school	25(24.3)
	Secondary school	34 (33.0)
	College/ University	12(11.7)
Social dug use	Non user	53(51.4)
	User	50(48.5)

5.2. Clinical characteristics

Majority of the study participants 90(87.4%) were newly diagnosed CKD patients, 69(66.99%) had <5 co morbidities, 66 (64.1%.) received <5 drugs per prescriptions and 80(77.7%) were stay in hospital for ≥7 days. Most of study participants 44(42.7%) had 18.5-24.5 BMI and 72(69.9%) of study participants had 1-2 DRPs per patient[Table 2].

Table 2. Clinical characteristics of CKD Patients at JUMC, Jimma Zone, Jimma, South west Ethiopia from April 01 to September 30 2018.

Variables		Frequency (%), N=103
Number of co morbidity	1-2	14(13.4%)
	3-5	71(68.9%)
	>5	18(17.4%)
BMI	≤18	38(36.9)
	18.5-24.5	44(42.7)
	25-29.9	17(16.5)
	≥30	4(3.9)
Number of drug taken per day	<5	55(53.3)
	≥5	48(46.6)
Duration with CKD (yrs)	<1	90(87.4)
	1-3	10(9.7)
	>3	3(2.9)
Length of hospital stay	<7 days	23(22.3)
	≥7 days	80(77.7)
Number of DRPs per patient	0	22(21.4%)
	1-2	72(69.9%)
	≥3	9(9.7%)

Most of study participants were 67 (65%) in stage-V chronic kidney disease patients [fig. 2]

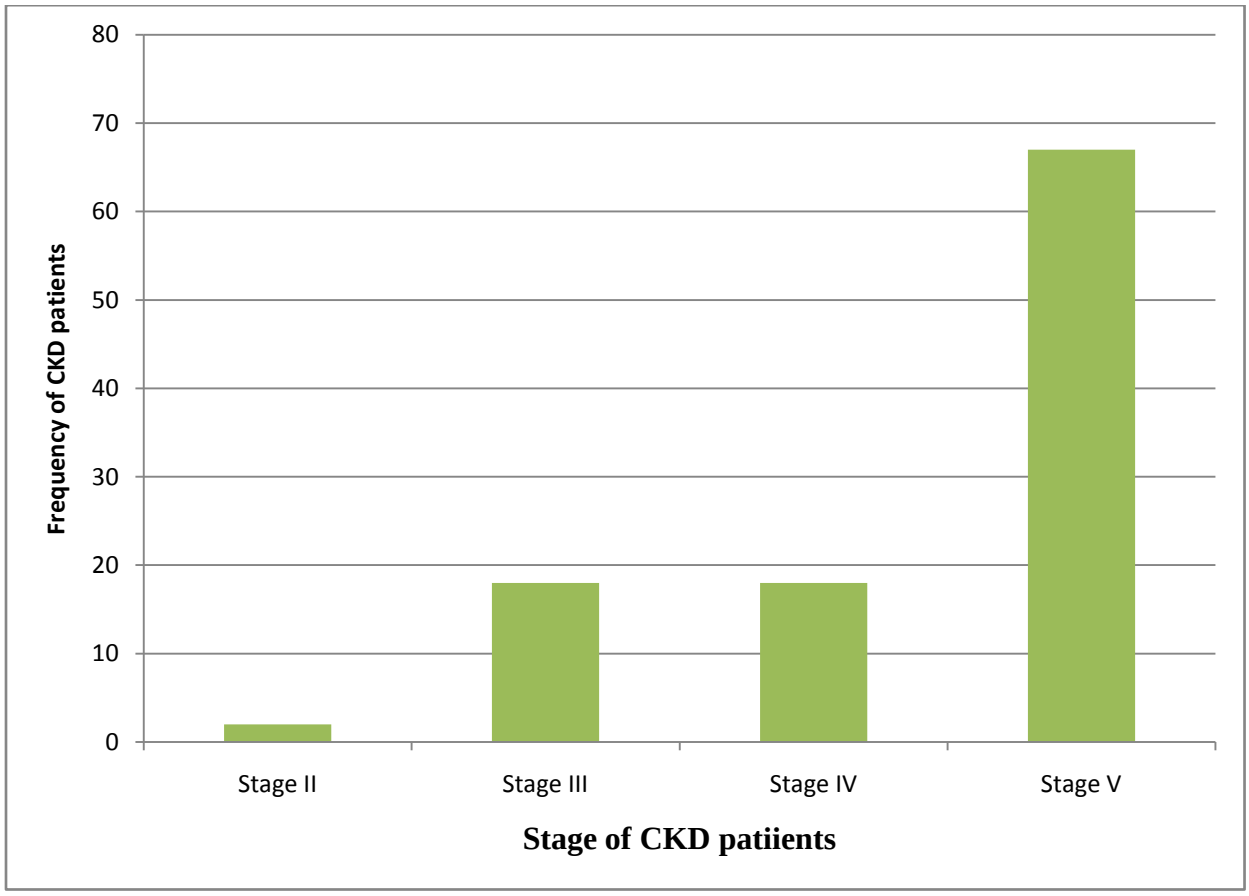

Figure 2. Stages of CKD among study participants at JUMC, Jimma Zone, Jimma, South west Ethiopia from April 1 to September 30, 2018.

All of the patients were found to have one to seven co morbidities. The top five co morbid conditions were acute kidney injury 87(84.5), anemia 86 (83.5), hypertension 77 (74.8%), dyspepsia 52 (50.5%), electrolyte abnormality 36(34.95%) [fig.3].

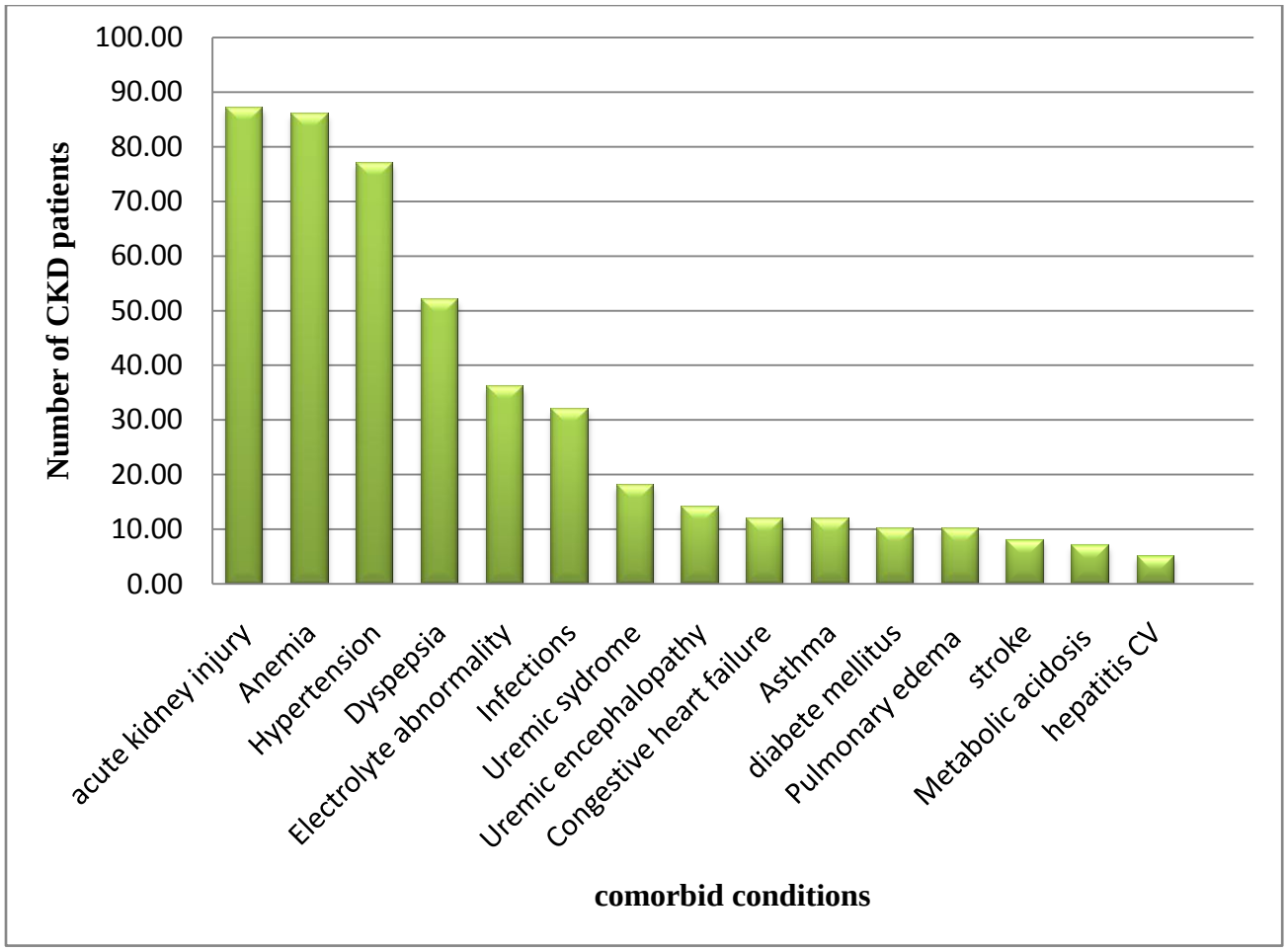

Figure 3. Common co morbidities among study participants at, JUMC, Jimma Zone, Jimma, South west Ethiopia from April to September 2018.

5.3. Prevalence of Drug Related Problems

Out of 103 study participants, 81(78.6%) of patients had DRPs, on average1.94 ± 0.873 DRPs per patient. The rate of overall DRPs was 30.95 DRPs per 100 medication orders. The most common DRPs among CKD patients were: need additional drug therapy 62 (31%), non-adherence 40(20%), dose too low 36(18%) [Table 3]

Table 3: Prevalence of Drug-related Problems among CKD patients at JUMC, Jimma Zone, Jimma, South west Ethiopia from April 1to September 30, 2018.

Problems (DRP Domain)	DRP sub-domain	Frequency (%), N= 200
Indication	Need additional drug therapy	62(31)
	Unnecessary drug therapy	9(4.5)
Effectiveness	Ineffective	20(10)
	Dose too low	36(18)
Safety	Adverse drug reaction	4(2)
	Dose too high	29(14.5)
Compliance	Non compliance	40(20)

The most common causes of need additional drug therapy 52(26%) were because of untreated medical conditions, non-adherence 19(9.5%) were because of the patient/caregiver forgets to take/give the medication, dose too low 29(14.5%) were because of the dose is too low to produce the desired response, Dose too high 19(9.5%) were because of dose is too high ,Ineffective 12(6%) were because of the drug is not the most effective for the medical problem, Unnecessary drug therapy 9(3.5%) and ADR 3(1.5%)were because of the drug product causes an undesirable reaction that is not dose-related [table 4].

Table 4. Causes of drug-related Problems among CKD patients at JUMC, Jimma Zone, Jimma, South west Ethiopia from April 1to September 30, 2018.

DRPs	Cause	Frequency (%), N=200
Need additional drug therapy	A medical condition requires the initiation of drug therapy.	52(26)
	Preventive drug therapy is required to reduce the risk of developing a new condition.	10(5)
Unnecessary drug therapy	There is no valid medical indication for the drug therapy at this time.	5(2.5)
	Multiple drug products are being used for condition	4(2)

	that requires single drug therapy.	
Ineffective	The drug is not the most effective for the medical problem	12(6)
	The medical condition is refractory to the drug product	8(4)
Dose too low	The dose is too low to produce the desired response	32(16)
	The dosage interval is too infrequent to produce the desired response	4(2)
Adverse Drug reaction	The drug product causes an undesirable reaction that is not dose-related	3(1.5)
	A drug interaction causes an undesirable reaction that is not dose-related.	1(0.5)
Dose too high	Dose is too high	19(9.5)
	The dosing frequency is too short	10(5)
Non-compliance	The patient/caregiver does not understand the instructions.	5(2.5)
	The patient/caregiver prefers not to take/give the medication	12(6)
	The patient/caregiver forgets to take/give the medication	19(9.5)
	The drug product is too expensive for the patient	4(2)

A total number of 646 medications were prescribed and the mean number of prescribed medications per patient was 6.26 ± 1.85. From these, 219 drugs were involved in 200 different types of DRPs. The most common drug classes associated with the occurrence of DRPs among study participants include cardiovascular medications were 31.9% of DRPs, gastrointestinal 19.1% and analgesic 19.1% .[Table 5]

Table 5. Classes of medications commonly prescribed and related with DRPs among study participants at JUMC, Jimma Zone, Jimma, South west Ethiopia from April 1 to September 30, 2018.

Therapeutic classes	Frequency (%), N= 646	Frequency of Drugs related with DRPs (%), N=219
Cardiovascular drugs	172 (26.6)	70(31.9)
Anti-infective	89(13.8)	42(19.1)
Gastrointestinal drugs	124(19.2)	42(19.1)
Analgesic	82(12.7)	40(18.3)
Drugs for blood disorder	40(6.2)	14(6.3)
Fluid and Electrolytes	82(12.7)	6(2.7)
Endocrine drugs	38(5.9)	3(1.4)
Respiratory drugs	19(2.9)	2(0.9)

5.4. Intervention for DRP

A total of 218 clinical interventions were undertaken at three levels of the intervention: prescriber level: 88 (40.4 %); patient/career level: 56 (25.7 %) and drug level: 74 (33.9. Out of this interventions, 178(81.6%) were accepted and 174(79.8 %) were totally solved [table 6].

Table 6. Interventions and Outcomes of interventions among study participants at JUMC, Jimma Zone, Jimma, South west Ethiopia from April 1 to September 30, 2018.

	Interventions	Frequency (%), N=218
At prescriber level	Prescriber informed only	2(0.9)
	Prescriber asked for information	1(0.5)
	Intervention proposed to prescriber	50(22.9)
	Intervention discussed with prescriber	35(16.1)
At patient level	Patient (drug) counseling	54(24.7)
	Patient referred to prescriber	1(0.5)
	Spoken to family member/care giver	1(0.5)

At drug level	Drug changed to	9(4.1)
	Dosage changed to	24(11)
	New drug started	38(17.4)
	drug stopped	3(1.4)
Intervention Acceptance	Intervention accepted	178(81.6)
	Intervention not accepted	40(18.3)
Outcome of interventions	Problem totally solved	174(79.8)
	Problem partially solved	40(18.3)
	Problem not solved	8(3.6)

5.5. Predictors of Drug Related Problems

The association of independent variables with dependent variable were investigated using both univariate and multivariate logistic regression techniques. In univariate logistic regression analysis; age (COR= 0.926, 95% CI: 0.357-2.400), marital status 0.360 (COR= 0.360, 95% CI: 0.136-0.953), Length of hospital stay COR= 2.320, 95% CI: 1.345-3.543), social drug use (COR= 0.7500, 95% CI: 0.289-1.944, p= 0.232), number of co morbidities (COR=2.029, 95% CI: 0.77-5.350), place of residence (COR= 1.500, 95% CI: 0.564-3.988), Poly-pharmacy , (COR= 3.871, 95% CI: 1.363-10.994), p= 0.013, monthly income 0.800((COR= 0.800, 95% CI: 0.291-2.199) , stage of CKD `(COR=1.114, 95% CI: 0.404-3.074) were associated with DRPs .(Table 7).

Table 7. Binary logistic regression result of predictors of DRPs among CKD patients at JUMC, Jimma Zone, Jimma, South west Ethiopia from April 1 to September 30, 2018.

Predictor variable	Category	DRPs		COR (95% CI)	p-value
		Yes	No		
Age	<50	43	12	1.00	0.244
	≥ 50	38	10	0.926(0.357-2.400)	
Sex	Male	57	16	1.146(0.441-2.977)	0.816
	Female	24	7	1.00	
BMI	≤18	28	10	1.00	
	18.5-24.5	34	10	0.129 (0.345-5.875)	0.772

	25-29.9	15	2	0.106(0.129-12.129)	0.918
	≥30	3	1	0.080(0.106-12.557)	0.999
Duration since diagnosis with CKD in (years)	<1	82	8	1.00	
	1-3	7	3	1.816(.156-21.117)	634
	>3	2	1	2.000(0.115-34.822)	634
Length of hospital stay	<7 days	32	9	1.000	0.087
	≥7 days	49	13	2.320(1.345-3.543)	
Marital status	Married	53	9	1.00	0.060
	Single	28	13	0.360(0.136-0.953)	
Educational status	No formal education	22	7	1.00	0.248
	Primary school	23	5	0.738(0.246-2.218)	0.068
	Secondary school and above	36	10	1.294(0.383-4.371)	0.251
Monthly income	No regular income	51	14	1.00	0.166
	≥1000	30	8	0.800(0.291-2.199	
Place of residence	Urban	28	9	1.00	0.154
	Rural	53	13	1.500(0.564-3.988	
Stage of CKD	II,III and IV	29	7	1.00	0.022
	V	52	15	1.114(0.404-3.074)	
Social drug use	User	39	11	1.00	0.232
	Non user	42	11	0.750(0.289-1.944)	
Number of medications	<5	48	7	1.00	0.013
	≥ 5	33	15	3.871(1.363-10.994)	
Number of co morbidities	<5	53	16	1.00	0.053
	≥ 5	28	6	2.029(0.77-5.350)	

Those variables with a p value <0.25 in bivariate analysis were introduced to multiple logistic regression. The result of the multivariate analysis showed that Participants who were married were 62% times more likely to have DRPs compared to those who were single (=AOR =0.383, 95% CI: 0.042-0.792, p= 0.023). Participants who took poly-pharmacy were 4.695 times more likely to have DRPs compared to those who not took poly-pharmacy (AOR= 4.695, 95% CI: 1.370.-16.091). Participants who have ≥ 5 co morbidities were 3.616 times more likely to have

DRPs compared to those who have <5 co morbidities (AOR=3.616, 95% CI: 1.015-1.8741). Participants who treated for stage V CKD were 3.941times more likely to have DRPs compared to those in other stages of CKD (AOR= 3.941, 95% CI: 1.221-12.715) (table 8).

Table 8. Multivariate logistic regression result of factors associated with DRPs among CKD patients at JUMC, Jimma Zone, Jimma, South west Ethiopia from March to September 2018.

Predictor variables	Category	DRPs		AOR (95% CI)	p-value
		Yes	No		
Age	<50	12	43	1.00	0.270
	≥ 50	10	38	0.855(0.241-3.029)	
Length of hospital stay	<7 days	32	9	1.000	0.077
	≥7 days	49	13	2.720(2.325-3.543)	
Marital status	Married	9	53	1.00	0.023
	Single	13	28	0.383(0.042-0.792)	
Educational status	No formal education	7	22	1.00	0.278
	Primary school	5	23	0.234(0.049-1.115)	0.068
	Secondary school and above	10	36	0.415(0.081-2.123)	0.291
Monthly income	No regular income	14	51	1.00	0.166
	≥1000	8	30	0.505(0.112-1.457)	
Place of residence	Urban	9	28	1.00	0.252
	Rural	13	53	2.460(0.713-8.495)	
Stage of CKD	II,III and IV	7	29	1.00	0.022
	V	15	52	3.941(1.221-12.715)	
Social drug use	User	11	39	1.00	0.272
	Non user	11	42	0.510(0.153-1.696)	
Number of medication	<5	7	48	1.00	0.014
	≥ 5	15	33	4.695(1.370.-16.091)	
Number of co morbidities	<5	13	53	1.00	0.047
	≥ 5	9	28	3.616(1.015-1.874)	

6. DISCUSSION

Chronic Kidney Disease patients are always at high risk for drug related problems as they are prescribed with multiple drugs to counter the co morbidities and achieve the desired out comes. As the number of drugs increases, the risk of DRPs also increases. The prevalence of DRPs among hospitalized patients is associated with different reasons and risk factors. Identifying these factors is critical for the prevention and control of DRPs in an individual patient. This study was employed to assess DRPs among CKD patients of JUMC in Ethiopia.

Most of patients in the study population belonged to the age group of 18-40 years. The studies conducted in Nigeria also reported that CKD was a substantial concern in this group of population with an increasing incidence of treated kidney failure resulting in dialysis [8]. The mean age (SD) of participants was of 45.83 ± 17.7 years .Conversely, studies conducted in USA, India and Norway reported a mean age greater than 60 years [19, 22, 52]. Reasons for this difference could be explained by the fact that CKD in developed countries is common among older population while in developing country it affects younger adults.

Out of 103 study participants, 81(78.6%) of patients had DRPs, on average1.94 ± 0.873 DRPs per patient. The rate of overall DRPs was 30.95 DRPs per 100 medication orders. This result is lower than the result obtained from studies done in Indonesian (42.7 DRP per 100 medication orders) [2] and higher than the result found in USA (6.58 DRPs per 100 medication orders) [15]. Each study participant had at least one type of DRPs and the number of DRPs per participant range between 2 and 4. Conversely, study conducted in France reported that DRPs experienced by 93% to 99% of studied patients and ranged between 2 and 6 DRPs per patient [38]. This showed that CKD patients are a group with high burden of DRPs both in developed and developing countries. This has been attributed to multiple medications and complex medication regimens used to treat co morbidities or retard disease progression among patients with CKD.

Need additional drug therapy contributed for 31% of all DRPs identified in this study. This finding is almost similar with the studies done in France (30%) (31.7%) [26, 37] and Singapore (31.1%) [42]. This is because of more co morbidities and complex CKD management algorithm identified in most study settings. In contrast to this finding, need additional drug therapy accounted for a larger proportion of the DRPs in studies conducted in USA (61.5%) [15], India,

(40.6%) [44], Canada (51.3%) [43] And Pakistan (40.19) [7]. The discrepancy can be due the better study settings to identify all possible untreated conditions. However, the finding of this study was greater than the results obtained from mid-western America (17.5%)[15], USA (16.9%) [22], France (24.1%) [5], Swiss (18%) [47]. This can be due to the nature of health care provision setting which offers more opportunities to capture untreated conditions.

The prevalence of unnecessary drug therapy in this study was 4.8%. This finding was consistent with studies done in Canada (5.5%) [43]. In comparison, this finding is lower than the studies done in America (30.9%), [15], Netherlands (25.5%), [20], Swiss (10%) [48], Nigeria (36.75%)) [8] Malaysia (20.9) [54] and Pakistan (21.2%) [7], But higher than study done India (2.2%) [58]. Despite the difference of figures in many countries, poly-pharmacy is common among CKD population due to the nature of its management.

Ineffective drug therapy contributed for 10% of all DRPs identified in this study. In comparison to this finding, studies conducted in India, (40.6%) [44], Canada (51.3%) [43], Beirut (28%) [49] and USA (14.9%)[22] showed larger proportion of ineffective drug therapy. This might be due to in developed countries CKD patients treated for many years which can result in drug resistance while most of the study participants in this study were newly diagnosed patients.

Dose too low accounted for 18 % of all DRPs identified in this study. This finding was consistent with studies done in France (19%) [26] and Nigeria (20.9%) [8]. This may be due to, similar study design used. Conversely, dose too low accounted for higher proportion of the DRPs in studies conducted in USA (33.5%) [19], France (25.5%) [37], Pakistan (31.1%) [7] and Beirut (10%) [49]. The difference can be explained by the difference in study design used and health care setting in which the studies conducted. However this finding was higher than those found in America (15.4%) [15], Canada (7.7%) [43], (13.6%) [44], Netherlands (5.4%)[20] and Singapore (12.5%) [41].

Over-dosage was accounted for 14.5 % of all DRPs identified in this study. This finding is consistent with studies done in Canada (13.6%) [43] and Swiss (16%) [47]. Conversely, dose too high accounted for a larger proportion of the DRPs in studies conducted in USA (20.3%)[22], France (42.2%)[37], Canada (23.7%)[42], Indonesia (37.7%), Pakistan (31.1%) [7] and Beirut (28%)[49]. However, this might be an underestimate due to the lack of comprehensive

documentation at the point of admission in this study. However, this study's finding was higher than what was found in Netherlands (5%) [20], Singapore (3.1%) [41]. Inappropriate disease monitoring could be the reason for the occurrence of over dosage due to the failure of adjusting renal dosed drugs as per the renal function.

ADR was another DRP identified in the study accounting for 2% of all DRPs identified. Conversely, studies conducted in USA (20.7%) [19], India, (40%) [44] Canada (6.8%)[43], Pakistan (8.9)% [7] and Singapore (25%) [41] resulted in higher ADR of all DRPs. However, this result was higher than what was conducted in Canada (0.25%) [42]. Majority of these drug reactions were self -reported by participants. The difference in this prevalence could be explained by the fact that the other studies were carried out over long period thus could identify more ADRs over time when compared to this study which carried out over the period of six months.

In this study non-adherence was accounting for 20% of all DRPs identified. This finding is higher than the studies done in USA (16.9%), Netherlands (5.6%), [20] and India (11.1%) [58]. however lower than what was found in Canada (28%) [43] and Singapore (28.1%) [41]. These findings can be attributed to failure of the patients to understand their disease process and the benefits of adhering to medications as prescribed, the patient/caregiver prefers not to take/give the medication and the patient/caregiver forgets to take/give. Indeed, a study in France established an obvious lack of knowledge concerning CKD and its treatment objectives which led to a potential for non adherence [21]. The high number of drugs per participant as well as co morbidities could also contribute to the high prevalence of non-adherence.

In this study, cardiovascular medications 31.9%, GI medications 19.1% and analgesic 19.1% were the common drug classes involved in DRP. Similarly, the studies conducted in USA and France found that cardiovascular medications were the top ranking drug classes involved in drug related problems [19, 26], while study conducted in Netherlands indicated GI medications [16].

The identification of associated factors for DRPs is helpful in finding patients at risk. This study revealed that marital status, stage of CKD, poly-pharmacy and number of disease were found to be independent predictors for the occurrence of DRPs. Married patients were 62% times more likely to develop DRPs compared to single patients (AOR =0.383, 95% CI: 0.042-0.792,

p=0.023). This may be due to working conditions, life style and economic status of married participants. Patients who have poly-pharmacy were 4.695 times more likely to develop drug related problem as compared to patients who not took poly-pharmacy (AOR= 4.695, 95% CI: 1.370.-16.091, p= 0.014). The number of medications used was found to be a risk factor for DRPs by a number of studies conducted in France and India [26, 43].

The finding of this study showed that, patient who have ≥5 number of co morbidities were 4.695 times more likely to have DRPs than patients who have <5 co morbidities (AOR= 4.695, 95% CI: 1.370.-16.091, p= 0.014). This finding is in agreement with those studies done in USA and India [15, 44]. Possible reasons for prescribers not picking up some of the co morbidities among patients with CKD may be due to inadequate assessment time as the prescribers may be rushing toward round resulting in inadequate information transfer between the patient and the prescriber. Stage V CKD patients were 4.695 times more than other stages of CKD patients (AOR= 4.695, 95% CI: 1.370.-16.091, p= 0.014). This result is consistent with a result obtained from study conducted in Norway [5]. This was due to CKD stage 5 patients are known to suffer from numerous co morbidities and complications. As a result, the treatment needs a large number and variety of drugs, which are linked to a number of DRPs, high cost and short-term mortality [21].

There was documented pharmacist intervention or recommendation geared towards preventing or resolving identified DRPs. A total of 218 clinical interventions were undertaken at three levels of the intervention. Out of this interventions, 178(81.6%) were accepted, 174(79.8 %) were totally solved and 40(18.3%) Problems were partially solved due to Lack of cooperation of prescriber and patient. Amongst the DRPs indentified, 78.1% were successfully resolved. Conversely, study conducted in Nigeria showed the acceptance of clinical interventions was 67.54% and 7.86 % was successfully resolved [8]. This study showed the most frequent pharmacist interventions were dose adaptation, addition of drugs, drug stoppage and drug substitution. Similarly, study conducted in France reported the most frequent pharmacist interventions as adaptation of doses, addition of drugs, drug stoppage and drug substitution [26].

6.1. Limitations of the study

DRPs related to medication administration were not addressed in this study. The result of this study may not be generalized to all hospitals because it was single centered.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Conclusion

Drug-related problems are high in CKD patients. The most common DRPs found in the study were need additional drug therapy, non-adherence and dose too low. Most of interventions done by pharmacist were accepted. Marital statuses, stage of CKD, poly-pharmacy and co morbidity were independent predictors for DRPs.

7.2. Recommendations

7.2.1. Recommendations for Jimma University Medical center.

- ✓ Should implement strategies to decrease the high prevalence of DRPs among CKD patients.
- ✓ Should assign inter-disciplinary health care provider in inpatient settings to decrease the prevalence of different types of DRP among CKD patients.

7.2.2. Recommendations for Health care provider.

- ✓ Since CKD patients are at high risk to present with co- morbidities, Physicians should consider all while treating them.
- ✓ Health care provider should adhere to dose adjustment recommendations guidelines
- ✓ Physicians should prescribe essential medicines only to reduce poly-pharmacy and if possible, poly-pharmacy should be avoided.

7.2.3. Recommendations for the Patients

- ✓ All patients at high risk of developing CKD should timely screen for their stage to benefit from their drugs.
- ✓ CKD patients should adhere to their medication.

7.2.4. Recommendations for the Researcher

- ✓ Multi-centered study should be conducted to make more representative.

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58.

Annex-I: Patient Information Sheet

Name of investigator: AsterWakjira

Name of study area: Jimma University Medical Center

Research budget covered by: Jimma University

Research objective: To determine drug therapy problems and associated factors among chronic kidney disease patients admitted to JUMC, Jimma Zone, Jimma, South west Ethiopia from March – June 2018.

Study procedure: The data collectors will interview chronic kidney disease patients attending JUMC using structured questionnaires.

Risks: This study will not impose any risk on participants.

Participant's right: The patient has a full right to stop the interview at any time and not to allow review of his/her chart, or to skip any question that he/she does not want to answer.

Beneficial: The study is beneficial for patient's quality service delivery and as well as for future encounters and on spot intervention during data collection. It also shows determinant of poor treatment outcome among chronic kidney disease patients.

Incentives: Patient will not be provided any specific incentive for taking part in the research other than acknowledgment.

Confidentialities: The study result will not include patient's name, specific address and any personal details that may lead to identification of patient. The information that we collect from this research project will be kept confidential. Information that will be collected from the study will be kept under lock and key, and it will not be revealed to anyone except the principal investigator and the concerned health professional.

Agreement: Patients are expected to be fully voluntary to participate in the study.

Contact: If you want any detail information and encounter inconveniences about the study you can contact with**AsterWakjira**, Cell Phone: +251922542111 or email address: asterwakjira@gmail.com

Annex-II: Informed Consent

Name of investigator: Aster Wakjira

Research title: Drug therapy problems and associated factors among chronic kidney disease patients at Jimma University Medical Center.

Card number_____ Patient unique ID_____

1. I confirm that I understand the information sheet for the above study and have had the opportunity to ask questions.
2. I understand that my participation is completely voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.
3. I understand that my medical notes will be looked at by data collectors of this study and necessary information will be extracted. I give permission for these individuals to have access to my records.
4. I agree to take part in the above study. I would like to confirm my agreement by signing.

Participant's ID_____Signature_____date_____

Name of the data collector: _____ Signature: _____ date_____

Name of the principal investigator: _____Signature: _____ date_____

Annex III: Data collection tool

This questionnaire is prepared to collect data regarding the "drug therapy problems and associated factors among chronic kidney disease Patients in JUMC. The responses you give will be used for the sole purpose of the study and it will not be given to any third party. It is believed that the result of this study will be significant in finding solutions for the challenges of the magnitude DTPs, types of DTPs and associated factors in chronic kidney disease patients.

Thank you for your cooperation!

Identification Code:_____

Part I: Socio-demographic Characteristics

1. **Ward:_____**
2. **Card No:_____**
3. **Gender: A. Male B. Female**
4. **Weight:_____**
5. **Height:_____**
6. **Age:**
7. **Marital status:**

   A. Single B. Married C. Divorced D. Widowed
8. **Educational Status:**

   A. Illiterate B. Read and Write C.1-8 D. 9-12 E. College/ University
9. Occupation A. Farmer B. No job C. Employed D. Merchant E. others_____
10. Working condition

    A. Relaxed B. Somewhat relaxed C. Extremely relax D. Stressful

    E. Somewhat stressful F. Extremely stressful
11. Monthly Income

    A. No regular Income B. _____birr/month
12. Living condition

    A. with family B. Alone C. with friends
13. Pace of residence A .Rural B. Urban

14. Do you use any OTC medications? A.YES B.NO

If yes, please specify _____

15. Do you smoke cigarettes? A.YES B.NO

If yes, please specify the number of packs of cigarettes smoked per day_____

16. Do you drink alcohol**?** A.YES B.NO

If yes, please specify the number of drinks per day_____

17. Do you chew khat**?** A.YES B.NO

If yes, please specify _____

Part II. Information regarding kidney disease patients

18. Stage of CKD (from patient record or calculated from SCr

A.Stage I B. Stage II. C. Stage III D. Stage IV E. Stage V

19. Do you have any medical history? A, YES B,NO

If yes, please specify _____

20. Do you have any medication history (review the patient card)? A. YES B. No

If yes, please specify by reviewing patient medical records _____

_____

21. Do you have any co-morbidity (review the patient card)?

A. YES B. No

If yes, please specify by reviewing patient medical records _____

_____

22. How many years are you with the disease? _____years

Part III: Laboratory data

Tests		Result			Comment
Renal Function Test	Serum Creatinine (SCr)				
	Blood Urea Nitrogen (BUN)				
	Creatinine Clearance				
FLP	Total cholesterol (mg/dl)				
	Triglycerides (mg/dl				
	HDL-C (mg/dl)				
	LDL-C (mg/dl)				
LFT	ALT				
	AST				
	ALP				
Cardiac biomarkers	CTn				
	CK-MB				
CBC	WBC				
	RBC				
	Platelets				
	Hematocrit				
	Hemoglobin				
	MCV				
	MCH				
	MCHC				
	Neutrophils				
	Lymphocyte				
urinalysis	Proteinuria				
	Hemacturia				

	Albuminuria				
	Microalbuminuria				
	Nitrite				
	Ketone				
	Urine output				
	Casts				
	Crystals				
	Leukocyte				
	Glucose				
	Albumin				
electrolyte	Na+				
	K+				
	Mg+2				
	Ca+2				
	Cl-				
	PO4-2				
	P				
Cells	WBC				
	RBC				
	Eosinophils				
	Epithelial cells				

Please document all other laboratory result from the patient record_____

_____

_____

Part IV. Information on prescribed drugs for kidney disease patients and co morbidities

S.N^{o}	**Indications**	**Drug & Dosage Regimen** (Name, Dosage Form, Dose, Frequency)	**Start date**	**Stop date**	**Remark**

Part V. Drug therapy problem identified

1. Indication

    a) Need additional drug therapy _____

    b) Unnecessary drug therapy_____

    c)

2. **Effectiveness**

    a) Ineffective

    b) Dosage too low

3. **Safety**

a) Adverse drug reaction

b) Dosage too high

4. Compliance

a) Non-compliance

Part VI. Type of drug therapy problems

a.actual DTP b.potential DTP

Part VII .Causative factors of DRP in drug treatment process

Based on the above drug related needs identified tick on one of sub option provided under each drug related needs given**.**

1. Need additional drug therapy

a. A medical condition requires the initiation of drug therapy.

b. Preventive drug therapy is required to reduce the risk of developing a new condition.

c. A medical condition requires additional pharmacotherapy to attain synergistic effects

2. Unnecessary drug therapy

a. There is no valid medical indication for the drug therapy at this time.

b. Multiple drug products are being used for a condition that requires single drug therapy.

c. The medical condition is more appropriately treated with non-drug therapy.

d. Drug therapy is being taken to treat an avoidable adverse reaction associated with another medication

3. Ineffective drug therapy

a. The drug is not the most effective for the medical problem.

b. The medical condition is refractory to the drug product.

c. The dosage form of the drug product is inappropriate.

d. The drug product is not an effective product for the indication being treated

4. Dosage too low

a. The dose is too low to produce the desired response.

b. The dosage interval is too infrequent to produce the desired response.

c. A drug interaction reduces the amount of active drug available.

d. The duration of drug therapy is too short to produce the desired response**.**

5. Adverse drug reaction

a. The drug product causes an undesirable reaction that is not dose-related.

b. A safer drug product is required due to risk factors.

c. A drug interaction causes an undesirable reaction that is not dose-related.

d. The dosage regimen was administered or changed too rapidly.

e. The drug product causes an allergic reaction.

f. The drug product is contraindicated due to risk factors

6. Dosage too high

a. Dose is too high.

b. The dosing frequency is too short.

c. The duration of drug therapy is too long.

d. A drug interaction occurs resulting in a toxic reaction to the drug product.

e. The dose of the drug was administered too rapidly.

7. Non-compliance

a. The patient/caregiver does not understand the instructions.

b. The patient/caregiver prefers not to take/give the medication.

c. The patient/caregiver forgets to take/give the medication.

d. The drug product is too expensive for the patient.

e. The patient cannot swallow or self-administer the drug product appropriately.

f. The drug product is not available for the patient

Part VIII. Planned intervention

I0. No intervention

I1. Prescriber's level

a. Prescriber informed only
b. Prescriber asked for information
c. Intervention proposed to prescriber
d. Intervention discussed with prescriber

I2. At patient level

e. Patient (drug) counseling
f. Written information provided(only)
g. Patient referred to prescriber
h. Spoken to family member/care giver

I3. At drug level

a. Drug changed to----------
b. Dosage changed to----------
c. Formulations changed to----------
d. Instructions for use changed to----------
e. New drug started----------
f. Drug stopped----------
g. Frequency changed to----------

I4.Other intervention or activity

h. Other interventions (specify) —

i. Side effect reported to authorities

Part IX. Acceptance and Implementation of intervention (tick one box only)

A1. Intervention accepted

- **a.** Intervention accepted and fully implemented
- **b.** Intervention accepted and partially implemented
- **c.** Intervention accepted but not implemented
- **d.** Intervention accepted and implementation unknown

A2. Intervention not accepted

- **a.** Intervention not accepted, not feasible
- **b.** Intervention not accepted, no agreement
- **c.** Intervention not accepted, due to other reason(specify)
- **d.** Intervention not accepted, unknown reason

A3. Other (no information on acceptance)

- **a.**
- **b.** Intervention proposed, acceptance unknown
- **c.** Intervention not proposed

Part X. Status of DRPs (outcome of intervention)

O0.problem status unknown

O1. Problem totally solved

O2. Problem partially solved

O3.Problem not solved

- **a.** Lack of cooperation of patient
- **b.** Lack of cooperation of prescriber
- **c.** Intervention not effective
- **d.** No need or possibility to solve problem

Part IX.Morisky Medication Adherence Scale (MMAS-8)			
S. No.	**Questions**	**Yes**	**No**
1	Do you sometimes forget to take your pills?		
2	People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?		
3	Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?		
4	When you travel or leave home, do you sometimes forget to bring along your medicine?		
5	Did you take all your medicine yesterday?		
6	When you feel like your symptoms are under control, do you sometimes stop taking your medicine?		
7	Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?		
8	How often do you have difficulty remembering to take all your medicine? Never/ Rarely….. Once in while….. Sometimes..… Usually…... All the time……		

Level of adherence -High adherence=0 medium adherence=1, 2 low adherence>=3

Naranjo Adverse Drug Reaction Probability Scale					
Question		Yes	No	Do not know	score
1	Are there previous conclusive reports on this reaction?				
2	Did the adverse event appear after the suspected drug was administered?				
3	Did the adverse reaction improve when the drug was discontinued or a specific antagonist was administered?				
4	Did the adverse event reappear when the drug was re-administered?				
5	Are there alternative causes (other than the drug) that could on their own have caused the reaction?				
6	Did the reaction reappear when a placebo was given?				
7	Was the drug detected in blood (or other fluids) in concentrations known to be toxic?				
8	Was the reaction more severe when the dose was increased or less severe when the dose was decreased?				
9	Did the patient have a similar reaction to the same or similar drugs in any previous exposure?				
10	Was the adverse event confirmed by any objective evidence?				

Score **Probable ADR=5-8** **Possible ADR =1-4** **Doubtful ADR =0**

Wabii I.Shiittii Ragaa yaallama

Maqaa qorataa: Aster wakjira

Qorannoon bakka itti geggeeffamu: Giddu-gala yaalaa Yuunivarsiitii Jimmaa

Baasi qorannoo kan danda'u:Jimmaa Yuunivarsiitii

Kaayyoo qorannoo: Yaalamtoota dhibee kalee kan Giddu-gala yaalaa Yuunivarsiitii Jimmaatti yaalaman irratti qorannoo waa'ee Rakkoolee yaala qorichaa fi sababoota kanaan wal-qabatan murteessu ta'a.

Duraa duuba qorannoo: Ragaa walitti qabdoonni gaafii duuraan duurse qopha'e fayyadamuun Yaalamtoota dhibee kalee Kan Giddu-gala yaalaa Yuunivarsiitii Jimmaatti yaalamaa jiran irraa afaanin gaaffii fi deebi ni adeemsiisu.

Miidhaa Qorannichaa: Qorannoon Kunmiidhaa kamiyyuu yaalamaa irraan hin gahu.

Mirga yaalamaa: Yaalamaan yeroo kamiyyuu gaaffii fi deebii addaan kutuus ta'ee galmeen yaalaa dhuunfaa isaanii akka hin ilaalamne taasisuu ykn gaaffii deebisuu hin barbaanne irra darbuu mirga qaba.

Faayidaa qorannichaa: qorannoon Kun yaalamtootaaf yaala qulqullina qabu kennuurratti gahee guddaa qaba. Akkasumas bu'aa gad-aanaa yaala dhibee kalee dhukkubsattoota dhibichaa irratti mul'atu akka daangessu agarsiisa.

Onnachiiftuu: Yaalamtootni qorannoo kanarratti waan hirmaataniif galataan ala kanfaltiin argatan hin jiru.

Iccitummaa: Bu'aan qorannoo kanaa; maqaa yaalamaa, teessoo fi gaaffii gadi fageenyaa eenyummaa Nama qorannicharratti hirmaate ibsuu fi raga iccitii baasu hin hammatu. Ragaan qorannoo kanaaf jedhamee walitti qabamu iccitaawaa fi of eeggannoon kan qabamu ta'ee qorataa fi ogeeyyii fayyaa dhimmi kun ilaallatuun ala eenyumaafuu hin ibsamu.

Waliigaltee: Yaalamtootni dhibee kalee qorannicha irratti hirmaatan guutumaan guututti fedhiin hirmaatu jedhamee amanama.

Qunnamtii: waa'ee qorannichaa ilaalchisee ibsa gahaa yoo barbaaddan ykn wanti isinitti hin tolle yoo jiraate lakk. Bil. +251922542111 ykn karaa email **asterwakjira@gmail.com** **tiin Addee Asteer Gaafachuu dandeessu**

Wabii II: Hubatanii Itti walii galuu

Maqaa qorataa: Asteer Waaqjiraa

Mata-duree Qorannoo: Yaalamtoota dhibee kalee Kan Giddu-gala yaalaa Yuunivarsiitii Jimmaatti yaalaman irratti qorannoo waa'ee Rakkoolee yaala qorichaa fi sababoota kanaan wal-qabatan

Lakk. Kaardii_____ koodii addaa Yaalamaa_____

1. Shiittii Ragaa Yaalamaa qorannoof qophaa'e waanan hubadheef carraa gaaffii gaafachuu qabaachuu koo nan mirkaneessa.
2. Guutumaan guututti fedhii kootiin waanan irratti hirmaadheef, yeroon barbaadetti sababa tokko malee osoo mirgi yaalamuu Koos ta'ee kan biroo osoo hin sarbamin akkan adda kutuu danda'u hubadheera.
3. Guutumaan guututti waanan hubadheef raga funaantonni kaardii yaalaa koorraa ragaa yaalaa qorannoof barbaachisu akka fudhatan eeyyameera.
4. Qorannicha irratti hirmaachuuf walii galuu koo mallattoo koonan mirkaneessa

Eenyummaa hirmaata_____mallattoo_____Guyyaa_____

Maqaa ragaa funaanaa_____mallattoo_____Guyyaa_____

Maqaa qorataa _____mallattoo_____Guyyaa_____

Wabii III.Guca odeeffannon ittiin funaannamu

Unka Gaafii fi deebii waa'ee ragaalee dhimma rakkoolee yaala qorichaa fi sababoota ittin wal qabatan yaalamtoota dhibee kalee qaban Kan Gidduugala yaalaa Yuunivarsiitii Jimmaatti yaallaman irraa guuruuf qophaa'edha. Deebiin isin laattan qorannoof qofa kan fayyaduu fi guutummaan iccitaawaadha. Bu'aan qorannoo kanaa olaanaa fi furmaata hammaa fi gosoota rakkoolee yaala qorichaa akkasumas sababoota rokkoolee kanaaf galtuu ta'an kan yaalamtoota dhibee kalee irratti mul'ataniif fala ta'a jedhamee amanama. Fedha keessaniif dursinee sin galateeffanna.

Koodii Addaa_____

Kutaa I. :Waa'ee nama deebii kennaa/kennituu ilaalchise

1. Saala deebii kennaa:
   1. Dhiira 2. Dubartii
2. Umrii: waggaa _____dha.
3. Teessoo:
   1, magaalaa 2, baadiyyaa
4. Amantaa:
   1. Ortoodoksii, 2 Musiliima
   3. Pirootestaantii 4. Kan biro yoota'e ibsaa_____
5. Haala maatii:
   1. Hin heerumne 2. kan heerume 3. Kan hiike 4. Kan irraa du'e
6. Haala Barnootaa:
   1. Dubbisuu fi bareessuu hin danda'u 2. Dubbisuu fi bareesuu ni danda'a
   3. Sadarkaa tokkoffaa (Kutaa 1-8) 4. Sadrkaa lammaffaa (Kutaa 9-12)
   5. Waraqaa Ragaa fi dippiloomaa (TVET) 6. Digirii fi isaan ol
7. Haala Hojii:
   1. Ni cima 2. Hamma ta'e ni cima 3 Baay'ee ni cima
   2. 4. Salphaadha5 hammata'e salphaadha. 6. Baay'ee salphaadha

8. Tilmaama gidduu galeessaa galii maatiisaanii (qarshiidhaan) _____
9. Haala jireenyaa:
    1. Maatii waliin 2. Hiriyaa waliin 3. Kophaa
10. Ajaja ogeessaan ala qoricha ni fayyadamtuu? A, eeyyen B. miti
11. Gaaffii lakk. 12f Deebiin keessan eeyyen yoo ta'e, ibsaa_____
12. Tamboo ni aarsituu? A, eeyyen B. miti
13. Gaaffii lakk. 12f Deebiin keessan eeyyen yoo ta'e, guyyaatti meeqa aarsitu ibsaa_____
14. Dhugaatii alkoolii Ni fayyadamtuu? A, eeyyen B. miti
15. Gaaffii lakk. 14f Deebiin keessan eeyyen yoo ta'e, guyyaatti meeqa dhugdu? ibsaa_____
16. Jimaa ni qamatu?
17. Gaaffii lakk. 16f Deebiin keessan eeyyen yoo ta'e, guyyaatti yeroo meeqa qamatu? ibsaa_____
18. Dhibee keessan yaalamuudhaaf dawaan jalqabaa filattan maalidha?
    1 Dawaa/qorichaa aadaa mukkeen biyyaa keessaatti argaamu
    2 Xabala
    3 Dawaa/qoriichaa ammayyaa
    4 Kan biro yoo ta'e ibsaa_____

ቅጥያ I.የታካሚ መረጃ ሺት

የአጥኚ ስም፡-አስቴር ዋቅጅራ

ጥናቱ የሚካሄድበት ቦታ ስም፡- ጅማ ዩኒቨርሲቲ ህክምና ማዕከል

የጥናቱን በጀት የሚሸፍን፡-ጅማዩኒቨርሲቲ

የጥናቱ አላማ፡-በጅማ ዩኒቨርሲቲ ሕክምና ማዕከል ሕክምናቸውን የምከታተሉ የኩላሊት ታካምዎች የመድኃኒት ህክምና ችግሮችና ተያያዥ መንስዔዎችን መወሰን ይሆናል፡፡

የጥናቱ ቅደም ተከተል፡-መረጃ ሰብሳቢዎቹ ቀድሞ የተዘጋጀዉን ቃለ-መጠይቅን ተጠቅሞ በጅማ ዩኒቨርሲቲ ሕክምና ማዕከል ሕክምናቸውን የምከታተሉ የኩላሊት ታካምዎችን ቃለ መጠይቅ ያደርጉላቸዋል፡፡

የጥናቱ ጉዳት፡-ይህ ምርምር ምንም አይነት ጉዳት በተሳታፊ ላይ አያደርስም፡፡

የተሳታፊዎች መብት፡-ታካሚ በማንኛውም ጊዜ ቃለ መጠይቁን የማቋረጥም ሆነ የህክምና ማህደራቸው እንዳይታይ የማድረግ ወይም መመለ ስያልፈለገዉን ጥያቄ የመተው መብት አላቸው፡፡

የጥናቱ ጥቅም፡-ጥናቱ ለታካሚዎች ጥራት ያለውን ሕክምና ከመስጠት አንጻር የጎላ ጥቅም አለው፡፡እንዲሁም ዝቅተኛ የኩላሊት ሕክምናን ውጤትን በኩላሊት ህሙማን ለመወሰን ያሳያል፡፡

ማትግያ (ጉርሻ)፡-ታካሚዎች በዝህ ጥናት በመሳተፋቸው ከምስጋና ሌላ የገንብ ክፍያ (ጉርሻ) አያገኙም፡፡

ምስጥራዊነት፡-የጥናቱ ውጤት የታካሚዉን ስም፣አድራሻና ማንኛውን ምጥልቅና ማንነትን የሚገልጽ ዝርዝር መረጃ አያካትትም፡፡ከዝህ ጥናት የሚሰበሰብ መረጃ ፈጽሞ ምስጥርና በጥንቃቄ የሚያዝ ሆኖ ከአጥኚና ከሚመለከታቸው የጤና ባለሙያዎች ዉጪ ለማንም ግልፅ አይደረግም፡፡

ስምምነት፡የህመሙ ታካሚዎች በጥናቱ ለመሳተፍ ሙሉ በሙሉ ፍቃደኞች ናቸው ተብሎ ይታመናል፡፡

መገናኛ፡ዝርዝር መረጃ በምፈልጉበትና ስለጥናቱ ያልተመቸዎት ነገር በሚኖርበት ጊዜ በስልክ ቁጥር +251922542111

ወይም በኢሜይል አድራሻ asterwakjira@gmail.com አስቴርን ማግኘት ይችላሉ፡

ቅጥያ II- ተረድቶ መስማሚያ

የአጥኚስም፡-አስቴር ዋቅጅራ

የጥናቱርእስ፡በጅማ ዩኒቨርሲቲ ሕክምና ማዕከል ሕክምናቸውን የምከታተሉ የኩላሊት ታካምዎች የመድኃኒት ህክምና ችግሮች ናተያያዥ መንስዔዎች

ካርድቁ.ጥ----------የታካሚ ልዩ መታወቂያ----------

1. ለጥናቱ የተዘጋጀዉን የመረጃ ሺት ስለተረዳው ጥያቄዎችን የመጠየቅ እድል እንዳለኝ አረጋግጣለው፡፡
2. ሙሉ በሙሉ በፍቃደኝነት ስለተሳተፍኩ ፣በፈለኩ ጊዜ ያለምንም ምክንያት የህክምናም ሆነህ ጋዊ ሙብቴ ሳይጣስ እንደማቋርጥ ተረድቻለው፡፡
3. ሙሉ በሙሉ ስለስለተረዳው መረጃ ሰብሳቢዎች ከህክምና ማህደሬ ለጥናቱ የሚያስፈልገውን መረጃ እንዲወስዱ የህክምና ማህደሬን እንድያገኙ ፈቅጃለው፡፡
4. በጥናቱ ለመሳተፍ መስማማቴን በፊርማዬ አረጋግጣለው፡፡

የተሳታፊ መታወቅያ----------ፊርማ----------ቀን--------

የመረጃ ሰብሳቢው ስም----------ፊርማ----------ቀን----------

ጥናቱን የሚያካሄድ----------ፊርማ----------ቀን

ቅጥያ III. መጠየቂያ ቅፅ

ይህ መጠየቂያ ቅፅ ስለመድኃኒት ህክምና ችግሮችና ተያያዥ መንስዔዎችን በጅማ ዩኒቨርሲቲሕክምና ማዕከል ሕክምናቸውን ከምከታተሉ የኩላሊት ታካምዎች መረጃ ለማሰባሰብ የተዘጋጀ ነው፡፡ የምትሰጡት መልስለም ርምር ብቻ የሚውል ሲሆን ምስጥራዊነቱ የተጠበቀ ነው፡፡ የዚህ ምርምር ዉጤት ከጠቃሚነቱ ምበተጨማሪ ለኩላሊት ሕሙማን የመድኃኒት ሕክምና ችግሮችና ተያያዥ መንስኤዎቹ መፍቴና እንደግብዓት የሚያገለግል ነው ተብሎ ይታመናል፡፡

ለትብብርዎ አስቀድመን እናመሰግናለን

ልዩኮድ----------

ክፍል ፡ **የተሳታፊ ሰው መረጃ**

5. ፆታ 1. ወንድ 2. ሴት
6. ዕድሜ----------
7. አድራሻ 1. ከተማ 2. ባላገር
8. ሐይማኖት 1. ኦርቶዶክስ 2. እስላም3.ፕሮቴስታንት 4. ሌላ----------
9. የቤተሰብሁኔታ

   1.ያላገባ 2.ያገባ 3.የተፋታ 4.የሞተበት
10. የትምህርትሁኔታ

    1.ማንበብና መጻፍየማይችል 2. ማንበብናመጻፍየሚችል 3. አንደኛደረጃ

    4.ሁለተኛ ደረጃ 5. ዲፕሎማ6.ድግሪናከዛበላይ

11. የሥራ ሁኔታ

    1. ከባድ 2.በመጠኑከባድ 3.በጣም ከባድ 4.ቀላል 5.በመጠኑ ቀላል 6. በጣም ቀላል
12. .አማካኝ ወራዊየገቢግምት(ብር)----------
13. የኑሮሁኔታ

    1. ከቤተሰብጋር 2. ከጓደኛጋር 3. ለብቻ
14. ከባለሙያትዕዛዝውጪመድኃኒትይጠቀማሉ? 1. አዎ 2. አይደለም
15. ለጥያቄቁ.ጥ 12 መልስዎአዎከሆነ፣ ያብራሩ----------
16. ስጋራያ ጨሳሉ ? 1. አዎ 2. አይደለም
17. ለጥያቄቁ.ጥ 14 መልስዎ አዎ ከሆነ፣ በቀን ስንት ጊዜ ያጨሻሉ፤ ያብራሩ----------
18. የአልኮል ይዘት ያላቸውን መጠጦች ይጠቀማሉ? 1. አዎ 2. አይደለም
19. ለጥያቄቁ.ጥ 16 መልስዎ አዎ ከሆነ፣ በቀን ምን ያህል ይጠጣሉ፤ ያብራሩ----------