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Predictors of functional status and disability among patients living with chronic kidney diseases at St Paul's hospital millennium medical college, Ethiopia: findings from a cross-sectional study

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Abstract

Background The rise in risk factors like obesity, hypertension, and diabetes mellitus has partly led to the increase in the number of patients affected by chronic kidney disease, affecting an estimated 843 million people, which is nearly 10% of the general population worldwide in 2017. Patients with CKD have an increased risk of functional difficulties and disability. This study aimed to assess the level of functional status and disability and its associated factors among patients with chronic kidney attending Saint Paul Hospital, Millennium Medical College, Addis Ababa, Ethiopia.

Methods An institution-based cross-sectional study was conducted with 302 enrolled study participants through systematic random sampling techniques. Face-to-face interviews and chart reviews were used to collect data using a semi-structured questionnaire adapted from works of literature. The Health Assessment Questionnaire Disability Index (HAQ-DI) was used to assess the functional status and disability of the participants. Data was entered into EPI info version 7 and exported to SPSS version 23 for analysis. Bivariate logistic regression analysis was employed with a p-value less than 0.25. Finally, those variables with a p-value less than 0.05 in multivariate analysis were taken as statistically significant.

Results A total of 219 (72.5%) CKD patients had moderate to severe functional limitation and disability (HAQ-Di > 0.5-3). Age > 50 years [AOR = 1.65; 95% CI (1.23, 3.15)], being at stage 2 and 3 CKD [AOR = 4.05; 95% CI (1.82, 9.21), being at stage 4 and 5 CKD [AOR = 2.47; 95% CI (1.87, 4.72)], and having MSK manifestations [AOR = 2.97; 95% CI (1.61, 5.55)] were significantly associated with functional status and disability.

Conclusion The findings of this study suggest that CKD-associated functional disabilities are common. The advanced stage of CKD, higher age, and presence of musculoskeletal manifestations appear to be important variables predicting

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self-reported functional status. Healthcare professionals treating CKD shall be vigilant about the CKD-associated disability, the modifiable predictors, and interventions to limit the CKD-related disability.

Keywords Chronic kidney disease, Disability, Functional status, Predictors, Musculoskeletal diseases

Background

The rise in risk factors like obesity, hypertension, and diabetes mellitus has partly led to the increase in the number of patients affected by chronic kidney disease (CKD), affecting an estimated 843 million people which is nearly 10% of the general population worldwide in 2017 [1]. The Global Burden of Disease (GBD) studies reported that the findings from 1990 to 2019 have demonstrated that CKD has emerged as one of the major global causes of mortality, and the global all-age death rate attributed to CKD increased by 41.5% between 1990 and 2017. Besides, CKD is also the 12th leading cause of years of life lost (YLL) and is predicted to become the 5th highest cause of YLL globally by 2040 [2, 3].

The number of people who suffer from kidney disease is rising globally and is predicted to keep rising [4]. Literature reports that the prevalence of stage 3 CKD is estimated to be between 11 and 13% [5]. Among the adult population living in Western, Middle, Eastern, Southern, and Northern Africa, the prevalence of CKD was estimated to be 19.8%, 16.0%, 14.4%, 10.4%, and 6.1%, respectively, and equivalent figures were higher at 32.3% among high-risk population (diabetes, and hypertension) [6]. According to the World Bank health data (2019) for CKD stratified by global regions, the age-standardized prevalence and disability-adjusted life years (DALYs) per 100,000 people were 11.5% and 790, respectively, in Africa [6, 7]. A systematic review (2022) of 12 regional studies involving individuals with diabetes mellitus, hypertension, and HIV reported that the prevalence rate ranged from 12.2 to 38.9% in Ethiopia [8]. Further, it is important to recognize that the estimates of CKD were based on patchy surveillance data, and little is known about the scale, complications, and outcomes associated with CKD in the Sub-Saharan Africa region.

Like most developing countries in the world, Sub-Saharan African countries are witnessing an uptrend in individuals needing dialysis therapy [2, 9]. CKD patients are affected by symptoms related to their renal disease, comorbid, accelerated aging, and treatment options, which can compromise their quality of life [5]. Studies report that multi-factors like treatment-related issues, weakness, severity or stage of the disease, low level of energy, poly-medication, cognitive impairments, fatigue, physical frailty, and low activity level are often associated with functional limitations and disability among CKD patients [10–12]. Predicting the outcomes of CKD and its treatments [13] is a vital part of clinical care, decision-making, and more importantly resource allocation in developing countries. Disability among CKD patients is a key factor in determining the treatment outcome and quality of life. Most often, kidney failures occurs during the late middle and old age, so problems like musculoskeletal manifestations, cognitive impairment, and incontinence can further increase the likelihood of experiencing a decline in physical functions [11, 14–16]. Further, even early stages of CKD can cast up 5 or more years into the aging process; hence, CKD is often known as the model of accelerated aging [17]. Addressing functional status among this population warrants better insight into their disability index, pattern of functional decline, and determinants to be manipulated to improve their functional status [12, 16]. Measuring self-reported disability using a standardized tool will provide a measure of physical function among patients with CKD and also an insight into the variables that are associated with disability [13, 18]. It is therefore, essential to investigate the functional status and associated predictors based on different psycho-social contexts to improve functional independence and decision-making in managing CKD patients.

Almost all the epidemiological studies on CKD in the region [8, 19–21] have focused on exploring the relationship between the determinants of CKD, predictors of mortality in this population, and clinical characteristics. Seldom efforts were made to address the functional status, disability index, and the predictors of CKD in the country. The increasing trend of CKD prevalence in Africa and the sub-Saharan region is known. With the improvement of health care and renal care facilities in Africa, research emphasizing the measure of function and associated clinical characteristics will immensely improve the understanding of the activity limitation domain among this population. Hence, this study aimed to determine the functional status and disability index among patients visiting the renal unit of St. Paul's Hospital Millennium Medical College (SPHMMC) and identify the predictors of functional status and disability.

Materials and methods

Study setting, study design, and population

The St. Paul's Hospital Millennium Medical College (SPHMMC) under the Federal Ministry of Health is located in Addis Ababa, Ethiopia. The hospital has been providing health care since 1969 for a wide spectrum of diseases and health conditions. An estimated 500,000 people are referred from all over the country and are served annually. The renal unit of the SPHMMC is the

only established public renal care facility for renal transplants since 2015, providing comprehensive inpatient and outpatient care [22].

According to the data from the Ministry of Health, Health Information Centre, approximately 7500 CKD patients visit the hospital annually to the Urology department. Based on the previous year's registry, about 1400 adult patients are estimated to visit the renal unit during the study period (March to May 2021). An institutional-based cross-sectional study was designed and conducted. All patients with chronic kidney disease and attending the renal unit of the SPHMMC were the source population. Patients with CKD with diagnosed psychiatric conditions, cerebrovascular accidents, lung diseases, history of trauma, and surgery during the recall period were excluded.

Sample size determination and sampling technique

The power calculated sample required was calculated using Epi info version 7, with the following assumptions for the single population proportion formula [23]: estimated population 1900, assumed prevalence 50% (since no similar studies), 5% margin of error at 95% confidence interval. The derived sample size was $n=352$, with a 10% contingency; the final sample size was $n=334$. A systematic random sampling method was used to recruit eligible participants. The sampling fraction (K^{th}) was $(K=1900/352)=5.4$, which was rounded to 5. Since all the patients in the renal unit visit the hospital based on the appointment, from the patients listed in the register, the first participant was selected from the first to fifth listed participants, and then the next 5th participant was approached every day.

Data collection tools and procedure

The socio-demographic, behavioral, comorbid factors, and clinical data were recorded through face-to-face interviews and from the patient medical charts. A semi-structured questionnaire was formed using a literature review [10, 11, 13, 15] and used for recording socio-demographic data such as age, gender, educational attainment, marital status, body mass index (BMI), and family income (Appendix 1). Behavioral factors like alcohol intake, smoking habits, and physical exercise were recorded using self-reported questions. Clinical data like duration of CKD, stage of CKD, hemodialysis, duration of hemodialysis, presence of co-morbid conditions, hyperuricemia, C-reactive protein (CRP: categorized < 3, 3 to 5 and > 5 mg/dL), serum 25-hydroxy vitamin D (< 20 ng/mL, 20–29 ng/mL, and ≥ 30 ng/mL), serum calcium level (< 8.4 versus ≥ 8.4 mg/dL) and parathyroid hormone levels [24] were recorded from patients medical charts, which is the most recent one. CKD is defined as the presence of albuminuria or glomerular filtration rate (GFR) of < 90 mL/min/1.73 m^2 in two separate measurements within 3 months. Musculoskeletal manifestation is operationally defined as the presence of conditions like joint pain, muscle cramps, joint pain, tenosynovitis, and swelling in extremities. The Health Assessment Questionnaire Disability Index (HAQ-DI) was used to assess the functional status and disability index of the participants [25]. The HAQ-DI is a standard patient-reported outcome measure, containing 8 sections with questions representing 20 activities of daily life: dressing, arising, eating, walking, hygiene, reach, grip, and activities carried out daily. Each question or activity is scored from 0 to 3 (0 without any difficulty, 1 with some difficulty, 2 with much difficulty, and 3 unable to do). The scores are average into 0 to 3 scores of overall HAQ-DI.

This study was conducted following the Declaration of Helsinki, and written informed consent was obtained from all the participants; for participants with no formal education or illiterates the informed consent was obtained from a parent and/or legal guardian. The study was proposed, presented to, and approved by the Institutional Ethical Review Board of Mekelle University. This study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [26] (Appendix 2).

Data processing and analysis

Data was entered into EPI info 7 and then exported and analyzed using SPSS version 23 software. The normality of the distribution of the observed continuous variables was tested using the Shapiro-Wilk test. The participant's socio-demographic characteristics were expressed as frequencies, percentages, and proportions for categorical variables. The continuous variables were presented as mean (standard deviations) or median (interquartile range). The dependent variable ''CKD associated disability" based on HAQ-Di score was categorized as ''no or mild disability" (0 to 0.5) and moderate or severe disability (> 0.5 to 3.0) [27]. The variables in the univariate model included age, gender, educational status, marital status, BMI, physical activity, smoking habit, alcohol habit, family income/month in ETB, duration of CKD, stage of CKD, hemodialysis, duration of hemodialysis, presence of co-morbid, hyperuricemia, CRP level, diabetes mellitus, diabetes mellitus & hypertension, hypertension, cardiovascular diseases (CVD) and musculoskeletal manifestations. Variables associated with HAQ-DI scores with p values below 0.25 were considered to be potential predictors. The results were considered statistically significant when the 95% confidence intervals did not contain unity (equal to p-value < 0.05), for the main and interaction effects. The fit of the model was tested using the Hosmer-Lemeshow goodness-of-fit

and multi-collinearity diagnostic was performed with the variance inflation factor < 10 as the cut-off. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 21 for Windows (SPSS Inc, Chicago, IL, USA).

Results

Socio-demographic and behavioral characteristics of patients with chronic kidney disease

A total of three hundred and fifty-two out-patients who visited the renal unit of SPHMMC were invited to participate in this study, and three hundred and two ($n=302$) eligible respondents consented to participate. The response rate was 85.8%, which is about 94% of the power-calculated sample size, and the common reasons for non-responses were not interested, feeling tiresome, and constrain of time.

The mean age of the study participants was 44 ± 15.03 years. One hundred and thirty-one (43.4%) of the study participants are under the age group of 35–50. More than half of the participants 167 (55.3%) are male and most of the participants 190 (62.9%), were married. Of the total 302 respondents, most of the participants 243 (80.5%) reported no history of smoking. Ninety-seven (32.1%) of the total 302 respondents reported alcohol habits, and almost all of the respondents 280 (92.7%) reported not performing regular physical exercise. One hundred and sixty-seven (55.3%) of the study participants had a family income of < 5000 Ethiopian Birr (ETB) per month. A detailed descriptive analysis of the study variables is presented in Table 1.

Table 1 Socio-demographic characteristics of the CKD patients at St Paul's Hospital Millennium Medical College (SPHMMC), Addis Ababa ($n=302$)

Variables	Descriptive statistics
Age (years)	
Mean (SD), 95% CI	44.06 (15.31), 42.33–45.79
Age group, n (%)	
< 35 years	88 (29.1)
35–50 years	131 (43.4)
> 50 years	83 (27.5)
Gender (male), n (%)	167 (55.3)
Educational attainment n (%)	
No formal schooling	60 (19.9)
Primary level	20 (6.6)
Secondary level	99 (32.8)
University level	123 (40.7)
Marital status n (%)	
Married	190 (62.9)
Single	72 (23.8)
Divorced/widowed/separated	40 (13.2)
Occupation n (%)	
Farmer/labor	101 (33.5)
Own business	63 (20.8)
Professional/Clerical	59 (19.5)
Unemployed/retired	79 (26.2)
Smoking habit (yes), n (%)	59 (19.5)
Alcohol habit (yes), n (%)	97 (32.1)
BMI	
Mean (SD)	23.66 (3.48)
Median (IQR)	23.68 (20.88, 25.55)
Family income/month in ETB	
Mean (SD)	5340.5 (1526)
Median (IQR)	4200 (2675, 6500)
Family income/month in ETB, n (%)	
< 5000 ETB	167 (55.3)
5000–10,000 ETB	103 (34.1)
> 10,000 ETB	32 (10.6)

ETB – Ethiopian birr, SD – Standard deviation, IQR – Inter-quartile range, CI – Confidence interval

Clinical characteristics and PROM-patient-reported outcome measure scores (HAQ-Di, VAS) among the CKD patients

Among the total of the study participants, 157(52%) were stage 2 and 3 CKD patients. One hundred and eighty-six (61.6%) of the participants did not take hemodialysis. Hypertension was the most recorded 140 (46.4) co-morbid condition. Around 77 (25.5%) of the participants had diabetes mellitus, 49 (16.2%) of them had CVD, and 36 (11.9%) of the respondents had hyperuricemia. Among the total of 302 study participants (89.1%) had CRP levels > 5 mg/l. We observed that 177 (58.6%) of participants had musculoskeletal manifestations. One hundred and thirty-four (44.4%) of the study subjects had Moderate pain with the VAS scale. This study showed that a total of 219 (72.5%) CKD Patients had Moderate to severe functional limitation and disability (HAQ-Di > 0.5-3) Table 2.

Sub-group analysis

A sub-group analysis was conducted between the three categories of CKD stages (stage 1, stages 2–3, and stages 4–5). The independent (predictor) variables that were significantly different between the stages of the CKD group were pain category, HAQ-Di category, age group, self-reported musculoskeletal manifestations in the past 7 days, mean age, and mean score of VAS (Appendix 3).

Factors associated with functional status and disability in CKD patients

In bivariate logistic regression analysis, functional status and disability were significantly associated with sex, age, marital status, Stage of CKD, CRP level, musculoskeletal manifestation, presence of comorbidities, hypertension and DM, hyperuricemia, and hypertension. In multivariate logistic regression analysis, disability was significantly associated with Age > 50 years [AOR = 1.65; 95% CI (1.23, 3.15)], stages 2 and 3 CKD [AOR = 4.05; 95% CI (1.82,

Table 2 Clinical characteristics and PROM-patient-reported outcome measure scores (HAQ-Di, VAS) among the CKD patients at St Paul's Hospital Millennium Medical College (SPHMMC), Addis Ababa ($n=302$)

Variables	Descriptive statistics
Stage of CKD, n (%)	
Stage 1	69 (22.8)
Stages 2 & 3	157 (52)
Stages 4 & 5	76 (25.2)
Chronicity of CKD, mean SD	4.7 ± 1.6
Dialysis, (yes) n (%)	116 (38.4)
Comorbidities, (yes) n (%)	198 (65.6)
Diabetes mellitus	77 (25.5)
Diabetes mellitus & Hypertension	46 (15.2)
Hypertension	140 (46.4)
CVD	49 (16.2)
Hyperuricemia, (yes) n (%)	36 (11.9)
CRP mg/dL, median (IQR)	17 (9, 17)
≤ 5 mg/dL	33 (10.9)
> 5 mg/dL	269 (86.4)
Musculoskeletal manifestations, (yes) n (%)	177 (58.6)
PROM	
Pain VAS, 0–10 cm, median (IQR)	6.4 (4.4, 8.1)
Pain category n (%)	
No pain	12 (4.0)
Mild pain	46 (15.2)
Moderate pain	134 (44.4)
Severe pain	110 (36.4)
HAQ-Di, 0–3, median (IQR)	1.0 (0.50, 1.87)
No & mild disability (HAQ-Di, 0–0.5) n (%)	83 (27.5)
Moderate & severe disability (HAQ-Di > 0.5-3) n (%)	219 (72.5)

CRP - C-reactive protein, CVD – Cardio-vascular disease, VAS – Visual Analogue Scale, SD- standard deviation, IQR – Interquartile range

9.21), stages 4 and 5 CKD [AOR=2.47; 95% CI (1.87, 4.72)], and having MSK manifestations [AOR=2.97; 95% CI (1.61, 5.55)]. (Table 3). The interaction effect of stages of CKD and common comorbidities like diabetes mellitus, and hypertension were not significantly associated with the disability.

Discussion

To the best of our knowledge, this is the first study to describe the functional status of CKD patients in Ethiopia. The present study also recruited patients from a governmental hospital with an established public renal care facility and the largest capacity renal center in the country. The present study observed that CKD was associated with moderate to severe disability among 72.5% of patients. Age above 50 years, higher stages of CKD, and presence of musculoskeletal manifestations were independent predictors of worse functional status and self-reported disability based on the HAQ-Di score.

CKD has a definitive negative impact on the patient's functional status and disability rate; the findings of this study are affirmative of it, and the proportion of CKD-associated disability was higher than the rate reported elsewhere among CKD patients. However, the prevalence of disability associated with CKD varied substantially (23.4–81.7%) across studies [10, 11, 13, 17, 28], because the type of disability differs based on the coexisting conditions in the CKD patients. For instance, arthritis is most often associated with impaired mobility, and a cardiovascular condition affects aerobic capacity. Hence, the multiple manifestations of CKD, like anemia, hyperuricemia, bone de-mineralization, diabetes, and hypertension may not allow the determination of the single effect of CKD on disability. Further, the different measures of disability used in the previous studies to measure limitations of activities of daily life (ADL), work-related disability, and instrumental ADL may have resulted in variation. Further, a systematic review reported that several unique instruments were used to measure functional status or CKD-associated disability in the studies; the authors found that 26 unique instruments were used across 30 studies included in their review, and the consensus of data may not make sense.

According to the GBD 2016, the DALYs due to CKD globally have increased from 0.88 to 1.47%, while the DALYs contributed by CKD have come down in most high-income countries [5]. Notably, the rise in DALYs was reported to be driven by the increased burden of CKD in low socio-demographic Index (SDI) countries. Further, the lack of regional (Ethiopia) studies reporting disability index and musculoskeletal manifestations among CKD patients did not permit comparing and contrasting regional findings related to disability index in CKD [20, 22, 29, 30]. Nevertheless, 58.6% of patients reported experiencing at least one or more musculoskeletal mnifestations in this study. Though various global studies reported on musculoskeletal manifestations among CKD, the operational definition varied widely: 38% chronic muscle pain, 83% arthralgia, 69% joint pain, musculoskeletal symptoms 76.4%, and pain in the limbs 61%. The proportion of MSK manifestation reported in these studies ranges from 38 to 83% [31, 32]. Researchers report that low levels of circulating 25-hydroxyvitamin D among CKD patients will affect the muscle metabolic pathway and correlate with clinical symptoms and muscle morphological changes [33].

Furthermore, the MSK manifestations among CKD are reported to be a cluster effect of advanced age, stage of the disease, and longer dialysis period. Though gouty arthritis and hyperuricemia were reported to be strongly associated with the incidence of MSK this study had only 11% of CKD patients with hyperuricemia [34]. It is not surprising to observe the significant association of higher

Table 3 Logistic regression models examining associations between disability (Health Assessment Questionnaire (HAQ-Di) categorized as 'no/mild disability' versus 'moderate/severe disability'), and predictor variables ($n = 302$)

Variables	Univariable		Multivariable	
	OR (95% CI)	*P*	OR (95% CI)	*P*
Sex				
Female	1 (ref)			
Male	1.152 (0.69, 1.92)	0.18 †	1.84 (1.50, 2.95)	0.78
Age group				
< 35 years	1 (ref)	0.009†		
35–50 years	0.87 (0.49, 1.56)		0.54	
> 50 years	2.62 (1.22, 5.61)		1.65 (1.23, 3.15)	**0.03**
Marital status				
Married	1 (ref)	0.16 †		
Single	1.19 (0.55, 2.56)		0.45 (0.18, 1.13)	0.08
Divorced/widowed/separated	1.67 (1.21, 2.15)		0.87 (0.35, 2.11)	0.75
Stage of CKD				
Stage 1	1 (ref)	0.00 †		
Stages 2 & 3	3.44 (1.87, 6.33)		4.05 (1.82, 9.21)	**0.001**
Stages 4 & 5	3.18 (1.55, 6.5)		2.47 (1.87, 4.72)	**0.02**
CRP mg/dL				
≤ 5 mg/dL	1 (ref)	0.001		
> 5 mg/dL	5.43 (1.93, 10.15)		2.49 (0.75, 3.8)	0.13
MSK manifestations				
No	1 ref			
Yes	3.94 (2.33, 6.7)	0.001 †	2.97 (1.61, 5.55)	**0.001**
Presence of comorbidities				
No	1 ref	0.011 †		
Yes	2.71 (1.11, 4.86)		1.76 (1.09, 7.21)	0.23
DM and Hypertension				
No	1 ref	0.014 †		
Yes	3.14 (1.30, 9.12)		0.99 (0.31, 2.6)	0.32
Hypertension				
No	1 ref	0.015 †		
Yes	2.36 (1.51, 3.96)		1.94 (1.01, 4.8)	0.15

† p-value for trend, DM – Diabetes mellitus, MSK- Musculoskeletal, CRP- C reactive protein

scores (severe disability) among CKD patients with MSK manifestations and higher age in this study, as musculoskeletal conditions and aging are strong independent predictors of disability in most of the conditions [11, 17, 30, 34]. These findings agree with most studies reporting the association of HAQ-Di among CKD patients. We found that older adults had higher odds of disability associated with CKD; this could be attributed to the amplification of CKD-induced accelerated aging process, effects of medications, comorbid, and depression. We also observed that disability associated with CKD was more likely among stages 2 and 3 followed by stages 4 and 5, which might be due to the increasing effects of CKD interventions, disease progress, and comorbid [11, 21, 35]. In this study, the sub-group analysis of CKD stages versus pain, age, VAS score, and musculoskeletal manifestations in the past 7 days was observed to be statistically significant. A higher proportion of the stages 2 and 3 CKD patients in this study self-reported moderate to severe pain than the stages 4 and 5 CKD, and the stage 2 and 3 groups were younger by 3.7 years than the stages 4 & 5 CKD patients. More importantly, among those who reported the presence of musculoskeletal manifestations in the past 7 days, stage 2 and 3 CKD had a higher proportion than their counterparts. These differences would have contributed to the higher odds of disability among the stage 2 and 3 CKD patients in this study (Appendix 3). Likewise, the participants in the earlier stages of CKD are less likely to suffer severe anemia and mineral bone diseases, which might explain why stage 1 CKD patients did not report moderate or severe disability.

Strengths and limitations

Low muscle mass is reported as one of the major causes of functional limitation among CKD patients, but this study did not have the provision to include sarcopenia as one of the variables. Confounding variable like concomitant peripheral neuropathy among diabetic CKD patients

is not accounted for the association with disability in this study. With advanced age being associated in this study, the interaction effect of sarcopenia associated with age and CKD can be a key predictor. Furthermore, CKD-associated fatigue as a predictor of disability was not explored in this study.

Conclusion

This study is the pioneer attempt to describe the findings of CKD-associated disability in Ethiopia. Our results demonstrated a decline in function and moderate to severe disability among the majority of those living with CKD. The advanced stage of CKD, higher age, and presence of musculoskeletal manifestations are important variables predicting self-reported functional status. The observations suggest that further exploration of determinants of disability, association of pattern of CKD with disability, disability weighing refinement for stages of CKD, and estimate of cost associated in this population requires attention. Further, this study's findings reinforce the need to evaluate disability as standard care at the early stage and the identified predictor variables shall aid in recognizing high-risk groups among CKD patients.

Abbreviations

BMI	Body Mass Index
CI	Confidence interval
CKD	Chronic kidney diseases
CRP	C-reactive protein
CVD	Cardio-vascular disease
DALY	Disability-adjusted life year
DM	Diabetes mellitus
ETB	Ethiopian birr
GBD	Global Burden of Disease
HAQ-Di	Health Assessment Questionnaire Disability Index
IQR	Inter-quartile range
MSK	Musculoskeletal
SD	Standard deviation
SPHMMC	St Paul's Hospital Millennium Medical College
SPSS	Statistical Package for the Social Sciences
USA	United States of America
VAS	Visual Analogue Scale
YLL	Years of Life Lost

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12882-024-03783-9.

Supplementary Material 1: Appendix 1 – structured questionnaire

Supplementary Material 2: Appendix 2 – STROBE checklist

Supplementary Material 3: Appendix 3 – additional table

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Author contributions

SD and BJ conceptualized the idea and carried out the data acquisition, and dataset tabulation, and participated in the study design and analysis. AA, DI, TY, BJ, and MS revised the proposal and participated in the analysis and manuscript writing. BJ and SD was involved in data analysis, conceiving the study, participated in its design, reran data analyses, coordinated draft work, and supervised the project. All authors read and approved the final manuscript.

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Data availability

The study contains all of the study data related to these findings. The data is the intellectual property of the Mekelle University (funder). Hence, requests for more information on the dataset and questions about data sharing should be directed to the correspondence author (SD) sisaydeme21@gmail.com.

Declarations

Ethical approval and consent to participate

This research was conducted in line with the Helsinki Declaration. The College of Health Sciences Research and Community Service, Ethical Review Committee of Mekelle University, Tigray, Ethiopia approved this study (ref no MU/IEC/CMHS-ACSH-27/2021). The signed agreement was obtained after delivering a verbal account describing the study from the participants and/or attesting to informed consent from a parent and/or legal guardian for study participation, if the respondent had no formal schooling or was illiterate. Furthermore, the privacy and confidentiality of information was ensured.

Consent for publishing

Not applicable.

Competing interests

The authors declare no competing interests.

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