

Occupational Determinants of Chronic Kidney Disease and Their Effect on Work Activity: A Hospital-Based Study in Addis Ababa, Ethiopia

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Abstract

Background: Chronic kidney disease (CKD) represents a growing global public health challenge. While diabetes, hypertension, and genetic predispositions are well-established causes, occupational and environmental exposures are emerging as under-recognized contributors to CKD. In low-resource settings, these occupational risk factors remain poorly characterized, despite their potential impact on disease progression and work-related functioning.

Methods: A cross-sectional study was conducted between January and March 2025 among CKD patients attending Black Lion Referral Hospital and St. Paul's Hospital Millennium Medical College in Addis Ababa, Ethiopia. A total of 392 participants were enrolled through consecutive sampling. Data on occupational exposures were collected via structured face-to-face interviews. The Work Productivity and Activity Impairment (WPAI) questionnaire was utilized to evaluate the impact of CKD on work productivity and daily activities.

Results: Of the 392 participants, the largest age group was 61 years and older (24.5%). The most common occupations were office work (21.2%) and farmers (14.8%). Exposure to physical occupational hazards was reported by 74.7% of participants, followed by psychosocial (57.7%) and chemical hazards (27.3%). Based on the WPAI findings, CKD led to an average absenteeism rate of 28.1%. Additionally, 54.7% of participants ($n = 165$) experienced presenteeism, resulting in an overall work productivity loss in 70.3% of the sample.

Conclusions: Occupational exposures to physical, chemical, and psychosocial hazards are prevalent among individuals with CKD and contribute significantly to reduced work productivity and activity impairment. These findings underscore the need for occupational health interventions and policy attention in the prevention and management of CKD in working populations.

Keywords: Chronic Kidney Disease, Occupational Exposure, Workplace Hazards, Work Productivity, Activity Impairment, Ethiopia

1. Background

Chronic kidney disease (CKD), defined as a glomerular filtration rate (GFR) of less than 60 mL/min/1.73 m² for at least three months, is a major global public health challenge with substantial implications for morbidity, mortality, and healthcare systems [1,2].

The global prevalence of CKD is estimated to be between 13% and 15%, and its burden continues to rise [1].

In Africa, the increasing incidence of CKD is attributed to both communicable diseases, such as HIV and noncommunicable

conditions, including diabetes and hypertension [3,4]. In Ethiopia, a growing number of CKD cases have been reported, even among younger populations. However the underlying etiologies in many cases remain poorly understood [4]. While earlier studies in Ethiopia have documented nephrotoxic exposures such as lead and organic solvents, there remains a gap in understanding the broader range of occupational risks contributing to CKD. Most existing research focuses on specific chemical exposures or selects work environments, neglecting the cumulative effect of multiple occupational hazards including physical, chemical, and psychosocial factors.

Furthermore, kidney failure itself contributes to functional disability and frequently leads to job loss or early withdrawal from the workforce, especially among patients in advanced stages of CKD [5]. Although prior studies have addressed the quality of life among CKD patients, the specific effects of the disease on work productivity, absenteeism, and overall activity impairment remain underexplored in low-resource settings such as Ethiopia.

This study aims to address these gaps by comprehensively assessing occupational risk factors associated with CKD and evaluating their impact on work productivity and activity impairment. It is among the first efforts in Ethiopia to examine a wide range of occupational exposures across different sectors, and to quantify how CKD affects workforce participation and functional capacity.

2. Methods

2.1. Study Design and Setting

A hospital-based cross-sectional study was conducted from January to March 2025 at the nephrology outpatient departments of two major public referral hospitals in Addis Ababa, Ethiopia: Black Lion Specialized Hospital and St. Paul's Hospital Millennium Medical College. These institutions are the largest providers of specialized nephrology care in the country, with St. Paul's Hospital housing Ethiopia's first public kidney transplant center.

2.2. Eligibility Criteria

Inclusion criteria were adults aged 18 years or older with a confirmed diagnosis of chronic kidney disease (CKD) who were receiving follow-up care in the nephrology outpatient clinics during the study period and provided informed consent. Patients with cognitive impairments that hindered meaningful participation or consent were excluded.

2.3. Sample Size Determination and Sampling Technique

The sample size was calculated using a single population proportion formula, based on a previously reported prevalence of 54.5% for sickness absenteeism among flower industry workers in Bishoftu, Ethiopia [41]. Using a 95% confidence interval, 5% margin of error, and accounting for a 10% non-response rate, the final sample size was set at 401. A consecutive sampling method was used, enrolling all eligible patients until the target sample size was reached.

3. Data Collection Tools and Procedures

Data were collected through structured face-to-face interviews conducted during routine clinic visits. The questionnaire included items on sociodemographic characteristics, occupational history, and workplace exposures, and was adapted from previously validated instruments [6-9,37,38].

The Work Productivity and Activity Impairment (WPAI) questionnaire was included to assess the impact of CKD on productivity and activity limitation over the past seven days [10]. The questionnaire was developed in English, translated into Amharic, and back-translated to English to ensure consistency. It was pre-tested on 5% (n = 21) of the target sample at Yekatit 12 and Zewditu Memorial Hospitals. Feedback from the pretest was used to revise ambiguous or unclear items. The final version was uploaded to smartphones using ODK Collect for digital data capture.

3.1. Operational Definitions

- Absenteeism (%): Work time missed due to health; this is for currently employed participants who worked in the previous seven days [11,12].
- Presenteeism (%): Degree of impairment while working, this is for the same subgroup [11,12].
- Overall Work Impairment (%): Combined absenteeism and presenteeism, [11,12].
- Activity Impairment (%): Impact of health on regular activities, this is for all participants [11,12].

3.2. Data Quality Control

Four trained data collectors and one supervisor conducted the interviews. Training included one day of instruction on study objectives, consent procedures, and use of the ODK application. Data collection was supervised daily by the principal investigator, who also performed daily quality checks on uploaded responses. Continuous monitoring ensured adherence to protocol, and inconsistencies were addressed in real time.

3.3. Data Management and Analysis

Data were validated and exported to SPSS version 25 for analysis. Descriptive statistics were used to summarize sociodemographic and occupational characteristics, expressed as frequencies and percentages. Chi-square tests were used to explore associations between occupational risk factors and CKD. WPAI scores were calculated according to established guidelines to quantify productivity loss and activity impairment.

4. Human Ethics and Consent to Participate declarations

Ethical approval for this study was obtained from the Ethical Review Committee and Institutional Review Board (IRB) of Addis Ababa University, School of Public Health, prior to data collection. An official letter of ethical approval was submitted to Black Lion Specialized Hospital and St. Paul's Hospital Millennium Medical College. Permission to conduct the study was subsequently obtained from the clinical directors, renal department heads, and renal unit heads of both hospitals.

The study was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from all individual participants included in the study. All participants voluntarily agreed to take part in the study and provided informed consent prior to their inclusion.

All eligible participants were informed about the purpose, procedures, potential risks, and benefits of the study. Verbal consent was obtained from all participants prior to data collection. Participants were also informed of their right to refuse or withdraw from the study at any time without any consequences. Confidentiality and privacy were strictly maintained throughout the study. No personal identifiers were recorded, and all data

were anonymized and securely stored with access limited to the principal investigator. No identifiable personal information was collected.

Consent for publication: Not applicable

5. Results

5.1. Sociodemographic Characteristics

Of 401 eligible CKD patients, 392 responded (response rate 97.8%). the largest age group was 61 years and older (24.5%). Males comprised 211 (53.8%), and most participants were married (293, 74.7%). Educational attainment varied: 150 (38.3%) had college or university-level education.

Variables	Categories	Frequency (%)
Age	18-30	67(17.1)
	31-40	60(15.3)
	41-50	81(20.7)
	51-60	87(22.2)
	61 and above	97(24.7)
Gender	Male	211(53.8)
	Female	181(46.2)
Marital status	Single	68(17.3)
	Married	293(74.7)
	Divorced	13(3.3)
	Widowed	18(4.6)
Educational status	Unable to read and write	46(11.7)
	Primary school (1-8 grade)	100(25.5)
	High school (9-12 grade)	96(24.5)
	Grade college/University graduate and above	150(38.3)

Table 1: Socio-Demographic Characteristics of Ckd Patients at Black Lion and Spmmch 2024/25

5.2. Environmental / Living Conditions

Most respondents (295, 75.3%) relied on tap water as their main drinking source; 321 (81.9%) did not treat their water. A minority

(37, 9.4%) reported prolonged exposure to hot environments. Regarding proximity to environmental exposures, 102 (26.0%) lived near agricultural fields and 76 (19.4%) near industrial areas.

Variables	Categories	Frequency(%)
Primary source of drinking water	Tap water	295(75.3)
	Protected well water	20(5.1)
	Unprotected well water	10(2.6)
	Protected spring water	27(6.9)
	Unprotected Spring water	8(2.0)
	River/Stream	14(3.6)
	Bottled/Packaged water	18(4.6)
Treatment of water	Yes, by boiling	24(6.1)
	Yes by filtration	47(12)
	Yes, by chemicals	16(4.1)
	No	321(81.9)
Weather/Climatic condition of living area	Hot	40(10.2)
	Cold	67(17.1)
live or spend prolonged periods in hot environments	Yes	37(9.4)
	No	3(0.8)
live near any of the following	Industrial areas/factories area	76(19.4)
	Agricultural fields	102(26.0)
	Mining sites	29(7.4)
	Waste disposal sites/landfills	45(11.5)
	Rivers or streams with reported contamination	146(37.2)
	NONE	141(36.0)

Table 2: Environmental Factors of CKD patients at Black Lion and SPMCH 2024/25

5.3. Personal Behaviors and Health Conditions

A majority (337, 86%) had never smoked; 153 (39.0%) reported regular secondhand smoke exposure. Alcohol consumption was

occasional for 216 (55.1%) respondents. Hypertension was the most commonly reported comorbidity (215, 54.8%), while 133 (34%) reported none of the listed conditions.

Variables	Categories	Frequency(%)
smoking tobacco	Yes, currently a smoker	1(0.3)
	Yes, Former smoker	54(13.8)
	Never smoker	337(86.0)
secondhand smoke	Yes	153(39.0)
	No	239(61.0)
Area of secondhand smoke	Home	14(3.6)
	Workplace	114(29.1)
	Social settings	102(26.0)
frequency secondhand smoke	Rarely	3(0.8)
	Occasionally (1–2 times)	58(14.8)
	Frequently (3–5 times)	92(23.5)
Alcohol drinking	Yes, daily	15(3.8)
	Yes, occasionally	216(55.1)
	Never	161(41.1)
Amount of alcohol	1-2	9(2.3)
	3-4	3(0.8)
	5 and more	3(0.8)
Physical exercise	Daily	164(41.8)
	Weekly	86(21.9)
	Rarely	35(8.9)
average daily water intake	Less than 1 liter	175(44.6)
	1-2 liters	176(44.9)
	More than 2 liters	41(10.5)
Diet	Good	66(16.9)
	Average	105(26.8)
	Poor	221(56.4)
Health condition	Hypertension	215(54.8)
	Diabetes	111(28.3)
	Cardiovascular disease	83(21.2)
	Cancer	7(1.8)
	HIV	7(1.8)
	Stroke	19(4.8)
	Urinary tract infections	52(13.3)
	None	133(34)
Regular checkup	At least once a year	101(25.8)
	Every few years	11(2.8)
	Only when symptoms arise	226(57.7)
	Never	54(13.8)

Table 3: Personal Factor and Health Condition of CKD Patients at Black Lion and SPMCH

6. Occupational History

The most frequent occupations were office work (83, 21.2%), followed by farming (58, 14.8%). The majority (316, 80.6%) worked full time, and 157 (40.1%) had over 15 years of work

experience. Regarding working hours, 253 (64.5%) participants reported working more than 8 hours daily, and 108 (27.6%) worked in outdoor settings.

Variables	Categories	Frequency(percent)
current occupation	Agriculture/Farming	58(14.8)
	Manufacturing/Factory Work	35(8.9)
	Construction	17(4.3)
	Healthcare	14(3.6)
	Mining	2(0.5)
	Transportation	28(7.1)
	Office Worker	83(21.2)
	Merchants	51(13.0)
	Religious leaders	4(1.0)
	Housewife	34(8.7)
	Students	22(5.6)
	Non employed	4(1.0)
	Private employed	40(10.2)
Type of factory	Metal work	5(1.3)
	Woodwork	12(3.1)
	Soap and Detergent	5(1.3)
	Automotive repair/Garaj	7(1.8)
	Textile	6(1.5)
Work status	Full-time	316(80.6)
	Part-time	5(1.3)
	Shift work	15(3.8)
Work experience	Less than 1 year	5(1.3)
	1-5 years	37(9.4)
	6-10 years	70(17.9)
	11-15 years	65(16.6)
	More than 15 years	157(40.1)
Hour of working	8.00	79(20.2)
	Above 8.00	253(64.5)
Type of work environment	Outdoor	108(27.6)
	Indoor	177(45.2)
	Both	47(12.0)

Table 4: General Occupational History of CKD Patients at Black Lion and SPMCH 2024



Occupational Hazard Exposures, Figure 1 Bar graph of occupational hazards

6.1. Physical Hazards

Physical hazards were the most commonly reported (293, 74.7%). Prolonged sitting was particularly common among office workers (89%) and transport workers (96.4%). Heat/dehydration exposure was reported by 117 (29.8%), especially among farmers (67.2%), manufacturing workers (88.2%), merchants (60%), and

construction workers (53.3%). Dust exposure was nearly universal among farmers (96.4%). Ergonomic issues affected 41.8% of office workers. High noise (> 85 dB) was experienced by 69 (17.6%), with machines being the predominant source; hearing protection was rarely used (only 2 individuals consistently).

Variables	Categories	Frequency(%)
prolonged sitting	Yes	293(74.7)
	No	29(7.4)
high temperatures (extreme heat) or risk of dehydration	Yes, frequently	117(29.8)
	Yes, occasionally	78(19.9)
	No	137(34.9)
high levels of noise (>85 dB)	Yes	69(17.6)
	No	259(66.1)
noise sources	Machinery	45(11.5)
	Transportation vehicles	37(9.4)
	Tools	26(6.6)
Frequency of exposure to high noise levels	Occasionally (1–2 times a week)	3(0.8)
	Frequently (3–5 times a week)	24(6.1)
	Daily	48(12.2)
Duration of exposure to high noise levels per shift	Less than 8 hrs	1(0.3)
	8 hrs	11(2.8)
	greater than 8 hrs	36(9.2)
hearing protection equipment	Yes,	8(3.1)
	No	61(15.6)

Table 5: Physical Work Hazards of CKD Patients at Black Lion and SPMCH 2024/25

6.2. Chemical and Dust Hazards

Chemical exposures were reported by 111 respondents (28.3%). The primary agents included pesticides/herbicides (15.1%), organic solvents (6.9%), cleaning agents (5.9%), and heavy metals (5.9%). Daily exposure occurred in 44 (11.2%), and 22 (5.7%) had exposures for more than 8 hours per shift. Protective equipment

use was limited: 64 (16.3%) reported none. In particular, 86.4% of farmers and 82.3% of factory workers reported chemical exposures, many without adequate safeguards. Dust or particulate exposure was reported by 168 (42.9%) participants, with soil/construction dust most common (31.6%).

Variables	Categories	Frequency(%)
Contact with any chemicals at work	Yes	111(28.3)
	No	221(56.9)
Types of chemicals:	Heavy metals	23(5.9)
	Organic solvents	27(6.9)
	Pesticides/herbicides	59(15.1)
	Cleaning agents	23(5.9)
Primary sources of chemical exposure	Handling raw chemicals	93(23.7)
	Manufacturing processes	21(5.4)
Frequency of chemicals contact	Daily	44(11.2)
	Monthly	32(8.2)
	Rarely	15(3.9)
	Weekly	18(4.6)
Duration of exposure per shift	8 hrs	16(4.1)
	Less than 8 hrs	6(1.5)
	more than 8 hrs	22(5.7)
Protective equipment when handling chemicals	Gloves	31(7.9)
	Masks/respirators	19(4.8)
	Goggles	9(2.3)
	Protective clothing	16(4.1)
	None	64(16.3)
Ventilation	Well-ventilated	100(25.5)
	Limited ventilation	6(1.5)
	Poor ventilation	1(0.3)
Enclosed areas or with fume hoods or other air purifier	Yes	24(6.1)
	No	84(21.4)
Regular breaks away from chemical exposure areas	Yes	22(5.6)
	No	86(21.9)
Training on safe chemical handling and hazard identification	Yes	13(3.3)

	No	95(24.2)
Material Safety Data Sheets (MSDS) for the chemicals	Yes	8(2.0)
	No	100(25.5)
health screenings related to chemical exposure	Yes	7(1.8)
	No	101(25.8)
Dust or particulate matter	Yes	168(42.9)
	No	165(42.1)
Types of dust or particulate matter	Mineral dust	8(2.0)
	Metal dust	19(4.8)
	Organic dust	54(13.8)
	Synthetic dust	18(4.6)
	Soil or construction dust	124(31.6)
	Soot or carbon-based particles	7(1.8)
	Vehicles/ transportation	43(11.0)
Frequency of exposed to dust, fumes, smoke	Daily	147(37.5)
	Weekly	17(4.3)
	Monthly	4(1.0)
	Rarely	6(1.5)
Duration of exposure per shift	Less than 8 hrs	22(5.6)
	8hrs	43(11.0)
	More than 8 hrs	82(20.9)

Table 6: Chemical and Dust hazards of CKD Patients at Black lion and SPMCH 2024/25

6.3. Biological Hazards

Fifty-three respondents (13.5%) reported potential exposure to biological agents, primarily fungi/molds (11.5%). Frequent

sources included animals/animal waste and human contact (e.g. in healthcare). Daily exposure was reported by 32 (7.9%), but use of PPE was rare (12, 3.1%).

Variables	Categories	Frequency(%)
Infectious agents	Yes	53(13.5)
	No	279(70.6)
Types of biological agents	Bloodborne pathogens	16(4.1)
	Bacteria	15(3.8)
	Viruses	17(4.3)
	Fungi or molds	45(11.5)
	Parasites	17(4.3)
	Animal or human bodily fluids	26(6.6)

Primary source of biological hazard	Human patients	12(3.1)
	Animals or animal waste	42(10.7)
	Contaminated	1(0.3)
Frequency of exposure to biological agents	Daily	32(7.9)
	Weekly	19(2.3)
	Rarely	2(0.8)
Duration of exposure	Less than 8 hrs	2(0.5)
	8hrs	8(2.0)
	More than 8 hrs	22(5.6)
protective equipment for biological hazards	Yes	12(3.1)
	No	34(8.7)

Table 7: Biological Work Hazards of CKD Patients at Black Lion and SPMCH 2024/25

6.4. Psychosocial Hazards

Work-related stress was reported by 221 (56.4%) participants. Of these, 112 (28.6%) experienced stress daily, and 70 (17.9%) for

durations more than 8 hours. In office settings, 86.8% noted high stress conditions; among merchants and transportation workers, psychosocial burden was also widespread.

Variables	Categories	Frequency (%)
Work-related stress	Yes	221(56.4)
	No	113(28.8)
Under pressure due to deadlines or productivity targets	Yes	192(49.0)
	No	29(7.4)
Frequency of stressful situations	Daily	112(28.6)
	Weekly	74(18.9)
	Monthly	5(1.3)
	Rarely	13(3.3)
Duration of stress	8 hrs	29(7.4)
	Less than 8 hrs	14(3.6)
	More than 8 hrs	70(17.9)

Table 8: Psychosocial Hazards of CKD Patients at Black Lion and SPMCH 2024/25

6.5. Work Productivity and Activity Impairment (WPAI)

Among employed participants (n = 165), the mean absenteeism rate was 28.1%. Presenteeism affected 54.7% (n = 165), and the

combined overall work impairment averaged 70.3%. Activity impairment outside work was reported by all participants, with a mean of 60.7% (n = 392)

WPAI components	Valid (N)	Mean (%)
Work Time Missed (Absenteeism)	165	28.1(10.65)
Reduced Productivity While Working (Presenteeism)	165	54.7(18.8)
Overall Work Impairment (Absenteeism + Presenteeism)	165	70.3(53.2)
Activity Impairment Outside of Work:	392	60.7(14.8)

Table 9: WPAI Summary of CKD Patients at Black Lion and SPMCH 2024/25

6.6. Awareness and Preventive Measures

Only 40 individuals (10.2%) reported noticing health changes attributable to their job. Knowledge of CKD-related occupational risks was low (71, 18.1%), and 310 (79.1%) had not received

training. Regular workplace health checkups were reported by 35 (8.9%), and 319 (81.4%) indicated that their worksite lacked formal safety protocols or PPE.

Variables	Categories	Frequency (%)
Training about occupational hazards linked to CKD	Yes	20(5.1)
	No	310(79.1)
Regular medical checkups through your workplace	Yes	35(8.9)
	No	298(76.0)
safety protocols for handling occupational hazards	Yes	14(3.6)
	No	319(81.4)
Describe the ventilation in your work area where occupational hazards exposure occurs	Well-ventilated	323(82.4)
	Limited ventilation	11(2.8)
	Poor ventilation	1(0.3)

Table 10: Awareness and Preventive Measure of CKD Patients at Black Lion and SPMCH2024/25

7. Discussion

This study provides a comprehensive overview of occupational exposures among CKD patients and quantifies their impact on work productivity. Several key findings warrant further discussion. First, physical hazards particularly prolonged sitting, heat stress, dust exposure, and poor ergonomics were highly prevalent across occupational groups. Prolonged sitting has been implicated in metabolic risk (obesity, hypertension), which are established CKD risk factors [13]. The observed high proportion of office workers aged < 40 with CKD (28/83, ~34.2%) may reflect the additive effects of sedentary behavior. Prior research has noted associations between sedentary occupations and proteinuria or CKD (e.g. odds ratio ~1.26) [14]; current KDIGO guidelines also recommend limiting sedentary time [15].

Heat exposure and dehydration, particularly in outdoor and agricultural laborers, pose a plausible pathway to kidney injury (so-called heat stress nephropathy). The elevated exposures in merchants, construction, and transport roles align with existing literature from Central America, South Asia, and tropical regions where intensive labor, limited hydration, and high ambient temperatures contribute to CKD prevalence [16-18].

Noise exposure (> 85 dB) was reported by a notable minority of participants, especially in manufacturing and transport sectors. Chronic noise has been linked to hypertension, oxidative stress, and vascular damage—factors that may mediate CKD progression [21]. Studies in China and Korea have demonstrated elevated CKD prevalence among noise-exposed workers, with odds ratios between 1.77 and 2.72 [19,20]. A meta-analysis and cohort data likewise support modest associations (ORs ~1.2 to 1.39) between noise exposure and hypertension a known CKD risk factor [21,22].

Chemical hazards, especially pesticides and solvents, were common in agriculture and manufacturing. Lack of protective equipment use was alarming. Past investigations in India, Indonesia, Cameroon, Ghana, Nigeria and elsewhere have documented associations between agricultural chemical exposure and CKD, often in the absence of traditional risk factors [23-31]. Our findings echo these, underscoring the need for safer handling practices and regulatory oversight.

Psychosocial stressors were highly prevalent, particularly in office and merchant roles. Chronic stress may influence CKD development via behavioral (e.g. poor diet, hypertension) and physiological pathways (e.g., cortisol dysregulation) [10]. Although less studied in nephrology, occupational stress has been implicated in other

noncommunicable disease progression [32]. CKD patients missed over a quarter of their working hours, supporting this finding, studies in Bishoftu town and Lume district in Ethiopia reported sickness absenteeism rates of 54.5% and 58.8%, respectively, [34,35]. Similarly, a multi-country study (France, Germany, Italy, Spain, the UK, USA, and China) found a mean absenteeism rate of 18.6% among CKD patients with low hemoglobin levels [33], while a U.S. survey reported an even higher rate of 21.6% among dialysis patients [36].

This finding is consistent with a multinational study across seven countries that reported a mean presenteeism rate of 26.5% among CKD patients with low hemoglobin levels, indicating significantly reduced productivity despite being present at work [13]. Overall work impairment was high among CKD patients, Multinational study reported a 42.7% overall work impairment among CKD patients with low hemoglobin levels, while a U.S. survey showed a 44.3% activity impairment in dialysis patients, underscoring CKD's significant impact on work performance [13].

CKD patients experienced high activity impairment beyond the workplace. This finding is consistent with a multinational study reporting 55.6% among those with low hemoglobin levels [13], and a U.S. survey showing a similar rate of 55.5% indicating significant limitations in daily tasks, household management, and social engagement [36].

8. Conclusion

Occupational hazards spanning physical, chemical, biological, and psychosocial domains are pervasive among CKD patients in Addis Ababa. These exposures likely act in concert with conventional risk factors to exacerbate CKD progression. Importantly, CKD imposes a heavy burden on work productivity and daily functioning. The pattern of hazards varies by occupation, emphasizing that a one-size-fits-all prevention strategy is inadequate. Tailored occupational health interventions are urgently needed to mitigate these risks and preserve workforce capacity among individuals with or at risk for CKD.

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Authors Contribution declaration

¹Yetemwerk Dagmawi contributed to the study design, data collection, data analysis, interpretations of the results, and

manuscript preparation.

²Abera Kumie, ³Samson Wakuma Abaya (The second and third authors) contributed to the study design, continuous comments on data collection and analysis, and manuscript review.

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