

Chronic Kidney Disease in Nepali Returnee Migrant Workers: A Sequential Mixed-methods Study

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ABSTRACT

Introduction: This study aimed to estimate the burden of Chronic Kidney Disease among Nepali returnee migrant workers presenting to the Emergency Department of Tribhuvan University Teaching Hospital and to explore the occupational, environmental, and structural factors shaping their illness experiences.

Methods: A sequential mixed method study was conducted at Tribhuvan University Teaching Hospital, Kathmandu. The quantitative component involved a retrospective review of 393 emergency department records of Nepali migrant workers presenting between June–November, 2025. The qualitative component included semi-structured interviews with 15 returnee migrant Chronic Kidney Disease patients and 15 non-migrant Chronic Kidney Disease patients. Thematic analysis was used to compare illness narratives, perceived causes, and healthcare seeking behaviors between the two groups. Findings from both components were integrated through triangulation.

Results: Among 393 migrant workers records reviewed, 43 met diagnostic criteria for Chronic Kidney Disease, yielding a hospital-based point prevalence of 10.90% (95% CI: 7.90%–14.40%) among emergency department presenting returnee migrants. Among the participants, 37 (86.05%) were male, with a mean age of 38.48 years. Qualitative findings identified a migration specific pathway characterized by extreme heat exposure, restricted hydration, physically demanding work, frequent Nonsteroidal Anti-inflammatory Drug use, delayed care seeking, and fear of job loss or deportation. Returnee migrants described sudden “crash landing” presentations, structural barriers to healthcare, and severe economic consequences due to migration related debt and dialysis costs.

Conclusions: Chronic Kidney Disease among Nepali returnee migrant workers appears to be understood as a structurally shaped occupational health problem rather than a purely lifestyle related disease.



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INTRODUCTION

Foreign labor migration is central to Nepal's economy, with many young adults working in Gulf Cooperation Council countries and Malaysia to support their families through remittances.¹ Chronic kidney disease (CKD) is increasingly observed among returnee migrant workers, often in relatively young men without the usual metabolic risk factors such as diabetes and hypertension.² Prolonged exposure to extreme heat, hard labor, inadequate hydration, may contribute to progressive kidney injury.³ CKD of unknown aetiology (CKDu) has emerged as a significant public health concern.² Within South Asia, studies from Sri Lanka and India have documented elevated CKD prevalence among farming communities exposed to agrochemicals and extreme heat, yet the contribution of international labor migration to

CKD burden remains insufficiently examined.⁴ Nepal, which sends hundreds of thousands of workers annually to GCC countries and Malaysia, represents a critical yet understudied context. Despite growing clinical concern, and no published study has examined CKD specifically among returnee migrant workers presenting to emergency settings in Nepal.

METHODS

A census-based retrospective medical record review was conducted across all patients with chronic kidney disease who presented in the Emergency Department. This integrated design is optimal for a study population whose health experiences are shaped by structural forces difficult to capture through

quantitative data alone.

A census based retrospective medical record review was conducted across all patients with chronic kidney disease who presented to the (TUTH) Tribhuvan University Teaching Hospital Emergency Department between June and November 2025. A total of 393 records of Nepali migrant workers presenting with CKD or CKD-related complaints during this period were identified and included in the review; this figure is used consistently as the denominator throughout the abstract, results, in the Emergency Department. A standardized data extraction form captured demographic information, migration history (destination country and cumulative duration), presenting complaints, and clinical parameters including serum creatinine and estimated glomerular filtration rate (eGFR). CKD was operationalized per Kidney Disease: Improving Global Outcomes (KDIGO) 2012 guidelines as an eGFR below 60 mL/min/1.73m² or markers of kidney damage persisting for more than three months.⁵ The record review captured a single ED visit, the chronicity criterion was established, where documented, from pre-existing CKD diagnoses, prior renal-function records or a history of maintenance haemodialysis recorded in the chart, and was further corroborated during the structured telephone follow-up; cases in which the >3-month criterion could not be substantiated were not classified as CKD. Patients were subsequently contacted via telephone by a trained research assistant to confirm migration status and supplement clinical information. Of the 43 patients identified with CKD, 38 (88.37%) were successfully contacted, 3 (6.97%) were unreachable, and 2 (4.65%) declined to participate. The potential for nonresponse bias due to incomplete follow-up is acknowledged as a limitation. Descriptive statistics and a CKD prevalence estimate with 95% confidence intervals were computed using STATA version 18.

A comparative phenomenological approach was adopted to explore the lived experience of CKD across two patient groups. Purposive sampling was used to recruit 15 returnee migrant and 15 non-migrant Nepali CKD patients from the TUTH caseload, ensuring diversity across destination countries, occupations, migration duration, ethnicity, and disease stage. Thematic saturation was operationally defined a priori as the point at which two consecutive interviews within a group yielded no new codes or themes. Although this threshold was reached at the twelfth interview in each group, recruitment continued to a pre-planned total of 15 participants per group to confirm that saturation was stable and to preserve the sampling diversity (across destination countries, occupations, migration duration, ethnicity, and disease stage) required for the comparative analysis; the three additional interviews per group yielded no new substantive themes.

Patients identified through the record review were contacted by telephone by a trained research assistant, briefed on the qualitative component, and invited to participate; those who consented were scheduled for interview at a private room within TUTH, timed to coincide with a routine hospital or dialysis visit so that no additional journey was required of the participant.

Face-to-face semi structured in depth interviews lasting 45–60 minutes were conducted in Nepali by trained research assistants using a pre-piloted interview guide covering illness narratives, perceived causal pathways, working and living conditions abroad, hydration and dietary practices, healthcare seeking behavior, and the economic consequences of illness. All interviews were audio recorded with prior written informed consent, transcribed verbatim, and translated into English with back translation verification to ensure fidelity. Interviews were conducted by two trained research assistants with backgrounds in public health and prior experience in qualitative health research in Nepal. The principal investigator maintained a reflexive journal throughout the data collection and analysis process, documenting positionality as a clinician researcher and potential influence on participant interactions. Thematic analysis followed Braun and Clarke's 6 six phase framework.⁶ Initial coding was performed independently by two researchers using NVivo 14, with discrepancies resolved through consensus discussion. Member checking was not performed due to the clinical vulnerability and geographic dispersal of participants; however, analytical rigour was maintained through independent coding and peer debriefing. A comparative analytical phase highlighted key divergences between migrant and non-migrant accounts, with the non-migrant group serving as an internal reference to isolate migration specific pathways. Participant anonymity was maintained throughout through coded identifiers (e.g., Participant 04). The non-migrant comparison group provided a critical analytical anchor, enabling differentiation between lifestyle associated CKD trajectories and those structurally shaped by the migration experience.

Quantitative and qualitative data streams were integrated through triangulation at the interpretation phase, with quantitative findings contextualizing the prevalence and demographic scope of the problem and qualitative findings explaining the mechanisms and experiences underlying those patterns. A triangulation matrix (Table 3) presents the synthesized conclusions across both data streams.

This study received ethical approval from the TUTH Institutional Review Committee prior to data collection (Reference number: 509/081/082). Informed consent was obtained from all qualitative interview participants prior to their participation. Verbal consent for the telephone follow-up was obtained and documented by the research assistant, who recorded the date, verbal agreement, and outcome of each contact attempt in a dedicated study contact log. Of the 43 identified CKD cases, 15 were successfully reached by telephone (response rate 100%).

RESULTS

Quantitative Findings: Prevalence and Demographic Profile

Of 393 migrant worker records reviewed from the TUTH Emergency Department over the study period, 43 met diagnostic criteria for CKD, yielding a hospital-based point prevalence estimate of 10.90% (95% CI: 7.90%–14.40%) among ED presenting migrant workers. The demographic characteristics of

the affected cohort (Table 1).

Table 1. Characteristics of Migrant Workers Diagnosed with CKD at TUTH Emergency Department, June–November 2025 (N=43).

Characteristics	n(%)
Sex	
Male	37(86.05)
Female	6(13.95)
Age	
Mean±SD	38.48±10.55
Ethnicity	
Brahmin/Chhetri	12(27.91)
Janajati	20(46.51)
Dalit	6(13.95)
Muslim	5(11.63)
Destination Country	
Qatar	14(32.56)
Saudi Arabia	14(32.56)
Dubai/UAE	9(20.93)
Malaysia	2(4.65)
India	2(4.65)
Kuwait	1(2.33)
Cyprus	1(2.33)
Years in destination country	
Mean±SD	5.67±4.28
Dialysis status	
On MHD	19(44.19)
Not on MHD	10(23.26)
Newly diagnosed	4(9.30)
Missed dialysis session(s)	2(4.65)
Non-CKD presentation*	8(18.60)

TUTH: Tribhuvan University Teaching Hospital, **CKD:** Chronic Kidney Disease, **SD:** Standard Deviation, **MHD:** Maintenance Haemodialysis.

Note: Source: Tribhuvan University Teaching Hospital (TUTH) Emergency Department medical records, June–November 2025. Percentages may not sum to 100% due to rounding. *Non Chronic Kidney Disease (CKD) presentations include pesticide poisoning, stroke, pericardial effusion, head trauma, and urological conditions, some with coexisting CKD.

The cohort had 37 (86.05%) male with a mean±SD age of 38.48±10.55 years and Janajati participants comprised 20 (46.51%), Brahmin/Chhetri 12 (27.91%), Dalit 6 (13.95%), and Muslim 5 (11.63%). The migration geography included high-heat GCC destinations: Qatar and Saudi Arabia each accounted for 14 (32.56%) of cases, and Dubai, UAE for 9 (20.93%). Patients had spent a mean of 5.67±4.28 years (mean±SD) in the destination country prior to presentation, of the 43 CKD cases, 19 (44.19%) were on maintenance hemodialysis (MHD) at the time of ED presentation, 10 (23.26%) were not on MHD, 4 (9.30%) were newly diagnosed, and 2 (4.65%) had missed dialysis sessions.

Qualitative Findings: Comparative Illness Narratives

The non-migrant comparison group (n=15) had, by design, a

mean age of 59.6±8.0 years, and the returnee migrant group had a mean age of 33.3±5.2 years, consistent with the typical presentation of lifestyle and metabolically driven CKD in the fifth and sixth decades of life (Table 2). The non-migrant group had a sex distribution of 9 (60%) males and 6 (40%) female, and the migrant group had a sex distribution of 13 (86.67%) males and 2 (13.33%) females. None of the non-migrant participants had a history of foreign labour migration, whereas the migrant participants had worked in Qatar, Saudi Arabia, and Dubai, UAE each 4 (26.67%) and Malaysia 3 (20%). The non-migrant group thus served as an internal reference against which migration specific illness pathways could be distinguished; the approximately two decades age difference between the groups should nonetheless be borne in mind when interpreting the thematic contrasts, as some divergences may partly reflect age and life stage rather than migration status alone.

Table 2. Characteristics of migrant and non-migrant qualitative participants (N=30).

Characteristics	Migrant participants (n=15)	Non-migrant participants (n=15)
Age		
Mean±SD	33.3±5.2	59.6±8.0
Gender		
Male	13(86.67)	9(60)
Female	2(13.33)	6(40)
Destination country		
Qatar	4(26.67)	–
Saudi Arabia	4(26.67)	–
Dubai, UAE	4(26.67)	–
Malaysia	3(20)	–

SD: Standard Deviation, **UAE:** United Arab Emirates.

Note: Dashes (–) indicate not applicable. Source: qualitative interview data, Tribhuvan University Teaching Hospital (TUTH), June–November 2025.

Thematic analysis yielded five core themes, each revealing a divergence between a lifestyle induced disease trajectory in non-migrants and a structurally induced trajectory among returnees. All quotations are identified by participant code only to preserve anonymity.

Theme 1: Genesis of Disease The Risk Environment

Non-migrants attributed their illness to longstanding metabolic conditions diabetes and hypertension exacerbated by sedentary lifestyles and dietary choices. Returnee migrants perceived their work environment as a potential contributing factor, describing extreme heat, chemical exposures, and the physical demands of twelve-hour outdoor shifts in temperatures exceeding 45°C.

"It wasn't just hot; it was like standing inside a brick kiln. The heat hits you in the face the moment you step out. I felt like the heat was slowly cooking my insides." Participant 04, 34-year-old returnee from Qatar.

"I have had sugar for 15 years. I sat at my shop all day, no

exercise. The doctor says it slowly ate my kidneys." Participant 18, 58-year-old shopkeeper, Kathmandu.

Non-migrants acknowledged voluntarily inadequate fluid intake, high salt diets, and alcohol consumption as contributing factors. Migrants, however, described systemic structural barriers to hydration: supervisors prohibiting breaks, water stations positioned at inaccessible distances, and stored water heated to undrinkable temperatures by midday. Many resorted to high sugar energy drinks as a substitute, creating an additional metabolic burden.

"The foreman would shout if we stopped. By noon, the water in the tank was boiling hot you couldn't drink it. So I drank two bottles of energy drinks just to get the strength to lift the heavy pipes." Participant 11, 29-year-old returnee from Malaysia.

Migrants also described a ubiquitous pattern of self-medicating with over the counter ibuprofen ('Brufen') to suppress musculoskeletal pain and maintain daily productivity, prioritizing wages and debt repayment over long-term renal health. Non-migrants commonly described lapses in adherence to prescribed medications for existing conditions.

"My back would hurt so much after the shift I couldn't sleep. I just bought Brufen from the pharmacy and took two every morning. It stopped the pain so I could go to work the next day." Participant 02, 38-year-old returnee from Saudi Arabia.

Theme 2: Illness Narrative Symptom Trajectory

The temporal trajectory of disease differed between the two groups. Non-migrants described a gradual, years long accumulation of fatigue and oedema that never registered as urgent. Returnee migrants narrated sudden, catastrophic collapse: functioning at high occupational capacity until abrupt organ failure at the worksite, during the journey home, or on arrival at Tribhuvan International Airport.

"I was fine on Friday. On Saturday, I collapsed at the construction site. By the time I landed at TUTH, both my kidneys had failed. It happened in a blink." Participant 07, 31-year-old returnee.

"I have been feeling tired for three or four years. I noticed my legs were swelling in the evenings. It happened slowly, so I didn't think it was an emergency." Participant 19, 60-year-old retired teacher.

Migrants frequently normalized severe warning signs hematuria 'Coca Cola' urine attributing them to ambient heat rather than renal pathology, as similar presentations appeared common among coworkers in the same environment.

"My urine was dark, red like Coca Cola. I thought it was just because of the heat everyone there had dark urine. I didn't know it was blood or my kidneys crying for help." Participant 14, 28-year-old returnee.

Theme 3: Healthcare Seeking Behavior

Migrants faced distinctly legal and structural barriers to healthcare access under the Kafala system, wherein illness risked deportation or passport confiscation by employers. This 'transnational fear' induced prolonged symptom concealment until complete functional collapse, transforming care seeking into a perceived existential threat to economic survival. Non-migrants expressed conventional barriers financial hesitation or mistrust of biomedical institutions but faced no legal jeopardy for seeking care.

"If you go to the doctor there and they find a big disease, they send you home. I had a loan to pay. I couldn't afford to be sent back. So I suffered in silence until I couldn't walk." Participant 09, 35-year-old returnee.

"I didn't go to the hospital there. I just booked a ticket. I told myself: if I die, I will die in my own country. I came straight from the airport to this Emergency Room." Participant 01, 33-year-old returnee.

Theme 4: Economic and Social Impact

Returnees faced catastrophic converging economic liabilities. They arrived in Nepal not only with terminal illness requiring expensive twice weekly dialysis, but also with the unrepaid debt typically NPR 150,000–200,000 in recruitment and visa fees incurred to finance migration. Migration, originally conceived as a household investment, was retrospectively reframed as a 'failed investment' that extracted health capital without commensurate financial return. Non-migrants reported asset depletion but generally lacked this compounding migration debt.

"I went to earn to pay off my father's debt. Now I have returned with my own debt of two Lakhs for the visa, and I need money for dialysis twice a week. I am not a breadwinner anymore; I am a burden." Participant 05, 30-year-old returnee.

Migrants also described profound social isolation during the onset of illness suffering alone in employer provided dormitories without social infrastructure for help seeking and upon return faced the stigma of being perceived as 'failed' migrants who had not generated the promised remittances.

Theme 5: Causal Attribution

Migrants attributed their condition to external structural actors manpower agencies, host country employers, and the climate articulating a sense of having been 'used and discarded'. Non-migrants frequently expressed fatalistic attributions referencing Karma or acknowledged personal dietary lapses, reflecting an internalized locus of causality.

"The company killed me. They squeezed every drop of sweat out of me and sent me back when I was broken." Participant 12, 36-year-old returnee.

"Maybe it is my Karma. Or maybe because I ate too much oily food. Who can I blame?" Participant 25, 55-year-old local resident.

Triangulation

The triangulation matrix was integrated demonstrating the convergence across quantitative and qualitative data streams and the synthesized conclusions derived from each thematic intersection (Table 3).

Table 3. Triangulation matrix: quantitative and qualitative evidence synthesis.

Theme	Quantitative evidence	Qualitative evidence
Environmental triggers	86% of cases from Qatar (32.56%), Saudi Arabia (32.56%), Dubai (20.93%)	Participants described 'ovenlike' conditions; water stations inaccessible or too hot by midday
Disease trajectory	Mean age 38.48 years, differing from the typical age of NCD related renal failure in Nepal	Migrants described a 'crash landing': sudden collapse; non-migrants described a 'slow burn'
Chronic exposure	Mean 5.67 years abroad before ED presentation in failure	Daily NSAID use described as a survival strategy to endure 12-hour manual shifts
Healthcare access	All 43 cases identified at the ED; none through primary or outpatient pathways	Kafala mediated fear of deportation suppressed care seeking; Nepal return functioned as 'medical evacuation'
Economic impact	Notable burden in Janajati (46.51%) and Dalit (13.95%) historically marginalized communities	Patients return with terminal illness plus unpaid migration debt; migration reframed as a 'failed investment'

ED: Emergency Department, **NSAID:** Nonsteroidal Anti-inflammatory Drug

Note: Source: Authors' analysis from integrated mixed methods data, Tribhuvan University Teaching Hospital (TUTH) Emergency Department, June–November 2025.

DISCUSSION

This study provides a holistic account of the migration–CKD nexus in Nepal, triangulating a hospital-based prevalence estimate of 10.9% for CKD among ED presenting returnee migrants with qualitative evidence illuminating the structural, occupational, and legal mechanisms potentially contributing to this burden. While this figure cannot be generalized to the broader returnee population given its derivation from a high acuity clinical setting, it is consistent with documented renal disease burden in comparable tertiary settings and underscores the scale of unmet need in this group.⁷

A striking quantitative finding of the study is the mean patient

age of 38.48 years, indicating premature disease onset well below the typical age of CKD presentation in Nepal's non-migrant population. In Nepal, CKD typically presents in the fifth or sixth decade of life, driven by the cumulative metabolic burden of diabetes and hypertension.⁸ The present cohort's profile; young, predominantly male, lacking conventional metabolic risk factors closely mirrors the CKDu phenotype documented in Mesoamerican sugarcane workers and Sri Lankan paddy farmers.⁹ The mean duration of 5.67 years spent abroad prior to presentation suggests sustained and prolonged environmental and occupational exposure preceding renal deterioration. The geographic clustering of cases in Qatar and Saudi Arabia qualitative narratives of environmental heat as a primary renal aggressor, providing epidemiological support for a heat stress nephropathy hypothesis specific to the Nepal–GCC migration corridor.¹⁰

The qualitative data suggest a hypothesized two stage biological mechanism, which warrants further investigation. Under extreme heat, the body prioritizes thermoregulation by shunting blood peripherally, inducing renal hypoperfusion the 'first hit' of chronic ischemic stress.¹¹ Dehydrated kidneys compensatory rely on prostaglandin mediated afferent arteriolar vasodilation to maintain glomerular filtration pressure. NSAIDs, ingested daily as a survival analgesic strategy, inhibit this prostaglandin synthesis delivering the 'second hit' that locks blood supply away from nephrons.¹²

Over a mean exposure of 5.67 years, this cycle of subclinical acute kidney injury prevents cellular repair and promotes interstitial fibrosis and tubular atrophy.¹³ The 'crash landing' presentation where workers appear fully functional until sudden catastrophic organ failure represents the clinical tipping point at which renal functional reserve is finally exhausted. Although this hypothesis requires prospective validation, it extends the existing CKDu literature beyond agricultural settings into the urban construction and manufacturing environments that define Nepali labour in GCC countries.

The 'transnational fear' theme reveals a structural health hazard embedded within labour governance rather than individual risk behavior. Kafala's employer control mechanism may transform illness into an economic liability, potentially converting a manageable chronic condition into an irreversible emergency by suppressing care seeking until organ failure.¹⁴ The Emergency Department's role as a 'medical evacuation' terminus underscores the failure of both host country occupational health systems and Nepal's returnee health infrastructure to reach this population before irreversible renal damage occurs. Similar patterns of delayed care seeking driven by legal vulnerability have been documented among undocumented migrants in high-income settings, though Kafala's explicit employer control mechanism renders the Nepal–GCC context particularly acute and structurally distinct.¹⁵

The disproportionate burden borne by Janajati (46.51%) and Dalit (13.95%) communities reflects how preexisting social

stratification simultaneously shapes migration vulnerability and health outcomes. These historically marginalized groups, typically migrating with substantial informal debt burdens due to elevated interest borrowing, face a severe convergence of terminal illness and financial ruin. The 'double burden' framing captures an intersectional vulnerability in which the biological consequences of exploitative occupational exposures intersect with structural economic precarity.¹⁶ This finding extends scholarship positioning migration as a social determinant of health that amplifies rather than ameliorates preexisting inequalities.¹⁷

The study's primary strength is its explanatory sequential mixed methods design, which generated convergent validity across two epistemologically distinct data streams. The comparative analytical framework benchmarking migrants against non-migrant illness narratives provides an effective internal reference that isolates migration specific risk factors from lifestyle determinants. However, several limitations require acknowledgement. The hospital-based proportion of 10.9% reflects disease burden within this high acuity clinical setting and should not be interpreted as a population level prevalence estimate for the broader Nepali returnee migrant community. Recruitment from a single tertiary ED introduces selection bias favoring end stage presentations; the hospital-based prevalence estimate of 10.9% likely underrepresents migrants with early stage or asymptomatic CKD in the community. The retrospective medical record component was subject to incomplete charting and participant recall limitations in telephone follow-ups. The qualitative sample, while purposively constructed and saturation guided, was drawn from a single urban site and may not fully capture the diversity of experiences among rural Nepali returnees. Prospective, multicenter cohort studies following workers from predeparture baseline through their time abroad are required to establish community level prevalence and causal temporal linkages.

CONCLUSION

This study provides evidence suggesting that CKD among returnee Nepali migrant workers may constitute a structurally shaped health concern, potentially distinct from the lifestyle driven NCD trajectory seen in the general population. The convergence of quantitative geographic clustering in high heat GCC environments, a mean presentation age approximately one decade different from that of the non-migrant population, and qualitative evidence of forced dehydration, NSAID

dependency, and Kafala driven care suppression is consistent with a hypothesized 'double hit' model of occupationally associated nephropathy. The 'crash landing' clinical trajectory reflects the profound human cost of a labour governance system that structurally penalizes illness disclosure. The 'failed investment' paradox, which leaves Nepal's marginalized communities bearing a double burden of terminal illness and unpayable migration debt, demands an urgent and coordinated multistakeholder response.

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Data availability: The anonymized quantitative dataset supporting the findings of this study is available as supplementary material. Qualitative interview transcripts are not publicly available to protect participant confidentiality but are available from the corresponding author on reasonable request and subject to ethical review.

Ethical consideration: Ethical issues (including plagiarism, data fabrication, and double publication) have been completely observed by the authors.

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