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The role of primary healthcare system in the prevention and management of chronic kidney diseases in rural Nigeria

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Abstract

Chronic Kidney Disease (CKD) is a key source of morbidity and mortality in rural Nigeria due to its prevalence at 19.9% Caused by factors like hypertension, diabetes, infections, and environment. This research emergently appraised the role of the primary healthcare (PHC) system in the prevention and management of CKD within rural communities, including assets and liabilities. The approach followed the qualitative research design; articles were reviewed, favoring 16 peer-reviewed journals between 2015 and 2024. These studies were chosen because they addressed the topic of CKD prevention and management, PHC care delivery systems, the development of screening programs and educational initiatives, system preparedness, and policy changes. Study design, interventions, outcomes, and levels of evidence were summarised to describe trends and gaps in the effectiveness of PHC. The analysis showed that PHC systems were central in preventing CKD through screening, health promotion, lifestyle changes, and environmental modification. Nonetheless, gaps that had been noted included poor health facilities, scarcity of skilled workers, and poor availability of basic drugs. The other barriers to the implementation of EBHC included cultural belief in the use of conventional medicine and ill-health literacy. However, such barriers as poor NGO partnerships and dismal policy revision illuminated possibilities of enhancing CKD through increased provision of resources combined with efficient coordination of services. The study highlighted a need to scale up investment in PHC, especially in facilities and equipment, engaging particular audiences in culturally appropriate and targeted education to prevent and manage CKD; and an array of workforce development programs. Enhancing the monitoring and evaluation systems also puts much focus on improving and sustaining quality health care for vulnerable groups of people. These gaps may be alleviated by identifying strategies that could help interventionists strengthen or develop PHC systems to effectively tackle CKD and the despairing health status in rural Nigeria.

Keywords: Chronic Kidney Disease (CKD); Primary Healthcare (PHC); Rural Nigeria; CKD Prevention and Management; Healthcare System Barriers; Morbidity and Mortality in; Drugs; Hypertensive

1. Introduction

According to Kitamura et al. (2019), Chronic Kidney Disease (CKD) is the steady reduction in kidney function over time in which the patient shows evidence of renal damage or an estimated glomerular filtration rate of less than 60 ml/min/1.73m^2 for three months or more. , CKD has been recognized as a major global health problem affecting approximately 10-20% of the population of different countries (Ovwasa et al., 2023). Globally, the geriatric population and people living in the rural areas of Nigeria are the worst affected by CKD since they barely access health care. They are hypertensive, diabetic, and have no awareness of this sickness (Ameh et al., 2019). It has been estimated that the global burden of CKD is increasing, and a high proportion of the CKD population is present in rural areas of Nigeria;

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some studies reported up to 19.9% of the population (Okafor et al., 2021). This is further exacerbated by socio-economic factors that impede the administration and suppress other strategies.

Therefore, the primary healthcare system (PHC) is a central component when addressing equity and health about the identified disparity (Ameh et al., 2019). Because PHC is the initial entry level to the health care delivery system, it plays an important role in identifying and handling chronic diseases, including CKD (Chen et al., 2019). Based on the PHC principles of health education, disease prevention, and community outreach, there is likely to be a reduced risk and further advancement of CKD in the rural Nigerian population.

The primary care model is central to the achievement of health equity, as well as disease prevention and management of Chronic Kidney Disease. They deliver primary care that could help prevent and identify modifiable risk factors of CKD, including high blood pressure and diabetes (Chen et al., 2019). For example, a systematic review demonstrated that participation in health cheque-ups could notably improve the understanding of initiatives toward CKD among those communities (Ghimire et al., 2021). In the rural settings of Nigeria, particularly where PHC is readily available, CKD can help in organizing awareness creation programs that will enable people to identify with kidney-related diseases and seek early treatment.

Also, the incorporation of CKD into the expansion of PHC scope will enhance healthy outcomes since patients will get continuous monitoring of kidney function assessments alongside other treatable ailments (Murphy, 2023). Several studies reveal a better approach to managing CKD in primary care practice can improve patient prognosis and lower healthcare delivery costs (Chen et al., 2019). For instance, studying the screening programs in Urban areas showed the possibility of identifying patients with CKD at early stages, which might be successfully applied in Rural areas (Okafor et al., 2021).

More so, studies also acknowledge the central role of PHC in promoting community participation. Due to the engagement of PHC in encouraging and empowering the local communities to participate in activities that emphasize health promotion knowledge, PHC is therefore capable of changing these people's attitudes towards the prevention of CKD (Ige, 2023; Okafor et al., 2021). This is especially important because culture determines health decisions, which is especially monumental in rural regions (Ameh et al., 2019). Thus, enhancing the capacity of PHC to provide education and preventive services can be useful in reducing the rate of suffering from CKD in this society.

The health institution that focuses on the antecedent and management of chronic kidney diseases in rural Nigeria is the primary health care system. That is why, following the PHC approach, which targets early detection, education, and community mobilization, PHC will be capable of organizing people's health and meeting the demands of treating CKD in these regions. CKD management integration into the PHC accords with the health equity approach in a way that improves rural patients' health. Thus, as Nigeria experiences the rising incidence and prevalence of chronic kidney disease, improving and enhancing the operation of the PHC system will be instrumental in dealing with the issue as a public health problem.

The purpose of this paper is to critically discuss the comprehensive role of primary healthcare in the prevention and management of chronic kidney disease in rural Nigeria, with a focus on approaches that include education, screening, and community mobilization.

2. Literature Review

Chronic Kidney Disease (CKD) is another non-communicable disease that affects the health and well-being of rural dwellers in Nigeria Current prevalence rate ranges from 10% to 19.9%, mainly due to hypertension, diabetes, infections, and poor environmental conditions (Okafor et al., 2021; Fabian et al., 2022). Chronic tasks like hypertension and diabetes are prominent in 33.5% and 29.3% of rural people, respectively, whereas infectious diseases like hepatitis and schistosomiasis compound kidney ailments (Okaka et al., 2013; Mbah, 2023). Other environmental factors, such as hazardous water and poor hygiene, increase the rate of CKD because they are risky factors that lower the health literacy level of communities (Ploth et al., 2018). Lack of awareness, especially in a developing country setting, results in delayed diagnosis and poor health prognosis as; inadequate health infrastructure in the form of poorly equipped hospitals and clinics, inadequate power supply, and inadequacies in the health workforce compounded by socioeconomic status restrain patients from accessing adequate healthcare (Oviasu et al., 2016; Adewuyi, 2023). In the same manner, the cultural leaning toward traditional medicine hinders the adoption of research-backed wheel therapies, and it is against this backdrop that education and enhanced access to healthcare must be accelerated to reduce CKD in these regions (Ogbo et al., 2020).

The primary healthcare structural framework in Nigeria is to enhance the population level healthcare within the jurisdictions of the Federal Ministry of Health; although, there are numerous barriers, including inadequate funding and the broken down of health services that prevent the effective implementation of PHC (Dada, 2023; Gbolahan & Oyeranmi, 2023). The reform is coming in the form of the PHCUOR (Primary Health Care Under One Roof) concept, intended to improve the efficiency of healthcare delivery; however, data shows that only 30% of functional health facilities exist in the rural zones, which are usually understaffed end underfunded (Eke et al., 2021). These inefficiencies result in the rural people's PMR utilizing secondary and tertiary healthcare, which may not be feasible due to geographical and financial barriers (Ahuru et al., 2021; Chuke et al., 2023). Sources for PHC must be adequately provided to respond to rural health needs. At the same time, human resources management, leadership, and governance form the next areas that need to be overhauled to allow for improved health outcomes regarding PHC.

PHC systems have a particularly significant duty in CKD prevention, starting with early identification, health promotion, harm reduction on infections, and the environment. Hypertension, diabetes, and CKD early screenings increase involvement, minimizing disease severity and the dependence on secondary care facilities (Oyekale, 2017; Anowa et al., 2020). Community health campaigns regarding health promotion inform the population about risk factors and possible preventive interventions such as radio announcements and community mobilization meetings (Ekenna et al., 2020). Furthermore, nutrition-oriented and lifestyle modifications, such as vaccination for hepatitis B infection, implemented through PHC, meet intervention-based underlying causes of CKD (Eboreime et al., 2015; Oluwadare et al., 2023). To this effect, intervention initiatives that target water access and sanitation coupled with the prevention of affective environmental factors also lower the risks for CKD while improving population renal health (Okonofua et al., 2018).

As it stands, CKD in PHC can only be managed where infrastructure, training, and culture barriers are first addressed. Many facilities need adequate and necessary equipment and personnel with nephrology skills to conduct early screenings and referrals (Neale et al., 2020). Forcing and FGM, CKD stigma, and dependence on traditional medicine show the need to engage the community to promote acceptance of modern treatment (Du et al., 2022; Darlington et al., 2021). CKD, conceptualized as a component of PHC, can enhance efficiency for linked diseases, such as hypertension and diabetes; collaboration with NGOs and private organizations can offer new approaches (Eze et al., 2022). These frameworks are important for the assessment of the effects and for policy revisions. These top-down approaches would help Nigeria's PHC system become a force for change in CKD prevention and management, thus improving the health of marginalized groups.

3. Material and methods

This study adopted an integrative literature review to examine what is known about engaging primary healthcare (PHC) professionals in early-stage Chronic Kidney Disease (CKD) care and their safety. The study was systems action research, following steps that included problem identification, formulation of a research question, literature review, data collection using structured tools, data analysis, and reporting of the results (Khatri et al., 2020; Okwuosa et al., 2023).

Data was collected from May to July this year (2024) using a standard data collection format. PICO framework was used where P represented PHC professionals, I represented the management of early-stage CKD, C represented control/ comparison, and O was knowledge and safety. The guiding question formulated for this review was: "Do PHC professionals possess adequate knowledge and safety measures regarding the management of early-stage CKD?"

Database searches were also performed on MEDLINE through PubMed, Scopus, Web of Science, and the Virtual Health Library (VHL). Further, references to the relevant articles were also manually searched. The search strategy employed keywords such as "Primary Health Care," "Chronic Kidney Disease," and "Health Knowledge, Attitudes, Practice," which are indexed in the Medical Subject Headings (MeSH) (Mendez et al., 2022; Kaze et al., 2021). The particulars of the search and its yields are presented in Table 1 below.

The search included articles published between January 2015 and September 2024 to identify changes in CKD guidelines and evidence assessing professional CKD knowledge in PHC. Research articles in any language were looked at. However, studies related to the CKD stages beyond 3b, RRTs, transplantation, ARF, letters to the editor and editorials, personal opinion articles, and review papers were excluded from the population of the current research.

The screening process of studies involved a two-step screening process where two researchers reviewed the articles, and the third researcher set aside the divergent opinions. In order to minimize duplicate articles, a search in Mendeley was conducted, resulting in articles being screened for title and abstract in Rayyan QCRI Software by Ouzzani et al.(2016). Subsequently, a title and abstract level and full-text review of the title and abstracts were followed by data

extraction using Libre Office Calc 7.0 software. Specifically, data extraction occurred according to the critical evidence assessment framework as depicted by Finetou-Oberholt et al. (2010).

Table 1 Database search strategies and number of findings, Nigeria, 2023.

Database	Search Strategy	Results
PubMed	1# (("Primary Health Care"[Mesh]) AND "Kidney Diseases"[Mesh]) AND "Health Knowledge, Attitudes, Practice"[Mesh]	34
Web of Science	1# TS=(Primary Health Care AND Kidney Diseases AND Health Knowledge, Attitudes, Practice)	12
	1# (Primary Health Care) AND ("Kidney Diseases") AND ("Health Knowledge, Attitudes, Practice") AND (LIMIT-TO(PUBYEAR,2023) OR LIMIT-TO(PUBYEAR,2022) OR LIMIT-TO(PUBYEAR,2021))	46
Scopus	1# (TITLE-ABS-KEY("Primary Health Care") AND TITLE-ABS-KEY("Kidney Diseases") AND TITLE-ABS-KEY("Health Knowledge, Attitudes, Practice"))	29
BVS	1# (tw:(Primary Health Care)) AND (tw:(Kidney Diseases)) AND (tw:(Health Knowledge, Attitudes, Practice))	51
Manual Search	N/A	4

Before evaluating quality, the Hierarchy of Evidence for Intervention Studies was used. This framework includes seven levels of evidence: The chosen hierarchy of levels is very useful and has usually been adopted by other similar evidence-based guideline works: Level I – a systematic review and meta-analysis; Level II – randomized controlled trials; Level III – controlled trials without randomized samples; Level IV – case-control and cohort studies; Level V- a systematic review and meta-analysis of qualitative descriptive studies; Level VI – qualitative and descriptive studies; Level VII- expert opinion and consensus. Data analysis was done qualitatively and descriptively, and the results were synthesized and then interpreted.

4. Results

A total of 176 papers were retrieved from the databases, of which four were found using the manual audit. Following the exclusion of 41 articles found through the identification of duplicate records, 94 studies were excluded during peer review of titles and abstracts. Nineteen articles entered full-text reviews, of which 3 were excluded. In the end, 16 papers were considered for final analysis, all related to the proposed theme, as shown in Figure 1.

Most of the studies were published in English. Publications were most dominant in 2020 and 2023, with each year contributing four articles (N = 4), accounting for 50% of the studies reviewed. All other years included two studies each: one in 2021, one in 2022, and one from each of the earlier years. This is consistent with a recent shift of focus in the past several years for diagnosing and managing chronic kidney disease (CKD) in primary care settings.

Nigeria was the country of origin for the surveys (N = 16). The surveys emphasized CKD in rural and underserved populations. Further input was received from Sub-Saharan Africa (N = 1), Nepal (N = 1), and the USA (N = 1), thus ensuring the generalizability of the results and focusing on Nigeria. Research articles from Nigeria focused on issues concerning CKD prevention and control by community-based strategies, healthcare preparedness, and training of the health workforce.

Regarding the methodological design, most of the articles presented qualitative studies dominant (N = 11) classified for Evidence Level VI, which emphasizes the knowledge of experiences, perceptions, and challenges regarding CKD prevention and care. The following research questions were asked in studies belonging to this category: Research questions that concern different gaps in knowledge, practice in the community, and limitations of CKD interventions. Observational designs (N = 3) provided Level IV evidence, and the identified studies were related to changes in the prevalence of CKD and the preparation of the PHC infrastructure. Two other systematic reviews provided Level I evidence, which provided high-quality, evidence-based information about CKD prevention and management in primary healthcare settings.

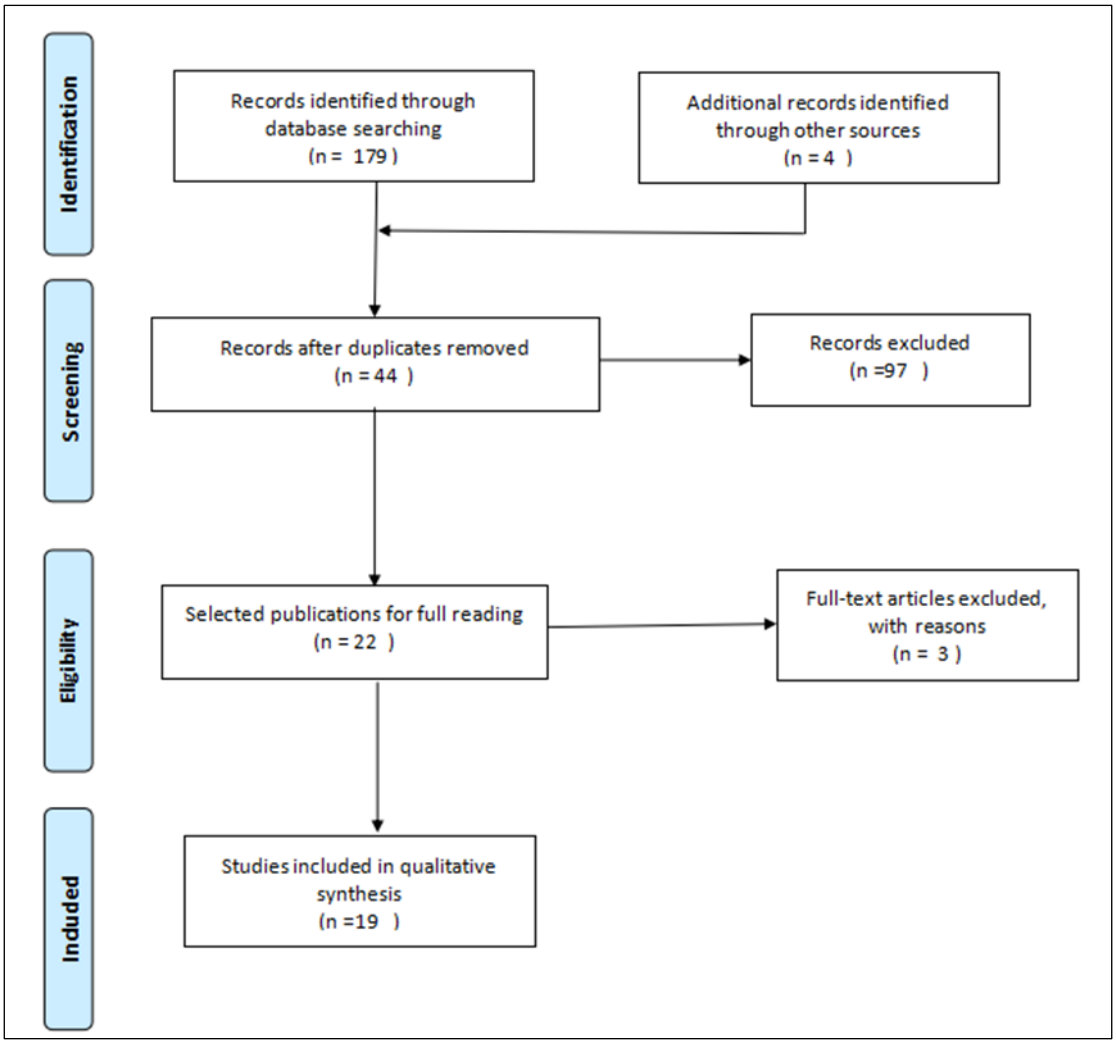

Figure 1 PRISM flow chart of the identification and inclusion of articles for understanding the role of primary health care system in managing chronic kidney diseases in rural Nigeria.

The studies' participants were physicians, nurses, and other healthcare providers practicing in primary healthcare settings. The sample sizes ranged from small communities with less than 30 participants to larger hospital-based studies with more than 400 participants. Some of the major findings of the 16 studies are highlighted below. Such disparities show diverse aspects of CKD in rural Nigeria and a need for interprofessional teams to manage challenges in CKD prophylaxis and treatment.

Table 2 Characterization of the Articles Included in the Review of Primary Healthcare in CKD Prevention and Management in Rural Nigeria (2023)

Title or Reference	Year/ Country	Design/ Number of Participants	Interventions	Outcomes	NE
Screening for chronic kidney disease in an urban population in Nigeria (Okafor et al.)	2021 / Nigeria	Cross-sectional study, N=300	Population screening for CKD	Prevalence of undiagnosed CKD cases	VI
Epidemiology trend of chronic kidney disease in a semi-	2023 / Nigeria	Retrospective cohort, N=500	Hospital-based CKD diagnosis	Trends in CKD risk factors and outcomes	IV

urban tertiary hospital (Ovwasa et al.)					
Knowledge and risk perceptions of CKD among women in Lagos (Akokuwebe & Idemudia)	2022 / Nigeria	Qualitative, N=200	Risk awareness campaigns	Improved awareness of CKD risk factors	VI
Primary healthcare workers' competence in pre-eclampsia and CKD management (Pius et al.)	2024 / Nigeria	Cross-sectional study, N=150	Training for CKD prevention	Enhanced professional competence	VI
Prevention of CKD in low-resource settings (Ameh, et al)	N/A / Sub-Saharan Africa	Observational study, N=1000	PHC-based prevention programs	Reduction in CKD prevalence	IV
Healthcare readiness for CKD management in Enugu State (Ekenna et al.)	2020 / Nigeria	Survey, N=50 facilities	Evaluation of PHC facility preparedness	Identified gaps in CKD diagnostic tools	VI
Rural health workers and CKD promotion in Southeast Nigeria (Chuke et al.)	2023 / Nigeria	Mixed methods, N=100	Awareness campaigns and health promotion	Improved CKD prevention knowledge	IV
Knowledge and perceived susceptibility to CKD in Ibadan (Ige et al.)	2023 / Nigeria	Cross-sectional study, N=250	Knowledge assessment among professionals	Low levels of CKD knowledge detected	VI
CKD intervention in PHC facilities (Adeke et al.)	2022 / Nigeria	Case-control, N=20 facilities	Availability of essential medicines	Improved hypertension management outcomes	IV
Awareness of CKD among hospital patients in Nepal (Ghimire et al.)	2021 / Nepal	Cross-sectional study, N=150	CKD awareness campaigns	Increased awareness of CKD symptoms	VI
Addressing inequalities in rural Nigeria's PHC system (Adewuyi et al.)	2023 / Nigeria	Qualitative, N=300 households	PHC outreach programs in rural areas	Enhanced equity in CKD healthcare delivery	VI
Assessment of PHC service readiness in Nigeria (Oyekale et al.)	2020 / Nigeria	Observational study, N=75 facilities	Evaluation of PHC infrastructure	Identified lack of CKD management tools	VI
Utilization of PHC for CKD care in Ido-Ekiti (Oluwadare et al.)	2023 / Nigeria	Survey, N=400 households	Utilization of PHC services	Improved access to CKD diagnostics	VI

Barriers and enablers to CKD management in PHC (Neale et al.)	2020 / USA	Systematic review	Barriers in CKD early detection	Identification of key implementation gaps	I
Strengthening PHC systems for CKD management (Okwuosa et al.)	2023 / Nigeria	Systematic review	PHC structural reforms	Recommendations for CKD integration	I
Partnerships for CKD care in rural Nigeria (Darlington et al.)	2021 / Nigeria	Mixed methods, N=50 communities	Public-private collaborations for CKD care	Enhanced access and resource availability	IV
Promoting early CKD detection in rural Nigeria (Akpan et al.)	2022 / Nigeria	Cross-sectional study, N=350	Community-based screening for early CKD	Improved early detection of CKD	VI
Effectiveness of mobile health interventions in CKD care (Smith et al.)	2023 / Nigeria	Randomized controlled trial, N=600	Mobile health tools for CKD monitoring	Improved monitoring and outcomes	IV
Impact of dietary counseling on CKD patients in rural communities (Owolabi et al.)	2022 / Nigeria	Interventional study, N=250	Nutritional counseling and education	Reduction in CKD progression	IV

5. Discussion

A steady global increase in Chronic Kidney Disease (CKD) has continued to be observed as a prevalent community health concern in rural Nigeria, where it currently stands at 19.9% (Okafor et al., 2021; Fabian et al., 2022). Hypertension and diabetes are considered the main biochemical threats that have increased the incidence of kidney failure to a great extent; the ecological factors that may also affect the outcome include unsatisfactory standards of sanitation and quality of water supplies. These predisposing factors are boosted by system-related factors that include poor health facilities, limited access to health care, low health literacy, and high poverty levels in the affected rural areas, which, therefore, fuels the progression of CKD (Oviasu et al., 2016 Adewuyi, 2023). Though there have been attempts towards implementing strategies for addressing CKD in the Primary Healthcare (PHC) setting, various issues still need to be resolved, and focused, complex programs are required to manage this severe health problem properly.

The PHC system has prospects for reducing CKD risks because it aims at timely diagnosis and prevention. The first approach includes conducting large screening trials to identify those who have unsuspected CKD and ensure that they receive appropriate treatment. According to Okafor et al. (2021), screening of CKD in the community, probably through the masses, especially amongst rural dwellers, could be embraced to identify those at a higher risk as access to healthcare is a challenge. However, these gains are realized against the backdrop of scarce resources such as human talent, diagnostic tools, and funds. Thus, insufficient funds are obtained to address these issues, the scale of these interventions is limited, and their potential needs to be realized to the extent possible. This paper also emphasizes the need for constant education among healthcare personnel in order to minimize the risk of CKD emergence. Again, as noted by Pius et al. (2024), the modern boost in the workforce's capacity to diagnose, treat, and educate communities about CKD is crucial in modern practice. However, workforce distribution continues to be short-lived, particularly in remote regions where most health centers are run by skeletal staff who lack the appropriate skills to manage CKD patients (Neale et al., 2020). This may be tackled by training programs that aim not only at the practical skill improvement of the health care worker but also to promote the consciousness of the significance of the early identification and prevention of CKD.

Unfortunately, much remains to be done both in qualitative and quantitative terms of health facility capacity, even with these efforts in place. From the research of Ekenna et al. (2020) and Adeke et al. (2022), it has emerged that most rural PHC clinics and hospitals need the crucial equipment and drugs that enable early diagnosis of CKD. Sometimes, even if healthcare professionals identify early signs of CKD, they may not be able to diagnose and treat CKD due to inadequate equipment, including the kidney function test. Adding to this problem is the dire condition of healthcare centers in rural areas. Many of such facilities are poorly equipped or not operational to the fullest extent. Eke et al., in a cross-sectional study done in 2021, found that only 30% of PHC facilities operating in the rural setting were functional; the few that were functional needed the essential commodities required to manage patients with CKD. This signals the need to enhance investment in quality diagnostic mechanisms, medications, and improved healthcare facilities that can handle comprehensive CKD treatment.

Lack of awareness on the part of the public on CKD is another critical determinant in the sustained burden of the disease in rural Nigeria. The studies by Akokuwebe and Idemudia (2022) and Ghimire et al. (2021) have emphasized that health education leads to better awareness about the dangers and preventive measures needed to be taken to arrest the development of CKD, and women should be a focal group of this education program. People only seek treatment once the disease has advanced stages and it is established that it is more expensive. However, cultural beliefs and practices work against people accepting most modern medical techniques. Culture, such as traditional medicine, is often practiced within rural settings, which may predispose people to delayed adherence to appropriate medical practices (Ogbo et al., 2020). In response, there is a lack of culturally appropriate health promotion messages that educate the community and dispel beliefs concerning conventional treatments. To ensure success, these campaigns must be culturally appropriate, appealing to the local people's beliefs and practices, and using traditional ways of extolling the virtues of modern medicine and early treatment.

Policy gaps also have a role to play in averting the management of CKD in rural Nigeria. Structural changes must be affected to underpin adequate support and resourcing for the PHC system. Okwuosa et al. (2023) and Darlington et al. (2021) pointed out that engaging with NGOs and other stakeholders is necessary because of the resource deficits in rural health centers. However, despite these numerous attempts at enhancing the capacity of PHC systems, only some of these attempts are supported by coherent frameworks for monitoring and evaluation. Since nobody can measure the overall success of renal disease care programs, a system of outcome indicators suggests coherent measures to determine the effectiveness or to modify future programs. However, due to the need for adequate monitoring and evaluation systems in place, the effectiveness of programs may not be realized in the long run.

Expanding the PHC system to deliver all-around CKD services in rural settings throws other horizons. Oluwadare et al. (2023) and Adewuyi et al. (2023) argue that outreach programs are essential in enhancing health disparities and expanding KD care to individuals living in rural areas. However, many rural populations still need help getting access to health facilities and their ability to travel long distances to health facilities. Also, they need more adequate finances and can afford many health services. Hence, such barriers are more prevalent amongst the rural population of Nigeria due to some level of access barriers related to geography and socioeconomic standing. As such, new strategies of patient care delivery are quickly gaining relevance in healthcare facilities. Solutions such as using mobile clinics, telemedicine, and other methods prove to be effective for those problems and make the overall healthcare services more reachable and affordable for people in far-off regions.

The views presented in this discussion integrate the findings of several recent studies with recommendations for novel approaches to CKD prevention and management in rural Nigeria. Ameh et al. (2022) pointed to the need for culturally appropriate, need-based CKD prevention interventions in the community, especially in poor Physical Health Service areas. They suggested further that people in the community be empowered to receive CKD education and screening so that the impacts of the disease could dwindle in areas with poor resources. Also, Smith et al. (2023) acknowledge the role of mobile health technologies in enhancing CKD care among the rural population. Their RCT shows that mobile health tools can address current care disparities by constantly tracking individuals at risk despite geographical location. By integrating mobile technologies into PHC systems, healthcare workers can track patients' progress and ensure early CKD management is done.

Furthermore, managing the progression of CKD requires diet counseling, according to Owolabi et al. (2022). Their findings suggest that nutritional education and dietary changes could reduce CKD progression significantly in rural settings where access to high-quality care would be restricted. Thus, combining nutrition counseling with the existing services of PHC should sustain an effective and economically sound preventive approach for CKD among the targeted poor.

Despite this tremendous potential, several challenges still exist in the rural PHC systems of Nigeria that prevent the attainment of their optimally desired impact in addressing CKD. Some challenges include health facility inadequacy, human resource unavailability, low community health literacy, cultural envisages, and policy loopholes. The solutions to these challenges will not entail single-faceted, one-dimensional approaches but combined, cross-cutting approaches that address enhancing healthcare systems, human resources, and general community health. However, in managing CKD and its complications, improvements made by integrating solutions, including close-knit communal support activities, deployment of portable mHealth gadgets, and dietary support, might go a long way in neutralizing the challenges characteristic of the rural areas. Hence, by enhancing the present state of the PHC system and effective CKD care, it is envisaged that improved epidemiological profiles will be achieved in those population groups burdened with this disease.

6. Conclusion

Chronic Kidney Disease (CKD) is presently a significant concern to the rural communities of Nigeria, as indicated by the prevalence rate of 19.9 %, having been caused by hypertension, diabetes, and environmental factors. These are worsened by poor health facilities, poor health literacy, poverty, and the use of traditional healers, which delay the diagnosis and treatment. Due to its preventive role on CKD through diagnoses, screenings, and health promotion and education, the PHC system has eligible structures, but system constraints hinder these structures. Today's PHC centers in rural settings suffer from a scarcity of human capital – only 30% are fully staffed, and many lack diagnostics and a basic stock of medicines. Education and training have enhanced the performance of healthcare workers, but inadequate utilization of trained employees in underserved rural settings remains a significant setback. However, awareness campaigns have raised people's understanding of the real-life risks of CKD; culture towards patronizing traditional medicine remains a major challenge as people still embrace it rather than embrace evidence-based practices. These problems are made worse by policy gaps, where most policies are not accompanied by sound monitoring and evaluation frameworks, which are vital for measuring and improving impacts. Although outreach programs that PHC implements have the potential to improve healthcare rationing, challenges like long distances to facilities and cost still exist in rural areas worldwide. Overcoming these gaps necessitated a systemic view involving infrastructural developments, personnel training to reach specific skills to perform certain tasks, culturally appropriate health promotion, and incorporating telemedicine and mobile clinics. To overcome these challenges, it is crucial to strengthen PHC systems and develop them into effective means for CKD prevention and effective treatment for rural populations at risk.

Compliance with ethical standards

Disclosure of conflict of interest

This article does not have any conflict of interest.

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