

ASSESSMENT OF OSTEOPOROSIS KNOWLEDGE, ATTITUDE, AND PRACTICES (KAP) AMONG CHRONIC KIDNEY DISEASE (CKD) PATIENTS IN A TERTIARY CARE HOSPITAL, KARACHI

Syed Muhammad Fauzan Ali¹, Ariba Khan², Shahnaz³, Muhammad Uzair⁴, Muhammad Umer Hayat⁵, Margrate⁶

¹Manager Innovation and Commercialization Assistant Dean, Faculty of Health Management Sciences Baqai Medical University

²Lecturer Baqai Institute of Health Management Sciences Baqai Medical University

^{3,4,5,6}Baqai Institute of Health Management Sciences Baqai Medical University

¹saiyedfauzan@gmail.com

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Corresponding Author: *

Syed Muhammad Fauzan Ali

Abstract

Chronic kidney disease patients face significantly elevated risks for osteoporosis, yet their awareness levels remain poorly characterized. This cross-sectional study assessed osteoporosis-related knowledge, attitudes, and practices among 100 CKD patients at a tertiary care hospital in Karachi. A validated interviewer-administered questionnaire was used to evaluate KAP levels. Results demonstrated surprisingly high overall knowledge (69% high knowledge), positive attitudes (66% high attitude), and good preventive practices (72% high practice) within this cohort. Statistical analysis revealed that higher educational attainment was significantly associated with better knowledge scores ($p=.019$), confirming education as a crucial determinant of health literacy. However, this educational advantage did not extend to improved attitudes or practices, highlighting a persistent know-do gap. Notably, clinical factors including CKD stage and demographic variables like age and gender showed no significant associations with knowledge levels. The findings suggest that specialized nephrology care effectively delivers complication-specific education, though additional strategies addressing behavioral mediators remain necessary to translate knowledge into consistent practice, particularly for patients with educational disadvantages.

INTRODUCTION

Chronic kidney disease (CKD) is a growing public health burden in Pakistan, largely driven by high prevalence of diabetes and hypertension (1). A critical yet underrecognized complication of CKD is osteoporosis, which substantially increases the risk of fractures, morbidity, and mortality due to altered mineral metabolism and prolonged medication use (2). Despite this elevated risk, patient awareness regarding bone health remains alarmingly low, even for CKD

itself, with meta-analyses indicating that only 19.2% of CKD patients are aware of their condition, varying significantly by clinical setting (3). This lack of awareness extends to osteoporosis, a silent disease often diagnosed only after a fracture occurs. In Pakistan, existing studies on osteoporosis knowledge have primarily focused on medical students, healthcare professionals, or general populations, revealing considerable knowledge gaps and suboptimal

preventive practices (4,5). However, there is a conspicuous absence of research examining osteoporosis-related knowledge, attitudes, and practices (KAP) among CKD patients, who represent a high-risk group requiring tailored clinical and educational interventions.

The problem is multifaceted: CKD patients are not only vulnerable to osteoporosis but are also often unaware of their risk, leading to inadequate self-management and poor health outcomes (6). Studies from other regions, such as China, have demonstrated that CKD patients exhibit moderate to low knowledge, neutral to negative attitudes, and insufficient preventive practices concerning osteoporosis (7). In Pakistan, similar trends are observed in the general population, where misconceptions about osteoporosis are widespread and preventive measures such as calcium supplementation, physical activity, and bone density scans are poorly adopted (8,9). This gap is particularly concerning given that effective disease management in CKD requires informed patient participation, and education level has been repeatedly shown to influence health literacy and self-efficacy (10,4). Without understanding the specific KAP profile of CKD patients in Pakistan, healthcare providers and policymakers cannot design effective, targeted interventions to mitigate fracture risk and reduce associated healthcare costs.

The rationale for this study is therefore rooted in the urgent need to generate context-specific evidence that can guide clinical practice and patient education within nephrology care settings. By assessing osteoporosis KAP among CKD patients, this research aims to identify critical knowledge gaps, attitudes, and behavioral patterns that may hinder effective prevention. Moreover, it seeks to determine whether socio-demographic and clinical factors, such as education level, gender, age, and CKD stage, significantly influence KAP outcomes. Previous studies in other populations have yielded conflicting results regarding the role of these factors, with some reporting significant associations with education and others finding no such relationships (11,12). Clarifying these dynamics in a Pakistani CKD cohort will enable

more stratified and efficient resource allocation, educational targeting, and policy development.

Consequently, this study aims to evaluate the knowledge, attitudes, and practices related to osteoporosis among CKD patients in a tertiary care hospital in Karachi, Pakistan.

Primary research Question:

What are the KAP scores concerning risk of osteoporosis among CKD patients?

Secondary question:

Do significant associations exist between socio-demographic/clinical variables, such as education level, CKD stage, age, and gender, and KAP scores?

By addressing these questions, this study intends to provide foundational evidence for developing patient-centered educational programs and clinical protocols aimed at reducing the burden of osteoporosis in this vulnerable population.

METHODOLOGY

A cross-sectional study was conducted to evaluate knowledge, attitudes, and practices concerning osteoporosis among patients with chronic kidney disease. The study was carried out in the survey camps of tertiary care hospitals in Karachi. A predetermined sample of one 100 participants was enrolled utilizing a combination of purposive and convenience sampling methods. This strategy was implemented to efficiently identify and recruit eligible individuals from the target population within the study's operational timeline.

Data collection was performed using a structured questionnaire administered by a trained interviewer to ensure comprehension and consistency. The instrument was adapted from previously validated tools and consisted of four parts: socio-demographic and clinical characteristics, knowledge assessment using true/false items, attitude evaluation based on a five-point Likert scale, and practice questions with yes/no responses. Each participant provided written informed consent before filling out the questionnaire.

Inclusion criteria required participants to be at least 25 years of age with a documented diagnosis of chronic kidney disease at stage 3, 4, or 5, including those receiving dialysis. Individuals with significant cognitive impairment, an active psychiatric condition, or those who declined participation were excluded. To minimize selection bias against older patients, those with mild communication difficulties were included provided a caregiver could assist in facilitating the interaction.

DATA ANALYSIS

The vast majority of patients demonstrated commendable awareness, with over two-thirds showing high knowledge and positive attitudes towards osteoporosis. Most patients also reported strong engagement in preventive practices, indicating a cohort that is generally well-informed and proactive about managing their bone health alongside chronic kidney disease.

Table 1 Distribution of Osteoporosis-Related Knowledge, Attitude, and Practice Scores among CKD Patients

Score Category	Knowledge n (%)	Attitude n (%)	Practice n (%)
Low	6 (6.0%)	7 (7.0%)	3 (3.0%)
Moderate	25 (25.0%)	27 (27.0%)	25 (25.0%)
High	69 (69.0%)	66 (66.0%)	72 (72.0%)
Total	100 (100%)	100 (100%)	100 (100%)

Descriptive Statistics was applied to identify the frequencies

This table reveals a clear educational gradient in osteoporosis knowledge. Patients with graduate education showed markedly higher knowledge (70.6% high knowledge) compared to those with only primary education (37.8% high knowledge). Interestingly, this educational advantage did not extend to attitudes or practices, where all groups showed similarly positive results. Neither gender

nor CKD stage demonstrated notable differences in knowledge distribution. These findings specifically address our secondary research question by identifying educational attainment as the only significant demographic predictor of knowledge levels, while showing other factors like disease severity and gender did not influence patient understanding in this cohort.

Table 2 Cross-tabulation of Socio-Demographic/Clinical Variables with Knowledge, Attitude, and Practice Scores

Predictor Variable	KA Score Category	Primary (%)	Secondary (%)	Graduate (%)	Male (%)	Female (%)	Stage 3 (%)	Stage 4 (%)	Stage 5 (%)
Education	Knowledge	Lo	8 (21.2)	5 (17.2)	2 (5.9)	—	—	—	—

	edg	Mo	6%)	%)	%)					
	e	der	15	10	8					
		ate	(40.	(34.5	(23.5					
		Hi	5%)	%)	%)					
		gh	14	14	24					
			(37.	(48.3	(70.6					
			8%)	%)	%)					
			4	1	2					
		Lo	(10.	(3.4%	(5.9					
		w	8%))	%)					
	Att	Mo	7	10	10	—	—	—	—	—
	itu	der	(18.	(34.5	(29.4					
	de	ate	9%)	%)	%)					
		Hi	26	18	22					
		gh	(70.	(62.1	(64.7					
			3%)	%)	%)					
			1	0	2					
		Lo	(2.7	(0.0%	(5.9					
		w	%))	%)					
	Pra	Mo	9	5	11	—	—	—	—	—
	ctic	der	(24.	(17.2	(32.4					
	e	ate	3%)	%)	%)					
		Hi	27	24	21					
		gh	(73.	(82.8	(61.8					
			0%)	%)	%)					
						4	2			
						(8.2	(3.9			
		Lo				%)	%)			
	Kn	Mo				15	10			
	owl	der	—	—	—	(30.	(19.	—	—	—
	edg	ate				6%	6%)			
	e	Hi))			
		gh				30	39			
						(61	(76.			
						.2%	5%)			
))			
								2	0	4
		Lo						(6.1	(0.0	(6.2
	Kn	w						%)	%)	%)
	owl	Mo	—	—	—	—	—	8	0	17
	edg	der						(24.	(0.0	(26.
	e	ate						2%	%)	6%)
		Hi								

gh)	3	43
	23	(100	(67.
	(69	.0%)	2%)
	.7%		
)		

Chi-Square Applied for Cross Tabulation

These statistical tests confirm what the previous table suggested: education level is the only factor significantly associated with knowledge, as shown by the statistically significant p-value of .019. The Cramer's V value of 0.24 indicates a modest but meaningful relationship between educational attainment and knowledge levels. Notably, education showed no significant association with

attitudes or practices, suggesting knowledge alone doesn't guarantee behavioral change. The non-significant results for gender and CKD stage reinforce that these factors don't meaningfully influence knowledge in this population, directing focus toward education as the key differentiator in patient understanding of osteoporosis risks.

Table 3 Chi-Square Test Statistics for Associations between Predictor Variables and KAP Scores

Predictor Variable	KAP Domain	χ^2 Value	df	P-value	Significant?	Cramer's V
Education Level	Knowledge	11.85	4	.019	Yes	0.24
Education Level	Attitude	3.10	4	.541	No	0.12
Education Level	Practice	4.23	4	.376	No	0.15
Gender	Knowledge	2.80	2	.246	No	0.17
CKD Stage	Knowledge	1.46	4	.834	No	0.09

Chi-Square Test Statistics Applied

The analysis for spearman correlation did not find any significance. This indicates that a patient's age was not a meaningful predictor of their osteoporosis knowledge in this study. This finding aligns with the other non-significant results, collectively showing that neither age, gender, nor CKD stage influenced knowledge levels, leaving education as the sole significant predictor.

Table 4 Correlation between Participant Age and Knowledge Score

			Participant's age	Knowledge Score
Spearman's rho	Participant's age	Correlation Coefficient	1.000	-.094
		Sig. (2-tailed)	.	.352
		N	100	100
	Knowledge Score	Correlation Coefficient	-.094	1.000

Sig. (2-tailed)	.352	.
N	100	100

Spearman correlation applied

DISCUSSION

The findings of this study present a compelling narrative that both aligns with and diverges from existing literature in important ways. The most striking result is the high overall level of osteoporosis knowledge, attitude, and practice observed in this cohort of CKD patients, which contrasts sharply with the low CKD awareness pooled across 32 studies (19.2%) (1), and the generally poor knowledge of CKD itself reported in other populations (2,3). This discrepancy may be attributed to the specialized nephrology care setting of our study, which aligns with findings that awareness is highest in nephrology clinics (86.2%) (1). It suggests that sustained, targeted education in tertiary care can effectively cultivate high levels of understanding regarding specific complications like osteoporosis, even if general disease awareness remains low, a phenomenon similarly observed in other specialized renal care contexts (14,15).

The results robustly confirm the pivotal role of education, a finding consistent across global and local contexts. The significant association (p=.019) between higher educational attainment and superior knowledge scores mirrors outcomes from studies in Pakistan (7,8), Saudi Arabia (9), Vietnam (10), and India (11), which consistently identify education as a primary driver of health knowledge. This underscores education as a fundamental social determinant of health literacy, transcending geographical and cultural boundaries. However, a crucial and novel insight from our study is that this educational advantage did not extend to influencing attitudes or practices. This "know-do" gap reinforces the complex nature of health behavior change suggested by Chuang et al., where knowledge alone is insufficient without the mediating role of self-efficacy (4), a challenge also documented in studies of hemodialysis patients' understanding of their treatment (16,17).

Furthermore, the absence of significant associations between knowledge and clinical factors like CKD stage or demographic factors like age and gender provides a critical nuance. This contrasts with some assumptions but aligns with studies that found no consistent link between knowledge and variables like gender or years of experience (12,13). This collective finding directs clinical focus away from assuming that sicker or older patients are less informed, and instead emphasizes that a patient's educational background is a more reliable indicator of their knowledge level, regardless of their clinical status, consistent with findings from multidisciplinary renal care teams (18).

The high overall KAP scores in our study population contrast sharply with the moderate-to-low knowledge and poor preventive practices reported in other CKD populations (6,19). This discrepancy may reflect the intensive, specialized care received by our cohort, suggesting that consistent education within nephrology clinics can effectively raise awareness of specific complications like osteoporosis, as demonstrated in educational interventions for diabetic CKD patients (19). However, the persistent gap between knowledge and practice emphasizes the need to address the psychosocial mediators of health behavior, particularly self-efficacy, which has been identified as a crucial factor in chronic disease management (4,20), even extending to complex scenarios such as pandemic management in dialysis populations (20) and AVF care among hemodialysis patients (15,21).

CONCLUSION

This study provides valuable insights into the osteoporosis-related knowledge, attitudes, and practices of chronic kidney disease patients within a specialized care setting. The findings reveal a notably high overall level of awareness and engagement with bone health management,

contrasting with generally poor CKD awareness documented in broader populations. This suggests that targeted, sustained education in nephrology care settings can effectively promote understanding of specific disease complications, offering an important model for improving patient education in chronic disease management.

The research clearly identifies educational attainment as the most significant predictor of osteoporosis knowledge, reinforcing education's role as a fundamental determinant of health literacy across diverse populations. However, the observed disconnect between knowledge and practice highlights the complex nature of health behavior change and underscores that information dissemination alone is insufficient. The absence of significant associations between knowledge and clinical factors like CKD stage or demographic variables suggests that in well-supported clinical environments, these factors may become less relevant to knowledge acquisition.

These findings have important implications for clinical practice and patient education strategies. They emphasize the need for educational interventions that not only transmit knowledge but also address the psychological and behavioral aspects of chronic disease management, particularly for patients with limited educational backgrounds. Future efforts should focus on developing tailored approaches that bridge the gap between knowledge and practice, potentially incorporating self-efficacy building strategies and addressing practical barriers to implementation. This study contributes to the growing body of literature on patient education in chronic kidney disease and provides a foundation for developing more effective, multidimensional approaches to osteoporosis prevention in this vulnerable population.

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