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Attitudes and practices toward therapeutic regimens among patients with chronic kidney disease; a prospective cross-sectional analysis

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ABSTRACT

Introduction: Chronic kidney disease (CKD) is a progressive condition associated with high morbidity and mortality, requiring strict adherence to therapeutic regimens to optimize outcomes. Patients' attitudes and practices play a critical role in determining treatment compliance, self-management, and long-term prognosis. Understanding the patients' attitude and practice levels and identifying demographic and clinical factors that influence these behaviors helps guide targeted interventions to improve outcomes.

Objectives: The aim of this cross-sectional study was to comprehensively evaluate the attitudes and practices of patients with CKD toward their therapeutic regimens and to identify the demographic and clinical factors that influence these behaviors. By analyzing these relationships, the study aimed to provide evidence on how sociodemographic characteristics shape health-related attitudes and practices, thereby informing the design of targeted interventions. Ultimately, the goal is to identify vulnerable subgroups who may require additional educational and behavioral support to improve adherence, enhance self-management, and optimize long-term outcomes in CKD care.

Patients and Methods: This prospective cross-sectional study was conducted in 2025 at the nephrology clinics in Yazd and enrolled 285 patients with CKD. Data were collected using a valid and reliable researcher-developed questionnaire consisting of 16 items across two domains (attitude and practice). Demographic and clinical information, including age, gender, education level, and dialysis status, was recorded, and questionnaire scores were calculated to quantify patient engagement and adherence. The primary outcome was the assessment of patients' attitudes and practice levels toward therapeutic regimens, with secondary outcomes examining associations with demographic and clinical factors.

Results: This study of 285 CKD patients found that attitudes and practices toward therapeutic regimens were generally moderate. Education and age emerged as significant determinants, with academically educated and older patients demonstrating more positive attitudes, stronger practices, and higher overall engagement, while gender and dialysis status showed no meaningful influence.

Conclusion: Patients with CKD showed moderate attitudes and practices, shaped mainly by education and age, while gender and dialysis status had no impact; interventions should prioritize younger and less-educated patients to improve engagement and health behaviors.

Implication for health policy/practice/research/medical education:
The study demonstrated that individuals with chronic kidney disease (CKD) generally exhibited moderate attitudes and practices in relation to their therapeutic regimen. Among the examined factors, education and age emerged as the most influential determinants of these outcomes. Patients with higher educational attainment consistently displayed more positive attitudes and greater engagement compared to those lacking academic education. Similarly, older participants tended to achieve stronger attitudes, better practices, and higher overall scores than their younger counterparts, highlighting the contribution of age-related experience to the development of constructive health behaviors. In contrast, gender and dialysis status did not appear to exert a meaningful impact on these measures.

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Original

Introduction

Chronic kidney disease (CKD) represents a major global health challenge, affecting millions of individuals worldwide and serving as a leading cause of morbidity, mortality, and diminished quality of life (1-3). The condition's progression often culminates in end-stage renal disease (ESRD) (4). These necessitate complex therapeutic regimens encompassing pharmacological interventions, dietary modifications, fluid restrictions, and lifestyle adjustments to mitigate complications such as cardiovascular events and hyperkalemia (5). From a public health perspective, the economic burden is substantial, with non-adherence to these regimens contributing to heightened hospitalization rates, increased healthcare expenditures, and poorer clinical outcomes, including accelerated disease progression and elevated mortality risk (6,7). In low- and middle-income countries, where access to essential kidney medications remains limited, these challenges are exacerbated by systemic barriers, underscoring the need to understand patient attitudes and practices as pivotal determinants of effective management (8). Addressing adherence is thus critical not only for individual patient well-being but also for alleviating the global burden of non-communicable diseases, where CKD accounts for a significant proportion of preventable deaths.

The current state of knowledge highlights that adherence to therapeutic regimens in CKD is suboptimal, with rates often ranging from 50% to 80% across various populations, influenced by multifaceted barriers (9). Studies reveal that patients frequently cite logistical challenges, such as polypharmacy, financial costs, and difficulties integrating dietary restrictions into daily routines, as key impediments (10). Facilitators include robust patient-provider communication, education on treatment rationale, and supportive resources, which enhance trust and self-efficacy (11). For instance, studies in diverse settings, including pediatric CKD cohorts, demonstrate that higher socioeconomic status and caregiver education correlate with improved adherence (12). Overall, evidence from the review studies indicates that while adherence interventions can slow CKD progression and improve quality of life, their success hinges on tailoring to patient-specific beliefs, such as perceived necessity versus concerns about side effects (13).

Despite these insights, significant inconsistencies and methodological limitations persist in the literature. Heterogeneity in adherence definitions, ranging from self-reported measures to objective pill counts, complicates cross-study comparisons and may inflate overestimations of compliance. These gaps highlight the need for further research to elucidate nuanced patient attitudes and practices, thereby informing targeted strategies to enhance therapeutic adherence and optimize outcomes in CKD populations.

Objectives

The objective of this cross-sectional study was to comprehensively evaluate the attitudes and practices of patients with CKD toward their therapeutic regimens and to identify the demographic and clinical factors that influence these behaviors. By analyzing these relationships, the study aimed to provide evidence on how sociodemographic characteristics shape health-related attitudes and practices, thereby informing the design of targeted interventions. Finally, the goal is to identify vulnerable subgroups who may require additional educational and behavioral support to improve adherence, enhance self-management, and optimize long-term outcomes in CKD care.

Patients and Methods

Study design and participants

This prospective cross-sectional study was conducted at the nephrology clinics in Yazd during 2025 to evaluate attitudes and practices of patients with CKD toward their therapeutic regimens. A total of 285 patients were enrolled through consecutive sampling, with eligibility confirmed after obtaining informed written consent.

Inclusion and exclusion criteria

Patients were eligible for inclusion if they had a confirmed diagnosis of CKD, were aged 18 years or older, and were able to provide informed written consent. Both patients undergoing dialysis and those not requiring dialysis were included. Exclusion criteria comprised individuals with severe cognitive impairment or psychiatric disorders that could interfere with questionnaire completion, and patients unwilling or unable to participate.

Data collection

This study was conducted following the acquisition of informed written consent from all participants. Data were collected using a valid and reliable researcher-developed questionnaire specifically designed to assess patients' attitudes and practices toward their therapeutic regimen. The instrument was administered directly to participants, ensuring standardized conditions for completion. Demographic and clinical information, including age, gender, education level, and dialysis status, was recorded alongside the questionnaire responses by patient interviews. Attitude and practice scores were subsequently calculated according to predefined scoring criteria, allowing for quantitative analysis of patient engagement and adherence behaviors.

Questionnaire validity, reliability, and scoring

A researcher-developed instrument was designed to evaluate attitudes and practices of patients with CKD toward their therapeutic regimens. The questionnaire comprised 16 items divided into two domains: attitude

(items 1–8) and practice (items 9–16). Each item was rated on a four-point Likert scale (0–3), with response options ranging from never (0) to always (3), or equivalently from none (0) to high (3). Domain scores were calculated by summing the respective items, yielding a possible range of 0–24 for both attitude and practice. The overall score was derived from the sum of all 16 items, ranging from 0 to 48, with a threshold of 70% of the maximum score considered indicative of adequate attitude and practice. Content validity was established through expert review by clinical nurses and nephrology specialists from Isfahan and Yazd (Islamic Azad University, Yazd and Khorasgan branches), who assessed the instrument against relevant literature and provided revisions to ensure conceptual clarity and clinical relevance. Reliability testing demonstrated excellent internal consistency, with a Cronbach's alpha coefficient of 0.92, confirming the robustness of the scale for use in this population.

Outcome measurement

The primary outcome of this study is the assessment of CKD patients' attitudes and practice levels toward their therapeutic regimens, measured through a validated scoring questionnaire of engagement and adherence behaviors. Secondary outcomes include assessing the association of demographic and clinical factors, specifically education level, age, gender, and dialysis status, in relation to these scores.

Statistical analysis

Statistical analyses were performed using SPSS version 27 (IBM Corp., USA). The distribution of continuous variables was assessed with the Kolmogorov–Smirnov test to evaluate normality, and the Levene's test was applied to examine the equality of variances across groups. Comparisons of mean attitude, practice, and combined scores between demographic and clinical subgroups were conducted using independent two-tailed significance tests, with a *P* value of less than 0.05 considered statistically significant. Linear regression analyses were further employed to identify predictors of attitude, practice, and total scores.

Results

In this study, a total of 285 patients with a mean age of 63.57 ± 14.60 years were included. The majority of participants were men and had attained an academic level of education. Slightly more than half of the patients did not require dialysis, while the remainder were undergoing this treatment. The age distribution revealed that the vast majority were older adults, with only a limited group being younger than 50 years. Regarding psychosocial measures, the average attitude score and practice score both indicated moderate levels of engagement, and when combined, the total attitude and practice score was also at a moderate level (Table 1).

The analysis of patients' attitude and practice scores across demographic and clinical characteristics demonstrated that gender and the need for dialysis did not show a significant difference in either attitude, practice, or their combined scores. Educational attainment, however, was strongly associated with higher attitude and total scores, with academically educated patients demonstrating more favorable outcomes compared to those without academic backgrounds. Age was another important factor, as older patients consistently exhibited higher attitude, practice, and total scores compared to younger individuals (Table 2).

The regression analysis demonstrated that both education level and age were significant predictors of patients' attitude and overall combined scores, with academically educated individuals and older patients showing more favorable outcomes compared to their counterparts. For practice scores, education did not

Table 1. Baseline data of participated patients in the study

Characteristics		Frequency	Percent
Gender	Male	171	60
	Female	114	40
Education level	Non-academic	113	39.6
	Academic	172	60.4
Need to dialysis	Yes	136	47.7
	No	149	52.3
Age category	< 50 years	50	17.5
	> 50 years	235	82.5
Characteristics		**Mean**	**SD**
Age (year)		63.57	14.60
Attitude score		19.55	3.89
Practice score		16.30	4.37
Total attitude and practice score		35.85	6.44

SD: Standard deviation.

Table 2. Frequency distribution of attitude and practice score according to demographic and clinical characteristics

Characteristics		Mean (SD)	*P* value*
Attitude score			
Gender	Male	19.66 (4.08)	0.552
	Female	18.98 (3.62)	
Education level	Non-academic	18.49 (3.32)	<0.001
	Academic	20.25 (4.09)	
Need to dialysis	Yes	19.87 (4.06)	0.185
	No	19.26 (3.72)	
Age category	< 50 years	18.28 (4.01)	0.011
	> 50 years	19.82 (3.82)	
Practice score			
Gender	Male	16.09 (4.31)	0.339
	Female	17.06 (4.44)	
Education level	Non-academic	15.74 (4.13)	0.080
	Academic	16.66 (4.48)	
Need to dialysis	Yes	16.59 (4.29)	0.279
	No	15.98 (4.43)	
Age category	< 50 years	15.02 (3.80)	0.022
	> 50 years	16.57 (4.44)	
Total attitude and practice score			
Gender	Male	35.76 (6.67)	0.773
	Female	36.01 (6.10)	
Education level	Non-academic	34.23 (5.68)	<0.001
	Academic	36.91 (6.70)	
Need to dialysis	Yes	36.47 (6.64)	0.124
	No	35.29 (6.39)	
Age category	<50 years	33.30 (6.42)	0.002
	>50 years	36.40 (6.32)	

SD: Standard deviation. *Independent *t* test.

emerge as a significant factor, whereas age retained a meaningful association, with older patients reporting better practices than younger ones. Collectively, these findings emphasize that higher education and older age are consistently linked to more positive attitudes and overall engagement, while age alone plays a decisive role in shaping practice behaviors (Table 3).

Discussion

The findings of this study indicated that patients with CKD demonstrate moderate levels of attitudes and practices toward their therapeutic regimens, with age and educational attainment emerging as significant positive predictors of favorable engagement, while gender and dialysis status show no significant associations. These results align with existing literature on CKD self-management, where moderate adherence is commonly reported as a barrier to optimizing health outcomes, particularly in the context of the disease's progressive nature and global prevalence (14, 15). Elliott et al conducted a descriptive study examining how various modifying factors and personal health beliefs relate to hemodialysis patients' adherence to a low-phosphorus diet. They found that characteristics such as age, education level, and disease knowledge, along with beliefs like confidence in performing healthy behaviors and perceived benefits of adherence, were all linked to better dietary compliance (16). In a study of hemodialysis patients, Li et al found that overall knowledge about cardiovascular complications was low, despite generally positive attitudes and moderate self-reported practices. Education emerged as a consistent determinant across all domains: patients with higher educational levels demonstrated significantly better knowledge, more positive attitudes, and more proactive practices. The stepwise relationship observed, where better knowledge predicted more positive attitudes, and better attitudes predicted stronger practices, highlights the importance of strengthening patient education as a foundation for improving cardiovascular risk management of hemodialysis patients (17). In a study by Su et al, patients with chronic respiratory diseases showed very poor knowledge of pulmonary rehabilitation, despite generally positive attitudes and moderate willingness to engage in pulmonary rehabilitation-related behaviors. Socioeconomic and clinical factors, particularly education, were strongly associated with knowledge, attitude, and practice differences, highlighting persistent disparities (18). Li et al reported that patients with ESRD demonstrated generally sufficient knowledge, favourable attitudes, and proactive practices toward hyperkalemia management. Education and dialysis-related factors significantly shaped knowledge, attitudes, and practices outcomes, with higher education linked to better attitudes and practices, and more frequent dialysis associated with stronger knowledge (19). The findings of Mahmoud et al showed that most participants demonstrated limited understanding of CKD, while a smaller portion displayed moderate awareness, and only a few had strong knowledge. Several demographic characteristics were found to be associated with knowledge levels, with differences observed across gender, age groups, educational backgrounds, marital status, and employment status (20). On the other hand, a study on individuals living with anemia indicated that they generally possess an adequate level of knowledge about their condition, with academic education as an independently associated factor, yet their attitudes toward disease management remain less favorable (21). This comparison underscores the consistency of our findings with patterns observed in cross-sectional assessments of CKD populations, where non-significant effects of dialysis status imply that engagement challenges persist regardless of treatment modality.

Interpreting these results, the positive influence of age and education on attitudes, practices, and overall

Table 3. The association of attitude and practice score with age and education levels using linear regression

Characteristics		B	Standard error	*P* value	95% CI	
					Lower	Upper
Attitude score						
Education level	Non-academic (Ref) Academic	1.76	0.641	<0.001	0.84	2.66
Age category	< 50 years (Ref) > 50 years	1.54	0.601	0.011	0.36	2.72
Practice score						
Education level	Non-academic (Ref) Academic	0.92	0.527	0.080	-0.11	1.96
Age category	< 50 years (Ref) > 50 years	1.55	0.676	0.022	0.22	2.88
Total attitude and practice score						
Education level	Non-academic (Ref) Academic	2.68	0.765	<0.001	1.17	4.18
Age category	< 50 years (Ref) > 50 years	3.10	0.988	0.002	1.15	5.04

B: Unstandardized coefficient; CI: Confidence interval; Ref: Reference.

involvement points to the pivotal role of accumulated experience and health literacy in fostering self-management behaviors among CKD patients. Older individuals may benefit from greater familiarity with chronic illness management, leading to more proactive attitudes, while higher educational attainment likely enhances the ability to comprehend and implement therapeutic recommendations, thereby improving practices (19-21). Scientifically, this suggests that health literacy acts as a mediator, enabling better processing of disease-related information and active participation in care, which could mitigate risks of disease progression and associated comorbidities like cardiovascular events, enhance adherence to treatment, and improve quality of life (15,17). Practically, these implications highlight opportunities for targeted interventions, such as tailored educational programs that address knowledge gaps in younger or less-educated patients to boost regimen adherence and overall involvement. A strength of this study lies in its identification of specific predictors, providing a focused lens on modifiable factors that can inform patient stratification in clinical settings.

Overall, these findings affirm the importance of demographic and cognitive factors in shaping self-management without introducing unsupported claims beyond the observed patterns. Potential applications include developing age- and education-sensitive educational interventions to elevate moderate levels of involvement, thereby supporting better adherence in clinical practice. Future research directions should explore longitudinal designs to assess how these predictors influence CKD progression over time, ensuring a deeper understanding of causal pathways.

Conclusion

The findings of this study revealed that patients with CKD demonstrated moderate levels of attitude and practice toward their therapeutic regimen, with education and age emerging as key determinants of these behaviors. Gender and dialysis status did not significantly influence outcomes, whereas patients with academic education consistently exhibited more favorable attitudes and greater overall engagement than those without formal education. Likewise, older individuals showed stronger attitudes, better practices, and higher combined scores compared to younger patients, underscoring the role of age-related experience in shaping constructive health behaviors. Collectively, these results suggest that tailored interventions should focus particularly on younger and less-educated populations, who may derive the greatest benefit from structured educational and behavioral support programs aimed at improving attitudes and practices in CKD management.

Limitations of the study

First, its cross-sectional design restricts the ability to establish causal relationships between demographic factors and patients' attitudes or practices toward therapeutic regimens. Second, data collection relied on self-reported questionnaires, which may be subject to recall bias and social desirability bias, potentially influencing the accuracy of responses. Third, the study was conducted in the nephrology clinics in Yazd, which may limit the generalizability of findings to broader CKD populations in other regions or healthcare settings. Finally, although the questionnaire demonstrated strong reliability, the use of a researcher-developed instrument may introduce

measurement constraints compared to widely validate international tools.

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Authors' contribution

Conceptualization: Mohammadhosein Rasulzadegan and Maryam Javadzade.
Data curation: Maryam Javadzade and Ahmad Shajari.
Formal analysis: Ahmad Shajari.
Investigation: Mohammadhosein Rasulzadegan.
Methodology: Ahmad Shajari and Mohammadhosein Rasulzadegan.
Project management: Ahmad Shajari.
Resources: All authors.
Supervision: All authors.
Validation: Ahmad Shajari
Writing–original draft: All authors.
Writing–review and editing: All authors.

Conflicts of interest

The authors declare no conflict of interest.

Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declaration of generative artificial intelligence (AI) and AI-assisted technologies in the writing process

While preparing this work, the authors utilized AI (Grammarly, SCiNiT, and Copilot) to refine grammar points and language style. Subsequently, they thoroughly reviewed and edited the content as necessary, assuming full responsibility for the publication's content.

Ethical issues

The research was conducted in accordance with the Declaration of Helsinki. Informed written consent was taken from all participants. This study was conducted at the Nephrology clinics in Yazd and was derived from the thesis work of Maryam Javadzade (Thesis#162886513), approved by the ethics committee of Islamic Azad University - Isfahan (Khorasgan) Branch, Isfahan, Iran, under the ethical code (IR.IAU.KHUISF.REC.1404.513; https://ethics.research.ac.ir/form/i2loslt2ih8k4x38.pdf). Besides, the authors have ultimately observed ethical issues (including plagiarism, data fabrication, and double publication).

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References

1. Caturano A, Galiero R, Rocco M, Tagliaferri G, Piacevole A, Nilo D, et al. The Dual Burden: Exploring Cardiovascular Complications in Chronic Kidney Disease. Biomolecules. 2024;14:1393. doi: 10.3390/biom14111393.
2. Hauwanga WN, Abdalhamed TY, Ezike LA, Chukwulebe IS, Ko Oo A, Wilfred A, et al. The pathophysiology and vascular complications of diabetes in chronic kidney disease: a comprehensive review. Cureus. 2024;16:e76498. doi: 10.7759/cureus.76498.
3. Palomo-Piñón S, Aguilar-Alonso JA, Chávez-Iñiguez JS, Hernández-Arellanes FE, Mariano-Murga JA, Flores-Rodríguez JC, et al. Strategies to address diabetic kidney disease burden in Mexico: a narrative review by the Mexican College of Nephrologists. Front Med (Lausanne). 2024;11:1376115. doi: 10.3389/fmed.2024.1376115.
4. Sun L, Xu M, Deng X, Liu X. Renal insufficiency caused by TMEM216 gene mutation: Case Report. Front Med (Lausanne). 2025;12:1579732. doi: 10.3389/fmed.2025.1579732.
5. Mechta Nielsen T, Frøjk Juhl M, Feldt-Rasmussen B, Thomsen T. Adherence to medication in patients with chronic kidney disease: a systematic review of qualitative research. Clin Kidney J. 2018;11:513–27. doi: 10.1093/ckj/sfx140.
6. Clyne N, Anding-Rost K. Exercise training in chronic kidney disease-effects, expectations and adherence. Clin Kidney J. 2021;14:ii3–ii14. doi: 10.1093/ckj/sfab012.
7. Cutler RL, Fernandez-Llimos F, Frommer M, Benrimoj C, Garcia-Cardenas V. Economic impact of medication non-adherence by disease groups: a systematic review. BMJ Open. 2018;8:e016982. doi: 10.1136/bmjopen-2017-016982.
8. Ramay BM, Cerón A, Méndez-Alburez LP, Lou-Meda R. Factors associated to acceptable treatment adherence among children with chronic kidney disease in Guatemala. PLoS One. 2017;12:e0186644. doi: 10.1371/journal.pone.0186644.
9. Kvarnström K, Westerholm A, Airaksinen M, Liira H. Factors contributing to medication adherence in patients with a chronic condition: a scoping review of qualitative research. Pharmaceutics. 2021;13. doi: 10.3390/pharmaceutics13071100.
10. Horne R, Chapman SC, Parham R, Freemantle N, Forbes A, Cooper V. Understanding patients' adherence-related beliefs about medicines prescribed for long-term conditions: a meta-analytic review of the Necessity-Concerns Framework. PLoS One. 2013;8:e80633. doi: 10.1371/journal.pone.0080633.
11. Kammerer J, Garry G, Hartigan M, Carter B, Erlich L. Adherence in patients on dialysis: strategies for success.

Nephrol Nurs J. 2007;34:479–86.
12. Robinson BM, Bieber B, Pisoni RL, Port FK. Dialysis Outcomes and Practice Patterns Study (DOPPS): its strengths, limitations, and role in informing practices and policies. Clin J Am Soc Nephrol. 2012;7:1897–905. doi: 10.2215/cjn.04940512.
13. Jin J, Sklar GE, Min Sen Oh V, Chuen Li S. Factors affecting therapeutic compliance: A review from the patient's perspective. Ther Clin Risk Manag. 2008;4:269–86. doi: 10.2147/tcrm.s1458.
14. Clarke AL, Yates T, Smith AC, Chilcot J. Patient's perceptions of chronic kidney disease and their association with psychosocial and clinical outcomes: a narrative review. Clin Kidney J. 2016;9:494–502. doi: 10.1093/ckj/sfw014.
15. Elisabeth Stømer U, Klopstad Wahl A, Gunnar Gøransson L, Hjorthaug Urstad K. Health Literacy in Kidney Disease: Associations with Quality of Life and Adherence. J Ren Care. 2020;46:85–94. doi: 10.1111/jorc.12314.
16. Elliott JO, Ortman C, Almaani S, Lee YH, Jordan K. Understanding the associations between modifying factors, individual health beliefs, and hemodialysis patients' adherence to a low-phosphorus diet. J Ren Nutr. 2015;25:111–20. doi: 10.1053/j.jrn.2014.08.006.
17. Li Z, Song L, Hua R, Xia F, Hu D, Luo Z, et al. Knowledge, attitudes, and practices toward cardiovascular complications among end-stage renal disease patients undergoing maintenance hemodialysis. BMC Public Health. 2024;24:1448. doi: 10.1186/s12889-024-18945-5.
18. Su L, Wang L, Ding J, Zhang X, Wang R, Bai X, et al. Knowledge, attitudes and practices regarding pulmonary rehabilitation among patients with chronic respiratory diseases: a cross-sectional questionnaire-based study in a tertiary hospital in China. BMJ Open. 2025;15:e085944. doi: 10.1136/bmjopen-2024-085944.
19. Li G, Peng W, Kong H, Hu F, Huang J, Han X, et al. Knowledge, attitudes and practices among patients with end-stage kidney disease towards hyperkalaemia management in Shenzhen, China: a cross-sectional study. BMJ Open. 2025;15:e092619. doi: 10.1136/bmjopen-2024-092619.
20. Mahmoud MA, Ibrahim A, Fadil HA, Alalawi AM, Alnezary FS, Alahmadi Y, et al. Assessment of public knowledge about chronic kidney disease and factors influencing knowledge levels: a cross-sectional study. Medicina (Kaunas). 2023;59:2072. doi: 10.3390/medicina59122072.
21. Yao B, Xu M, Cheng F, Peng M, Mao X. Knowledge, attitudes, and practices among patients with anemia towards disease management. Front Public Health. 2024;12:1380710. doi: 10.3389/fpubh.2024.1380710.