

Knowledge, attitude and perception of kidney transplantation among people living with chronic kidney disease, their caregivers and the general population in Kumasi, Ghana: a cross-sectional study

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Abstract

Background

Kidney transplantation is the most effective treatment for end-stage kidney disease (ESKD); however, it remains underutilized as a treatment modality in Ghana. As the incidence and prevalence of ESKD continue to rise, the development of kidney transplant services in Ghana has become imperative. Appraising the knowledge, attitude and perception of people living with chronic kidney disease (CKD), their caregivers and the general population concerning kidney transplantation is essential for designing appropriate policies, legislation and infrastructure for kidney transplantation in Ghana.

Methods

A cross-sectional survey was conducted between February and August 2023 at the Komfo Anokye Teaching Hospital (KATH) nephrology clinic and in selected communities in the Kumasi Metropolis, using an interviewer-administered knowledge, attitude and perception (KAP) questionnaire. The questionnaire comprised sections on sociodemographic characteristics, knowledge of kidney transplantation, attitude towards kidney transplantation and perception of kidney transplantation. Each correct or positive response scored 1 and each incorrect or negative response scored 0; using a modified Bloom's cut-off, a score of 60% or more in a section indicated adequate knowledge, positive attitude or good perception. Groups were compared using the chi-square test, and associated factors were examined using simple logistic regression in Stata version 17.0.

Results

The study included 424 respondents: 64 people living with CKD, 64 caregivers and 296 members of the general population. Overall, 86.6% of participants had adequate knowledge of kidney transplantation. Attitude and perception were poor: 48.4% of respondents had a positive attitude and 39.9% had good perception of kidney transplantation. Among people living with CKD, increasing age was associated with a poorer attitude towards kidney transplantation (crude odds ratio 0.93 per year, 95% CI 0.89–0.97). In the general population, a monthly income above GHS 500 was associated with a positive attitude and good perception.

Conclusions

People living with CKD, caregivers and the general population had adequate knowledge of, but poor attitude and perception towards kidney transplantation. These findings highlight the need for targeted interventions to address the factors that influence attitude and perception.

Trial registration

Not applicable.

Background

Chronic kidney disease (CKD) is characterized by progressive structural and functional damage to the kidney and has varied causes [1]. It has become a condition of global public health importance. Epidemiological studies show that the incidence of CKD is increasing year by year, and its global prevalence may be as high as 10–15% [2, 3]. CKD complicates many communicable and non-communicable diseases (NCDs), and as the prevalence of NCDs rises, complications such as CKD will rise with it [4]. Major causes of CKD include diabetes mellitus, hypertension, glomerulonephritis and inherited diseases such as polycystic kidney disease [5]. Complications of CKD are disproportionately high in low- and middle-income countries (LMICs), where health systems are weak and the health workforce is limited [6].

In Ghana, the prevalence of CKD is estimated at 13.3% [7]. People living with CKD are at increased risk of developing kidney failure, which is associated with significant morbidity and mortality [7]. Without treatment, CKD can progress rapidly to kidney failure [8]. The risk of progression from CKD to kidney failure has been estimated at approximately 55.2% over five years for individuals younger than 65 years [8, 9]. People living with kidney failure require dialysis or kidney transplantation to survive [8], and kidney failure is the primary indication for kidney transplantation [10]. Kidney transplantation is the most effective treatment for kidney failure, offering better survival and quality of life than long-term dialysis at a lower cost [8, 10, 11].

Despite this, most people with kidney failure in Ghana rely on hemodialysis or conservative management, largely because kidney transplantation is scarcely available and prohibitively expensive for most of those who need it [12, 13]. Dialysis has its own challenges: only 9 of Ghana's 16 regions have dialysis centers, which makes long-term dialysis inaccessible and unaffordable for many [7]. The burden of CKD in Africa is three to four times higher than in high-income countries, and the cost of treatment remains beyond the reach of most affected individuals [14].

According to Osafo et al., 17 live donor kidney transplants were carried out in Ghana between 2008 and 2014 with support from the University Hospital Birmingham, United Kingdom, and the Transplant Links Community (TLC) [15]. The Ghana Renal Registry reported 24 patients (3.5% of patients on renal replacement therapy) with a functioning kidney transplant in 2021 [7]. Kidney transplantation has continued since 2014, but only occasionally: over 20 people with kidney failure have received a transplant in Ghana, and the country still relies on external expertise and lacks a sustainable transplant program [16]. Korle Bu Teaching Hospital performed four living donor kidney transplants with Transplant Links in 2019 [17] and its first transplants led mainly by a Ghanaian team in July 2023 [18], and the University of Ghana Medical Centre performed six kidney transplants in June 2024 [19].

Research on kidney transplantation in Ghana remains limited, and more data are needed to guide policy and interventions by stakeholders. This study assessed the knowledge, attitude and perception of kidney transplantation among people living with CKD, their caregivers and the general population in Kumasi, Ghana.

Methods

Study design and setting

We conducted a quantitative cross-sectional study between February and August 2023 at the nephrology outpatient clinic of the Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana, and in selected communities within the Kumasi Metropolis. KATH is a tertiary referral hospital, and its nephrology clinic runs twice-weekly sessions for people living with CKD. People living with CKD and their caregivers were recruited at the clinic, and members of the general population were recruited from randomly selected communities in the Kumasi Metropolis.

Participants

Participants were selected by convenience sampling at the clinic and at the community sites. We included people living with CKD aged 18 years or older with an estimated glomerular filtration rate (eGFR) below 60 ml/min/1.73 m² for at least three months, caregivers of people living with CKD aged 18 years or older, and adult members of the general population. All participants provided written informed consent. People with CKD who were critically ill were excluded.

For this study, CKD was defined as abnormalities of kidney structure or function present for more than three months, with implications for health [20]. A caregiver was defined as a relative who had provided personal care to a person with CKD for one month or more in the preceding year. The general population comprised community members who were neither living with CKD nor directly involved in the care of a person with CKD.

Sample size

The minimum sample size was calculated using the Cochran formula, $n_0 = (z^2 \times p \times q) / e^2$, where z is the standard normal deviate (1.96 for a 95% confidence level), p is the estimated proportion of the population with the attribute of interest (assumed to be 50%), $q = 1 - p$, and e is the desired precision (5%). This gave a minimum sample of 385 participants, and allowing for a 10% non-response rate, the target sample was 424. The prevalence of CKD in Ghana (13.3%) [7] was rounded to 15%, and on the assumption that each person living with CKD attending the clinic was accompanied by at least one caregiver, participants were recruited in a ratio of 15:15:70 (people with CKD : caregivers : general

population). This resulted in the enrollment of 64 people living with CKD, 64 caregivers and 296 members of the general population.

Data collection and scoring

Data were collected using a structured, interviewer-administered KAP questionnaire of 44 items in four sections: sociodemographic characteristics (12 items), knowledge of kidney transplantation (12 items), attitude towards kidney transplantation (6 items) and perception of kidney transplantation (14 items). Each item had three response options: 'yes', 'no' and 'don't know'. Each participant was interviewed individually and in person, and responses were recorded digitally using KoboCollect [21].

In the knowledge section, each correct answer scored 1 and each incorrect answer scored 0. In the attitude and perception sections, a response designated as positive scored 1 and a response designated as negative scored 0. Using a modified Bloom's cut-off, a score of 60% or more in a section indicated adequate knowledge, a positive attitude or good perception, and a score below 60% indicated inadequate knowledge, a poor attitude or poor perception.

Statistical analysis

Categorical variables are presented as frequencies and percentages, and continuous variables as mean $\pm$ standard deviation (SD) or median with interquartile range (IQR). Responses were compared across the three groups using the chi-square test. Within each group, simple logistic regression was used to examine the association between participant characteristics and adequate knowledge, positive attitude and good perception, with results reported as crude odds ratios (cOR) and 95% confidence intervals (CI). A p-value below 0.05 was considered statistically significant. Data were analyzed using Stata version 17.0 [22]. Only the principal investigator and co-investigators had access to the data.

The study was approved by the Komfo Anokye Teaching Hospital Institutional Review Board (KATH IRB/AP/160/22) and was conducted in accordance with the Declaration of Helsinki.

Results

Participant characteristics

The study included 424 respondents: 64 (15.1%) people living with CKD, 64 (15.1%) caregivers and 296 (69.8%) members of the general population. The mean age was 53.0 ± 15.3 years for people living with CKD, 38.3 ± 13.2 years for caregivers and 28.2 ± 7.7 years for the general population.

Most participants were male (67.9%), Christian (89.9%) and resided in urban areas (82.5%). Overall, 79.2% had attained secondary-level education or above, and 73.0% earned more than GHS 500 per month. Hypertension was the most commonly reported comorbidity among people living with CKD (39 of 64, 60.9%), followed by diabetes mellitus (23 of 64, 35.9%).

Characteristics of people living with CKD

Table 1 shows the clinical characteristics of the participants living with CKD. The median duration since CKD diagnosis was 1 year, the median serum creatinine was 259.10 $\mu\text{mol/L}$ and the median hemoglobin was 110 g/L. Three of the 64 participants (4.7%) were receiving renal replacement therapy: two were on dialysis and one had a kidney transplant. Kidney transplantation had been suggested to only three participants (4.7%).

Table 1
Clinical characteristics of people living with CKD (n = 64)

Characteristic	n	%
Duration of CKD diagnosis in years, median (IQR)	1.00 (0.25–2.00)	
Serum creatinine ($\mu\text{mol/L}$), median (IQR)	259.10 (130.00–348.10)	
Hemoglobin (g/L), median (IQR)	110 (86–123)	
Renal replacement therapy		
Yes	3	4.69
No	61	95.31
Type of renal replacement therapy (n = 3)		
Dialysis	2	66.67
Kidney transplant	1	33.33

CKD, chronic kidney disease; IQR, interquartile range.

Knowledge, attitude and perception

Table 2 shows the knowledge, attitude and perception of kidney transplantation among people with CKD (n = 64), caregivers (n = 64) and the general population (n = 296).

Most respondents had adequate knowledge of kidney transplantation (86.6%); the proportion was highest among people living with CKD (90.6%) and lowest among caregivers (79.7%). Fewer than half of all respondents had a positive attitude towards kidney transplantation (48.4%). Caregivers had the highest proportion with a positive attitude (64.1%), compared with 48.0% of the general population and 34.4% of people living with CKD. Good perception of kidney transplantation was found in 39.9% of respondents overall, and 60.1% had poor perception.

Overall, 59.9% of respondents said they would donate a kidney to a relative if they could, and this differed significantly between groups ($p = 0.005$): 67.2% of caregivers were willing, compared with 39.1% of

people living with CKD. In the general population, willingness to donate to a relative was 12.8 percentage points higher than willingness to donate to a non-relative (62.8% vs 50.0%).

Table 2
Knowledge, attitude and perception of kidney transplantation by participant group (N = 424)

Domain	People with CKD (n = 64)		Caregivers (n = 64)		General population (n = 296)		All respondents (N = 424)
	n	%	n	%	n	%	n (%)
Knowledge of kidney transplantation							
Adequate	58	90.63	51	79.69	258	87.16	367 (86.56)
Inadequate	6	9.38	13	20.31	38	12.84	57 (13.44)
Attitude towards kidney transplantation							
Positive	22	34.38	41	64.06	142	47.97	205 (48.35)
Poor	42	65.63	23	35.94	154	52.03	219 (51.65)
Perception of kidney transplantation							
Good	23	35.94	31	48.44	115	38.85	169 (39.86)
Poor	41	64.06	33	51.56	181	61.15	255 (60.14)

CKD, chronic kidney disease. Adequate knowledge, positive attitude and good perception were defined as a score of 60% or more in the respective section.

Perception of kidney transplantation

Table 3 presents participants' views on whether kidney transplantation offers a better quality of life than dialysis, and their reasons for not opting for living kidney donation.

Overall, 59.4% of respondents agreed that kidney transplantation offers a better quality of life than dialysis, with the highest agreement among caregivers (68.8%; $p = 0.001$). Regarding reasons for declining living donation, 46.7% of respondents cited fear of surgery, most often in the general population (51.7%; $p = 0.014$), and 41.3% felt they were too young to donate, a response most common in the general population (46.6%) and among caregivers (42.2%; $p < 0.001$). Religious prohibition was cited by 6.4% of respondents ($p = 0.003$).

Table 3

Perception of kidney transplantation and reasons for declining living donation, by participant group

Statement	People with CKD (n = 64), n (%)	Caregivers (n = 64), n (%)	General population (n = 296), n (%)	All respondents (N = 424), n (%)	p-value
Kidney transplantation will give a better quality of life than dialysis					0.001
Yes	31 (48.44)	44 (68.75)	177 (59.80)	252 (59.43)	
No	12 (18.75)	5 (7.81)	14 (4.73)	31 (7.31)	
Don't know	21 (32.81)	15 (23.44)	105 (35.47)	141 (33.25)	
I would not opt to donate my kidney while alive because:					
I am too young					< 0.001
Yes	10 (15.63)	27 (42.19)	138 (46.62)	175 (41.27)	
No	44 (68.75)	29 (45.31)	126 (42.57)	199 (46.93)	
Don't know	10 (15.63)	8 (12.50)	32 (10.81)	50 (11.79)	
My religion forbids it					0.003
Yes	3 (4.69)	3 (4.69)	21 (7.14)	27 (6.40)	
No	34 (53.13)	45 (70.31)	127 (43.20)	206 (48.82)	
Don't know	27 (42.19)	16 (25.00)	146 (49.66)	189 (44.79)	
I am afraid of surgery					0.014
Yes	22 (34.38)	23 (35.94)	153 (51.69)	198 (46.70)	
No	30 (46.88)	34 (53.13)	116 (39.19)	180 (42.45)	
Don't know	12 (18.75)	7 (10.94)	27 (9.12)	46 (10.85)	

CKD, chronic kidney disease. Percentages are based on the number of respondents who answered each item. p-values compare the three groups (chi-square test).

Factors associated with attitude and perception

Among people living with CKD, those with a positive attitude were younger than those with a poor attitude (mean age 43.2 ± 16.3 vs 58.2 ± 12.0 years), and each additional year of age was associated with lower odds of a positive attitude towards kidney transplantation (cOR 0.93, 95% CI 0.89–0.97, $p =$

0.001). In the general population, a monthly income above GHS 500 was associated with a positive attitude (GHS 500–1500: cOR 3.43, 95% CI 1.80–6.54, $p < 0.001$; above GHS 1500: cOR 3.78, 95% CI 1.78–8.01, $p = 0.001$) and with good perception (GHS 500–1500: cOR 2.91, 95% CI 1.47–5.77, $p = 0.002$; above GHS 1500: cOR 3.19, 95% CI 1.46–6.98, $p = 0.004$), compared with an income below GHS 500. Caregivers earning above GHS 1500 per month were more likely to have good perception of kidney transplantation (cOR 5.60, 95% CI 1.36–23.06, $p = 0.017$).

Discussion

Few studies have assessed the knowledge, attitude and perception of kidney transplantation in Ghana [13, 23], and much of the published work from other settings has focused on health professionals and students [24–26]. In our study, all three groups had adequate knowledge of kidney transplantation, but none showed good perception, and only caregivers had a positive attitude. People living with CKD were considerably older than the other respondents, whose overall mean age was 33.5 ± 13.5 years; this is consistent with the higher prevalence of CKD in older individuals reported in previous studies [27, 28]. People living with CKD who had adequate knowledge were slightly older than those with inadequate knowledge (53.6 vs 47.8 years), as were caregivers (38.5 vs 37.8 years), although neither difference was statistically significant.

Prior studies have suggested a positive association between knowledge and attitude [29]. Bruns et al. found that attitude towards kidney transplantation improved with increasing knowledge, although the association did not reach statistical significance [30]. Our findings followed a different pattern: attitude and perception were poor even though most respondents had adequate knowledge. This may reflect the nature of the knowledge questions in our questionnaire, which addressed basic knowledge of CKD but did not explore misconceptions. It may also suggest that misconceptions and cultural beliefs exert a greater influence on attitude and perception than basic factual knowledge.

Overall, 59.9% of respondents were willing to donate a kidney to a relative, and willingness differed significantly between groups. Caregivers (67.2%) were considerably more willing than people living with CKD (39.1%). This may be related to the financial, psychosocial and physical demands of the caregiver role, which have been documented elsewhere [31].

Feeling too young to donate was a common reason for not opting for living donation, particularly in the general population (46.6%) and among caregivers (42.2%). If confirmed in future studies, this finding would be of clinical importance, given evidence that graft survival declines with increasing donor age [32].

In contrast to studies from other settings in which religious beliefs were a major barrier to organ donation [33], few of our respondents cited religion as a reason for not donating, either while alive (6.4%) or after death (8.3%), and fewer still cited culture (6.6%). This is similar to the findings of Iqbal et al. in Bangladesh, where 71% of respondents believed there were no religious restrictions to kidney transplantation [34].

Fear of surgery was an important reason for unwillingness to donate, cited by 46.7% of our respondents. The risks of living donor nephrectomy may reinforce such concerns: in a large national study from the United States, 16.8% of living kidney donors experienced a perioperative complication, although serious complications were infrequent [35]. Respondents appeared more willing to accept the risks of surgery for their own benefit than for the benefit of others: 79.3% said they would accept a kidney transplant if they needed one. The most frequently selected reason for not donating was concern about the remaining kidney, expressed as 'what if my other kidney fails later in life' (49.6%) [23, 36].

In the general population, willingness to donate to a relative was 12.8 percentage points higher than willingness to donate to an unrelated recipient, which illustrates the role of family ties in shaping attitudes to donation [37]. Even in the context of deceased donation in Canada, relatives were more likely to consent to organ donation when the recipient was personally known to them [38].

Deceased donation was unpopular among respondents: only 40.6% would sign up to donate their organs after death, and 32.4% considered kidneys from deceased donors acceptable. In the general population, 37.9% believed their bodies would be desecrated if they donated a kidney after death, a finding consistent with data from other parts of the world [39]. This gives further insight into the role that misconceptions and cultural beliefs may play in the poor perception observed among our respondents. Among caregivers, a higher monthly income was associated with better perception of kidney transplantation. This agrees with Iqbal et al., who found that higher education and income were associated with better knowledge, attitude and perception of kidney transplantation [34]. A similar pattern has been observed in Hungary, where employment and higher education were associated with more positive attitudes towards kidney transplantation among patients on hemodialysis [40].

Limitations

This study has some limitations. Participants were selected by convenience sampling from a single tertiary hospital and one metropolitan area, which may limit the representativeness of the sample and the generalizability of the findings. The groups of people living with CKD and caregivers were small, so estimates for these groups are imprecise, as shown by the wide confidence intervals. Associations were examined using unadjusted (crude) odds ratios, so confounding cannot be excluded. Finally, because the questionnaire was interviewer-administered, some responses may have been influenced by social desirability.

Conclusions

People living with CKD, their caregivers and the general population had adequate knowledge of kidney transplantation but poor attitude and perception towards it. The attitude and perception of these groups did not appear to be directly related to their level of knowledge. Further research into the specific factors that influence attitude and perception towards kidney transplantation, and into strategies to address

them, is recommended. Such research would provide valuable evidence to support the development of a kidney transplantation policy in Ghana.

Abbreviations

CI	Confidence interval
CKD	Chronic kidney disease
cOR	Crude odds ratio
eGFR	Estimated glomerular filtration rate
ESKD	End-stage kidney disease
GHS	Ghana cedi
IQR	Interquartile range
IRB	Institutional Review Board
KAP	Knowledge, attitude and perception
KATH	Komfo Anokye Teaching Hospital
LMICs	Low- and middle-income countries
NCDs	Non-communicable diseases
SD	Standard deviation
TLC	Transplant Links Community

Declarations

Ethics approval and consent to participate

Ethical approval was granted by the Komfo Anokye Teaching Hospital Institutional Review Board on 9 December 2022 (reference number KATH IRB/AP/160/22). Written informed consent was obtained from all participants before enrollment. All procedures were performed in accordance with the ethical

standards of the institutional and national research committees and with the 1964 Declaration of Helsinki and its later amendments.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Author Contribution

A.K.K., E.N., A.G. and E.K.T. conceived and designed the study, acquired the data and interpreted the findings. A.K.K. drafted the background and methods sections. E.N. drafted the discussion and conclusions. E.K.T. and A.G. critically revised all sections of the manuscript. All authors read and approved the final manuscript.

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Data Availability

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

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