Original Article

# Pharmacist-perceived barriers to pharmaceutical care of chronic and end-stage kidney disease patients in Saudi Arabia

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## ABSTRACT

**Objective:** The aim of this study is to explore pharmacists' attitudes regarding pharmaceutical care in chronic kidney disease (CKD) and end-stage renal disease (ESRD) patients.

**Methods:** A cross-sectional questionnaire-based study was conducted among Saudi pharmacists between October 2012 and October 2014. A convenient sampling technique was employed in the five Saudi Kingdom regions: Central, West, East, North, and South. The target sample was 200 pharmacists based on a calculation of the power of sample with an 85% confidence level. SPSS, version 20®, was used to descriptively analyze the data. The Kruskal–Wallis test was applied to highlight the significant responses. A $P < 0.05$ was considered statistically significant.

**Results:** Of the 200 questionnaires distributed, 162 were completed; a response rate 81.0%. Based on the results, pharmacists in Saudi generally had positive attitudes and beliefs toward pharmaceutical care in CKD and ESRD due to a complicated disease state with multiple drug and nondrug therapies (69.1%); this finding indicated that this type of pharmaceutical care requires that more time is dedicated to patients (69.7%). The results showed that 40.8% of pharmacists were familiar with National Kidney Foundation-Kidney Disease Outcomes Quality Initiative clinical practice guidelines. Most pharmacists either agreed or strongly agreed that implementing this type of pharmaceutical care will have a positive economic impact on patients' families and the health system. The physician–pharmacist relationship is also considered to be a major barrier for pharmacist intervention given that physicians have primary responsibility for modifying the patients' treatment plans.

**Conclusion:** The contribution of pharmacists in CKD and ESRD will continue to grow as their clinical knowledge improves. Saudi pharmacists believe that the pharmaceutical care is an essential component of managing CKD and ESRD patients.

Key words: Attitudes, beliefs, kidney disease, pharmaceutical care, Saudi Arabia

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## INTRODUCTION

End-stage renal disease (ESRD) is a major disease that creates an economic burden across the world.[1] Furthermore, multiple comorbid conditions increase polypharmacy and increase the likelihood of complex drug- and disease-related interactions. Recent data from the United States Annual Renal Report (2011) revealed higher prevalence estimates of chronic kidney disease (CKD) in patients' later years of life.[2] In response to these statistics, the World Health Organization set an economic priority to reduce the burden of ESRD and CKD, which amounts $8 billion in developing countries alone.[3]

In ESRD patients, the initiation of renal replacement therapies (RRTs) such as long-term dialysis – including hemodialysis (HD) or peritoneal dialysis – or transplantation is usually indicated to alleviate uremic symptoms. Transplantation is the most effective RRT, but it involves limited accessibility of organs for transplantation and a chance of rejection; therefore, other methods of medical management of ESRD have been frequently suggested.[4] However, along with these measures, patients suffering from other medical conditions also need drug therapy, which is the fundamental component in the medical management of patients with CKD and ESRD.[5] Therefore, ESRD patients often receive multiple medications and have complex medication regimens that require regular and careful monitoring.[6] Moreover, due to compromised renal function, their medication is often altered in terms of dose, frequency, and inter/intra pharmacological classes.[7] Such modifications and adjustments often lead to an increased potential for inaccuracy in medication and increase the chances of noncompliance and inconvenience for patients and healthcare teams.[8] Despite the advances, several studies have reported suboptimal health care of CKD/ESRD patients with respect to treating comorbidity referrals, and the preparation for RRTs.[9] Hence, The National Kidney Foundation (NKF) has laid out various guidelines to improve the care of patients, and these guidelines are in practice worldwide.[10]

With regard to the situation in Saudi Arabia, a recent survey by the Saudi Center of Organ Transplantation Registry has revealed that the incidence of ESRD in Saudi Arabia exceeds that reported in many other countries and has risen rapidly over the last three decades.[11] The prevalence of RRT has increased from 361 per million population (PMP) in 1995 to 874 PMP in 2008 (an increase of 142%). Over the same period, dialysis patient prevalence has escalated from 187 to 463 PMP (an increase of 162%) and renal transplant prevalence from 168 to 371 PMP (121%). However, qualified human resources are one of the main elements in ensuring the effective delivery of services to the ESRD patients, and qualified nurses and pharmacist can help improve the care of CKD and ESRD patients in different settings.[12] In particular, the presence of qualified pharmacists can help enhance the interpretation of laboratory monitoring, drug dosage adjustment, assessment of both drug safety and effectiveness, and recognition of (drug-related problems) DRPs In the Saudi setting, data on such important patient care services are completely lacking. Moreover, it is important to note that, with regard to the professional advancement of the clinical pharmacy discipline and the implementation of research and scientific evaluation, the Saudi situation can be described as a developing system. Therefore, the current study aims to explore pharmacists' beliefs, attitudes, and perspectives toward pharmaceutical care in CKD and ESRD patients.

## METHODS

A cross-sectional questionnaire-based study was conducted among Saudi pharmacists between October 2012 and October 2014.

### Study sample

A convenient sampling technique was employed based on the five Saudi kingdom regions: Central, West, East, North, and South. The target sample was 200 pharmacists based on a calculation of the power of sample with a confidence level of 85%.

### Study tool

A self-administered questionnaire with 44 items was developed based on the criteria outlines by the NKF-Kidney Disease Outcomes Quality Initiative (KDOQI) clinical practice guidelines.[13] A panel of four academic experts and one renal specialist were approached to validate the contents of the study tool. Upon completion of content validity, a 31-item questionnaire was finalized that was piloted among twenty pharmacists to meet the requirements of face validity. The reliability scale was applied for these twenty responses and alpha value was found to be 0.79, which confirms that the tool is adequate to meet the objectives of this study. Furthermore, to address any further concerns about the tool's content, its adequacy was measured using the Bartlett test of sphericity. The Kaiser–Meyer–Olkin measure of sampling adequacy

is an effective technique for judging content adequacy. In the current case, the Kaiser–Meyer–Olkin value was 0.827 and the interclass correlation coefficient was found to be significant. A Kaiser–Meyer–Olkin value > 0.6 indicates that the contents of the instrument are satisfactory to meet the study needs.

### Contents of the tool

The questionnaire comprised three sections. The first section focused on the demographic and practice-related information, whereas the second section sought to assess pharmacists' beliefs and attitudes toward pharmaceutical care in CKD and ESRD. The third and final sections assessed the major barriers that could limit the establishment of pharmaceutical care in CKD and ESRD area. All questions, except those regarding personal information and some regarding pharmacists' attitudes ("yes" or "no" response) in section two, used a five-point Likert scale that varied from "strongly agree" to "strongly disagree."

### Ethical approval

The entire survey was anonymous and no personal information was collected or inquired. In addition, the study protocol was approved by the Research Ethics Committee at the College of Pharmacy, Princess Nora Bint Abdul Rahman University in Riyadh, Saudi Arabia.

### Statistical analysis

Statistical Program for Social Sciences (SPSS) version 20® (SPSS Science, Chicago, IL) was used to analyze the data descriptively. The Kruskal–Wallis test was applied to highlight the significant responses. A $P < 0.05$ was considered statistically significant.

## RESULTS

The response rate to this survey was 81.0%. Of the 200 respondents who were approached, 162 only completed the survey forms. The instrument reliability as determined using Cronbach's coefficient alpha was more than 0.8, for all questionnaire items which also indicated a reliable measure. The majority of respondents (61.1%) were females, and the most common qualification was a bachelor's degree in pharmacy (61.7%) followed by a Pharm.D. (21.6%) and a master's degree (14.8%). The respondents were predominantly full-time employees (69.1%) who had more than 6 years' experience (60%). The distribution of their practice setting was as follows: 40.7% hospital's inpatient, 27.2% hospital's clinical departments, 31.5% hospital's outpatient, 8% academic/university, and 16% community pharmacies. Details are shown in Table 1.

### General attitudes toward and beliefs about pharmaceutical care in chronic kidney disease and end-stage renal disease

The results of this study show that most of the respondents disagreed that pharmaceutical care in CKD is an area for nurses and physicians only

**Table 1: Characteristics of the survey respondents**

| Characteristics | *n* (%) |
|---|---|
| Sex | |
| Male | 63 (38.9) |
| Female | 99 (61.1) |
| Age | |
| ≤30 | 56 (34.6) |
| 31-40 | 54 (33.3) |
| 41-50 | 46 (28.3) |
| ≥50 | 6 (3.7) |
| Nationality | |
| Saudi | 76 (46.9) |
| Egyptian | 30 (18.5) |
| Others | 56 (34.6) |
| Region of the Kingdom | |
| North | 31 (19.1) |
| South | 16 (9.9) |
| Middle | 82 (50.6) |
| East | 17 (10.5) |
| West | 16 (9.9) |
| Pharmacist's educational qualification | |
| Bachelor | 100 (61.7) |
| Pharm.D. | 35 (21.6) |
| M.Sc., | 24 (14.8) |
| PhD | 3 (1.9) |
| Employment status | |
| Part time | 50 (30.9) |
| Full time | 112 (69.1) |
| Current position | |
| Manager | 20 (12.3) |
| Staff | 138 (85.2) |
| Owner | 4 (2.5) |
| Years in practices | |
| <5 | 66 (40.7) |
| 6-15 | 62 (38.3) |
| 16-20 | 23 (14.2) |
| 21-30 | 7 (4.3) |
| ≥30 | 4 (2.5) |
| Practice setting | |
| Hospital inpatient | 66 (40.7) |
| Hospital outpatient | 51 (31.5) |
| Clinical pharmacy | 45 (27.2) |
| Community pharmacy | 26 (16) |
| Academic/university | 13 (8) |
| Industry (e.g., research) | 4 (2.5) |

($P < 0.001$). Similar responses were observed when the respondents were asked whether pharmacists should care about the drug product selection only and leave the pharmaceutical care of CKD patient to the doctors and nurses. Overall, a solid consensus was observed among pharmacists that pharmaceutical care is exclusively the role of a clinical pharmacist ($P = 0.041$). However, most respondents indicated that their current setup may not be supportive inadequate for providing pharmaceutical care for CKD patients ($P = 0.007$); details are shown in Table 2.

### The major barriers that could limit the establishment of pharmaceutical care in chronic kidney disease and end-stage renal disease

Table 3 describes pharmacists' preferences with respect to the major barriers that could limit the establishment of pharmaceutical care in the CKD area. A majority (52.5%) of participants agreed that lack of therapeutic knowledge in CKD is one of the barriers to pharmaceutical care for CKD/ESRD patients ($P = 0.010$), whereas 42% agreed that there was a lack of knowledge about clinical solutions to DRPs or lack of motivation. Notably, the barrier that had the highest degree of agreement was insufficient staff (50%), followed by inadequate training in pharmaceutical care practice in CKD area (50%). The physician–pharmacist relationship is considered to be a major barrier for pharmacist intervention since physicians are primarily responsible for modifying a patient's treatment plan.

### Perceived self-evaluation of knowledge, skills, and training

Interestingly, with regard to pharmacists' awareness of NKF-KDOQI clinical practice guidelines, 40.8% of respondents acknowledged their familiarity with these guidelines but to various extents: 3.7% indicated "excellent" familiarity, whereas 16.7% and 20.4% reported their "very good" or "somewhat" awareness, respectively. In contrast, nearly 60% of the pharmacists were either "not very" (16.7%) or "not at all" familiar (42.6%) with NKF-KDOQI guidelines. Collectively, the majority of the sample (79.7%) declared that pharmaceutical care in CKD requires specific clinical skill, personal abilities, and depth knowledge to demonstrate competence in the health team [Table 4]. In addition, when asked about their self-evaluation of their ability to interact with CKD patients, only 56.1% felt comfortable about their competence. Actually, more pharmacists strongly agreed/agreed that the present knowledge and skills of the pharmacist are inappropriate for pharmaceutical care practice in this area (37% vs. 30.9% disagree), details are shown in Table 4.

**Table 2: Pharmacists beliefs toward pharmaceutical care in chronic kidney disease and end-stage renal disease**

| Statement | Strongly disagree, *n* (%) | Disagree, *n* (%) | Unsure, *n* (%) | Agree, *n* (%) | Strongly agree, *n* (%) | Mean scorea | *P* |
|---|---|---|---|---|---|---|---|
| Pharmaceutical care in CKD area is only physicians and nurse's role | 52.5 (85) | 32.7 (53) | 7.4 (12) | 5.6 (9) | 1.9 (3) | 1.70 (0.938) | 0.001> |
| Pharmacist should care about the drug product selection only and leave pharmaceutical care of CKD patient to the doctors and nurses | 40.7 (66) | 32.1 (52) | 6.8 (11) | 14.2 (23) | 6.2 (10) | 2.09 (1.213) | 0.001> |
| Pharmacist should limit his interventions in CKD area if there are continuous conflicts with doctors and nurses | 34 (55) | 39.5 (64) | 14.2 (23) | 8.6 (14) | 3.7 (6) | 2.09 (1.077) | 0.164 |
| I believe that pharmaceutical care in CKD is very hard task due to complicated disease state with multiple drug and nondrug therapies | 3.1 (5) | 14.2 (23) | 13.6 (22) | 53.7 (87) | 15.4 (25) | 3.64 (1.007) | 0.219 |
| Pharmaceutical care is exclusively the clinical pharmacist role | 11.1 (18) | 29 (47) | 16.7 (27) | 32.7 (53) | 10.5 (17) | 3.01 (1.221) | 0.041 |
| Pharmaceutical care in CKD requires ones to dedicate more time for the patient | 6.8 (11) | 10.5 (17) | 13 (21) | 44.4 (72) | 25.3 (41) | 2.65 (1.060) | 0.011 |
| Currently, I consider the layout design of my (setting or institution) is inadequate for providing pharmaceutical care for CKD patients | 9.3 (15) | 21 (34) | 35.8 (58) | 37.2 (44) | 6.8 (11) | 3.02 (1.072) | 0.007 |

*1=Strongly disagree, 2=Disagree, 3=Unsure, 4=Agree, 5=Strongly agree, [a]The average score was obtained by averaging responses according to the following scale: Strongly agree=5; Agree=4; Uncertain=3; Disagree=2; Strongly disagree=1, [b]The values in parenthesis are standard deviations of the distribution of scores. Kruskal–Wallis test was applied. CKD=Chronic kidney disease, *n*=Total number of respondents

**Table 3: Barrier to pharmaceutical care for chronic kidney disease/end-stage renal disease patients**

| Barriers | 1 | 2 | 3 | 4 | 5 | *P* |
|---|---|---|---|---|---|---|
| Lack of therapeutic knowledge in CKD | 8 (13) | 17.3 (28) | 16 (26) | 52.5 (85) | 6.2 (10) | 0.010 |
| Lack of self-confidence | 12.3 (20) | 21.6 (35) | 20.4 (33) | 37 (60) | 8.6 (14) | 0.032 |
| Lack of knowledge of clinical solving drug-related problem | 8.6 (14) | 22.2 (36) | 17.9 (29) | 42 (68) | 9.3 (15) | 0.028 |
| Fear of change in my routine job duties | 15.4 (25) | 28.4 (46) | 21.6 (35) | 30.9 (50) | 3.7 (6) | 0.145 |
| Lack of motivation | 9.3 (15) | 19.1 (31) | 23.5 (38) | 41.4 (67) | 6.8 (11) | 0.045 |
| Lack of documentation knowledge | 9.9 (16) | 19.8 (32) | 19.1 (31) | 43.2 (70) | 8 (13) | 0.005 |
| Lack of communication skills | 10.5 (17) | 24.1 (39) | 13 (21) | 42.6 (69) | 9.9 (16) | 0.145 |
| Inadequate drug information resources | 14.8 (24) | 30.2 (49) | 11.7 (19) | 29.6 (48) | 13.6 (22) | 0.001 |
| Insufficient time | 6.2 (10) | 19.8 (32) | 17.3 (28) | 39.5 (64) | 17.3 (28) | 0.033 |
| Insufficient finance | 6.2 (10) | 19.8 (32) | 23.5 (38) | 33.3 (54) | 17.3 (28) | 0.040 |
| Lack of space for counseling | 6.8 (11) | 13 (21) | 16 (26) | 45.7 (74) | 18.5 (30) | 0.045 |
| Insufficient staff | 2.5 (4) | 7.4 (12) | 17.9 (29) | 50 (81) | 22.2 (36) | 0.035 |
| Lack of patient's demands | 10.5 (17) | 16 (26) | 37 (60) | 26.5 (43) | 9.9 (16) | 0.025 |
| Inadequate training in pharmaceutical care practice in general | 3.7 (6) | 13 (21) | 16 (26) | 48.8 (79) | 18.5 (30) | 0.001 |
| Inadequate training in pharmaceutical care practice in CKD area | 3.1 (5) | 10.5 (17) | 14.2 (23) | 50 (81) | 22.2 (36) | 0.009 |

1=Strongly disagree, 2=Disagree, 3=Unsure, 4=Agree, 5=Strongly agree. CKD=Chronic kidney disease

**Table 4: Perceived self-evaluation of knowledge, skills, and training**

| Statement | Scale* % (*n*) | | | | | Average score* |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| I feel comfortable with my ability to interact with CKD patients | 6 (3.7) | 6.8 (11) | 54 (33.3) | 66 (40.7) | 25 (15.4) | 0.947 (3.80)[b] |
| Pharmaceutical care in CKD requires specific clinical skill, personal abilities, and depth knowledge to demonstrate competence in the health team | 12 (7.4) | 13 (8) | 8 (4.9) | 68 (42) | 61 (37.7) | 0.977 (4.18) |
| The present knowledge and skills of the pharmacist are inappropriate for pharmaceutical care practice in this area | 12 (7.4) | 38 (23.5) | 52 (32.1) | 53 (32.7) | 7 (4.3) | 0.870 (3.57) |

*The average score was obtained by averaging responses according to the following scale: Strongly Agree=5; Agree=4; Uncertain=3; Disagree=2; Strongly disagree=1. [b]The values in parenthesis are standard deviations of the distribution of scores. CKD=Chronic kidney disease

## Pharmacists' professional practice and services for nephrology departments

In terms of pharmacists' participation in clinical activities and services for patients in nephrology departments, the majority of respondents indicated their involvement in reviewing patients' medication profile (69.8%) and hospital discharge counseling (63.6%). Additional services were also provided by pharmacists, however, to minor extents. About 56.8% denoted participation in patient care team rounds and 55% took part in conducting drug utilization reviews. In addition, 53.1% of the total pharmacists have highlighted their role in preparing information, tools, and materials for other health care professionals to improve their knowledge and practice related to CKD and ESRD detection and treatment as well as patients and their families, details are shown in Table 5.

**Table 5: Clinical pharmacy services for nephrology departments**

| Activity | *n* (%) |
|---|---|
| Team rounds | 92 (56.8) |
| Hospital discharge counseling | 103 (63.6) |
| Reviewing medication profile | 113 (69.8) |
| Preceptor training | 65 (40.1) |
| Quality assurance | 54 (33.3) |
| Institutional protocol and guidelines development | 65 (40.1) |
| Drug usage utilization review | 64 (55) |
| Research | 70 (43.2) |
| Preparing tools and educational materials for other health care professionals | 86 (53.1) |

*n*=Total number of respondents

## General pharmacists' opinion on their interventions on the outcomes in chronic kidney disease and end-stage renal disease patients

Interestingly, the majority of pharmacists strongly agreed/agreed that implementation of pharmaceutical care in this area will have a positive economic impact on patient families and health system. With respect to pharmacists' inspection of the subsequent important clinical outcomes in CKD and ESRD, most participants indicated their observation of improvement in general health, quality of life, and psychological status upon providing counseling for their, details are shown in Table 6.

**Table 6: General pharmacists' opinion on their interventions on the outcomes**

| Statement | Scale*, *n* (%) | | | | | Average score* |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| I have faith that implementation of pharmaceutical care in CKD will have a positive economic impact on patient families and health system | 2.5 (4) | 1.2 (2) | 14.2 (23) | 51.2 (83) | 30.9 (50) | 4.07 (0.850) |
| I noticed a significant improvement in general health status of dialysis patients whom I counseled | 3.7 (6) | 1.9 (3) | 43.8 (71) | 38.9 (63) | 11.7 (19) | 3.53 (0.865) |
| I noticed a significant improvement in dialysis patients' quality of life whom I counseled | 4.3 (7) | 0.6 (1) | 50 (81) | 35.8 (58) | 9.3 (15) | 3.45 (0.842) |
| I noticed a significant improvement in psychological state of dialysis patients whom I counseled | 3.1 (5) | 0.6 (1) | 52.5 (85) | 33.3 (54) | 10.5 (17) | 3.48 (0.813) |

*The average score was obtained by averaging responses according to the following scale: Strongly agree=5; Agree=4; Uncertain=3; Disagree=2; Strongly disagree=1. CKD=Chronic kidney disease

## DISCUSSION

This study is the first to investigate and provide descriptive data on the present beliefs, attitudes, and perspectives of Saudi pharmacists toward pharmaceutical care in CKD and ESRD. Although it is a preliminary study, it has provided an impression about the current status of pharmaceutical care in this area in Saudi Arabia. Participants suggested that hospital discharge counseling was an activity that the Saudi pharmacists seemed to be heavily involved in. This finding is consistent with a previous national survey conducted in 2012 to evaluate hospital pharmacy practice in the Riyadh region of Saudi Arabia, which confirmed that pharmacy departments have a more dominant role in education and counseling patients in Saudi Arabia hospitals.[14] Another activity that participants indicated favorably is reviewing patients' medication profiles. This provided an initially positive notion for our pharmacists' enthusiasm and wellness to be involved in this area. In particular, a previous prospective study in New Zealand that implemented a pharmacist medication review clinic for HD patients demonstrated beneficial impacts, namely in terms of identification of DRPs and risk factors for such problems.[5]

Although the pharmacists in this study seemed to have positive attitudes and beliefs in this area, the findings suggest that the lack of therapeutic knowledge about CKD and/or clinical solutions to DRPs were identified as major barriers that would limit the professional establishment of pharmaceutical care in this domain. In addition, the present survey revealed the inadequate training in pharmaceutical care practice in CKD area as a significant barrier, albeit to a lesser extent than the other barriers mentioned. Interestingly, these barriers were all in agreement with findings from a previous survey in hospital pharmacy practice in the Riyadh region.[14] This was attributed to the fact that most employed hospital pharmacists in Saudi Arabia hold a bachelor's degree in pharmaceutical science with minimal clinical skills gained during their 5 years of undergraduate education. A previous study, conducted in a major hospital in Jordan, was found to demonstrate the cost-effectiveness of the clinical pharmacist presence in the Intensive Care Unit (ICU).[15] This result was compatible with the participants' belief in our study. Considering the need for drug combination usage as a common practice in ICU and CKD patients, implementation of pharmaceutical care for those two types of patient categories could promote the rational use of drugs and therefore have a positive economic impact on patient families and health system.[6,16]

## CONCLUSION

The contribution of pharmacists in the CKD and ESRD will continue to grow as their clinical knowledge improves. Saudi pharmacists believe that pharmaceutical care is an essential component in the management of CKD and ESRD patients. The majority of participants have faith that implementation of pharmaceutical care in CKD will have a positive economic impact on the patient families and health system, as well as improving patients' quality of life. Patients will receive optimal management and delivery of care as pharmacists continue to expand their expertise. Finally, although pharmacists in our community displayed positive beliefs in the usefulness of their role in this area, the lack of therapeutic knowledge in CKD and/or clinical solutions to DRPs, and the inadequate training in CKD departments, has highlighted the need for continuous education and training workshop to enhance their clinical skills. In addition, further research is needed to extensively appraise their knowledge and the extent of their

awareness of other pharmaceutical care services, for which clinical pharmacists may play a crucial role in counseling society.

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### Conflicts of interest
There are no conflicts of interest.

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