Management of chronic kidney disease: perspectives of Brazilian primary care physicians

Thatiane Delatorre1, Elen A. Romão2, Augustus T. R. de Mattos3 and Janise B. B. Ferreira1

1Social Medicine Department of the Medical School of Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil; 2Medical Clinic Department of the Medical School of Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil and 3Medicine Department of Universidade Federal de São Carlos, São Carlos, SP, Brazil

Abstract

Aim: To investigate primary care physicians’ knowledge of and attitudes toward care for chronic kidney disease patients. Background: In Brazil, care for chronic kidney disease, a global public health problem, is provided by the Brazilian National Health System, which is organized around primary care. The study aimed to investigate the knowledge and attitudes of primary care physicians about the management of chronic kidney disease. Method: This research is based on quantitative and qualitative data. The participants were 92 physicians from 81 primary care units located in eight cities of the São Paulo/Brazil health region, who answered a self-administered questionnaire. Findings: Only 59% and 58% of the physicians recognized smoking and obesity, respectively, as risk factors for chronic kidney disease. Health appointments and drug therapy predominated as disease prevention strategies and less than 30% mentioned multiprofessional care and health education groups. For early diagnosis, isolated serum creatinine was the most used test and 64.6% stated they classified the disease stages. Exclusive follow-up in primary care decreased from 79% in stage 1 to 19.5% in stage 3B and the patients’ monitoring in the healthcare network varied from 8.7% in stage 1 to 70.6% in stages 4 and 5D, suggesting early referrals and lack of referral at the necessary stages. Access to information on the referred patient was, predominantly, through the patient’s report and 74% of the physicians did not have matrix support regarding chronic kidney disease. Conclusion: The study showed that the healthcare teams need to update their knowledge and procedures to be able to provide a comprehensive and efficient approach to treating chronic kidney disease in primary care.

Introduction

Chronic Kidney Disease (CKD) is defined as abnormalities in the kidney structure or function, which are present for more than three months and with health implications. The criteria used to define CKD are the presence of markers of kidney damage for more than three months (ie, albuminuria, urine sediment abnormalities, electrolyte and other abnormalities due to tubular disorders, abnormalities detected by histology, structural abnormalities detected by imaging, and history of kidney transplantation) and/or the glomerular filtration rate (GFR) below 60 mL/min/1.73 m². The CKD classification is done based on the cause of kidney disease, GFR category, and albuminuria category.

By associating GFR-based categorization with albuminuria, categories with a similar relative risk for CKD outcomes are obtained. Thus, CKD is divided into six stages of GFR (1, 2, 3A, 3B, 4, and 5) and three proteinuria stages (1, 2, and 3) with stage 1 representing normal kidney function and category 5 representing kidney failure (KDIGO, 2013).

CKD is a global public health problem that currently affects more than 750 million people. In 2017, it was estimated that the prevalence of any stage of CKD among Medicare patients in the American population was 14% (the United States Renal Data System, 2019). In Brazil, the prevalence of CKD is not known (Marinho et al., 2017). It is estimated that in 2017 the prevalence rate of kidney failure treated with replacement therapy was 610 patients per million (ppm) (Thomé et al., 2019).

The impact of kidney disease, its diagnosis, and treatment vary in different parts of the world, and its magnitude is better known in the developed countries.

However, recent evidence suggests that its effects are similar or may have greater importance in the developing countries (GBD 2015 DALYs and Collaborators HALE, 2016; Crews et al., 2019).

Robust scientific data indicate that CKD progression is linearly associated with worsening outcomes (Levey et al., 2011). The identification of CKD in its early stages is essential to prevent its progression, morbidity, and mortality, as well as to reduce the healthcare expenditure of...
persons with CKD. Therefore, public health approaches that enable the early initiation of treatment and mitigation of risk factors for the progression of this disease are essential (Vivekanand et al., 2013; United States Renal Data System, 2019).

Despite insufficient data that fail to reflect the real impact of kidney disease, Brazil is one of the 21% of the world’s middle-to-low income countries that have government funding for all aspects of CKD treatment through its National Health System (SUS), which is a universal health care system (Crews et al., 2019; GBD 2015 DALYs and Collaborators HALE, 2016).

Several studies warn of the financial impact of CKD on public and private health care systems. Spending on kidney failure with replacement therapy represents about 5% of SUS spending on medium and high complexity. In addition to government and personal assistance expenses, some losses are difficult to measure, since CKD also causes social and emotional repercussions in the life of the affected person and family members. These repercussions come from the chronicity, evolution, and complications of the disease and its treatment that affect the quality of life; physical, work, and functional capacity; sexual health; and leisure of the patients (Moreira et al., 2016; Alcalde and Kirsztajn, 2018; Silva Junior et al., 2018).

The central locus of care for chronic conditions in the SUS is primary care, a structure with large capillarity that is the gateway of the health care network. Primary care offers a broad set of individual and collective actions to solve the most common health problems (Starfield, 2002; Ministério da Saúde-BR, 2010; Mendes, 2012; Ministério da Saúde-BR, 2017).

In the world’s political agenda, the importance of kidney disease has not yet been widely recognized, which makes it a neglected disease. The Global Action Plan for the prevention and control of non-communicable diseases (NCDs) of the World Health Organization (WHO) does not include kidney disease. However, it can contribute to more deaths, in the world, than the four main NCDs together (Crews et al., 2019).

Thus, considering CKD’s impact on developing countries, the role of primary care, and the coverage of SUS, this study aimed to investigate primary care physicians’ knowledge and attitudes concerning care for CKD patients.

Methods

This research is based on quantitative and qualitative data. The participants were 92 physicians (50.3%) out of 183 physicians working in 81 primary care units in eight cities of a health region of the state of São Paulo, Brazil, with a population of approximately 900,360 inhabitants (IBGE, 2017). An initial survey was carried out through the Ministry of Health’s National Health Establishment Registration System (SCNES) to define the number of participants. After this stage, the researchers contacted the municipal managers of the primary health care (PHC) units of the studied health region by email and/or telephone, with the objective of scheduling visits to the primary health care units to explain the research to physicians and collect data. To be included in the study, the physician must have been working in primary care for at least one year. The exclusion criteria adopted were less than one year of working in primary health care, being on vacation, or away from work at the time of data collection. Data were collected from May to November 2017. The participants answered a self-administered questionnaire that had been previously submitted to a content validation process by six expert medical reviewers experienced in the subject, and circulated in the clinical practice of the national health services (Supplementary file 1). The content of the questionnaire was consistent with the federal clinical guidelines for CKD care, with the Brazilian Ministry of Health’s strategic action plan to manage chronic non-communicable diseases (CNCDs) and with the Brazilian laws that regulate the organization of this line of care (Ministério da Saúde-BR, 2011; 2014a; 2014d). It contained semi-structured questions divided into four dimensions: Dimension 1—clinical guidelines for the care of patients with CKD in SUS and within PHC (identification of risk groups, prevention strategies for CKD in patients at risk of developing the disease, and early diagnosis and treatment); Dimension 2—monitoring of the patient in the care network of patients with CKD; Dimension 3—availability of resources in the line of care for patients with CKD; and Dimension 4—coordination of care for people with CKD within PHC. It also contained an open question: Would you like to write about some difficulty you have experienced in assisting CKD patients in primary care? (Supplementary file 2).

The data were not recorded, as the participants completed a questionnaire with the majority of structured questions and one unstructured question. The quantitative data collected were entered into the public domain in Epi Info™ 7.2, the Centers for Disease Control and Prevention (CDC) computer program, and were analyzed using descriptive statistics. In contrast, the qualitative data obtained from the questionnaire’s unstructured question were transcribed and subjected to thematic analysis, consisting of phases such as pre-analysis, material exploration, and treatment of results, inference, and interpretation (Bardin, 1977).

Ethics review and approval for our evaluation of these data was received from the institutional review board of the Centro de Saúde Escola, Faculty of Medicine of Ribeirão Preto, University of São Paulo.

Results

The findings revealed that the majority of the 92 participants were women in the age group 31–40 years, with average education duration, for the physicians who provided this information (n = 70), of 14.2 years (Table 1).

Among the participants with medical residency (n = 62; 67%), 20 (32%) had completed residency programs in a medical clinic and two (3.2%) in nephrology. The second most prevalent specialty was family and community medicine (n = 19, 30%) (Table 1).

Half (n = 46, 50.5%) of the physicians reported not being familiar with the current law about the provision of assistance to CKD patients in primary care, but 83% (n = 76) considered themselves ‘capable’ of dealing with CKD in the stages attributable to primary care. In the ‘not capable’ answers given by 17% (n = 16) of the participants, they emphasized the gaps in health education.

Of the 87 physicians who responded about having received training to treat CKD, only 42.5% (n = 37) said yes. Of these, 25 (67.5%) reported the year of training, with the median time between the year of graduation and the year of training being 14 years (range 1–35 years). Table 2 presents the data about participants’ knowledge of risk factors for the development of CKD, the predictive factors (markers that give worse prognosis for loss of renal function), the offerings of health actions for the care of population groups at risk of developing CKD and the referral of cases to specialized care. Uncontrolled hypertension and blood glucose were identified as the main predictive factors.

Regarding home visits, 51% (n = 47) of doctors mentioned that this offer was available at the health service (Table 2). Home visits,
in the view of these 47 participants, were performed more frequently by nurses ($n = 33$, 70%), doctors ($n = 33$, 70%), and community health workers (CHA) ($n = 30$, 63%). Of the 61 educational activities cited by 26% ($n = 24$) of doctors, the most mentioned themes were healthy eating ($n = 24$, 100%) and arterial hypertension (AH) and/or diabetes mellitus (DM) ($n = 19$, 79%).

The time described by the participants ($n = 46$, 50%) between referral and consultation with the nephrologist was three months (range: 1–12). Thirty percent ($n = 27$) of the participants reported not referring patients in stages 4 and 5 to nephrologists.

Integration of primary care and the specialized nephrology services of the health care network was mentioned by 66% of the physicians ($n = 61$). As for secondary and tertiary specialized CKD services available in the city where the physician worked, 61% ($n = 56$) of the physicians reported that their city offered the services; 19.5% ($n = 18$) said their city did not have these resources; and 19.5% ($n = 18$) did not know whether the city offered the resources. The majority ($n = 67$, 73%) of the 91 participants who answered this question reported not receiving matrix support or consultancy regarding CKD. In comparison, 16% ($n = 15$) said they receive it informally by contacting colleagues, and only 10% ($n = 9$) reported receiving it formally from the institution where they work.

When the user was referred to another care provision unit of the health care network to receive a follow-up, 80% ($n = 73$) of the participants ($n = 91$) reported that the PHC health team accessed information predominantly through the patient’s report (65%, $n = 59$), or through an electronic information system (32%, $n = 29$), and only 20% ($n = 18$) through physical counter-reference.

### Table 1. General profile of the medical professionals who participated in the study, 2017

| Variable                  | Physician |
|---------------------------|-----------|
|                          | N  | %  |
| Sex                       |    |    |
| Female                    | 47 | 51.1|
| Male                      | 45 | 48.9|
| Age group                 |    |    |
| 25–30                     | 8  | 8.7 |
| 31–40                     | 41 | 44.6|
| 41–50                     | 15 | 16.3|
| 51–60                     | 14 | 15.2|
| 60 and older              | 3  | 3.3 |
| Not informed              | 11 | 11.9|
| Nationality               |    |    |
| Brazilian                 | 81 | 94.2|
| Cuban                     | 3  | 3.5 |
| Bolivian                  | 1  | 1.2 |
| German                    | 1  | 1.2 |
| Postgraduate education    |    |    |
| Residency                 | 62 | 67.4|
| Specialization            | 43 | 46.7|
| Master’s degree           | 8  | 8.7 |
| Doctoral degree           | 6  | 6.5 |
| Others                    | 10 | 10.9|
| Year of graduation        |    |    |
| 1972–1979                 | 2  | 2.2 |
| 1980–1989                 | 6  | 6.5 |
| 1990–1999                 | 13 | 14.1|
| 2000–2009                 | 28 | 30.4|
| 2010–2016                 | 21 | 22.8|
| Not informed              | 22 | 23.9|

### Table 2. Risk factors, predictive factors of prognosis, health actions offered to patients, and characteristics of referrals of CKD cases to specialized care, 2017

| CKD risk factor       | Number of participants* | %  |
|-----------------------|-------------------------|----|
| Arterial hypertension | 92                      | 100|
| Diabetes              | 92                      | 100|
| Nephrotoxic agents    | 85                      | 92  |
| Circulatory system disease | 79                  |    |
| CKD in the family     | 72                      | 78  |
| Age                   | 66                      | 72  |
| Smoking               | 54                      | 59  |
| Obesity               | 53                      | 58  |

| Prognostic predictor factor | Number of participants | %  |
|----------------------------|------------------------|----|
| Poorly controlled blood glucose | 91                    | 98.9|
| Arterial hypertension       | 91                     | 98.9|
| Albuminuria intensity       | 82                     | 89.1|
| Nephrotoxic agents          | 80                     | 86.9|
| Advanced stages of CKD      | 67                     | 72.8|
| High cholesterol            | 49                     | 53.2|
| Smoking                     | 45                     | 48.9|
| Others                      | 3                      | 3.2 |

| Health action offered       | Number of participants | %  |
|----------------------------|------------------------|----|
| Drug treatment              | 88                     | 96  |
| Health consultation         | 75                     | 82  |
| Home visits                 | 47                     | 51  |
| Multiprofessional service   | 25                     | 27  |
| Health education groups     | 24                     | 26  |

| Characteristics of CKD referrals to specialized care |
|------------------------------------------------------|
| CKD staging                                         |
| Number* of participants                              |
| %                                                     |
| G1                                                   | 8                       | 8.7 |
| G2                                                   | 16                      | 17.3|
| G3a                                                  | 35                      | 38.0|
| G3b                                                  | 62                      | 67.3|
| G4                                                   | 65                      | 70.6|
| G5 (non-dialysis)                                    | 65                      | 70.6|
| Grouped analysis: G1 to G3b                          | 75                      | 81.5|
| Other criteria                                       | 25                      | 27.0|

| Knowledge of the clinical guidelines*                 | Number of participants |
|------------------------------------------------------|------------------------|
| Know and use                                         | 70                     | 77.0|
| Unknown                                              | 21                     | 23.0|

| Regarding the time to carry out the referral**        | Number of participants |
|------------------------------------------------------|------------------------|
| Unknown                                              | 46                     | 50.0|

*Clinical guidelines for the care of patients with chronic kidney disease in SUS, 2014.
**Consultation with the nephrologist

CKD = chronic kidney disease
Still, 94% (n = 86) reported that the referred patient maintained regular return visits to PHC.

The majority of the physicians (n = 74, 80.4%) reported requesting clinical laboratory tests (Table 3) of patients at risk of developing CKD; 7.6% (n = 7) of the physicians mentioned requiring tests of all patients, regardless of the presence of risk factors; and 11.9% (n = 11) mentioned other criteria to request tests. Concerning the average time elapsed between the request of the test and the patient’s receipt of the result, most of the physicians (n = 83, 91.2%) knew about it, with a median of 60 days (variation: 2–182).

In the cross-analysis, we found that 23% (n = 19) of the professionals who used serum creatinine did not use the GFR from serum creatinine. The combined use of GFR from serum creatinine and urinalysis (urine spot sample analysis) was employed by 56% (n = 52) of the physicians for the diagnosis of CKD.

As for the periodicity with which the physicians requested tests of at-risk patients in whom CKD was not identified in the first assessment, 37% (n = 34) requested tests once a year, followed by 26% (n = 24) who requested them every semester. Furthermore, 89.1% (n = 82) reported assisting the patient with CKD in the primary care service where they worked, and 64.6% (n = 53) reported classifying the CKD stages.

The diagnosed patients’ follow-up exclusively in primary care varied according to the stages (Figure 1): 79.3% (n = 73) of physicians only followed stage 1 patients; 67.3% (n = 62) followed the patients until stage 2; 48.9% (n = 45) until at stage 3; and 19.57% (n = 18) until at stage 3B. Only 10 physicians (10.8%) reported following up patients at stages 1, 2, 3A, and 3B exclusively in primary care.

Regarding the objectives of the clinical management of CKD patients in primary care, despite the high frequency (close to or above 90%) of all the goals pertinent to primary care, smoking cessation and stimulus to physical activity were the least cited (n = 80, 87% and n = 83 90%, respectively).

Table 4 presents the thematic analysis of the physicians’ statements on the capacity and the main difficulties in the approach to CKD in PHC, according to the main themes, frequency of sense nuclei, and exemplification of the statements.

Discussion

This study showed a critical knowledge gap regarding the approach to CKD, as, among the group studied, half of the physicians were unaware of the national guidelines on CKD, and most professionals reported not having received training after hiring, which can interfere not only in the management but also in the access of people with this condition to care in PHC.

Research conducted in India identified several barriers to access for patients with CKD who needed urgent attention in PHC, recommending the creation of screening programs and specific educational initiatives to improve awareness of this disease. The study also points out that the PHC infrastructure needs to be strengthened for the care of patients with CKD, ensuring trained staff, availability of diagnoses, essential drugs, and creating efficient reference paths for quality care (Jafar et al., 2020).

The Pan American Health Organization emphasizes the world’s shortage of health workers qualified to meet the population’s health needs. Furthermore, the majority of today’s health workers were trained to treat acute diseases, not chronic problems, which require different skills and competencies (OPAS, 2015).

In Brazil, risk factors for CNCDs that contribute to the triple burden of disease predominate (Banco Mundial, 2005). Although most physicians reported feeling capable of dealing with CKD in primary care, the data showed that with respect to the prevention and strategies to slow the progression of CKD, almost none of them recognized the offering of educational actions focusing on modifiable risk factors as the first strategy of approach. A study (Silva and Brune, 2011) with patients at risk of developing CKD showed that 50% of them were in stages 3 and 4, which reveals the need for recognition and action by the primary care team about the risk factors. The physicians recognized systemic AH and DM as the main risk factors for CKD, but not all of them mentioned smoking, obesity, and sedentariness, which reflects the little importance they give to education strategies about the modifiable risk factors (Silva Junior et al., 2017). It is important to note that according to the project guidelines of the Brazilian Medical Association, massive proteinuria, severe AH, inadequate glycemic control in diabetics, smoking, and obesity are considered risk factors that worsen kidney injury and accelerate the fall in GFR after the onset of kidney injury (Kirsztajn et al., 2011).

It was noted that less than 30% of the physicians recognized multiprofessional involvement and educational groups as health care offerings for patients at risk of developing CKD. However, primary care is the most suitable locus of attention for these
Table 4. Frequency and examples of physicians’ discourse, according to the sense nuclei and on the ability and difficulties to address CKD in primary care, 2017

| Sense nuclei                      | Example of the participant’s discourse                                                                 | Number of nuclei | %     |
|----------------------------------|--------------------------------------------------------------------------------------------------------|------------------|-------|
| Health education                 | ‘Because I haven’t learned to follow up severe kidney patients adequately. I want to have continuing education about the theme’. ‘More training is necessary’. | 9                | 52.9  |
| Clinical management              | ‘I think the theme is very complex, I just focus on prevention of risk factors’.                       | 3                | 17.6  |
| Regulatory instruments           | ‘There is no protocol for us to follow’                                                                  | 2                | 11.8  |
| Matrix support                   | ‘Matrix support must improve so that we can provide care with better quality’.                         | 2                | 11.8  |
| Diagnostic resources             | ‘Because we don’t have all the laboratory diagnosis resources. The request for creatinine clearance was denied’. | 1                | 5.9   |
| **Total**                        |                                                                                                       | **17**           | **100** |

| Theme                              | Sense nuclei | Example of the participant’s discourse                                                                 | N Nuclei | %     |
|------------------------------------|--------------|--------------------------------------------------------------------------------------------------------|----------|-------|
| Characteristics of the care model  | Health education | ‘Lack of knowledge about the matter’ –M17                                                              | 7        | 44    |
|                                    | Continuity of care | ‘Due to the overcrowding and overloading of the primary level, there are management difficulties with premature return’. – M23 | 5        | 31    |
|                                    | Health team   | ‘The frequent absence of the multidisciplinary team, (scarce) qualification courses/professional recycling activities. Inefficient services in terms of prevention’. – M30 | 2        | 12.5  |
|                                    | Infrastructure | ‘The difficulties are related to the services’ structure, volume, and lack of training’ – M29          | 2        | 12.5  |
| **Total**                          |              |                                                                                                       | **16**   | **100** |
| Chronic kidney disease care in the primary level | Clinical management | ‘Indiscriminate use of anti-inflammatory drugs by patients with systemic arterial hypertension, diabetes mellitus, obesity always calls our attention during assistance. Patients are poorly informed about the pathology, adequate diets, comorbidities control. It is very difficult for the physician to approach all these things and provide guidance in a routine appointment due to lack of time’. – M71 | 7        | 58    |
|                                    | Diagnostic support | ‘Permission to request some tests: PTH (parathyroid hormone), NTD* (with the physicians’ justification) to better follow-up stage-3A patients that could be receiving follow up only at the Primary Care Unit/Family Health Unit’. – M92 | 5        | 42    |
| **Total**                          |              |                                                                                                       | **12**   | **100** |
| Primary Care and Assistance Regulation in the Healthcare Network | Regulatory instruments | ‘Long period of time elapsing before the patient is seen by a specialist; excessive bureaucracy in the protocol; electronic refusal without contact with the professional who referred the patient (rejection of referral); lack of integration between specialist professionals and primary care physicians to establish referral flows and CKD qualification; frequently, the specialist physician’s medical assistance is not entered into the electronic system, either because the professional does not do it or because the service does not have access to the patient’s electronic record; primary care physicians’ difficulty in following up patients – even though they are qualified, they do not have easy access to diagnosis resources that can be used exclusively by specialist physicians. This locks the system, generates queues and reduces the service’s efficiency and capacity to solve health problems’. – M76 | 18       | 50    |
|                                    | Integration and communication | ‘Lack of matrix support by nephrology teams; defective counter-referral system that offers only partial information frequently disconnected from primary care’. – M47 | 11       | 30.5  |
|                                    | Accessibility | ‘Difficulty in tests, both laboratory and imaging ones; lack of medicines in the healthcare network; difficulty in making an appointment with a specialist, even for assessment and guidance; long period of time elapsing before the follow-up appointment’. – M5 | 4        | 11    |
|                                    | Coordination of care | ‘We don’t know what happens to the patient in the specialized care. It would be interesting to have these orientations for the coordination of actions in primary care’. – M57 | 3        | 8.5   |
| **Total**                          |              |                                                                                                       | **36**   | **100** |

*Enzyme 5 Nucleotidase*
actions. It needs to be consolidated not only as a gateway to the health care system but also as the most appropriate place for this type of approach, through coordinated and continuous care. Thus, most CKD patients can be treated in PHC through ongoing follow-up to identify those at a high risk of progression to advanced stages, including end-stage kidney disease (Grill and Brimble, 2018).

Greer et al. (2012) indicate the need for investment in the educational initiatives about CKD in PHC, including the approaches taken by multidisciplinary teams, especially guiding self-care and spreading patient knowledge about the disease. Thus, the primary care team’s training on educational aspects in the management of chronic renal patients can provide qualified support to patients and families for the management of their condition and, ultimately, improve the clinical results of these patients. In this sense, a study carried out with chronic renal patients undergoing hemodialysis sought to understand how they performed self-care. From the patients’ statements, three categories emerged: requirements for self-care, self-care deficit, and education and information management for self-care. The study revealed difficulties in implementing self-care by these patients regarding resistance to changing life habits, adherence to treatment, and lack of information about their disease and treatment, as well as situations aggravated by the unfavorable economic conditions of some patients. On the other hand, the study pointed out that although the participants affirmed that they did not carry out self-care actions rigorously they were aware of the importance of carrying them out. Still, due to some limitations, it was noticed that people’s knowledge about their condition was generally acquired through the Internet and their own experience, and not through the health team. The authors concluded that people have the responsibility of maintaining their health but the health care team should recognize the conditions that interfere in these patients’ self-care to collaborate in overcoming the difficulties (Santana et al., 2020).

Care provision for CNCDs demands the transformation of reactive health systems into proactive systems, aiming to maintain the person as healthy as possible (OPAS, 2015). Thus, preventing CKD involves treating and controlling modifiable risk factors, and primary care must perform health actions beyond isolated and drug-based medical approaches (Ministério da Saúde- BR, 2014c; Azevedo et al., 2018). The importance of multiprofessional action was shown by a study in which clinical and laboratory parameters of patients with CKD improved significantly, contributing to reduce the progression of CKD (Luciano et al., 2012).

Results of a systematic review that sought to identify barriers and facilities that family doctors face when diagnosing and managing CKD suggest the need for time-efficient strategies that promote collaboration between members of the health care team and practical guidelines that consider the nature of CKD and the commonly associated comorbidities. A collaborative relationship between the family doctor and the nephrology services can also offer significant support to the PHC teams when diagnosing CKD, thus facilitating the patient’s self-management (Neale et al., 2020).

About the availability of resources for CKD treatment, many countries still do not have access to primary diagnoses and nephrology-trained workers (Crews et al., 2019). The approach to this chronic condition in primary care is grounded on its potential for solving health problems, based on its clinical and care capacity and on the incorporation of soft, soft-hard and hard technologies (diagnostic and therapeutic). The use of stratification by a little more than half of the physicians to identify subgroups according to the complexity of the chronic health condition helps in the differentiation of clinical care and of the flows that each user must follow in the health care network, for an integrated approach and rational use of resources (Mendes, 2012; Ministério da Saúde-BR, 2017).

The use of estimated GFR (eGFR) from serum creatinine associated with the assessment of albuminuria through the albumin-to-creatinine ratios (ACRs) is currently the best method to diagnose and categorize CKD (KDIGO, 2013). However, it is still neglected by a large number of the physicians in this study. GFR associated with spot urine samples analysis for the diagnosis was used by a little more than half of the physicians, although it is indicated as the first choice exam in the Brazilian clinical guidelines for caring for patients with CKD.

When the diagnosis was not made in the first screening, the great majority of them did not repeat the investigation with the recommended regularity. Evidence has shown (Silva and Brune, 2011) that the majority of patients in CKD stages 1 to 3 present serum creatinine within reference values (sensitivity of only 21% to detect individuals with altered GFR). Moreover, of the patients in stages 3 and 4, 79% present normal serum creatinine. Therefore, focusing exclusively on serum creatinine levels to evaluate GFR can delay the diagnosis of CKD. A spot urine samples analysis looking for urine sediment abnormalities that precede the reduction of GFR should always be on the minds of physicians as also ACRs, a marker of kidney damage, especially in at-risk persons such as diabetics and hypertensive patients.

Health managers and professionals must work in a concerted fashion among the target population from screening, to early diagnosis, and to appropriate diagnostic resources and the right time to use them in order to avoid inefficiency and poor care.

According to Grill and Brimble (2018), CKD screening should be performed only in patients with known risk factors and in the absence of an acute disease. The tests of choice for diagnosing CKD include GFR and spot urine ACRs. Most CKD cases in PHC have a low risk of progression and can be managed exclusively by family doctors. For patients with CKD who progress to more advanced stages or meet the reference criteria, it is essential to seek help from a nephrologist and work together to provide patients with the best care (Grill and Brimble, 2018).

The findings showed that 26% of the physicians referred patients at a very early phase (stages 1 and 2), and half of them referred them at stage 3A. On the other hand, 30% of the interviewed physicians followed up stage 4 patients in primary care.

In agreement with Vassalotti et al. (2016), the main reasons for referring patients with CKD to nephrology specialists are eGFR <30 mL/min/1.73 m², severe albuminuria, and acute kidney injury. The ultimate goal of CKD management is to prevent disease progression, minimize complications, and promote quality of life.

The SUS utilizes a protocol (Ministério da Saúde- BR, 2014a; 2014d) recommending that patients in stages 1, 2, 3A, and 3B should be assisted, preferably in primary care. However, the findings showed that although the majority of the physicians know and use the protocol of referral to nephrology, there was a decline in the follow-up at primary care as the stage advanced, suggesting that these physicians also referred primary care patients. The physicians frequently reported difficulties in the clinical management of CKD because it is a complex condition to approach.

In the view of patients and PHC professionals, significant limitations for care in CKD were the lack of knowledge and awareness about this disease. Barriers at the health system level included...
shortages of qualified professionals, medicines, fragmented referrals, and care and inadequate follow-up by specialists in hospitals. For patients and health care professionals, access to care in CKD can be improved through educational initiatives to raise awareness about CKD by the health care team in patients and their families by providing supplies and coordinating the care and involving the community health workers providing in-home care (Jafar et al., 2020).

Incomplete referrals or referrals at stages that could be treated in primary care and late diagnoses and referrals produce a negative repercussion for these patients’ morbidity and mortality. Adequate referral, in turn, can result in efficiency in the health care system, improvement in patients’ survival, delay in the need to begin Renal Replacement Therapy (RRT), timely intervention for making permanent access, better treatment choices and options, reduction in the number of emergency dialyses better nutritional patterns for patients and fewer hospitalization days (Bahiense-Oliveira et al., 2010; Coutinho & Tavares, 2011; Diegoli et al., 2015; KDIGO, 2013; McLaughlin et al., 2001; Padovani et al., 2012; Peña et al., 2006; Peña et al., 2012 and Nunes et al., 2014). The adoption of regulatory and care protocols guide the requesting professionals’ decisions and modulates the evaluation performed by the monitoring physicians (Ministério da Saúde- BR, 2017). Although the implementation of regulatory protocols can cause an increase in the demand for nephrologists, joint initiatives between specialists and primary care physicians can improve referral and optimize the use of the available resources, contributing to better clinical outcomes (KDIGO, 2013). In Brazil, this joint action is recommended by the matrix support strategy, which aims to ensure specialized back-up and technical-pedagogical support to primary care teams (Campos and Dominitti, 2007; Ministério da Saúde- BR, 2014b).

However, in this study, integration occurred only in two-thirds of the situation, and the matrix support provided by specialists was rarely available. Electronic support for clinical decisions is also a robust back-up and management strategy for primary care teams (Litvin et al., 2016).

As for the relation to other units of the health care network, the findings revealed the fragility of counter-referral and the difficult access to the referred patient’s information, which corroborates the results of other studies (Almeida et al., 2010; Magalhães Junior and Pinto, 2014). This situation negatively affects care coordination, an attribute of primary care inseparable from the health care network’s horizontal and vertical integration strategies, and organization of the health care network (Giovanna, 2014).

Knowledge about the health care network and its appropriation by its professionals, the network’s effective regulation, clear protocols and flows, and efficient communication among the different care provision units are necessary conditions for dealing with CKD. Such an organizational network postpones the onset of dialysis treatment in urgent and emergency care hospitals, even for CKD patients who were being followed up by a nephrologist at an outpatient clinic (Ferreira, 2015).

Another important tool to reduce fragmentation is the clinical information system, as it organizes data on individual patients and entire clinical populations (OPAS, 2015). However, in the studied scenario, the health care network showed up fragmented, poor communication, which can interfere in the occupation of vacancies in the specialized service, often by patients referred early, overload- ing the service and attention. Thus, PHC teams must act in an articulated manner with nephrologists from specialized services to uplift the care and life of people living with CKD (Grill and Brimble, 2018).

Conclusion and implications

There are gaps in many countries related to awareness-raising, workforce qualification, and improvement in the assistance provided for CKD patients. In Brazil, the structure of SUS, grounded on universal access and equity, enables us to deal with the entire spectrum of CKD, from screening and preventive strategies in at-risk patients to the provision of highly specialized care, such as RRT and transplantation.

However, the data showed that, especially in PHC, there is a need to qualify the care of patients at risk and patients with CKD, through the institution of relatively simple measures such as the appropriate use of available diagnostic resources and risk stratification, improvements in the connection in the health care network, provision of matrix support by specialists in nephrology, continuing education for professionals, and strategies that promote self-care by patients.

It is also necessary to enhance offerings not centered on medical care and drug therapy and to implement prevention strategies that can achieve integration of care and improvement in the management of this complex morbidity.

Indeed, investment in these aspects will facilitate better indicators related to CKD treatment in primary care, which will positively affect the patient and the health care system.

Financial Support. None.

Conflicts of interest. The authors declare no conflicts of interest.

Ethical Standards. The study was approved by the Research Ethics Committee (CAAE N° 58545116.3.0000.5414).

References

Alcalde PR and Kirsztajn GM (2018) “Gastos do Sistema Único de Saúde brasileiro com doença renal crônica”. Jornal Brasileiro de Nefrologia 40, 122–129.

Almeida PF, Giovanna L, Mendonça MMH and Escorel S (2010) “Desafios à coordenação dos cuidados em saúde: estratégias de integração entre níveis assistenciais em grandes centros urbanos”. Cadernos de Saúde Pública 26, 286–298.

Azevedo P, Sousa M, Souza N and Oliveira S (2018) “Health education shares in the context of chronic diseases: integrative review”, available from: http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/5013

Bahiense-Oliveira M, Duarte D, Meira GGC, Codes JJ and Ribeiro MZ (2010) “Referência para o ambulatório de nefrologia: inadequação da demanda para o especialista”. Brazilian Journal of Nephrology 32, 145–148.

Banco Mundial (2005) Enfrentando o Desafio das Doenças Não Transmissíveis no Brasil, Brasil: Banco Mundial.

Bardin L (1977) L’ Analyse de Contremp, translated by Reta, L.A. and Pinheiro, A., Lisboa: Edições 70, Presses Universitaires de France.
Campos GWS and Dominić AC (2007) "Apoio matricial e equipe de referência: uma metodologia para gestão do trabalho interdisciplinar em saúde." Cadernos de Saúde Pública 23, 399–407.

Coutinho NPS and Tavares MCH (2011) "Atenção ao paciente renal crônico, em hemodiálise, sob a ótica do usuário." Caderno de Saúde Coletiva 19, 232–239.

Crews DC, Bello AK and Saadi G (2019) "Burden, access, and disparities in kidney disease." Journal of Nephrology 32, 1–8.

Diegoli H, Silva MCG, Machado DS B and Cruz CERN (2015) "Encaminhamento tardio ao nefrologista e a associação com mortalidade em pacientes em hemodiálise." Brazilian Journal of Nephrology 37, 32–37.

Ferreira EDM (2015) "O Itinerário Terapêutico de Pessoas em Terapia Renal Substitutiva Com Doença de Base Hipertensão Arterial e/ou Diabetes Mellitus," Thesis [Master’s degree in Nursing], Faculdade de Enfermagem da Universidade Federal de Juiz de Fora, Brasil.

GBD 2015 DALYs and Collaborators HALE (2016) “Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 388, 1603–1658.

Giovanna L (2014) “Atenção Primária à Saúde e coordenação dos cuidados na rede assistencial." Rev. Divulgação em Saúde para Debate, 30–37.

Greer RC, Crews DC and Boulware LE (2012) Challenges perceived by primary care providers to educating patients about chronic kidney disease. Journal of Renal Care 38, 174–181.

Grill AK, and Brimble S (2018) Approach to the detection and management of chronic kidney disease: What primary care providers need to know. Canadian Family Physician 64, 728–735.

Instituto Brasileiro de Geografia e Estatística (IBGE) (2017) Estimativas Populacionais 2017 [Access on: 01 Jun. 2018]. Available from: <https://www.ibge.gov.br>. Available from: <https://www.ibge.gov.br/index.php>

International Society of Nephrology. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group (2013) “KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease”. Kidney International (Supplements) 1–150.

Jafar TH, Ramakrishnan C, John O et al. (2020) Access to CKD Care in Rural Communities of India: a qualitative study exploring the barriers and potential facilitators. BMC Nephrology 21 2–12.

Kirsztajn GM, Souza E, Romão JR, Bastos MG, Meyer F and Andrade NC (2011) Doença Renal Crônica (Pré-terapia Renal Substitutiva): Diagnóstico. In: Associação Médica Brasileira e Conselho Federal de Medicina. Projeto diretrizes. São Paulo: Associação Médica Brasileira e Conselho Federal de Medicina, 1–22.

Levey AS, de Jong PE, Coresh J, El Nahas M, Astor BC, Matsushita K, Neale EP, Middleton J and Lambert K (2012) "Major facilitators.

Disease (CKD) –– 2.8 doi: 10.1038/ki.2010.483. Epub 2010 Dec 8. Erratum in: Kidney Int. 2011 Nov;80(9):1000. PMID: 2110873.

Litvin CB, Hyer JM and Ornstein SM (2016) “Use of Clinical Decision Support to Improve Primary Care Identification and Management of Chronic Kidney Disease (CKD).” Journal of the American Board of Family Medicine 29, 604–612.

Luciano EP, Luconi PS, Sesso RC, Melaragno CS, Abreu PF, Reis SFS, Furtado RMS and Ruivo GF (2012) "Estudo prospectivo de 2151 pacientes com doença renal crônica em tratamento conservador com abordagem multidisciplinar no Vale do Paraíba, SP." Brazilian Journal of Nephrology 34, 226–234.

Magalhães Junior HM and Pinto HA (2014) "Atenção Básica enquanto orde-nadora da rede e coordenadora do cuidado: ainda uma utopia?". Revista Divulgação em Saúde para Debate 31, 14–29.

Marinho AWGB, Penha AP, Silva MT and Galvão TF (2017) "Prevalência de doença renal crônica em adultos no Brasil: revisão sistemática da literatura." Cadernos Saúde Coletiva 25, 379–388.

McLaughlin K, Manns B, Culleton B, Donaldson C and Taub K (2001) "An economic evaluation of early versus late referral of patients with progressive renal insufficiency". American Journal of Kidney Diseases 38, 1122–1128.

Mendes EV (2012) O cuidado das condições crônicas na atenção primária à saúde: o imperativo da consolidação da estratégia da saúde da família, Organização Pan-Americana da Saúde, Brasília, Brasil.

Ministério da Saúde (BR) (2010) Portaria nº 4.279 de 30 de dezembro de 2010: Estabelece diretrizes para a organização da Rede de Atenção à Saúde no âmbito do Sistema Único de Saúde (SUS), Ministério da Saúde (BR), Brasília (DF), [Access on: 15 Oct. 2017], Available from: <http://bvsms.saude.gov.br/bvs/saudelegis/gm/2010/prt4279_30_12_2010.html>.

Ministério da Saúde (BR) (2011) Plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis (DCNT) no Brasil, Ministério da Saúde (BR), Brasília (DF), [Access on: 08 Nov. 2018]. Available from: <http://bvsms.saude.gov.br/bvs/publicacoes/plano_acoes_entrente_dcnt_2011.pdf>

Ministério da Saúde (BR) (2014a) Diretrizes Clínicas para o Cuidado ao portador de Doença Renal Crônica – DRC no Sistema Único de Saúde. Ministério da Saúde (BR), Brasília (DF), [Access on: 01 Jun. 2018], Available from: <http://bvsms.saude.gov.br/bvs/publicacoes/diretrizes_clinicas_cuidado_paciente_renal.pdf>

Ministério da Saúde (BR) (2014b) Núcleo de Apoio à Saúde da Família, Ministério da Saúde (BR), Brasília (DF).

Ministério da Saúde (BR) (2014c) Organização local da linha de cuidado da pessoa com doença renal crônica – DRC: guia instrutivo, Ministério da Saúde (BR), Brasília – DF.

Ministério da Saúde (BR) (2014d) Portaria nº 389, de 13 de março de 2014. Define os critérios para a organização da linha de cuidado da Pessoa com Doença Renal Crônica (DRC) e institui incentivo financeiro de custeio destinado ao cuidado ambulatorial pré-dialítico, Diário Oficial da União, Brasília, DF, [Access on: 01 Oct. 2018], Available from: <http://bvsms.saude.gov.br/bvs/saudelegis/gm/2014/prt389_13_03_2014.html>

Ministério da Saúde (BR) (2017) Portaria nº 2.436, de 21 de setembro de 2017: Aprova a Política Nacional de Atenção Básica, estabelecendo a revisão de diretrizes para a organização da Atenção Básica, no âmbito do Sistema Único de Saúde (SUS), Ministério da Saúde (BR), Brasília (DF), [Access on: 20 Oct. 2017], Available from: <http://bvsms.saude.gov.br/bvs/saudelegis/gm/2017/prt2436_22_09_2017.html>

Moreira TR, Giatti L, Cesar CC, Andrade EIG, Acuário FA and Cherchiglia ML (2016) “Autoavaliação de saúde por pacientes em hemodiálise no Sistema Único de Saúde”. Revista de Saúde Pública 50, 10.

Neele EP, Middleton J and Lambert K (2020) Barriers and enablers to detection and management of chronic kidney disease in primary healthcare: a systematic review. BMC Nephrology 21, 1–17.

Nunes M, Santos E, Leite M, Costa A and Guilm D (2014) "Epidemiological profile of chronic kidney patients on dialysis program", Journal of Nursing UFPE on line 8, 69–76. Available from: <https://periodicos.ufpe.br/revistas/revistafermagen/artigo/view/9607>

Organização Pan-Americana da Saúde (OPAS) (2015) Cuidados inovadores para condições crônicas: organização e prestação de atenção de alta qualidade às doenças crônicas não transmissíveis nas Américas. Washington, DC: OPAS, 2015.

Padinaví CSS, Schor N and Laranja SM (2012) "Avaliação do perfil epide-miológico e das dificuldades encontradas pelos pacientes para o atendimento de primeira consulta no ambulatório de triagem da nefrologia da UNIFESP". Brazilian Journal of Nephrology 34, 317–322.

Peña JM, Logroño JM, Pernate B, Laviades C, Virto R and Vicente de Vera C (2006) "Late nephrology referral influences on morbidity and mortality of hemodialysis patients. A provincial study", Nefrología 26, 84–97.

Pena PFA, Silva JAG, Oliveira PTR, Moreira GAR and Libório AB (2012) “Cuidado ao paciente com Doença Renal Crônica no nível primário: pensar a integralidade e o matriciamento”. Ciência & saúde coletiva 17, 3135–3144.

Santana MBL, Silva DMGV da, Echevarría-Guaino ME, Lopes SGR, Romanoski PJ and Böell JW (2020) Self-care in individuals with chronic kidney disease on hemodialysis. Revista Gaúcha de Enfermagem, 41, e20190220. Epub June 05, 2020. <https://dx.doi.org/10.1590/1983-1447.2020.20190220>.
Silva MMH and Brune MFSS (2011) "Importância do cálculo da taxa de filtração glomerular na avaliação da função renal de adultos". Revista Brasileira de Farmacia 92, 160–165.

Silva Junior GB, Bentes ACSN, Daher EF and Matos SMA (2017) "Obesidade e doença renal". Brazilian Journal of Nephrology 39,65–69.

Silva Junior GB, Oliveira JGR, Oliveira MRB, Vieira IJES and Dias ER (2018) "Global costs attributed to chronic kidney disease: a systematic review" Revista Associacao Medica Brasileira 64, 1108–1116.

Starfield B (2002) Atenção Primária: Equilíbrio entre necessidades de saúde, serviços e tecnologia. UNESCO, Ministério da Saúde, Brasil.

Thomé FS, Sesso RC, Lopes AA, Lugon JR and Martins CT (2019) Brazilian chronic dialysis survey. Jornal Brasileiro Nefrologia 41, 208–214.

United States Renal Data System (2019) USRDS annual data report: Epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 1-64.

Vassalotti JA, Centor R, Turner BJ, Greer RC, Choi M, Sequist TD. National Kidney Foundation Kidney Disease Outcomes Quality Initiative (2016) Practical Approach to Detection and Management of Chronic Kidney Disease for the Primary Care Clinician. American Journal of Medicine 129, 153–162. doi: 10.1016/j.amjmed.2015.08.023. Epub 2015 Sep 25. PMID: 26391748.

Vivekanand J, Garcia-Garcia G, Iseki K, Li Z, Naicker S, Plattner B, Saran R, Yee-Moon Wang A and Yang C-W (2013) Chronic kidney disease: global dimension and perspectives. Lancet 382, 260–272.