

Early Detection of Chronic Kidney Disease in Mexico, a Case for Policy Transfer

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Introduction: Chronic kidney disease (CKD) treatment is often delayed in many countries, creating challenges for the health system. Therefore, it is necessary to strengthen its detection and management from the early stages. Local experiences that have been successful in managing CKD could transfer their policies and thus systematically expand the scope of their organizational learning.

Purpose: To characterize the elements of a success story of early detection and care of CKD in an adult population with social security, in order to transfer it to a similar organization.

Patients and Methods: Qualitative study of organizational nature, exploratory, descriptive, and analytical. It consisted of a narrative review, documentation of the process in a primary care unit of a social security institution in Jalisco, Mexico, and a flowchart linking the primary components. The analysis followed the questions used in the design of integrated care pathways.

Results: The literature review highlighted that early detection should be targeted at groups at risk for developing CKD, defining the clinical tests necessary to monitor and stage CKD, as well as management by a multidisciplinary team and the use of nephroprotective drugs. The case characterization provided insight into the institutional context in which the care process for patients with risk factors for CKD takes place. By incorporating the results of the review into the clinical care process, an ideal process for early detection of CKD was developed.

Conclusion: This research allowed the incorporation of elements of the institutional context in the characterization of the process of early detection and care of CKD, systematically identifying organizational and clinical elements that can promote the transfer of this process to other contexts.

Keywords: policy transfer, early detection, chronic kidney disease, social security, Mexico

Introduction

Chronic kidney disease (CKD) is a challenge for health systems worldwide, and particularly in Mexico because its attention has focused on attending to the last stages.¹ At national level, the numbers of patients in the last stage of CKD (stage 5), also known as end-stage chronic kidney disease (ESRD) or advanced CKD continue to increase, with almost 80% of people living with ESRD in Mexico are treated at the Mexican Institute of Social Security (IMSS).² This scenario is partially attributable to the lack of early diagnosis and the increase in noncommunicable diseases that are risk factors for the onset and progression of CKD, such as type 2 diabetes mellitus (T2DM), arterial hypertension (AHT) and obesity.³

Consequences of detecting CKD in its most advanced stages are a decrease in patient quality of life and survival, as well as the high costs of renal replacement therapies (dialysis or transplantation), whether publicly or privately funded.⁴ In 2019, Mexico reported the highest age-standardized rate of disability-adjusted life years (DALYs) due to CKD, with



1,489.7 per 100,000 population nearly twice the Latin American average (836.8 per 100,000).⁵ Moreover, an estimated 50% of patients with ESRD die prematurely from cardiovascular causes.⁶

Early detection of CKD requires protocols to halt progression and delay the initiation of dialysis or kidney transplantation, as well as policies to improve efficiency through cost-effective measures.⁷ Early detection is a process consisting of clinical assessment measures that are easily applicable from the primary care level, including measurement of serum creatinine, estimation of glomerular filtration rate (GFR), and determination albumin/protein excretion in a first voiding urine sample.⁸

In Mexico, there are some documented experiences with early detection of CKD.^{9–13} In addition to early detection interventions, educational interventions for primary care health professionals, particularly family physicians, have also been developed based on the content of clinical practice guidelines and protocols for early CKD. These interventions have demonstrated an increase in physicians' clinical competence and, subsequently, an improvement in blood pressure control and other clinical variables, as well as in the preservation of kidney function in patients with T2DM treated by these physicians in primary care units of the IMSS in Jalisco.¹⁴

Considering the potential of these experiences, it is necessary to replicate their best practices to generate organizational learning that allows for their adaptation to other institutions through systematic policy transfer work. This involves transferring a successful process from a source organization or transfer unit to another interested in implementing it, called a receiving unit.^{15,16} To develop a policy transfer experience, it is necessary to understand the objectives, instruments, and goals of the processes of the transfer and receiving units¹⁵ in order to develop learning for a planned, systematic, coordinated change that is adopted by the participating institutions. To develop learning, it is necessary to identify and select the best solutions, and once chosen actors who contribute new ideas and knowledge can be incorporated.¹⁷

It is initially necessary to search for best practices in other contexts, as well as a bibliographic review that serves as input when describing the experience of the transfer unit to generate an ideal learning experience from the context of origin. Therefore, the aim of this study was to characterize the elements of a successful case of early detection and care of CKD in an adult population with social security for transfer to a similar organization.

Materials and Methods

This manuscript consists of three components: a literature review, documentation of the study case, and the connection of the first components through a flowchart of the overall process. A qualitative methodology was used with an organizational, exploratory, descriptive, and analytical approach.

Literature Review

A narrative review was conducted following the scoping review checklist¹⁸ in the PubMed, LILAC, and Scielo databases, addressing the following question: What instruments should be considered in the transfer case for the early detection of CKD in the adult population? The search strategies included the following MeSH terms: *Renal Insufficiency, Chronic; Early Diagnosis; Diagnostic Screening Programs; Patient Care Team; Quality of Health Care* and their combinations: (((*Renal Insufficiency, Chronic*) AND (*Diagnostic Screening Programs*)) AND (*Quality of Health Care*); (((*Renal Insufficiency, Chronic*) AND (*Early Diagnosis*)) AND (*Patient Care Team*)) AND (*Quality of Health Care*). The MeSH term quality of care was added to the strategy, given that quality is implicit in the transfer, seeking to identify the best practices in different contexts.¹⁶

The inclusion criteria were: 1) manuscripts focused on early detection of CKD or early diagnosis combined with treatment in the first three stages in the population over 18 years of age with T2DM and AHT; 2) description of CKD early detection programs; 3) in English and Spanish, from 2013 to 2024. Conference abstracts, news and case reports, and articles addressing advanced CKD, acute kidney injury, and population under 18 years of age were excluded.

Search results were organized using the Rayyan bibliographic management tool to perform peer review and remove duplicates. For each study, the title and abstract were examined, taking into account the review question. Potentially relevant articles were peer-reviewed for inclusion or exclusion. Since protocols were included, the corresponding author was contacted for further information, and if no response was received, the first author was located. After the review of

titles and abstracts was completed, the full texts of all retrieved articles were obtained and reviewed. The PRISMA schema was used to show the search results, as it is a standardized diagram.¹⁹

The data extracted from each study included information on the authors, year of publication, study design and objectives, instruments, and goals. For greater clarity and systematization of the tools and goals for presenting results, the questions used in the development of the integrated care pathways proposed by Saturno et al were considered: What should be done? How is it done? When is it done? Who does it? Where is it done? and What is the improvement?.²⁰

Study Case

The early detection process for CKD, carried out at the Medical Research Unit for Kidney Diseases by Cueto-Manzano et al, was visited and documented in a Family Medicine Unit of the National Western Medical Center, IMSS, in Guadalajara, Jalisco.¹³ For the semi-structured interviews of the CKD screening process, the director of the primary care unit of the social security institution was initially contacted by Email to request authorization and participation; for the interviews, the key informants were contacted in person.

Semi-structured interviews and observation were conducted using convenience sampling. In addition, before visiting the unit, the instruments were pilot-tested to time the interviews and improve the exchange of ideas, ensuring they were as concrete as possible. Observations included monitoring the dynamics of patients with T2DM and AHT, from their admission to the clinic until they received care; outpatient visits and preventive medicine consultations were also monitored. An observation guide was developed with the following topics: identification of patients at-risk, clinical assessment of patients with risk factors, and diagnosis and classification of CKD patients. With the informed consent of staff and patients, the consultation of patients with T2DM, AHT, and preventive medicine was observed.

Once the observation was completed, a descriptive analysis was conducted, which served as input for triangulation with information from semi-structured interviews conducted with key informants who met the following criteria:

Clinical staff: medicine, nursing, nutrition, physical conditioning, and psychology, directly involved in the early detection of CKD or in the detection and care of chronic non-communicable diseases (T2DM and AHT), with one or more years of experience in the early detection of CKD or in the detection and care of chronic non-communicable diseases (T2DM and AHT), and willingness to participate in the project. Non-clinical staff: administrative staff (department heads or coordinators) who direct the process, social work, and pharmacy staff at the institution where early detection of CKD or the detection and care of chronic non-communicable diseases (T2DM and AHT) is carried out; seniority at the institution of at least two years; and willingness to participate in the project.

The interview guide included the following thematic axes, adapted to the type of informant: experience in early detection of CKD at the institution, external context of early detection of CKD, internal context of early detection of CKD, and general information about the informant.

Before beginning the interview, informants were asked for their written informed consent to audio-record the interviews and to publish anonymized responses and direct quotes. At the end, they were given a copy of their informed consent; the interviews were conducted at their workplace. Subsequently, the recordings were transcribed for content analysis,²¹ which consisted of identifying categories derived from the interview guide and available information.

To harmonize results of the review and interviews, questions were considered as analytical categories for the development of integrated care pathways: category 1) “What should be done in the early detection of CKD?” integrates specific clinical and organizational actions and includes the subcategories of identifying at-risk patients, continuity of care for patients with risk factors, communication among staff during care for at-risk patients (T2DM and AHT), education for patients with risk factors, and capacity development; and category 2) “How is early detection of CKD performed?” shows how to implement the actions considering evidence-based tools. This latter category includes the subcategory of identifying CKD in patients with risk factors and the use of evidence on CKD. It is worth mentioning that, when characterizing early detection of CKD in the clinic, the care for people with T2DM and AHT was included, so the subcategories are related to these types of patients.

General Process

Results of the literature review and the documented screening process are presented in a complementary manner, as a case study that describes the ideal process, combining the best practices with the actions taken in the clinic.

Results

Literature Review

Thirty-one articles were included in the review; the combined searches of the three databases yielded 40 articles, of which 5 were duplicates. The titles and abstracts of the 35 articles were reviewed, and 20 were excluded for not meeting the inclusion criteria. Five articles, including two protocols, were excluded from the full review due to lack of author response or lack of results. The remaining articles presented a very general approach to CKD treatment, and the rest focused on the final stage (stage 5). Therefore, 10 articles ultimately met all inclusion criteria (Figure 1).

To strengthen the search, a snowball search technique was also performed, reviewing the reference lists of previously included articles. A total of 462 articles were obtained, of which 21 met the inclusion criteria and were selected for review. Table 1 shows the characteristics and results of the final articles.

The review identified clinical and organizational actions or tools. Regarding clinical tools, screening should be targeted at people with diseases that constitute risk factors for CKD, in whom GFR should be estimated, and albumin excretion determined in a random urine sample (ideally a first voiding sample). After three months, the diagnosis of CKD should be confirmed, and, if necessary, imaging studies should be used.^{22–38,40–42} Pharmacological management should be individualized, considering the results of GFR and albuminuria, and the clinical parameters that will determine the use of certain drugs, for example, the use of metformin in diabetic patients.^{22,23,25–28,32,37,38}

The review highlighted as an organizational tool that the screening should be performed at the primary healthcare, with primary medical personnel, ensuring multidisciplinary management, including medical, nutrition, nursing, social work, physical activity, and psychology personnel. Other types of personnel can be incorporated, such as the clinical

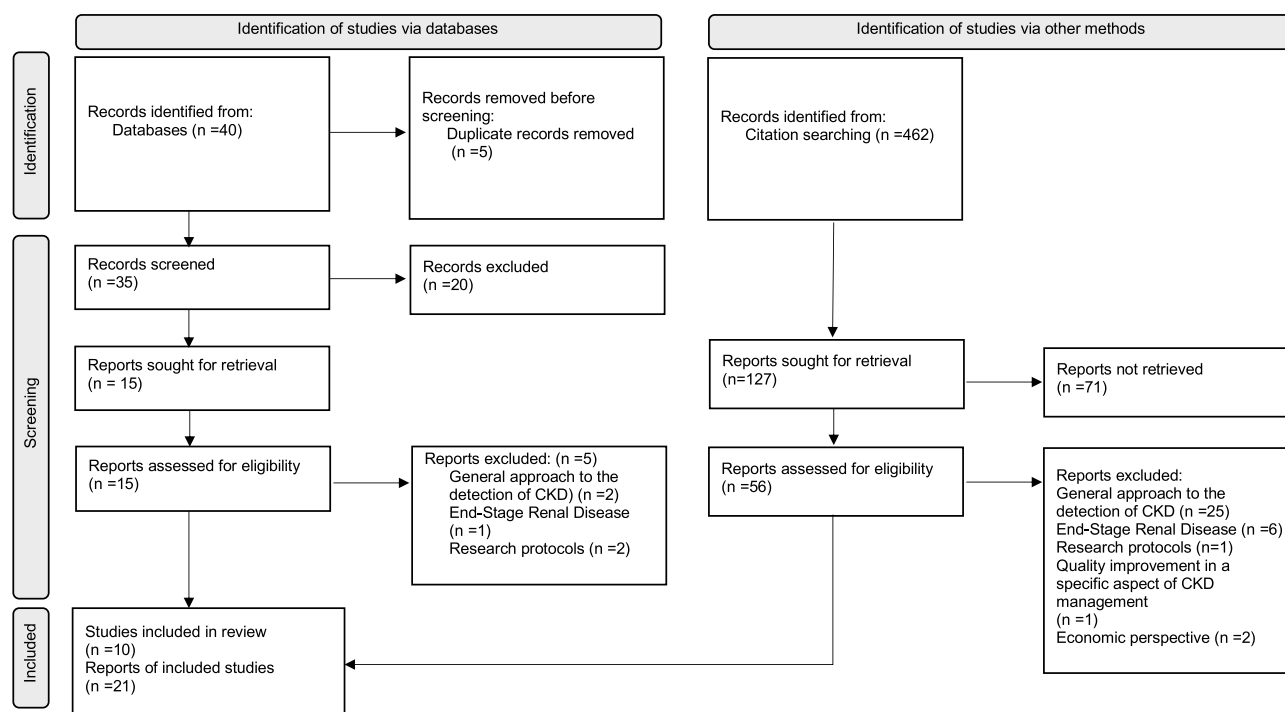


Figure 1 PRISMA diagram of the article identification process.

Notes: Information adapted from Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews.¹⁹

Abbreviation: CKD, Chronic Kidney Disease.

Table 1 Results of the Literature Review

	Clinical Instruments	Organizational Instruments
What should be done in the early detection of CKD?	• Aimed at CKD risk groups (AHT and T2DM). Determination of glucose, glycated hemoglobin, urea, creatinine, microalbuminuria, and albumin/creatinine ratio in a random urine sample, blood pressure measurement, and GFR estimation.^{22–41} • Control of blood pressure and glycated hemoglobin.^{22–41} • Individualized treatment and use of nephroprotective drugs (angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers).^{22,23,26,28,32,33,37,38} • Restriction of metformin use if the albumin/creatinine ratio is increased.^{22,23,26,28,32,33,37,38} • Avoid the use of nonsteroidal antiinflammatory drugs (NSAIDs).^{22,23,26,28,32,33,37,38}	• Communication between staff and patients, developing care networks.^{24,29,37,38,40,42–45} • Use of electronic medical records that include decision support tools, clinical reminders, links to supportive referrals, and treatment recommendations.^{24,29,37,38,40,42–45} • Training of clinical staff.^{24,29,37,38,40,42–45} • Patient follow-up through electronic means such as Email and phone calls.^{24,29,31,35,46} • Information provided through educational strategies.^{24,29,31,35,46}
How is CKD detected early?	• Estimation of glomerular filtration rate using standardized Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) and Modification of Diet in Kidney Disease (MDRD) formulas.⁴⁷ • Determination of albuminuria in a random urine sample.^{22–46,48–52} • Imaging studies such as ultrasound.³⁰	Not applicable
When is CKD diagnosed early?	• Screening should be performed once a person is known to have T2DM, AHT, heart disease, smoking, obesity, with a family history of kidney disease, congenital kidney defects, exposure to toxics, kidney injury, etc.^{22–24,27–30,35,37,38,40,41,44,45,48,52} • It should be confirmed three months after the first estimation of glomerular filtration rate.^{22–24,27–30,35,37,38,40,41,44,45,48,52}	Not applicable
Who performs early detection of CKD?	Not applicable	• Primary care physicians.^{22,26,28,30,31,34–42,44,49,51–53} • Management by a multidisciplinary team: Primary care nutritionists, nurses, psychologists, social workers, and physical therapists, with the support of a specialist (Nephrology and/or Internal Medicine).^{22,26,28,30,31,34–42,44,49,51–53} • Clinical pharmacist, as part of the multidisciplinary team, with management activities to initiate therapies, adjust doses, monitor drug complications, and even perform early detection by ordering laboratory tests.^{27,37,38,45}
Where is CKD early detection performed?	Not applicable	• Primary care units^{22,26,28,30} • Community centers^{22,26,28,30,31,34–42,44,49,51–53} • Targeted at preventive consultations for populations with conditions that constitute risk factors for CKD.^{22–24,32–34,36,38–42,48,49,53}

(Continued)

Table 1 (Continued).

	Clinical Instruments	Organizational Instruments
What is the improvement with early detection of CKD?	• Control of blood pressure and glycated hemoglobin levels.^{30,31} • Decreased rate of kidney damage progression.⁴¹ • Increased percentage of albuminuria determinations.^{25,42} • Increased diagnosis of CKD.^{25,42} • Reduction in the use of NSAIDs and temporary discontinuation of potentially nephrotoxic medications.^{29,35} • Increased use of nephroprotective drugs.^{29,35}	• Increased number of interventions by pharmacists, with a reduction in the number of drug-related complications.⁴⁵ • Increased awareness of early detection and risk factors among patients and staff.⁵²

Abbreviations: CKD, Chronic Kidney Disease; T2DM, Type 2 Diabetes Mellitus; AHT, Arterial Hypertension; GFR, Glomerular Filtration Rate; NSAIDs, nonsteroidal anti-inflammatory drugs; CKD-EPI, Chronic Kidney Disease Epidemiology Collaboration; MDRD, Modification of Diet in Renal Disease.

pharmacist (although in our country it is very rare for this professional to participate), and the family medicine specialist nurse, all of them working hand in hand with the nephrology or internal medicine specialists.^{22,27,28,30–32,34–42,44,49,51–53}

Other organizational tools included in the review findings include communication and continuity of care between healthcare staff and patients. Both areas demonstrate the use of electronic tools and increased information by means of training and education strategies.^{27,36,37,40,43–46}

In addition to identifying the tools, the review revealed outcomes or improvements in their interaction. These can be expressed in clinical terms, such as adequate control of blood pressure and glycated hemoglobin levels, slowing of GFR deterioration, and reduced use of nephrotoxic drugs,^{25,29–31,35,41,42} as well as in organizational terms, such as the use of resources for laboratory testing (increased screening), improved communication with patients, and greater knowledge about the disease.^{25,35,42,45,52}

Study Case

Observations were conducted in seven areas: medicine, nursing and preventive medicine, physician assistants, laboratory, social work, and nutrition. Twelve semi-structured interviews were conducted (two physicians, two nurses, one physician assistant, two department heads, and five researchers). Almost all the informants were women, their educational level ranged from undergraduate to graduate, and their average experience in the field was 15 years. As mentioned above, results of the review and interviews were integrated, considering questions for the development of integrated care pathways as analytical categories. [Figure 2](#) describes the categories and subcategories.

What Should Be Done for Early Detection of CKD?

Identification of patients with T2DM and AHT. Key informants commented that identification is done in three ways: the first is when people come to the clinic and, while they wait their turn, preventive medicine staff can measure their capillary glucose and blood pressure. The second is when medical assistants detect any missed preventive measures, checking their card and directing them to that area. It was reported that, if the patient is over 20 years old, the measures include blood pressure measurement and capillary glucose determination. The third way is when people go directly to the clinic to receive all the necessary measures.

All patients without a diagnosis of T2DM or AHT go through the PrevenIMSS process, that is, they go to the preventive medicine care modules. There, they are tested for T2DM or AHT by measuring their blood pressure or capillary blood glucose

Nursing Staff, 18 Years of Work Experience

Patients over 20 years of age who have not undergone screening in the last 3 years and who are neither diabetic nor hypertensive

Nursing Staff, 20 Years of Work Experience

Continuity of care for patients with T2DM and/or AHT. It was reported that, in the event of any change in blood pressure or capillary blood glucose measurements, the staff initiates the following procedures to ensure continuity of

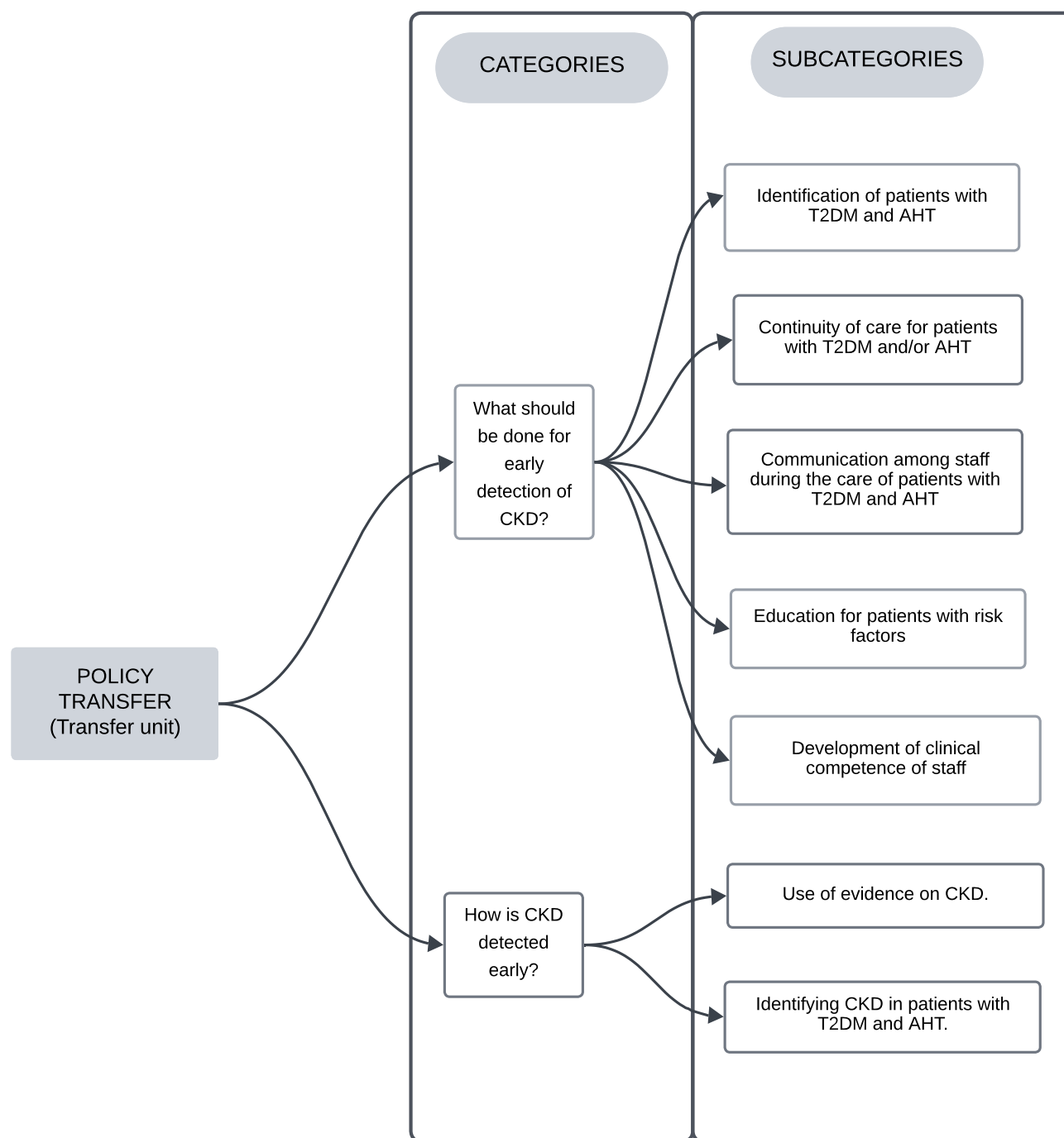


Figure 2 Categories and subcategories of semi structured interviews.

Abbreviations: CKD, Chronic Kidney Disease; T2DM, Type 2 Diabetes Mellitus; AHT, Arterial Hypertension.

care. If the patient's blood pressure is abnormal, it is rechecked; if it persists, a five-day log is requested, and instructions are given on how to measure and record it. After five days, the patient returns to preventive medicine; if the readings are not normal, an appointment is scheduled with the physician assistant in their assigned office, with a time limit for this appointment not to exceed five days. After scheduling the appointment, the preventive medicine staff speaks with the patient to find out if they already had an appointment and what their primary care physician prescribed, as this department keeps an internal record.

We teach them the correct way to measure their blood pressure, either before or when they can do it, so they can be more assertive. We also teach some patients how to use a sphygmomanometer, as they sometimes come here

Nursing staff, 19 years of work experience.

Regarding capillary glucose, if it is abnormal, the patient is referred for central glucose testing. It was indicated that samples are generally processed urgently, with results expected within 24 hours. As soon as the results are available, the patient should return to preventive medicine for an explanation and a referral to family medicine, which should occur within 5 days.

When a patient undergoes capillary blood glucose testing, if the result is above normal, a laboratory order is issued, they are followed up, or they are referred regularly. Preventive medicine nurses refer the patient and schedule the laboratory appointment

Nursing staff, 19 years of work experience.

Communication among staff during the care of patients with T2DM and AHT. In this category, informants confirmed that they communicate with the clinical team in person or through official means, such as notes of the electronic medical record, reports requested by department heads, and interdepartmental referral forms.

Every week, the laboratory prints all the results of the suspected patients we refer. We perform a specific search. We can also query the system to view the laboratory results

Nursing staff, 19 years of work experience.

In the electronic medical record, family medicine nurse specialists can create a nursing note, which the physician can review; they can also send patients to other services using the service request form 4-30-200

Nursing staff, 22 years of work experience.

Education for patients with risk factors. One form of training is through educational strategies taught by different healthcare professionals, including talks, hands-on practice, and workshops. In these activities, topics related to nutrition, exercise, treatment, mental health, and the management of complications of type 2 diabetes and hypertension are considered.

Patients receive monthly care from family medicine nurse specialists, as well as from the family physician. Diabetic and hypertensive patients also see the nurse specialist, where they receive 12 sessions of comprehensive educational programs, including: what they should eat, how much water they should drink, what types of exercises they can do, how to care for their feet, how to detect kidney disease, what the warning signs of their condition are

Nursing staff, 18 years of work experience.

Development of clinical competence of staff. The family medicine unit has a continuing education program focused on chronic diseases such as T2DM and AHT, as well as CKD care. The courses are taught to the unit's medical staff, who receive a scholarship that which allows them to invest their consultation time in the course.

At the IMSS, these are known as 'scholarship courses,' and we have scheduled a course called 'Early Detection of CKD in People with Type 2 Diabetes.' In this course, a family physician is the instructor, but we also have guest speakers, nephrologists, nutritionists, CKD specialists, and researchers

Medical staff, 5 years of work experience

From the written comments about these course sessions, we can see that they graduate with the idea of being grateful for the knowledge acquired, which allows them to refer a patient to a secondary care provider without delay. This makes it clear to them

Medical staff, 5 years of work experience.

The continuing education program offers weekly morning and afternoon sessions, open to all clinical staff, bringing together researchers and experts in various fields, including CKD.

The sessions have covered topics such as CKD, early detection, and diet for patients with kidney disease

Medical staff, 5 years of work experience.

How Is CKD Detected Early?

Use of evidence on CKD. The information provided by the informants coincided with what has been reported in the literature on this regard, highlighting the multidisciplinary approach and the use of nephroprotective measures that include risk factor control and the promotion of healthy dietary changes and physical activity.

As we proposed, CKD screening should be performed at any consultation as soon as risk factors are detected in a given patient. How to do this is explained in our proposed algorithms. Management should include the participation of a multidisciplinary team; we proposed that patients should have at least medical, nutrition, and social work consultations, and ideally, if resources are available, psychological consultations

Researcher, 28 years of work experience.

Identifying CKD in patients with T2DM and AHT. Regarding CKD, once patients begin their usual treatment for T2DM and AHT, medical staff apply the Cockcroft-Gault formula to establish the CKD diagnosis; this formula is found in the electronic patient record. It was observed that laboratory results are monitored at each visit, and the need for referral is determined based on the decline in GFR.

The family physician should perform general examinations at least twice a year and prescribe general care. When requesting a creatinine test from the patient, they apply the formulas to determine if there is kidney damage

Medical Staff, 18 Years of Work Experience

At the end of the consultation, the physician generates a referral and counter-referral for the patient using a specific form, and we must generate the referral through the electronic platform. This is how the patient receives medical care, prescriptions, and referral to the secondary care provider

Medical Staff, 17 Years of Work Experience

General Process

The flowchart described in [Figure 3](#) integrates key elements of the review results, as well as the activities carried out in the transfer unit for the early detection of CKD during the care of patients with diseases such as T2DM and AHT.

The key clinical elements are the estimation of the GFR based on the diagnosis of T2DM and AHT; moreover, it is necessary to consider family history and inherited or congenital diseases and the adjustment of medication doses accordingly. Referral to Nephrology should consider both GFR and albuminuria, so management goals such as improving patients' blood pressure, maintaining a controlled glycated hemoglobin percentage (less than or equal to 6.5% to less than or equal to 8%), reducing body mass, and, if possible, eliminating the use of nephrotoxic drugs, particularly nonsteroidal anti-inflammatory drugs (NSAIDs), should be considered. These key organizational elements include incorporating CKD-related education and follow-up activities for the family practice nurse, as well as utilizing social work as a liaison not only with the nutrition, physical activity, and psychology departments, but also with the medical and nursing staff to ensure continuous care.

In the diagram, the nutrition department of the transfer unit offers individual and group sessions to address nutritional issues. The literature review, additional recommendations are included regarding lifestyle practices addressed during individual sessions, such as eating behaviors influenced by social and work environments, meal preparation routines, the type of physical activity performed, sleep quality, and tobacco prevention; followed by anthropometric assessment (body mass, muscle mass), body mass index (BMI) calculation, and laboratory results (serum creatinine and glucose, glycosylated hemoglobin, and GFR estimation). The nutritional history should include a questionnaire on food frequency, a three-, seven-, or 24-hour food recall.

In the documented case, group psychology sessions were observed, while the review included individual sessions in addition to group sessions. In both cases, the main themes are motivation, self-care, empowerment, and treatment

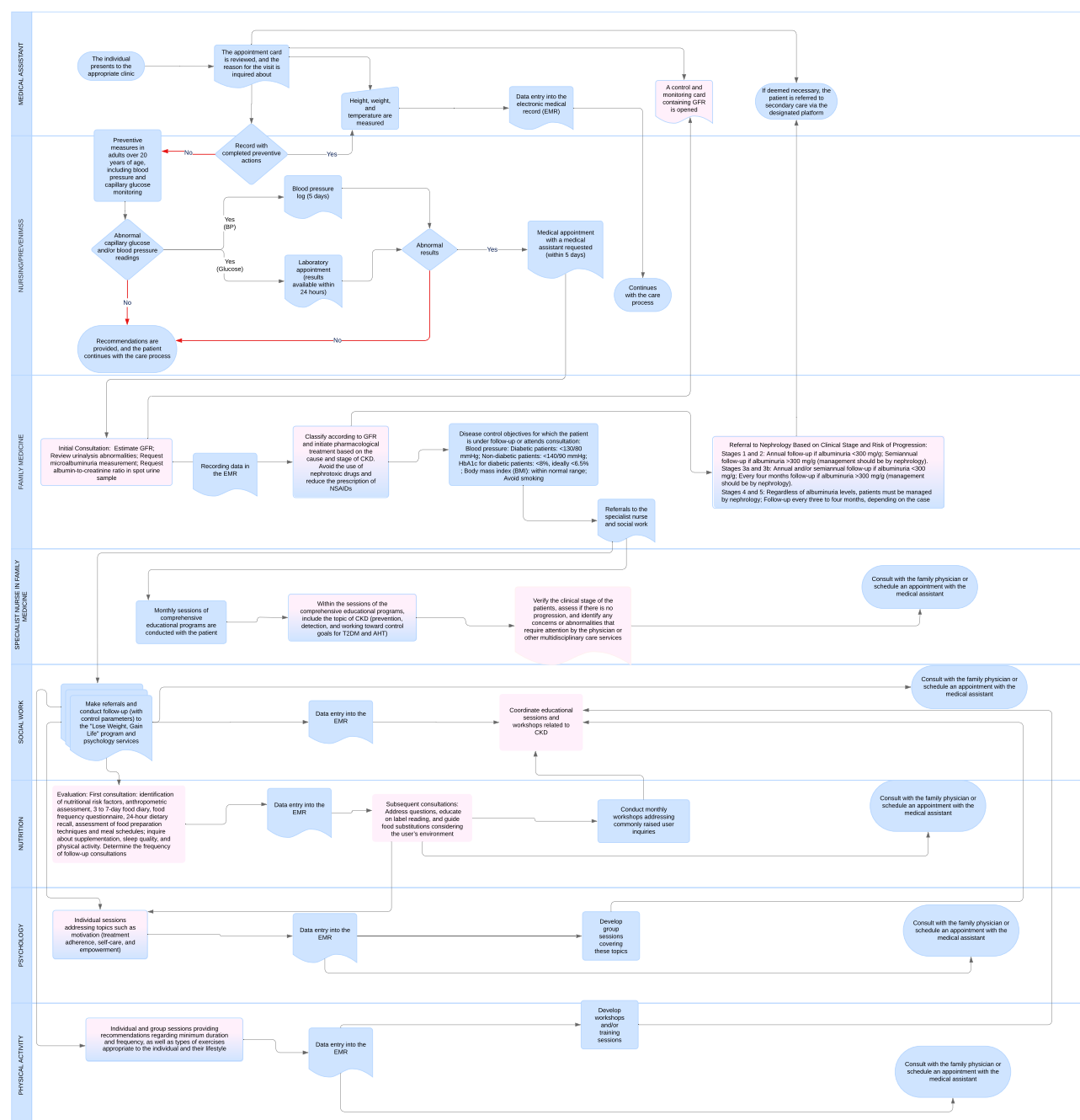


Figure 3 General process for CKD early detection IMSS Jalisco, 2024.

Notes: Blue indicates activities performed at the clinic; pink denotes those recommended in the literature for early CKD detection. Dual-colored activities reflect partial implementation and require completion based on the recommendations established in the literature.

Abbreviations: EMR, Electronic Medical Record; BP, Blood Pressure; GFR, Glomerular Filtration Rate; CKD, Chronic Kidney Disease; NSAIDs, nonsteroidal anti-inflammatory drugs; BMI, body mass index; T2DM, Type 2 Diabetes Mellitus; AHT, Arterial Hypertension.

adherence. Finally, the diagram shows that activities related to the “Lose Weight, Gain Life” program are carried out in the physical activation area of the transfer unit, and patient referrals are made through the social work area. However, based on the literature review, group sessions that integrate individual recommendations are recommended, considering the following: avoid a sedentary lifestyle by performing 30 to 60 minutes of moderate exercise, 4 to 7 days a week (minimum 150 min/week), with moderate-intensity aerobic and/or strength exercises.

Discussion

Results of this study allows to characterize the early detection and care process for CKD by combining the aspects gathered in the literature review and the documentation of a successful case in Mexico. To this end, elements of an institutional context were incorporated, allowing us to identify the organizational and clinical elements that can facilitate the transfer of this process to other contexts interested in developing it.

The organizational elements consider the application of electronic tools to ensure continuity and communication between staff and patients, including the electronic medical record and the use of electronic media to facilitate communication. These results are consistent with the findings of Bravo-Zúñiga et al and Drawz et al, who indicated that the use of electronic records and media for communication with staff and patients facilitated the management of CKD.^{40,43}

A key organizational element was the incorporation of CKD screening into the care processes for T2DM and AHT. However, the timing of CKD detection differs from the recommendations of the kidney disease: Improving Global Outcomes (KDIGO),⁵⁴ which establishes that screening should be performed in patients from the moment of diagnosis of high-risk conditions, such as T2DM and AHT. Screening is performed in the transfer unit if obvious symptoms of CKD or laboratory test abnormalities are present in this kind of patients.

The clinical elements considered in this article are the staging of CKD and the subsequent implementation of measures to improve control of factors that contribute to the progression of kidney disease, such as blood glucose, lipid, and blood pressure control, and the individualization of nephroprotective drug therapy. While there are differences in the timing of CKD staging and the type of formulas used, these could be due, on the one hand, to the physician's lack of knowledge to make an accurate CKD diagnosis,⁵⁴ or to the institution's failure to modify the formulas available in the electronic medical record; whatever the reason, this could somehow influence the course of the disease.⁵⁵

Limitations. The strategy is predominantly focused on CKD attributable to risk factors such as T2DM and hypertension; thus, other risk factors may not yet be sufficiently considered in the early detection process. Additionally, this study only considers the perspective of healthcare professionals, so it would be pertinent to explore the patient's perspective in greater depth to fully understand the process. The work by Cueto-Manzano et al was conducted before the case characterization in this article, which may present some differences with what has been reported in the literature. Although the policy transfer process does not depend on the development time of the processes, the review served to strengthen the unit's activities related to the early detection of CKD. Future research should focus on understanding the effect of time on the sustainability of innovations in a given context. These weaknesses were offset by source triangulation, feedback, and validation of information by participants, which contributed to greater specificity in the described tasks.

Conclusion

This study may facilitate the transfer of documented cases by systematizing the procedures used for CKD screening. This could promote organizational learning to subsequently increase the chances of successful transfer of CKD screening by combining evidence from different sources to improve kidney health.

Abbreviations

CKD, Chronic Kidney Disease; ESRD, End-stage chronic kidney disease; IMSS, Mexican Institute of Social Security; T2DM, Type 2 Diabetes Mellitus; AHT, Arterial Hypertension; GFR, Glomerular Filtration Rate; PRISMA, Preferred Reporting Items for Systematic reviews and Meta-Analyses; NSAIDs, nonsteroidal anti-inflammatory drugs; BMI, body mass index; KDIGO, the kidney disease: Improving Global Outcomes.

Ethics Statement

The study received approval from the Research Ethics Committee of the National Institute of Public Health, registered with CONBIOÉTICA: 17CEI00420160708. The researchers contacted the interview participants by Email and described the purpose of the study and the interview process. Written informed consent was obtained from each participant before

the interview. They were assured of confidentiality and anonymity, that participation was voluntary, and that they were free to withdraw from the study. No participants withdrew their consent.

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Author Contributions

All authors made a significant contribution to the paper, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The author(s) report no conflicts of interest in this work.

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