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CHRONIC KIDNEY DISEASE IN AGRICULTURAL COMMUNITIES IN CENTRAL AMERICA: FINAL REPORT

Background

1. The purpose of this document is to present to the Governing Bodies of the Pan American Health Organization (PAHO) the final report on progress made to date in relation to the comprehensive response to the health problem posed by chronic kidney disease (CKD) in the agricultural communities of Central America, particularly the type of CKD known as CKD from non-traditional causes (CKDnT). This matter was considered by PAHO Member States in 2013 during the 52nd Directing Council of PAHO, which approved Concept Paper CD52/8 (1) through Resolution CD52.R10 (2). Progress reports on the implementation of Resolution CD52.R10 were presented in 2015, 2017, 2019, and 2021 (3–6).

2. Over the past two decades, a growing number of cases of people suffering and dying from CKD have been reported in the Central American subregion. Among these cases, a type of kidney disease (CKDnT) whose etiology is not related to the most frequent causes of CKD, such as diabetes mellitus and hypertension, has been noted. This health problem occurs in this subregion with a higher frequency than in the Region of the Americas as a whole, and it represents a growing percentage of reported cases. Among possible causes of CKDnT, exposure to agrochemicals and recurrent dehydration have been investigated. Following the multiple investigations conducted in recent decades, the focus has been on these two possible causal agents (7).

Analysis of Progress Achieved

3. This analysis outlines the results achieved by various entities at the regional level and by the six countries integrating the comprehensive response project (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama) in the following five strategic areas of work.

Strengthening of local capacity for a comprehensive response to CKDnT in affected municipalities

4. Since 2017, the six Central American countries integrating the project have made progress in carrying out interventions to strengthen national and local capacities to offer a comprehensive response to CKDnT, with emphasis on the municipalities most affected by the disease. These municipalities, located in El Salvador, Guatemala, Honduras, and Panama, have a population of more than 4 million inhabitants. Noteworthy progress was made in areas such as strengthening the capacity of health workers at the first level of care; community awareness-raising and participation; knowledge of the epidemiological situation, risk factors and clinical management of CKDnT; and the development of guidelines and protocols for the management of patients with CKD.
5. The achievements have varied according to the context of each country:
 - a) In Costa Rica, a significant number of health officials and workers have become aware of the need for a comprehensive approach to CKDnT. Thanks to the development and approval of a protocol for the care of people with chronic diseases, primary health care workers in the prioritized cantons have the capacity to diagnose and treat cases of CKD and CKDnT (4).
 - b) In El Salvador, based on the guidelines of the comprehensive response strategy for CKD and CKDnT, technical capacities for monitoring and management of patients have been strengthened at the primary care level as a result of the opening of the Kidney Disease Clinical Management Unit in the affected areas of Bajo Lempa and Guayapa Abajo and in hospitals in the eastern, western, and paracentral health regions. Workshops with community organizations, patients and relatives of patients, and staff of community health teams raised awareness of the problem and discussed opportunities for improving care and treatment. These elements were incorporated into the guidelines for strengthening kidney disease clinical management units and for continuous outpatient peritoneal dialysis at home (5).
 - c) In Guatemala, once a situation analysis of CKD had been conducted, national sociodemographic information was obtained for patients on hemodialysis and dialysis in public, social security, and private services, disaggregated by departments and municipalities. In order to strengthen capacities to prevent CKD, training in the management of CKD, hypertension, diabetes mellitus, and cardiovascular diseases was provided through PAHO's Virtual Campus for Public Health to staff of the Ministry of Public Health and Social Assistance at the first and second levels of care (4).
 - d) In Honduras, epidemiological characterization of adult patients with CKD was carried out at Hospital del Sur, Hospital San Lorenzo, and Hospital Tela. Hemodialysis and peritoneal dialysis protocols were published to bolster the technical capacity of health workers in the clinical management of patients with CKD (5).

- e) In Nicaragua, the quality of care for CKD patients and follow-up at home has improved as a result of efforts to enhance the response capacity of the primary care level through the provision of human resources (nephrologists, psychologists, and social workers) for the early detection and management of patients with CKD, diabetes, and hypertension and protocols for CKD treatment for laboratory and pharmaceutical services and for hemodialysis teams. The results of a national survey made it possible to determine the magnitude of the problem and then formulate national plans that include prevention, health promotion, care, and rehabilitation of patients through a comprehensive approach that involves the family, as well as the promotion of patients' groups (8).
- f) In Panama, several workshops on CKD were held with primary care personnel and community leaders in the most affected districts of Coclé province. This facilitated a situation analysis of health and health determinants, with a focus on CKD. Clinical practice guidelines for the management of CKD, particularly CKDnT, in primary health care were also developed (9).

Strengthening of interventions related to the care of people living with CKD and CKDnT

6. As regards strengthening of the technical capacities of human resources, regional virtual courses on CKD management and on peritoneal dialysis for primary care teams have trained 47,442 professionals since 2018 (6, 10). As for the development of tools to improve the care of CKD patients and those in peritoneal dialysis treatment, recommendations for the management of patients who present complications due to kidney disease were included in a guide for the care of critical adult patients with COVID-19 in the Region, which was developed and updated at the regional level (11).

7. Almost all the affected countries developed technical protocols or guidelines. Costa Rica developed and approved a protocol for the care of people with CKD in the health services network of the Costa Rican Social Security Fund. In El Salvador, a comprehensive strategy was established to coordinate dialysis registry, clinical management of renal replacement therapy, continuous outpatient peritoneal dialysis, and preparations for kidney transplant in adults. In addition, various instruments were developed to strengthen self-care interventions at the primary care level, such as guidelines for the management of CKD. In Honduras, hemodialysis and peritoneal dialysis protocols were approved and published. In Guatemala, CKD care guidelines were developed and distributed at all three levels of care. In Panama, clinical practice guidelines for the management of CKD at the primary care level were developed (5, 9, 12).

Improvement of epidemiological, occupational, and environmental surveillance, registry systems, and the generation and use of scientific evidence with an emphasis on CKDnT

8. An important step for strengthening public health surveillance of CKDnT was the publication of a technical document entitled *Epidemic of Chronic Kidney Disease in Agricultural Communities of Central America. Case definitions, methodological basis, and approaches for public health surveillance*, which sets out CKDnT case definitions and

provides a methodological framework for public health surveillance (7). At the regional level, an integrated operational monitoring framework has been developed, with a catalogue of actions based on published methodologies that have been validated at the country level (5, 13). In addition, an interprogrammatic mapping of integrated surveillance capacities in the field of public health was developed, with occupational and environmental surveillance indicators complementing already published methodological indicators (8).

9. A review of the evidence on the occupational nature of CKDnT was published in the *Pan American Journal of Public Health*, based on four systematic reviews and 61 primary studies. Based on existing scientific evidence and the precautionary principle, it was considered important to apply preventive measures to mitigate the harm caused by CKDnT for both farmers and their communities (for example, through improvements in working conditions, responsible use of agrochemicals, etc.). In the immediate future it will be important to scale up high-quality research to measure impact and broaden the scientific evidence base (14–16).

10. A manual for public health surveillance of CKDnT and CKD, with a set of epidemiological and clinical information indicators, was developed. Regarding occupational and environmental epidemiological surveillance, occupational surveillance and screening protocols for the early detection of cases have been developed and put in place, as have protocols for occupational and environmental monitoring and control of hazardous exposures in the affected countries (4).

11. The six Central American countries integrating the project made efforts to establish or strengthen national kidney dialysis and transplant registries, which is essential for strengthening surveillance and is also the basis for estimating the level of health services and access to replacement therapy needed for patients with end-stage kidney failure. Progress to date in the countries has been uneven, owing to differences in the conditions in each of them.

- a) In Costa Rica, new health surveillance regulations were approved which, for the first time, require mandatory reporting of CKD by the health services; official definitions of a suspected case and a confirmed case of CKDnT were established; routine surveillance of mortality due to CKD was performed; and national standards for the protection of workers at risk of thermal stress and for comprehensive management of CKD (17–19) were approved.
- b) El Salvador updated the situation analysis of CKD in the country, including stakeholder mapping, and instituted a registry of renal replacement therapy patients. There is now therefore a clearer identification of the areas and sites that are most affected and have the highest prevalence; analysis and production of knowledge related to CKD in the country have also improved.

- c) In Guatemala, a sentinel surveillance system was implemented in four prioritized departments (Chimaltenango, Escuintla, Quetzaltenango, and Petén). The country also created the Guatemalan Kidney Dialysis and Transplant Registry and produced a reporting manual and primary data collection form, which can be found on the EPIWEB platform of its Health Management Information System.
- d) In Honduras, the health authorities were made aware of the need for CKD and CKDnT surveillance, and an instrument for mapping national capacities for such surveillance was developed.
- e) In Nicaragua, a national survey was conducted to determine the prevalence of CKD and an electronic platform was developed to manage the electronic clinical records of patients with CKD and register them in the social security system.
- f) In Panama, the standards for the epidemiological surveillance information system for CKD were approved, and health workers from all health regions received training (4, 5).

Strengthening of advocacy, leadership and intersectoral action for the prevention of CKDnT

12. At the regional and subregional levels, technical support was provided to complement interventions at the national level, including the aforementioned technical publication (7), a study to analyze the cost of diagnosis and treatment of CKD, as well as the virtual course for the prevention and treatment of the disease, with a special focus on CKDnT and the establishment of a regional research agenda to address this issue in Central America. Generic research protocols on CKDnT were also developed to ensure the harmonization and quality of epidemiological research studies in the Region.

13. Several countries conducted studies or updated their CKD and CKDnT situation analyses, while also carrying out various activities aimed at publicizing the importance of this public health issue in the subregion (4, 5, 8). In addition, Honduras launched a Research Agenda for Health, which includes a component focusing specifically on chronic noncommunicable diseases and kidney disease.¹

Dissemination of research results on CKDnT as an environmental and occupational disease

14. Priorities for research on CKDnT were established in Central America (20). These priorities were presented and promoted to the Research Committee of the Council of Ministers of Health of Central America and the Dominican Republic (COMISCA), which has incorporated them into the regional research agenda. The Third International Workshop on Chronic Kidney Disease of Uncertain/Non-Traditional Etiology in Mesoamerica and Other Regions was held with a view to strengthening research and analysis of evidence to support decision-making in coordination with the PAHO/WHO collaborating centers in

¹ Further examples of actions by the other five countries integrating the project may be found in the progress reports submitted on the implementation of the resolution (3–6).

environmental and occupational health (the National Institute of Environmental Health Sciences [NIEHS] in the United States, and the Regional Institute for Studies on Toxic Substances [IRET] in Costa Rica). The final report of the workshop is available online (21).

15. Work has been done to harmonize CKDnT standards and research processes to improve the quality of standardized protocols, questionnaires, and informed consent forms for cross-sectional, case-control, and cohort studies on CKDnT. A summary of the evidence on CKD management for the adult population in primary care was prepared, which included risk assessment, diagnosis, non-pharmacological treatment, referral to other levels of care, and prognostic factors and was used to develop case management guidelines, such as those developed by the Ministries of Health of El Salvador and Paraguay (4, 5, 22, 23).

16. With regard to the actions and achievements of countries, Costa Rica prepared a compilation of CKDnT research. In El Salvador, materials aimed at raising awareness about CKD and health promotion at the community level were reproduced, and more than 300 health promoters from community health teams and more than 12 community-based organizations were trained in the areas most affected by CKD. In Guatemala, information about the situation and impact of CKD in the country was disseminated among various stakeholders. Honduras promoted the virtual courses on CKD, distributed printed materials, and used social media to raise awareness of the issue. Nicaragua systematized research on CKD and developed a virtual course on CKD determinants and risk factors. Panama held a workshop to develop a communications strategy on CKD and CKDnT in the province of Coclé (4).

Lessons Learned

17. Kidney disease in farming communities is a serious public health problem that affects the most vulnerable people and communities, causing thousands of deaths before the age of 50, with an enormous health and social burden. Its determinants include poverty and exclusion, and reveal a need to improve working conditions and ensure that agrochemicals are used properly. Although progress has been made in some countries, greater attention to and investment in the policy and health agenda is required, as is a coordinated and multisectoral response at all levels, in conjunction with civil society actors and community and patient organizations. For all these reasons, it is essential for kidney disease in agricultural communities to remain one of the Region's priorities and for there to be continued advocacy for the development of sustainable agriculture and for better access to and quality of health services to promote health, protect the most impacted communities, ensure early detection of cases, and provide quality care, including improved access to medications and renal replacement therapy.

Action Needed to Improve the Situation

18. Given the progress and challenges countries face regarding CKDnT, the following actions are deemed necessary:

- a) Ensure compliance with international agreements and regulations on the application and responsible use of agrochemicals (24); monitor procedures and the implementation of regulations to prevent risks to workers; reinforce certain public health measures related to the use of agrochemicals, given reasonable doubt and their relevance to health, especially in the most affected communities; ensure effective, robust environmental monitoring; and take a comprehensive approach to the problem, including sustainable agricultural practices and health surveillance.
- b) Promote the development of action plans and accountability for a comprehensive response to the problem of CKDnT that encompasses the determinants of health related to CKDnT through intersectoral action and community participation to help prevent CKDnT. Also, building partnerships and networks between ministries of health and other government entities, such as those related to agriculture, trade, and social security, as well as regulatory agencies and academic, social, community, patient, and family organizations, will help protect the health of agricultural workers and raise awareness of the need for regulatory frameworks that will help reduce the incidence of CKDnT.
- c) Promote the elimination of barriers to access to services for the prevention, early diagnosis, and treatment of persons with CKD and strengthen the response capacity of the primary care level. Implement home and community care modalities and organize comprehensive health services networks for the management of CKD and CKDnT, taking into account the experiences and lessons learned from the COVID-19 pandemic (25). Also continue efforts to improve the quality of care by implementing a comprehensive person-, family-, and community-centered model of care. Develop, update, and use tools and instruments based on the best evidence and scientific knowledge; train health workers; and ensure the availability of equipment, medicines, and supplies for the care of persons with CKD.
- d) Boost access to renal replacement therapies (hemodialysis, peritoneal dialysis, and kidney transplant) for CKD patients who need such care through capacity-building for human resources, technologies, and medicines and the coordination of strategies in health care networks.
- e) Maintain efforts to strengthen active, systematic, and innovative epidemiological, occupational, and environmental surveillance. Also continue to strengthen registry systems, with emphasis on CKDnT, including through greater collaboration with research institutions to bolster capacity for the analysis and use of information for surveillance systems and activities. Tailor surveillance, prevalence studies, and screening to local needs and the use of agreed basic protocols to facilitate assessment of the environmental and occupational situation and the comparison of country information.

- f) Move forward with a high-quality research agenda and strengthen national and international partnerships to promote the use of scientific evidence in public policymaking and in practice, which will help to strengthen health systems and access to services. Also improve communications and the sharing of information, research findings, experiences, tools, guidelines, and protocols, as well as strengthen cooperation among countries to increase their response capacity, advocacy and intersectoral action to tackle this problem.
- g) Encourage governments to strengthen health protection mechanisms and implement public policy actions to catalyze compliance with international resolutions and agreements on sustainable agriculture and the responsible use of agrochemicals.

Action by the Directing Council

19. The Directing Council is invited to take note of this report and provide any comments it deems pertinent.

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