The price of unhealthy working conditions:
Sugarcane workers in Nicaragua

This case was written by Carlotta Conrad and Hannah Lehner, German affiliate of International Physicians for the Prevention of Nuclear War (IPPNW). It was edited by Charlotte Butler, Project Consultant. The case is intended to be used as the basis for group work and class discussion rather than to illustrate either effective or ineffective handling of a Medical Peace Work situation.

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On her first weekend in Chichigalpa Dr Marta Majia set out for a walk and soon found herself in a busy market. It was January 2013. Newly qualified as a doctor Marta had been sent to Chichigalpa, a town in the Chinandega Department of Nicaragua, by the central Ministry of Health. Like every graduate, having finished her training in the capital city, Managua, she was expected to spend a few years carrying out community service somewhere in the countryside. In Marta’s case, this meant practicing as a GP in a small health center in Chichigalpa, near Chinandega (Exhibit 1).

The town was a good two-hour trip by car from Managua so Marta was glad that a friend had helped her move. Today was her last free day before starting work. As she walked round looking at the food on display she was warmly greeted by the locals shopping in the market. They were always eager to meet young arrivals, and doctors were especially popular as there were few of them in the town. Soon, she thought, people would start to ask her advice and tell her about their medical problems. As she sat on a bench and watched the people chattering and buying vegetables from the market stalls, an old lady came and sat next to her. After introducing herself, she began to tell Marta a moving story about her husband, and how he had died from chronic kidney disease.

As she finished describing his death, the woman wiped away a tear with the end of her scarf. “And I am not the only widow left in this town,” she said. “In almost every street in this part of the city you will find other families that have lost their fathers and brothers. And now my son is suffering from the same illness. My handsome, young José. He used to be so strong and wonderful.” As the woman wept, Marta began to realise that in this “Isla de las Viudas” – or Isle of Widows – as people who lived there called it, she would be facing some challenging medical problems. Her heart began to sink. What did the people of Chichigalpa expect of her, a young doctor, newly arrived in the area? What did she know about local conditions? How could she possibly help them?

**Background**

Chichigalpa was home to Nicaragua’s largest sugar mill, producing more than 63% of the country’s sugar. The Ingenio San Antonio Sugar Plantation (ISA) and refinery belonged to the National Sugar Estates Limited (NSEL) and was the main employer in the region. The estate produced raw sugar, which was then exported to the USA and elsewhere. It also refined ethanol to make popular rum, marketed globally under the name *Flor de Cana*. The NSEL was a subsidiary of the commercial conglomerate Grupo Pellas, the largest private company in Nicaragua.

For some time the people in this region had been badly affected by a painful kidney disease. In 2012, the Nicaraguan Ministry of Health (MINSA) published a report quoting chronic kidney
disease (CKD) as the leading cause of death among men in Chichigalpa and the surrounding area.\(^1\) Since dialysis and kidney transplants were not widely available, CKD was considered a terminal diagnosis. In 2006, statistics showed that 95 deaths per 100,000 inhabitants with a 5:1 male predominance were due to CKD.\(^2\)

A study of the population in the villages around Chichigalpa looked at the specific circumstances, both occupational and environmental, relating to kidney disease. It discovered that the prevalence of increased Serum Creatinin (SCr, a marker for kidney function) levels was highest among men working in mining and farming (26%) and in villages dominated by banana/sugarcane production (22%). Men from villages working in the mining/subsistence farming or banana/sugarcane industries showed significantly abnormal SCr levels. The authors could not identify a single specific factor to account for this, but concluded that the men from these villages were exposed to an unknown environmental or occupational hazard that put them at risk of kidney damage.\(^3\) Another study researched anecdotal reports about the high prevalence of chronic kidney disease in Northwestern Nicaragua, predominantly among younger men. They carried out a study in Quezalguaque, a village only 20km East of Chichigalpa. The authors concluded, that kidney disease also appeared common in residents of Quezalguaque, but that further research was needed to explain the causes.\(^4\)

In a Review published in 2012, medical researchers concluded that recent reports revealed an epidemic of CKD affecting not only Nicaragua, but the whole Pacific coast of Central America (Exhibit 2).\(^5\) A similar study in El Salvador found elevated SCr levels for agricultural workers in coastal sugar cane and cotton plantations, possibly linked to hard working conditions in hot climates that causing them to sweat profusely. This could also lower blood pressure and diminish filtration in the kidneys.\(^6\)

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For Costa Rica the study showed that between 2000 and 2005, the number of patients on hemodialysis had doubled giving this country the highest number of kidney transplants per million population in Latin America.\(^7\) Kidneys can continue to function until a certain number of cells are damaged. After this point, the kidneys are no longer able to filtrate the blood, extract toxic products and produce urine. Hemodialysis is an artificial way of clearing the blood until a transplant is possible.

Mortality estimates in Central America from the Pan American Health Organization (PAHO) showed that among men aged below 60 years CKD, coded as N18 in WHO’s ICD-10 (International Classification of Diseases revision 10) had been responsible for thousands of deaths over the past decade.\(^8\) A PAHO Resolution called for efforts to be stepped-up to investigate and address the environmental and occupational factors believed to underlay the problem. Following the publication of figures showing a further increase in male deaths from CKD between 2005-2009, Ministers of Health from countries throughout the Americas acknowledged that CKD due to unknown causes was a serious public health problem.\(^9\)

### Non-traditional Chronic Kidney Disease (CKDnT)

The disorder, known as non-traditional Chronic Kidney Disease (CKDnT) – was not related to the usual causes such as hypertension and diabetes and mainly affected young male agricultural workers. It was also referred to as Mesoamerican endemic Nephropathy (MeN). The highest mortality rates were found in El Salvador and Nicaragua. However, CKDnT also affected women and non-agricultural workers living in farming communities.\(^10\)

CKDnT is characterized by a tubulointerstitial nephropathy with low-grade proteinuria, which has a long subclinical period, during which cell damage is only visible under a microscope and the patient shows no symptoms. Once the patient does begin to show symptoms the illness tends to progress to end-stage renal disease within a short period of time.\(^11\)

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The causes of CKDnT have not yet been determined, but research suggests that it could be associated with occupational exposure to heat, stress in conjunction with pesticide inhalation, sugarcane chewing and sugar intake during the working day. A study of patients with and without decreased kidney function looked at differences in their nutrition, past medical history, medication and substance use, and agricultural behaviors and exposures. Other research hypothesized that heavy workloads in a hot climate might lead to chronic dehydration as a cause of CKDnT (Exhibit 3).

Data from the PAHO indicated that hospitalizations for CKD in El Salvador increased by 50% between 2005 and 2012, making CKD the leading cause of hospitalization there. Nearly 1,500 of these patients were under 19 years old (out of a total 40,000 hospitalized patients of all ages during the same period). According to data reported by national transplant coordinators, in 2014 nearly 3,100 patients were receiving dialysis in El Salvador, over 3,000 in Guatemala, 1,800 in Panama and 1,000 in Nicaragua.

**Health care in Chichigalpa**

The health care system in Nicaragua and throughout Central America was considered reasonably good. However, since it was usually linked to those who were employed those who lost their jobs, for example due to illness, found it much harder to access health care.

For the whole of Nicaragua only about 14 trained Nephrologists were available, most of them working at a private clinic in the capital city Managua. Clinics there could also offer haemodialysis whereas in other cities, only peritoneal dialysis was available, which was less efficient than hemodialysis and due to the catheter used and its potential to introduce bacteria to the abdomen presented a risk of peritonitis (infection of the peritoneum).

Chichigalpa had dialysis machines for only about 15 patients. A nephrologist visited the town once a week for just two hours; the rest of the time internal physicians or GPs would carry out the treatment. Another problem was the acceptance of dialysis. Since they saw people dying

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after being treated, patients believed that dialysis actually caused death. Moreover, even if someone managed to get peritoneal dialysis treatment and was able to pay for a sterile room and infusion bags, it was highly likely they would soon develop peritonitis. The concept of sterile use for infusion was not well known and transferred. As antibiotic treatment would be carried out without pre-testing the bacteria for sensitivity, many patients would develop multi-resistant or fungal infections, which were even harder to treat. The catheter would have to be explanted to solve the infection but during this time a patient would need hemodialysis for bridging. As this was not available, a fungal infection or any infection with multi-resistant bacteria meant nearly certainly death (Exhibit 4).\textsuperscript{15}

A 2010 study emphasized that intensive care treatment was vital during the last months of chronic kidney disease, since Stage 5 CKD, patients experienced clinically important physical and psychological symptoms during their final months similar or greater than those of advanced cancer patients. The study concluded that these symptoms should be addressed through routine symptom assessment and appropriate intervention and end-of-life care.\textsuperscript{16}

\textbf{Dr Marta Majía begins work}

Marta felt lost. It was now Monday morning in the second week of her new job at the Chichigalpa health centre. As a newly qualified doctor she had expected to spend her first days being introduced to the centre by her more experienced colleagues, and at the same time expand her medical knowledge by talking to them about the patients and treatments. But although her new colleagues were welcoming and friendly, showed her around and tried to answer her questions, their heavy daily workload didn't leave them much time to spend with her.

During the first few days Marta was asked to watch and follow her colleagues as they went on their rounds and dealt with patients, but shortly after she found herself dealing with her own long list of patients. However, despite feeling a little overwhelmed by all the unexpected responsibility, Marta found she soon felt at home with her patients and enjoyed her new life as a doctor.

\textsuperscript{15}Report by Dr Goebbels, who worked in Nicaragua, Chichigalpa in 2012/2013.
Then at the end of her first month a young man of about 25 came to her clinic. His name was José Rodríguez and as Marta later recalled, the conversation went like this:

José Rodríguez: “Hello, Dr Majía. My Name is José Rodríguez.”

Marta: “Good morning, Senor Rodríguez. Please have a seat and tell me why you have come to see me.”

JR: “Well, to be honest, I’m not feeling too well. At first I didn’t want to see a doctor but my mother urged me to come to the clinic. She is perhaps being over cautious because we lost my father and two other brothers recently. She says she now fears she will lose me as well.”

M: “I’m so very sorry to hear about the tragic events in your family – my condolences. It’s good that you came to see me, I’m sure we can find out what is wrong you. Could you tell me how exactly you feel unwell?”

JR: “Yes, of course, doctor. For several weeks now I’ve been feeling very weak and always tired. In the evenings, my feet are very swollen and I often suffer from nausea and vomiting. My friends say I have lost my strength at baseball – I used to be a very good player. And that is my mother’s concern – she says my father had the same symptoms and died shortly after they began. I’m very worried.”

And makes some discoveries...

Over the following weeks Marta noticed that nearly every day a man – nearly half of them still in their early twenties – came to consult her about symptoms of chronic kidney disease (CKD). She started to document all the cases and symptoms in a small notebook, and tried to catch up on their medical history. With every new patient she discovered new factors they had in common. At first only their sex and age, but as she asked more questions, she realized they all worked at the same company and did similar jobs. Nearly every one of them was a sugar cane worker.

The best solution for them, she decided, would be if they stopped working for a while to see whether their symptoms diminished and they began to feel better. However, taking a week or two off work was clearly not an option for these men. Discussing the job situation in Chichigalpa with one of her colleagues, Marta learned that since the sugar cane plantation was the only employer in the area, every family depended on ISA for work. If the men didn’t get a job there, there was no alternative way for them to earn a living. She also learned that the company was taking urine and blood samples from applicants to work at the factory in order to detect those
with decreased kidney function. Those showing these symptoms were not hired. As ISA was the only big company offering jobs, many young men tried to improve their blood quality by drinking concoctions of fresh tamarind juice and linseed oil. They also avoided the sun and forced themselves to rest, or handed in samples taken from a healthy person.\textsuperscript{17} If still unsuccessful, a subcontractor that would not care about their illness would hire them and the men would do the same work without social security and health care access, and also for less money.

In her free time, Marta started to look for available literature on CKD. Searching PubMed and other online sites, she found many articles covering the topic in Central America. It startled her to realise that, although it seemed to be a well-known and scientifically researched disease in this part of the world, she had not learned about it at university.

During her online search she also came across a local public health and policy NGO, La Isla Foundation (LIF), which worked “at the intersection of public health and human rights to address a fatal epidemic of chronic kidney disease (CKD) among sugarcane workers in Latin America”.\textsuperscript{18} The website included videos that Marta sat and watched at her desk. One of them affected her deeply:

\texttt{A Cycle of Death, La Isla Foundation, 2011: https://www.youtube.com/watch?x-yt-ts=1422579428\&x-yt-cl=85114404\&v=4c3kNNqfBDQ}\textsuperscript{19}

Marta told herself that as a doctor, she really should try and do something for her patients in Chichigalpa. Her best move, she decided, would be to contact the NGO and arrange to meet someone there. That evening she sent an email to LIF introducing herself as a new doctor working at a health clinic in Chichigalpa seeking information about CKD. At the end of February, she was invited to go and see someone there late one afternoon.


La Isla Foundation

When Marta arrived at La Isla Foundation, a political scientist who worked in the LIF community development section welcomed her and introduced himself as David. He immediately put her at her ease.

David: “Hey Marta, nice to meet you. Hope you found our office easily?”

Marta: “Yes, thank you – no problem! Nice to meet you too, David, and thank you so much for inviting me here.”

D: “Let’s sit in the kitchen. It’s our hangout area. Would you like a coffee?”

M: “Yes, please. Coffee would be great. I have had a long working day...”

David offered Marta a seat at a small table and made coffee for the two of them. As he was pouring it into the cups he asked Marta about herself. They talked a little about where they came from and what brought them to Chichigalpa. The discussion then moved on to the work of LIF. 20

M: “So, I read that LIF has been working on the subject of CKDnT since 2008. What exactly do you do here?”

D: “It’s crazy, isn’t it? I’ve been working on the subject for over five years now! Since 2008, LIF has been committed to conducting and facilitating public health research, offering informed...

advocacy, and supporting community development projects for workers, their families, and the communities in which they live. As you may have learned, recently published scientific literature on CKDnT has established a link between harsh working conditions and the onset of the disease. It is our view that despite the efforts made to improve working conditions in Nicaragua generally and in the sugar sector especially, much remains to be done. So we are conducting more research into CKDnT and trying to improve the working and living conditions of the populations affected by it.”

M: “And yet every year there are still many new cases of CKDnT. It seems frustrating that so little has been done. Even I get very discouraged about the lack of progress and I only started getting interested in it a few weeks ago. What is it that keeps you motivated?”

David laughed: “Oh Marta, that’s a very good question! To be honest, sometimes I feel frustrated, too. But there is an amazing success story that happened in El Salvador. Have you heard about it? In 2004, Human Rights Watch publicised the fact that a third of workers in El Salvador’s sugarcane fields were children. Through the cooperative efforts of sugar producers, government agencies, and the International Labour Organization, by 2008 child labour in sugarcane had declined by 72%.21 Today, El Salvadoran sugar is widely regarded as a success story when it comes to child labour. The country has also led the fight against CKDnT, encouraging independent research to identify the disease’s causes as well as setting up programs to improve working conditions… It is very motivating to have such positive examples!”

M: “So tell me, what could I do in Chichigalpa to start changing things?”

D: “You have got interested in CKD at just the right time. At this very moment we are organising the sugar cane plantation workers and widows who have lost their husbands to CKDnT to take part in a protest march. It will take place on March 18th, actually in Chichigalpa. You might be interested in joining us as we are also protesting about the inability of workers to access adequate health care. Maybe you have already realised that workers don’t get a job if their kidney function is impaired, and lose their job if they experience a medical problem while working in the fields. Without a job, they no longer have access to the company’s plantation clinic yet are left with no alternative options for appropriate medical care.”

M: “Well… I’ve never really taken part in a demonstration before. But maybe it would be a good first step”. Marta took a deep breath and continued: “Thank you so much for your invitation David, but I feel I need some time to think. You have given me so much new information today, my head is starting to spin. But thank you so much anyway! I’ll think about it.”

D: “It has been a pleasure to talk to you and I’d love to meet again. Just take your time and come back and visit us whenever you are free!”

After Marta had thought about the commitment shown by LIF and its connection with the patients she was seeing at her clinic, she decided to join the demonstrations. She still felt a little uncomfortable about walking with the protesters. She had only just moved to Chichigalpa, and was new to many of the people. She felt that she did not yet know enough about the underlying conflicts and the history of CKDnT in Nicaragua.

The protest of the March 18th turned out to be a disaster. About 180 people – former workers, widows, and their children gathered in Chichigalpa to march in protest against the way the government was handling the CKD epidemic. After a quiet and peaceful start violence broke out. Demonstrators were beaten by the local police and many were arrested.22

The failure of the demonstration, however, made Marta even more convinced she had to find new ways to improve the situation of the people of Chichigalpa. But she felt confused about what to do. There was already so much research going on about CKDnT, and yet the biggest risk factor causing the disease had not been identified. And the ongoing dialogue and protests taking place between the company, the workers and the health centres did not look as if they would reach a solution any time soon. However, determined to do something positive Marta decided to develop a checklist to try and identify for herself the potential risk factors for CKDnT.

A few days later she met José Rodrigues and his mother in a downtown café. Asking about his state of health she learned that for the moment, his symptoms were not getting any worse. Nevertheless his mother lived in constant fear of losing yet another family member. With only one working member left in the family she was worried about how they would survive.

Marta felt frustrated about not being able to solve their problem. On the other hand she was pleased that she had already learned a lot about CKDnT. Through her checklist, she also felt that

she was now able to do understand more about what was causing the epidemic, and do something about it. To give José’s mother some hope Marta told her about the protests and demands for better access to health care that were going on. The news seemed to please her very much.

Wrapping her scarf tighter around her shoulders, José’s mother squared her shoulders and walked out of the café a little more confident about the future. The sight cheered Marta, but as she walked home she asked herself what more she could do to help her patients, and how long it would take to find a solution.
Exhibit 1

Map of Nicaragua

Source: http://google.ch/maps/

Exhibit 2

Male deaths from kidney disease
Percentage increase 2005 to 2009

Guatemala 27%
Nicaragua 41%
El Salvador 26%
Costa Rica 16%

Source: Center for Public Integrity analysis of World Health Organization and Pan American Health Organization

Source: http://www.bbc.co.uk/news/magazine-16007129
Exhibit 3

**What is the Difference?**

**CKD**
- **Common Chronic Kidney Disease**
- Also known as chronic renal disease or chronic renal failure, is a degenerative, progressive condition marked by the gradual loss of kidney function.

**CKDnT**
- **Chronic Kidney Disease from Nontraditional Causes**
- Associated with heavy labor in hot temperatures, especially among industrial agricultural workers, particularly those that work in sugarcane production.

**Who Gets It?**
- **Older Age**
- **Females + Males**
- **Working Age**
- **Males**

**Parts of the Kidney Affected**
- **Glomerulus**
  - Consistent with high blood sugar, high blood pressure
- **Tubules + Interstitial Tissues**
  - Consistent with dehydration, toxic poisoning

**Risk Factors**
- **Obesity**
- **Diabetes**
- **Strenuous Labor**
- **Farm Worker**
- **Hypertension**
- **Residence in Hot Lowland Climates**

**Proteins in Urine**
- **High Proteins**
- **Low Proteins**
WHERE IN THE WORLD

- Worldwide, highest in rich countries
- Central America, Sri Lanka + India

46% of all male deaths in Guanacastal Sur, Nicaragua from 2002-2012 were caused by CKDnt

CKD (including CKDnT) Prevalence in Men in 2012

- World
- USA
- Nicaragua
- Non-worker communities
- La Isla

Current Theories of CKDnt

We are investigating the link between chronic and acute dehydration + environmental toxin exposure.

Chronic acute dehydration causes kidney damage and can increase damage from environmental exposures. The solution is not as simple: providing sufficient water. It is doubtful the body can absorb the water necessary for the water to hydrate the body properly.

Work conditions must be addressed.

Source: "What is the difference between CKD and CKDnt?" Center for Public Integrity and La Isla Foundation, http://www.laislafoundation.org
Exhibit 4

Home dialysis in Nicaragua

Source: At the home of Ernesto Narajes, 30, who suffers from CKD and is on home dialysis. Chichigalpa, Nicaragua on March 6, 2013. Photo credit: Ed Kashi for La Isla Foundation/VII.

Source: Lino Andreas Martinez, 57, receives help providing dialysis at home by his daughter at their family compound in Chichigalpa, Nicaragua on Jan. 9, 2013. Martinez suffers from end stage kidney disease. He worked in the sugar fields for decades and now receives dialysis at home and is cared for by his family. His son, Jimmy, 24, who worked in the sugar fields for 5 years, is now suffering from kidney disease as well. Photo credit: Ed Kashi for La Isla Foundation/VII.