The Need for Dialysis in Haiti: Dream or Reality?

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Key Words

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Abstract

According to the World Health Organization reports, nowadays burden of chronic kidney diseases (CKD) is well documented. The high prevalence of noncommunicable diseases (NCD) such as hypertension, diabetes, and obesity, which are the main causes of CKD, is a big concern in the world health scenario [1]. These NCD can progress slowly to end-stage renal disease (ESRD) and the low-middle income countries (LMIC) like Haiti are not left unscathed by this worldwide scourge. Several well-known public health issues prevalent in Haiti such as acute diarrheal infections, malaria, tuberculosis, cholera, and acquired immunodeficiency syndrome (AIDS), can also impair the function of the kidney. Dialysis, a form of renal replacement therapy (RRT), represents a life-saving therapy for all patients affected with impaired kidney. In Haiti, few patients have access to health insurance or disability financial support. Considering that seventy-two percent (72%) of Haitians live with less than USD 2 per day [2], survival with CKD can be quite stressful for them. Data on the weight of the dialysis and its management are scarce. Addressing the need for dialysis in Haiti is an important compo-

nent in decision-making and planning processes in the health sector. This paper is intended to bring forth discussion on the use of this type of renal replacement therapy in Haiti: the past, the present, and the challenges it presents. We will also make some recommendations in order to manage this serious problem.

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Introduction

Infectious diseases and protein-energy malnutrition emerged as the focal public health challenges in low-middle income countries (LMIC). However, the high prevalence of the noncommunicable diseases (NCD) such as hypertension, diabetes, and obesity, which are the main causes of chronic kidney disease (CKD), is a big concern for health professionals world over. According to World Health Organization, CKD in the Global burden disease report of 2010 ranks at the 18th place for death (mean rank 17.5) compared to 27th in 1990 with a median change of 84% (65–95% UI) [1]. The NCD progress slowly to end-stage renal disease (ESRD) and low-middle income countries (LMIC) like Haiti are not left unscathed by this worldwide scourge. Globally, there is an increase in the number of patients with ESRD requiring dialysis or

kidney transplantation. This is estimated to be about 1.4 million with an annual growth of 8% [3]. Dialysis is almost exclusively the privilege of patients in high-income countries although there is a massive unmet need for dialysis in LMIC for acute and chronic renal failure [4]. The incidence of ESRD in children seems to be higher in those countries. For example, the incidence is 18/106 in Kuwait versus 8/106 in Europe [5]. In Haiti, many challenges stand in the way of achieving sustainable health and quality of life for our patients. As the number of patients afflicted grows exponentially, the available resources become more and more limited. In addition, accurate and timely diagnosis, the cost of dialysis, the access to dialysis facilities and the number of trained nephrologists are all contributing factors [6, 7]. For example, there are a few pediatric nephrologists in LMIC: 1/500,000 children in Egypt, 1/10 million in Nigeria. In some of the LMIC, care for pediatric end-stage renal disease is nonexistent [5].

The Potential Causes of Kidney Injury in Haiti

In Haïti, living with kidney disease or failure is a life-threatening and a stressful struggle. Estimating the burden of the problem is difficult as we do not have a national registry. The national health information system does not collect data related to kidney diseases.

Kidney Problems and the Adults

With the dramatic rise of diabetes, hypertension, and overweight/obesity in our country, we can anticipate that chronic kidney disease may be exacerbated and increased. FHADIMAC (Haitian Foundation of Diabetes and Cardio-vascular diseases) documented that diabetes mellitus and hypertension have a prevalence of 12 and 47%, respectively [8]. The increased incidence of diabetes and hypertension throughout the LMIC means that the number of patients requiring dialysis is likely to increase considerably [9].

In 1999, a retrospective study conducted (unpublished, over 27 months) by Metayer et al. revealed that there is an incidence of six cases of renal failure per month at the internal medicine ward of the State University Hospital Haiti (HUEH). And 4 out of those 6 cases were diagnosed with end-stage renal disease. Hypertension was the leading cause in 57%, followed by diabetes mellitus (total of 164 patients, male to female ratio 1:1.6, mean age 47 years). Another study from the Caribbean renal registry for six English-speaking countries reported the same situation [10]. The three most common causes of end stage renal

failure were hypertension (65.5%), diabetes mellitus (27.6%), and primary chronic glomerulonephritis (12.5%). Also as it is common in other LMIC [11], we have a high incidence of kidney diseases related to infections.

Pediatric Kidney Diseases and Etiologies

With respect to the children, pediatric nephrology is not a priority in LMIC, but it should be improved along with the development of both preventive and curative simple measures [12]. Congenital disorders, including congenital anomalies of the kidney and urinary tract (CAKUT) and hereditary nephropathies, are responsible for about one half to two thirds of all cases of CKD among children in developed countries [13, 14]. By contrast, the prevalence of genetic and hereditary kidney diseases is low in LMIC where acquired causes such as chronic glomerulopathies predominate [13, 15]. Retrospectively in 2010, Exantus et al. reviewed data (unpublished) for a sample of 20 children: 7 boys, 13 girls; M:F ratio 0.53:1; mean age 11.6 years (range 5–18 years) admitted for chronic renal failure in two pediatric units in Port-au-Prince, Haiti, from 1996 to 2009. The main causes for the renal failure were nephrotic syndrome (37%), systemic lupus erythematosus (26%), human immunodeficiency-associated nephropathy (16%), obstructive uropathy (11%), and hypertension (10%). Only six out of those 20 children were hemodialyzed over a mean duration of 8 weeks (range 3–24); one patient is still in chronic hemodialysis.

The putative causal pathophysiological relation between overweight/obesity during childhood and non-communicable diseases (NCD) such as hypertension, diabetes, metabolic syndrome, and progressive chronic kidney diseases is well known [16, 17]. Due to lifestyle ‘changes of Haitian children like physical inactivity and eating habits, we noticed a trend of overweight in the pediatric population; other studies also documented the negative effect of these changes on the health of the children [18]. In fact in 2010, the World Bank Report ‘Promoting nutrition security in Haiti’ showed that 16.1% of Haitian children fall into the group of overweight [19]. These children are at a higher risk of developing NCD during adulthood and, therefore, kidney-related problems.

According to the World Bank in 2006 [20], 25% of Haitian children are born with low birth weight. Low birth weight is associated with childhood obesity [21] and increases the risk of NCD adulthood. It is reasonable to believe that the burden of kidney diseases related to these causes is really underestimated.

Table 1. Some determinants of health in Haiti

Determinants	Values
Total population	10,413,211
Children less than 15 years	3,675,863
Population 15 years and older	6,737,347
Number of doctors or nurses/10,000 people	5.9
Number of nephrologists available in Haiti (2014)	4 adult nephrologists; 2 pediatric nephrologists
Hemodialysis centers in the country	2 private; 1 public
Location	Port-au-Prince (West)
Health insurance coverage	3.1% of population
Percentage of population living under poverty line (less than USD 2) in 2009	72%

In addition to the causalities mentioned above, LMIC have had to deal with acute renal failure due to diethylene glycol poisoning (Bangladesh, Haiti), crush syndrome related to earthquake (Haiti, Chili), leptospirosis (Brazil), and malaria (numerous LMIC) [12, 22]. One out of 5 children will have peritoneal dialysis and the global mortality in care of acute kidney injury is around 40% because of comorbidities and absence of dialysis [23]. Two factors of severe prognosis have been identified: delayed management (2/3 of cases) and use of traditional medicine (1/3 of cases). No reliable data pertaining to the role of these predisposing factors in Haiti is available. The prevalence of pediatric renal disease in the country is rising and is associated with significant morbidity and mortality as seen in other LMIC [15].

State of Dialysis in Haiti

According to the Institut Haïtien de Statistique et d'Informatique (IHSI), in 2012, the Haitian population was 10,413,211 and about one third live in the West department (36.9%), which comprises the capital and surrounding boroughs. The proportion of children younger than 15 years was at this time 35.3%. Less than 3% of the Haitians have healthcare coverage [2].

Hemodialysis treatment became available in Haiti in 1982 in the internal medicine ward of the State University Hospital; some few patients with acute renal failure post-malaria have been dialyzed. Over time, many attempts to implement hemodialysis units were unsuccessful due to economic constraints in purchasing and maintaining standard hemodialysis equipment. In addition, peritoneal dialysis has never been an option because of the risks of infection, lack of training, and availability of

sterile dialysate and machines in medical centers. These difficulties should be viewed in the context of problematic public health policies [5].

The first private hemodialysis unit was implemented in the Hospital St. François de Sales in 1985 with only one machine and it was closed three years later. Another private center was born in 1995 and has provided services until now with seven machines. In 2002, the Internal Medicine Ward of State University Hospital opened its own hemodialysis unit with six machines. Additionally, in 2009, two other private dialysis facilities were inaugurated. One of them was destroyed after few months by the earthquake of January 2010 and the other one is still operating with four machines. To date, the problem remains the same. We should point out that the number of machines did not increase over years and the availability of supplies is uncertain. Figure 1 illustrates the geographical distribution of dialysis machines for the ten (10) departments of the country. We can see that only the West Department offers dialysis treatment to the population in three (3) centers located in Port-au-Prince, Haiti's capital-city. The total number of the machines is seventeen (17): 6 in the public unit and 11 in the private units (for both). So there is inequity in terms of the availability and the location of dialysis services in Haiti.

In a private center, the weekly average cost of three hemodialysis sessions is USD 600. In the public setting, the cost varies from USD 66 to 460. But considering the number of stations compared to the number of patients in the public setting hospital, usually patients are under-dialyzed with one to two sessions. During last year, the average number of hemodialyzed patients per month in the 3 centers was 56 with hypertension and diabetes mellitus as the first and second leading causes, respectively. The main vascular access for our patients is jugular or femoral

Fig. 1. Departmental distribution of dialysis stations.

vein catheterization. The mean patient age is 44 (range 4–85 years) and less than 10% of patients have an arterio-venous fistula.

Pediatric Dialysis in Haiti

There are some important points in the history of pediatric dialysis in Haiti that are worth noting. First, the epidemic of pediatric death from acute kidney injury (AKI) due to diethylene glycol (DEG) poisoning in 1996 has pointed out the weaknesses of the national health system in matter of renal replacement therapy (limited diagnostic facilities, dialysis availability). During that investigation, 109 cases of AKI were identified among children; all of whom had taken acetaminophen syrup contaminated by DEG. There was not a single healthcare facility for these patients so the majority died as a result. In fact, 85 (98%) out of 87 patients who remained in Haiti for treatment died, while 3 (27%) out of 11 patients who were transported to the United States for intensive care died before hospital discharge [24]. At that time, thankfully with collaboration of some centers from North America we had our first contact

with PD. The procedure was performed manually using percutaneous or adapted catheters. Unfortunately, this tragedy did not contribute to increasing the awareness of renal diseases or the need for intensive care units capable of providing PD or HD. However, following this and to address the deficiencies in our health care facilities, some Haitian professionals decided to create the first public dialysis unit in the state university hospital in collaboration with the public health ministry, as mentioned earlier. Second, the collapse of a school in 2008 created several cases of AKI. An adolescent girl of 14 years survived, thanks to hemodialysis, and because we had HD catheters and dialyzers adapted to her age and her growth parameters. Third, the last tragedy to recall was the violent earthquake in 2010. However, due to the lack of diagnosis tests and also to the emergency of the time, it was very difficult to have an exact estimate of patients who have suffered from acute kidney injury following the earthquake [25].

Managing pediatric kidney failure is still very challenging in Haiti for health workers, patients, and parents. Chronic peritoneal dialysis (CPD) is the most common dialysis treatment modality used to treat pediatric patients with ESRD, particularly in children less than five

years of age [26, 27]. Unfortunately, this modality has never been used in Haiti. Hospital hemodialysis is the method of RRT most widely used even for the rare children treated so far on an irregular basis. Several parameters are at issue in this context: nonavailability of central catheters or dialysers for kids, the cost of a dialysis session, the obligation for parents to move to Port-au-Prince even when they can pay the first sessions and also the lack of medical expertise. The youngest patient hemodialyzed in our centers for AKI due to hemolytic uremic syndrome was 4 years old. In any case (PD or HD), there is no dialysis prescription individualized to the patient's age, body size, residual renal function, or growth-related metabolic needs. We are more comfortable with acute hemodialysis since we know that there will be recovery of renal function and then the cost of the treatment could be affordable for the parents. Generally, chronic hemodialysis is not an option for our pediatric population.

Most Haitian children with kidney failure die without any adequate treatment as in the other LMIC [28]. Not only are there inequities between countries for dialysis treatment, in Haiti, there is inequity between adults and children, between patients regarding where they live and also due to their socioeconomically status [29].

Conclusion

Kidney diseases either acute or chronic are a reality in Haiti. Infectious diseases and diarrheal syndrome are the most common causes of acute kidney injury. Regarding chronic kidney diseases and end-stage renal diseases, hypertension and diabetes mellitus are the most predominant etiologies in adults. Chronic glomerulopathies rank as first causes in children. Hemodialysis is the only type of renal replacement therapy provided and is available only in the capital-city. The majority of patients cannot access and sustain hemodialysis. There is no program for ambulatory peritoneal dialysis. The lack of effective information and scarcity of medical expertise in the area contribute to a lack of the awareness of these diseases and also to the ignorance of their burden. Promotion of peritoneal dialysis should be a priority in Haiti. The knowledge of the epidemiology is essential and urgent for planning care and for providing dialysis with equity to the Haitian people. We recommend timely diagnosis and management for kidney diseases, particularly in patients at risk. We should seek the collaboration of all health workers and the support of the health ministry for reducing the burden of ESRD.

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