



ORIGINAL ARTICLE

Cost analysis of substitutive renal therapies in children[☆]

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KEYWORDS

Economics;
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Abstract

Objective: End-stage renal disease is a health problem that consumes public and private resources. This study aimed to identify the cost of hemodialysis (either daily [DHD] or conventional hemodialysis [CHD]) and transplantation in children and adolescents.

Methods: This was a retrospective cohort of pediatric patients with End-stage renal disease who underwent hemodialysis followed by kidney transplant. All costs incurred in the treatment were collected and the monthly total cost was calculated per patient and for each renal therapy. Subsequently, a dynamic panel data model was estimated.

Results: The study included 30 children who underwent hemodialysis (16 CHD/14 DHD) followed by renal transplantation. The mean monthly outlay for hemodialysis was USD 3500 and USD 1900 for transplant. Hemodialysis costs added up to over USD 87,000 in 40 months for CHD patients and USD 131,000 in 50 months for DHD patients. In turn, transplant costs in 50 months reached USD 48,000 and USD 70,000, for CHD and DHD patients, respectively. For CHD patients, transplant is less costly when therapy exceeds 16 months, whereas for DHD patients, the threshold is around 13 months.

Conclusion: Transplantation is less expensive than dialysis in children, and the estimated thresholds indicate that renal transplant should be the preferred treatment for pediatric patients.

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PALAVRAS-CHAVE

Economia;
 Transplante renal;
 Diálise renal;
 Pediatria

Análise de custos de terapias renais substitutivas em crianças**Resumo**

Objetivo: A Doença Renal em Estágio Final é um problema de saúde que consome recursos públicos e privados. Nosso objetivo é identificar o custo da hemodiálise (hemodiálise diárias ou convencional) e transplante em crianças e adolescentes.

Métodos: Uma coorte retrospectiva de pacientes pediátricos com Doença Renal em Estágio Final (DREF) submetidos à hemodiálise após transplante de rim. Todos os custos incorridos no tratamento foram cobrados e o custo total mensal foi calculado por paciente e por cada terapia renal. Então, foi estimado um modelo dinâmico com dados em painel.

Resultados: Estudamos 30 crianças submetidas à hemodiálise (16 hemodíálises convencionais/14 hemodíálises diárias) após transplante renal. O gasto médio mensal para hemodiálise foi US\$3,5 mil e US\$1,9 mil para transplante. Os custos de hemodiálise somam mais de US\$87 mil em 40 meses para pacientes submetidos a hemodiálise convencional (HC) e US\$131 mil em 50 meses para pacientes submetidos a hemodiálise diária (HD). Por outro lado, os custos de transplante em 50 meses atingem US\$48 e US\$70 mil, para pacientes submetidos a HC e HD, respectivamente. Para pacientes submetidos à hemodiálise convencional, o transplante é menos oneroso quando a terapia ultrapassa 16 meses, ao passo que para pacientes submetidos a hemodiálise diária o limiar é cerca de 13 meses.

Conclusão: O transplante é menos caro que a diálise em crianças e os limiares estimados indicam que o transplante renal deve ser o tratamento preferencial para pacientes pediátricos.

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Introduction

End-stage renal disease (ESRD) is a disorder characterized by the irreversible loss of kidney function. The disease is a health problem that increases mortality rate, causes a negative impact on the quality of life of patients, and consumes a high amount of resources. Kidney transplantation is the treatment of choice for ESRD in children, and preemptive transplant should be the first therapeutic goal for pediatric patients with this condition.¹

In Brazil, a large portion of the budget of the Brazilian Unified Health System (Sistema Único de Saúde [SUS]) is allocated for renal replacement therapies; increased demands are predicted, due to the rising prevalence of the disease.² The incidence and prevalence of pediatric chronic dialysis in Brazil is 6 and 20 cases per million age-related population (pmarp), respectively,³ and the incidence of pediatric kidney transplantation is 4 pmarp.⁴ Hemodialysis is three times more used than peritoneal dialysis (75% vs. 25%), and there are regional differences in access to ESRD treatment, which is lowest in the North and Midwest regions.^{3,4} Inequalities in access to ESRD treatment are not exclusive to Brazil and have a macroeconomic origin.⁵⁻⁸

Given the amount of resources used in the treatment of the disease, various studies estimate the costs of renal replacement therapies. In general, those studies suggest that transplanting younger and healthier individuals and even those with considerable ESRD co-morbidities is cost-effective.⁹⁻¹⁶

However, most of these studies are based on data from adults, and no study has analyzed the costs of childhood renal replacement therapies in Brazil. Extrapolation from the studies with adults is not appropriate, since ESRD has

peculiarities in each age range, making treatment in children and adolescents almost individualized, and thus more complex and expensive.

When considering dialysis treatment alone, recent data indicate that daily hemodialysis promotes better outcomes for children when compared with conventional dialysis.¹⁷ Consequently, the interest in daily hemodialysis has increased but, to date, the costs of this therapy have not been evaluated.

In this context, this study aimed to fill these gaps by identifying the costs of hemodialysis (either daily [DHD] or conventional hemodialysis [CHD]) and transplantation in children and adolescents. This is the first analysis in Brazil to compile all costs of different kidney treatment therapies in children.

Methods

The authors report on a single-center cohort of 30 pediatric patients with ESRD who were treated between 2007 and 2013, all of whom underwent hemodialysis followed by kidney transplantation at Hospital Samaritano. The convenience sample was drawn from the 168 pediatric kidney transplants that were performed during the study period. Data were retrospectively collected for all treatment costs including material, medicine, equipment, medical fees, administrative costs, daily rates of hospitalization, physiotherapy, nutrition, nursing, administrative fees, equipment, wages, and laboratory tests.

The monthly total costs were calculated for each patient on hemodialysis and transplantation (by the official price

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