

A Cost-Saving Hemodialysis Scheme in Limited-Resource Settings



To the Editor: In low-income and middle-income countries, access to dialysis is hindered by poor resources, and 75% of patients with end-stage kidney disease die for not affording dialysis.¹ Lebanon has been a middle-income country where access to dialysis is universal. The quality of dialysis has reached its peak by implementing ultrapure fluids, mandatory thrice-weekly dialysis, and monthly laboratory tests.² Recently, this country has been facing a catastrophic inflation. Dialysis fees' reimbursement became insufficient to cover costs. A shortage in laboratory kits prevented routine testing. The unaffordable price of fuel made transportation to units difficult. In response to this conundrum, dialysis units were challenged to adapt and improvise the best balance to sustain treatment and preserve quality. This letter summarizes the outcomes of a cost-saving scheme in a sample of hemodialysis patients. This scheme consists of reducing dialysis sessions and blood tests ([Supplementary Methods](#)).

A total of 76 patients were included ([Supplementary Table S1](#)). There were 24 patients shifted to twice-weekly dialysis, but 5 developed hyperkalemia and returned to thrice weekly. [Table 1](#) illustrates a significant difference between the medians of interdialytic weight gain preimplementation and post-implementation of the cost-saving scheme. This difference is driven by those shifted to twice-weekly dialysis. A significant difference was noted in hemoglobin before and after but not driven by patients shifted to twice-weekly dialysis. The decrease in hemoglobin level was found significant in patients who had erythropoiesis-stimulating agent dose reduced >25% and left 2 months without testing ($P = 0.041$; Wilcoxon test). Patients who had the same or increase in erythropoiesis-stimulating agent dose had no significant difference in hemoglobin ($P = 0.247$; Wilcoxon test).

In summary, shifting patients with residual diuresis to twice-weekly dialysis is safe. Incremental hemodialysis was found to be cost-effective in incident dialysis patients; trials are ongoing to clarify its long-term effects.³ Anemia did not worsen in our patients shifted to twice-weekly dialysis. Increasing the interval between

Table 1. Clinical outcomes pre-cost-saving and post-cost-saving scheme implementation

Variable	Pre (n = 76)	Post (n = 76)	P value
Hemoglobin, median (IQR)	10.7 (10.0–11.7)	10.5 (9.87–11.7)	0.080
Hb in patients on thrice weekly	11 (10–12)	10.6 (9.9–11.7)	0.017
Hb in patients on twice weekly	10.3 (9.5–10.7)	10.3 (8.8–11.7)	0.679
Serum potassium, median (IQR)	5.1 (4.6–5.7)	5.15 (4.6–5.6)	0.621
Predialysis SBP, median (IQR)	140 (130–150)	140 (130–150)	0.925
IDW, median (IQR)	2 (1.5–3)	2 (1.62–3)	0.009
IDW in patients on thrice weekly	2 (2.3)	2 (2.3)	0.131
IDW in patients on twice weekly	2 (1.2)	2 (1.3)	0.023
At least 1 hospitalization, n (%)	21 (27.6)	11 (14.5)	0.137

Hb, hemoglobin; IDW, interdialytic weight gain; IQR, interquartile range; SBP, systolic blood pressure.

Wilcoxon test was used to compare the pre- and post-results.

2 blood tests seemed safe in patients who had no significant reduction in their erythropoiesis-stimulating agent dose. Testing every 6 weeks was suggested by a Canadian study.⁴ In conclusion, a personalized approach to the management of hemodialysis patients can be cost-saving without jeopardizing the patients' safety on the short term. Each country has its specificities and necessitates a different cost-effective hemodialysis program.⁵

SUPPLEMENTARY MATERIAL

[Supplementary File \(PDF\)](#)

[Supplementary Methods.](#)

Table S1. Comparison between the thrice-weekly and the twice-weekly dialysis patients.

1. Thurlow JS, Joshi M, Yan G, et al. Global epidemiology of end-stage kidney disease and disparities in kidney replacement therapy. *Am J Nephrol.* 2021;52:98–107. <https://doi.org/10.1159/000514550>
2. Aoun M, Makkouk J, Ammar W. UltraPure water in haemodialysis: a step towards better quality in Lebanon. *East Mediterr Health J.* 2019;25:134–141. <https://doi.org/10.26719/emhj.18.032>
3. Murea M, Moossavi S, Fletcher AJ, et al. Renal replacement treatment initiation with twice-weekly versus thrice-weekly haemodialysis in patients with incident dialysis-dependent kidney disease: rationale and design of the TWOPLUS pilot clinical trial. *BMJ Open.* 2021;11:e047596. <https://doi.org/10.1136/bmjopen-2020-047596>
4. Silver SA, Alaryni A, Alghamdi A, Digby G, Wald R, Iliescu E. Routine laboratory testing every 4 versus every 6 weeks for patients on maintenance hemodialysis: a quality improvement project. *Am J Kidney Dis.* 2019;73:496–503. <https://doi.org/10.1053/j.ajkd.2018.10.008>
5. Ball JT. Establishing a cost-effective hemodialysis program in the developing world. *Clin Nephrol.* 2020;93:17–20. <https://doi.org/10.5414/CNP92S103>

Mabel Aoun^{1,2}

¹Faculty of Medicine, Saint-Joseph University, Beirut, Lebanon and ²Department of Nephrology, Saint-George Hospital, Ajaltoun, Lebanon

Correspondence: Mabel Aoun, Faculty of Medicine, Saint-Joseph University, Beirut, Lebanon. E-mail: aounmabel@yahoo.fr; mabel.aoun@usj.edu.lb

Received 28 March 2022; accepted 4 April 2022; published online 9 April 2022

Kidney Int Rep (2022) **7**, 1437–1438; <https://doi.org/10.1016/j.ekir.2022.04.001>

© 2022 International Society of Nephrology. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).