

Missed Dialysis Sessions Result in Increased Erythropoiesis-Stimulating Agent Use

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Introduction

- End-stage renal disease (ESRD) patients who regularly miss dialysis sessions have higher morbidity and mortality, and increased risk of hospitalization, compared to patients who attend dialysis according to their prescribed schedules.¹⁻³
- In addition to missing dialysis itself, patients may fail to receive medications—such as erthyropoiesis-stimulating agents (ESAs)—that are commonly dosed at each session.
- Missed sessions can also have a direct impact on facility costs:
- Under the current Medicare bundled Prospective Payment System (PPS) introduced in 2011, the dialysis composite rate payment was expanded to cover the cost of injectable drugs (such as ESAs) and laboratory tests that were previously separately billable.⁴
- An understanding of the frequency of missed sessions in the dialysis population and the effect of missed sessions on ESA use is needed to assess their potential effect on reimbursement under the Medicare PPS

Objective

We have conducted a retrospective database analysis of missed dialysis sessions among ESRD patients within a large dialysis organization in the US to assess their frequency and effect on current ESA use.

Methods

- Data from adult (≥18 years old) patients receiving in-center hemodialysis ≥3 times per week between 1 January 2010 and 31 December 2010 were assessed.
- A missed session was defined as an expected dialysis session that the patient did not attend and did not make up.
- 12 to 14 hemodialysis sessions/month were expected of patients, depending on schedule and calendar month
- Missed sessions for any cause (including hospitalization) were included in the analysis.
- Missed sessions occurring consecutively without interruption by an attended session were considered part of a missed session "episode."
- Average ESA doses in the periods before (14 or 30 days) and after (14 days, 30 days or days 31–60) a missed session episode were characterized and stratified by length of the missed session episode. Differences in ESA utilization in the before and after periods were calculated.
- To determine overall ESA utilization, we assessed mean monthly total ESA dose stratified by the number of sessions missed in the month.

Results

- Data from 105,519 patients over 903,179 patient-months were analyzed. More than two-thirds (67.9%) of all patient-months had no missed sessions, and an additional 11.8% had one missed session (**Figure 1**).
- The mean number of attended sessions was 12.01 ± 2.24
 (mean ± SD) per patient-month, or 92.0% of expected sessions. The mean number of missed sessions was 1.05 ± 2.20 per patient-month (8.0% of expected sessions).
- Mean per-session ESA doses were higher in the period following a missed session episode—increases ranged from 134 to 1,512 U/session comparing the 14 days before and after missed session episodes; from 1,835 to 4,093 U/session for the 30 days before and after; and from 63 to 2,778 U/session comparing days 31–60 after episodes to the 30 days before (Table 1).

Table 1: Per-Session ESA Dose Increases Following Missed Session Episodes

Days After Missed Sessions	Number of Missed Sessions in Episode	All Patients		Not Hospitalized	
		Change in ESA Dose (U)	N (Patient- Months)	Change in ESA Dose (U)	N (Patient- Months)
14 Day	1	+ 134	278,294	+ 78	251,886
	2	+ 616	47,508	+ 367	21,402
	3	+ 898	21,180	+ 414	5,633
	4	+ 1,159	11,090	+ 553	2,201
	5	+ 1,158	6,601	+ 173	1,182
	6	+ 1,270	4,248	+ 307	1,001
	7	+ 1,461	2,835	+ 108	556
	8	+ 1,512	2,028	+ 590	423
30 Day	1	+1,835	278,294	+ 1,842	251,886
	2	+ 2,693	47,508	+ 3,100	21,402
	3	+ 2,572	21,180	+ 2,804	5,633
	4	+ 3,145	11,090	+ 3,526	2,201
	5	+ 3,422	6,601	+ 3,393	1,182
	6	+ 3,754	4,248	+ 2,301	1,001
	7	+ 4,093	2,835	+ 4,093	556
	8	+ 3,631	2,028	+ 2,884	423
31–60 Day	1	+ 63	240,177	- 16	217,284
	2	+ 951	39,847	+ 689	17,713
	3	+ 1,501	17,872	+ 983	4,721
	4	+ 1,963	9,211	+ 1,278	1,792
	5	+ 2,168	5,428	+ 1,061	959
	6	+ 2,507	3,524	+ 1,058	841
	7	+ 2,778	2,286	+ 1,708	426
	8	+ 2,601	1,648	+ 1,498	306

- Longer missed session episodes were generally associated with greater dose increases in the post-missed session period. All dose increases were sustained over 60 days (Table 1).
- An analysis excluding patients who missed sessions due to hospitalization showed similar trends of increased ESA use after missed session episodes (Table 1).
- An analysis that excluded patients with additional missed sessions in the periods before and after the missed session episode showed similar results (data not shown).
- Total monthly ESA use was increased in months where patients missed up to 6 sessions, compared to months in which all sessions were attended, despite the fact that no ESA was received on the missed session days (**Table 2**). For months with 7 or more missed sessions, total ESA use was lower, although per-session use continued to be elevated over months with no missed sessions.

Figure 1: Distribution of Missed Sessions

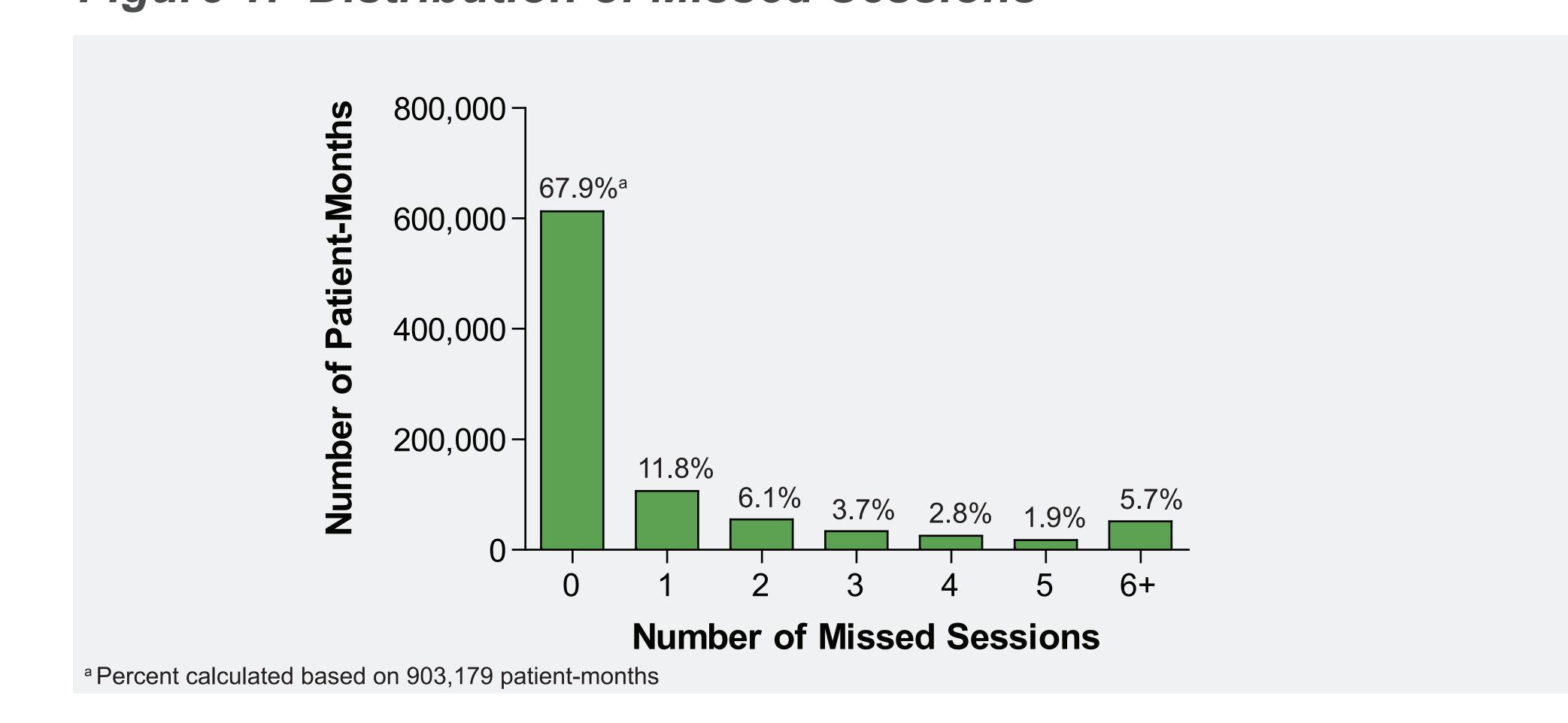


Table 2: Total Monthly ESA Dose Is Increased in Months With Missed Sessions

Missed Sessions (Per Patient-Month)	N (Patient-Months) ^a	Change in Total Monthly ESA Dose (U)	
0	613,049		
1	105,093	+ 8,707	
2	53,739	+ 14,130	
3	32,358	+ 15,125	
4	24,156	+ 9,122	
5	16,191	+ 5,651	
6	10,279	+ 1,803	
7	7,218	- 7,797	
8	5,796	- 17,281	

^a Complete (non-discontinuation) months only

Conclusions

- Patients attended 92.0% of scheduled dialysis sessions, and the majority of patients that missed sessions in any given month missed only 1 or 2.
- Missed sessions (for any reason) resulted in substantial increases in ESA use when the patient returned to the clinic (1,835 to 4,093 U/session increase comparing the 30 days before and after missed session episodes for all patients).
- Longer missed session episodes were generally associated with greater increases in ESA use in the post-missed session period.
- Dose increases following missed session episodes were sustained over 60 days for episodes of 2 or more sessions in length.
- Total monthly ESA doses were higher for months in which patients missed up to 6 dialysis sessions than for months in which patients attended every session.
- Increases in ESA use following missed sessions should be considered in any assessment of the impact of missed sessions.

Limitations:

 This analysis reflects mean changes in ESA dose. However, since ESA utilization is skewed, means may be unduly influenced by outliers and may not be an accurate reflection of typical ESA utilization in a population.

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Acknowledgments

We extend our sincere appreciation to the teammates in more than 1,800 DaVita clinics who work every day to take care of patients and also to ensure the extensive data collection on which our work is based. We thank DaVita Clinical Research® (DCR®), and specifically acknowledge Abigail Hunt, PhD, of DCR for editorial contributions in preparing this poster. DCR is committed to advancing the knowledge and practice of kidney care.

This study was funded by Affymax Inc and Takeda Pharmaceutical Company Limited.

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American Society of Nephrology Kidney Week, 30 October - 4 November 2012; San Diego, CA