A Multi-year Analysis of Decision Fatigue in Opioid Prescribing

Jordan Hughes, BA¹ , Jerzy Lysikowski, PhD², Rabina Acharya, MPH², Eleanor Phelps, RN³, and Enas Kandil, MD MSc⁴

¹Medical School, University of Texas Southwestern Medical Center, Dallas, TX, USA; ²Office of Medical Education, University of Texas Southwestern Medical Center, Dallas, TX, USA; ³Office of Quality, Safety, and Outcomes Education, University of Texas Southwestern Medical Center, Dallas, TX, USA; ⁴Department of Anesthesiology & Pain Management, University of Texas Southwestern Medical Center, Dallas, TX, USA.

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INTRODUCTION

Decision fatigue is a psychological phenomenon describing how people can, when making a series of decisions, deplete their mental resources over time and unknowingly attempt to reduce their cognitive burden by favoring the status quo—the cognitively “easier” choice.¹ Every day, primary care physicians (PCPs) make myriad decisions which subject them to such mental depletion. As one study of the phenomenon in primary care concludes, “decision fatigue progressively impairs clinicians’ ability to resist ordering inappropriate treatments.”²

Because the USA faces an unprecedented epidemic of opioid abuse, we must understand the extent to which decision fatigue affects opioid prescribing, as the prescription of these drugs has been associated with both long-term use and overdose deaths.^{3–5} Additionally, it is important to measure how recent opioid interventions have, if at all, affected decision fatigue’s role. The aim of this study is to measure PCPs’ varying likelihoods of prescribing opioids throughout the clinical day, before and after major interventions were implemented to combat the epidemic, as this can serve as an indication of both the presence of decision fatigue and the impact of concerted interventions.

METHODS

We began by selecting the years 2014 and 2017 to represent the pre- and post-intervention periods for study, as many major interventions to combat the opioid epidemic took place in 2016. These interventions include new clinical practice guidelines, federal and state legislation, and the severity of the epidemic becoming prominent national news. Next, we analyzed the percentage of appointments in which opioids were

prescribed in each hour of physicians’ clinical days, at three exclusively primary care clinics at University of Texas Southwestern Medical Center. Scheduled appointment times were used as substitutes for visit times. We then excluded patients with cancer and those who had surgery within 6 weeks of an appointment, in order to minimize the number of appointments in which opioids may be prescribed by clear clinical indication. This study was exempt from review by the UT Southwestern Institutional Review Board.

We employed logistic regression analysis to determine the predictive relationship between appointment time and opioid prescriptions, using physicians’ prescription rates in their first clinic hour as the reference for calculating odds ratios in each year.

RESULTS

A total of 34,972 clinic visits in 2014 and 42,313 clinic visits in 2017 met our inclusion criteria (Table 1). The overall likelihood of patients being prescribed opioids in 2017 was 22.5% less than in 2014 (95% CI, 0.732–0.822). However, the hourly likelihoods of patients being prescribed opioids increased significantly throughout the clinical day in each year (Fig. 1).

DISCUSSION

While there was a significant decrease in the overall likelihood of being prescribed opioids in 2017 compared with 2014, the variation in hourly prescription likelihoods is similar in both years. These results reflect the findings of similar studies of prescription decision fatigue.^{2, 6} The results show that while interventions to combat the opioid epidemic were successful in reducing the overall amount of opioids prescribed, they had minimal impact on the effect of decision fatigue. Additionally, we had hypothesized that by increasing regulation and social pressure to not prescribe opioids in the midst of this epidemic, the cognitively “easier” choice for physicians in 2017 would change to become *not prescribe*, and thus prescription

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Table 1 Characteristics of Primary Care Visits in 2014 and 2017. Comparisons Between the Years 2014 and 2017 in Each Characteristic Category (Patient Age, Patient Sex, Clinic Site, Physician Sex) Have *P* Values <0.001

2014				
Characteristic	Overall sample (N = 34,972)	Prescribed opioid (1866 [5.34%])	Not prescribed opioid (33,106 [94.66%])	<i>P</i> value
Patient age group, no. (%)				0.12
18–64	22,576	1173 (5.20%)	21,403 (94.80%)	
> 65	12,396	693 (5.59%)	11,703 (94.41%)	
Patient sex, no. (%)				< 0.001
Male	12,446	569 (4.57%)	11,877 (95.43%)	
Female	22,520	1297 (5.76%)	21,223 (94.24%)	
Unknown	6	0 (0.00%)	6 (100%)	
Clinic site, no. (%)				< 0.001
General internal medicine	22,677	1308 (5.77%)	21,369 (94.23%)	
Family medicine	9683	441 (4.55%)	9242 (95.45%)	
Geriatric medicine	2612	117 (4.48%)	2495 (95.52%)	
Physician sex, no. (%)	34,382 (missing = 590)	1841	32,541	< 0.001
Male	12,458	588 (4.72%)	11,870 (95.28%)	
Female	21,923	1253 (5.72%)	20,670 (94.28%)	
Unknown	1	0 (0.00%)	1 (100%)	
2017				
Characteristic	Overall sample (N = 42,313)	Prescribed opioid (1838 [4.34%])	Not prescribed opioid (40,475 [95.66%])	<i>P</i> value
Patient age group, no. (%)	42,307 (missing = 6)			0.01
18–64	26,240	1192 (4.54%)	25,048 (95.46%)	
> 65	16,067	645 (4.01%)	15,422 (95.99%)	
Patient sex, no. (%)				0.003
Male	14,259	561 (3.93%)	13,698 (96.07%)	
Female	28,053	1277 (4.55%)	26,776 (95.45%)	
Unknown	1	0 (0.00%)	1 (100%)	
Clinic site, no. (%)				< 0.001
General internal medicine	26,624	1343 (5.04%)	25,281 (94.96%)	
Family medicine	11,381	358 (3.15%)	11,023 (96.85%)	
Geriatric medicine	4308	137 (3.18%)	4171 (96.82%)	
Physician sex, no. (%)	42,237 (missing = 76)	1838	40,399	0.002
Male	8260	310 (3.75%)	7950 (96.25%)	
Female	33,977	1528 (4.50%)	32,449 (95.50%)	
Unknown	—	—	—

Figure 1 Hourly opioid prescribing likelihoods in 2014 and 2017. The hourly odds ratios for the year 2014 are in blue; those for the year 2017 are in green. The hourly odds ratios, with 95% confidence intervals in parentheses, for 2014 are as follows: 1 (reference), 0.951 (0.752–1.203), 1.253 (0.999–1.573), 1.300 (1.036–1.632), 1.648 (1.296–2.096), 1.479 (1.152–1.899), 1.457 (1.150–1.846), 1.363 (1.069–1.737), 1.457 (1.141–1.859). The hourly odds ratios, with 95% confidence intervals in parentheses, for 2017 are as follows: 1 (reference), 0.921 (0.736–1.153), 1.066 (0.857–1.326), 1.256 (1.012–1.559), 1.427 (1.132–1.798), 1.363 (1.065–1.743), 1.417 (1.128–1.780), 1.299 (1.026–1.645), 1.612 (1.281–2.029).

likelihood would decrease throughout the clinical day. This hypothesis is not supported by the results of the study.

This study has multiple limitations, including that it was performed at a single academic medical center and other factors besides decision fatigue may be contributing to our results. Future studies may include measuring the effect of implementing decision support tools for opioid prescribing into clinical practice, as well as continuing to monitor prescription likelihoods as patient and physician perceptions of opioids continue to change.

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Corresponding Author: Jordan Hughes, BA; Medical School, University of Texas Southwestern Medical Center, Dallas, TX, USA (e-mail: jordan.bland@utsouthwestern.edu).

Compliance with Ethical Standards:

Conflict of Interest: The authors declare that they do not have a conflict of interest.

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