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## The association between specific narrative elements and patient perspectives on acute pain treatment

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### Abstract

**Background:** Narratives are effective tools for communicating with patients about opioid prescribing for acute pain and improving patient satisfaction with pain management. It remains

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Author statement

AD, FS, MS, EH, KR, VB, EG, JB, LS, ES, DLS, SM, MZ, LB, RG, ZM contributed to the study concept, design, and implementation.

EER, AD, FS, MS, ZM contributed to the data analysis and manuscript preparation.

Declaration of interest

KR reported employment as chief implementation officer at the Agency for Healthcare Research and Quality during the conduct of the study. LB reported receiving grants from BrainCool, Nihon Kohden, the Patient-Centered Outcomes Research Institute, United Therapeutics, and ZOLL Medical and serving on the advisory boards of the National Institutes of Health and Philips outside the submitted work. ZM reported receiving grants from the Centers for Disease Control and Prevention and the National Institute on Drug Abuse outside the submitted work. No other disclosures were reported.

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unclear, however, whether specific narrative elements may be particularly effective at influencing patient perspectives.

**Methods:** This study was a secondary analysis of data collected for Life STORRIED, a multicenter RCT. Participants included 433 patients between 18 and 70 years-old presenting to the emergency department (ED) with renal colic or musculoskeletal back pain. Participants were instructed to view one or more narrative videos during their ED visit in which a patient storyteller discussed their experiences with opioids. We examined associations between exposure to individual narrative features and patients' 1) preference for opioids, 2) recall of opioid-related risks and 3) perspectives about the care they received.

**Results:** Participants were more likely to watch videos featuring storytellers who shared their race or gender. We found that participants who watched videos that contained specific narrative elements, for example mention of prescribed opioids, were more likely to recall having received information about pain treatment options on the day after discharge (86.3% versus 72.9%,  $p=0.02$ ). Participants who watched a video that discussed family history of addiction reported more participation in their treatment decision than those who did not (7.6 versus 6.8 on a ten-point scale,  $p=0.04$ ).

**Conclusions:** Participants preferentially view narratives featuring storytellers who share their race or gender. Narrative elements were not meaningfully associated with patient-centered outcomes. These findings have implications for the design of narrative communication tools.

## Introduction

Acute pain is a common presenting complaint in the emergency department (ED), contributing to almost half of ED visits <sup>1</sup>. Despite the frequency of this presentation, ambiguity remains about the appropriateness of using opioids for the management of acute pain <sup>2</sup>. The Center for Disease Control recommends using a shared decision-making model to guide choices about acute pain management <sup>3</sup>.

Traditionally, providers communicate with patients using probabilistic messages that emphasize risks and benefits. Alternatively, narrative approaches use patient stories to guide choices and have been shown to improve patient engagement in medical care <sup>4,5</sup>. In the case of opioid prescribing, we have previously described how the exposure to patient narratives about experiences with opioids increases patient satisfaction with pain management, improves patient recall of their own opioid-related risks, and decreases patients' preference for opioids <sup>6</sup>.

While the use of patient narratives may play an important role in communicating treatment risks and benefits to patients, it remains unknown whether specific storyteller features or narrative elements are most effective in influencing patient perspectives. We sought to address this gap in the literature by characterizing the relationship between exposure to specific narrative elements and storyteller features and 1) patient preference for opioids 2) patients' recall of their own opioid-related risks and 3) patient perspectives about the care that they received during an ED encounter for acute pain.

## Methods

### Study design and setting

This is an analysis of data from Life Stories for Opioid Risk Reduction in the Emergency Department (Life STORRIED), a multi-center randomized controlled trial conducted in the EDs of four academic medical centers. Complete methods and primary results for the study have been described in previous publications <sup>6,7</sup>. The primary intent of the original study was to compare the effectiveness of three strategies for communicating the risks of opioid use for acute pain conditions in which there is no clear gold standard for pain treatment. The study was approved by the institutional review boards of the University of Pennsylvania, the Mayo Clinic, and the University of Alabama at Birmingham. All participants provided informed consent.

### Participants

Participants in Life STORRIED included patients between the ages of 18 and 70 years who presented to the ED with musculoskeletal back or neck pain or pain from kidney stones. Of 1,301 patients in the study, 433 were randomized to receive an opioid-related narrative. For the purposes of the present study, only the narrative arm (n=433) was included in the analyses.

### Interventions

All videos included in the study consisted of a real patient (referred to as a storyteller) sharing their story in their own words about their experiences with opioids and/or opioid use disorder. In the narrative arm of the intervention, all participants were assessed for their individual risk of opioid misuse using the Opioid Risk Tool <sup>8</sup>. Then participants were asked to view at least one of eight short storyteller videos. Participants were able to select videos by clicking on thumbnails showing a photograph of the video storyteller (Figure 1). In each video, a real patient shared a story about using opioids and, in a subset of videos, their experiences with opioid use disorder. The videos included speakers who had negative and positive experiences with opioids and represented multiple racial and gender identities as well as a range of ages. All narratives used in the study were developed using iterative feedback from investigators including patient investigators.

### Measures

**Independent variables**—Two authors (EER and AD) reviewed the videos used in the study and identified two primary themes among the videos: 1) experiences with pain and 2) experiences with opioid use disorder. Research staff double-coded the theme(s) of each video as pain, opioid use disorder, or both. Staff also coded each video for mention of heroin use, mention of prescribed opioids, and mention of family history of addiction. The videos were also coded for whether the storyteller described themselves as a healthcare worker during the video and whether the speaker was sharing the story of someone who had died as a result of opioid use disorder. The codebook used for characterizing videos was developed iteratively by both coders (EER and AD) and there was 100% agreement on the resulting video codes between the two coders.

Concordance variables were also created to compare participant and storyteller self-reported demographics. Participants who watched videos featuring storytellers that shared their age, gender, or racial group were defined as concordant for that variable and vice versa. All video storytellers identified as either White (n=6) or Black (n=2) and as male (n=3) or female (n=5). Age was recoded into a binary variable corresponding to middle age with a cutoff of 45 years old for both patients and storytellers (6 story tellers were over age 45)<sup>9</sup>. Patients self-reported which of the eight videos they watched during their ED visit.

**Dependent variables**—The outcome variables in the present analysis were 1) opioid preference, 2) opioid risk recall, 3) patient satisfaction, 4) self-reported patient participation in the treatment decision, 5) patient recall of whether or not they were given information about their pain treatment options (all patients received this information), and 6) self-reported helpfulness of the information received. These variables included the outcome variables from the primary study (opioid preference and opioid risk recall) as well as variables intended to capture patient perspectives about the care they received in the emergency department. One variable (opioid use in the two weeks following discharge from the ED) was a pre-specified primary outcome in the original trial but was excluded here due to the small number of patients who reported opioid use at 14 days in this subset of participants (n=31). Patient perspectives were included in this secondary analysis because of previous research suggesting that provider communication may play an important role in forming patient perspectives about the quality of care they received<sup>10</sup>.

Prior to discharge, patients were asked to report their preferred method of pain management (i.e. no pain medicine, non-opioid pain medicine, opioid-containing medicine for 1–3 days, or opioid-containing medicine for 4–5 days). Participants who endorsed a preference for opioids for any period were classified as preferring opioids. Participants were informed of their own risk of opioid misuse via a visual graphic. At two weeks following discharge, patients were asked to recall their opioid misuse risk (at risk, high risk, or highest risk) and their responses were coded as correct versus incorrect. On the day following discharge, the study portal sent all participants automated emails or text messages that provided a link to online follow-up surveys including items from the Revised American Pain Society Patient Outcome Questionnaire<sup>11,12</sup>. In the surveys, participants were asked whether they recalled receiving information about pain treatment options and to rank their ED experience on a scale from 1 to 10 across a variety of domains. The remaining outcome variables were abstracted from this survey.

## Analysis

Chi-squared tests were used to examine the relationship between demographic concordance variables as well as video features (pain theme, mention of heroin, prescribed opioids, family history of addiction, or discussion of death from OUD) and the outcome variables (opioid risk recall, treatment preference, satisfaction with treatment, self-reported receipt of information about pain treatment options, participation in treatment decision, and helpfulness of pain treatment information). The majority of participants watched at least one video with an addiction theme, so this theme was excluded from the analysis due to lack

of variation. Analyses were completed using Stata 17.0 (StataCorp 2015, College Station, TX, StataCorp LP)

## Results

The study sample consisted of 193 men (44.6%), 239 women (55.2%) and one participant (0.2%) who did not identify with either gender. The mean age of the sample was 40.3 years old (SD 13.8) and 42.8% of the sample identified as White (n=185), followed by Black (n=167, 38.7%), Asian (n=21, 4.9%), and other race (including American Indian, Pacific Islander and multi-race, n=59, 13.7%). Participants watched a mean of 1.7 videos with a minority of participants (7.4%, n=32) watching three or more videos during their ED stay. The majority of participants watched at least one video that was concordant in terms of race (60.2%, n=260) and gender (80.4%, n=348). Half of the participants (49.7%, n=215) watched an age-concordant video (see Tables 1a and 1b for complete descriptive statistics).

White participants were more likely to watch a video featuring a White storyteller than Black participants and participants who identified as neither White nor Black (94.1%, n=174 versus 85.6%, n=143 and 91.3%, n=73,  $p=0.03$ ). Black participants were more likely to watch a video featuring a Black storyteller than either White participants or participants who identified as neither White nor Black (51.5%, n=86 versus 24.3%, n=45 and 17.5%, n=14,  $p<0.001$ ). Women were more likely than men to watch one or more videos featuring a woman as the storyteller (83.7%, n=200 versus 60.3%, n=117  $p<0.001$ ). Men were more likely than women to watch one or more videos featuring a man as the storyteller (76.8%, n=148 versus 47.7%, n=114  $p<0.001$ ). One participant did not identify with either gender and they were not included in this analysis. There was no significant association between participant age and storyteller age.

There was no association between any of the video features assessed in this study (including concordance between patient and storyteller demographics) and accurate recall of opioid misuse risk or preference for opioids (Table 2). In a subgroup analysis, patients at high risk for opioid misuse (a prespecified subgroup of interest) who watched a video featuring a pain theme were less likely to recall their opioid risk correctly two weeks later compared to those who did not (22.5% vs. 48.4%,  $p=0.02$ ).

In terms of patient perceptions of their treatment, patients who watched a video featuring a healthcare worker (91.7% versus 80.2%,  $p=0.01$ ) or that included mention of prescribed opioids (86.3% versus 72.9%,  $p=0.02$ ) or family history of addiction (89.2% versus 77.6%,  $p=0.01$ ) were more likely to recall having received information about pain treatment options on the day after discharge. Participants who watched a video that discussed family history of addiction reported higher participation in their treatment decision than those who did not (7.6 versus 6.8 on a ten-point scale,  $p=0.04$ ). There was no association between any of the video features assessed in this study and patient satisfaction (Table 3).

## Discussion

This study investigated the association between specific narrative elements and 1) patient recall of opioid-related risks, 2) preference for opioids and 3) perspectives on the care

they received during their ED encounter. We found that specific narrative features were associated with modest increases in patient-reported participation in treatment decisions, improved patient recall of receiving information about pain treatment options, and, among patients at high risk, recall of opioid misuse risk. Narrative features were not associated with preference for opioids, satisfaction with pain management, or patient-reported helpfulness of pain treatment information.

When given the choice, participants tended to select narratives featuring storytellers who shared their race or gender. Despite this preference, exposure to a narrative that was concordant in terms of race, gender, or age was not associated with any of the outcomes evaluated in this study. This latter finding runs counter to previous research, which has found that race-concordant communication may play an important role in communication quality across multiple domains<sup>13</sup>. For example in one multi-center study of primary care practices, patients in racially concordant physician pairings had longer visits, described their physicians as more participatory, and reported higher satisfaction than those in racially discordant patient-physician pairs<sup>14</sup>. The participant preference for gender and racially concordant storytellers identified in this study adds to this literature by providing support for the importance of representation in future studies of narrative communication.

Videos mentioning a family history of addiction or use of prescribed opioids were associated with improved recall of having received information about pain treatment options. This may be because these video elements highlighted commonalities between the storyteller and study participant. This is consistent with research that has found that messaging from peers with high social proximity may be seen as particularly credible<sup>15</sup>. Interestingly, we also found that participants were more likely to recall having received pain treatment information if they watched a video featuring a storyteller who identified themselves as a healthcare worker, which arguably decreases social proximity with the average ED patient. Further research is needed to identify narrative elements that may be particularly effective in engaging patients in shared decision-making and to clarify the role of social proximity in narrative communication.

We found no association between any unique narrative element evaluated in this study and patient satisfaction, preference for opioids, or patient-reported helpfulness of pain treatment information. This may be because the primary effect of the narrative intervention on these outcome variables was not driven by any single narrative element or was driven by a narrative element that was unmeasured in the current study. Alternately, we may have been underpowered to detect small effects on these outcomes.

Strengths of this study include the high quality of the study sample, which was recruited from multiple diverse ED sites in the controlled setting of a randomized trial. Limitations include the self-report nature of the data (i.e. respondents self-reported which videos they watched). As a result, it is possible that participants selectively recalled watching the narratives that were most compelling to them and did not recall watching narratives that they found less persuasive, which could cause us to underestimate the effect of individual narrative elements. Patients were also exposed to the communication intervention during an episode of acute pain and stress, both of which have complex impacts on memory



formation. The use of the ORT also poses an important limitation in that the ORT was not specifically validated for use in the ED population and may not predict opioid use patterns in ED patients<sup>16,8</sup>. Lastly, all storytellers included in this study identified as either male or female and either White or Black and some demographics were not represented at all in the study (for example, Black men). Future research should explore the impact of concordant storytellers in other patient populations including among individuals in demographic groups not included in the present analysis. This is especially important given evidence in the study that patients prefer to view narratives featuring demographically concordant storytellers.

## Conclusions

Participants tend to view narratives featuring storytellers who share their race or gender. Narrative elements were not meaningfully associated with patient-centered outcomes. Further research is needed to determine the degree to which narrative communication tools vary in effectiveness.

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**Figure 1:**  
Storyteller thumbnails

**Table 1a:**

Frequency of watching videos featuring each narrative element

	<b>Watched % (n)</b>
<b>Pain theme</b>	63.1% (273)
<b>Addiction theme</b>	97.2% (421)
<b>Heroin use</b>	74.6% (323)
<b>Prescribed opioids</b>	86.4% (374)
<b>Family history</b>	56.6% (245)
<b>Healthcare worker narrator</b>	36.0% (156)
<b>Death</b>	36.7% (159)
<b>Age concordant</b>	49.7% (215)
<b>Gender concordant</b>	80.4% (348)
<b>Race concordant*</b>	60.2% (260)

**Table 1b:**

Descriptive statistics of outcome variables

	% (n) *
<b>Opioid risk recall</b>	
Incorrect	56.3% (166)
Correct	43.7% (129)
<b>Opioid preference</b>	
No opioids	74.1% (320)
Opioids	25.9% (112)
<b>Patient-reported receipt of info about pain treatment options</b>	
Did not receive	15.8% (49)
Received	84.2% (261)
	<b>Mean +/- SD</b>
<b>Satisfaction with pain treatment</b>	7.3 +/- 3.0
<b>Participated in treatment decisions</b>	7.3 +/- 3.4
<b>Found pain treatment helpful</b>	8.0 +/- 2.3

\*  
n varies based on response rate to each question

**Table 2:**

Association between video features and treatment preference and opioid risk recall

	<i>Correct opioid risk recall (n=129)</i>	<i>P value</i>	<i>Preferred opioids (n=112)</i>	<i>P value</i>
<b>Pain theme</b>				
Did not watch	40.7% (48)	0.39	23.8% (38)	0.43
Watched	45.8% (81)		27.2% (74)	
<b>Heroin use</b>				
Did not watch	40.9% (29)	0.57	29.1% (32)	0.38
Watched	44.6% (100)		24.8% (80)	
<b>Prescribed opioids</b>				
Did not watch	34.9% (15)	0.21	22.0% (13)	0.46
Watched	45.2% (114)		26.5% (99)	
<b>Family history</b>				
Did not watch	45.7% (58)	0.56	25.5% (48)	0.87
Watched	42.3% (71)		26.2% (64)	
<b>Healthcare worker narrator</b>				
Did not watch	44.6% (82)	0.71	25.7% (71)	0.90
Watched	42.3% (47)		26.3% (41)	
<b>Death</b>				
Did not watch	42.0% (76)	0.45	26.7% (73)	0.61
Watched	46.5% (53)		24.5% (39)	
<b>Age concordant</b>				
Did not watch	48.7% (73)	0.08	27.5% (60)	0.45
Watched	38.6% (56)		24.3% (52)	
<b>Gender concordant</b>				
Did not watch	39.7% (23)	0.49	29.4% (25)	0.41
Watched	44.7% (106)		25.1% (87)	
<b>Race concordant *</b>				
Did not watch	46.4% (51)	0.48	24.6% (42)	0.58
Watched	42.2% (78)		26.9% (70)	

\* number of respondents is different due to missing race data for 1 participant

**Table 3:**

Association between video features and perspectives on treatment

	Satisfaction w/ pain treatment	<i>P value</i>	Participated in decisions about tx	<i>P value</i>	Received info about pain tx options (n=261)	<i>P value</i>	Found pain tx info helpful	<i>P value</i>
<b>Pain theme</b>								
Did not watch	7.4	0.42	7.6	0.21	84.4% (108)	0.94	7.9	0.53
Watched	7.1		7.1		84.1% (153)		8.1	
<b>Heroin use</b>								
Did not watch	7.8	0.10	7.8	0.13	88.7% (63)	0.23	8.2	0.43
Watched	7.1		7.1		82.9% (198)		8.0	
<b>Prescribed opioids</b>								
Did not watch	6.9	0.39	7.1	0.70	72.9% (35)	0.02	7.8	0.47
Watched	7.3		7.3		86.3% (226)		8.1	
<b>Family history</b>								
Did not watch	6.9	0.08	6.8	0.04	77.6% (104)	0.01	7.8	0.18
Watched	7.5		7.6		89.2% (157)		8.2	
<b>Healthcare worker narrator</b>								
Did not watch	7.2	0.56	7.3	0.88	80.2% (162)	0.01	8.1	0.64
Watched	7.4		7.2		91.7% (99)		7.9	
<b>Death</b>								
Did not watch	7.5	0.14	7.6	0.06	87.2% (164)	0.07	8.1	0.46
Watched	6.9		6.8		79.5% (97)		7.9	
<b>Age concordant</b>								
Did not watch	7.3	0.94	7.1	0.23	84.0% (136)	0.90	7.9	0.32
Watched	7.2		7.5		84.5% (125)		8.2	
<b>Gender concordant</b>								
Did not watch	7.7	0.20	7.4	0.85	82.8% (48)	0.74	8.0	0.86
Watched	7.2		7.3		84.5% (213)		8.0	
<b>Race concordant</b>								
Did not watch	7.4	0.53	7.4	0.74	87.1% (101)	0.28	8.2	0.26
Watched	7.2		7.2		82.5% (160)		7.9	