



Background

- Many young patients have limitations in managing dental anxiety, and in many cases pharmacological intervention is required¹
- In a survey of AAPD members, 97% of respondents use nitrous oxide in their practice¹
- Rapid onset and recovery makes nitrous oxide a favorable pharmacological tool to manage cooperative but anxious patients^{2,3,4,5}
- Nitrous oxide has a superior safety profile with no recorded fatalities or cases of serious morbidity when used within recommended concentrations (< 50%)^{2,3,4,5}
- There are recent trends towards ensuring patient safety, so clinician familiarity with evidence-based studies concerning nitrous oxide is paramount⁵
- Serious adverse events, such as chest pain, desaturation, and apnea, have been reported with 50-70% nitrous oxide levels⁶
- Parental preference for pharmacological behavior management techniques is increasing, and is likely impacting patient management decisions⁷

Objectives

The purpose of this study is to identify prevalence and variables that may lead to adverse events that occur following nitrous oxide administration in a dental school clinic

Materials and Methods

- 9,484 nitrous oxide logs were collected between August 1, 2017 and July 6, 2022
- 7,554 nitrous oxide logs were analyzed (21% of all collected forms were excluded due to missing data)
- Information obtained included age, sex, nitrous oxide concentration and duration, dental department, and presence of an adverse event
- The records of patients with adverse events were accessed via the electronic health record for further investigation

Results

- 7,176 (96.5%) forms reviewed were from pediatric dentistry
- 117 (0.7%) patients experienced adverse events across all departments
- 116 (99.1%) of adverse events occurred in pediatric dentistry
- The adverse event group spent an average of 41.8 minutes on nitrous oxide, while the non-adverse event group spent an average of 34.2 minutes on nitrous oxide (p < 0.001)
- Males experienced 65% of all adverse events
- Age is not significant in determining presence of an adverse event (p > 0.05)
- Gender and duration of time on nitrous oxide were significant factors for adverse events (p < 0.05)
- The most common adverse event was “nausea/vomiting”

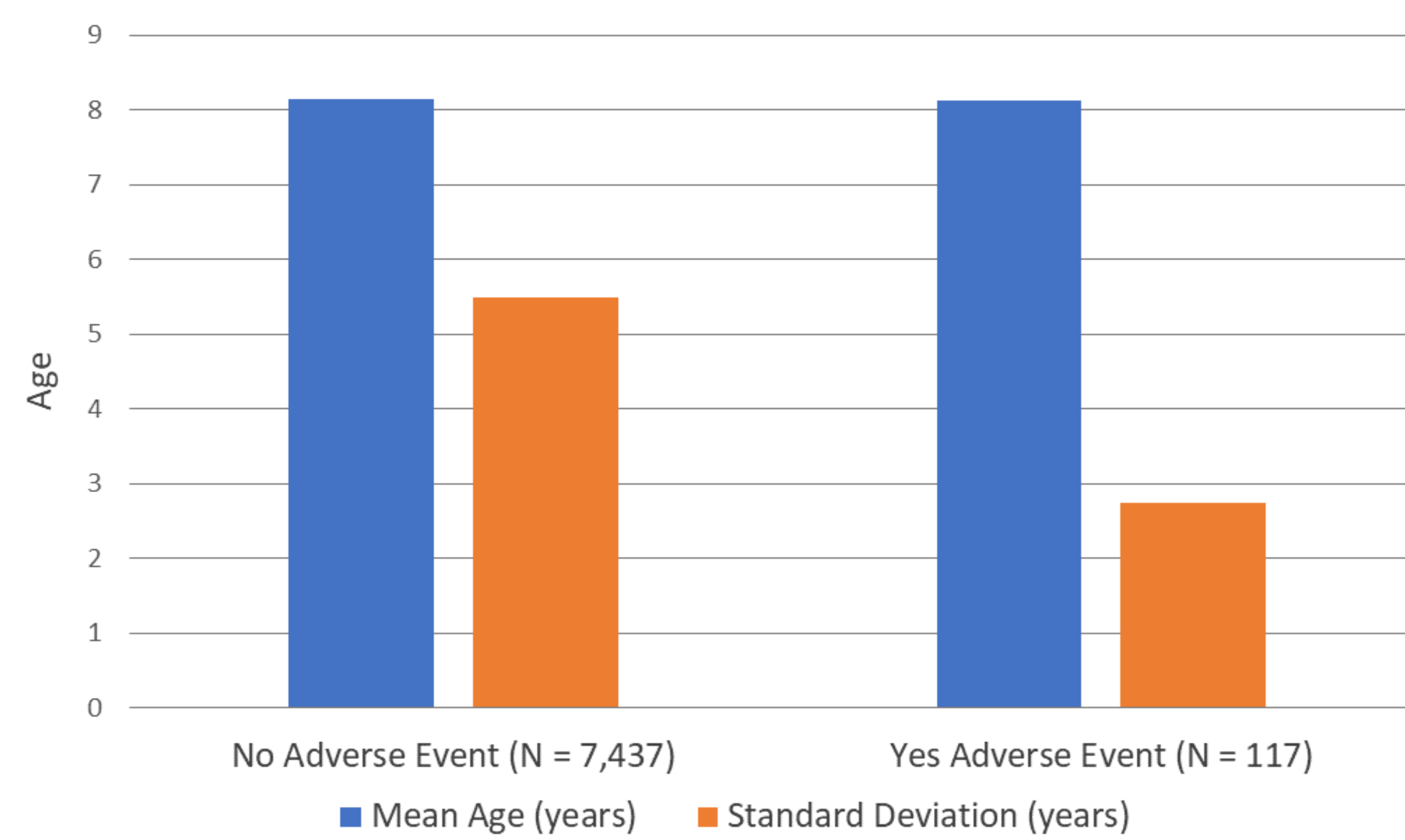


Figure 1. Age and Adverse Events (p = 0.376)

Table 1. Age and Adverse Events

Adverse Event?	No (N = 7,437)	Yes (N = 117)	Total (N = 7,554)	P-Value = 0.376
Mean Age (SD)	8.142 (5.489)	7.692 (2.740)	8.135	
Range	1.000 - 88.000	3.000 - 17.000	1.000 - 88.000	

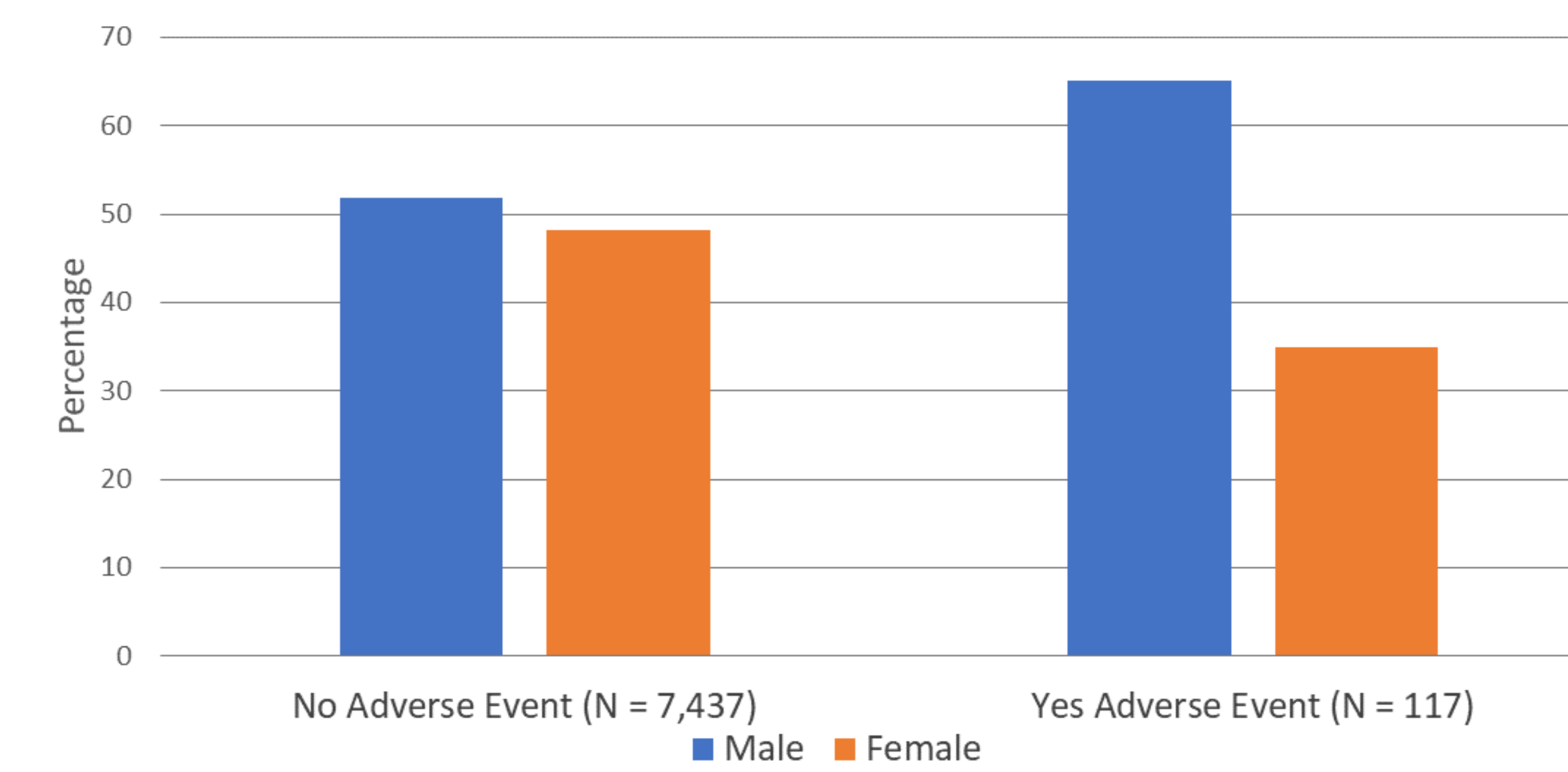


Figure 2. Gender and Adverse Events (p = 0.005)

Table 2. Gender and Adverse Events

Adverse Event?	No (N = 7,437)	Yes (N = 117)	Total (N = 7,554)	P-Value = 0.005
Unidentified	3	0	3	
Female	3579 (48.1%)	41 (35%)	3620 (47.9%)	
Male	3855 (51.9%)	76 (65%)	3931 (52.1%)	

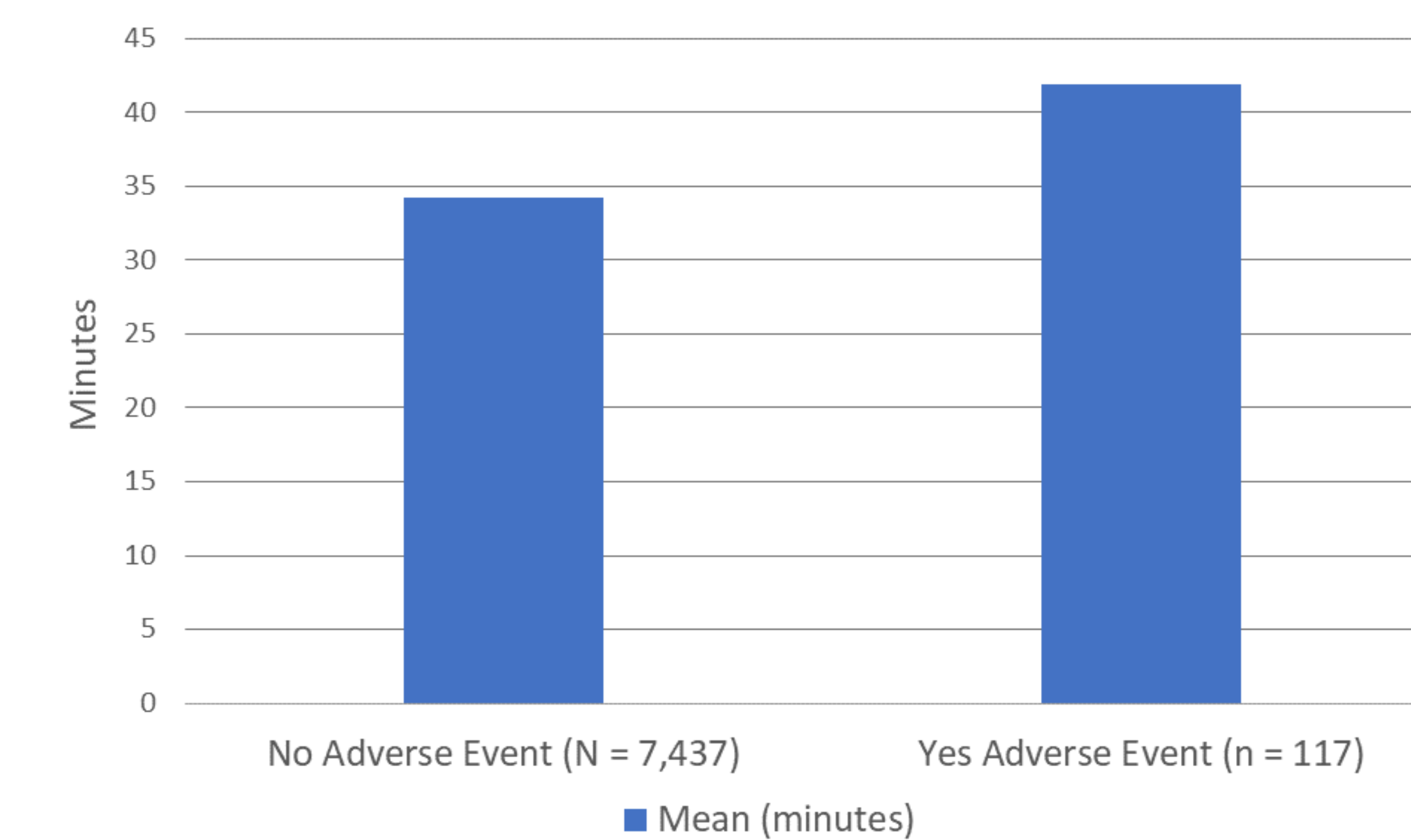


Figure 3. Duration of Time on N2O and Adverse Events (p < 0.001)

Table 3. Duration of Nitrous Oxide Use and Adverse Events

Adverse Event?	No (N = 7,437)	Yes (N = 117)	Total	P-Value < 0.001
Mean (minutes)	34.236	41.863	34.354	
Range (minutes)	1.000 - 174.000	4.000 - 120.000	1.000 - 174.000	

Limitations

- Lack of standardization among providers concerning what constitutes an adverse event
- Improper documentation of nitrous oxide logs resulting in exclusion from the study
- Inconsistencies in charting
- Did not assess nitrous oxide concentrations higher than 50%

Conclusions

- The results of the study suggest that males have a higher likelihood of experiencing an adverse nitrous oxide event.
- More time spent on nitrous oxide appears to increase the odds of an adverse event.

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References

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