

### Background

- Treating patients with COVID-19 has presented multiple challenges to practitioners, including high requirements for analgesia and sedation in mechanically ventilated patients and drug shortages
- Ketamine is an analgesedative agent that has generated more interest in recent years, but still has a limited body of evidence for its use as a sedative in critically ill patients in general, and certainly is lacking for patients with COVID-19
- In retrospective cohort studies evaluating ketamine as an adjunct for sedation, doses of other sedatives were decreased or did not increase when ketamine was initiated
- In these studies, no difference was reported in the rate of adverse events between patients who were initiated on ketamine and those who were not

### Objective

The objective of this study is to describe ketamine usage for sedation in mechanically ventilated adult patients with COVID-19

### Methods

- This was a retrospective case series performed at Capital Health Regional and Hopewell Medical Centers from June to October 2020
- Inclusion criteria: 18 years or older, received ketamine infusion for at least 24 hours, SARS-CoV-2 positive, received at least one continuous infusion of a benzodiazepine, dexmedetomidine, propofol, or an opioid
- As this study was a case-crossover design, patients included in this study served as their own controls (figure 1)
- Primary outcome evaluated the percent relative change in dose of other sedatives and analgesics 48 hours after ketamine is initiated
- Secondary outcomes evaluated change in vasopressor requirements, change in oxygenation requirements, and time spent in goal RASS

Figure 1. Case-crossover study design

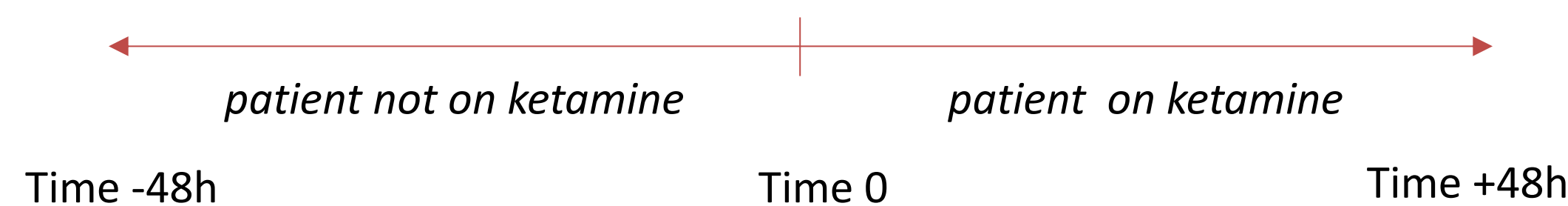
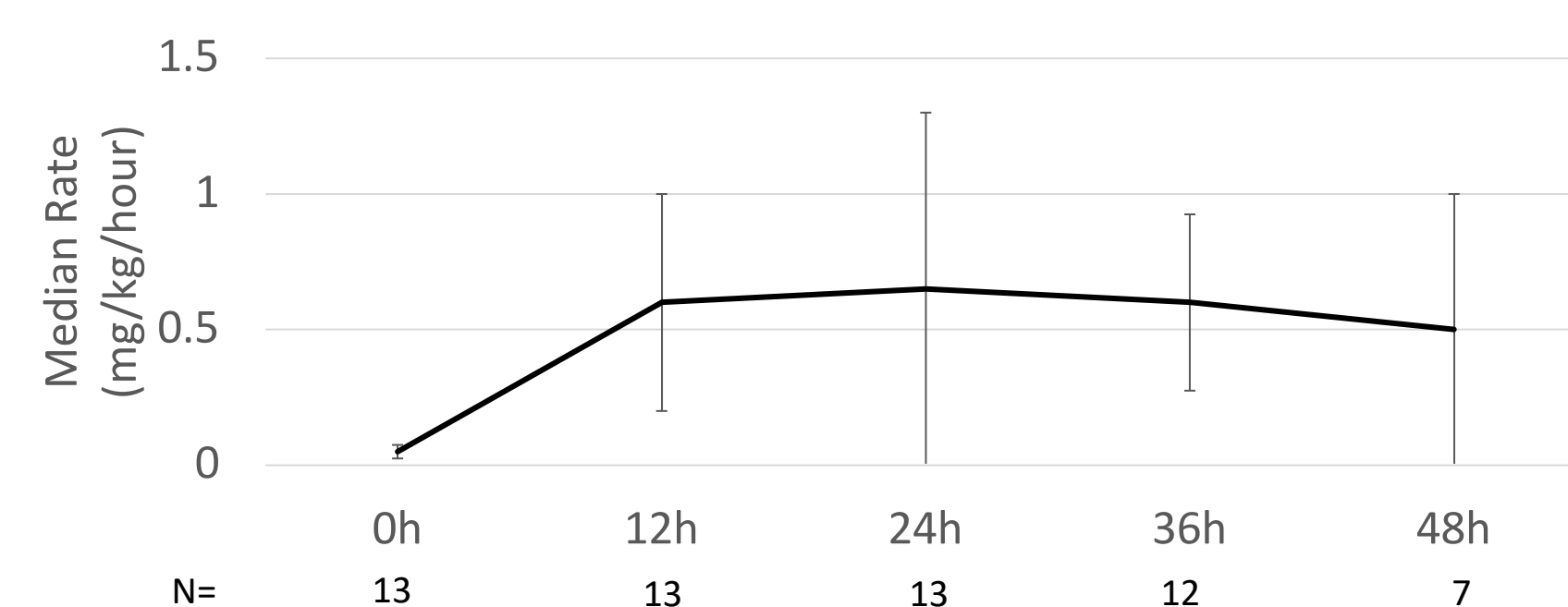


Table 1. Baseline characteristics of included patients

Characteristic	Value (Mean)
Age, years (SD)	58.38 (12.91)
Male, %	69
Weight, kg (SD)	75 (25.37)
Race/ethnicity (%)	
White	31
Black or African American	23
Hispanic	15
Asian	8
Unknown	23
Comorbidities (%)	
Hypertension	62
Psychiatric History	31
Depression/Anxiety	31
Bipolar Disorder	15
Schizophrenia	8
Other Psychiatric Disorder	0
Substance Use	0
COPD	8
Asthma	31
Pulmonary Hypertension	0
Initial SOFA Score	7.83 (2.23)
Length of ICU Stay, days (SD)	27.31 (13.99)
Length of Hospital Stay, days (SD)	31.54 (10.97)

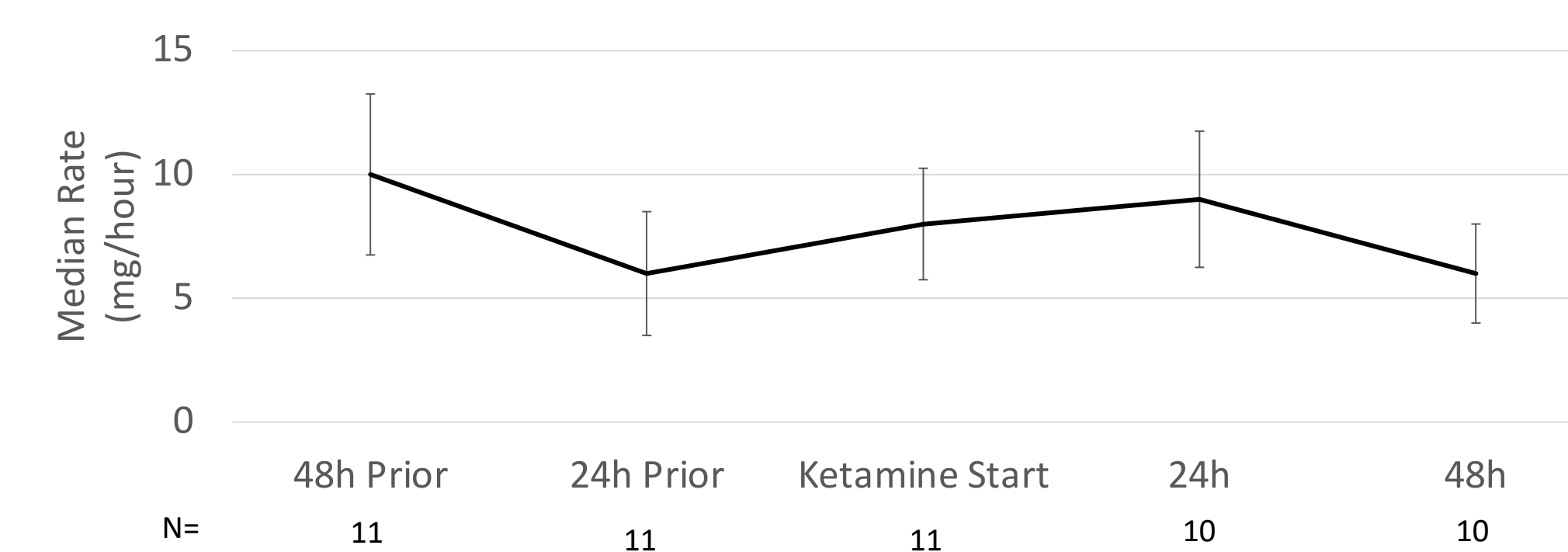
Figure 2. Median rate of ketamine infusion



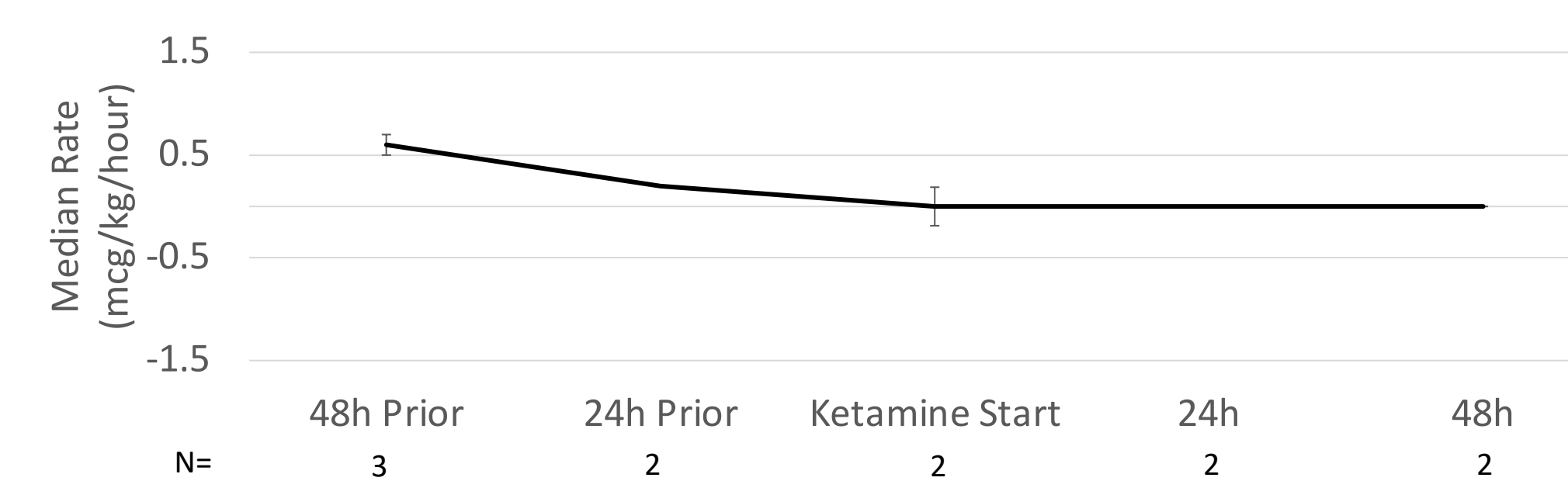
### Results

Figure 3. Median infusion rates of adjunctive sedatives and analgesics

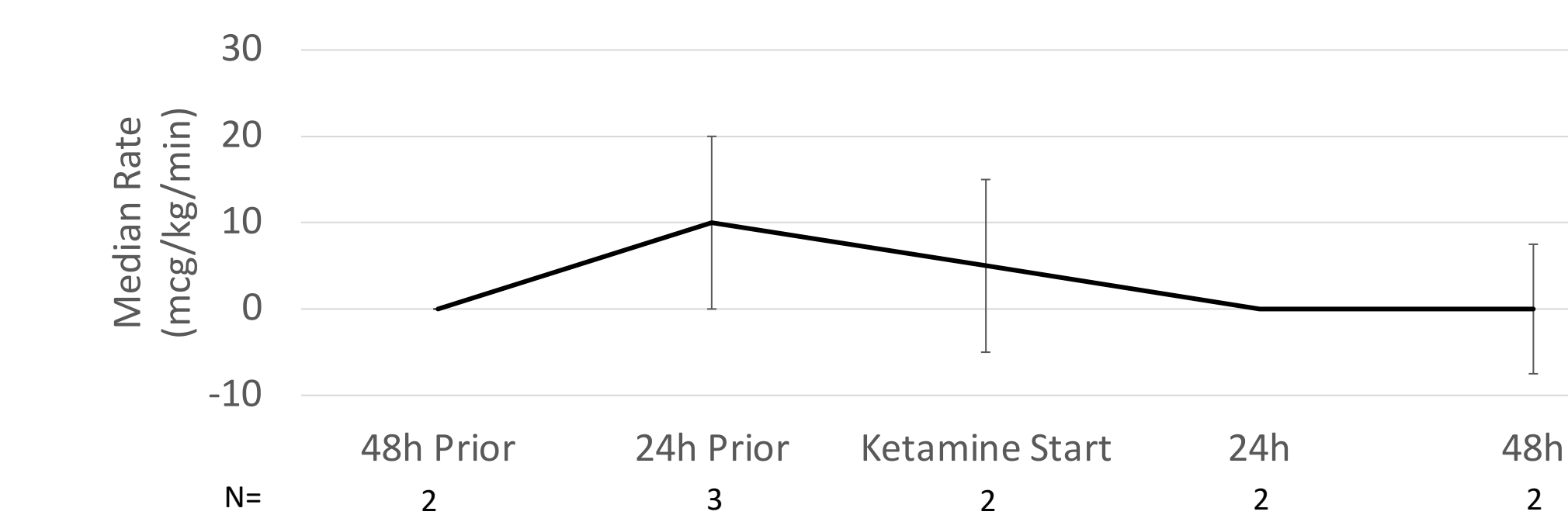
#### A. Benzodiazepine infusion rate



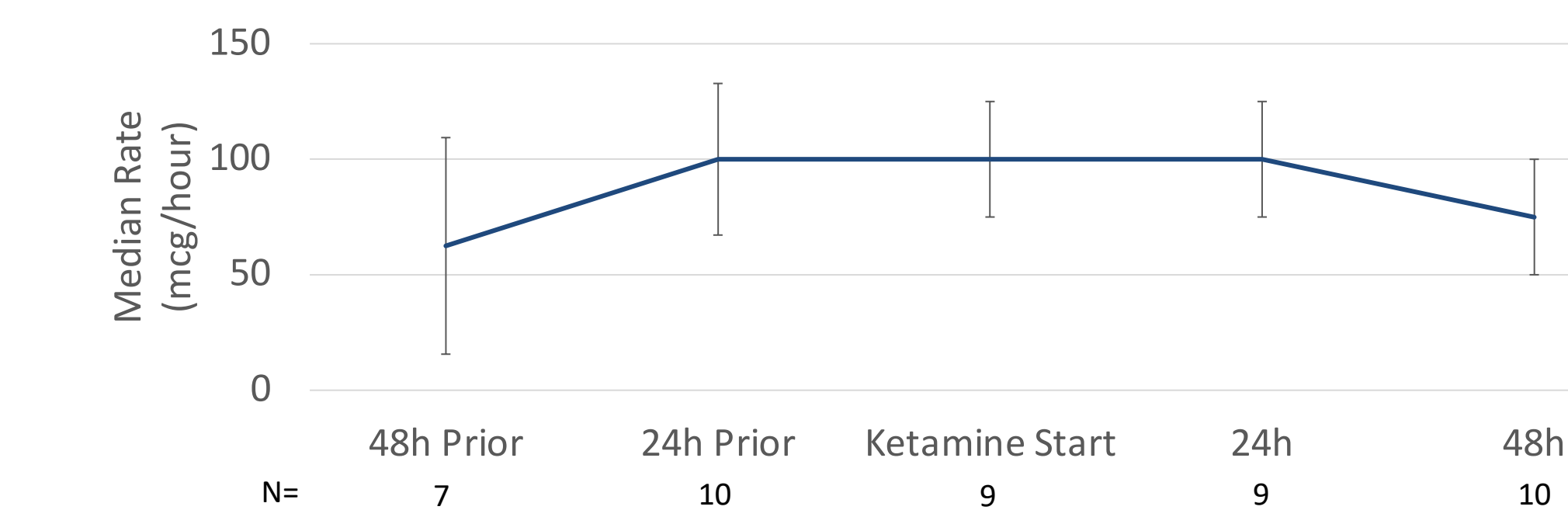
#### B. Dexmedetomidine infusion rate



#### C. Propofol infusion rate



#### D. Fentanyl infusion rate



### Results (continued)

Table 2. Secondary outcomes and adverse events

Outcome	48 Hours Prior to Ketamine Initiation (Median)	48 Hours After Ketamine Initiation (Median)
Percentage of time spent in goal RASS, %	85.71	47.92
Percentage of time spent in goal MAP, %	93.75	93.75
Vasopressor total dose (norepinephrine units, mcg/min)	0	0
Ratio of PaO <sub>2</sub> :FiO <sub>2</sub> (P/F Ratio)	145.13	151.17
Adverse events, n (%)	-	4 (31)

### Limitations

- Retrospective case series
- Small study population
- Infusion rates of ketamine were not standardized and varied among patients
- Did not capture as needed doses of analgesics or sedatives

### Conclusions

- Ketamine initiation is generally associated with decreased sedation requirements, but this was not consistently observed in all of our patients
  - This could be due to variation in prescribing practices and practices of nursing staff as well as inter-individual differences in drug responsiveness
- Two patients were able to be extubated while on ketamine, demonstrating its potential utility in this scenario
  - Ketamine does not suppress respiratory drive, thus it has the niche potential to keep patients sedated during extubation
- Overall, ketamine may have the ability to decrease sedative requirements in mechanically ventilated patients with COVID-19, especially during extubation

### References

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