

# Impact of Low BMI on Moderate Sedation Outcomes in the Dental Office

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## BACKGROUND

- Conscious or moderate sedation allows patients to tolerate uncomfortable procedures while maintaining cardiovascular and pulmonary function and retaining the ability to respond purposefully to verbal commands with or without tactile stimuli (1)
- By contrast, during deep sedation, patients cannot be easily aroused and will only respond purposefully to repeated verbal and painful stimuli (2)
- Drug regimens for oral sedation procedures are typically determined based on patient’s age and weight, however recent studies have demonstrated that BMI status may affect patient outcomes during sedation procedures (3)
- Our study aims to evaluate low BMI status as a potential risk factor for over-sedation during sedation procedures in the dental clinic.

## METHODS

- Retrospective chart review of patients at Children’s Hospital Colorado ages 2-18 years old who have undergone moderate procedural sedation in the dental clinic, with data extracted from 2019-2021.
- Subjects were evaluated for meeting over-sedation criteria which included: bradycardia (decreased heart rate (HR) below 60 bpm or decrease in HR 20% below baseline); hypoxemia (SpO2 <90%); hypotension (>20% reduction in pre-sedation blood pressure (BP)), deep sedation (Ramsey score between 4-6); delayed recovery (discharge >120min post medication administration), or report of difficulty arousing patient.

## RESULTS

Table 1: Patient Demographics by Over-sedation

	Overall Patients (N=140)	Number of patients over-sedated* (N = 63)	Number of patients not over-sedated* (N = 77)	P-Value
Age, Median (Range)	5 (3, 10)	5 (3, 9)	5.5 (3, 10)	0.7644
Sex				0.9535
Female	70 (52%)	36 (54.5%)	40 (54.1%)	
Male	64 (48%)	30 (45.5%)	34 (45.9%)	
Race				0.1897
White	53 (39.6%)	28 (42.4%)	27 (36.5%)	
Black	21 (15.7%)	6 (9.1%)	15 (20.3%)	
Others	46 (34.3%)	22 (33.3%)	26 (35.1%)	
Unknown	14 (10.4%)	10 (15.2%)	6 (8.1%)	
Ethnicity				0.4201
Hispanic	77 (57.5%)	35 (53.0%)	46 (62.2%)	
non-Hispanic	46 (34.3%)	23 (34.9%)	23 (31.1%)	
Unknown	11 (8.2%)	8 (12.1%)	5 (6.7%)	
Language				0.7266
English	98 (73.1%)	50 (75.8%)	54 (73.0%)	
Spanish	27 (20.2%)	13 (19.7%)	14 (18.9%)	
Others	9 (6.7%)	3 (4.5%)	6 (8.1%)	
Insurance				0.9514
Private	22 (16.4%)	11 (16.7%)	11 (14.9%)	
Medicaid	101 (75.4%)	50 (75.8%)	55 (74.3%)	
CHP	8 (6.0%)	3 (4.5%)	5 (6.8%)	
None	3 (2.2%)	2 (3.0%)	3 (4.0%)	

Table 2: Patients who experienced criteria for over-sedation

	% of Overall Patients	% of Over-Sedated* Patients
HR < 60bpm	1.5%	3.2%
20% drop HR	11.2%	23.8%
SpO2 < 90%	2.3%	4.8%
20% drop BP	33.6%	71.4%
Ramsey Score 4-6	12.7%	27.0%
Difficulty arousing	0.75%	1.6%
Increased time to DC	11.9%	25.4%

One hundred thirty-one patients were included in the analysis. Forty-four (32.8%) patients had one clinical sign of over-sedation, 18 (13.4%) had two signs, and 1 (0.8%) had three signs. Over-sedation variables with high % of incidence were grouped (labeled “Post-Hoc Over-sedation”) and logistic regression model was used to test significant association between over-sedation and BMI/BMI percentile of patient.

Table 3: The Distribution of Patients’ BMI and BMI percentile by over-sedation

	Overall Patients (N = 140)	Number of patients over-sedated* (N = 63)	Number of patients not over-sedated* (N = 77)	P-Value
Average BMI	15.9 (2.0)	16.2 (2.3)	15.7 (1.7)	0.1145
Average BMI Percentile	50.6 (28.8)	55.7 (29.1)	46.1 (28.0)	0.0548

Table 4: Logistic Regression Model the Relationship between Over-sedation and BMI/BMI Percentile

Dependent Variable	Odds Ratio Estimates				
	Effect	Point Estimate	95% Wald		
			Confidence Limits	P Value	
Post-Hoc Over-sedation	BMIPCT	1.01	1.00	1.03	0.0285
Post-Hoc Over-sedation	BMI	1.18	0.99	1.42	0.0727

\*Over-sedated: Defined as patients who met at least one over-sedation criteria as outlined by study protocol

## CONCLUSIONS

- No statistically significant relationship was found between low BMI and over-sedation.
- A statistically significant correlation found between “Post-Hoc Over-Sedation” and BMI percentile: 10% increase in BMI percentile was associated with 14% increased odds of over-sedation
- Limitations: Small sample size of patients who met “over-sedation” criteria, reporting of Ramsey score or difficulty arousing patient is subjective to variable provider assessments, high incidence of increased baseline heart-rate due to patient anxiety prior to procedure start.

## IMPLICATIONS

- While our study did not identify any relationship between low BMI and over-sedation outcomes, findings from our study may support existing literature suggesting a correlation between high BMI and over-sedation outcomes.
- Further studies should be conducted to investigate the impact of low BMI on over-sedation outcomes to determine any possible risk factors associated with low BMI. Identifying these risk factors will aid in determining the appropriate drug dosages for patients undergoing moderate sedation in the dental clinic.

## REFERENCES

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