A Retrospective Analysis to Analyze Health Data and Obstructive Sleep Apnea Risk in Women

Kimberly Latham BSN, RN, CCRN; Tamera Bird BSN, RN, CCRN; Brenda Johnson MSN, RN; Victoria Roelker RRT; Mark Scherer BSN, RN

The Christ Hospital Health Network

MAGNET RECOGNIZED — AMERICAN NURSES CREDENTIALING CENTER

Purpose

The purpose of this study was to examine if the clinical outcomes of female patients who *did not qualify for or receive* capnography monitoring due to STOP BANG screening score of 4 were different from men who *did qualify for and received* capnography monitoring based on screening scores of 5, which included an additional point for male gender alone.

Background

- The incidence of Obstructive Sleep Apnea(OSA) is reportedly higher in men than women. OSA has been estimated to have a male-to-female ratio of between 3:1 and 5:1 in the general population (Wimms, 2016).
- The **STOP BANG** screening tool consists of four yes/no questions that address **S**noring, **T**iredness, **O**bserved apnea and high blood **P**ressure (**STOP**) combined with **B**ody Mass Index(BMI), **A**ge, **N**eck size and **G**ender (**BANG**) to generate a score (Chung, 2008).
- As a result, women screened for OSA using the STOP BANG tool are automatically assigned a 1 point deduction based on gender alone.
- Discrepancies between males and females in the prevalence of OSA could be a result of women frequently being misdiagnosed or underdiagnosed due to reporting different symptoms (Wimms, 2016).
- There may be insufficient evidence to support the difference in OSA scoring between men and women.

✱ ✱ ✱ ✱ ✱ ✱

- At our institution, the STOP BANG tool is used to screen patients pre-operatively for OSA risk. Each "yes" answer is issued 1 point. For a score of 5 on the 8-point scale, the patient will be monitored on capnography post-operatively.
- Women who score 4 on the 8-point scale do not meet the criteria for capnography. Based on the STOP BANG tool, men receive 1 additional point for gender alone.
- PACU nurses observed women who scored a 4 were having episodes of desaturations and apnea while in the PACU.

Methods

This study used a retrospective chart analysis, over a two year period, to examine the STOP BANG scores of patients who were screened for OSA pre-operatively.
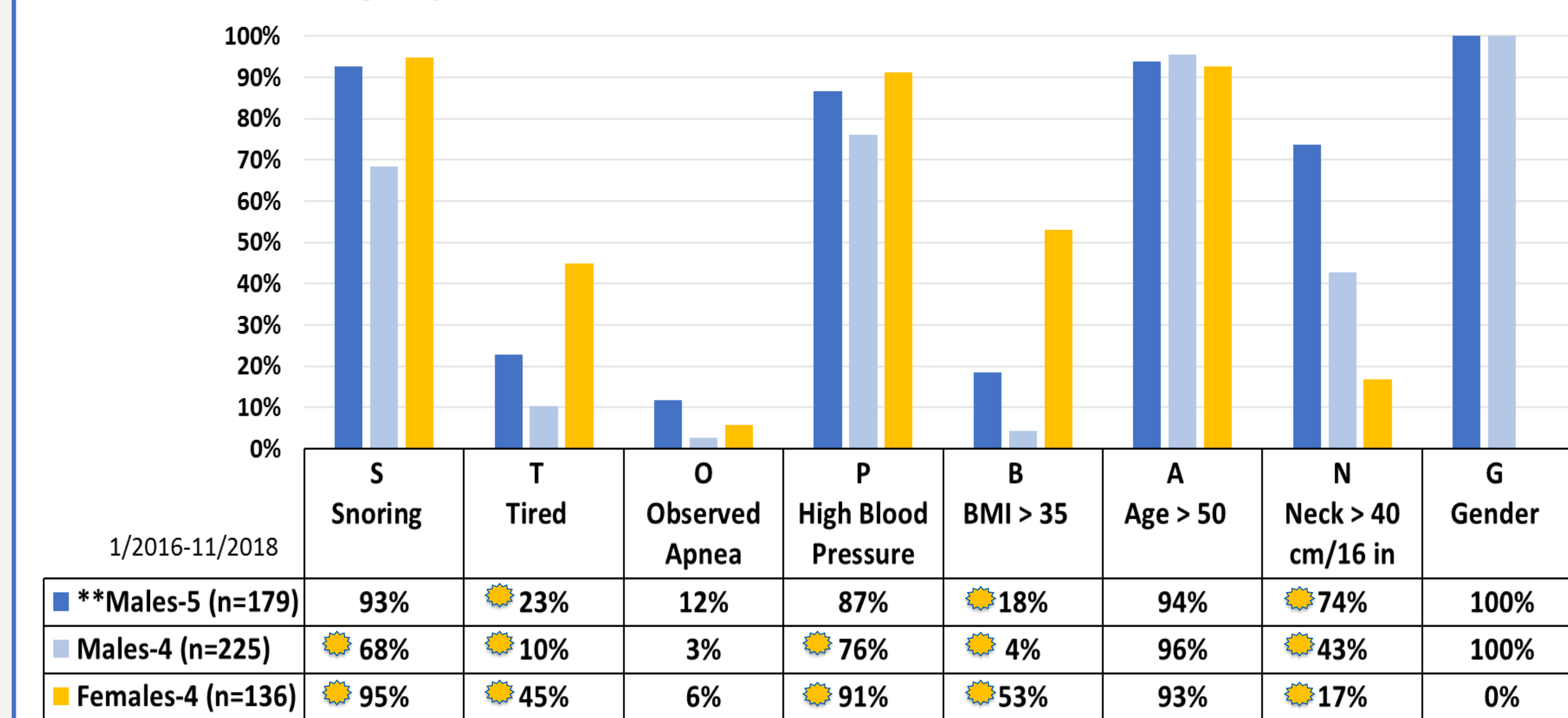
Setting
- A 550 bed, Magnet designated, metropolitan teaching hospital in the mid-west.

Population
- Inpatients who underwent surgery with general anesthesia lasting longer than 2 hours and recovered in the PACU post op were included in the study. Patients who received patient-controlled analgesia (PCA) and patients who had a previous diagnosis of sleep apnea were excluded, since these patients were all monitored with capnography per hospital policy.
- Males with a score of 5 (Males-5) who were monitored with capnography per policy and females with a score of 4 (Females-4) were compared. Additionally, males with a score of 4 (Males-4) and Females-4 were compared. Eleven demographic (7 from the STOP BANG tool) and 27 clinical outcomes data points were analyzed using t-test, Chi-Square, or Fisher's Exact Tests.

Results

Demographics: STOP BANG Assessment Tool Results

1/2016-11/2018	S Snoring	T Tired	O Observed Apnea	P High Blood Pressure	B BMI > 35	A Age > 50	N Neck > 40 cm/16 in	G Gender
Males-5 (n=179)	93%	23%	12%	87%	18%	94%	74%	100%
Males-4 (n=225)	68%	10%	3%	76%	4%	96%	43%	100%
Females-4 (n=136)	95%	45%	6%	91%	53%	93%	17%	0%

**ALL males with score of 5 were monitored with capnography - per protocol.

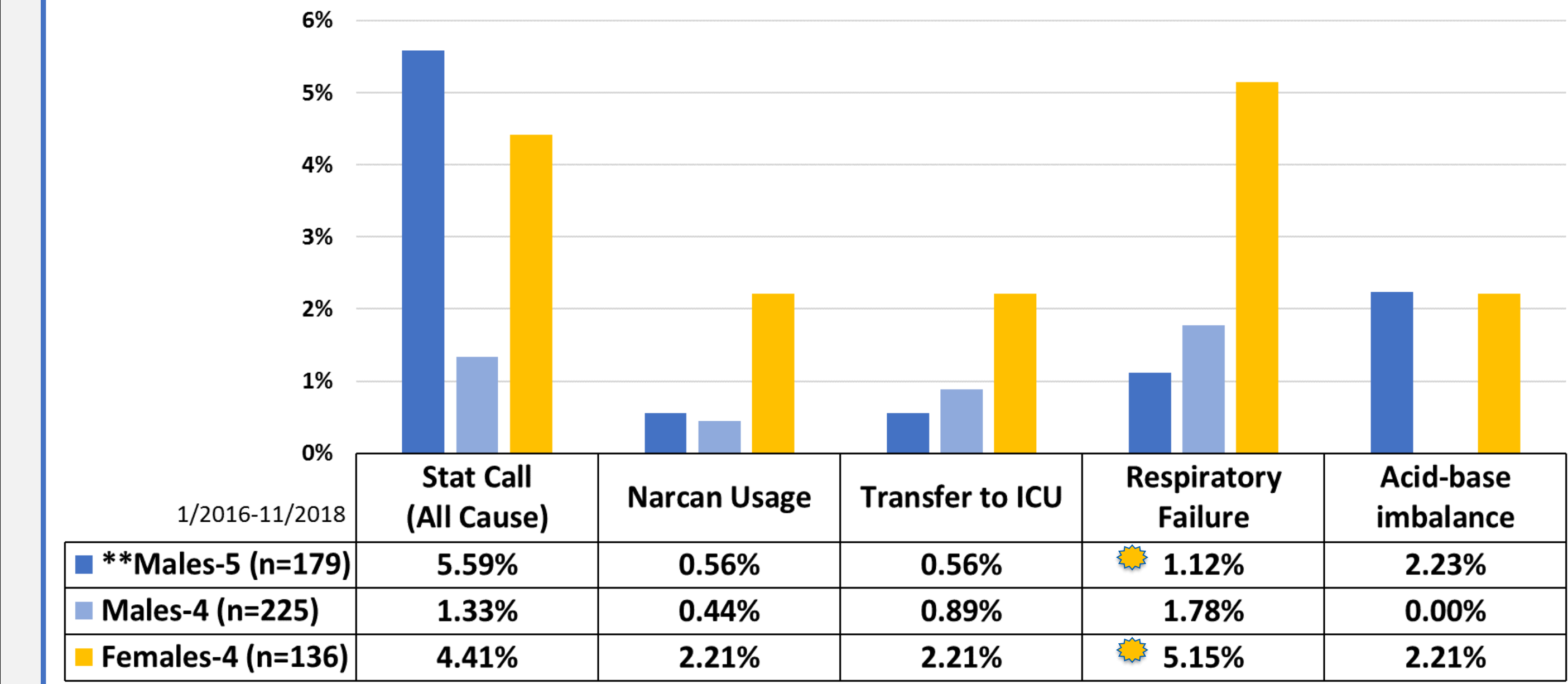The groups were similar in both age and risk adjusted weighted scores. Statistically significant differences were seen in many of the STOP BANG metrics (p< 0.001).

Males received extra point for gender - and often for neck circumference.

Results (continued)

Variation in Clinical Outcomes

1/2016-11/2018	Stat Call (All Cause)	Narcan Usage	Transfer to ICU	Respiratory Failure	Acid-base imbalance
Males-5 (n=179)	5.59%	0.56%	0.56%	1.12%	2.23%
Males-4 (n=225)	1.33%	0.44%	0.89%	1.78%	0.00%
Females-4 (n=136)	4.41%	2.21%	2.21%	5.15%	2.21%

**ALL males with score of 5 were monitored with capnography - per protocol.

Respiratory Failure was 4.03% higher in Female-4 vs Men-5 (p< 0.001). *Important clinical note:* although not statistically significant, in several other outcome comparisons Females-4 had a higher percentage than Males-4 or Males-5.

Discussion and Implications for Nursing

The demographic differences suggest major limitations with the tool's specificity in women. In addition, percentage differences in the clinical outcomes point to a need for further research with a larger sample size.

Neither the Males-4 or Females-4 were monitored with capnography per protocol. If a capnography order was placed, it was due to the clinician's assessment at the bedside. Noting that several times the monitoring order was placed, an analysis was done to compare the incidence of the capnography monitoring order between these 2 groups. This revealed a 7.63% (p<0.05) difference in the groups (Females-4 10.29% vs Males-4 2.67%). The capnography monitoring order analysis further reinforces the need for a tool that better reflects women's risk for Obstructive Sleep Apnea.

Capnography Monitoring Order analysis: Males-4 vs Females-4 = 7.63% increase (p<0.05)

Capnography Monitoring due to Bedside Clinician's Assessment

Males-4 (n=225): 2.67% — Females-4 (n=136): 10.29%
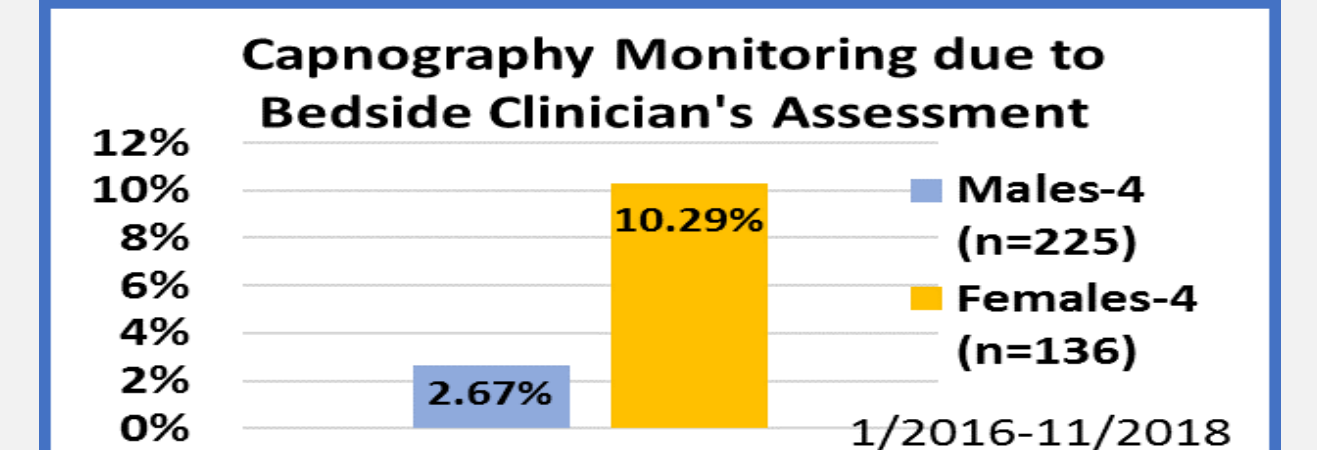
The high incidence of BMI > 35 in women, prompted a deeper dive into the overall surgical population during the time period of the study. The results suggest females consistently have a higher percentage in this at risk category. Further studies and interventions are indicated.

All surgical patients during the time frame of the study
➢ BMI > 35: Females = 5.61% Increase over Males (p<0.001)

BMI > 35 All Surgeries: 1/2016-11/2018

Males (n=13,853): 17.38% — Females (n=23,051): 22.99%
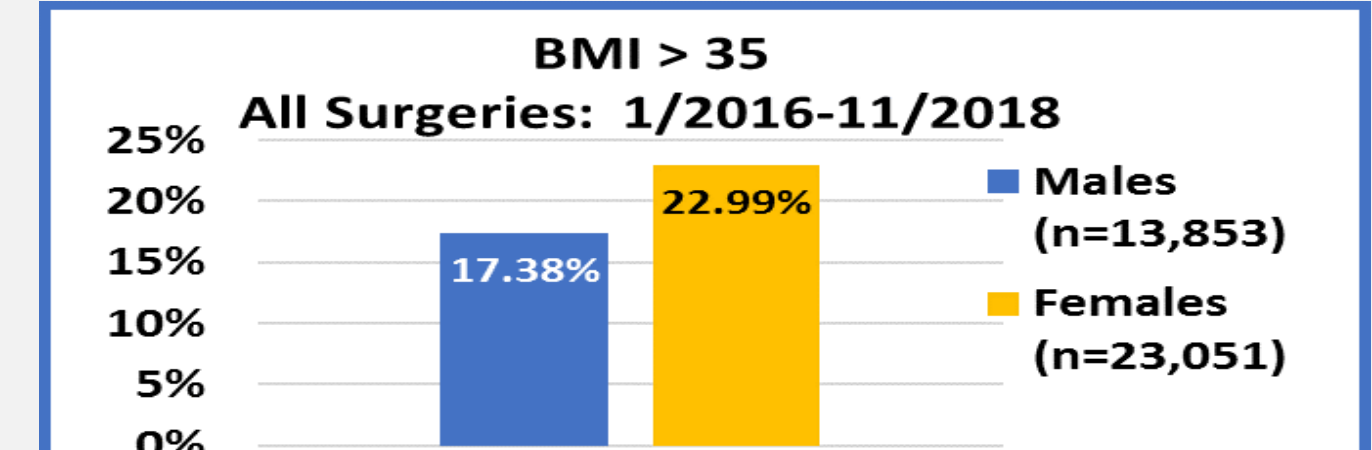
References:
1) Chung F, Subramanyam R, Liao P, et al. (2012) High STOP-Bang score indicates a high probability of obstructive sleep apnoea. British Journal of Anaesthesia. 108, 768-75.
2) Wimms A, Woehrle H, Ketheeswaran S, et al. (2016) Obstructive Sleep Apnea in Women: Specific Issues and Interventions. BioMed Research International. Article IS 1764837, 1-9.