Effects of BMI on Severity of OSA in Chinese, South Asian and Non-Asian Patients

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INTRODUCTION

Obstructive sleep apnea (OSA) is a common sleep disorder affecting both genders in all ethnicities. Obesity is one of the major causes of OSA and its severity [1-6]. It is well known that Asians are generally less obese than the non-Asian. However, the prevalence of OSA in Asians is still high, likely due to the small and narrow upper airway anatomy[1]. There is limited large scale data on the prevalence and effect of BMI on Chinese and South Asian patients, as most studies involved non-Asian patients. The objective of this study was to analyse the prevalence and the additive effects of BMI on OSA severity in these ethnic groups as compared to non-Asian.

METHODS

A large scale (N=1788), retrospective study analyzing AHI, and its relationship with BMI amongst Chinese, South Asian and non-Asian groups was performed.

Polysomnography: All data was taken retrospectively between 2008-2012. Standard overnight polysomnography included recording of EEG, submental and bilateral leg electromyograms. Sleep stages were scored in 30-s epochs using the AASM sleep scoring criteria. AHI was defined as the number of apneas and hypopneas per hour of sleep. Severity of sleep apnea was classified according to recommendations by the American Academy of Sleep Medicine[6].

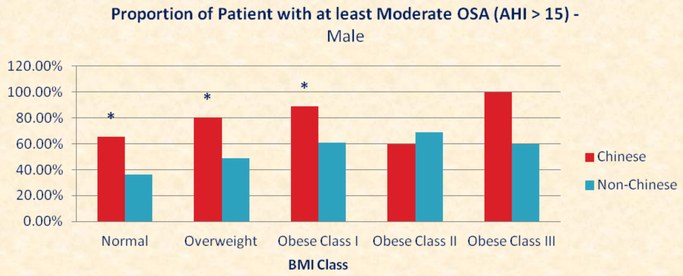
Statistical Analysis: Subgroup analyses after matching for OSA severity; BMI; age and gender were performed between the three groups using SPSS software. The comparison of all measures was performed using repeated measures using t-tests one tail method. All data analyses were performed using the statistical package, IBM SPSS for Windows version 19. The values are all expressed as means +/- standard deviation. A p-value of <.05 was taken as statistical significant (table and graph mark *as significant).

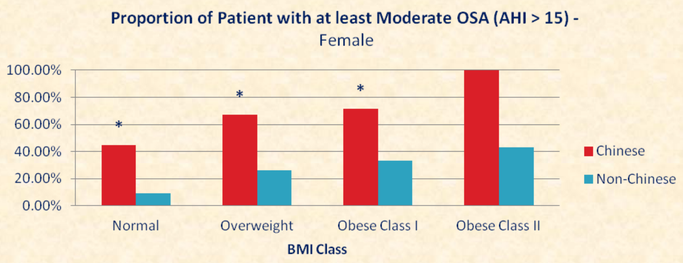
RESULTS

There is a significant positive correlation between BMI and severity of OSA in all three groups studied. However, a significant higher prevalence of OSA among Chinese and South Asian patients compared to non-Asian was observed. Furthermore, the positive effect of BMI on AHI is much more profound in the Chinese group (BMI coefficient of 2.06), followed by South Asian group (coefficient of 1.73), with the least impact observed in the non-Asian group (coefficient of 0.83). The effect of BMI on severity of OSA is much more profound in Chinese female. At normal BMI, the average AHI of Chinese group (AHI of 32) is 1.78 times that of South Asian and non-Asian (AHI of 18 and 19 respectively).

Comparison of Prevalence of Moderate to Severe OSA in each BMI Class

between Chinese and non-Chinese Populations





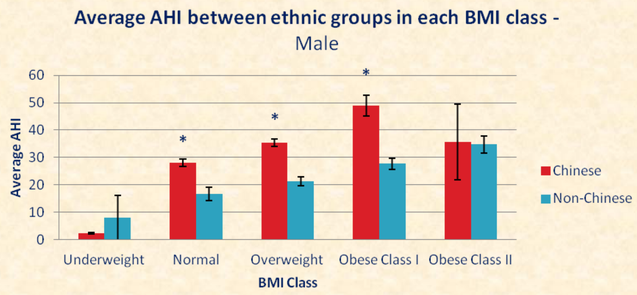
Highlight:

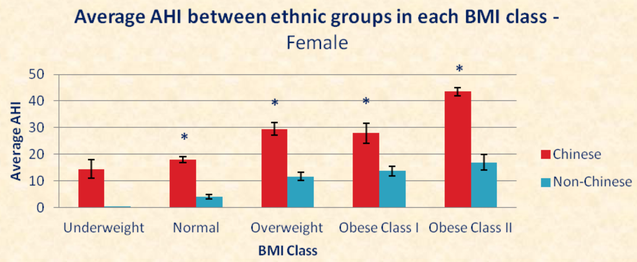
- In each obesity class, a greater proportion of Chinese have at least moderate to severe degree of OSA than non-Chinese

RESULTS

Comparison of Average AHI and BMI Class

between Chinese and non-Chinese Populations



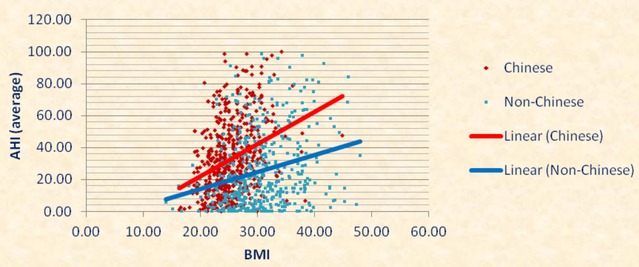


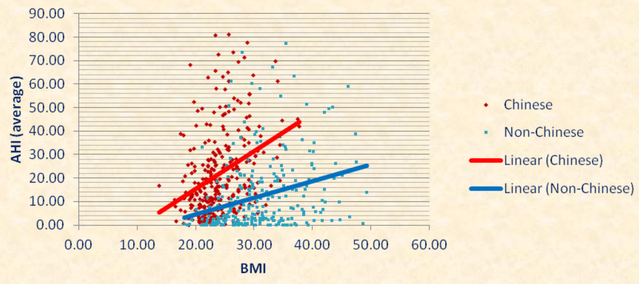
Highlight:

- In all BMI classes, AHI is significantly higher in Chinese than non-Chinese in both male and female groups, however the differences is much more pronounced in Chinese females
- Most Chinese patients have at least moderate degree of OSA and significantly higher degree of AHI increment is observed with increasing BMI when compared to the non-Chinese group
- Majority of non-Chinese females have mild to mild moderate degree of OSA
- Some Chinese females who are underweight have mild moderate degree of OSA

Correlation of OSA & BMI

between Chinese and non-Chinese Populations



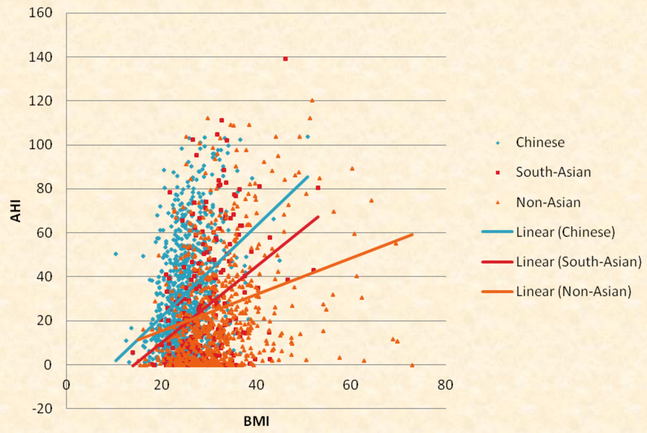


Highlight:

- BMI is positively correlated with AHI. Regression analysis shows a greater increase in AHI for every increase in BMI in Chinese populations.
- *Pearson product-moment correlation used to test for significance and linear regression.*

Comparison of BMI & AHI

between Chinese, South Asian and non-Asian Populations



Group	Sample size	r^2	BMI coefficient	ANOVA Statistic
Chinese	900	0.129	2.065	F(1,899) = 133.28, p < 0.001
South-Asian	259	0.128	1.739	F(1,258) = 37.892, p < 0.001
Non-Asian	629	0.072	0.830	F(1,628) = 48.395, p < 0.001
Overall	1788			F(3,1784) = 80.513, p < 0.001

CONCLUSION

Upper airway anatomy and obesity are two important factors in determining severity of OSA. While Chinese and Asian patients tend to be less obese compared to the non-Asian populations, the high prevalence of OSA in these ethnic groups is often due to small and narrow upper airway. Results from this study suggest that Chinese and South Asian have higher prevalence of OSA compare to non-Asian. However, obesity, as measured by BMI, has a much more profound effect on OSA severity in these ethnic groups particularly Chinese female. This study highlights the significant additional risk of obesity on OSA and the need to manage obesity aggressively in these ethnic groups. Furthermore, modification of risk assessment criteria for OSA, such as the effect of BMI and more detailed upper airway assessment would be particularly important as part of management in Chinese and South Asians.

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