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An Evaluation of neck circumference with the pulmonary functional examination in obese individuals

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Abstract

Neck circumference is associated with various diseases. Obesity is nowadays becoming a serious health problem especially in the developed and developing countries. Overweight and obesity mainly include abnormal or excessive fat accumulation that may impair health. Neck circumference is a simple and time saving screening measure that can be used to identify overweight's.

Keywords: Overweight, Obesity, Adiposity, Pulmonary

Introduction

Obesity is the most vulnerable and annoying health issue nowadays leading to major health issues. Adult obesity has become a major risk factor leading to many dreadful diseases. But it is a lifestyle disease which is preventable if treated in a disciplined manner.

The outbreak of obesity presents a major dispute between the health and disease all over the world throughout their life, influenced by growth in economy, urbanization, sedentary lifestyle, and transition of nutritional status from healthy homemade foods to junk and processed foods with high calorie diets. As per WHO (World Health Organisation) body mass index ≥ 25 is considered as overweight and ≥ 30 as obese. BMI is considered as a simplest index of obesity. Imbalance between the calories overwhelmed and disbursed is the basic cause of becoming obese. Neck circumference has become apparently an easy, original, and discrete measuring index of upper part of the body. It is used to differentiate the pattern of obesity among the people. Many studies have shown NC as a rational for measuring the abnormal metabolic activity as its correlation is well with the body measures like body mass index, waist circumference and waist hip ratio. The cut-off values changes based on the difference in gender, age and ethnicity.

Pulmonary function tests are used as a prime tool in investigating and monitoring the patients with respiratory pathology. The patency of large and small airways, arrangement of the pulmonary parenchyma and the size and integrity of the pulmonary capillary bed can be found with the help of the pulmonary function tests. Even though they are not considered as the diagnostic

procedure they provide a lead for the diagnosis in various respiratory diseases. Based on the test results we get a clue for the type of respiratory disease to be treated.

Materials and Methods

In Department of Medicine conducted a cross sectional study with 250 subjects of age group 20-60 including both male and female. We ensured that all of them who took part in the study were healthy subjects without any known health issues. A detailed history was taken to rule out any family history or past history of medications for chronic respiratory illness. History of alcoholism and smoking was taken.

The anthropometric measurements like Height, weight, NC of subjects was taken. The height was calculated by standing erect in a stadiometer. The weight was calculated using a digital weighing scale. Neck circumference was calibrated by asking the subject to stand straight without any bending at the level of the thyroid cartilage. Used Koko spirometry to assess the pulmonary function of the individual. Calibration of the apparatus was done with a 3 lpiston before starting the test. Making the Subject to sit straight in a relaxed position and then to take deep breath and then asked to blow into the mouthpiece of the spirometer without any break for 6 seconds and then take a deep inspiration till the curve was obtained.

Results

Neck circumference correlates negatively well with all the values with the p-value <0.05. (table 2) From the correlation coefficient (r value= 0.1-0.3) value it is seen that there is a good negative correlation i.e. as the neck circumference increases there is a decline in the PFT values which means that in this study obese subjects with neck circumference more than 32cm (female) and 35cm(men) has compromised lung function.

Table 1: Clinical aspects of class III obese non-OSAS and OSAS patients with Spiro metric values.

	Non-OSAS patients (N = 10)	OSAS patients (N = 35)	P value
Male:Female	0:100%	40:60%	NS*
Age (years)	53.1 ± 9.1	44.6 ± 10.6	0.02**
BMI (kg/m^2)	47.8 ± 6	49.8 ± 6.9	NS*
Neck circumference (cm)	39.5 ± 2.0	44.6 ± 5.2	0.004**

*P value < 0.004.

Neck circumference and the Spiro metric values are compared in this table. It shows that FVC values are more significant compared to other two values.

Table 2: Correlation between the Neck circumference and the Spiro metric values

Correlations					
			FEV_1 (Litres)	FVC (Litres)	FEV_1/FVC
Pearson correlation	NC (cm)	Correlation Coefficient[R]	-.083	-.129*	-.030
		Sig. (2-tailed)[P-VALUE]	.0150	.026	.051
		N	299	299	299
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

NC and the Spiro metric values are correlated well in this table.

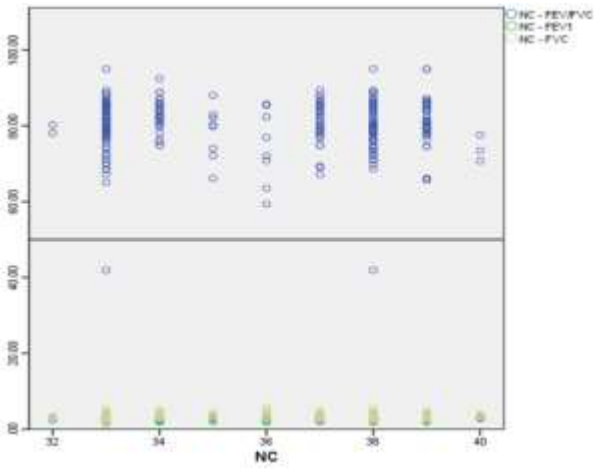

Figure 1: Scatter plot of Neck circumference with Spiro metric values

This picture shows the negative correlation between NC and all the FEV1, FVC, FEV1/FVC.

Discussion

This cross-sectional study was done to evaluate the better indicator of obesity and how effectively it correlates with the PFT values of the obese individual. A total of 300 subjects were taken into this study (140 were female and 160 were male). The age group varied from 20-40 years whereas the major group falls under the age group of 20-25years (students).

Anthropometric measures like height, weight, Neck circumference, Bp, HR were measured.

Bernard et al study found that neck circumference is positively associated with traditional anthropometric measures of obesity and also related well with cardiovascular risk.

To assess overweight and obesity the Neck circumference is used as an alternate screening tool as it is authentic, effortless, rapid and admissible. This study was done in Iranian population to study the correlation between neck circumference and visceral obesity.

A similar study was done by Mendane saka indicating that there is great association between Neck circumference and BMI, WHR which lead to great changes in their health in both genders.

Based on the Neck circumference the study subjects are classified as overweight and obese. The p value is found to be <0.05. The increase in Neck circumference shows statistical decrease in PFT values which shows that there is decline in the pulmonary function with rise in NC irrespective of gender. (Table 1).

There is a significant negative linear correlation (which means that as the Neck circumference increases the PFT values decreases) between the neck circumference and the spirometric values with p value less than 0.05 and R is -0.083, -0.129 and -0.030. Decline in the pulmonary function with the pulmonary function test values has been reflected in this table. (Table 2).

Neck circumference had a significant negative correlation {i.e. one variable (Neck circumference) increases and the other variable (Spirometric variables) decreases} with the pulmonary function test values like FEV1, FVC, and FEV1/FVC. Negative linear correlation between all the variables is shown clearly in the scatter plot diagram as groups. The r-square value for the above graph is 0.1i.e. 0.1% of variability in neck circumference is explained by FVC, FEV1, FEV / FVC.

Conclusion

This study observed that Neck circumference i.e. (increase in the circumference of the neck) highly correlates with the reduction in the pulmonary function. i.e. a good negative correlation with the pulmonary function test values which is statistically significant. Finally, we concluded that NC could be a better indicator of obesity while analysing the pulmonary function.

References

1. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. World Health Organ Tech Rep Ser 2000; 894:1–253.
2. Chen Y, Breithaupt K, Muhajarine N. Occurrence of chronic obstructive pulmonary disease among Canadians and sex-related risk factors. J Clin Epidemiol 2000; 53:755-61.
3. Chinn DJ, Cotes JE, Reed JW. Longitudinal effects of change in body mass on measurements of ventilatory capacity. Thorax 1996; 51:699–704.
4. Chen Y, Horne SL, Dosman JA. Body weight and weight gain related to pulmonary function decline in adults: a six year follow up study. Thorax1993; 48:375– 80.

5. Dockery DW, Ware JH, Ferris BG Jr, et al. Distribution of forced expiratory volume in one second and forced vital capacity in healthy, white, adult never-smokers in six U.S. cities. Am Rev Respir Dis 1985;131: 511-20.
6. Carey IM, Cook DG, Strachan DP. The effects of adiposity and weight change on forced expiratory volume decline in a longitudinal study of adults. Int J Obes Relat Metab Disord 1999; 23:979–85.
7. McKay RT, Levin LS, Lockey JE, et al. Weight change and lung function: implications for workplace surveillance studies. J Occup Environ Med 1999;41:596–604
8. Dontas AS, Jacobs DR Jr, Corcondilas A, Keys A, Hannan P. Longitudinal versus cross-sectional vital capacity changes and affecting factors. J Gerontol 1984;39:430.
9. Liubov (Louba) Ben-Noun,Ezra Sohar and Arie Laor ..Neck circumference as a simple measure for identifying overweight and obese patients. Obesity Research (2001) 9, 470–477
10. Helena Santana, Elena Zoico, Emanuela Turcato, Paolo Tosoni, Luisa Bissoli, Mario Olivieri, Ottavio Bosello and Mauro Zamboni.Relation between body circumference, fat distribution and lung function in man.American Journal of Clinical Nutrition, Vol. 73, No. 4, 827-831, April 2001.
11. Anne-Marie Gabrielsen & May Brit Lund & Johny Kongerud & Karl Erik Viken & Jo Røislien & Jøran Hjelmesæth The Relationship Between Anthropometric Measures, Blood Gases, and Lung Function in Morbidly Obese White Subjects (DOI 10.1007/s11695-010-0306-9, 2010).
12. Marize Jácome Gonçalves, Sheyla Thatiane Santos do Lago, Eudes de Paiva Godoy, Guilherme Augusto de Freitas Fregonezi, and Selma Sousa Bruno. Influence of Neck Circumference on Respiratory Endurance and Muscle Strength in the Morbidly Obese. OBES SURG (2011) 21: 1250–1256
13. S Lioret1, B Maire2, J-L Volatier1 and M-A Charles Child overweight in France and its relationship with physical activity, sedentary behaviour and socioeconomic status. European Journal of Clinical Nutrition (2007) 61, 509–516.
14. Stanley .P. Brown,Wayne C Miller, Jane M.Eason, Exercise physiology- basis of human movement in health and disease,2007.
15. Altan Onat et al , Neck circumference as a measure of central obesity: Associations with metabolic syndrome and obstructive sleep apnea syndrome beyond waist circumference .Journal of Clinical Nutrition Volume 28, Issue 1 , Pages 46-51, February 2009.