
RESPIRATORY HEALTH STATUS AND ITS CORRELATION TO ANTHROPOMETRIC PARAMETERS OF UNDERGRADUATE STUDENTS OF IMO STATE UNIVERSITY, P.M.B 2000, OWERRI, IMO STATE.

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Abstract: Respiratory health status and its correlation to anthropometric parameters - Height, body weight, age and body mass index (BMI) of undergraduate students of Imo State University, Owerri, were studied using Wright Peak Expiratory Flow Meter. Out of 906 questionnaires administered to the students for the study, 444 were completed and returned. This number constitutes the study group (test). 88 out of 444 students live in industrial areas of Owerri, 29 students smoke cigarettes and 68 students had previous history of cough. The study lasted for 3months and Peak Expiratory Flow Rate (PEFR) and its correlation to anthropometric parameters among the students were established. Results obtained showed that PEFR for male students were significantly higher than female students ($P<0.005$). It also showed that PEFR for male and female students living in industrial areas of Owerri were significantly lower than their counterparts living in non industrial areas of Owerri ($P<0.05$). PEFR for smokers were significantly reduced than non smokers ($P<0.05$). On the anthropometric parameters, it was observed that PEFR increased linearly with increase in age from 16-29 years and declined from 30-40 years. PEFR was also observed to significantly increase with increase in height and body weight. Students with previous history of cough have their PEFR reduced compared with those free from cough ($P<0.05$). However, PEFR was unaffected by body mass index (BMI) in the present study. It is therefore concluded that respiratory health status and its correlation to anthropometric parameters of Imo State University undergraduate students were affected by height, age, sex and body weight with maximum respiratory functional activities between 22-29years.

Keywords: Respiratory, Health status, peak expiratory flow rate, Imo State University students.

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INTRODUCTION

Respiratory health status and its correlation to anthropometric parameters of undergraduate students of Imo State University, Owerri, were studied using Wright Peak Flow Meter. This instrument is used to monitor respiratory functions in health and disease conditions. It measures the maximum rate at which air can be expired after a deep inspiration, Sembulingam K and Sembulingam P (2010). Maduka et al (2009), Osim et al (1992,1998) and Okwari et al (2005) reported obstructive and restrictive air way diseases using this instrument in occupational exposed workers. Fisher et al (2003), Gautrin et al (1994) and Hussian et al (2007) reported obstructive and restrictive air way diseases in cigarette smokers using also this instrument. Out of 906 questionnaires administered to students, 444 (333 males,111 females) were completed and returned. This constitutes the study group (test). Out of this number, 29 students smoke cigarettes, 68 had previous history of cough and 88 live in industrial areas of Owerri. The study lasted for 3 months and was conducted in the morning between 9am and 12noon. Hussian et al (2007) and Gayol et al (2008), Richa et al (2010) reported significant variations in PEFr between morning and evening. This study was carried out in sitting position. McCoy et al (2010) and Vaswani et al (2005) reported that sitting or standing position did not significantly affect PEFr . There is paucity of reports regarding respiratory health status of undergraduate students of Imo State University, Owerri and its correlation to anthropometric parameters. This study therefore is aimed at studying the respiratory health status and its correlation to anthropometric parameters among the students of Imo State University, Owerri, Imo State, Nigeria.

MATERIALS AND METHODS

Materials

Materials used in this study include Wright Peak Expiratory Flow Meter, weighing balance, tape rule, cotton wool, wooden back seat, methylated spirit, nose clip, questionnaires designed to include, sex, age, residential address, smoker/non smoker, tribe, nationality, history of cough, cigarettes smoker/non smoker, if smoker number of sticks smoked a day, past medical history, drug history, surgical history.

Methods

906 questionnaire administered to the students only 444 were completed and returned. Out of this 444 that were returned, 333 were males and 111 were females. 88 (63 males, 25 females) out of 444 live in industrial areas

of Owerri, 29 (25males,4 females) students smoke cigarettes and 68 (42 males,26 females) have previous history of cough. Their informed consents were obtained. Their heights and weights were obtained using tape rule and weighing balance. Body mass index (BMI) was calculated using this formula $\text{weight(kg)}/\text{height(m}^2\text{)}$. Subjects were seated on a wooden back chair, educated about the study and the instrument (Peak Expiratory Flow Meter).Each subject was asked to maximally inhale and maximally exhale air into the Peak Expiratory Flow Meter which registered the amount of air exhaled in L/min with the nose clipped with nose clip. Each subject was made to perform this procedure three times with minimum interval of five minutes between each exercise. The mean reading was then obtained. The instrument was usually cleaned with cotton swab soaked in methylated spirit before using it for another student.

Statistical Analysis

SPSS 14 statistical software was used for data analysis. Student t-test was used to compare two mean values, $P < 0.05$ is taken as significant.

Results

Table1 showed frequency of age distribution for undergraduate students in this study.

Age (Years]	Mid-point (x)	Frequency(F)	FX	$X-\bar{X}$	$(X-\bar{X})^2$	$F(X-\bar{X})^2$
16-20	18	187	3366	3.5	12.5	229.75
21-25	23	212	4876	1.5	2.25	477
26-30	28	40	1120	6.5	42.25	1690
31-35	33	4	132	11.5	132.25	529
36-40	38	1	38	16.5	272.25	272.25
Total	140	444	9532	32.5	461.25	5100

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Table 2 showed mean height, weight, BMI and PEFR in male and female students.

	Male (n=333)	Female (n=111)	P-value
Height (m)	1.72 ± 0.01	1.66 ± 0.01	NS
Weight (kg)	71.11 ± 0.14	62.67 ± 0.48	*
BMI (kg/m ²)	21.35 ± 0.04	22.72 ± 0.14	NS
PEFR L/min.	579 ± 1.13	466.01 ± 3.29	*

*=P<0.05 when compared with control. NS= not statistically significant.

Table 3 showed mean height, weight, BMI and PEFR of male and female students that reside in industrial areas.

	Male student (n=63)	Female student (n=25)	P-value
Height (m)	1.70 ± 0.01	1.64 ± 0.07	NS
Body Weight (kg)	65.65 ± 0.01	62.04 ± 1.76	*
BMI (kg/m ²)	22.3 ± 0.15	22.91 ± 0.26	NS
PEFR	514.95 ± 3.97	462.6 ± 10.32	*

*=P<0.05 when compared with control. NS= not statistically significant.

Table 4 showed mean height, weight, BMI and PEFR of male and female students that smoke cigarettes.

	Male student (n=25)	Female student (n=4)	P-value
Height (m)	1.80 ± 0.07	1.71 ± 0.02	NS
Weight (kg)	68.32 ± 0.08	67.25 ± 2.75	*
BMI (kg/m ²)	23.3 ± 0.31	24.03 ± 1.3	NS
PEFR (l/min)	474.2 ± 9.0	373.75 ± 17	*

*=P<0.05 when compared with control. NS= not statistically significant.

Table 5 showed mean height, weight, BMI and PEFR of male and female students that have respiratory symptoms.

	Male student (n =42)	Female student (n=26)	P-value
Height (m)	1.86 ± 0.01	1.77 ± 0.01	NS
Weight (kg)	66.8 ± 0.03	61.52 ± 1.14	*
BMI (kg/m ²)	22.76 ± 3.15	22.49 ± 0.34	NS
PEFR (l/min)	494.54 ± 11.92	485.6 ± 10.59	*

*=P<0.05 when compared with control.

NS= not statistically significant.

Table 6 showed mean PEFR, height, body weight and BMI of all the male and female students according to their various ages.

Years Age	Male students				Female students			
	Height (m)	Weight kg	BMI (kg/M2)	PEFR (L/min) for male	Height (m)	Weight (kg)	BMI kg/m2	PEFER
16	1.7±0.06	67.3±1.0	22.3±1.53	416.67±20.0	1.6±0.01	81±0.5	21.66±.96	402.5±2.5
17	1.55±0.04	65.29±3.28	22.2±0.53	416.0±12.14	1.64±0.02	61.8±4.33	22.88±0.86	477.5±17.5
18	1.69±0.81	63.16±1.8	22.2±0.53	452.08±12.6	1.63±0.03	54.0±6.75	21.38±0.22	421.75
19	1.66±0.01	64.14±1.10	23.33±0.44	467.72±12.7	1.65±0.02	54±1.73	21.45±0.5	421.4
20	1.69±0.01	63.29±0.6	22.03±0.22	488.58±14.8	1.63±0.02	62.28±1.5	23.39±0.5	457.78±19.0
21	1.7±0.01	66.3±0.95	22.5±0.95	459.5±8.0	1.69±.4	62.2±4.83	21.9±.92	429.17±41.8
22	1.7±0.01	65.85±0.58	22.37±.21	520.5±10.4	1.65±0.1	63.35±1.5	22.23±0.5	472.1±11.8
23	1.7±0.01	68.9±1.0	23.5±0.31	527.24±8.3	1.71±0.02	67.4±2.3	23.32±0.7	534±28.6
24	1.73±0.01	67.9±.69	22.68±0.2	522.56±7.8	1.68±0.06	68.33±4.3	24.28±1.8	485±24.1
25	1.69±0.04	69.7±3.0	24.54±1.1	544.7±2.5	1.7±0.06	62.16±5.2	24.5±0.6	573.3±3.8
26	1.7±0.02	67.9±0.67	23.1±0.54	517.6±2.0	1.7±0.02	69.2±2.4	23.3±0.7	498±55.1
27	1.75±0.02	65.7±2.6	21.6±0.74	538.8±2.3	1.68±0.02	72.5±6.8	25.9±1.4	505±45.1
28	1.71±0.02	76.5±5.5	26.1±1.85	546±1.7	1.61±0.00	70.0±0.0	24.4±0.01	560±0.00
29	1.84±0.00	58.0±0.00	21.6±0.00	560±0.00	1.79±0.00	72.0±0.0	21.6±0.00	415±0.00
30	1.61±0.03	67.0±0.6	23.8±1.6	468.3±5.8	1.7±0.00	64.0±0.0	22.1±0.00	490±0.00
31-40	1.75±0.03	86.25±3.5	24.7±0.93	404.7±5.60				

DISCUSSION

Respiratory health status and its correlation to anthropometric parameters of undergraduate students of Imo State University, Owerri were studied using Peak Expiratory Flow Meter. Out of 906 questionnaires administered to the students, 444 were completed and returned. This constitutes the study group(test) Out of this 444 students,333 students were males and 111 students were females,29 students smoke cigarettes,68 had previous history of cough and 88 live in industrial areas of Owerri. The study lasted for 3 months and was carried out in the morning. Results obtained showed that mean value of PEFR for male students (579.0±1.13L/min) was significantly higher than the female students (466.01±3.29L/min),(P<0.001).It was also observed that PEFR for male students (514.95±3.92L/min) and female students (462.6±.32L/min) living in industrial areas of Owerri was significantly lower than their counterparts living in non-industrial areas (P<0.05). This agreed with the work of Srinivas et al(2007) who reported that people living near industries have decreased PEFR compared with people not living near industries. Those that smoke cigarettes have their PEFR reduced to 474.2±1.0 L/min for males and 373.75±1.7 L/min for females

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compared to non-smokers ($P < 0.05$). This agreed with the work of Hussain et al (2007) and Ukoli et al (2002) who observed that PEFr of smokers was reduced significantly when compared with those of non-smokers ($P < 0.05$). This work was carried out in sitting position and between 9am and 12 noon. McCoy et al (2010) and Vaswani et al (2005) observed that PEFr is not affected by positions. With regards to time, variations in PEFr could not be established since the study was carried out only in the morning as against Hussain et al (2007), Gayol et al (2008) and Richa et al (2010) who reported significant variations in PEFr between morning and evening in their works. On the anthropometric parameters, PEFr was observed to increase linearly with age from 16-29 years and declined from 30-40 years with highest respiratory functional activity at 22-29 years. PEFr was also observed to increase with increase in height and body weight. This agreed with the work of Gupta et al (2008) who reported increase in PEFr with increase in age, height and body weight. PEFr was unaffected by BMI in this present work since we did not observe obese subject. However, Mukhtar et al (2008) reported that females have increased BMI compared to male subjects. It is therefore concluded that PEFr is significantly higher in males than females, affected linearly by height, age, sex, and body weight with maximal respiratory functional activity between 22-29 years.

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