

# ASSESS THE RELATIONSHIP BETWEEN VO<sub>2</sub> MAX AND SELECTED CLINICAL PROFILE AMONG NURSING STUDENTS

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## Abstract

**Background** - Cardiovascular endurance or aerobic fitness have an important role in cardiovascular diseases, which is the prime cause of mortality in India. Cardiovascular assessment is the good choice to determine these physiological functions. VO<sub>2</sub> max is one of the best method among them.

**Aim**- The aim of the study is to assess the relation between VO<sub>2</sub> max and selected clinical profile among Nursing Students.

**Method**- Quantitative research approach was used in this study and exploratory research design was adopted for this study, 150 BSc Nursing students were selected for this study and correlation between cardio respiratory determinants and demographic variables was analyzed using inferential and non-inferential statistical method. The association between the variables were assessed by using Chi square and fisher exact significance test and correlation was assessed by Kendall's Tau C.

**Result**- Our study result projects a clear negative correlation of skin fold test with VO<sub>2</sub> Max (-0.070\*) and no other Clinical profile was shown association with VO<sub>2</sub> Max.

**Conclusion**: The younger population is often unaware about the cardiovascular risks and may fail to take the appropriate actions that could save their lives.

**Key words**- Cardiovascular endurance, VO<sub>2</sub> max, Clinical Profile, Nursing, students.

## INTRODUCTION

Cardiovascular endurance or aerobic fitness have an important role in cardiovascular diseases, which is the prime cause of mortality in India<sup>1</sup>. Cardiovascular endurance is the body's capability to deliver oxygen to the muscles and which will help carry out the activities<sup>2</sup>. Cardiovascular assessment is the good choice to determine these physiological functions<sup>3</sup>. There are numerous methods to evaluating aerobic fitness of individuals. VO<sub>2</sub> max is one of the best method among them<sup>4</sup>.

## OBJECTIVES

1. To assess influencing factors of cardio-respiratory fitness among nursing students.
2. To determine association and correlation of cardio-respiratory determinant (VO<sub>2</sub> max) with selected demographic variables.
3. To determine association and correlation of cardio-respiratory determinant (VO<sub>2</sub> max) with selected clinical profile.

## MATERIAL AND METHOD

The descriptive exploratory study was adopted to evaluate the influencing factors of cardio-respiratory fitness of the nursing students and explored the relationship between VO<sub>2</sub> max and selected clinical profile among Nursing Students. The present study was approved by ethical committee of King George's Medical University, Lucknow, Uttar Pradesh, India (ref. code: 84th CCMIIID/PI). 150 BSc Nursing students aged 18-25 years were enrolled in these studies, who were studying in KGMU College of nursing Lucknow.

Inclusion criteria: nursing student who were in between the aged 18-25 yrs. having no history of cardio-vascular illness.

Exclusion criteria: Participant who had history if any pathology related to cardio-vascular system. Participant who had history of Asthma and who had health issues during the time of enrolment like fever, dysmenorrhea, cough, respiratory infection.

A Pro Bodyline treadmill was used for the exercise testing which was conducted with the Modified Bruce Protocol.

**Pre-test phase**: I. pre-exercise HR was measured and recorded. II. The submaximal targeted exercise HR was estimated using the formula for estimating MHR [(208-(0.7x age) x85%]. The values were recorded on the form. The purpose of treadmill was described. Each of the stages were as per tolerance with a goal to achieve steady-state

HR (HR<sub>ss</sub>) at each workload as long as HR<sub>ss</sub> has been achieved, the speed & incline was increased at the end of three-minute interval.

**Test administration:** **I.** The treadmill tests were started at 1.7 mph & 10% incline. The maximal HR were recorded. **II.** The test was terminated until the subject's HR response exceeds 85% of MHR the participant's responses were exceeded 115 bpm for two stages upon completion of test. **III.** The nursing students were cool down on the treadmill, walking with moderate speed until breathing returns to normal & HR drops below 100 bpm. The point at which exercise testing was stopped, when the desired heart rate was reached.

**Post test phase:** The measurement of VO<sub>2</sub> Max was done post completion of exercise. The formula used for calculating VO<sub>2</sub> Max was  $HR_{max}/HR_{rest} \times 15.3\text{ml/kg/min}$

The participants were then analyzed under the following category:

For Females: Values from  $\leq 23.6$  to 28.9 were considered poor category, 29 to 36.9 were in good category and values from 37 to 41 came under excellent category.

For Males: Values from  $< 33$  to 36.4 were considered to be in poor category, 36.5 to 46.4 were in good category and values from 46.5 to  $> 52.4$  came under excellent category.

### DATA COLLECTION AND ANALYSIS

A formal order was obtained from the ethical permission from the ethical committee of KGMU Lucknow. Data collection was done within the given period with the help of pre decided tool and tabulated by the inferential and non-inferential statistics. The association between the variables were assessed by using Chi square and fisher exact significance test and correlation was assessed by using Kendall's Tau C.

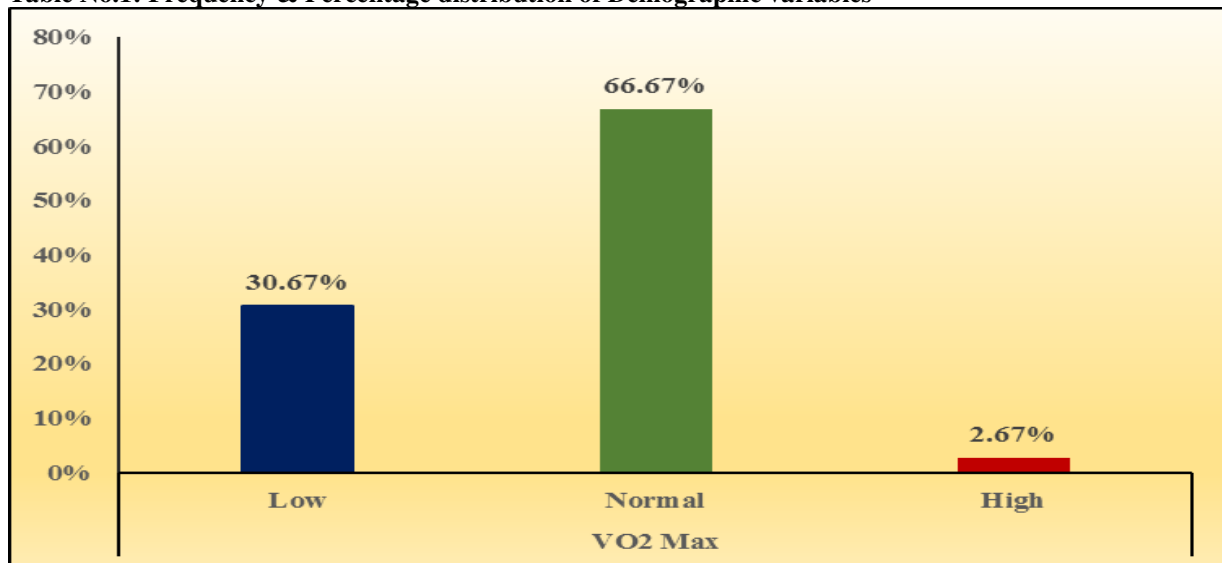
### RESULTS AND DISCUSSION

#### Section -1 Description of sample characteristics

Variable	Category	Frequency	Percent
Age	18-19	24.00	16.00
	20-21	45.00	30.00
	22-23	31.00	20.67
	24-25	50.00	33.33
Gender	Male	51.00	34.00
	Female	99.00	66.00
Marital Status	Married	1.00	0.67
	Unmarried	149.00	99.33
Educational status	Pursuing B.Sc. Nursing	150.00	100.00
Financial dependency	Dependent	150.00	100.00
Place of stay	Rural	40.00	26.67
	Urban	110.00	73.33
Family income	>5000	14.00	9.33
	5001-10000	23.00	15.33
	10001-20000	29.00	19.33
	20001-25000	39.00	26.00
	>25000	45.00	30.00
Diet	Veg	83.00	55.33
	Non-Veg	67.00	44.67
Freq. OF Fast Food	0-2	87.00	58.00

	3 or above	63.00	42.00
<b>Freq. OF Fast</b>	0-2	147.00	98.00
	3 or above	3.00	2.00
<b>Freq. OF Feast</b>	0-2	139.00	92.67
	3 or above	11.00	7.33
<b>Drug indulgence</b>	No	143.00	95.33
	Other	6.00	4.00
	Over counter	1.00	0.67
<b>Physical Exercise</b>	Not at all	25.00	16.67
	Occasionally	66.00	44.00
	Once a week	17.00	11.33
	Twice week	16.00	10.67
	3 time week	26.00	17.33
<b>VO<sub>2</sub> Max</b>	Low	46.00	30.67
	Normal	100.00	66.67
	High	4.00	2.67

**Table No.1: Frequency & Percentage distribution of Demographic variables**



**Fig No:1: Frequency & Percentage distribution of Demographic variables according to VO<sub>2</sub> Max**

On the view of demographic variables, most of the individuals are of age group 24-25 (33.33%), maximum are females (66%). All the individuals except one (married) are unmarried. All of them are Pursuing B.Sc. Nursing. All of them are financially dependent. Maximum of them (73%) stays in urban area. Family income of most of them is >25000 (30%). Most of them are vegetarians (55%). Most of these consume fast food between 0 to two times in a week (58%).majority of the candidates are having the habit of 2 time fast per week (98%) and also has a habit of taking feast in a frequency of 2 time per week (92%). Maximum individuals are not having drug indulgence (95%). Maximum does physical exercise occasionally (44%).For most of the individuals the tolerated time in TMT is normal (79%) Heart Rate for most of the individuals is normal (68%). The VO<sub>2</sub> Max is Normal for most of the individuals (66.67%).

**Section -2****Section -2: Association and correlation of VO<sub>2</sub> Max with selected demographic variables**

Variable	Category	VO <sub>2</sub> Max			Chi Square (p-Value)	Fisher's Exact Significance	Correlation (Kendall's tau c)
		Low	Normal	High			
Age	18-19	9	14	1	7.148 (0.307)	0.237	-0.060 (0.386)
	20-21	11	32	2			
	22-23	6	25	0			
	24-25	20	29	1			
Gender	Male	18	32	1	0.862 (0.650)	0.695	0.068 (0.359)
	Female	28	68	3			
Marital Status	Married	0	1	0	0.503 (0.777)	>0.999	-0.007 (0.318)
	Unmarried	46	99	4			
Place of stay	Rural	9	31	0	3.601 (0.165)	0.187	-0.065 (0.302)
	Urban	37	69	4			
Family income	>5000	3	11	0	11.682 (0.166)	0.177	0.077 (0.241)
	5001-10000	11	10	2			
	10001-20000	10	19	0			
	20001-25000	11	28	0			
	>25000	11	32	2			
Diet	Veg	21	59	3	2.914 (0.233)	0.243	-0.130 (0.089)
	Non-Veg	25	41	1			
Freq. OF Fast Food	0-2	31	54	2	2.427 (0.297)	0.305	0.118 (0.114)
	3 or above	15	46	2			
Freq. OF Fast	0-2	46	97	4	1.531 (0.465)	0.587	0.022 (0.084)
	3 or above	0	3	0			
Freq. OF Feast	0-2	42	93	4	0.459 (0.795)	0.810	-0.022 (0.590)
	3 or above	4	7	0			

<b>Drug indulgence</b>	No	45	94	4	1.351 0.853	0.811	0.020 (0.303)
	Other	1	5	0			
	Over counter	0	1	0			
<b>Physical Exercise</b>	Not at all	9	16	0	8.790 (0.360)	0.258	0.028 (0.650)
	Occasionally	18	46	2			
	Once a week	6	10	1			
	Twice week	8	7	1			
	3 time week	5	21	0			

**Table No 2 : Association and correlation of VO2 Max with selected demographic variables**

The study result project that there is no demographic variable significantly related with VO2 max. In a similar study by Majid Jalili et al, (2018)<sup>5</sup>, conducted on 349 healthy boys, (12.49 ± 2.72 years). In order to generate VO<sub>2</sub> max prediction equations, the multiple regression analysis was used, the results showed a significant correlation between VO2 Max with selected demographic variables and Six-Minute Walk Test characteristics (R = 0.11-0.723, P < .01).

**Section 3- Association & Correlation VO<sub>2</sub> Max with Selected Clinical Profiles**

Variable	Category	VO2 Max			Chi Square (p-Value)	Fisher's Exact Significance	Correlation (Kendall's tau c)
		Low	Normal	High			
<b>Family cardiac diseases</b>	H/o Yes	11	31	1	0.801 (0.670)	0.762	-0.054 (0.425)
	No	35	69	3			
<b>Family respiratory diseases</b>	H/o Yes	8	19	0	0.957 (0.620)	>0.999	0.006 (0.915)
	No	38	81	4			
<b>Co-morbid illness</b>	Yes	4	7	1	1.737 (0.420)	0.295	-0.004 (0.928)
	No	42	93	3			
<b>History of breathing</b>	Yes	1	5	0	.827 (0.661)	0.716	-0.019 (0.445)
	No	45	95	4			
<b>H/o Cough</b>	Yes	3	2	0	2.141 (0.343)	0.285	0.041 (0.216)
	No	43	98	4			
<b>H.R.</b>	Normal	43	96	4	.652 (0.722)	0.735	-.026 (0.456)
	Abnormal	3	4	0			
<b>B.P.</b>	Normal	38	89	2	5.493 (0.064)	.059	-0.014 (0.824)
	Abnormal	8	11	2			
<b>Auscultation</b>	Normal	43	92	3	1.707	0.425	0.030

<b>Finding</b>	Abnormal	3	8	1	(0.426)		(0.403)
<b>R.R.</b>	Normal	45	98	4	0.089 (0.957)	>0.999	-0.004 (0.866)
	Abnormal	1	2	0			
<b>C.C.</b>	Normal	41	94	3	2.629 (0.269)	0.189	-.022 (0.661)
	Abnormal	5	6	1			
<b>A/P diameter</b>	Normal	45	97	4	0.195 (0.907)	>0.999	0.004 (0.861)
	Abnormal	1	3	0			
<b>transverse diameter</b>	Normal	45	98	4	.089 (0.957)	>0.999	-0.004 (0.866)
	Abnormal	1	2	0			
<b>Lungs Auscultation finding</b>	Normal	43	94	4	0.278 (0.870)	>0.999	-0.011 (0.766)
	Abnormal	3	6	0			
<b>Height</b>	Low	4	16	0	6.466 (0.167)	0.179	-0.058 (0.133)
	Normal	40	84	4			
	High	2	0	0			
<b>Weight</b>	Low	7	21	0	4.314 (0.365)	0.463	-0.067 (0.201)
	Normal	31	70	4			
	High	8	9	0			
<b>BMI</b>	Low	4	22	1	6.291 (0.178)	0.138	-0.138 (0.009)
	Normal	31	65	3			
	High	11	13	0			
<b>MUAC</b>	Low	3	12	0	2.228 (0.694)	0.641	-0.040 (0.260)
	Normal	41	86	4			
	High	2	2	0			
<b>W.C.</b>	Low	26	62	3	8.104 (0.088)	0.103	-0.071 (0.235)
	Normal	14	36	1			
	High	6	2	0			
<b>H.C.</b>	Low	21	56	2	3.327 (0.505)	0.512	-0.083 (0.173)
	Normal	17	35	2			
	High	8	9	0			
<b>Skin Fold Test</b>	Normal	37	94	2	11.884 (0.003)	0.005	-0.070* (0.273)
	Abnormal	9	6	2			

**Table 3- Association & Correlation VO<sub>2</sub> Max With Selected Clinical Profiles**

The study result projects that Skinfold test is significantly associated to the VO<sub>2</sub> Max and it shows a negative correlation with VO<sub>2</sub> Max and no other clinical profiles are showing a relation with VO<sub>2</sub> Max.

In a similar study conducted by Shete N Anjali, et. al (2014)<sup>6</sup>, on VO<sub>2</sub> Max and Body Fat Percentage in Female Athletes. The study was conducted on Twenty-five female athletes at an age group of 17-22years. The study results

depicted, significant higher VO<sub>2</sub> max in female athletes and showed a negative correlation between VO<sub>2</sub> max and body fat percentage. But was not statistically significant.

#### CONCLUSION

The study results projects a clear negative correlation of skin fold test with VO<sub>2</sub> Max. These results statistically proving H<sub>1</sub>, H<sub>2</sub>. That means there is a significant association and correlation of VO<sub>2</sub> max with selected clinical profiles and there is no association and correlation of VO<sub>2</sub> Max with demographic variables. However, there is a scope that if sample size increases some or all of the selected clinical profile findings may come out to be significantly related with VO<sub>2</sub> Max.

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#### CONFLICT OF INTEREST

Authors declare no conflict of interest related to this study.

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