



"Assess the relation between HRR and Selected Clinical Profiles among Nursing Students"

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Introduction:

Cardio respiratory fitness is having a major role in reduction of incidence cardiovascular disorders among the population of India. HRR is one of the prime factor which will act as indicator for cardiovascular fitness, HRR is the rate of heart rate drops after the exercise, commonly measure after 1 or 2 minutes after peak exercise The purpose of the study is to identify relation between HRR and Selected clinical profiles among young nursing students.

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Method: Quantitative exploratory research design was adopted for this study. 150 BSc Nursing students from KGMU College of Nursing were selected for this study. Association and correlation between cardio-repertory determinant (HRR) and demographic variables were analysed using inferential and non-inferential statistical method. The association between the variables was assessed by using Chi square and fisher exact significance test and correlation was assessed by Kendall's Tau C.

Results : Heart recovery rate time is associated with the Lungs Auscultation finding (6.633) and correlation suggests that Heart recovery rate is moderately positively related with Lungs Auscultation finding (0.348)

Conclusion : Lung Auscultation finding is a good indicator for cardio respiratory fitness as per the study

Key words: Cardio-respiratory fitness, Heart rate recovery (HRR), Biochemical Parameters, Nursing, students

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Introduction

Cardio respiratory fitness (CRF) refers to the ability of the circulatory and respiratory system to supply oxygen to skeletal muscles during sustained physical activity. Cardio-respiratory fitness have a major role in reduction of incidence of cardiovascular disorders and mortality among the population of India¹

Recent data have shown that the cause of large national health burden of chronic

diseases is due to behavioural dimensions such as physical inactivity and low levels of cardio-respiratory fitness². The identified modifiable risk factors that can affect cardio respiratory fitness included blood pressure and fasting blood levels of glucose, triglycerides, total cholesterol and high-density lipoprotein and cholesterol³. HRR is defined as the return of heart rate to baseline following a stressful period⁴. Because the combination of parasympathetic and sympathetic activity is related to the reduction



on heart rate after exercise^{4,5}, it represents the autonomic nervous system's balance. HRR is one of the prime factors which act as indicator for cardio-respiratory fitness^{4,5}. Lower HRR reading after maximal and submaximal exercise⁶ indicate an imbalance in the autonomic nervous system⁵. This scenario is linked to a higher risk of cardiovascular and cardio metabolic event⁷, as well as chronic illness mortality⁵. HRR can be influenced by the body's cardiac biochemical parameters¹.

The possible tracking of cardiovascular disease risk factors from childhood to adulthood makes it important to increase our understanding of the complex relationships between physical activity, cardio-respiratory fitness and cardiovascular risk factors early in life. Furthermore, since clustering of risk factors is evident in childhood and persists into young adulthood the presence of multiple risk factors could indicate the acceleration of atherosclerosis in such population⁸⁻¹¹. Researcher has noticed high incidence of mortality due to cardiovascular disorder among young adults¹ which can be prevented by proper screening techniques. Although a specific risk factor influences the risk that a person will have cardiovascular disease, risk factors tend to aggregate and usually appear in combination¹².

HRR helps to predict the cardiovascular diseases in early stages thereby reducing the disease progression. From this perspective the researcher planned to explore the relationship between HRR and Clinical Profile (Family history, Co-morbid illness, BMI, MUAC, Waist Circumference, Hip Circumference, Skin Fold test)

From the previous knowledge, the aim of the present study was to identify relationship between HRR and cardiac Clinical Parameters among young nursing students.

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 relation and association between cardiovascular fitness (HRR) and Biochemical parameters. The present study was approved by ethical committee of King Georges Medical University, Lucknow, Uttar Pradesh, India (ref.code:84th CCMIID/PI). This study was conducted in 150 BSc Nursing students aged 18-25 years, who were studying in KGMU College of nursing Lucknow. The entire participant enrolled after the written informed consent form according to inclusion and exclusion criteria.

Inclusion criteria: nursing student who were in between the aged 18-25 yrs. having no history of cardiovascular 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 according to 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 $[(208 - (0.7 \times \text{age}) \times 85\%]$. 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 (HRss) at each workload as long as HRss has been achieved, the speed & incline was increased at the end of three-minute interval.

Test administration: I. The treadmill tests starts 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 HRR was done after 1 minute of maximal heart rate by using the formula $HR_{max} - HR_{rest}/after\ 1\ minute$.

The values of HRR were considered <20 low, 21-52 normal and >53 High.

Family history of cardiac and respiratory diseases, Co-morbid illness, history of breathing difficulty, history of cough, heart rate, Blood Pressure, Auscultation findings, Respiratory rate, Chest circumference, A/P diameter, Transverse diameter Lung auscultation finding, height, MI, MUAC, Waist Circumference, Hip Circumference, Skin Fold test) were evaluated by hospital (KGMU) standard protocol.

Statistical Analysis:

Data was analysed by with the help of inferential & 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 :

In the view of demographic variables Table-1 shows that most of the individuals were age group of 24- 25 (33.33%), maximum were 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%).on the basis of frequency of fast Majority of the sample belongs to the category of 0-2days/week (58%) and remaining 42 % in the category of 3 and more than 3 days per week. Majority of sample take feast 0-2 per week (92.67%) and remaining will be in the category of 3 and more feast per week(7.33%) Most of these consume fast food between 0 to 2 times in a week (58%). Maximum individuals do not have drug indulgence (95%). Maximum does physical exercise occasionally (44%).For most of the individuals Heart Rate recovery is normal (68%).

Table 1: Frequency & Percentage distribution of Demographic variables

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
Freq. OF Fast	0-2	147.00	98.00
	3 or above	3.00	2.00
Freq. OF Feast	0-2	139.00	92.67
	3 or above	11.00	7.33
Therapy for chronic illness	No	143.00	95.33
	Other	6.00	4.00
	Over counter	1.00	0.67
Physical Exercise	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
Heart Rate Recovery	Low	41.00	27.33
	Normal	102.00	68.00
	High	7.00	4.67

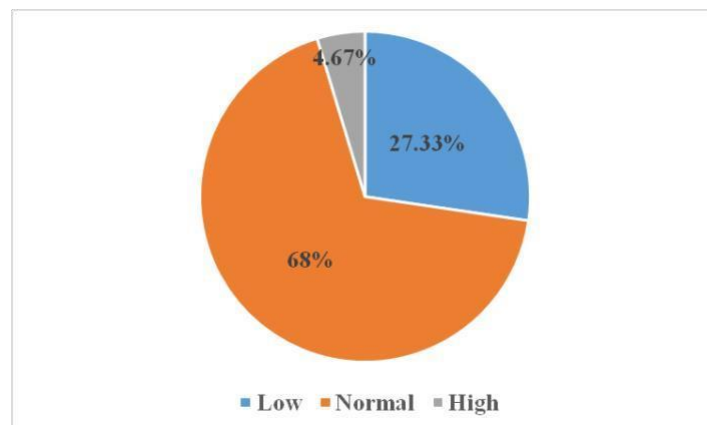


Fig1: Frequency & Percentage distribution of Demographic variables according to HRR

Table No: 2 depicts that the p-value for Lungs Auscultation finding is less than 0.05 therefore the Heart recovery rate time is associated with the Lungs Auscultation finding and correlation suggests that Heart recovery rate is moderately positively related with Lungs Auscultation finding. All the other p-values are more than 0.05, therefore, no other clinical profile finding is significantly related with Heart recovery rate time

Table No 2 Association & correlation HRR with selected clinical Profiles

Variable	Category	Tolerance Time in TMT			Chi Square (p-Value)	Fisher's Exact Significance	Correlation (Kendall's tau c)
		Low	Normal	High			
family H/o cardiac dis.	Yes	7	35	1	0.768 (0.681)	0.533	-0.044 (0.456) ²³⁹⁴
		16.3%	81.4%	2.3%			
	No	22	84	1			
		20.6%	78.5%	.9%			
family H/o respiratory dis.	Yes	7	20	0	1.294 (0.524)	0.611	.055 (0.311)
		25.9%	74.1%	0.0%			
	No	22	99	2			
		17.9%	80.5%	1.6%			
co-morbid illness	Yes	1	11	0	1.240 (0.538)	0.544	-0.031 (0.241)
		8.3%	91.7%	0.0%			
	No	28	108	2			
		20.3%	78.3%	1.4%			
h/o breathing	Yes	2	4	0	0.843 (0.656)	0.387	0.024 (0.442)
		33.3%	66.7%	0.0%			
	No	27	115	2			
		18.8%	79.9%	1.4%			
H/o Cough	Yes	1	4	0	0.070 (0.965)	>0.999	0.002 (0.921)
		20.0%	80.0%	0.0%			
	No	28	115	2			
		19.3%	79.3%	1.4%			
H.R.	Normal	28	113	2	0.232 (0.890)	>0.999	0.007 (0.763)
		19.6%	79.0%	1.4%			
	Abnormal	1	6	0			



		14.3%	85.7%	0.0%			
B.P.	Normal	24	103	2	.609 (0.737)	0.678	-0.031 (0.518)
		18.6%	79.8%	1.6%			
	Abnormal	5	16	0			
		23.8%	76.2%	0.0%			
Auscultation Finding	Normal	26	110	2	0.421 (0.810)	0.749	-0.021 (0.575)
		18.8%	79.7%	1.4%			
	Abnormal	3	9	0			
		25.0%	75.0%	0.0%			
R.R.	Normal	27	118	2	4.405 (0.111)	0.134	-0.038 (0.204)
		18.4%	80.3%	1.4%			
	Abnormal	2	1	0			
		66.7%	33.3%	0.0%			
C.C.	Normal	26	110	2	0.421 (0.810)	0.749	-0.021 (0.575)
		18.8%	79.7%	1.4%			
	Abnormal	3	9	0			
		25.0%	75.0%	0.0%			
A/P diameter	Normal	28	116	2	0.133 (0.936)	>0.999	-0.007 (0.754)
		19.2%	79.5%	1.4%			
	Abnormal	1	3	0			
		25.0%	75.0%	0.0%			
transverse diameter	Normal	28	117	2	0.413 (0.813)	>0.999	-0.012 (0.592)
		19.0%	79.6%	1.4%			
	Abnormal	1	2	0			
		33.3%	66.7%	0.0%			
Lungs Auscultation finding	Normal	26	113	2	1.292 (0.524)	0.452	-0.036 (0.339)
		18.4%	80.1%	1.4%			
	Abnormal	3	6	0			
		33.3%	66.7%	0.0%			
Height	Low	3	16	1	3.092	0.409	-0.022



		15.0%	80.0%	5.0%	(0.543)		(0.517)
	Normal	26	101	1			
		20.3%	78.9%	.8%			
	High	0	2	0			
		0.0%	100.0%	0.0%			
Weight	Low	5	22	1	2.263 (0.688)	0.621	0.002 (0.971) 2396
		17.9%	78.6%	3.6%			
	Normal	22	82	1			
		21.0%	78.1%	1.0%			
	High	2	15	0			
		11.8%	88.2%	0.0%			
BMI	Low	4	22	1	2.295 (0.682)	0.608	-0.055 (0.258)
		14.8%	81.5%	3.7%			
	Normal	19	79	1			
		19.2%	79.8%	1.0%			
	High	6	18	0			
		25.0%	75.0%	0.0%			
MUAC	Low	2	12	1	4.960 (0.291)	0.283	-0.017 (0.589)
		13.3%	80.0%	6.7%			
	Normal	27	103	1			
		20.6%	78.6%	.8%			
	High	0	4	0			
		0.0%	100.0%	0.0%			
W.C.	Low	24	65	2	9.478 (0.050)	0.036	0.119 (0.025)
		26.4%	71.4%	2.2%			
	Normal	5	46	0			
		9.8%	90.2%	0.0%			
	High	0	8	0			
		0.0%	100.0%	0.0%			
H.C.	Low	20	57	2	6.636	0.161	0.089



		25.3%	72.2%	2.5%	(0.156)		(0.064)
	Normal	8	46	0			
		14.8%	85.2%	0.0%			
	High	1	16	0			
		5.9%	94.1%	0.0%			
Skin Fold Test	Normal	28	103	2	2.578 (0.276)	0.368	0.055 (0.059)
		21.1%	77.4%	1.5%			
	Abnormal	1	16	0			
		5.9%	94.1%	0.0%			

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Discussion

Association & correlation HRR with selected demographic variables indicating that there is none of the demographic variable is significantly related with Heart rate recovery time

Association & correlation HRR with selected clinical Profiles depicts that the p-value for Lungs Auscultation finding is less than 0.05 therefore the Heart recovery rate time is associated with the Lungs Auscultation finding and correlation suggests that Heart recovery rate is positively moderately related with Lungs Auscultation finding. All the other p-values are more than 0.05, therefore, no other clinical profile finding is significantly related with Heart recovery rate time. In this study the researcher was taken the 150 samples from which the investigator traced 9 samples are with abnormal lung auscultation finding with wheezing during deep expiration while auscultation. They were also lies in the category of low HRR.

Similar findings was found in the study conducted by Ernesto Crisafulli, Matteo Vigna et. al conducted a study on Heart rate recovery is associated with ventilatory constraints and excess ventilation during exercise in patients with chronic obstructive

pulmonary disease the prospective study was conducted at the University Hospital of Parma (Italy), in a period between January 2010 and August 2017. By a systematic sampling method, all consecutive adult COPD outpatients admitted to lung function unit and who met criteria according to the global initiative for chronic obstructive lung disease (GOLD) document²⁰ were considered for the study. Out of 254 patients enrolled, 156 (61%) showed heart rate recovery delay. As compared to patients with normal heart rate recovery, patients with delay were older, with a worse lung function and with lower values of peak oxygen uptake, maximal workload, oxygen pulse at rest and at peak, and inspiratory capacity/total lung capacity at peak. Conversely, VE/VCO₂ slope and dyspnoea and leg fatigue perception at peak were higher in patients with heart rate recovery delay. In the multivariate regression model adjusted for age, sex, fat-free mass, heart rate at rest and use of β -blockers, they found that inspiratory capacity/total lung capacity at peak (<0.25) (odds ratio 2.61; P = 0.007) and VE/VCO₂ slope (>32) (odds ratio 2.26; P = 0.018) predict the risk of heart rate recovery delay. The study result projects that chronic obstructive pulmonary disease outpatients, heart rate recovery is associated



with dynamic hyperinflation and excess ventilation during exercise.

Limitation

1. The literatures related to Indian context were limited in number.
2. The study was conducted for a small sample size with simple random sampling, which limits the generalization of principles.
3. Exploratory studies all data are interpreted by the investigator and it can be judgmental and biased.
4. The study was conducted in a limited setting
5. There is a limitation in fund raising, intended to conduct a study in generalized and extended setting funding is essential.
6. Exploratory studies have its own boundaries to establish cause and effect relationship.
7. Exploratory study design was opted because of the limitations in the randomization of samples
8. All samples were from one area because of convenience of researcher due to newly emerged pandemic diseases

Conclusion

Our study put forwarded that to investigate the association and correlation of cardio respiratory determinants with Clinical Profiles Through this investigation the researcher intended to conclude that various test finding such as Age, skin fold test, Lungs Auscultation finding, waist circumference is showing Association & correlation with HRR

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