

Research Article

Effectiveness of Cardiac Walking on Blood Pressure Among Patients with Acute Coronary Syndrome

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ABSTRACT

Background: Cardiovascular diseases (CVD) are the leading cause of the mortality in urban and rural India and foremost causes of the death worldwide. Hypertension is a major risk condition that plays a pivotal role regarding the complications for those diagnosed with Acute Coronary Syndrome. According to the World Health Organization (2012), hypertension is the number one cause of mortality in the world and it is a major risk factor for cardiac diseases and stroke. Objectives: i) To identify the level of blood pressure (BP) in pre and post test among study and control group of patients with acute coronary syndrome. ii) Determine the effect of cardiac walking on blood pressure among patients with ACS. iii) Associate the selected back ground variables with the level of systolic BP in the post test among study and control group. Methods: A quasi experimental design was adopted for this study. There are 50 Patients diagnosed with ASC admitted for the treatment and attending cardiac OPD were selected by purposive sampling technique of non- probability type. The intervention cardiac walking given for a period of one month to the study group. Findings: The comparison of before and after systolic and diastolic blood pressure (BP) within study group depicted statistically significant difference at $**p < 0.001$ but not in control group. The comparison of post systolic and diastolic BP between study and control group inferred that there was statistically significant difference at $**p < 0.001$. Conclusion: Cardiac walking is most effective way to stabilize the blood pressure among patients with ACS in order to prevent further complications such as stroke.

Keywords: cardiac walking, blood pressure, acute coronary syndrome.

INTRODUCTION

Globally cardiovascular disease accounts for approximately 17 million deaths a year as complications due to many disorders. Cardiovascular diseases (CVD) are the leading cause of the mortality in urban and rural India and foremost causes of the death worldwide. In India, heart disease is the single largest cause of death in the country with heart attack being responsible for one third of all deaths caused by heart diseases. According to a projection by the WHO¹ and the Indian Council of Medical Research (ICMR), "India will not only be the heart attack capital, but also the capital of diabetes and hypertension by 2020". Among the heart diseases Acute Coronary Syndrome (ACS) is a severe condition of the heart that requires immediate hospital admission and needs aggressive treatment. It refers to a spectrum of clinical presentation ranging from ST segment elevation Myocardial Infarction (STEMI) to presentations found in non- ST- segment elevation Myocardial Infarction (NSTEMI) or unstable angina.

Hypertension is a major risk factor for coronary heart disease and ischemic as well as hemorrhagic stroke. It is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke. According to the WHO statistics (2012) 26 % of total death was due to

cardiovascular diseases. Worldwide, raised blood pressure is estimated to cause 7.5 million deaths, which is about 12.8% of the total of all deaths. Blood pressure levels have been shown to be positively and continuously related to the risk for stroke and coronary heart disease. Heart failure, peripheral vascular disease, renal impairment, retinal hemorrhage and visual impairment are some of the other complications of hypertension. Treating systolic and diastolic blood pressure may lead to reduction in cardiovascular complications. A study conducted by Helelo² TP et al (2014) revealed that the prevalence of hypertension is high among male aged above 31 years, increased salt intake, eating less vegetables may be 3 or fewer days per week, not continuously walking at least 10 min/day and being overweight. Physical inactivity is another important risk factor that increases the blood pressure leading to obesity which increases the systemic vascular resistance and exerts pressure on the heart. Life style plays an important role to regulate the blood pressure. The normal blood pressure is maintained by cardiac output and systemic vascular resistance. When the life style factors increase the cardiac output and systemic vascular resistance which ultimately increase the heart rate and blood pressure. Thus regular physical activity at least 30-60 minutes walking/day will lower the blood pressure

4-9 mm of Hg. Hypertension can be curtailed by changes like exercises, dietary and behavioral modification measures apart from taking anti-hypertensive drugs. In India the awareness of hypertension its risk factors and prevention of complications among people are very poor. However rapidly increasing incidence of hypertension is posing a great challenge to the modern health care system. But the behavioral modifications such as cardiac walking appear to reduce and stabilize the blood pressure within normal limit among patients with Acute Coronary syndrome. Thus exercises are the corner stone in reducing the cardiovascular risk and to control the blood pressure. Recently cardiac walking has been shown to reduce and maintain the blood pressure within normal limit among patients with hypertension and coronary artery disease. Various studies had shown the reduction in blood pressure of hypertensive patients who practiced walking. Very few studies have been conducted to evaluate the effect on cardiac walking on patients with ACS. Hence this study aim to assess the effect of cardiac walking diagnosed with hypertension among ACS patients in South India.

Objectives of the study

Identify the level of blood pressure before and after cardiac walking as an intervention among study group and compare with the control group.

Compare the blood pressure after the intervention between the groups.

Associate the selected demographic variables with the level of systolic blood pressure in the post test among study and comparison group.

Hypothesis

H1 - There is a significant difference in the systolic and diastolic blood pressure among patients with acute coronary syndrome who had subjected to cardiac walking exercise than compared with control group.

MATERIALS AND METHODS

There are 70 patients with Acute Coronary Syndrome (ACS) attending the cardiac OPD on their 3rd month follow up were recruited from Frontier lifeline hospital Chennai. Out of 70 patients 20 were not willing to participate hence were excluded from the investigation. 50 willing participants were selected based on the inclusion and exclusion criteria. Inclusion criteria included hypertensive male patient with ACS undergoing treatment, patients who were cooperative and able to converse in Tamil or English

RESULTS AND DISCUSSION

The comparison of before and after systolic and diastolic blood pressure within study group depicted statistically significant difference at $p < 0.001$ but in control group no statistically significant difference.

The comparison of post systolic and diastolic blood pressure between study and comparison group inferred that there was a statistically significant difference at $p < 0.001$.

There was no statistical significant association of demographic variables with post systolic blood pressure in both the groups elicited except for BMI in the comparison group at $p < 0.001$.

were also included. Patients who were critically ill and disoriented, healthcare professionals, impaired physical mobility in lower limb and unable to walk, mentally challenged, disoriented and unable to follow the instructions, diagnosed with CCF, Valvular disorders, and cardiomyopathy, edema in the lower limb, patients with regularly practicing yoga and or exercises were excluded from the study.

The selected participants were informed about the study protocol. They gave the written informed consent. These participants were randomly distributed into two groups having 25 participants in each group. Group 1 was the control group without cardiac walking as the intervention and Group 2 was the study group with cardiac walking as an intervention for a period of one month. Each patient was explained about the intervention and the benefits of cardiac walking on long run to stabilize the blood pressure. Participants were explained three phases of cardiac walking as described below:

Phase - I - Warm up - It involved 5 - 10 minutes of low intensity walking.

Phase - II - This comprised of 10 to 15 minutes of moderate intensity walking.

Phase - III - Cool down, this included 5 - 10 minutes of low intensity walking.

The cardiac walking was advised before breakfast for one month. Group 2 did not receive cardiac walking as an intervention. In both the groups, the pre data and post data was obtained from the clinical records at 0 day and after 30th day respectively. In group 1 once the post data was recorded, the cardiac walking and its benefits were explained to the participants.

Tools for data Collection

The demographic variables comprised of age, education, history of smoking, history of alcoholism, BMI and comorbidity. According to the National institute of health, Seventh report of the national committee (2008) American Heart Association (AHA). The blood pressure was monitored by using stethoscope and sphygmomanometer and was classified as Systolic (mmHg) Diastolic (mmHg), Normal < 120 and < 80 , Pre hypertension 120-139 Or 80-89, Stage1 hypertension 140-159 Or 90-99, Stage2 hypertension Greater or equal to 160 Or greater or equal to 100. Reliability of the tool was tested by test retest method for which Pearson correlation coefficient was computed. The 'r' value was 0.96.

The first objective was to identify the level of blood pressure in pre and post -test among study and comparison group of patients with hypertension diagnosed to have Acute Coronary Syndrome.

Out of 25(100%) control group participants 2(8%) had progressed to stage 2 hypertension in the terms of both systolic and diastolic blood pressure from stage 1 hypertension, 20(80%) participants were on the same level of stage1 hypertension in the post and 3(12%) had pre hypertension in post test.

In study group, majority of respondents 23(92%) had stage I hypertension and 2(8%) had stage II hypertension in pre test whereas in the post test, it reduced such as 1(4%) had stage II hypertension, 2(8%) had stage I hypertension,

Table 1: Distribution of level of blood pressure before, after among Study and Control group N=50.

S. No	Level of BP (mm Hg)	Study group								Control Group							
		Pretest				Posttest				Pretest				Posttest			
		Sys		Dias		Sys		Dias		Sys		Dias		Sys		Dias	
No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
1.	Stage-2 HT	2	8	2	8	1	4	1	4	0	0	0	0	3	12	3	12
2.	Stage-1 HT	23	92	23	92	2	8	2	4	25	100	25	100	20	80	20	80
3.	Pre HT	0	0	0	0	19	76	19	76	0	0	0	0	2	8	2	8
4.	Normal BP	0	0	0	0	3	12	3	12	0	0	0	0	0	0	0	0

In study group majority of respondents 23(92%) had stage I hypertension and 2(8%) had stage II hypertension in the pretest whereas in the post test it reduced such as 1(4%) had stage II hypertension, 2(8%) had stage I hypertension, 19(76%) had pre hypertension and 3(12%) were maintained normal Blood Pressure.

Table 2: Comparison of blood pressure before and after intervention within study & control group N=50.

S.No	Observation	Study group		Paired 't' value	Control group		Paired 't' value
		Mean	SD		Mean	SD	
1.	Pre test –systolic (mm of Hg)	140.06	2.96	8.458*** p=0.000	140.40	2.51	0.860
2.	Post test- systolic (mm of Hg)	128.33	6.68	SS at P<0.001	138.96	1.02	p=0.386 NS
3.	Pre test–diastolic (mm of Hg)	91.71	1.40	17.060*** p=0.000	90.86	1.63	1.418
4.	Post test–diastolic (mm of Hg)	82.22	1.84	SS at P<0.001	91.30	1.11	p=0.164 NS

The paired 't' value was 8.458 and 17.060 found to be statistically significant at p<0.001** in study group. The paired 't' value was 0.386 and 1.418 found no statistical significant in control group.

Table 3: Comparison of post blood pressure between study and control group N=50.

S.No	Observation	Study group		Control group		't' & P value
		Mean	SD	Mean	SD	
1.	Post testsys(mm of Hg)	128.33	6.68	140.41	4.56	8.010 p=0.000SS
2.	Post testdia(mm of Hg)	82.22	1.84	91.30	3.51	11.01 P=0.000SS

The 't' value was 8.010 in Post systolic (mm of Hg) found to be statistically significant at p<0.001. The 't' value was 11.01 in Post diastolic (mm of Hg) found to be significant at p<0.001.

19(76%) had pre hypertension and 3(12%) were maintained normal Blood Pressure.

This proved that cardiac walking had reduced the blood pressure among study group. this group of participants had taken anti hypertensive's and also practiced cardiac walking but comparison group participants had taken only anti hypertensive's without any non- pharmacological measures to reduce blood pressure these findings highlights the importance of regular cardiac walking among patients with hypertension.

These findings are substantiated by the study conducted by Lima LG, Moriguiti JC, Ferrioli E (2012)³ which revealed that there were immediate 14 mm of Hg and 12 mm of Hg reduction in systolic blood pressure and 4 mm of Hg in diastolic blood pressure after exercise session for 5 days, which were statistically significant at p<0.05 and p<0.01 respectively.

The second objective was to determine the effect of cardiac walking on blood pressure among patients with hypertension. The paired t-test value on comparison of pre and post-test scores of systolic and diastolic blood

pressures within study group revealed statistically significant difference at level p<0.001, whereas in control group significant difference was not elicited. These evidences proved that study group had the changes in the level of blood pressure between pre and post test than comparison group participants.

It proved that the above findings were because of the cardiac walking by the study group participants along with routine care, but comparison group participants were only on routine care. These findings were further supported by the independent 't' test, on comparison of post- test systolic and diastolic blood pressures between study group and comparison group, which disclosed the statistically significant difference at level p<0.001. The mean value of post test systolic blood pressure was 128.33 mm of Hg among study group participants whereas among comparison group, it was 140.41. The mean value of diastolic blood pressure was 82.22 mm of Hg among study group participants, but it was 91.30 mm of Hg among comparison group participants. These differences in the mean value of systolic and diastolic blood pressures were

Table 4: Association of selected background variables with the level of systolic blood pressure among comparison group N=50.

S.No	Demographic variables	Control Group								Chi square value	P value
		Normal blood pressure		Pre hyper tension		Stage1 Hyper tension		Stage2 hyper tension			
		No	%	No	%	No	%	No	%		
1.	Age (yrs)									5.52 NS	0.202
	35-40	0	0	0	0	6	24	2	4		
	41-45	0	0	0	0	7	28	0	0		
	46-50	0	0	0	0	6	24	0	0		
	51-55	0	0	0	0	4	16	0	0		
2.	Educational status									4.154 NS	0.575
	Illiterate	0	0	0	0	7	28	1	4		
	Primary education	0	0	0	0	6	24	1	4		
	Higher secondary	0	0	0	0	8	32	0	0		
	Graduate	0	0	0	0	2	8	0	0		
3.	Habit of Alcoholism									1.023 NS	0.312
	Yes	0	0	0	0	9	36	2	8		
	No	0	0	0	0	14	56	0	0		
4.	Habits of Smoking									2.456 NS	0.125
	Nil	0	0	0	0	13	52	0	0		
	Smoking	0	0	0	0	10	40	2	0		
5.	Body Mass Index									** 12.121 SS	0.007
	Under weight (<19)	0	0	0	0	0	0	0	0		
	Ideal weight (19.1-25)	0	0	0	0	3	12	1	4		
	Over weight (25.1-30)	0	0	0	0	16	64	0	0		
	Obese (30.1 - 35)	0	0	0	0	4	16	0	0		
	Severe Obese (35.1- 40)	0	0	0	0	0	0	0	0		
	Morbid Obese(>40)	0	0	0	0	0	0	1	4		
6.	Co- morbid illness									3.261 NS	0.186
	Hypertension	0	0	0	0	10	40	0	0		
	HT & Diabetes	0	0	0	0	13	52	2	8		

NS – Not Significant ** P < 0.05.

due to the effect of cardiac walking done by the study group participants.

This study finding were substantiated by the study conducted by Duangpunmat et al (2013)⁴ on the effect of walking exercise on blood pressure among patients with hypertension. The result revealed there was a statistically significant difference between experimental and comparison group of systolic and diastolic blood pressure from baseline to 3rd week at p < 0.05.

The third objective was to associate the selected background variables with the level of systolic blood pressure in the post test among study and comparison group. The chi-square value of association of demographic, biological, and clinical variables with the level of systolic blood pressure among study and comparison group portrayed that there was a statistically significant association of body mass index with the level of systolic blood pressure in the post test among comparison group participants, at level of p<0.001**.

This finding may be due to the prevalence of obesity among study and comparison group. The distribution of BMI among study and comparison group unveiled that

12(48%) study and 17(68%) comparison group participants had over weight with the BMI ranging from 25.1%-30 kg/m². There was no statically significant association of BMI with the level of BP among study group, which may be due to the effect of cardiac walking. This group, will be benefited more on their BP over a period of time, throughout their survivorship. The chi-square value of association of BMI with the level of systolic BP among comparison group was 12.212, with the p value of 0.007, which was statistically highly significant at level p<0.001**.

This finding is supported by a study conducted by Xuhong Hou (2013) et al,⁵ which disclosed that there was a 1.7fold higher risk for hypertension with the BMI >30KG/M² which was statistically significant at p <0.05. Thus it is evident from the above, that blood pressure can be maintained within normal limit for the patients with hypertension by using simple and cost effective strategies like cardiac walking. This evidence based strategies will enhance the well being of patients with hypertension and prevent the complications throughout their survivor ship.

CONCLUSION

Cardiac walking is very effective and significantly reduced the blood pressure within normal limit among patients with hypertension. This is found to be a simple measure and easy to practice which incentives a person to have a tremendous change in the blood pressure to maintain within normal limit along with pharmacological measures. The study findings showed that the respondents had demonstrated a change in the blood pressure to the normal limits. Hence it is most effective way of secondary prevention of acute coronary syndrome. A combination of education and home monitoring programs, family teaching cooking demonstration and other exercise program can be made helpful for the patients in turn to have a better quality life

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