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### RESEARCH ARTICLE

#### EFFECTIVENESS OF COMMUNITY BASED COMPREHENSIVE LIFESTYLE PROMOTION PACKAGE ON CARDIO-VASCULAR RISK (BIOCHEMICAL RISK PARAMETERS) AMONG ADULTS WITH HYPERTENSION IN SOUTH INDIA

Tamilselvi P.<sup>1</sup> and Jayaraman V.<sup>2</sup>

1. Nursing Tutor, College of Nursing, Madras Medical College, Chennai.
2. Research Associate, Plastic Surgeon, Child Trust Hospital, Chennai.

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Community Based Comprehensive Lifestyle Promotion Package, Cardio-Vascular Risk, Adult With Hypertension

#### Abstract

To assess the effectiveness of community based comprehensive lifestyle promotion package on cardio-vascular risk (biochemical parameters risk score) among adult with hypertension.

**Methodology:** Quantitative approach, true experimental design was adopted in the study. 200 samples in experimental and 198 samples in control group who fulfilled the inclusion criteria were selected using probability sampling technique. Cardio-vascular risk (biochemical parameters risk score) was assessed by using laboratory values.

**Results:** The chi-square analysis showed that there was no statistically significant difference between the experimental and control group in the pre test. In post test 3 there was statistically significant difference in the biochemical parameter risk score between experimental and control group. In post test 3 total cholesterol, HDL, LDL, VLDL, Triglycerides risk reduction score were 138.93, 54.06, 117.85, 23.22, 127.70 respectively among experimental group whereas in the control group risk reduction score was 160.90, 49.09, 123.62, 29.38, 135.94. Student independent t-test ( $t=8.65$  at  $p=0.001$ ,  $t=5.69$  at  $p=0.001$ ,  $t=3.29$  at  $p=0.01$ ,  $t=9.39$  at  $p=0.001$ ,  $t=1.97$  at  $p=0.05$ ) showed that there was a significant difference between the experimental and control group in the post test 3. Results also revealed that there was a statistically significant difference between pretest and post test 3 ( $F=116.58, 39.54, 26.05, 43.33$  and  $104.9$  respectively at  $p=0.001$  level) only in the experimental group alone.

**Conclusion:** The results revealed that the community based comprehensive lifestyle promotion package was effective in reducing the biochemical parameter risk score and thus preventing the cardiovascular diseases hence can be utilized as a step in prevention of cardiovascular risk among adult with hypertension.

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#### Introduction:-

Hypertension is one of the strongest risk factors for almost all different cardiovascular diseases acquired during life, including coronary disease, left ventricular hypertrophy and valvular heart diseases, cardiac arrhythmias including atrial fibrillation, cerebral stroke and renal failure. The continuous relationship between blood pressure and

**Corresponding Author:- Tamilselvi P.**

Address:- Nursing Tutor, College of Nursing, Madras Medical College, Chennai.

cardiovascular and renal events makes the distinction between high normal blood pressure and hypertension based on arbitrary cut-off values for blood pressures.

Hypertension is quantitatively the most important risk factor for premature cardiovascular disease; it is more common than cigarette smoking, dyslipidemia, and diabetes, which are the other major risk factors. Hypertension accounts for an estimated 54% of all strokes and 47% of all ischemic heart disease events globally. Hypertension increases the risk for a variety of cardiovascular diseases including stroke, coronary artery disease, heart failure, atrial fibrillation, and peripheral vascular disease. The risk for both coronary disease and stroke increases progressively with an/every incremental increase in blood pressure above 115/75 mmHg, as shown in numerous epidemiologic studies. (Michael J & Basile M, 2016)

Hypertension remains a dominant risk factor for cardiovascular diseases, and others, around the world. CVD currently accounts for nearly half of non-communicable diseases (NCDs). NCDs have overtaken communicable diseases as the world's major disease burden, with CVD remaining the leading global cause of death, accounting for 17.3 million deaths per year, a number that is expected to grow to >23.6 million by 2030. Increasingly, the populations affected are those in low- and middle-income countries, where 80% of these deaths occur, usually at younger ages than in higher income countries. (Harlen M & Krumholz M, 2017)

CVD risk factors are widely distributed among south Asians. The diversity and difference in CVD risk factors in native North Asians compared to South Asians are due to difference in culture and life style, difference in dietary practices, tobacco use and physical inactivity and also variations in economic development between and within different states of India.

### **Methods & Materials:-**

Researcher adopted an experimental study. Ethical committee approval was received from the International Centre for Collaborative Research (ICCR) Omayal Ach College of Nursing. A formal written permission was obtained from the Block Medical Officer of Primary Health Centre. The villages were categorized as experimental and control group by simple randomization, lottery method. Simple random sampling technique was used for selecting the sample.

The investigator assured the adults with hypertension about the anonymity and confidentiality. The samples were made to sit comfortably in a well ventilated place. After brief introduction about the purpose and usefulness of the study and after obtaining the informed consent, the demographic details were collected. After gaining their confidence, pretest was conducted among 398 adults with hypertension (Experimental -200 and Control -198). Researcher done an assessment of Bio-chemical parameter risk score (lipid profile) which includes total cholesterol, HDL, LDL, VLDL, triglycerides, CHO/HDL ratio, LDL/HDL ratio, HDL/LDL ratio.

Everyday the investigator selected 10 to 15 adults with hypertension to collect the data. The intervention package, community based comprehensive life style promotion package were administered only to experimental group which consisted of IEC package, counseling of diet and healthy habits and demonstration of exercises. No intervention was given after pretest for the control group. In both experimental and control group, post test was conducted at 1<sup>st</sup>, 3<sup>rd</sup> and 5<sup>th</sup> month and data were prepared and analyzed.

### **Results & Discussion:-**

The analysis revealed that there was no significant difference in pre test and post test 1. After the implementation of community based comprehensive lifestyle promotion package, the post test 2 and 3 result revealed that in experimental group, there was a significant shift in the number of samples from moderate and severe to mild risk. In contrast status, of the control group remained same in the post test also. The chi-square value  $\chi^2 = 5.49, 12.59$  also revealed that there was a high statistical significant difference in the pre and post test among experimental group and there was no significant difference in the pre and post test among control group. In experimental group, the percentage of bio-chemical risk score reduction was 12.60, whereas in the control group bio-chemical risk score reduction was 0.87.

The comparison of the pre and post test mean scores in experimental group using repeated measures ANOVA F-test revealed that  $F=60.57$  at  $p=0.001$  level which indicated that there was a very high statistically significant difference

in the pre and post test. But in control group, there was no significant difference in the pre and post test. This showed that community based comprehensive lifestyle promotion package was effective in promoting lifestyle of adults with hypertension by reducing bio-chemical risk score in experimental group.

The uni-variate and multi-variate analysis revealed that the influencing factors for bio-chemical risk reduction score in experimental group were age, family monthly income, type of family, chronicity of hypertension, family history of hypertension and history of smoking.

**Table 1:-** Pretest and post test level of bio-chemical parameter risk score N=398.

Group	Lipid profile	Bio-chemical score								Mean Difference	Repeated measures ANOVA F-test
		Pretest		Post test 1		Post test 2		Post test 3			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD		
EXPERIMENTAL	TC	163.41	25.14	157.82	15.47	147.63	17.99	138.93	14.28	24.48	F=116.58 p=0.001(S)
	HDL	48.14	8.30	48.57	8.26	50.55	8.09	54.06	6.73	5.92	F=39.54 p=0.001(S)
	LDL	124.86	12.38	123.16	14.12	121.50	15.36	117.85	17.29	7.01	F=26.05 p=0.001(S)
	VLDL	31.48	6.74	27.81	6.16	27.48	4.65	23.22	2.30	8.26	F=43.33 p=0.001(S)
	Triglycerides	137.13	41.84	133.15	40.57	130.02	39.98	127.70	40.66	14.24	F=104.9 p=0.001(S)
CONTROL	TC	163.06	36.87	162.44	33.98	161.58	33.69	160.90	32.93	2.16	F=2.01 p=0.11(NS)
	HDL	48.85	10.47	49.06	10.38	48.98	10.50	49.09	10.32	0.24	F=1.09 p=0.35(NS)
	LDL	124.02	17.28	123.79	17.50	123.69	17.52	123.62	17.61	0.40	F=2.13 p=0.11(NS)
	VLDL	30.94	7.69	30.15	7.45	29.65	7.04	29.38	7.31	2.92	F=1.97 p=0.12(NS)
	Triglycerides	136.95	42.56	136.67	41.36	136.65	42.61	135.94	42.67	1.01	F=1.28 p=0.28(NS)

\*\*\* very high significant at  $p \leq 0.001$

**Table 2:-** Percentage of pretest and post test level of bio-chemical parameter risk score N=398.

Group	Test	Maximum score	Mean	% of mean score	% of bio-chemical risk reduction score
Experimental	Pretest	15	7.00	46.67	12.60
	Post test 1	15	6.53	43.53	
	Post test 2	15	6.05	40.33	
	Post test 3	15	5.11	34.07	
Control	Pretest	15	6.90	46.00	0.87
	Post test 1	15	6.82	45.47	
	Post test 2	15	6.79	45.27	
	Post test 3	15	6.77	45.13	

**Table 3:-** Comparison of overall pre and post test level of bio-chemical parameter risk score within experimental and control group N=398.

Risk classification	Group		Chi square test
	Experimental (n=200)	Control(n=198)	

		n	%	n	%	
Pretest	Mild	156	78.0	150	75.8	$\chi^2=1.28$ p=0.59 (NS)
	Moderate	44	22.0	48	24.2	
	Severe	0	00.0	0	00.0	
Post test1	Mild	163	81.5	150	75.8	$\chi^2=1.95$ p=0.16(NS)
	Moderate	37	18.5	48	24.2	
	Severe	0	00.0	0	00.0	
Post test2	Mild	171	85.5	151	75.8	$\chi^2=5.49$ p=0.02* (S)
	Moderate	29	14.5	47	24.2	
	Severe	0	00.0	0	00.0	
Post test3	Mild	180	90.0	152	76.8	$\chi^2=12.59$ p=0.001*** (S)
	Moderate	20	10.0	48	23.2	
	Severe	0	00.0	0	00.0	

\* significant at  $p \leq 0.05$  \*\*\* very high significant at  $p \leq 0.001$

**Table 4:-** Identification of influencing factors for Biochemical risk reduction score using Multivariate logistic regression in experimental group N=398.

Demographic Variables	Uni-variate analysis		Multivariate analysis	
	p-value	Unadjusted Odds Ratio (95%CI)	p-value	Adjusted Odds Ratio (95%CI)
<b>Age</b> ( $\geq 40$ years Vs $< 40$ years)	0.01**	2.2(1.1 -4.0)	0.02*	1.9(1.1 – 3.8)
<b>Family monthly income</b> ( $>Rs.7500$ Vs $<Rs.7500$ )	0.01**	2.1(1.2 -4.0)	0.33	1.3(0.7-4.1)
<b>Type of family</b> (Nuclear Vs Joint family)	0.01**	2.2(1.1 -4.4)	0.29	1.6(0.8- 4.0)
<b>Chronicity of HT</b> ( $\leq 12$ months Vs $>12$ months)	0.001***	3.3(1.8 -6.3)	0.01**	2.4(1.2-5.9)
<b>Family history of H/T</b> ( Yes Vs No)	0.01**	2.7(1.3 -5.7)	0.01**	2.3(1.2- 5.5)
<b>Smoking status</b> (Yes Vs No)	0.001***	3.1(1.5 -6.4)	0.03*	3.0(1.3- 6.2)

\* significant at  $p \leq 0.05$  \*\* highly significant at  $p \leq 0.01$  \*\*\* very high significant at  $p \leq 0.001$

The study results were consistent with the study conducted by Wu H, Yu Z, Huang Q (2022) regarding characteristics of serum lipid levels in patients with hypertension. 35448 patients with hypertension were enrolled in this study and their serum lipids were analysed. Results revealed that low high-density lipoprotein-cholesterol (HDL-C) (29.9%) accounted for the highest proportion in dyslipidaemia, followed by high triglyceride (TG) (20.7%), high total cholesterol (TC) (14.0%) and high low-density lipoprotein-cholesterol (LDL-C) (7.9%) in all subjects. The largest proportion of dyslipidaemia types was independent low HDL-C (12.7%). The proportion of low HDL-C was 15.5% in non-elderly men, 6.4% in non-elderly women, 16.7% in elderly men and 8.5% in elderly women, respectively. The largest proportion of dyslipidaemia types was independent high TG in non-elderly female patients (13.7%) and elderly patients (8.9%).

Another study conducted by Choudhury KN, Mainuddin AK, Wahiduzzaman M, Islam SM (2014) on serum lipid profile and its association with hypertension in Bangladesh. 234 participants including 159 hypertensive patients and 75 normotensive controls in Dhaka, Bangladesh. Data were collected on sociodemographic factors, anthropometric measurements, blood pressure, and lipid profile including total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL), and high density lipoprotein (HDL). Results revealed that the mean ( $\pm$  standard deviation) systolic blood pressure and diastolic blood pressure of the participants were  $137.94 \pm 9.58$  and  $94.42 \pm 8.81$ , respectively, which were higher in the hypertensive patients ( $P < 0.001$ ). The serum levels of TC, TG, and LDL were higher while HDL levels were lower in hypertensive subjects compared to normotensives, which was statistically significant ( $P < 0.001$ ). Age, waist circumference, and body mass index showed significant association with

hypertensive patients ( $P < 0.001$ ) but not with normotensives. The logistic regression analysis showed that hypertensive patients had 1.1 times higher TC and TG, 1.2 times higher LDL, and 1.1 times lower HDL than normotensives, which was statistically significant ( $P < 0.05$ ).

Bindu CB, Lokesh HC (2019) study also reported that the lipid profile changes among newly detected adult hypertensive patients with normotensive patients in a tertiary care hospital. Two hundred and fifteen age and sex matched patients were enrolled for the study and they were divided into two groups based on blood pressure. Group A - study group (109) newly detected hypertension patients and Group B - control group (106) comprising normotensive patients. Both the groups fasting lipid profile was studied and compared. Results showed that the serum levels of cholesterol, triglyceride and LDL were 194.2, 152.2 and 122.2 mg/dl respectively in hypertensive patients, whereas in normotensive patients they were 146.4, 110.2 and 102.6 mg/dl respectively which were higher in hypertensive patients. Whereas serum HDL was almost the same in both the groups. The study concluded that newly detected adult hypertensive patients are dyslipidemic as compared to normotensive patients, so proper blood pressure control and monitoring of lipid profile at regular intervals helps in preventing major complications such as cardiovascular diseases and cerebrovascular accidents.

### **Conclusion:-**

The study was aimed to assess the effectiveness of community based comprehensive lifestyle promotion package among adult living with hypertension. The findings revealed that there was reduction in the cardiovascular risk (biochemical parameter risk score) among experimental group after administration of community based comprehensive lifestyle promotion package and there was no difference was found in the control group. Community based comprehensive lifestyle promotion package has made modification in the biochemical parameters risk score hence can reduce biochemical parameter risk factors which in turn decreases the cardio-vascular risk among adult with hypertension.

### **Conflict of Interest:**

None declared.

### **Funding:**

None.

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