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EFFFICACY OF AN INTERVENTION PACKAGE IN REDUCING HYPERTENSION IN AN URBAN SET UP OF VARANASI

Community Medicine

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ABSTRACT

The root causes of non-communicable diseases can be addressed by promoting healthy lifestyle and dietary modifications and such approaches may be beneficial for subjects having hypertension. This community based study was carried out on hypertensive subjects in an urban set up of Varanasi to assess the efficacy of an intervention package in reducing hypertension. Average baseline systolic and diastolic blood pressure (mm of Hg) of subjects in intervention (N=81) and non-intervention (N=81) groups was similar. Mean systolic blood pressure of subjects in intervention group at the time of baseline and final assessments were 155.49 ± 17.13 and 147.31±12.98, respectively ($p<0.01$). In comparison to baseline assessment (91.06±8.40), there has been significant ($p<0.01$) decline in the diastolic blood pressure of subjects in the intervention group during final post intervention assessment (88.12±7.19) The intervention package was efficacious in lowering average systolic and diastolic blood pressure.

KEYWORDS:

Hypertension, Intervention, Lifestyle modifications.

INTRODUCTION

Hypertension is a major public health problem and contributor to the burden of non-communicable diseases. Researchers have estimated that raised blood pressure currently kills nine million people every year (WHO, 2013). India being in a stage of rapid socio economic and health transition is facing a rising burden of non-communicable diseases causing significant morbidity and mortality. Demographic changes, changes in the lifestyle along with increased rates of urbanization are the major reasons responsible for the increase in non-communicable diseases (Upadhyay, 2008).Lifestyle modifications are universally accepted, not only as the first step in the management of hypertension but also as a way to prevent hypertension.

Community based randomized controlled trial of non-pharm acological interventions in prevention and control of hypertension have shown the utility of major non-pharmacological interventions (daily walking, reduction in salt intake and *Yoga)* in reduction of elevated blood pressure and hence the morbidity and mortality associated with stroke and coronary heart disease in the community (Saptharishi et al, 2009; Subramanian et al, 2011). In this study major focus is to bring positive changes in hypertensive individuals in an urban area of Varanasi by risk reduction and life style modification after intervention. The primary objective of the study was to assess the efficacy of an intervention package in reducing hypertension.

MATERIAL AND METHODS

This study was carried out in Sunderpur, which is an urban field practice area of Department of Community Medicine, Institute of Medical Sciences, Banaras Hindu University (BHU), Varanasi, India during the period from February, 2014 to July, 2015. Ethical approval was obtained from ethical committee of the Institute of Medical Sciences, BHU.

The consent of participants was obtained during different phases of study. A pre-designed and pre-tested pro-forma and an electronic blood pressure monitor served as the primary tools. The educational material prepared for the purpose of intervention emphasized on the risk factors of hypertension, consequences of uncontrolled hypertension and dietary and lifestyle modifications needed to reduce hypertension. The educational material was developed in the form of posters and charts.

The techniques of this action demonstration research are given below:

[A]. Pre-Intervention Phase

The required sample size was computed based on the assumption that prevalence of hypertension in adults aged 25 years and above was 40% as per WHO 2008 (WHO, 2011) using the formula $N=Z \times P \times Q / L^2$.

During the pre- intervention phase, 611 subjects aged 25 years and above were selected from two sectors of Sunderpur community. Their socio-demographic characteristics were assessed by interview technique using pre-designed and pre-tested proforma. Blood pressure of each subject was measured using electronic blood pressure monitor and following standard technique. Blood pressure of subjects was classified according to JNC 7 criteria. Only the subjects in stage 1 and stage 2 hypertension were included in the study.

[B]. Intervention Phase:

Out of the two selected sectors, one of the sectors (Sector A) was assigned to as intervention group and the other sector (Sector D2) was selected as non-intervention group by lottery method. Out of 173 subjects screened as hypertensive, 90 belonged to intervention group and 83 to non-intervention group.

All the 90 subjects from the intervention group were given intervention in the form of educational package developed for the purpose. They were educated regarding risk factors of hypertension, consequences of uncontrolled hypertension and lifestyle interventions needed to reduce hypertension. The intervention package primarily emphasized on life style modifications viz smoking cessation, moderation in alcohol intake, weight reduction, increased physical activity and dietary modifications (viz low salt intake and consumption of fruit and vegetables). Subjects were taught in small groups through interactive, participatory approach. Educational material was combined with family orientation through home visits. Study subjects from non-intervention group were not provided intervention.

[C]. Post- Intervention Phase:

Blood pressure assessments of study subjects from both intervention and non-intervention groups were done in the post intervention phase. A total of three blood pressure assessments were done at monthly intervals during post intervention phase. However final

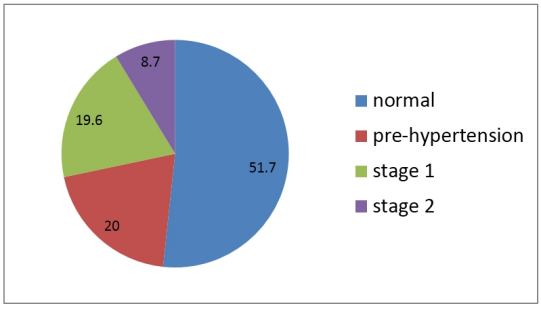
data could be collected from 162 subjects only.

Statistical Analysis: Data thus generated was entered in Microsoft excel and analyzed with the help of SPSS software version 16.0. Appropriate tables were generated and χ^2, t test and ANOVA statistics were applied for statistical association and inference.

RESULTS

Subjects were classified into normal, pre-hypertensive, stage1 hypertensive and stage 2 hypertensive according to JNC-7 criteria (JNC-7, 2003). A total of 173 subjects were hypertensive. One fifth of study subjects were pre-hypertensive.; 19.6% and 8.7% of study subjects were in stage 1 and stage 2 Hypertension, respectively, whereas 51.7% subjects were normal (Figure-1).

Figure-1: Distribution of subjects according to their blood pressure category.



Socio-Demographic profile of study subjects:

Socio-Demographic profile of study subjects belonging to Intervention and Non-Intervention Groups has been given in Table 1. Fifty eight (71.6%) subjects from intervention and 53 (65.4%) subjects from nonintervention group were > 50 years of age. As much as 54.3% subjects from intervention and 42% subjects from non-intervention group were female. As much as 42.0%, 53.1% and 4.9% subjects from intervention group belonged to SC/ST, OBC and Other Caste category, respectively; corresponding values for non-intervention group were 33.3%, 37.0% and 29.6%. In case of 54.3% subjects from intervention and 45.7% subjects from non-intervention group family size were6. There existed no significant (p>0.05) difference in the socio demographic profile of subjects belonging to intervention and non-intervention groups.

Subjects from intervention and non-intervention group were similar with respect to their educational status. As much as 13.6% subjects from intervention group and12.3% subjects from non-intervention groups were illiterate. Subjects from intervention and non-intervention group with graduation were 13.6% and 17.3% respectively, whereas 21.0% and 61.7% subjects from intervention group had per capita income <Rs 1000 and Rs 1001-2999 per capita per month, respectively; subjects with respective income categories from non-intervention group were 19.8% and 56.8%. As much as 69.1% subjects from intervention and 72.8% subjects from non-intervention group belonged to class 4 socio economic class. None of the study subjects belonged to socio-economic class 1 and 2. Unemployed subjects from intervention group were 40.7% and 34.6% in non-intervention group. Semi-skilled subjects from corresponding groups were 17.3% and 11.1%.

Table 1: Socio-Demographic profile of study subjects belonging to Intervention and Non-Intervention Groups.

Parameters	Intervention (N=81)		Non-intervention (N=81)		Test of Significance		
	No.	%	No.	%	χ^2	df	p- value
Age Group (yrs)							
• 25-39	12	14.8	11	13.6	1.67	3	0.64
• 40-49	11	13.6	17	21.0			
• 50-59	31	38.3	30	37.0			
• ≥60	27	33.3	23	28.4			
Sex							
• Male	37	45.7	47	58.0	2.47	1	0.12
• Female	44	54.3	34	42.0			
Caste							
• SC/ST	30	42	27	33.3	2.78	2	0.25
• OBC	36	53.1	30	37.0			
• Others	15	4.9	24	29.6			
Total number of family members							
• ≤ 6	44	54.3	37	45.7	1.91	2	0.38
• 7-9	26	32.1	27	33.3			
• ≥10	11	13.6	17	21.0			
Educational Status							
• Illiterate	11	13.6	10	12.3	5.95	6	0.43
• Primary school	06	7.4	13	16.0			
• Middle school	17	21.0	10	12.3			
• High school	18	22.2	20	24.7			
• Intermediate	12	14.8	11	13.6			
• Graduate	11	13.6	14	17.3			
• Professional	06	7.4	3	3.7			
Per Capita Income (Rs/month)							
• <1000	17	21.0	16	19.8	1.97	4	0.74
• 1001-2999	50	61.7	46	56.8			
• 3000-4999	04	4.9	8	9.9			
• 5000-7499	05	6.2	7	8.6			
• 7500-9999	05	6.2	4	4.9			
Occupation							
• Unemployed	33	40.7	28	34.6	5.09	6	0.53
• Unskilled	8	9.9	14	17.3			
• Semi-skilled	14	17.3	9	11.1			
• Skilled	10	12.3	14	17.3			
• Clerk/shop	11	13.6	9	11.1			
• Semi Professional	5	6.2	6	7.4			
• Professional	0	0.0	1	1.2			
Socio-economic Class *							
• Class 3	15	18.5	15	18.5	0.61	2	0.74
• Class 4	56	69.1	59	72.8			
• Class 5	10	12.3	7	8.6			

Note: * None of the study subjects belonged to socio-economic class 1 and 2

Both the intervention and non-intervention groups were comparable to each other with respect to most of the variables (Table -2)

Table-2: Comparison of average values of different variables in interventional and non-interventional groups.

Variables	Intervention group (N=81)	Non-intervention group(N=81)	Test of significance	
	Mean ± SD	Mean ± SD	t-value	p-value
Total No. of family members	6.62 ± 2.91	7.41±2.81	1.75	0.08
Age (yrs)	53.91 ±14.27	52.11±13.16	0.84	0.40
Height (cm)	159.54± 9.74	160.54±8.32	0.70	0.48
Weight (kg)	68.36 ±15.32	68.63±16.50	0.11	0.91
BMI (kg/m2)	26.84 ± 5.24	26.54±5.67	0.35	0.72
Waist (cm)	91.05 ± 6.49	92.36±6.35	1.30	0.20
Hip (cm)	102.48± 7.78	102.03±7.20	0.38	0.70
Waist-Hip Ratio	0.89 ± 0.05	0.90±0.05	1.89	0.06
Income (Rs/month)	2205 ± 1869.86	2385.79±1961.59	0.60	0.55

Salt Intake (gm/day)	12.04 ± 2.91	11.47±3.14	1.20	0.23
Energy (kcal)	1779.22 ± 509.85	1858.83±663.63	0.86	0.39
Protein (gm/day)	56.33 ± 10.97	55.77±11.68	0.32	0.75
Total Fat (gm/day)	32.44 ± 13.22	33.84±8.28	0.81	0.42
Total Sodium (mg/day)	5045.17±1176.86	4887.49±1240.41	0.83	0.40
Potassium (mg/day)	1518.51± 461.73	1401.85±515.97	1.52	0.13
Calcium (mg/day)	394.90 ± 80.15	366.65±74.22	2.33	0.02
Magnesium (mg/day)	224.67 ± 60.43	220.01±123.43	0.30	0.76

Systolic blood pressure of study subjects during different assessments:

Comparison of systolic blood pressure of study subjects during different assessments is given in Table 3. Average systolic blood pressure of subjects in intervention group at the time of baseline assessment, post assessments 1, 2 and 3 were 155.49 ± 17.13, 151.15±12.86, 149.01±12.83 and 147.31±12.98, respectively.In comparison to the baseline assessment, there has been a significant ($p<0.05$) decline in the systolic blood pressure of subjects in the intervention group in subsequent assessments.Average systolic blood pressure of subjects in non-intervention group at the time of baseline assessment, post assessment 1, 2 and 3 were 155.58±11.04, 155.57±11.16,155.65±10.93 & 155.67±11.10,respectively. There existed no significant ($p>0.05$) difference in the systolic blood pressure of subjects in non-intervention group in subsequent assessments.

Table -3: Comparison of systolic blood pressure of intervention and non-intervention groups during different assessments

Systolic Blood Pressure (mm of Hg)	Study groups		Test of Significance		
	Intervention (N= 81)	Non- intervention (N=81)	t-value	df	p- value
Baseline assessment	155.49±17.13	155.58±11.04	0.38	160	0.97
Post intervention 1st	151.15±12.86	155.57±11.16	2.34	160	0.02
Post intervention 2nd	149.01±12.83	155.65±10.93	3.55	160	0.001
Post intervention final	147.31±12.98	155.67±11.10	4.40	160	0.00
Test of Significance	F=5.009 P =0.001	F=0.002 P>0.09			

Diastolic blood pressure of study subjects during different assessment is.

Diastolic blood pressure of study subjects during different assessments is given in Table 4. Average diastolic blood pressure of subjects in intervention group at the time of baseline assessment, post assessments 1, 2 and 3 were 91.06±8.40, 89.73±7.57, 89.00±7.32 and 88.12±7.19, respectively. In comparison to baseline assessment, there has been decline in the diastolic blood pressure of subjects in the intervention group in subsequent assessments with a significant ($p<0.05$) decline during final post intervention assessment. Average diastolic blood pressure of subjects in non-intervention group at the time of baseline assessment, post assessment 1, 2 and 3 were 90.68±6.48, 90.72±6.47, 90.70±6.40 and 90.67±6.51, respectively. There existed no significant ($p>0.05$) difference in the diastolic blood pressure of subjects in non-intervention group in subsequent assessments except for the final assessment in which a significant ($p<0.05$) difference was noted.

Table No. 4: Comparison of diastolic blood pressure assessments of intervention and non-intervention study groups

Diastolic Blood Pressure (mm of Hg)	Study groups		Test of Significance		
	Intervention (N= 81)	Nonintervention (N=81)	t-value	df	p-value
Baseline assessment	91.06±8.40	90.68±6.48	0.32	160	0.75
Post intervention 1st	89.73±7.57	90.72±6.47	0.89	160	0.37
Post intervention 2nd	89.00±7.32	90.70±6.40	1.56	160	0.12
Post intervention final	88.12±7.19	90.67±6.51	2.37	160	0.02
Test of Significance	F=5.009; p=0.07	F=0.002; p=0.9			

DISCUSSION

Using JNC VII Classification, half of the subjects were normotensive. Nearly 3 out of 10 subjects were hypertensive; two third of them were in stage 1 hypertension. Similar findings were reported by several workers (Anchala t al, 2014 ; Gupta, 1997). Contrary to this several workers reported a higher prevalence of hypertension (Ganguliet al, 2013; Joshi et al, 2012). Lower prevalence of hypertension were reported by some researchers (Anand, 2000; Depa et al, 2003; Malhotra et al,1999; Mohan et al, 2001). It is alarming to note that one fifth of the study subjects were in the stage of pre hypertension. Although they were free from the disease as per JNC-7 criteria, they were at potential risk of the disease.

Results of pre-intervention and post-intervention assessments clearly demonstrates the efficacy of intervention package in lowering average systolic blood pressure of subjects in intervention group during post intervention assessments 1, 2 and 3 done at monthly intervals whereas this has not happened in the non-intervention group. Although decline in the diastolic blood pressure of the subjects in the intervention group occurred in subsequent assessments, the decline with reference to non-intervention group was significant in the final post intervention assessment only. The findings of the study are in consonance of results obtained in randomized controlled trials in Puduchery (Saptharishi et al, 2009; Subramanian et al, 2011). As the post intervention period was of short duration, further decline in blood pressure could not be assessed.

CONCLUSION

The intervention package was efficacious in lowering average systolic blood pressure in the intervention group during follow up assessments. The findings of this have significant implication in management of hypertension and consequent reduction in cardiovascular morbidities.

REFERENCES

1. Anand, M.P.(2000). Prevalence and grades of hypertension amongst executives of Mumbai. J AssocPhysInd, 48(12)1200-1201.
2. Anchala, R., Kannuri, N. K., Pant, H., Khan, H., Franco, O.H., Angelantonio, E.&Prabhakaran, D.(2014) Hypertension in India: a systematic review and meta-analysis of prevalence, awareness, and control of hypertension. J Hypertens ,32(6),1170-7.
3. Deepa, R., Santirani, C.S., Pradeepa, R., Mohan, V. (2003). Is the rule of halves in hypertension still valis? Evidence from the Chennai urban population study.J.Assoc. Pys. India, 51, 153-157.
4. Ganguli, D., Das, N., Saha, I., Chaudhuri, D., Ghosh, S., Dey S.(2013). Risk factors for hypertension in a population-based sample of postmenopausal women in Kolkata, West Bengal, India.Asia Pac J Public Health, 25(5),388–397.
5. Gupta, R.(1997). Meta-analysis of prevalence of hypertension in India.Indian Heart J, 49(1),43-8.
6. JNC-7: The Seventh Report of The Joint National Committee On Prevention, Detection, Evaluation, And Treatment Of High Blood Pressure (Jnc 7), (2003).U.S. Department of Health and Human Services, National Institute of Health; National Heart Lung and Blood Institute.NIH Publication No.03-5233,2-3.
7. Joshi, S.R., Saboo, B., Vadivale, M., Dani, S.I., Mithal, A., Kaul, U.,....Sivakadaksham, N. (2012). Prevalence of diagnosed and undiagnosed diabetes and hypertension in India: results from the Screening India's Twin Epidemic (SITE) study. Diabetes TechnolTher ,14(1),8–15.
8. Malhotra, P., Kumari, S., Kumar, R., Jain, S., Sharma, B.K.(1999). Prevalence and

determinants of hypertension in an un-industrialized rural population of north India.J. Hum. Hypertens, 13(7), 467-472.

9. Mohan, V., Deepa, R., Rani S. S., Premlatha, G.(2001) Prevalence of CAD and relationship to lipids in a selected population in South India. J. Am. Coll. Cardiol, 38(3), 682-687.
10. Saptharishi, L., Soudarssanane, M., Thiruselvakumar, D., Navasakthi,D., Mathanraj, S., Karthigeyan,M., &Sahai, A. (2009). Community-based Randomized Controlled Trial of Non-pharmacological Interventions in Prevention and Control of Hypertension among Young Adults. Indian Journal of Community Medicine : Official Publication of Indian Association of Preventive & Social Medicine, 34(4), 329–334. http://doi.org/10.4103/0970-0218.58393
11. Subramanian,H., Soudarssanane, M. B., Jayalakshmy, R., Thiruselvakumar, D., Navasakthi, D., Sahai, A., &Saptharishi, L. (2011). Non-pharmacological Interventions in Hypertension: A Community-based Cross-over Randomized Controlled Trial. Indian Journal of Community Medicine : Official Publication of Indian Association of Preventive & Social Medicine, 36(3), 191–196. http://doi.org/10.4103/0970-0218.86519.
12. Upadhyay, R. P. (2012). An Overview of the Burden of Non-Communicable Diseases in India. Iranian Journal of Public Health, 41(3), 1–8.
13. World Health Organization (2011).Global status report on non-communicable diseases 2010.Geneva.
14. World HealthOrganization (2013) : A Global brief on hypertension; silent killer: global public health crisis. World health day 2013, Document number: WHO/ DCO/ WHD/2013.