International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

Effect of Laughter Therapy on Blood Pressure and Pulse Rate in South Indian Population

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Received: 20/04/2015 *Revised: 28/04/2015* *Accepted: 17/05/2015*

ABSTRACT

Health is a very complex concept and depends on many factors; laughter yoga can be used as additional therapy for many chronic diseases.100 healthy volunteers of both the sexes (Male - 65; Female - 35) with an age group of 18 – 69 years from Kurnool Laughter Club, Kurnool were taken for the study. The present study was conducted in 10 sessions with the all above volunteers during a period of 365 Days. In our study we have observed all the vital parameters values like Pulse Rate, Systolic Blood Pressure and Diastolic Blood Pressure were reduced after laughter therapy and were shown significant incidence. We were also observed mean diastolic blood pressure reduced in all age groups, the reduction was more significant among younger age group (< 50 yrs) compared to the older age group (>50 yrs).Positive effects of laughter considered as one of the additional methods for enhancement of health and to prevent cardiovascular disease.

Key words: Blood pressure, Diastolic, Laughter, Systolic, Therapy

INTRODUCTION

Psychosocial stresses of our modern life precipitates various cardiovascular disorders by distorting basic neuro-endocrine mechanism. The psychosocial stresses activate limbic system and hypothalamus which controls the autonomic nervous system. [1] When this system is stimulated, increase in output of both adrenaline and nor-adrenaline occur, both from sympathetic nerve fibers as well as from adrenal medulla causing increase in heart rate, systolic and diastolic blood pressures. [1,2] Laughter is the best medicine. It can be effectively used as part of a complementary program for promoting good health and in the prevention and treatment of various micro vascular diseases. [3] Laughter therapy has positive effects on diabetes, the immune system, depression, loneliness, dementia, and micro vascular diseases. Current research indicates that using laughter is well accepted by the public and is frequently used as coping mechanism. Today there are 6000 laughter clubs in 60 countries where people practice laughter. [4]

MATERIALS AND METHODS

100 healthy volunteers of both the sexes (Male - 65; Female - 35) with an age

group of 18-69 years from Kurnool Laughter Club, Kurnool were taken for the study. The present study was conducted in 10 sessions with the all above volunteers during a period of 365 Days. All the subjects were with good socioeconomic background and consent was obtained from individual subject respectively with prior information about the procedure of the study. Our study has no conflicts of interest and not funded by any government organization. Ethical Clearance for the study was obtained from Institutional Ethical Committee, Sri Padmavathi Medical College, SVIMS, Tirupati, Andhra Pradesh. The parameters like Systolic pressure, Diastolic pressure and pulse rate were measured by using Infi Check Automatic blood pressure monitor. All the Data was tabulated and statistical analysis was done. The data was expressed as mean. Probability values-'P' values are derived from analysis of variants. 'P' value less than 0.05 was considered statistically significant. The results were then interpreted and tabulated.

RESULTS

Mean Systolic Blood Pressure (SBP) before and after laughter practice was 125 and 119.71 respectively in Female volunteers. Mean difference was 5.37. Mean Systolic Blood Pressure (SBP) before and after laughter practice was 125.52 and 119.69 respectively in Male volunteers. Mean difference was 5.83. In both the volunteers (Male - 65; Female-35) mean SBP before and after laughter practice was 125.37 and 119.7 respectively. Mean difference was 5.67 (Table-1).The reduction in mean SBP after laughter practice was statistically significant ($p<0.001$).Mean Diastolic Blood Pressure (DBP) before and after laughter practice was 79.37 and 72.82 respectively in Female volunteers. Mean difference was 6.54. Mean Diastolic Blood Pressure (DBP) before and after laughter practice was 79.55 and 73.95 respectively in Male volunteers. Mean difference was 5.6.In both the volunteers (Male - 65; Female-35) mean DBP before and after laughter practice was 79.49 and 73.56 respectively. Mean difference was 5.93 (Table-2). The reduction in mean DBP after laughter practice was statistically significant ($p<0.001$). In 35 female study volunteers; Mean pulse rate before and after laughter practice were 83.51 and 80.2 respectively. The Mean difference was 3.31. In 65 male study volunteers; Mean pulse rate before and after laughter practice were 81.01 and 77.2 respectively. The Mean difference was 3.81. In 100 total study volunteers; Mean pulse rate before and after laughter practice were 81.89 and 78.25 respectively. The Mean difference was 3.64 (Table-3).The reduction in pulse rate after laughter practice was statistically significant ($p<0.001$). In 15 study volunteers of 18- 20 years age group mean SBP before and after laughter practice were 119 and 114.86 and mean difference was 4.1.In 16 study volunteers of 21-30 years age group mean SBP before and after laughter practice were 120.56 and 116.31 and mean difference was 4.25.In 28 study volunteers of 31-40 years age group mean SBP before and after laughter practice were 125.92 and 120.07 and mean difference was 5.85.In 17 study volunteers of 41-50 years age group mean SBP before and after laughter practice were 128.82 and 122.05 and mean difference was 6.76.In 15 study volunteers of 51-60 years age group mean SBP before and after laughter practice were 128.8 and 122.60 and mean difference was 6.2.In 9 study volunteers of 60-69 years age group mean SBP before and after laughter practice were 130.55 and 123.33 and mean difference was 7.22 (Table-4).The reduction in SBP after laughter practice in every age group was statistically significant ($p<0.001$). In 15 study volunteers of 18- 20 years age group mean DBP before and after laughter practice

were 76.8 and 72.73 and mean difference was 4.06.In 16 study volunteers of 21-30 years age group mean DBP before and after laughter practice were 75.18 and 68 and mean difference was 7.18.In 28 study volunteers of 31-40 years age group, mean DBP before and after laughter practice were 78.60 and 73.96 and mean difference was 4.64.In 17 study volunteers of 41-50 years age group, mean DBP before and after laughter practice were 82.05 and 77.41 and mean difference was 4.64.In 15 study volunteers of 51-60 years age group, mean DBP before after laughter practice were 79 and 74.06 and mean difference was 4.93.In 9 study volunteers of 60-69 years age group, mean DBP before and after laughter practice were 79.22 and 75.44 and mean difference was 3.77(Table-5).The reduction in DBP after laughter practice in every age group was statistically significant ($p<0.001$). In 15 study volunteers who were in 18 to 20 years age group, mean pulse rate before and after laughter practice were 85.66 and 84.26 and mean difference was 1.4.In 16 study volunteers of 21-30 years age group mean pulse rate before and after laughter practice were 82.87 and 79.06 and mean difference was 3.81.In 28 study volunteers of 31-40 years age group mean pulse rate before and after laughter practice were 82.39 and 78.39 and mean difference was 4.00.In 17 study volunteers of 41-50 years age group mean pulse rate before and after laughter practice were 80.88 and 75.82 and mean difference was 5.05.In 15 study volunteers of 51-60 years age group mean pulse rate before and after laughter practice were 79.53 and 75.2 and mean difference was 4.33.In 9 study volunteers of 60-69 years age group mean pulse rate before and after laughter practice were 78.11 and 76.00 and mean difference was 3.64 (Table-6).The reduction in pulse rate after laughter practice in every age group was statistically significant ($p<0.001$).

In 100 total study volunteers, mean pulse rate before and after laughter were 81.89 and 78.25 respectively. The Mean difference was 3.64.Mean SBP before and after laughter were 125.37 and 119.7 respectively. The Mean difference was 5.67. Mean DBP before and after laughter were 79.49 and 73.56 respectively. The Mean difference was 5.93(Table-7). All vital parameters PR, SBP, DBP significantly reduced after laughter practice.

Table-1: Distribution of Systolic Blood Pressure according to gender

Gender	No	MEAN		S D		MEAN DIFFERENCE	T VALUE	P VALUE
		Before	After	Before	After			
Female	35	125.08	119.71	5.33	3.51	5.37	10.62	p<0.001; s
Male	65	125.52	119.69	6.50	6.50	5.83	15.38	p<0.001; s
Total	100	125.37	119.7	6.09	5.62	5.67	18.74	p<0.001; s

Table-2: Distribution of Diastolic Blood Pressure according to gende

Gender	No.	MEAN		SD		MEAN DIFFERENCE	T VALUE	P VALUE
		Before	After	Before	After			
Female	35	79.37	72.82	6.174	12.73	6.54	3.61	p<0.001; s
Male	65	79.55	73.95	9.27	5.61	5.6	5.47	p<0.001; s
Total	100	79.49	73.56	8.29	8.73	5.93	6.49	p<0.001; s

Table-3: Distribution of Pulse Rate of volunteers according to gender

Gender	No.	MEAN		SD		Mean Difference	T Value	P Value
		Before	After	Before	After			
Female	35	83.51	80.2	7.87	9.29	3.31	3.98	P<=0.001; s
Male	65	81.01	77.2	10.45	10.71	3.81	7.72	P<=0.001; s
Total	100	81.89	78.25	9.66	10.29	3.64	8.43	P<=0.001; s

Table-4: Distribution of Systolic Blood Pressure in different Age group

AGE	NO.	MEAN SBP		SD		MEAN DIFFERENCE	T VALUE	P VALUE
		BEFORE	AFTER	BEFORE	AFTER			
18-20	15	119	114.86	5.41	4.59	4.13	6.79	p<0.001; s
21-30	16	120.56	116.3	3.20	2.52	4.25	6.82	p<0.001; s
31-40	28	125.92	120.07	4.61	4.78	5.85	11.82	p<0.001; s
41-50	17	128.82	122.05	5.81	7.29	6.76	8.07	p<0.001; s
51-60	15	128.8	122.6	4.195	4.23	6.2	7.09	p<0.001; s
60-69	9	130.55	123.33	4.33	4.18	7.22	6.70	p<0.001; s
Total	100	125.37	119.7	6.09	5.62	5.67	18.74	p<0.001; s

Table-5: Distribution of Diastolic Blood Pressure in different Age group

AGE	NO.	MEAN DBP		S.D		MEAN DIFFERENCE	T ALUE	P VALUE
		BEFORE	AFTER	BEFORE	AFTER			
18-20	15	76.8	72.73	5.88	6.32	4.06	11.8	P<0.001; S
21-30	16	75.18	68	5.02	16.98	7.18	1.94	P>0.05; NS*
31-40	28	78.60	73.96	6.14	5.75	4.64	7.06	P<0.001;S
41-50	17	82.05	77.41	4.80	5.07	4.64	10.85	P<0.001; S
51-60	15	79	74.06	5.56	5.78	4.93	3.35	P<0.001; S
60-69	9	79.22	75.44	1.92	1.17	3.77	3.15	P<0.05; S
TOTAL	100	78.49	73.56	5.85	8.73	4.93	7.44	P<0.001; S

*NS : P >0.05

Table-6: Distribution of Pulse Rate in different Age group

AGE	NO.	MEAN PR		S.D		MEAN DIFFERENCE	T VALUE	P VALUE
		BEFORE	AFTER	BEFORE	AFTER			
18-20	15	85.66	84.26	5.96	6.91	1.4	2.46	P<0.05; S
21-30	16	82.87	79.06	6.27	8.61	3.81	3.73	P<0.01; S
31-40	28	82.39	78.39	10.59	10.87	4	4.00	P<0.001; S
41-50	17	80.88	75.82	12.79	11.94	5.05	4.32	P<0.001; S
51-60	15	79.53	75.2	8.85	10.41	4.33	4.34	P<0.001; S
60-69	9	78.11	76	10.87	10.48	2.11	2.61	P<0.05; S
TOTAL	100	81.89	78.25	9.66	10.29	3.64	8.43	P<0.001; S

Table-7: Distribution of mean vital parameters before and after laughter practice

Vital parameters	Sample	Mean		S.D		Mean Difference	T Value	P Value
		Before	After	Before	After			
Mean PR	100	81.89	78.25	9.66	10.29	3.64	8.43	p<0.001; s
Mean SBP	100	125.37	119.7	6.09	5.62	5.67	18.74	P<0.001;s
Mean DBP	100	79.49	73.56	8.29	8.73	5.93	6.49	p<0.001; s

Figure-1: Infi check automatic blood pressure monitor

DISCUSSION

Miller and Fry has stated that through the laughter the release of beta-endorphin starts and it acts as an opiate it also affects the vascular proliferation and acts anti inflammatory, which reduces the risk and prevents cardiovascular diseases. The effective impact on well-being and consequently on the pulse was also scientifically proven in the studies on the effects of laughter on the endothelium. [5,6] Literature sated that laughter significantly decreased pulse wave velocity, while stress significantly increased pulse wave velocity. Also, laughter significantly decreased

cortisol levels. [7] Movie clips creating mental stress shown 14 of the 20 volunteers experienced reduced blood flow in the brachial artery due to constricted blood vessels. In contrast, arterial widening was increased in 19 of 20 volunteers after watching the movie segments that generated laughter. Overall, mean upper arm flow mediated vasodilation (a measurement of blood flow through the arteries) was increased 22 percent during laughter and reduced 35 percent during mental stress. [8] The effect of laughter therapy on the plasma levels of renin, angiotensinogen and prorenin (substances that help regulate blood pressure) was investigated in patients with type 2 diabetes. The results were that long-term (six months) laughter therapy significantly reduced the plasma components of renin-angiotensin system in patients with diabetes. [9] Effects on blood pressure and vascular tone, it is hypothesized that β-endorphins released by the pituitary activate μ3 opiate receptors (expressed in the vascular endothelium) that in turn, upregulate nitric oxide synthase to enhance production of nitric oxide ; which exerts a variety of cardioprotective cellular processes via cellular signaling pathways that include a cGMP-dependent pathway responsible for vasodilation and reduced platelet aggregation as well as inhibition of leukocyte trafficking for reduction of vascular inflammation. [10,11] In our study we have observed all the vital parameters values like Pulse Rate, Systolic Blood Pressure and Diastolic Blood Pressure were reduced after laughter therapy compared to before therapy. The reduction in PR, SBP, DBP were due to increased vagal tone on the heart because of the modulation of autonomic function mediated through the limbic system and hypothalamus. [1,12] The mean diastolic blood pressure reduced significantly in all age groups, the reduction was more significant among younger age group (< 50 yrs) compared to the older age group (>50 yrs) was 1.07.The reduction in mean diastolic blood pressure was more in younger age group than in older age group. Mirthful laughter may serve as a useful and important vehicle for the promotion of vascular health. Thus, Laughter therapy can be used as non-pharmacological treatment for the prevention of diabetic microvascular complications. [9,12]

CONCLUSION

Laughter is a powerful form of exercise that gives you more of a cardiovascular workout than many regular aerobic activities. [12] Non pharmacological method like laughter should be encouraged to control the modifiable risk factors. [12] Our study suggests that Laughter therapy could be used as alternative medicine in the prevention and treatment of illnesses.

ACKNOWLEDGEMENTS

Authors acknowledge the valuable suggestions received from Prof. B. Narsing Rao, Department of Physiology, Kurnool Medical College, during this work.

Conflict of Interest: NIL

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How to cite this article: Nagoor K, Dudekula R. Effect of laughter therapy on blood pressure and pulse rate in south Indian population. Int J Health Sci Res. 2015; 5(6):269-274.

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