

## RESEARCH ARTICLE

### A cross-sectional study on the role of laughter therapy on regulation of blood pressure in Visakhapatnam population

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#### ABSTRACT

**Background:** Laughter has positive effects on certain aspects of health and has a significant role in the management of cardiovascular health. **Aims and Objectives:** The aim and objective is to study the role of laughter therapy on the regulation of blood pressure. **Materials and Methods:** A total of 100 healthy volunteers of both the sexes (male - 65 and female - 35) with an age group of 18–70 years from Vizag Laughter Club, Visakhapatnam, were utilized to study the effect of laughter therapy in the regulation of blood pressure. The present study was conducted in 10 sessions with the all above volunteers during 2017–2018. **Results:** A significant reduction in vital parameters such as pulse rate, systolic blood pressure, and diastolic blood pressure was noted after laughter therapy in our study. We have observed reduced mean diastolic blood pressure in all age groups which was more significant among younger age group (<50 years) compared to the older age group (>50 years). **Conclusion:** Laughter can be considered as an alternative method to enhance good health and to prevent cardiovascular diseases.

**KEY WORDS:** Blood Pressure; Laughter; Practice; Pulse Rate

#### INTRODUCTION

Laughter can be used as part of a complementary program for promoting good health.<sup>[1]</sup> Laughter therapy has a primary role in the management of diabetes, the immune system, depression, loneliness, dementia, and microvascular diseases. The psychosocial stress stimulates the limbic system and hypothalamus to control the autonomic nervous system.<sup>[2]</sup> Significance increase in output of both adrenaline and nor-adrenaline occurring due to stimulation of the autonomic nervous system leads to increase in heart rate, systolic blood pressure, and diastolic blood pressure (SBP and DBP).<sup>[2,3]</sup>

In coping mechanism, laughter is widely accepted by the public indicating its importance. Due to the significant role of laughter therapy, many laughter clubs established and suggested to practice laughter in various countries.<sup>[4,5]</sup> Provoking laughter in people by watching funny videos, the new method coming from India, may prove to be of efficient in the regulation of blood pressure. The present study was undertaken to study the role of laughter therapy in the regulation of blood pressure and its importance in Visakhapatnam population.

#### MATERIALS AND METHODS

A total of 100 healthy volunteers of both the sexes (male - 65 and female - 35) with an age group of 18–70 years from Vizag Laughter Club, Visakhapatnam, were taken for the study. The present study was conducted in 10 sessions with the all above volunteers from April 2016 to March 2017. All the subjects were with good socioeconomic background,

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**Table 1: Blood pressure in study population after laughter therapy**

Gender	Mean±SD				P value
	SBP		DBP		
	Before	After	Before	After	
Female	123.08±5.33	119.71±3.51	78.33±5.97	71.80±11.93	P<0.001*
Male	124.52±6.50	119.69±6.50	78.54±8.87	72.92±5.68	

\*P<0.05: Statistically significant. SD: Standard deviation, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

**Table 2: PR after laughter therapy in study population**

Gender	Mean±SD		P value
	Before	After	
Female	82.61±7.89	80.12±9.29	P≤0.001*
Male	81.21±10.45	77.2±10.71	

\*P<0.05: Statistically significant. SD: Standard deviation, PR: Pulse rate

and the consent was obtained from individual subject, respectively, with prior information about the procedure of the study. The present study was in Clearance with the Institutional Ethical Committee, GIMSR, GITAM University, Visakhapatnam, Andhra Pradesh (No.13/GIMSR/GU/AP/26/04/2016). Systolic pressure, diastolic pressure, and pulse rate (PR) were measured using automatic blood pressure monitor.  $P < 0.05$  was considered statistically significant using ANOVA.

## RESULTS

We have noted a significant reduction in blood pressure (SBP and DBP) in both males and female after laughter practice in the present study [Table 1]. Statistically significant reduction was observed in PR in males and females [Table 2]. The reduction in blood pressure and PR after laughter practice was statistically significant ( $P < 0.001$ ). The mean blood pressure in different age groups (18–70 years) was significantly reduced after laughter practice and also noted significant SBP and DBP reduction in individual group. Reduced mean diastolic blood pressure in all age groups was more significant among younger age group (<50 years) compared to the older age group (>50 years) and there was noted [Table 3]. There was a significant reduction in PR in different age groups (18–70 years) after laughter practice and also noted a significant reduction in individual group [Table 4]. The vital parameters such as mean SBP, mean DBP, and mean PR were significantly reduced after laughter practice in the present study and there was noted [Table 5].

## DISCUSSION

SBP, DBP, and PR parameters were significantly reduced after laughter therapy in the present study. Laughter therapy can be used as non-pharmacological treatment for the prevention

of diabetic microvascular complications.<sup>[6,7]</sup>  $\beta$ -endorphin release due to laughter acts as anti-inflammatory and reduces the risk of cardiovascular diseases.  $\beta$ -endorphins released by the pituitary activate  $\mu$ 3-opiate receptors in turn, upregulate nitric oxide synthase to enhance production of nitric oxide; which exerts a variety of cardioprotective cellular processes responsible for vasodilation and reduced platelet aggregation as well as inhibition of leukocyte trafficking for reduction of vascular inflammation leads to regulation of blood pressure and vascular tone.<sup>[8,9]</sup> The mean PR also significantly reduced after laughter therapy in the present study. The effect of laughter therapy studies on the pulse was also scientifically proven.<sup>[10,11]</sup> Laughter significantly decreased the pulse wave velocity and cortisol levels.<sup>[12]</sup> Laughter therapy effects on the plasma levels which regulate blood pressure were investigated in patients with type 2 diabetes. The long-term laughter therapy significantly reduced the plasma components of renin-angiotensin system in patients with diabetes.<sup>[6]</sup> Mean upper arm flow-mediated vasodilation was increased by 22% during laughter and reduced 35% during mental stress.<sup>[13]</sup> The reduced vital parameters values such as PR, SBP, and DBP after laughter therapy were compared to before therapy due to increased vagal tone on the heart because of the modulation of autonomic function mediated through the limbic system and hypothalamus.<sup>[2,7]</sup> The practice sessions of laughter therapy in the present study suggest the alternative method in the regulation of blood pressure to maintain good health. The results of the present study are in agreement with the previous literature and state that laughter practice plays a major role in the regulation of blood pressure and PR to maintain good cardiac health.

## CONCLUSION

Laughter therapy considered as one of the additional methods for the enhancement of good health and in treatment of illnesses.

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**Table 3: Blood pressure in different age groups**

Age	n	Mean SBP		Mean DBP		P value
		Before	After	Before	After	
18–20	12	119.00±5.41	114.86±4.59	76.8±5.88	72.73±6.32	P<0.001*
21–30	18	120.56±3.20	116.3±2.52	75.18±5.02	68±6.98	P<0.001*
31–40	27	125.92±4.61	120.07±4.78	78.60±6.14	73.96±5.75	P<0.001*
41–50	18	128.82±5.81	122.05±7.29	82.05±4.80	77.41±5.07	P<0.001*
51–60	14	128.8±4.195	122.6±4.23	79±5.56	74.06±5.78	P<0.001*
61–70	11	130.55±4.33	123.33±4.18	79.22±1.92	75.44±1.17	P<0.001*

\*P<0.05: Statistically significant. SBP: Systolic blood pressure, DBP: Diastolic blood pressure

**Table 4: PR in different age groups**

Age	n	Mean PR		P value
		Before	After	
18–20	12	85.66±5.96	84.26±6.91	P<0.05*
21–30	18	82.87±6.27	79.06±8.61	P<0.01*
31–40	27	82.39±10.59	78.39±10.87	P<0.001*
41–50	18	80.88±12.79	75.82±11.94	P<0.001*
51–60	14	79.53±8.85	75.2±10.41	P<0.001*
61–70	11	78.11±10.87	76±10.48	P<0.05*

\*P<0.05: Statistically significant. PR: Pulse rate

**Table 5: Distribution of mean vital parameters before and after laughter practice**

Parameters	Mean±SD		P value
	Before	After	
Mean PR	81.89±9.66	77.27±10.29	P<0.001*
Mean SBP	126.37±6.09	118.67±5.81	P<0.001*
Mean DBP	79.49±8.29	72.96±7.94	P<0.001*

\*P<0.05: Statistically significant. SD: Standard deviation, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

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