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Pulmonary Function Tests of Elderly Males Engaged In Laughter Clubs

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Abstract
Background :It has been more than 30 years since Norman Cousins published an article in the New England Journal of Medicine(1) extolling the potential medicinal benefits of laughter and humor. Yet the study of laughter still occupies a rather modest place in scientific inquiry.(2)Many studies have proved that laughter has both, short term and long term benefits on our physical, mental and emotional health.
Purpose: *The purpose of this study is to assess and compare the pulmonary functions of elderly attending laughter clubs and sedentary individuals of same age group.*
Study Design: *This was a case control study.*
Methods : *55 elderly healthy males who were aged 50 to 70 years, who were regularly (with at least 85% attendance) engaged in laughter club and same age, height, weight matched sedentary individuals were enrolled in the study. Pulmonary function test parameters like FVC, MVV, FEV1, FEF 25 - 75% were measured.*
Data Analysis : *Unpaired 't' test was applied for comparing the parameters.*
Results :*Statistically highly significant difference was found when the respiratory functions when compared between elderly individuals going to laughter clubs with sedentary individuals.*
Conclusion : *Subjects regularly attending laughter clubs have highly significant increase in pulmonary function test parameters when compared with sedentary individuals.*
Key Words: *Elderly individuals, laughter clubs, Pulmonary Function test (PFT) parameters.*

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I. Introduction

"Laughter is the tonic, the relief, the surcease for pain" is said by Charlie Chaplin. It was not until 1995 that laughter as an exercise or laughter yoga, emerged. But during the past decade, systematically through laughter clubs, the popularity of such laughter programs has grown markedly.

So, with increasing recognition one might expect that there would be growing application of laughter for their complementary and alternative medical benefits. It should be also mainly noted that laughter is an adjunct to and not a replacement for accepted therapies.

They are easy to prescribe and even there are no substantial concerns with respect to dose, side effects or allergies.

Even after so many advantages it seems, however, that medical professionals have been reluctant to embrace and support laughter for health. (3)

As defined by World Health Organization (WHO), health is a state of complete physical, mental and social well being and not merely an absence of infirmity or disease. Health promotion mainly is a part of primordial and primary approaches of health care delivery system. It is the process of empowering people to make healthy lifestyle choices and improve the quality of life. But for any health promotion process to be successful, active community participation is crucial. (4)

Increase in self-help clubs and voluntary organizations developed to encourage this in India. Two decades back, "Laughter Club" is one such. social activity, which got started (3)

"Seven days without laughter makes one weak." says Joel Goodman and **yes, laughing matters**. (5)

An observational research done by Colin Greaves, proved that in 12 months, there were significant improvements in depression and social support in geriatric participants engaging in programs of creative exercise and / or cultural activities with an emphasis on social interaction. (6) Tun SA, Tan LG et al proved that humor appears to alternate catecholamines and myocardial infarction (MI) recurrence and thus may be an effective adjunct in post MI Care (7)

Laughter has physiological, psychological, social and spiritual benefits with limited adverse effects and practically no contraindications.

Mainly, therapeutic efficiency of laughter is mainly desired from spontaneous laughter (triggered by positive emotions or external stimuli) and self - induced laughter (triggered by oneself at will) (8)
However, the medical literature contains little on humor, and very little research has been conducted on this common aspect of human communication. (9)
Although individual reviews and opinions are published regarding the therapeutic use of laughter, but very few studies on laughter clubs are reported. Hence, the aim of this study is to assess the effect of laughter clubs (Hasya Yoga Mandal) in health promotion of elderly subjects and to compare their lung volumes and capacities with those of sedentary individuals.

II. Materials And Method :

Present study was conducted in the Pulmonary Function Test (PFT) Laboratory, Department of Physiology, Govt. Medical College, Aurangabad.
Study Design : Case Control Study.
Cases : 55 elderly healthy males, aged 50 - 70 years, who were regularly (at least 85% attendance) attending laughter club since last 4 years, were recruited as study cases.
Controls : 55 Sedentary males were recruited as controls and care was taken that age, height, weight of the control was comparable and similar to the study cases.
Matching with socio-economic status was done and none of the subject was engaged in any kind of regular physical exercise or athletic activity.
After explaining the purpose and design of the study, informed consent was obtained from all participants.
All the study participants were clinically examined to rule out history of smoking, acute / chronic respiratory disorders, cardiovascular, hepatic or renal impairment and subjects with these aliments were excluded from the study.
Pulmonary functions were recorded on Whole Body Plethysmograph - Elite - Dx model (Med-Graphics USA make) PFT machine.
All the parameters were recorded on subjects sitting comfortably in up-right position and at Body Temparature and Pressure Saturated (BTPS).
The test procedure was done between 3 to 5 pm for all the participants to avoid diurnal variations.
Percent (%) predicted values with respect to their characterizations as per the Breeze Suite Software for PFT were taken into consideration for statistical analysis to eliminate the effect of age, sex, height and weight on different parameters of pulmonary function.
Unpaired 't' test was applied for comparison between two groups.

III. Results

Table I : Demographic Variable.

Parameter	**Cases (Mean + SD)**	**Controls (Mean + SD)**
Age (Years)	62.88 + 8.24	60.66 + 7.84
Height (Centimeter)	165.1 + 6.8	164.6 + 7.1
Weight (Kilogram)	64.7 + 7.7	62.5 + 9.2

Table II : Comparison of Percent (%) Predicted values of Pulmonary functions.

Lung Parameters	Test Group **(Mean + SD)**	Control Group **(Mean + SD)**	'p' Value
FVC (%)	78.9 + 6.4	54 + 9.7	0.0001**
MVV (%)	99.7 + 13.3	78.4 + 17.3	0.0001**
FEV1(%)	73.5 + 4.9	56.1 + 5.8	0.0001**
FEF 25-75(%)	99.7 + 13.3	78.4 + 17.3	0.0001**

**** Highly Significant**

IV. Discussion

Present study indicates that the individuals daily going to laughter clubs had significantly higher lung volumes and capacities when compared with the sedentary individuals.
Laughter is a uniquely human vocal signal with possible health benefits attributed to reduced muscle tension, increased oxygenation of blood and exercising of the heart.
The sounds of laughter are short, spasmodic and broken and as Drawin observed, " as different as possible from screams or cries."(10)
They are produced by contractions of the chest walls and especially the diaphragm, forcing air through the vocal tract and often followed by a deep inspiration of air. (11,12)

Smiling and laughing may occur spontaneously in response to humor or to appropriate emotional or sociological stimuli, and can be elicited upon command as either a voluntary or contrived i.e. fake laughter. These two types of laughter involve different neural pathway.(13)

Humor has positive physiological effects, such as decreasing stress hormones like epinephrine and cortisol and increasing the activation of the mesolimbic dopaminergic reward system.(14, 15)

Laughter is a unique human behaviour naturally occuring in a variety of social situations.

Facial, respiratory and laryngeal muscles are all involved for laughter production (11), leading to changes in lung volume and dynamic compression of the airways .(16)

A strong physiological component involved in laughing is respiration.(17) The function of respiratory system depends on many factors out of which important ones are the central nervous system with the neural pathways and the muscles of respiration and chest wall.

The lungs are not capable of inflating themselves. The force of this inflation must be supplied by the muscles of respiration.(18)

The experimental group demonstrated a significant increase in pulmonary function test parameters. The above obtained result is supported by research findings which proved that respiratory system is coordinated in a rather precise way with laryngeal activity during a laugh. Phasic respiratory efforts are present during laughter. (19)

Laughter involves deep inspiration followed by forceful expiration and exhalation. Due to increased respiratory muscle strength by regular laughter therapy, indicating improvement in lung volumes and capacities.

Increase in respiratory functions is also observed in the study conducted by NIshigandha R. Supekar et al.(20)

Similar type of results are also discussed in a study conducted by MS Buchowski et al . (21)

Findings range from suggesting that in addition to a stress relief effect, laughter can bring about feeling of being uplifted or fulfilled (22) to showing that the act of laughter can lead to immediate increases in respiratory rate, respiratory depth, oxygen, consumption and heart rate. (23)

These increases are then followed by a period of muscle relaxation, with a corresponding decrease in respiratory rate, heart rate and blood pressure.

Even if laughter and humor are not beneficial for everyone, but since there are no negative side effects, they should be done and used at least to help reduce stress and pain (24)

V. Conclusion

In the present study, we found that the mean values of pulmonary function parameters such as FVC,FEV1,FEF 25-75 %,and MVV were significantly increased in subject going to laughter clubs, regularly.

Hence we can conclude that participation in a regular exercise program such as engaging oneself in social activities as in laughter clubs is an effective intervention, in elderly.

Laughter clubs definitely play a major role in promotion of health in community with respect of pulmonary function.

VI. Recommendations

Human emotions, such as anxiety, depression, fear, joy, and mainly laughter, profoundly impact psychological and physiological processes. These emotions form a set of basic, evolved functions that are shared by all humans. Keeping this fact in mind, health care providers may take advantage of these powerful emotions to improve health. Hence,

1) Medical practitioners should recommend their elderly patients at least who are not able to go out for exercise daily, to get enrolled in laughter clubs.

2) Everyone should laugh for at least 15 to 20 minutes a day along with minimum 30 minutes of exercise, to enhance health.

3) Let us begin to consider that, along with getting enough sleep, regularly eating green vegetables, laughter should also be endorsed as a wonderful way to enhance health and it can act as a catalyst for change, for no cost.

Limitations :

More pulmonary function parameters must also be studied for detailed effect of laughter on respiratory system as a whole.

An important limitation of the present study may be not comparing the effects of laughter on other body functions.

Small sample size and gender is one more limitation of the present study.

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