

Original Article

Effectiveness of laughter therapy in cognitive skills improvements

Sonya Arshad, Syed Hasan Abbas Rizvi, Muhammad Faisal Qureshi, Minha Hanif, Imama Iftikhar, Majid Ayoub & Sanjay Kumar

Liaquat National School of Physiotherapy

DOI:10.29052/IJEHSR.v7.i1.2019.55-60

Corresponding Author Email:

sonya.arshad@lnh.edu.pk

Received 08/11/2018

Accepted 27/01/2019

Published 01/03/2019



Abstract

Background: In today's society, a huge population is facing intellectual health problems. Therapeutic expense of such problems leads people into a financial burden. In spite of squandering cash on pharmaceutical prescription, it is better to take benefit from laughter therapy. It is a part of human behavior, which helps human clarify their intentions in social interaction. The aim of this study was to determine the effects of laughter on cognition.

Methodology: This uncontrolled experimental study was conducted on 80 participants, recruited on convenience bases. All 18-30 years aged subjects with no chronic psychological disorder were included. While patients with a chronic psychological disorder were excluded from the study sample. Participants were divided into 3 groups: 26 participants in Group A, 33 participants in Group B and 21 participants in Group C. Cognition skills were assessed by using Montreal Cognitive Assessment (MoCA) score before and after laughter therapy session of about 25 mins. The collected data was then analyzed using SPSS version 21.

Results: All the groups showed improvement in MoCA score after laughter therapy. Group A MoCA score after therapy was 22.70. Group B MoCA score after therapy was 25.10. Group C MoCA score after therapy was 25.42. By mean analysis, we figured out that there is a greater change of cognition seen in members of Group C than in Group B and change in Group B is greater than in Group A.

Conclusion: It was concluded that laughter improves cognition and regulates neurotransmitters. Moreover, it has great influence in daily life and puts a great impact on memory and cognitive skills.

Keywords

Laughter, Humor, Intellectual, Montreal Cognitive Assessment (MoCA), Cognition



Introduction

In modern society, with strong competition and socioeconomic interaction, a huge population is facing psychological and mental health problems¹. Laughter therapy is a type of cognitive-behavioral therapy; it could make psychological, physical and social relationships salubrious by relieving the physical and emotional stress and thus have a great impact on cognitive function². Cognitive function refers to the ability of an individual to process thoughts and perform the various mental activities most closely associated with memory, concentration, learning, and problem solving³. Laughter is a part of human behavior controlled by the brain, helping humans to clear up their intentions in social interaction and give an emotional context to conversations⁴.

Neurophysiology indicates that laughter is connected with the activation of the ventromedial prefrontal cortex that produces endorphins (natural pain killers)^{3, 5&6}. It plays a role in the process of decision making, self-control and cognition⁷. Using humor to decrease stress, diminish pain, improve quality of life and even attempt to improve immune functioning, has recently become a well-liked topic in professional literature. Researchers have documented that increased level of stress can lead to the alteration in psychological and physiological functioning by changes in the usual stress hormones such as asadenocorticotrophic hormone (ACTH), cortisol, epinephrine^{8&9}. Laughter decreases the level of stress hormones like cortisol, epinephrine (adrenaline), growth hormone and increases the level of endorphins¹⁰. Scientists have found that good belly laughter leads to release of endorphins from the brain which enhance many mental functions¹¹. Endorphins have a powerful strengthening effect on learning and memory^{12&13}.

Elevating endorphin levels can produce a natural rise in serotonin levels¹⁴. Release of a

large amount of serotonin facilitates the synaptic transmission to a greater extent, leading to memory storage¹⁵⁻¹⁷. Both endorphin and serotonin are responsible for modulating mood and brain chemistry¹⁸. Laughter therapy can help regulate the dopamine and serotonin release^{2&19}. The most advantageous laughter therapy sessions involve systematic programmable activities, typically provided in a group setting that provides laughter exercise, funny videos and attitudinal mindfulness to achieve general or specific goals²⁰. Laughter session may provide opportunities for individuals to laugh and understand to cope up with the stressful situations in our daily life²⁰.

The purpose of the current study was to evaluate the effectiveness and the importance of laughter in daily life because it is not just a method of capturing attention, but all these factors have a great impact on our memory and cognitive skills.

Methodology

An uncontrolled experimental study was conducted; convenience based sampling was done to recruit eighty participants from Liaquat national school of physical therapy. The participants were pre-screened for inclusion criteria of age group 18-30 of both gender and exclusion criteria of any chronic psychological disorder, using an antidepressant, taking any immunosuppressant medication and person having any sleep difficulties. Informed consent was given and verbally explained to all individuals.

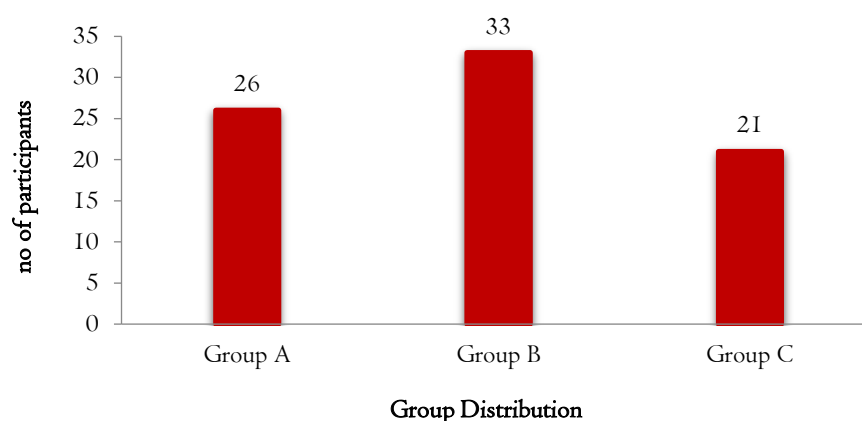
Participants were divided into 3 groups: Group A (always smile), Group B (frequently smile) and Group C (rarely smile). Data was collected by means of a structured questionnaire given to the participants after receiving consents. For screening of cognitive ability of participants each individual was given MoCA Scale²¹. MoCA is 30 points highly validated exam that test for cognitive ability, in which cognitive

functions were tested by examining orientation, short term memory recall, language abilities, attention and calculation, and visual spatial ability. Visual spatial abilities were assessed by using a clock drawing activity and three dimensional (3D) cube activity. The language was assessed by Clash naming task with low familiarity animals i.e. (lion, Camel, Rhino). Attention, concentration and working memory were evaluated using sustained attention task and a serial subtraction task in MoCA test. The time duration for the MoCA test was 10 minutes. Then laughter therapy of 25 minutes was given to participants, the therapy included three videos of ten minutes in total and laughter yoga session of 15 minutes

was also conducted to relieve and relax the participant's mind and to improve their focus and cognition. After the session subjects were again assessed using MoCA test and now time duration was limited to 4 minutes and results were recorded. Finally the pre and post laughter therapy MoCA score were compared using paired sample t-test using SPSS version 21.

Results

A total of 80 participants with a mean age 23.45 ± 1.27 years were included in the study. Out of which 28% were males and 72% were female.



*Group A= Always Smiling; Group B= Frequently Smiling; Group C= Rarely Smiling

Figure I: Distribution of patients with respect to the questionnaire.

According to the results, 36% patients belonged to Group A i.e. always smiling, 43 % (frequently smiling) Group B and 21% (rarely smiling) belonged to Group C as shown in figure I.

Table I: Comparison between before and after mean MoCA Score.

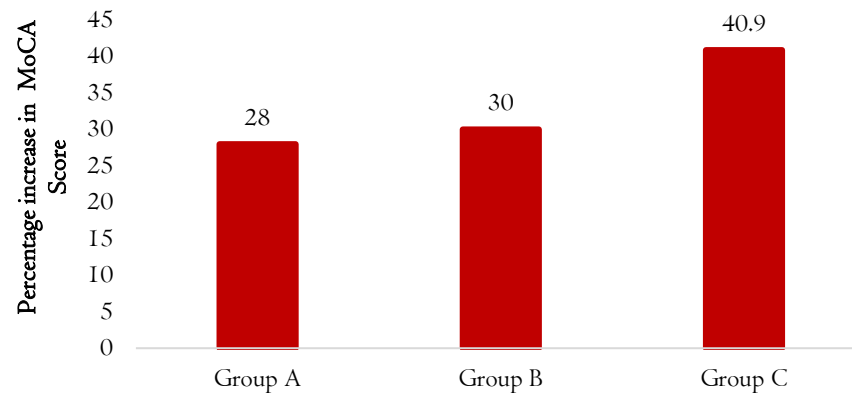
Groups	Before Therapy	After Therapy
Group A	16.26 ± 5.80	22.70 ± 5.17
Group B	17.46 ± 4.38	25.10 ± 3.22
Group C	15.00 ± 5.47	25.42 ± 4.07

*SD=Standard Deviation; Group A= Always Smiling; Group B Frequently Smiling; Group C= Rarely Smiling

*Values are given as Mean \pm SD

The results shown in table I depicts the comparison of MoCA scores of Group A, B and C. Group A MoCA score before therapy was 16.26 ± 5.80 and after therapy was 22.70 ± 5.17 . Group B MoCA

score before therapy was 17.46 ± 4.38 and after therapy was 25.10 ± 3.22 . Group C MoCA score before therapy was 15.00 ± 5.47 and after therapy was 25.42 ± 4.07 . However, the p-value was less than 0.05



*MoCA=Montreal Cognitive Assessment

Figure 2: Percentage increase in MoCA Score.

By mean analysis it was clear that there is greater change of cognition seen in members of Group C than in Group B and change in Group B is greater than in Group A. The percentage increase in MoCA score of Group C was 40.9%, Group B was 30% and Group A was 28% shown in figure 2. The P-value is less than 0.05 thus, found extremely significant results.

Discussion

Laughter therapy induces many physiological changes in the body. The foremost objective of this study was to evaluate the effectiveness of Laughter therapy in cognitive skills improvement. Frued (1905) mentioned that humor can be seen as a specific defense mechanism by which positive emotions can overcome the negative emotions in a stressful situation²². Laughter is a natural and economical therapy that is intended to produce mental and social benefits.

The current study showed a substantial increase in the cognitive ability of group C participants with the statistically significant mean value shown in table I. Group C who rarely smiles were found to be more benefited with the mirthful laughter. The results directly uncovered the significant connection

of memory with an extended period of stress and humor²³.

A study by Berk LS has indicated the neuroendocrine changes during mirthful laughter, in which repeated measures showed a significantly lower level of epinephrine with the p-value=0.017 and cortisol with a p-value=0.011 in the experimental group than control group²⁴. Another study on the effectiveness of laughter therapy in the elderly was performed by Ko HJ and Youn CH. The MMSE scores showed similar increment in both groups, which was not statistically significant. The results were influenced by many factors. Relatively older age, depression and chronic illness may have influenced the low HRQOL in this study²⁵.

Results of the current study in table I supported by the study of Ji Eunjo in terms

of MoCA Scale value ($t = 6.86$, $P\text{-value} < 0.001$)²⁶.

Laughter therapy is considered to be a cost-effective and easily accessible intervention. The current study was limited to the younger population without any disease and sample size was limited by practical consideration of time and space. Further studies are needed to evaluate if laughter would have the same effects on a participant with chronic or acute illness. In addition, further researches with larger sample size, frequent follow up, high frequency and long-term therapy may provide better results in the understanding of therapeutic advantages of Laughter therapy.

Conclusion

The result outlines that "Laughter Therapy" is beneficial to improve cognitive skills. It has been shown to cause changes in cognition and alters neurotransmitter level. It is an inexpensive, easy performed and effective tool for communication. It enhances the mindfulness and strengthens the connections with each other. We need to laugh to stay present and focused. There is nothing in the world as irresistibly contagious as laughter as laughter and good humor.

Conflicts of Interest

None.

Acknowledgement

I would like to express our deep and sincere gratitude to the Liaquat National School of Physiotherapy and the research faculty for giving us the opportunity to do research and providing invaluable guidance throughout this research.

Funding

None.

References

1. Lupien SJ, McEwen BS, Gunnar MR, Heim C. Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Rev Neurosci.* 2009; 10(6):434.
2. Yim J. Therapeutic benefits of laughter in mental health: a theoretical review. *Tohoku J Exp Med.* 2016; 239(3):243-249.
3. Robinson OJ, Vytal K, Cornwell BR, Grillon C. The impact of anxiety upon cognition: perspectives from human threat of shock studies. *Front Hum Neurosci.* 2013; 7:203.
4. Kurtz LE, Algoe SB. Putting laughter in context: Shared laughter as behavioral indicator of relationship well-being. *Pers Relatsh.* 2015; 22(4):573-590.
5. Wild B, Rodden FA, Grodd W, Ruch W. Neural correlates of laughter and humour. *Brain.* 2003; 126(10):2121-2138.
6. Hosobuchi Y, Rossier J, Bloom FE, Guillemin R. Stimulation of human periaqueductal gray for pain relief increases immunoreactive beta-endorphin in ventricular fluid. *Science.* 1979 203(4377):279-281.
7. Kaye WH, Fudge JL, Paulus M. New insights into symptoms and neurocircuit function of anorexia nervosa. *Nature Rev Neurosci.* 2009; 10(8):573.
8. Kiecolt-Glaser JK, McGuire L, Robles TF, Glaser R. Psychoneuroimmunology: Psychological influences on immune function and health. *J. Consult. Clin. Psychol.* 2002; 70(3):537.
9. Munck A, Guyre PM, Holbrook NJ. Physiological functions of glucocorticoids in stress and their relation to pharmacological actions. *Endocr Rev.* 1984; 5(1):25-44.
10. Bowirrat A, JH Chen T, Blum K, Madigan M, A Bailey J, LihChuan Chen A, William Downs B, R Braverman E, Radi S, L Waite R, Kerner M. Neuro-

- psychopharmacogenetics and neurological antecedents of posttraumatic stress disorder: unlocking the mysteries of resilience and vulnerability. *Curr Neuropharmacol.* 2010; 8(4):335-358.
11. Berk RA. The active ingredients in humor: Psychophysiological benefits and risks for older adults. *Educ Gerontol.* 2001; 27(3-4):323-339.
 12. Khanum F, Bawa AS, Singh B. *Rhodiolarosea*: a versatile adaptogen. *Compr Rev Food Sci F.* 2005; 4(3):55-62.
 13. Sprenger M. *Learning and memory. The brain in action.* USA: ASCD; 1999. I-II4.
 14. Van Loon GR, De Souza EB. Effects of β -endorphin on brain serotonin metabolism. *Life Sci.* 1978; 23(9):971-978.
 15. Bruns D, Riedel D, Klingauf J, Jahn R. Quantal release of serotonin. *Neuron.* 2000; 28(1):205-220.
 16. Woolf NJ. A structural basis for memory storage in mammals. *Prog Neurobiol.* 1998; 55(1):59-77.
 17. Baker KB, Kim JJ. Amygdalar lateralization in fear conditioning: evidence for greater involvement of the right amygdala. *Behav Neurosci.* 2004; 118(1):15.
 18. Mathew J, Paulose CS. The healing power of well-being. *Acta Neuropsychiatr.* 2011; 23(4):145-155.
 19. Otte C, Wingenfeld K, Kuehl LK, Kaczmarczyk M, Richter S, Quante A, Regen F, Bajbouj M, Zimmermann-Viehoff F, Wiedemann K, Hinkelmann K. Mineralocorticoid receptor stimulation improves cognitive function and decreases cortisol secretion in depressed patients and healthy individuals. *Neuropsychopharmacology.* 2015; 40(2):386.
 20. Gelkopf M. The use of humor in serious mental illness: a review. *Evid Based Complement Alternat Med.* 2011; Article ID 342837.
 21. Freitas S, Simoes MR, Marôco J, Alves L, Santana I. Construct validity of the montreal cognitive assessment (MoCA). *J. Int. Neuropsychol. Soc.* 2012; 18(2):242-250.
 22. Porteous J. Humor as process of defense. The evolution of laughing. *Int J Humor Res.* 2009; 1(1): 11-19.
 23. Newcomer JW, Selke G, Melson AK, Hershey T, Craft S, Richards K, Alderson AL. Decreased memory performance in healthy humans induced by stress-level cortisol treatment. *Arch Gen Psychiatry.* 1999; 56(6):527-533.
 24. Berk LS, Tan SA, Fry WF, Napier BJ, Lee JW, Hubbard RW, Lewis JE, Eby WC. Neuroendocrine and stress hormone changes during mirthful laughter. *Am J Med Sci.* 1989; 298(6):390-396.
 25. Ko HJ, Youn CH. Effects of laughter therapy on depression, cognition and sleep among the community-dwelling elderly. *Geriatr Gerontol Int.* 2011; 11(3):267-274.
 26. Ji E, Kim O. Effect of the laughter therapy combined with cognitive reinforcement program for the elderly with mild cognitive impairment. *Korean J Adult Nurs.* 2014; 26(1):34-45.