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Original Article

Efficacy of Balloon Blowing Activity in Reducing Stress Levels Among Female Adolescents Aged 17-18

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ABSTRACT

Objective: To evaluate the efficacy of balloon-blowing activity as a stress reliever among female adolescents aged 17 to 18.

Methodology: A pre-test post-test Quasi-experimental study was conducted in a private college Bahria College Karsaz. 225 participants met the inclusion criteria and were subjected to the study intervention which involved a balloon blowing activity. Participants filled the Pre-test and Post-test questionnaires. Collected data was entered SPSS version 22.0. Paired sample t-tests was applied at 5% level of significance.

Result: The mean age of the participants was 17.52 ± 0.501 years. A significant reduction in stress levels was observed, with a mean difference of 2.422 between pre-test and post-test measurements (95% CI: 2.270 to 2.573, $p < 0.001$).

Conclusion: This study concludes that simple and engaging stress management interventions, such as balloon blowing, can significantly improve adolescents' mental health by providing an effective, easy, and low-cost method of stress relief during a critical developmental stage. It emphasizes the importance of addressing adolescent stress and recommends further research to evaluate the long-term impact and sustainability of such interventions.

Keywords: Adolescent girls, Depression, Anxiety, Stress scales, Stress management intervention

INTRODUCTION

Adolescence (ages 13-18) is a period of significant growth and physical development that includes changes in body composition, metabolic and hormonal fluctuations[1]. Although, adolescents make up about 20 percent of the world's population (of whom 85 percent live in developing countries).[2] Stress is defined as "the nonspecific result of any demand upon the body, be the effect mental or somatic"[3]. Family conflicts and academic pressures were the main triggers for increased stress. Issues around peer relationships, and social position were also important contributors[4]. Thus, adolescence is a difficult time, both physically and emotionally. Rapid growth coupled with physical changes in the background of high levels of activity can be overwhelming. Meanwhile, unfamiliar life stressors coupled with undeveloped compensatory mechanisms can lead to overwhelming anxiety and emotional distress[5].

Adolescents with high levels of perceived stress were more likely to develop a mental disorder[6]. The heightened stress levels among adolescents cause adverse effects on the mental well-being of these individuals and result in the reduction of their capabilities to handle the challenges of life. Those who experience chronic stress in their adolescence turn out to be less efficient adults who cannot tackle their everyday tasks. These individuals are more prone to anxiety, depression, drug substance abuse, etc compared to the individuals with low stress levels. Thus, cultivating effective stress management strategies is extremely important in promoting adolescents' holistic well-being and resilience.

To achieve stress resilience among adolescents several stress management interventions have been introduced. Primary prevention programs targeting the definition of stress and improving coping strategies should be promoted[7]. These strategies have been identified to be valuable as efficient stress relievers. Stress management programs that range from relaxation to cognitive-behavioral and patient-centered therapy are of utmost significance when it comes to preventing and treating burnout[8]. Many complex interventions like cognitive behavior therapy help individuals to eliminate avoidant and safety-seeking behaviors that prevent self-correction of faulty beliefs, thereby facilitating stress management to reduce stress-related disorders and enhance mental health[9]. Similarly, another complex intervention for stress management is mindfulness stress management therapy which is not only efficient for stress management but also improves work engagement[10].

However, simple techniques like breathing exercises, group counseling sessions, etc have also provided a significant reduction in stress levels, yet these interventions are underexplored. A recent study conducted at Islamic International Medical College, Rawalpindi highlighted the positive impact of balloon-blowing activity in the stress reduction of 86 students. According to the study, blowing balloon exercise may be used as one of the stress-reducing strategies as it improves the pulmonary function tests and enhances the parasympathetic tone as indicated by indices of ventricular depolarization.[11]

This study aims to build upon these findings by further exploring the efficacy of blowing balloons as a stress reduction intervention among adolescents. The present experiment inspects the efficacy of balloon-blowing therapy as a stress management intervention using a pretest-post-test design augmented by self-report measures among adolescents. The results of the current research can be useful in contributing to the understanding of balloon-blowing activity in mitigating stress levels.

METHODOLOGY

A quasi-experimental pre-test-post-test pattern analysis was used to assess the impact of a balloon-blowing activity on stress levels among female adolescents aged 17 to 18 through non-probability convenience sampling. The study was conducted at Bahria College Karsaz, with the approval of the Vice Principal under the supervision of a medical officer and the

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college psychologist. A private college was set up based on the convenience and ease of access. The study was conducted within the premises of the institute in the Girls Wing. The total period for the study was 5 hours. The tool for data source was a validated structured questionnaire provided to the participants.

The study population was from 11th grade and 12th grade with their ages falling in brackets of 17 to 18. Initially, 400 students were provided with a Pre-test questionnaire with self-reporting of stress levels on a scale of 1-10. The values from 1-5 marked very low stress levels. Values from 6 to 10 marked moderate to extreme stress levels respectively. The answers to questions on the questionnaire and the self-reporting on a scale of each student were thoroughly observed and out of 400 students, 225 students were recruited for the study.

The inclusion criteria for participants involved in the study were being aged between 17 to 18 years, being a female, and scoring 6 or above on a validated stress questionnaire administered during the pre-test assessment. Exclusion criteria included individuals outside the specified age range, those scoring below 6 on the stress questionnaire, or those with physical or psychological conditions that could potentially impact their ability to participate or influence stress assessment outcomes. Prior to participation, individuals were briefed about the study's objectives, procedures, and potential risks and benefits. Consent forms were distributed and collected from willing participants.

The intervention consisted of a structured balloon-blowing activity conducted under the supervision of trained facilitators. Participants were instructed on proper balloon-blowing techniques. They were provided with the same size and same shaped commercially available balloons. Participants were asked to breathe in and then breathe out the maximum in the balloon mouth. 10 minutes after the balloon-blowing activity, post-test questionnaires were provided to the participants, and they were asked to scale their stress levels again.

Statistical analysis was conducted to assess the effectiveness of the intervention in reducing stress levels among participants. Descriptive statistics summarized participant characteristics and stress levels, while inferential statistics, including the T-test, were employed to compare pre-test and post-test stress levels and determine the intervention's efficacy. The T-test result showed a highly significant value of 0.0001, indicating a substantial difference in stress levels pre and post-intervention.

RESULTS

A total of 225 female adolescents, the Mean age of the participants was noted as 17.52 ± 0.501 years with 95% C.I (17.46 -17.59) participated in the study. The results indicated that the balloon-blowing activity was effective in reducing stress levels among the participants. A paired samples t-test revealed a statistically significant decrease in stress levels after the activity, with a mean difference of 2.422 (95% C.I: 2.270 to 2.573, $p < 0.001$). This demonstrates that the balloon-blowing activity had a notable impact on lowering stress levels in this adolescent group.

Furthermore, confidence intervals were calculated to estimate the range within which the true population mean difference lies. The narrow confidence interval (95% CI: 2.270 to 2.573) around the mean difference in stress levels provides additional support for the precision of the estimated effect size. This interval indicates a high degree of certainty that the observed reduction in stress levels post-activity is consistent and reliable. Additionally, the standard error of difference was calculated to be 0.076, further supporting the reliability of the observed effect as mentioned in **Table** I.

Table I: Comparison Between Pre and Post Test Stress Levels (n=225)

Stress Level	Mean	±SD	Std. Error Mean	Mean Difference 95% Confidence Interval	P-Value
Pre-Test	8.11	1.23	0.076	2.422 (2.270----2.573)	0.0001*
Post-Test	5.69	1.67			

DISCUSSION

Adolescent stress has become a major problem with implications for mental health and well-being. The purpose of this article is to analyze if simple interventions could help reduce stress levels specifically the role of balloon-blowing therapy has been identified as an essential simple intervention for stress reduction in young people. In addition, it examines the potential of exercise-based interventions, including aerobic exercise and stretching, to reduce stress in university students and workplace workers.

This quasi-experimental research which involved the balloon blowing activity as a stress intervention has proven to be an effective stress relieving strategy among adolescents. This study highlights the potential of simple interventions in mitigating stress levels. The mean difference of 2.422 in stress levels between the pre-test and post-test assessments indicates a substantial reduction in stress experienced by participants following the balloon-blowing activity. This finding aligns with previous research suggesting that physical activities, such as balloon blowing, can serve as effective stress management strategies by providing a means for releasing tension and pent-up emotions.

The highly significant p-value of 0.0001 further validates the robustness of the observed effect, indicating that the reduction in stress levels post-activity is unlikely to have occurred by chance alone. The narrow confidence interval (95% CI: 2.270 to 2.573) around the mean difference in stress levels provides additional confidence in the precision of the estimated effect size. This interval suggests that the true population mean difference in stress levels lies within this range with a high degree of certainty.

Along with that, this study proves that small interventions could be effectively used to replace pharmacological therapies to reduce stress to some extent. Many such interventions have been introduced like laughter therapy etc. A multitude of techniques for relaxation and stress reduction are described, e.g. flotation-REST[12], meditation[13] and yoga[14], and Tai Chi Chuan[15]. Even certain toys like fidget spinners have been

introduced as miniature tools to manage stress. Similarly, a research article suggests that exercise and physical activity have beneficial effects on depression symptoms that are comparable to those of antidepressant treatments.[16]

However simple interventions like laughter therapy can physiologically lessen the pro-stress factors and increase the mood-elevating anti-stress factors to reduce anxiety and depression. Physiologically, laughter therapy reduces stress factors and increases mood-enhancing anti-stress factors that reduce anxiety and depression[17,18]. The implementation of such interventions highlights the potential of nonmedical approaches to reduce stress. Thus, it is evident that some simple interventions involving physical activity can be taken as the right approach to alleviate stress.

The results from the studies conducted within the research project so far which are briefly summarized in this manuscript suggest that physical activity, mental health, and well-being are positively related, also in university students as an important group of emerging adults. The results further suggest that exercise interventions comprising aerobic exercises of low- to moderate intensity may work best to improve mental health (alleviate depressive symptoms and perceived stress) among university students after a few weeks of intervention according to another study, The implementation of a short program of stretching exercises in the workplace was effective for reducing levels of anxiety, bodily pain, and exhaustion, and for raising levels of vitality, mental health, general health, and flexibility[19,20]. These findings suggest that incorporating physical activity into daily routines can be an effective tool for stress management and overall well-being.

The underlying mechanism for the reduced stress level could be engaging in an exercise of blowing a balloon as such physical activities promote the release of endorphins and other neurotransmitters associated with the feeling of relaxation. Along with that, the interactive nature of activity created a sense of support thus helping in alleviating stress levels.

The limitations of this study include being conducted within a specific institutional setting, as it limits the generalizability of the findings to other populations. Moreover, only the female gender was subjected to the study. Additionally, the study's reliance on self-reported stress levels by the scaling method on questionnaires introduces the potential for response bias. Future research should explore the long-term effects and sustainability of the intervention beyond immediate post-activity assessments.

CONCLUSION

This study concludes that simple and engaging stress management interventions, such as balloon blowing, can significantly improve adolescents' mental health by providing an effective, easy, and low-cost method of stress relief during a critical developmental stage. It emphasizes the importance of addressing adolescent stress and recommends further research to evaluate the long-term impact and sustainability of such interventions.

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REFERENCES

1. Desbrow B. Youth athlete development and nutrition. Sports Med. 2021;51(Suppl 1):3-12.
2. Dehne KL, Riedner G. Adolescence--a dynamic concept. Reprod Health Matters. 2001; 9(17):11-5.
3. Gates DM. Stress and coping. A model for the workplace. AAOHN J. 2001;49(8):390-7.
4. Nagabharana TK, Joseph S, Rizwana A, Krishna M, Barker M, Fall C, et al. What stresses adolescents? A qualitative study on perceptions of stress, stressors and coping mechanisms among urban adolescents in India. Wellcome Open Res. 2021;6(106):1-17.
5. Watson A, Eckersley R, Horwitz MD, Tolerton SK, Zlotolow DA. Adolescent wrist pain. J Hand Surg Am. 2022;47(11): 1108-14.
6. Lindholdt L, Labriola M, Andersen JH, Kjeldsen MM, Obel C, Lund T. Perceived stress among adolescents as a marker for future mental disorders: a prospective cohort study. Scand J Public Health. 2022;50(3):412-7.
7. Roohafza H, Sarrafzadegan N, Sadeghi M, Talaei M, Talakar M, Mahvash M. The effectiveness of stress management intervention in a community-based program: Isfahan Healthy Heart Program. ARYA Atheroscler. 2012;7(4):176-83.
8. Romani M, Ashkar K. Burnout among physicians. Libyan J Med. 2014;9(1):23556.
9. Nakao M, Shirotsuki K, Sugaya N. Cognitive-behavioral therapy for management of mental health and stress-related disorders: recent advances in techniques and technologies. BioPsychoSocial Med. 2021;15:16.
10. Bartlett L, Buscot MJ, Bindoff A, Chambers R, Hassed C. Mindfulness is associated with lower stress and higher work engagement in a large sample of MOOC participants. Front Psychol. 2021;12:724126.
11. Sadiq N, Khan HF, Siddiqu A. Blowing balloons, a novel way for reducing stress and improving pulmonary function tests. J Islamic Int Med Coll. 2018;13(2):66-70.
12. Garland MM, Wilson R, Thompson WK, Stein MB, Paulus MP, Feinstein JS, et al. A randomized controlled safety and feasibility trial of floatation-REST in anxious and depressed individuals. Plos one. 2024;19(6):e0286899.

13. Álvarez-Pérez Y, Rivero-Santana A, Perestelo-Pérez L, Duarte-Díaz A, Ramos-García V, Toledo-Chávarri A, et al. Effectiveness of mantra-based meditation on mental health: a systematic review and meta-analysis. Int J Environ Res Public Health. 2022;19(6):3380.
14. van der Kolk BA, Stone L, West J, Rhodes A, Emerson D, Suvak M, et al. Yoga as an adjunctive treatment for posttraumatic stress disorder: a randomized controlled trial. J Clin Psychiatry. 2014;75(6):22573.
15. Tsai PF, Kitch S, Chang JY, James GA, Dubbert P, Roca JV, et al. Tai chi for posttraumatic stress disorder and chronic musculoskeletal pain: a pilot study. J Holist Nurs. 2018;36(2):147-58.
16. Dinas PC, Koutedakis Y, Flouris AD. Effects of exercise and physical activity on depression. Ir J Med Sci. 2011;180(2):319-25.
17. Akimbekov NS, Razzaque MS. Laughter therapy: a humor-induced hormonal intervention to reduce stress and anxiety. Curr Res Physiol. 2021;4:135-8.
18. Herbert C. Enhancing mental health, well-being and active lifestyles of university students by means of physical activity and exercise research programs. Front Public Health. 2022;10:849093.
19. Montero-Marín J, Asún S, Estrada-Marcén N, Romero R, Asún R. Effectiveness of a stretching program on anxiety levels in logistics platform workers: a randomized controlled trial. Primary Care. 2013;45(7):376-83.
20. Benson H, Greenwood MM, Klemchuk H. The relaxation response: psychophysiologic aspects and clinical applications. Int J Psychiatry Med. 1975;6:87-98.

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