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Original Article

Efficacy of Progressive Muscle Relaxation in Reducing Psychological Distress and Improving Quality of Life Among Nursing Students: A Feasibility Trial from Pakistan

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ABSTRACT

Objective: To assess the level of psychological distress and evaluate the efficacy of Progressive Muscle Relaxation on psychological distress (stress, depression, anxiety) and quality of life among nursing students.
Study Design: Mixed-methods Study.
Place and Duration of Study: College of Nursing, Armed Forces Post Graduate Medical Institute, Rawalpindi Pakistan, from Jun to Aug 2024.
Methodology: Phase I of the study includes the assessment of psychological distress, in which a total of 28 nursing students reported significant psychological distress based on the Depression Anxiety Stress Scale (DASS-21) and participated in testing the efficacy of PMR intervention. In phase II, a single session of PMR was used along with pre- and post-testing for study variables through DASS21, the World Health Organization Quality of Life Scale (WHOQOL-BREF), and a Demographic Information sheet (DIS) in a group setting.
Result: We present initial evidence of the intervention's fidelity, with good inter-rater reliability (r=0.80), high acceptability through qualitative feedback analysis, and the feasibility of running a randomized controlled trial. Further, results revealed that after the intervention, depression scores significantly reduced with a moderate effect size (Cohen's d=0.314). Qualitative assessment from acceptability feedback interviews complemented the findings.
Conclusions: We support using PMR intervention to manage psychological distress and enhance the quality of life among nursing students in Pakistan.

Keywords: Anxiety, Depression, Mental Health, Nursing Students, Progressive Muscle Relaxation.

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INTRODUCTION

The demanding nature of nursing education is characterized by rigorous academic schedules and clinical training, which brings significant psychological distress. This effects not only their academic performance but also their overall quality of life. Among these issues, stress, anxiety and depression are prevalent.[1,2] Research has highlighted the high prevalence of psychological distress among nursing students, with various studies reporting alarmingly high rates of depressive symptoms in this population.[3] These findings underscore the need for targeted mental health interventions within nursing education. Understanding and addressing these challenges is crucial to support nursing students in mananging these condtions and enahncing their mental well-being and quality of life.

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Maintaining a high quality of life is essential for nursing students and helps them achieve academic success and professional development. High stress, anxiety, and depression levels can significantly deteriorate their quality of life, highlighting the need for effective stress management strategies. Research has shown that nursing students often report a lower quality of life than their non-nursing peers, attributing to the intensive demands of their training and the emotional toll of clinical practice.[4] Therefore, enhancing the quality of life of nursing students through effective interventions is paramount.

Progressive Muscle Relaxation (PMR) is a widely recognized stress management technique involving systematically tensing and relaxing muscle groups. This technique, developed by Edmund Jacobson in the 1920s, aims to reduce muscle tension and promote relaxation, alleviating stress and anxiety.[5] PMR is effective in reducing stress, anxiety, and depression in various populations, including healthcare professionals and students. Studies have

demonstrated the efficacy of PMR in enhancing mental health and well-being, making it a valuable tool for nursing students facing high-stress levels.[6] With this backdrop, the current study stems from the growing recognition of the mental health challenges faced by nursing students and the potential of PMR as a cost-effective, non-pharmacological intervention to mitigate these issues. Given the high prevalence of stress, anxiety, and depression among nursing students, it is imperative to explore and validate interventions that can improve their mental health and overall quality of life. Previous studies have demonstrated the effectiveness of PMR in reducing stress-related symptoms; however, there is limited research explicitly targeting nursing students.[7,8] So, the present study is designed with the objectives to assess the level of psychological distress, and to evaluate fidelity, acceptability, feasibility, and the efficacy of progressive muscle relaxation in reducing psychological distress and improving quality of life among nursing students.

METHODOLOGY

The mixed-methods was conducted at College of Nursing, AFPGMI, Rawalpindi, Pakistan, from June to August 2024, where participants completed baseline measures of psychological distress through Depression Anxiety Stress Scale-21 (DASS-21). Subsequently, participants undergone a single session of progressive muscle relaxation intervention in group format (PMR - Urdu Translated Version,[9] was used), followed by post-intervention assessments. The sample was selected through a convenient purposive sampling technique. Nursing students with BS degrees from the College of Nursing AFPGMI, Rawalpindi, Pakistan from Jun to Aug 2024 were approached and screened for psychological distress. All students who screened positive for psychological distress were enrolled. As this was a non-powered feasibility trial, the sample size was not calculated and so, the sample size was selected based on the resources available as recommended by standard guidance for feasibility studies by Moore, *et al*., 2020.[10]

Inclusion Criteria: The participants were under-graduate female nursing students ages 17 to 28 who were currently enrolled in a nursing program.

Exclusion Criteria: Those diagnosed with psychiatric/psychological disorders, currently undergoing psychotherapy or using psychiatric medications, and unable to participate were not included in the study.

Demographic Information Sheet (DIS) along with Depression Anxiety Stress Scale (DASS-21), Urdu Version, a self-report, 21-items, 4-point Likert scale with good reliability (0.93-0.95),[11] and World Health Organization Quality of Life Brief Version (WHOQOL-BREF), Urdu Version, a 26-items self-report questionnaire reliability of 0.7,[12] were used.

Ethical approval was obtained from the ethics committee before commencing the study, along with permission from the concerned authors to use their scales. Formal permission from the institute was obtained, and informed consent was obtained from participants. The initial assessments identified those that needed intervention, and PMR sessions were conducted over one week. Pre and post-intervention assessments, along with debriefing sessions, were performed.

The Statistical Package for Social Sciences (SPSS) version 25 software was used for data, where descriptive analysis was performed for normality of data, Alpha reliability was conducted for psychometric properties of scales, and Kappa reliability analysis was performed for inter-rater reliability. Feasibility and acceptability were done through a qualitative study, and a paired sample t-test was used to evaluate the efficacy of the intervention. Qualitative data analysis was done according to the guidelines of the Framework of Acceptability (TFA), which recommends a mixed method approach (quantitative and qualitative methods).[13] In qualitative assessment, acceptability and feasibility of intervention were explored through qualitative interviews. For quantitative assessment; a 5 point feedback assessment form was also developed after getting insight from qualitative interviews.

RESULTS

The present investigation evaluated the efficacy of PMR for psychological distress (including stress, depression, anxiety) as a primary outcome and quality of life as a secondary outcome among female nursing students with an age range of 18 years to 24 years old enrolled in 1st and 2nd semester of BS Nursing programs. The study's descriptive statistics show mean scores of study variables are 8.07 for stress, 4.07 for depression, 3.64 for Anxiety, and 84.88 for Quality of Life. Further results analyzed were tabulated as follows:

Table-I presents the demographic characteristics of the 108 study participants. The age distribution shows that most participants were 19 years old (31.5%)

or 18 years old (24.1%), followed by 20 years (22.2%) and 21 years (21.3%), with only 0.9% aged 24. In terms of academic standing, 51.6% were enrolled in the 1st semester, while 48.1% were in the 2nd semester. Regarding family structure, most of the participants (74.1%) belonged to nuclear families, while 25.9% came from joint family systems. In terms of birth order, 38.9% were first-born children, followed by 23.1% second-born, 15.7% third-born, and 11.1% each in the fourth and last birth order categories. Finally, the parental status data indicate that 86.1% of participants reported both parents alive, whereas 13.9% had at least one deceased parent.

Table-I: Demographic Profiling of the Participants (n=108)

Variables	Categories	n (%)
Age	18	26(24.1)
	19	34(31.5)
	20	24(22.2)
	21	23(21.3)
	24	1(0.9)
Semester	Ist Semester	56(51.6)
	2nd Semester	52(48.1)
Family System	Nuclear	80(74.1)
	Joint	28(25.9)
Birth Order	1st	42(38.9)
	2nd	25(23.1)
	3rd	17(15.7)
	4th	12(11.1)
	Last	12(11.1)
Parents Status	Alive	93(86.1)
	Deceased	15(13.9)

Table-II summarizes the psychological assessment outcomes for participants in Phase II of the study. The sample (n=108) was assessed using the DASS. The overall mean DASS score was 11.30±7.58, with a score range of 1 to 42 and a high internal consistency (α=.89). Subscale scores indicated mean stress levels of 5.09±3.73, α=.84, depression at 3.55±2.78, α=.74, and anxiety at 2.66±2.08, α=.64. A subsample of 28 participants who screened positive for elevated symptoms reported higher average scores on all DASS measures. Their overall DASS mean was 15.78±6.14, ranging from 6 to 42, with good reliability (α=.83). Mean stress was 8.07±2.62, α=.62, depression 4.07±2.55, α=.77, and anxiety 3.64±2.36, α=.68). In addition to this, this group's quality of life was assessed, showing a mean score of 84.88±7.83 on a scale ranging from 64 to 103, with strong reliability (α=.86).

Table-III presents the prevalence rates of psychological symptoms among the 108 participants. Stress was the most reported condition, with 18 participants (16.67%) exhibiting significant levels. Both depression and anxiety were observed in 5 participants each, representing 4.63% of the sample for each condition. These findings indicate that while stress was relatively more prevalent, the rates of clinically significant depression and anxiety were lower among the participants.

Table-II: Psychometric Properties of the Scales and Subscales for the Sample in Phase I and Phase II of the Study

Sample	Scales	Mean±SD	Range	.α.
108 Sample assessed	DASS	11.30±7.58	1-42	0.89
	Stress	5.09±3.73	0-18	0.84
	Depression	3.55±2.78	0-14	0.74
	Anxiety	2.66±2.08	0-10	0.64
28 Screen positive sample	DASS	15.78±6.14	6-42	0.83
	Stress	8.07±2.62	1-18	0.62
	Depression	4.07±2.55	1-14	0.77
	Anxiety	3.64±2.36	0-10	0.68
	Quality of Life	84.88±7.83	64-103	0.86

Note. DASS= Depression Anxiety Stress Scale, M= Mean, SD= Standard Deviation

Table-IV reports the inter-rater reliability of the intervention fidelity assessment using the Kappa coefficient. The Kappa value was 0.80, indicating a high level of agreement between raters. This result was statistically significant (p<0.05), suggesting that the implementation of the intervention was consistent and reliably evaluated across different raters.

Acceptability & Feaibility of Intervention

Data from qualitative interviews were analyzed according to a thematic-qualitative approach to explore the acceptability and feasibility of the intervention.[14] Two researchers analyzed the data manually, doing transcripts independently, which were later pondered together. Basic themes were explored by using multiple interactive steps of thematic analysis. At first, the researcher transcribed all audio-recorded interviews verbatim, and each transcription took almost two hours. After transcribing interviews, a stepwise process of thematic analysis was conducted, and the content of the interviews was read and re-read by the researcher to get familiar with the verbatim. During this step, important data of concern was highlighted. In the next step, highlighted data was extracted from the individual interviews and then separately written according to the similarities and differences in the nature of their content. This initial coding of descriptive statements has been done in English. These

themes were assembled together to form high-order themes in a summary in the Figure.

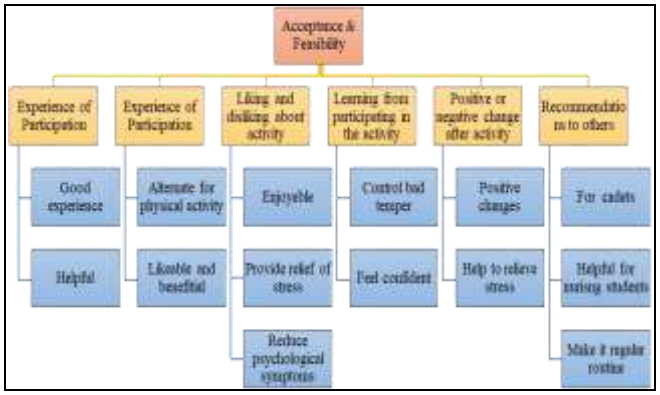

Figure: Diagram showing Themes of Acceptability and Feasibility

Table-III: Frequencies and Percentages of Anxiety, Depression and Stress (n = 108)

Variables	n (%)
Stress	18(16.67)
Depression	5(4.63)
Anxiety	5(4.63)

Table-IV: Fidelity of intervention through Kappa Coefficient

	Kappa Coefficient	*p*
Inter-rater reliability	0.80	<0.05

Additionally, participants reported a significant improvement in quality of life, with scores increasing from 84.88±6.61) to 92.88±7.83) post-intervention (t= -8.73, *p*<.001), reflecting a large effect size (d=1.104; 95% CI: -9.89 to -6.11). These findings suggest that PMR was an effective intervention for reducing psychological distress and enhancing quality of life among nurses.

DISCUSSION

The results of present study show that the participants ages ranged from 18 to 24, with the majority being 19 years old (31.5%). This age group is often characterized by transitional challenges, such as adjusting to new academic and social environments, which can contribute to stress and anxiety.[15] The even distribution between those in their first (51.6%) and second semesters (48.1%) highlights that new and continuing students experience these challenges. Most participants come from nuclear families (74.1%), with first-borns constituting the largest group (38.9%). Regarding parental status, a significant majority of participants have both parents alive (86.1%), while a smaller portion has experienced parental loss (13.9%).

The psychometric properties of the DASS and its subscales for the study participants (n=108) are good (α=.89), The Stress subscale (α=.84), The Depression subscale (α=.74), and The Anxiety subscale (α=.64). These findings align with previous research that has validated the DASS as a reliable tool for assessing psychological distress in various populations, including students.[16]

Table-V: Effect of Progressive Muscle Relaxation on Stress, Depression and Anxiety Among Nurses (n=28)

Variables	Before Intervention (n=28)	After Intervention (n=28)	t Value	*p* Value	95% CI	Cohens' d
	M±SD	M±SD			LL-UL	
Stress	8.07±2.62	4.82±1.87	6.12	<0.001	2.16-4.34	1.428
Depression	4.07±2.55	3.32±2.21	1.52	<0.001	-0.27-1.77	0.314
Anxiety	3.64±2.36	2.57±2.15	2.71	<0.001	0.26-1.88	0.421
Quality of Life	84.88±6.61	92.88±7.83	-8.73	<0.001	-9.89- -6.11	1.104

Note. M= mean, SD= Standard Deviation, LL= Lower Limit, UL= Upper Limit

Table-V presents the pre- and post-intervention outcomes for depression, stress, anxiety, and quality of life following the implementation of progressive muscle relaxation (PMR) among 28 nurses. There was a statistically significant reduction in stress levels, with mean scores decreasing from 8.07±2.62 before the intervention to 4.82±1.87 after the intervention (t=6.12, *p*<.001), and a large effect size (Cohen's d=1.428; 95% CI: 2.16 to 4.34. Depression scores also showed a significant reduction from 4.07±2.55 to 3.32±2.21, (t = 1.52, *p*=.034), with a small to moderate effect size (d=0.314; 95% CI: -0.27 to 1.77). Similarly, anxiety scores declined significantly from 3.64±2.36 to 2.57±2.15), (t=2.71, p=.001), with a moderate effect size (d =0.421; 95% CI: 0.26 to 1.88).

The prevalence of stress, depression, and anxiety among the 108 participants aligns with existing literature that underscores the significant impact of these mental health issues on individuals. Previous studies have consistently shown that stress is a pervasive problem, often more prevalent than depression and anxiety in various populations. Research found that stress affects approximately 20% of adults, comparable to the 16.67% found in this study. This is further supported by the researchers

who noted that workplace stress often surpasses other mental health issues in frequency. Furthermore, the lower prevalence of depression and anxiety in this sample, each at 4.63%, is also in line with national statistics reported by the National Institute of Mental Health (NIMH).[17] Psychometric properties of Quality of Life measure for a sample of 28 participants is (α=.86), reflecting excellent reliability. Previous studies have similarly validated these measures for determining mental health and quality of life in various populations.[12]

The inter-rater reliability of the intervention, as indicated by a Kappa coefficient of 0.80 and a statistically significant *p*-value of less than 0.05, demonstrates strong consistency and agreement among raters. According to Landis and Koch, Kappa values between 0.61 and 0.80 represent substantial agreement, suggesting that the intervention was implemented and evaluated uniformly across different raters. This high level of reliability is crucial for ensuring that the outcomes are credible and not influenced by subjective variations. In research and clinical practice, such a substantial Kappa coefficient indicates that the intervention can be reliably replicated, which is essential for validating its effectiveness and generalizability.[18] The statistically significant *p*-value further strengthens this finding by confirming that the observed agreement is unlikely due to chance, reinforcing the validity of the intervention's fidelity measures. This level of reliability is significant in interventions involving subjective assessments, as it underscores the robustness of the evaluation process.

The findings of thematic analysis align well with existing literature on the benefits of progressive muscle relaxation (PMR). Numerous studies have documented the positive impact of PMR on reducing stress and anxiety among various populations, including nursing students. Participants' reports of stress relief and improved psychological well-being corroborate research, indicating that PMR effectively reduces symptoms of anxiety and depression. The students' feedback about feeling well and confident after the intervention echoes the work of Conrad and Roth, who found that PMR contributes to enhanced emotional regulation and self-efficacy. The mention of PMR being a time-efficient alternative to physical activity resonates with findings from Jakobsen and colleagues suggesting that relaxation techniques like PMR can be just as effective as physical exercise in stress management without requiring significant time investment.[19,20]

However, the concern about the intervention being time-consuming contrasts with some literature, which typically emphasizes the short duration of PMR sessions (15-20 minutes) as a benefit.[19] This discrepancy might be due to individual differences in perceived time constraints or initial unfamiliarity with the technique. The positive changes and stress relief mentioned by participants are consistent with literature highlighting PMR's role in mitigating the effects of homesickness and improving overall mental health. Additionally, the recommendation of PMR to cadets and roommates suggests a perceived high value of the intervention, aligning with studies that advocate for the broader application of PMR in high-stress environments.[20] Overall, the findings support the extensive literature endorsing PMR as a valuable tool for stress management and psychological well-being, particularly among nursing students and other high-stress groups.

We hypothesized that there would be a significant reduction in psychological distress and a significant increase in quality of life at post and follow-up assessments compared to pre-assessment among nursing students. The results in Table VII supported these hypotheses, showing substantial decreases in stress, depression, and anxiety and significant improvements in quality of life following the progressive muscle relaxation intervention. Specifically, stress scores dropped from 8.07 to 4.82, depression scores from 4.07 to 3.32, and anxiety scores from 3.64 to 2.57, all with statistically significant *p*-values. Quality of life scores improved significantly from 84.88 to 92.88. These findings align with existing literature that underscores the effectiveness of progressive muscle relaxation (PMR) in reducing psychological distress and enhancing quality of life. For instance, research found that PMR significantly alleviates stress and anxiety in high-stress populations. Similarly, Conrad and Roth reported that PMR contributes to better emotional regulation and psychological well-being.[21] The significant improvements in quality of life observed in this study are consistent with previous work, demonstrating that relaxation techniques can enhance overall life satisfaction and well-being.[22] Similar type work has been done by Mustafa *et al*., in 2021 in Pakistan in which they studied a sample 20 female nurses coming in psychiatric OPDs and found progressive muscular

relaxation was more effective in reducing the symptoms of depression and stress as compared to music therapy.[23]

Thus, the results of this study corroborate previous research, reinforcing the efficacy of PMR as a beneficial intervention for nursing students' mental health and quality of life. The significant improvements from progressive muscle relaxation (PMR) among nurses may be due to its ability to induce deep physiological relaxation, promote mindfulness, enhance coping mechanisms, and positively influence interconnected mental health factors, leading to overall better well-being.

LIMITATIONS OF STUDY

The study faced several limitations, including a relatively small sample size for the intervention group and a single-institution setting, lacking follow-up assessments to determine whether the observed improvements in psychological distress and quality of life are sustained over time. This may limit the generalizability of the findings. Future research should consider larger, more diverse samples and multi-institutional studies focusing on long term effeciacy (3 and 6 months follow-up) to validate these findings.

CONCLUSION

In conclusion, by investigating the impact of PMR on this specific population, this study aims to provide evidence-based recommendations for incorporating PMR into nursing education programs to enhance students' well-being and academic performance. This research filled a critical gap in the literature and contributed to developing comprehensive mental health strategies for nursing students.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

SA & NM: Data acquisition, data analysis, critical review, approval of the final version to be published.

AF & SRK: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Shdaifat EA, Jamama A, Sulieman MA. Predictors of stress and coping strategies among Jordanian nursing students. J Nurs Res 2018; 26(6), 402-408. https://doi.org/10.5539/gjhs.v10n5p33
2. Pulido-Martos M, Augusto-Landa JM, Lopez-Zafra E. Sources of stress in nursing students: a systematic review of quantitative studies. Int. Nurs Rev 2012; 59(1): 15-25. https://doi.org/10.1111/j.1466-7657.2011.00939.x
3. Gao YQ, Pan BC, Sun W, Wu H, Wang JN, Wang L. Anxiety symptoms among Chinese nurses and the associated factors: a cross sectional study. BMC Psychiatry 2012; 12: 1-9. https://doi.org/10.1186/1471-244X-12-141
4. Nabirye AK, Munabi IG, Mubuuke AG, Kiguli S. Emotional and Psychological Experiences of Nursing students caring for Dying Patients: A phenomenology study at Mulago National Hospital, Uganda. Research Square. 2024; 3: 4323878. https://doi.org/10.21203/rs.3.rs-4323878/v1
5. Toussaint L, Nguyen QA, Roettger C, Dixon K, Offenbächer M, Kohls N, et al. Effectiveness of Progressive Muscle Relaxation, Deep Breathing, and Guided Imagery in Promoting Psychological and Physiological States of Relaxation. Evid Based Complement Alternat Med 2021; 2021: 5924040. https://doi.org/10.1155/2021/5924040
6. Li M, Yang Y, Liu Y, Zhang L. Effects of progressive muscle relaxation on anxiety and depression in patients with COVID-19. J. Tradit. Chin. Med 2020; 7(4), 279-284. https://doi.org/10.1016/j.jad.2020.06.033
7. Toussaint L, Nguyen QA, Roettger C, Dixon K, Offenbächer M, Kohls N, et al. Effectiveness of Progressive Muscle Relaxation, Deep Breathing, and Guided Imagery in Promoting Psychological and Physiological States of Relaxation. Evid Complement Alternat Med 2021; 5924040. https://doi.org/10.1155/2021/5924040
8. Van der Riet P, Rossiter R, Kirby D, Dluzewska T, Harmon C. Piloting a stress management and mindfulness program for undergraduate nursing students: Student feedback and lessons learned. Nurse Educ Today 2015; 35(1): 44-49. https://doi.org/10.1016/j.nedt.2014.05.003
9. Hassan, Mustafa. Progressive Muscle Relaxation Intervention Urdu Version. Psychological Research Wing during Mid-carrer Course. Nursing College Rawalpindi. June to August, Theis; 2024.
10. Moore SA, Avery L, Price CI, Flynn D. A feasibility, acceptability and fidelity study of a multifaceted behaviour change intervention targeting free-living physical activity and sedentary behaviour in community dwelling adult stroke survivors. Pilot Feasibil Stud 2020; 6: 1-3. https://doi.org/10.1186/s40814-020-00603-3
11. Husain W, Gulzar A. Translation, adaptation and validation of Depression, Anxiety and Stress Scale in Urdu. Insigh Depress Anxiety 2020; 4: 001-004. https://doi.org/ 10.29328/journal.ida.1001011
12. Whoqol Group. Development of the World Health Organization WHOQOL-BREF quality of life assessment. Psychol. Med 1998; 28(3): 551-558. https://doi.org/10.1017/S0033291798006667
13. Braun V, Clarke, V. Using Thematic Analysis in Psychology. Qualit Res Psychol 2006; 3(2), 77-101.
14. Sekhon M, Cartwright M, Francis JJ. Acceptability of healthcare interventions: An overview of reviews and development of a theoretical framework. BMC Health Serv Res 2017; 17: 88. https://doi.org/10.1186/s12913-017-2031-8
15. Turner K, McCarthy VL. Stress and anxiety among nursing students: A review of intervention strategies in literature between 2009 and 2015. Nurse Educ Pract 2017; 22: 21. https://doi.org/10.1016/j.nepr.2016.11.002

16. Henry JD, Crawford JR. The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. Br J Clin Pharmacol 2005; 44(2): 227-2239. https://doi.org/10.1348/014466505X29657
17. De Oliveira C, Saka M, Bone L, Jacobs R. The Role of Mental Health on Workplace Productivity: A Critical Review of the Literature. Appl Health Econ Health Policy 2023; 21(2): 167–193. https://doi.org/10.1007/s40258-022-00761-w
18. Conrad A, Roth WT. Muscle relaxation therapy for anxiety disorders: it works but how?. J Affect Disord 2007; 21(3): 243-264. https://doi.org/10.1016/j.janxdis.2006.08.001
19. Jakobsen MD, Sundstrup E, Brandt M, Jay K, Aagaard P, Andersen LL. Physical exercise at the workplace reduces perceived physical exertion during healthcare work: cluster randomized controlled trial. J Public Health 2015; 43(7): 713-720. https://doi.org/10.1177/1403494815590936
20. Khir SM, Yunus WMWA, Mahmud N, Wang R, Panatik SA, Sukor MSS, et al. Efficacy of Progressive Muscle Relaxation in Adults for Stress, Anxiety, and Depression: A Systematic Review. Psychol Res Behav Manag 2024; 17: 345–365. https://doi.org/10.2147/PRBM.S437277
21. Hains AA, Szyjakowski M. A cognitive stress-reduction intervention program for adolescents. J Couns Psychol 1990; 37(1): 79. https://doi.org/10.1037/0022-0167.37.1.79
22. Dolbier CL, Rush TE. Efficacy of abbreviated progressive muscle relaxation in a high-stress college sample. Int J Sports Med 2012; 19(1): 48. https://doi.org/10.1037/a0027326
23. Mustafa N, Farzeen M, Kiani S, Khan S, Ain N, Mumtaz. J. Comparison of Progressive Muscular Relaxation (PMR) and Music Therapy (MT) in Reducing the Anxiety, Depression and Stress Symptoms among Nurses. Pak Armed Forces Med J 2021; 71(6): 38. https://doi.org/10.51253/pafmj.v6i6.6338