

The effect of progressive muscle relaxation method on test anxiety in nursing students

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ABSTRACT

Background: Concerning the prevalence of test anxiety among nursing students and presence of stress in nursing education years, this study was conducted to determine the effect of progressive muscle relaxation method on test anxiety among nursing students of Isfahan University of Medical Sciences in 2013.

Materials and Methods: This was a quasi-experimental study conducted in three stages on 49 male and female nursing students divided into two groups (study and control). In the pre-test stage, demographic data and Sarason anxiety questionnaires were filled by 94 students (of terms 3 and 4). Then, in the intervention stage, the students having test anxiety were assigned to two groups (study and control), and the progressive muscle relaxation method was performed in the experiment group in four sessions. Then, the students did this method two times a day until final exams, immediately following which they filled the self-reported checklists. On the first day of the final exams, test anxiety questionnaire was filled by the two groups again. The collected data were analyzed by the statistical tests, i.e. χ^2 , paired *t*-test, independent sample *t*-test, Mann–Whitney and Wilcoxon tests, using SPSS 18.

Results: Independent *t*-test showed a significant difference in the mean scores of test anxiety after intervention between the two groups of study and control ($P = 0.00$), but this difference was not significant before intervention ($P = 0.76$). Also, in the study group, there was a significant difference in the mean scores of test anxiety before and after intervention ($P = 0.00$), but this difference was not significant in the control group ($P = 0.09$). Mann–Whitney test showed no significant difference in categorization of test anxiety scores before intervention in the study and control groups ($P = 0.60$), but the difference was significant after intervention ($P = 0.00$). Wilcoxon test showed a significant difference in categorization of test anxiety scores in the study group before and after intervention ($P = 0.00$), but the difference was not significant in the control group ($P = 0.083$).

Conclusions: Generally, the results showed that performing progressive muscle relaxation method was effective in reducing test anxiety among nursing students. It is suggested to conduct educational programs concerning this method in the faculties of nursing to decrease the test anxiety of nursing students.

Key words: Iran, muscle relaxation, nursing, students, test anxiety

INTRODUCTION

Test anxiety is a worldwide phenomenon.^[1] Its prevalence among university and school students has been reported to be 10-30%.^[2] It has been estimated that about 10 million pre-university students and 15% of university students in the US experience test anxiety annually.^[3] Sarason believes that test anxiety

is a type of mental amusement, which is defined by individuals' inferiority complex and uncertainty about their abilities, and often, leads to negative cognitive evaluation, lack of concentration and inappropriate physiological reactions, and poor academic performance.^[4] Most of the students obtain proper marks during the semester, but at final exams, their marks drop due to their high level of anxiety. Low level of anxiety during exams is essential for students when they study, but sometimes, their anxiety gets so high that it restricts their activities.^[5] A literature review conducted by McDonald showed that prevalence of test anxiety increases day after day as the use of tests is growing.^[6] Meanwhile, nursing students suffer from both their own life stressors and those of the clinical environment.^[7] They witness people's pain, suffering, and sorrow everyday, and specific hospital situations such as patients' pain and their worsening of condition and death, shortage of sleep, and distrust in and disturbance of interpersonal communications at

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all levels result in their high tension and anxiety.^[8] In addition to existing tension in clinical environment, nursing students, like other students, suffer from test anxiety. For instance, Moghimian *et al.*,^[9] Cheragian *et al.*,^[10] and Moadeli *et al.*^[11] showed that 85%, 100%, and 86% of nursing students had test anxiety in minor, moderate, and severe levels, respectively. Therefore, with regard to the important association between anxiety and learning, and the existence of test anxiety in a high percentage of nursing students, some strategies should be considered to diminish the level of test anxiety. White *et al.*^[12] believe that when individuals are under pressure, they should try to reduce its effects through psychological and social skills. Henriques *et al.*^[13] argue that the skills, which are convenient and available and have few complications, are welcomed better by individuals and applied in their life to solve their problems and fulfill their needs. One of the suggested methods to reduce anxiety is relaxation,^[14] of which one of the most applicable techniques is progressive muscle relaxation (PMR). PMR or active relaxation is a technique in which the individuals attain relaxation through active contraction of a group of special muscles and then releasing them in a progressive manner and reach self-peace. Based on new research, complete relaxation can be felt as a result of practicing this technique at least for four or five sessions. The clients are recommended to practice it two or three times a day.^[15] This technique can be learned by practicing and repeating for three or four times unlike the other relaxation methods which bring about drowsiness, increased anxiety and stress in individuals, and are hard to learn. It is a conscious technique in which the clients do not fall asleep and is practiced easily in public places.^[16] Davison *et al.*^[17] showed that relaxation techniques result in a reduction of respiration distress, systolic and diastolic BP, the level of blood norepinephrine, heart rate (HR), and body temperature. Palles^[18] and Alexander^[19] showed that PMR leads to a reduction in the effects of anxiety, such as lowered HR, respiration rate, and respiration distress. About 116 studies on PMR showed that this technique reduces anxiety, depression, and pain.^[20] For instance, Hassanpour *et al.*^[21] showed that PMR was effective in reducing nursing students' anxiety at their entrance to clerkship. PMR can notably reduce physical contractions as a result of tension, and in this way, brings about relief from physical and psychological effects of anxiety. Despite the emphasis on the effect of PMR on the level of anxiety, no study has been conducted on its effect on nursing students' test anxiety. Based on the personal experience of the researcher and the observation of test anxiety among BS nursing students caused due to the load of educational materials and the short time available to study because of attending the hospital for clerkship, the present study aimed to investigate the effect of PMR method on test anxiety in nursing students.

MATERIALS AND METHODS

Ethical considerations

Our students have received prior written informed consent for research conducted and also We gave students the confidence that their data will remain confidential.

This quasi-experimental study (IRCT2013080114242N1) was conducted to investigate the effect of PMR method on test anxiety among the nursing students studying in the second semester of year 2012-2013 in the Nursing and Midwifery School of Isfahan University of Medical Sciences. It was conducted in three stages with two groups of study and control. Study population comprised all term 3 and 4 male and female nursing students of Isfahan University of Medical Sciences ($N = 104$). The study subjects comprised 50 male and female term 3 and 4 nursing students. We selected term 3 and 4 students as they had identical clerkship and similar theoretical and practical credits. Sample size was calculated as 22 subjects by Gigi chart and Pokok formula and based on the study of Nikbakht-Nasrababdi *et al.* (2004)^[22] that compared the two methods of Benson Relaxation Method and Azkar repetition on patients' anxiety status before abdominal surgeries. Due to subjects dropping out of the study, the number of subjects was estimated as 25 ($n = 25$ in the study and control groups, respectively).

In the pre-intervention phase, the researcher, after getting approval for the research project from the Vice-Chancellery for research in Isfahan University of Medical Sciences, explained the goals of the study to term 3 and 4 nursing students. Sarason test anxiety questionnaire was given to the subjects before midterm exams (early May), and they were asked to fill the questionnaire together with a demographic information questionnaire. Sarason test anxiety questionnaire and demographic information questionnaire were filled by 94 subjects out of 104. Sarason test anxiety scale was used to measure the level of test anxiety. This scale includes 25 true-false items with the maximum of 25 points showing severe anxiety and the minimum of zero showing no anxiety. In other words, points <12 show minor anxiety, 12-20 show moderate anxiety, and >20 show severe anxiety. In a study conducted by Amiri-majd *et al.*^[6] on the effect of cognitive and behavioral therapy on university students' test anxiety reduction, the validity of Sarason test anxiety scale (through split-half method) and Cronbach alpha calculations were as 88% and 87%, respectively. Based on Amiri-majd's results^[6], Homand reported its validity as 84% through split-half method. The coefficient index between this scale and school anxiety questionnaire was reported to be 82%.^[6] Internal consistently index obtained for Sarason test anxiety

scale was 91% through split-half method and its re-test index after 6 months was reported as 82%.^[1]

After 94 students completed the questionnaire, the questionnaires were analyzed and students' test anxiety scores were calculated. Then, the list of the students who had moderate to acute anxiety (those with scores ≤ 12) was extracted from two educational terms; a total of 50 students had test anxiety. Then, the names of the students who had test anxiety were separately written on pieces of paper and put in a box, and random allocation was done, so that the name picked up by the first researcher was assigned to the study group and the one picked up by the second researcher was assigned to the control group. Inclusion criteria were not participating in relaxation courses or similar researches, not being affected by psychotic diseases, and the willingness to attend the study. In the intervention phase (45 days before final exams), a written consent was taken from the subjects in the study group to attend the intervention, and then, the study group subjects were divided into four groups. Students in the study group were assigned to one of these four groups based on their convenience and leisure time, and were given the time table of attending the educational sessions. It should be noted that one subject in the study group just attended one of the educational sessions, and therefore, was excluded.

A total of 24 subjects in the study group attended all relaxation technique sessions. For convenience, the female and male relaxation sessions were held separately. As the number of male students with test anxiety was 11, they were divided into two groups of 5 and 6 members, respectively, and the female students were divided into two groups of 6 and 7 members, respectively. PMR exercises were practically conducted by the researcher in front of the students in four sessions and the students practically repeated them under her supervision. On an average, each session lasted for half an hour. In each session, the students performed the relaxation technique in front of the researcher for three times. In this way, all subjects in study group individually performed PMR correctly in front of the researcher in one of the classrooms in the nursing school that had the necessary conditions (peaceful with appropriate light and temperature). Then, checklist of PMR education was given to the subjects and they were asked to practice exercises twice a day (in the morning and at night) until their final exams started. The students were also given a self-report checklist of the administered relaxation technique and were asked to tick that every time they did the technique to hand it to the researcher on the first day of final exams. It should be noted that the first exam for both study and control groups was medical surgical nursing, which is considered by the students to cause the

highest anxiety due to the load of educational materials. After intervention, on the first day of final exams, the study and control groups were given Sarason test anxiety questionnaire to be filled by the students. After this stage and completion of the post-test questionnaire by the study and control groups, a session of PMR was held for the control group to respect ethical considerations, and they were given the relaxation education checklist. The information of the subjects was kept confidential keeping the ethical issues into consideration, and the subjects were given the results on their own demand. The final result was forwarded to the authorities of Isfahan University of Medical Sciences. The obtained data were analyzed by Chi-square, independent and paired *t*-tests, Wilcoxon and Mann-Whitney tests using SPSS version 14.

RESULTS

The results obtained in the present study showed that subjects' mean ages in the study and control groups were 22.42 and 21.72 years, respectively. In the study group, 54.2% ($n = 13$) were females, and in the control group, 52% ($n = 13$) were males. In the study and control groups, 83.3% ($n = 20$) and 92% ($n = 23$) were single, respectively. In the study group, 50% ($n = 12$) of the subjects were residing at their home, and in the control group, 52% ($n = 13$) were residing in a dormitory. In the study group, 45.8% ($n = 11$) were absolutely interested in nursing. In the control group, 64% ($n = 16$) were relatively interested in nursing. About 75% ($n = 18$) of the subjects in the study group and 52% ($n = 13$) in the control group reported no history of anxiety diseases among their relatives. About 20.8% ($n = 5$) in the study group and 12% ($n = 3$) in the control group reported taking sleep medication and tranquilizers including Alprazolam, Inderal, Citalopram, and Chlordiazepoxide. Among these, seven subjects took these medications at the time of anxiety and one subject took a Chlordiazepoxide tablet daily. It should be noted that anti-anxiety medications were matched by Chi-square test in the study and control groups. About 54.2% ($n = 13$) in the study group and 64% ($n = 16$) in the control group avoided stressful environments to reduce their anxiety. Independent *t*-test and Chi-square test showed no significant difference in demographic characteristics between study and control groups. Both groups were identical in age, sex, marital status, residential status, the interest in educational course, number of children in the family, sequence of birth, level of family income, history of anxiety diseases in relatives, history of taking tranquilizer, history of a specific disease, hospitalization and surgery. Independent *t*-test showed no significant difference in test anxiety mean scores in both groups before intervention ($P = 0.76$), but this difference was significant after intervention ($P = 0.00$).

Paired *t*-test showed a significant difference in test anxiety mean scores before and after intervention in the study group ($P = 0.00$), but this difference was not significant in the control group ($P = 0.09$) [Table 1]. The results of Mann-Whitney test also showed no significant difference in test anxiety scores' categorization before intervention in the study and control groups ($P = 0.60$), but this difference was significant after intervention ($P = 0.00$). Wilcoxon test showed a significant difference in test anxiety scores' categorization before and after intervention in the study group ($P = 0.00$), but this difference was not significant in the control group ($P = 0.083$) [Table 2].

DISCUSSION

Test anxiety is an important issue among university students and affects them highly in exam sessions, wherein lower anxiety in them results in a better academic performance and more self-confidence. Therefore, application of anxiety reduction methods, especially non-medication methods, is very important among university students. It was found in the present study that practicing PMR is effective in reducing the test anxiety mean score among nursing students. A significant difference was also observed in the test anxiety scores' categorization before and after PMR in the study group. Tryan^[23] showed that multimodal therapy (relaxation education, regular desensitization, and cognitive behavioral interventions) has notable effects on students' test anxiety reduction. Biabangard^[24] investigated the effects of

multimodal therapy of Lazarus, Alice rational-emotional therapy, and relaxation in decreasing test anxiety among school students and reported them to be effective in the reduction of test anxiety. Heidari *et al.*^[25] also showed that education of muscle relaxation and gradual disappearance of tension, accompanied with bio-feedback significantly diminishes students' anxiety. Devineni and Blanchard,^[26] in a study through internet, educated individuals about gradual détente (PMR), accompanied with bio-feedback, to stop psychological pressure and found that 39% and 47% of the participants experienced a significant reduction in their anxiety level and headache immediately after ending the educational course and after 2 months follow-up, respectively. Halamadaris and Power^[27] reported that the anxiety score of the students practicing muscle relaxation was less than the scores in control group. Haravi *et al.*^[20] showed that education of relaxation exercise is effective in reducing nursing students' latent and overt anxiety. Deckro *et al.*^[28] showed that the relaxation is suitable for reducing anxiety in students. Hassanpour *et al.*^[21] showed that PMR was effective in reducing nursing students' anxiety at their entrance to clerkship. Dehghan-Nayery *et al.*^[29] reported that PMR leads to a reduction in stress and improvement of quality of life (QOL) among school girls. Stepen-Gilla^[30] reported that PMR was effective in reducing individuals' anxiety and increasing their self-confidence. Our results showed a significant difference in test anxiety scores' categorization before and after PMR in the study group. In the present study, 91.7% and 8.3% of the students had moderate and severe anxiety, respectively, before intervention in the study group, but 91.7% and 8.3% had low and moderate anxiety, respectively, after intervention. Cheragian *et al.*^[10] showed that 48.7% of the nursing students had low anxiety, 34% had moderate anxiety, and 3.3% had severe anxiety. Also, Moghimian *et al.*^[9] reported that 27.3% of the nursing students had low anxiety, 38.2% had moderate anxiety, and 20% had severe anxiety. Holroyd and Penzien,^[31] Antall and Kresevic,^[32] and Hallman^[33] *et al.* showed that the goal of muscle relaxation is to help individuals obtain adapted

Table 1: Comparison of mean and SD of nursing students' test anxiety scores before and after intervention in the study and control groups

Stage Group	Before		After		Paired <i>t</i> -test
	Mean	SD	Mean	SD	
Study	15.25	3.17	7.2	3.17	$P=0.00$
Control	15.20	3.12	14.40	3.60	$P=0.09$
Independent <i>t</i> -test	$P=0.760$		$P=0.00$		

SD: Standard deviation

Table 2: Comparison of absolute and relative frequency distributions of test anxiety scores' categorization before and after intervention in the study and control groups

Group	Study				Control				
	Before		After		Before		After		
	F	%	F	%	F	%	F	%	
<12 (low anxiety)	0	0	22	91.7	0	0	3	12	
12-20 (moderate anxiety)	22	91.7	2	8.3	23	92	20	80	
>20 (severe anxiety)	2	8.3	0	0	2	8	2	8	
Total	24	100	24	100	25	100	25	100	
Mann-Whitney (comparison of two groups before intervention)									$P=0.60$
Mann-Whitney (comparison of two groups after intervention)									$P=0.00$
Wilcoxon test (comparison of each group before and after intervention)	$P=0.00$				$P=0.083$				

psychological reactions and coping methods versus anxiety. These exercises enhance students' resistance through behavioral antibodies (conditioning) and expose them to the stimulants that empower them to tolerate the tension resulting from university pressure.^[29-32] Based on researches, relaxation has been introduced as the strongest and most powerful treatment for psychosomatic complications including anxiety.^[20] This is because the body tries to modify injuries and discharge poisons through production of natural chemicals during relaxation status. In addition, relaxation results in an increased useful output, flourishing the internal talents, and an increase in ability of thinking and innovation through empowerment of psychological and mental power and increase of self-confidence.^[34] Therefore, practice of PMR seems to be essential for students, especially nursing students, as based on a study, test anxiety diminishes information processing speed.^[35] The general hypothesis in PMR is to enable the individuals to intelligently learn how to inhibit their muscular tension intentionally and, consequently, decrease their level of anxiety. Convenience, cost efficacy, and independency of practice are among the major advantages of this technique in reduction and management of anxiety. Nursing is stressful for nursing students and plays a role in their anxiety due to the load of educational materials, stressful clinical environment, and comprehensive exams. PMR, as an efficient method to reduce test anxiety, can change individuals' perceptions on their ability to cope with their daily life pressure and can be used to reduce students' test anxiety.

CONCLUSION

The results of the present study revealed the effect of PMR on reduction of test anxiety in nursing students. Therefore, it is suggested to conduct educational programs about this technique for nursing students in nursing schools before their final exams start, to reduce their test anxiety.

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