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Effect of Progressive Muscle Relaxation Technique on Level of Anxiety among Nursing Students: A Quasi-Experimental Study

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ABSTRACT

Background: A quasi experimental study was conducted to assess the effect of progressive muscle relaxation technique on level of anxiety among nursing students in selected nursing colleges of Trivandrum district, Kerala. A total sample of 60 BSc Nursing students were selected using purposive sampling technique. The major purpose of the study was to find out the effect of progressive muscle relaxation technique on level of anxiety.
Materials and Methods: A two-group pre-test post-test design was used to conduct the study. A sample comprising of 30 first year BSc Nursing students in experimental and 30 in control group were enrolled using non-probability purposive sampling technique. The investigator adopted "Von Bertalanffy's General System Theory" for this study. Tools used for data collection were Socio-demographic Proforma and the Burns Anxiety Inventory (BAI).
Results: Data analysis was performed using descriptive and inferential statistics. Findings of the study revealed that the mean post-test anxiety score 13.0±5.4 among experiment group was significantly lower than the mean pre-test anxiety score 23.7±5.2 [Mean difference 10.7] and the Paired t value computed at 13.99** was statistically significant at p<0.01 level. Mean post-test anxiety score [-25.6± 8.6] in control group presented a negative statistical significance (P<0.01). The t test value (6.77**, df=58) revealed that, there is significant reduction in the mean post-test anxiety score (13.0±5.4) among experimental group compared to the mean post-test anxiety score (25.6±8.6) among control group at 0.01 level. Significant association was observed between level of anxiety and Mother's education (x2 value 5.88*, P<0.05).
Conclusion: The findings of the study confirmed that progressive muscle relaxation was significantly effective in reducing the level of anxiety among nursing students.

Key Words: Progressive muscle relaxation technique (PMR), Nursing students, Anxiety, Effect, Quasi-experimental study.

I. INTRODUCTION

"Longer life can be a price as well as a penalty. It is not great to live longer but it is important how to live longer in good health".

Modern man is living in anxious anticipation of destruction. Chronic anxiety is a state more undesirable than any other and can easily result in self-destruction. As a German saying puts it: "Better an end with terror than a terror without end". [1] Anxiety (also called angst or worry) is a psychological and physiological state characterized by somatic, emotional, cognitive, and behavioural components. It is the displeasing feeling of fear and concern. The root meaning of the word anxiety is 'to vex or trouble' in either presence or absence of psychological stress, anxiety can create feelings of uneasiness, fear, worry and dread. Anxiety is a generalized mood that can occur without an identifiable triggering

stimulus. As such, it is distinguished from fear, which is an appropriate cognitive and emotional response to a perceived threat.[2] It is estimated that about 25% of the population will experience an anxiety disorder at some stage of their life. Women are twice more likely to suffer from an anxiety disorder than men. Unfortunately, only 50% of people receive treatment for their disorder. Anxiety problem often leads to mental disorders. People with anxiety disorders are also at higher risk of being affected by substance abuse. So, it needs to be addressed before an anxiety disorder can be effectively treated. [3] 12 million adult face mental health problem each year. Most of these cause anxiety and depression and much of it is stress related.[4] It is estimated that among the world population, the prevalence rate of anxiety is 16.6%.[5] The prevalence rate of anxiety in India is 18.5% per 1000 population.[6] Some studies reflect that college students in general may have a higher rate of anxiety than the general population. Additionally, high levels of stress tend to lead to more anxiety, anger, and depression.[7] Researchers reported about 20.1% of adolescent boys and 17.9% of adolescent girls experience severe anxiety. They also reported anxiety rate is in moderate level among 15-24 years.[8] Studies also shows that the ratio of Generalised anxiety disorders among female and male is 2:1 respectively. All college students face challenges such as financial restraints, challenging courses, adapting to new experiences, and peer pressure. However, nursing students may have additional stressful situations to consider. Research indicates that nursing students claim course structure, clinical experiences, and lack of support are common themes for producing anxiety.[9] Jones and Johnston reported an additional source of anxiety for nursing students is the demand of working with sick patients in a variety of stressful settings while preparing for exams.[10] Nursing students face a variety of stressors and anxiety which are usually associated with less pleasant aspects of life. Studies suggest that it is particularly high among BSc nursing students as they juggle the rigors of college life and demands of clinical experience and at the very same time they have to struggle with their own personal responsibilities.[11] Nursing students describe the experience of nursing school as unique in that there is additional anxiety associated with clinical placement, lack of free time, fear of failure, long study hours, and college response to the needs of students. Nursing students displayed higher levels of distress than fourth-year medical students and the general population. Preparation for a career in nursing is linked to higher levels of emotional stress and well-being among nursing students.[7] It is a well-known fact that some student nurses who experience anxiety during clinical experiences leave nursing education. Identifying and decreasing anxiety in nursing students has a two-fold effect. First, when anxiety is decreased, learning may be increased. Second, decreasing anxiety may help alleviate the nursing shortage because more students complete their nursing education.[12] Progressive muscle relaxation (PMR) is a technique for reducing anxiety by alternately tensing and relaxing the muscles. It was developed by American physician Edmund Jacobson in the early 1920s.[13] Jacobson argued that since muscle tension accompanies anxiety, one can reduce anxiety by learning how to relax the muscular tension. PMR entails a physical and mental component.[14] Research indicates that progressive muscle relaxation may also help soothe anxiety and stress by reducing levels of cortisol (a hormone released in response to stress). A study conducted among graduate students revealed that progressive muscle relaxation with appropriate supportive measures may help them manage anxiety and prevent depression.[15] Another controlled trial conducted to determine the effect of muscle relaxation training in reducing anxiety among nursing students. Students underwent training for 8 weeks. Study found that muscle relaxation training has at

least a short-term effect in alleviating anxiety in nursing students.[16] Since health care professionals provide care to the public, the perception of unstable nurses can cause serious concern among society and nursing professionals. Early identification of these emotional problems is imperative in prevention or reduction of negative emotional states among student nurses and potentially future registered nurses. Relaxation techniques must be employed in combating the high levels of anxiety experienced by nursing students. With this viewpoint, the investigator(s) aims to implement a progressive muscle relaxation technique and find out its effect in reducing anxiety among nursing students.

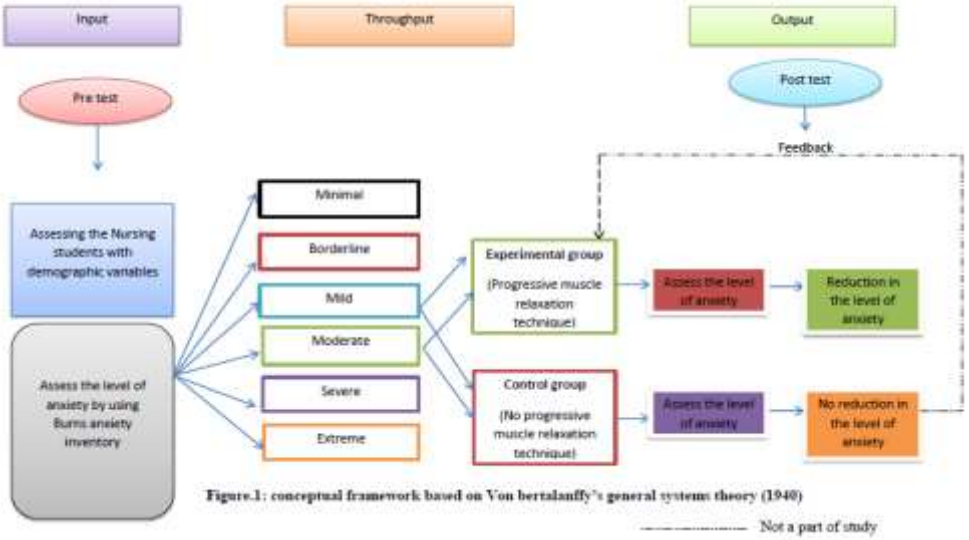
Objectives of the study

1. To assess the level of anxiety among first year BSc nursing students in experimental and control group.
2. To assess the level of anxiety among first year BSc nursing students after implementing progressive muscle relaxation technique.
3. To find out the effect of progressive muscle relaxation technique on level of anxiety among nursing students.
4. To find out the effect of progressive muscle relaxation technique on anxiety subscales.
5. To find out association of pre-test level of anxiety among first year BSc nursing students and selected socio-demographic variables.

Hypothesis [Tested at 0.05 level of significance, 95%CI]

- H_1- There is significant difference in mean anxiety scores before and after progressive muscle relaxation technique among experimental group.
- H_2- There is significant difference in mean post-test anxiety scores among experimental and control group.
- H_3- There is significant association between level of anxiety of nursing students with selected socio-demographic variables.

Figure 1: Conceptual Framework based on "Von Bertalanffy's General System Theory"



II. MATERIAL AND METHODS

Research Approach: Quasi experimental approach.

Research Design: Pre-test – post-test control group design.

Population: Primary school teachers.

Settings: The study was conducted in Nursing colleges, SSNMM College of Nursing, Varkala (Experimental group) and Ananthapuri College of Nursing, Chakkai, Trivandrum (Control group).

Sampling Technique: Non –probability purposive sampling technique.

Sample size: 60 First year BSc Nursing students (30 in experimental and 30 in control group).

Figure 2: Schematic representation of Research design

Experimental Group	O_1	X	O_2
Control Group	O_1		O_2

❖ **O_1: Pre-test, X: Intervention (Progressive muscle relaxation), O_2: Post-test.**

Tools and Technique:

I) Socio-demographic proforma: was used to collect the background data of the study subjects. It consisted of age, sex, religion, type of family, father's education, mother's education, father's occupation, mother's occupation, family income per month, medium of instruction of previous school education, academic performance in previous school education, pattern of higher secondary education, number of siblings, hobbies and education loan taken.

II) Burns anxiety inventory (BAI)was used to measure level of anxiety among nursing students. The Burns anxiety inventory is a checklist of thirty-three symptoms related to anxiety. They are broken down into three categories: anxious feelings, anxious thoughts, and physical symptoms. The items are scored based on a four-point Likert scale ranging from a minimum score of zero indicating not at all, score of 01 denoting somewhat, a score of 02 for moderately and a maximum score of 03 for a lot that the symptom has bothered the person. Burns anxiety inventory have an excellent reliability, and internal consistency (r = 0.9). Reliability computed using split half method in the present study was 0.744.

III) Progressive muscle relaxation technique: Progressive muscle relaxation technique, developed by Dr. Edmund Jacobson for combating anxiety by a series of muscle relaxation exercises involving particularly tensing and relaxing muscles of the whole body and practiced consistently. PMR entails a physical and mental component. The physical component involves the tensing and relaxing of muscle groups over the legs, abdomen, chest, arms and face. With the eyes closed and in a sequential pattern, a tension in a given muscle group is purposefully done for approximately 10 seconds and then released for 20 seconds before continuing with the next muscle group. PMR begins with starting three deep breaths very slowly following tensing and relaxation of muscles of the lower extremities progressing to thighs and buttocks, abdomen, back, chest, upper extremities shoulder and face muscles. The mental component focuses on the difference between the feelings of the tension and relaxation. Because the eyes are closed, one is forced to concentrate on the sensation of tension and relaxation.

Method of Data collection: A prior written permission was obtained from the Principal, SSNMM College of Nursing, Varkala and Ananthapuri College of Nursing to conduct the study. The main study was conducted in SSNMM College of Nursing (Experimental group) and Ananthapuri College of Nursing (Control group) from 3-1-2013 to 18-1-2013 (2weeks duration). The investigator introduced himself to the subjects and the objectives of the study were briefly explained to the participants. The investigator informed consent and assured confidentiality throughout the conduct of study. socio demographic proforma and Burns anxiety inventory was used to collect data. In phase 1, all nursing students were assessed for anxiety. In phase 2, students with mild to moderate anxiety each from experimental and control group were selected using purposive sampling technique. The subjects in the experimental group were exposed to progressive muscle relaxation technique for one week duration (4-1-2013 to 11-1-3013) with a period of 30 minutes every day and control group had no

intervention. At the end of 2nd week (18-1-2013) post test was conducted for the both groups by using the same anxiety inventory.

Inclusion criteria: First year BSc nursing students with mild and moderate anxiety and who were willing to participate in the study and who were available during the period of data collection.

Exclusion criteria:
First year BSc nursing students who were receiving therapies like music, yoga, meditation, laughter therapy etc and who takes anxiolytic drugs. Students who were married were also excluded.

STATISTICAL ANALYSIS:

Both Descriptive and Inferential statistics were used to analyse the data [using SPSS version 20 (SPSS Inc., Chicago, IL)]. Descriptive statistics such as Frequency distribution and percentage were used to describe the socio demographic data. Effect of progressive muscle relaxation technique was analysed using 'paired t test'. Effect of PMR on anxiety subscales (Anxious feelings) was analysed using analysis of covariance (ANCOVA). Association between level of anxiety and selected demographic variables was computed using chi-square test. The level $P < 0.05$ (95% CI) was ascertained as the minimum accepted level of significance.

III. RESULTS

Section I: Description of Sample Characteristics.

Table 1: Frequency distribution and percentage of nursing students based on socio-demographic variables. [N=60]

Demographic Variables	Experimental		Control	
Age (In years)	f	%	f	%
17-18	24	80	23	76.7
19-20	06	20	07	23.3
Sex				
Male	02	6.7	03	10
Female	28	93.3	27	90
Religion				
Hindu	26	86.7	22	73.3
Muslim	03	10	03	10
Christian	01	3.3	05	16.7
Type of Family				
Nuclear	29	96.7	23	76.7
Joint	01	3.3	07	23.3
Father's Education				
Primary	02	6.7	05	16.7
High School	16	53.3	15	50
Higher Secondary	06	20	05	16.7
Diploma	05	16.7	02	6.7
Graduate	01	3.3	01	3.3
Post Graduate	0	0	02	6.7
Mother's Education				
Primary	01	3.3	02	6.7
High School	14	46.7	12	40
Higher Secondary	10	33.3	07	23.3
Diploma	01	3.3	05	16.7
Graduate	03	10	02	6.7
Post Graduate	01	3.3	02	6.7
Father's Occupation				
Employed	20	66.7	10	33.3
Unemployed	01	3.3	01	3.3
Self Employed	09	30	19	63.3
Mother's Occupation				
Employed	24	80	16	53.3
Home maker	05	16.7	14	46.7
Self Employed	01	3.3	0	0
Family Income Per Month				
Up to ₹10,000	16	53.3	14	46.7
₹ 10,001- 20,000	10	33.3	07	23.3
₹ 20,001- 30,000	02	6.7	04	13.3
More than ₹ 30,000	02	6.7	05	16.7

Medium of Instruction of Previous School Education				
English	09	30	19	63.3
Malayalam	21	70	11	36.7
Academic Performance in Previous School Education				
> 75%	17	56.7	17	56.7
60-75%	11	36.7	11	36.7
<60%	02	6.7	02	6.7
Pattern of Higher Secondary Education				
SCERT	29	96.7	27	90
VHSE	0	0	01	3.3
CBSE	0	0	02	6.7
OTHERS	01	3.3	0	0
Number of Siblings				
No sibling	01	3.3	02	6.7
1-2	28	93.3	26	86.7
3 and above	01	3.3	02	6.7
Hobbies				
Reading books	07	23.3	20	66.7
Hearing Music	30	100	28	93.3
Indoor games	04	13.3	08	26.7
Outdoor games	05	16.7	07	23.3
Any other	10	33.3	09	30
Education Loan Taken				
Yes	13	43.3	14	46.7
No	17	56.7	16	53.3

Section II: Level of Anxiety among Nursing Students

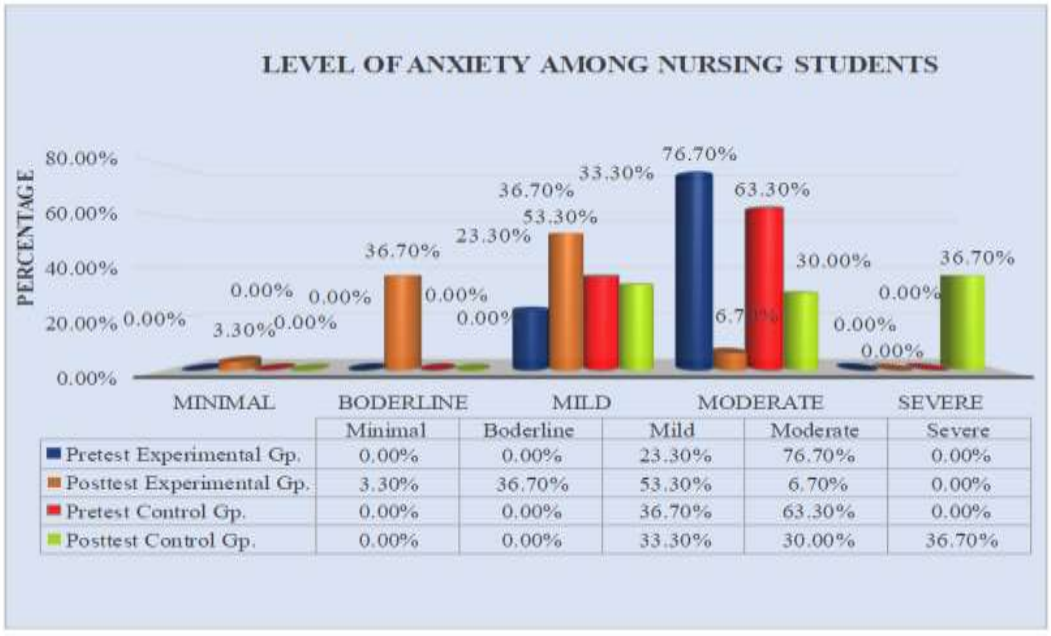
Table 2: Frequency and percentage of nursing students based on pre-test level of anxiety. [N=60]

Level of Anxiety	Experimental		Control	
	f	%	f	%
Minimal	0	0.0	0	0.0
Borderline	0	0.0	0	0.0
Mild	07	23.3	11	36.7
Moderate	23	76.7	19	63.3
Severe	0	0.0	0	0.0

Table 3: Frequency and percentage of post-test level of anxiety among nursing students. [N=60]

Level of Anxiety	Experimental		Control	
	f	%	f	%
Minimal	01	3.3	0	0.0
Borderline	11	36.7	0	0.0
Mild	16	53.3	10	33.3
Moderate	02	6.7	09	30.0
Severe	0	0.0	11	36.7

Figure 3: Cylindrical diagram depicting the percentage distribution of mean pre-test and post-test level of anxiety



Section III: Effect of Progressive Muscle Relaxation Technique on Level of Anxiety.

Table 4: Mean, standard deviation and t value of level of anxiety among nursing students before and after progressive muscle relaxation technique. [N=60]

Group	Stage	Mean	SD	Mean Difference	df	Paired t	p
Experimental	Pre-test	23.7	5.2	10.7	29	13.99**	0.00
	Post-test	13.0	5.4				
Control	Pre-test	23.2	6.6	2.4	29	3.1**	0.004
	Post-test	25.6	8.6				

**** Significant at 0.01 level**

Table 5: Mean, SD and t value of level of anxiety among nursing students in experimental and control group [N=60]

Stage	Group	Mean	SD	df	t	p
	Experimental	23.7	5.2	58	0.37	0.713
Pre-test						
	Control	23.2	6.6			
	Experimental	13.0	5.4			
Post test				58	6.77**	0.000
	Control	25.6	8.6			

**** Significant at 0.01 level**

Section IV: Effect of Progressive Muscle Relaxation Technique on Anxiety Subscales.

Table 6: Mean, standard deviation and paired t value of level of anxious feeling among nursing students before and after progressive muscle relaxation technique [N=60]

Group	Stage	Mean	SD	df	Paired t	p
	Pre-test	5.0	2.0	29	6.16**	0.00
Experimental						
	Post-test	2.8	1.7			
	Pre-test	4.0	1.5			
Control				29	1.32	0.197
	Post-test	4.4	1.7			

**** Significant at 0.01 level**

Table 7: Mean, SD and F test value of level of anxious feeling among nursing students before and after progressive muscle relaxation technique (ANCOVA). [N=60]

Stage	Group	Mean	SD	df	F	p
	Experimental	5.0	2.0	(1, 58)	4.35*	0.713
Pre-test						
	Control	4.0	1.5			
	Experimental	2.8	1.7			
Post test				(1, 58)	13.75**	0.000
	Control	4.4	1.7			
Adjusted post test	Experimental	2.6	0.3			
				(1,57)	27.02**	0.00
	Control	4.6	0.3			

****Significant at 0.01 level. * Significant at 0.05 level.**

Table 8: Mean, standard deviation and t value of level of anxious thoughts among nursing students before and after progressive muscle relaxation technique [N=60]

Group	Stage	Mean	SD	df	Paired t	p
	Pre-test	8.2	2.7	29	9.15**	0.00
Experimental						
	Post-test	4.5	2.3			
	Pre-test	8.1	2.8			
Control				29	2.75*	0.00
	Post-test	9.6	3.7			

****Significant at 0.01 level. * Significant at 0.05 level.**

Table 9: Mean, SD, t value of level of anxious thoughts among nursing students in experimental and control group [N=60]

Stage	Group	Mean	SD	df	t	p
	Experimental	8.2	2.7	58	0.14	0.89
Pre-test						
	Control	8.1	2.8			
	Experimental	4.5	2.3			
Post test				58	6.36**	0.00
	Control	9.6	3.7			

****Significant at 0.01 level.**

Table 10: Mean, standard deviation and paired t value of level of physical symptoms among nursing students before and after progressive muscle relaxation technique. [N=60]

Group	Stage	Mean	SD	df	Paired t	p
	Pre-test	10.5	2.7	29	8.32**	0.00
Experimental						
	Post-test	5.7	2.3			
	Pre-test	11.0	2.8			
Control				29	1.14	0.264
	Post-test	11.6	3.7			

****Significant at 0.01 level.**

Table 11: Mean, SD, t value of level of physical symptoms among nursing students in experimental and control group. [N=60]

Stage	Group	Mean	SD	df	t	p
	Experimental	10.5	3.6	58	0.48	0.635
Pre-test						
	Control	11.0	4.9			
	Experimental	5.7	3.3			
Post test				58	5.19**	0.00
	Control	11.6	5.3			

****Significant at 0.01 level.**

SECTION V: Association between Level of Anxiety and selected Socio-demographic Variables.

Table 12: Association between level of anxiety among nursing students and selected socio demographic variables. [N=60]

Demographic Variables	Level of Anxiety Mild		Moderate		df	χ^2	p
	f	%	f	%			
Mother's Education Up to High School	13	44.8	16	55.2	01	5.88*	0.015
Above High School	05	16.1	26	83.9			

*** Significant at 0.05 level.**

IV. DISCUSSION

The present study focused on the effect of progressive muscle relaxation technique on level of anxiety among nursing students in selected nursing colleges in Thiruvananthapuram district. The major findings of the study are discussed in relation to the findings of other research studies. The first objective of the study was to assess the level of anxiety among first year BSc nursing students in experimental and control group and study revealed that in experimental group 23.3% had mild anxiety and 76.7% had moderate anxiety. In control group 36.7% had mild anxiety, 63.3% had moderate anxiety and none of the samples had minimal and severe level of anxiety in both experimental and control group. This was supported by various studies which revealed that anxiety is common among nursing students. A study on anxiety in first-year nursing students found that over half of the students reported significant anxiety. Most students experienced anxiety; however, the distressed students experienced more intense symptoms. These experiences lead to feelings of hostility and use of fantasy among nursing students.[7] A descriptive study conducted on 200 randomly selected female nursing students of Dayanand College of nursing, Ludhiana revealed that majority of the students were experiencing mild to moderate level of anxiety. students after implementing progressive muscle relaxation technique. The study showed that in post-test in experimental group 3.3% students had minimal anxiety, 36.7% had borderline anxiety, 53.3% had mild anxiety and 6.7% had This was supported by various studies which revealed that PMR is effective in reducing anxiety.[17] A study conducted on the effectiveness of progressive muscle relaxation, cognitive restructuring, and assertiveness training was examined on academic performance among college students results showed significantly greater improvements on self-report measures of trait anxiety and stress-related symptoms at post-test but with no marked difference in the academic performance for the two groups.[18] The third objective is to find out

the effect of progressive muscle relaxation technique on level of anxiety among nursing students. The results showed that among the experimental group anxiety reduced to 13±5.4 and in control group anxiety increased to -25.6 ±8.6. Experimental group shows better improvement in anxiety than the control group. There is significant difference in the mean anxiety scores of nursing students before and after progressive muscle relaxation technique which is significant in reducing anxiety in nursing students. It is interpreted that progressive muscle relaxation technique is significant at 0.01 levels. This was supported by various studies. A quasi-experimental study conducted to assess the effect of relaxation training on the levels of state anxiety concerning first year female nursing students at their initial experience in clinical setting in Tehran University of medical sciences. The findings revealed a positive reduction in level of anxiety in the experimental group with progressive muscle relaxation training.[19] The fourth objective was to find out the effect of progressive muscle relaxation technique on anxiety subscales. The study revealed that average anxious feeling score among the experimental group reduced to 2.8 ± 1.7. Reduction in the anxious feeling after intervention in the experimental group was statistically significant ($p< 0.01$). The mean post-test anxious thought score of nursing students in experimental group is 4.5 and that in control group is 9.6. There is statistical difference in the mean post-test anxious thought score of nursing students in experimental and control group at 0.01 level of significance. After intervention among the experimental group the physical symptoms score reduced to 5.7±2.3. Reduction in the physical symptoms score is statistically significant at $p< 0.05$. It is interpreted that progressive muscle relaxation technique is significant at 0.01 levels. The fifth objective was to find out association between pre-test level of anxiety among nursing students and selected socio-demographic variables. The study revealed that there was significant association between level of anxiety and mother's education (χ^2 value 5.88*, $P<0.05$) and no association between level of anxiety and other selected socio-demographic variables.

V. CONCLUSION

The study was conducted to assess the effect of progressive muscle relaxation technique on level of anxiety among first year /BSc nursing students. The results reveal that mean pre-test anxiety score among experimental group (before intervention) was 23.7±5.2 SD and that among the control was 23.2±6.6 SD. After intervention, among the experimental group the mean anxiety score is reduced to 13±5.4. Reduction in anxiety level after intervention in the experimental group was statistically significant. (Paired t value 13.99**, $p<0.01$). Mean post-test anxiety score in control group increased to 25.6± 8.6 SD with a negative statistical significance (Paired t value 3.1**$P<0.01$). This score changes also represent the effectiveness of the intervention. Therefore, it is interpreted that there is significant reduction in the mean anxiety score of nursing students before and after progressive muscle relaxation in the experimental group. Hence research hypothesis H_1 was accepted. Also, the t test value 6.77** computed by comparing the post-test anxiety scores among experimental and control group was statistically significant at $p<0.01$ level. The comparison of pre-test anxiety scores among experimental and control group was not significant. (t test value 0.37, $P>0.05$.) There is statistical significance in the reduction of mean anxiety score of nursing students in the experimental group as compared to control group at 0.01 level. Hence the research hypothesis H_2 was accepted. Therefore, it is interpreted that progressive muscle relaxation technique is effective in reducing anxiety level among nursing students.

Limitations

- The present study was limited to 60 samples.
- The influence of extraneous variables during the period between pretest and posttest on the control group cannot be explored.
- The study used a purposive sampling, the generalization of findings remains limited.
- As the study was conducted in an institutional set up generalizations of findings for nursing students in the community setups remain restricted.

Recommendations

- The study can be done using simple random sampling on a large sample over a longer period of time.
- A similar study can be conducted on another stream of students.
- A comparative study can be done between undergraduate nursing students and corresponding arts college students respectively.
- A similar study can be conducted in different settings.

Declaration by Authors

Ethical Approval: Ethical committee clearance was obtained from the Institutional ethical committee, letter No. SCN/Cert/44/12-13; Dated 05th June 2012. A formal permission was obtained from concerned authorities [Office order(s)Vide, No.SCN/off. Orders/29/12-13, dated 01/11/12 and CN.No.2/2013, dated 03/01/2013] before the conduct of the study. An informed consent was taken from samples and confidentiality was ensured throughout the conduct of the research.

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Conflict of Interest: The authors declare no conflict of interest.

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