

# Progressive muscle relaxation technique on anxiety and depression among persons affected by leprosy

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Anxiety and depression have been found to be increasing among people with leprosy and it may lead to decreased social participation. The progressive muscle relaxation technique (PMRT) is widely used today in choice of treatment for reducing the anxiety and depression. This study aimed to assess the effectiveness of PMRT in reducing anxiety and depression among the hospitalized leprosy affected person in a tertiary care centre. This study is a case series of 50 leprosy affected people aged between 18–60 years who were admitted for leprosy complications in tertiary leprosy referral hospital. The Anxiety-Depression scale was developed and validated by the investigators and administered before intervention of PMRT and after 2 weeks. The follow-up assessment was done at 6 weeks after the initial intervention. The finding shows that a statistically significant difference was observed on anxiety

domain before and after application of PMRT. The anxiety means score showed steady decline from 6.76 at pretest to 3.0 ( $t=25.068$ ,  $P\leq 0.001$ ) at post test and 1.12 ( $t=22.679$ ,  $P\leq 0.001$ ) at follow-up. In depression domain, a statistically significant difference was seen in before and after application of PMRT. The depression means score showed steady decline from 6.92 at pre test to 3.28 ( $t=16.082$ ,  $P\leq 0.001$ ) at post test and to 1.16 ( $t=18.918$ ,  $P\leq 0.001$ ) at follow-up. This study proved that the PMRT as a valid treatment option for hospitalized person with leprosy in minimizing the anxiety and depression related symptoms and to benefit the psychosocial wellbeing of leprosy affected patients.

**Keywords:** Leprosy, Progressive muscle relaxation, Anxiety, Depression

## INTRODUCTION

Hospitalization is a stressful and threatening experience (Li et al., 2016). Patients admitted for leprosy complications often suffer from painful physical and mental symptoms. This is reflected on their reluctance and delay in seeking hospitalization and also it generates great anxiety while admitted as inpatients (George et al., 2013). Depression and anxiety symptoms increased from the time of admission toward longer hospital stay (Shoar et al., 2016). Studies show that, up to 50% the people affected by leprosy will face depression, anxiety and even have thoughts of suicide (Lepra, 2017). This anxiety and depression may lead to decreased social participation and social exclusion among leprosy affected person (Adhikari et al., 2014).

Anxiety disorders have been found to be increasing among peo-

ple with leprosy. It is suggested that it creates tension, irritation, anger and worries (Chauhan et al., 1983). A study reported, all responses experienced anxiety while admitted at a hospital and the majority felt that lengthy institutionalization had more disadvantages than advantages (Scott, 2000).

Depression is more than just sadness. According to the American psychological association (2018), people with depression may experience a lack of interest and pleasure in daily activities, significant weight loss or gain, insomnia or excessive sleeping, lack of energy, inability to concentrate, feelings of worthlessness or excessive guilt and recurrent thoughts of death or suicide. Studies are reported depression is the most common psychiatric disorder among leprosy patients (Kisivuli et al., 2005; Kumar and Verghese, 1980; Sentürk and Sağduyu, 2004). According to the World Health Organization (WHO), if we not take immediate

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act on depression, it will result the leading illness globally by 2030 (WHO, 2017).

Relaxation has a significant psychological impact. Through relaxation we can improve specific aspects of our personality, strengthening the positive qualities and changing unwanted habits and attitudes (Kumar et al., 2015). Edmund Jacobson invented the progressive muscle relaxation technique (PMRT) in the 1920s as a way to help patients to deal with anxiety and he felt that relaxing the muscles could relax the mind as well (Kisner and Colby, 2007). The progressive muscle relaxation technique is easily learned and widely used today as a choice of treatment for reducing the anxiety and depression. Hence, the study aim to assess the effectiveness of progressive muscle relaxation technique in reducing anxiety and depression among the hospitalized leprosy affected person in a tertiary care centre.

## MATERIALS AND METHODS

A prospective open-label single arm study conducted with 50 leprosy affected people who were admitted for leprosy complications during the period of March to August, 2016 in a tertiary leprosy referral hospital.

### Inclusion and exclusion criteria

The study includes those aged between 18–60 years, who were willing to participate in the study and able to understand relaxation techniques. Those patients who were practicing other relaxation technique such as yoga and/or on meditation for anxiety or depression were excluded from the study. Those who are alcohol dependence, tobacco chewers and/or smokers were also excluded as they may directly affect psychological status of an individual.

### Semistructured questionnaire

A semistructured questionnaire was used to interview the participants and it consists details of disease profile, clinical profile, and demographic profile.

### Anxiety and depression scale

Most of the standardized scales of anxiety and depression are available in self-administered model, and it is not suitable for the hospitalized leprosy affected people, as the leprosy affects mostly poor and illiterate people. Hence, the researcher developed a set of questionnaires for face-to-face interview, with the reference from Hospital anxiety depression scale (Zigmond and Snaith, 1983), Beck depression inventory (Beck et al., 1961), Beck anxiety inven-

tory (Beck et al., 1988), and Hamilton anxiety scale (Hamilton, 1959). It consists of 10 items questionnaire in a 4-point likert scale (0, never; 1, sometimes; 2, most of the times; and 3, always) in two domains (5 items each in anxiety and depression). Each domain of anxiety and depression scores range from 0 to 15, the higher level of score indicates that more anxiety and depression.

The scale translation procedure was followed as per WHO guidelines (WHO, 2007). The content and face validity were done for scale items by three expertise who experienced in leprosy treatment and rehabilitation. The study was carried out in a manner to ensure the clarity of questions to patients and conducted a reliability test for internal consistency of the questionnaires.

### Reliability

The Hindi version of the scale was tested in the community and studied for internal consistency and reliability. The Cronbach alpha score was 0.865 for 10 items scale of Anxiety-Depression scale. The domain Cronbach alpha score was, 0.80 for anxiety (5 items) and 0.77 for depression (5 items). The corrected item-total correlation ranged from 0.43 to 0.83, with 7 items falling at or above 0.50. The Cronbach alpha scores for the scale of each individual item deleted ranged from 0.83 to 0.87. A statistical significant positive relationship was found between anxiety domain and depression domain ( $r=0.68$ ,  $P=0.00$ ).

### Intervention of PMRT

Jacobsen progressive muscle relaxation technique was demonstrated and taught after ensuring that the participants understood about the technique.

Sequence of progressive muscle relaxation techniques:

- Make them in a comfortable position (preferably sitting)
- While beginning to tense the muscle group, asked the patient to feel the tension, but not so much that deal of pain. Keep the muscle tensed for approximately 5 sec
- Relax the muscles and keep it relaxed for approximately 10 to 15 sec

Followed by instruction, relaxation sequences were demonstrated to the patients in three steps as showed in Table 1. In first and third steps of the relaxation sequence, the patients were advised to begin the technique from right side of the body followed by left side.

### Procedure

Author arranged a convenient place in in-patient department to demonstrate the PMRT. After participants become familiar with performing this PMRT, they were asked to perform it according

**Table 1.** Relaxation sequence demonstrated to patients

Step	Progressive muscles relaxation technique	
	Parts	Exercise
1	Hand & forearm	Make a fist with your hand
	Upper arm	Bring your right forearm up to your shoulder to “make a muscle”
2	Forehead	Raise your eyebrows as high as they will go, as though you were surprised by something
	Eyes and cheeks	Squeeze your eyes tight shut
	Mouth and jaw	Open your mouth as wide as you can, as you might when you’re yawning
	Neck	Be careful as you tense these muscles. Face forward and then pull your head back slowly, as though you are looking up to the ceiling
	Shoulders	Tense the muscles in your shoulders as you bring your shoulders up towards your ears
	Shoulder blades/ back	Push your shoulder blades back, trying to almost touch them together, so that your chest is pushed forward
	Chest and stomach	Breathe in deeply, filling up your lungs and chest with air
3	Hips and buttocks	Squeeze your buttock muscles
	Upper leg	Tighten your thigh
	Lower leg	Do this slowly and carefully to avoid cramps. Pull your toes towards you to stretch the calf muscle
	Foot	Curl your toes downwards

to their choice of individual or in a group; twice in a day for 5–6 days a week under supervision of the physiotherapist during hospitalization. In a day, two sessions were conducted in the morning and evening approximately for 30 min. The anxiety-depression scale assessment was first administered at the time of admission and repeated after 2 weeks. Patients were instructed to continue the same technique and follow-up assessment were done in 6 weeks after the initial intervention. When patients were discharged at any time during the study period, they were requested to continue the techniques at home and given an appointment for follow-up assessment.

Informed consent was taken prior to inclusion in the study from each individual participant. All the collected information about patient was kept confidential. Collected data were entered and analyzed in statistical software of IBM SPSS Statistics ver. 23.0 (IBM Co., Armonk, NY, USA).

## RESULTS

A total of 50 subjects who are aged between from 18 to 60 years were undergone PMRT during the study period, out of all participants 36 (72%) were males. Thirty-six of the participants (72%) was admitted for the first time for treatment for leprosy and 39

**Table 2.** Demographic and disease profile of the participants (n=50)

Demographic status	No. (%)
Gender	
Male	36 (72)
Female	14 (28)
Age (yr)	
18–30	24 (48)
31–45	13 (26)
46–60	13 (26)
Education	
Primary	9 (18)
Secondary	16 (32)
Higher secondary	9 (18)
No education	16 (32)
Occupation	
Farmer	15 (30)
Labor	10 (20)
Skilled labor	11 (22)
Professional & small business	8 (16)
House wife	6 (12)
Treatment status	
New	11 (22)
Under treatment	28 (56)
Released from treatment	11 (22)
WHO disability grade	
Grade 0	9 (18)
Grade 1	13 (26)
Grade 2	28 (56)
Reason for admission	
Neuritis	18 (36)
Reaction and neuritis	20 (40)
Ulcer	12 (24)
Number of time admission	
First time	36 (72)
Second time	9 (18)
Third time and above	5 (10)

WHO, World Health Organization.

(78%) were on multidrug therapy, of this 11 were newly diagnosed case of leprosy and 28 of the participants (56%) had grade 2 disabilities. Thirty-eight participants had recent history of lepra reaction and/or neuritis and all of them were under steroid therapy. The demographic and disease profiles are shown in Table 2.

### Descriptive analysis for anxiety-depression scale for variables

In anxiety-depression scale, the scores of the single items were summed and divided by the total number of items (5) for each domain (anxiety and depression). The higher mean score indicates that, the more anxiety and depression on person affected with leprosy.

The female had higher mean score on domains of anxiety and depression when compared with male. The patients aged with 45–60 years had a higher mean score than 18–30 years and 31–45 years in the domains of anxiety and depression. The participants who were not attained formal education had higher mean score in

**Table 3.** Descriptive analysis for anxiety-depression scale for variables before progressive muscle relaxation technique (n=50)

Variable	No.	Anxiety	Depression
<b>Gender</b>			
Male	36	6.19±2.45 (2–12)	6.42±2.74 (1–13)
Female	14	8.21±3.04 (5–12)	8.21±3.02 (4–13)
<b>Age (yr)</b>			
18–30	24	6.63±2.86 (2–12)	6.75±2.40 (3–13)
31–45	13	6.46±2.07 (5–12)	6.00±2.92 (2–13)
46–60	13	7.31±3.25 (2–12)	8.15±3.51 (1–13)
<b>Education</b>			
Primary	9	6.78±2.91 (2–10)	6.67±3.57 (1–11)
Secondary	16	5.56±2.00 (2–11)	6.56±2.73 (3–13)
Higher secondary	9	6.89±2.76 (3–12)	6.33±2.35 (2–9)
No education	16	7.88±3.05 (3–12)	7.75±3.04 (4–13)
<b>Treatment status</b>			
New	11	6.09±3.18 (2–12)	5.55±1.13 (4–7)
Under treatment	28	6.89±2.60 (2–12)	7.07±3.23 (1–13)
Released from treatment	11	7.09±2.84 (3–12)	7.91±2.95 (4–13)
<b>Disability status</b>			
Grade 0	9	6.11±2.67 (2–11)	6.00±2.69 (1–10)
Grade 1	13	6.62±2.87 (3–12)	7.38±3.45 (3–13)
Grade 2	28	7.04±2.78 (2–12)	7.00±2.74 (2–13)
<b>Reason for admission</b>			
Neuritis	18	6.00±2.45 (3–12)	6.00±2.68 (2–13)
T1 reaction	11	5.91±2.51 (2–11)	5.91±2.91 (1–11)
T2 reaction	9	8.33±2.24 (6–12)	8.44±2.30 (6–13)
Ulcer	12	7.50±3.29 (2–12)	8.08±3.03 (4–13)
<b>Number of admission time</b>			
First time	36	6.44±2.84 (2–12)	6.42±2.96 (1–13)
Second time	9	7.67±2.96 (5–12)	8.22±2.95 (5–12)
Third time and above	5	7.40±1.14 (6–9)	8.20±1.10 (7–10)

Values are presented as mean ± standard deviation (range).

**Table 4.** Paired t-test for before and after application of progression muscle relaxation technique (n=50)

Status	Pretest	Posttest	Follow-up	Paired t-test	t-value	P-value
Anxiety	6.76±2.75	3.00±2.63	1.12±1.51	Pre- vs. Posttest	25.07	0.000*
				Pretest vs. follow-up	22.68	0.000*
Depression	6.92±2.91	3.28±2.59	1.16±1.53	Pre- vs. Posttest	16.08	0.000*
				Pretest vs. follow-up	18.92	0.000*

Values are presented as mean ± standard deviation.

\*P<0.05, statistically significant difference.

both the domains than the attained formal education. Those who had completed multidrug therapy had higher mean score than those who are under multidrug therapy. It was found that persons with grade 2 disabilities had a higher mean score in anxiety domain, whereas the person with grade 1 disabilities had higher mean score in depression domain. In association with neuritis and type 1 lepra reaction, the type 2 lepra reaction and ulcer patients had higher mean score on both the domains. The mean score were higher for those who were admitted in the hospital for more than one time (Table 3).

### A significant difference for before and after PMRT on anxiety and depression

#### Anxiety

A statistically significant difference was seen on anxiety before and after application of PMR techniques. The anxiety means score showed steady decline from 6.76 at pretest to 3.0 ( $t=25.068$ ,  $P\leq 0.001$ ) at posttest and 1.12 ( $t=22.679$ ,  $P\leq 0.001$ ) at final follow-up.

#### Depression

A statistically significant difference was seen on depression before and after application of PMR technique. The depression means score showed steady decline from 6.92 at pretest to 3.28 ( $t=16.082$ ,  $P\leq 0.001$ ) at posttest and to 1.16 ( $t=18.918$ ,  $P\leq 0.001$ ) at final follow-up (Table 4).

## DISCUSSION

In our knowledge, this was the first study in leprosy which used PMRT to reduce anxiety and depression among hospitalized persons. PMRT is the choice of relaxation therapy to reduce anxiety and depression disorders used in most of the chronic disease (Stoppler, 2014). Past research showed, anxiety related symptoms improved after the use of PMRT (Redd et al., 2001; Burish and Tope, 1992). Studies from India showed PMRT are effective in re-

ducing anxiety among people affected with psychological disorders (Ranjita and Sarada, 2014), reducing the level of stress among the geriatric patient with psychotic illness (Ramakrishnan and Kalai Chandran, 2015), and reducing the physical symptoms due to chemotherapy in cancer patients receiving chemotherapy (Gupta et al., 2016). In this study, pretest versus posttest and follow-up test showed a statistically significant steady decline of anxiety and depression among those admitted for leprosy complication.

A study from Bangladesh found, depressive status in leprosy patients was greater than that of general public (Tsutsumi et al., 2004). A comparative study from Ethiopia, showed that mental distress was significantly higher in patients with leprosy compared to patients with other dermatological conditions (Leekassa et al., 2004). Bhatia et al. (2006), done a study on psychiatric morbidity and pattern of dysfunction in patients with leprosy showed that the predominant psychiatric illness in study group was generalized anxiety disorder (27.8%) and mixed anxiety and depressive disorder (13.3%). In this study, the initial assessment before the start of PMRT showed that 42% had moderate sum score from 6 to 10 and 12% had higher sum score (above 10) in anxiety domain. In depression domain, 50% had moderate sum score from 6 to 10 and 14% had higher sum score (above 10), which is comparable to their findings.

A study on women with leprosy showed that anxiety disorders were more commonly found in women (Morrison, 2000). A study from India done by Yaduvanshi et al. (2016), revealed that the female leprosy affected patient had significantly more depression than male patients. A study from Ethiopia done by Leekassa et al. (2004), found a higher prevalence of mental distress in female leprosy patients than males which was significantly associated with disability. In this study, female patients had a statistically significant higher mean score in anxiety-depression scale than the male patients after their admission in hospital for treatment of complications due to leprosy.

Elder patients and those who have not attained any formal education patients had higher mean score in anxiety and depression domain than younger patients and attained formal education patients, respectively. It is not surprising that not attained formal education patients had higher mean score in anxiety and depression domain, which may be due to their lack of knowledge and awareness about the disease. However, the improvement in anxiety and depression was observed across age group and level of education.

Reis et al. (2014), found a higher prevalence of psychological

distress in leprosy patients with higher disability levels, further patients with psychological distress had the lowest quality of life. In this study, the participant who had grade 2 disabilities found to have more anxiety than those with grade 1 or no disability, while the depression levels was higher among those with grade 1 disability. Although the persons admitted for type 2 lepra reaction and plantar ulcers had higher mean score as compared to persons admitted for neuritis and type 1 lepra reaction. This is probably due to need a longer hospitalization for type 2 lepra reaction and plantar ulcers.

Early detection and treatment of psychiatric disorders among leprosy affected patients is a powerful psychotherapeutic measure (Singh, 2012). In this study a statistically significant relationship was found between domains of anxiety and depression, suggesting that hospitalized patients are prone to develop anxiety and depressive disorder. The PMRT helps in reducing their symptoms. Moreover, this relaxation therapy is easy to learn and practice, does not require trained professional or any equipment to facilitate the training and is cost effective. This study proved as a valid treatment option for hospitalized person with leprosy to minimize the anxiety and depression related disorders among them.

Manzoni et al. (2008), conducted a systemic review and examined anxiety level before and after relaxation training for reduction of anxiety both in clinical and nonclinical population. It is found that many studies shown a positive clinical outcome after the relaxation techniques in connection with anxiety.

This study had few limitations. This study involved the small sample of person with leprosy hospitalized for their illness and there was no control group to compare the outcome. It has to be noted that the study participants are those admitted for complications due to leprosy, and often come from far away distance. It is very difficult to ascertain whether the observed anxiety and depression is due to complications of leprosy or prolonged hospitalization or both. Future studies will need to investigate the Anxiety-Depression scale test-retest reliability and need cross cultural validation of the scale.

In summary, the PMRT is effective relaxation therapy to reduce the anxiety and depression among hospitalized person with leprosy. This relaxation therapy is easy to learn and practice, does not require trained professional or any equipment to facilitate the training. This study proved as a valid treatment option for hospitalized person with leprosy in minimizing the anxiety and depression related symptoms and to benefit the psychosocial well-being of leprosy affected patients.



## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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