

Effect of progressive muscle relaxation on stress in parents of children with disability

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Abstract

Background: Parenting a child is a wonderful and rewarding experience. On other hand it can be negative and stressful too. In a child with cerebral palsy extra demands on parents, result in stress. Parental stress predict less positive outcomes from the early intervention programs for children with disabilities. As physiotherapists we may need to manage parental stress to achieve child related goals. If body relaxes mind relaxes. Progressive muscle relaxation (PMR) is easy to learn. **Aim:** To study effects of PMR on stress in parents of children with cerebral palsy. **Method:** Parents filled pre-PSS. The PMR technique was given in the form of structured auditory tape recorded by investigator in Hindi language for 20 minutes. Two sessions per week were given for 3weeks followed by filling up post-PSS. Parents were also advised to practice this technique at home on their own without tape. **Result:** The p value was 0.006 suggesting statistically reduced PSS scores post PMR. **Conclusion:** Physiotherapist should give PMR to parents of cerebral palsy. **Clinical implications:** Managing parental stress using PMR reduces their stress.

Key Words: Cerebral Palsy, Parental stress scale, Progressive muscle relaxation, Stress.

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INTRODUCTION

Parenting a child is a wonderful and rewarding experience. Sometimes, it is often accompanied by high levels of stress because of the difficulties, frustrations, and challenges that the parent must face in everyday life. Thus, stress can be defined as “a negative emotional experience accompanied by predictable biochemical, physiological, cognitive, and behavioral changes that are directed towards altering the stressful event or accommodating its effects”¹. “Parenting stress” is a stress that is directly attributable to the demands of parenthood². Chronic conditions of disability, both medical and

emotional, make extra demands on parents, resulting in stress³. Higher levels of stress were seen in all domains in parents of children with developmental disabilities. Parenting stress and adaptation depend upon the type of disability, the family’s coping resources, and formal and informal supports in the community. Having a child with an intellectual or developmental disability creates negative family outcomes and these parents experience higher levels of stress and interact differently with their children⁵. In a European study conducted in 2011, 36% of parents of children with cerebral palsy, presented with high levels of parental stress. This is significant compared with the rate of 5% in the general population⁶.

Parental stress scale: This scale was developed by Berry and Jones (1995) as an alternative to the 101-item parenting stress index. It provides a measure that considers positive aspects of parenting as well as the negative ‘stressful’ aspects traditionally focused on. It is a self-report scale and possible scores on the scale can range from 18-90. Higher scores on the scale indicate greater stress. It demonstrates satisfactory levels of internal reliability (.83), and test-retest reliability (.81). The scale is intended to be used for the assessment of parental stress for both mothers and fathers and for

parents of children with and without clinical problems. In the field of stress medicine, Sterling and Eyer introduced the concept of 'allostasis'. It is defined as "maintaining stability or homeostasis "through change"⁷. It states the effects of psychosocial and environmental factors of physical or mental well-being. It describes the capacity to adapt, to constantly change and to modify, physiological parameters to adjust to ever shifting environmental conditions. When the brain perceives or senses an experience as stressful, physiologic and behavioral responses are initiated, which leads to allostasis and adaptation. Therefore, the goal is to keep homeostasis, self-organize, and maintain autonomy under challenge and ultimately to survive. 'Allostatic load' refers to the wear and tear that the body experiences due to repeated cycles of allostasis, or the inefficient turning-on or shutting-off of these activated responses. These ongoing adaptations, results in accumulation of allostatic load and the overexposure to neural, endocrine, and immune stress mediators which will have adverse effects on various organ systems, leading to the onset or progression of diseases. The molecules that play a major role in the allostatic stress response are cortisol, nor-epinephrine (NE)/epinephrine, melatonin and anandamide⁸ Physiological changes play a role in stress-related disease processes, so does the 'relaxation response'. The relaxation response (RR) is defined by a set of integrated physiological mechanisms and 'adjustments' that are elicited when a subject engages in a repetitive mental or physical activity and passively ignores distracting thought. These types of behaviors are seen in meditation and in certain forms of prayers, Tai Chi or Qigong, Yoga, autogenic training etc. that are associated with instant physiological changes which includes decreased oxygen consumption or carbon dioxide elimination, lowered heart rate, arterial blood pressure, and respiratory rate⁹. PMR is a simple, easy to administer and learn. It was devised by E Jacobson. The individual systematically tenses and then relaxes muscles concentrating on the contrasting bodily sensations while at the same time maintaining a passive attitude. Tension in involuntary muscles can be reduced if the associated skeletal muscles are relaxed. Freeman (2001) suggests that PMR and other muscle-based relaxation variations convey health benefits in three ways:

1. Manipulate autonomic responses
2. Increases or activates the production of opiates
3. Promotes optimal immune function.

Progressive muscle relaxation and other relaxation techniques generate a relaxation response, resulting in normalizing of the blood supply to the muscles, decreasing oxygen consumption, heart rate, respiration, and skeletal muscle activity and increasing skin resistance

and alpha brain waves. Physiotherapy is the main stay of treatment in children with developmental disability Very few studies have been done to plan interventions for this stress. As a therapist we need to assess parent's stress and take remedial steps to have positive effect on child and family well-being. The purpose of the study was to assess the effect of PMR on stress in parents of children with disability

MATERIAL AND METHODS

The parents of children with disability attending Physiotherapy OPD in KEM hospital- a tertiary care hospital in Mumbai were screened in the period of 8 months from October 2015 to May 2016. They were explained the nature of study, requested to participate and sign informed consent document. The inclusion criteria were- parents of children with cerebral palsy (CWCP) able to understand written and spoken English, Hindi and Marathi. Since continuity was mandatory, 4 weeks continuous follow up was also an inclusion criterion. Parents with pain any body part of 5 on visual analog scale were excluded. Of the 50 parents who were enrolled, 30 could complete the study. 14 parents did not participate in PMR sessions for continuous 3 weeks. 6 parents failed to respond back in department after 3 weeks for the parental stress scale score. They also were not reachable on their cell phones may be because they relocated out of Mumbai city. Progressive muscle relaxation was administered to parents in a chair with back rest and arm rest. The audio tape was heard via head phones wore by parents for 20 minutes. The initial 5 minutes included deep breathing and remaining 15 min included progressive muscle relaxation. Important aspects of instructions given for progressive muscle relaxation

- Loosen your clothing, take off your shoes, and get comfortable.
- Take a few minutes to relax, breathing in and out in slow, deep breaths.
- When you are relaxed and ready to start, shift your attention to your right foot. Take a moment to focus in the way it feels.
- Slowly tense the muscle in your right foot, squeezing as tightly as you can. Hold for a count of 10.
- Relax your right foot. Focus on the tension flowing away and the way your foot feels as it becomes limp and loose
- Stay in relaxed state for a moment, breathing deeply and slowly.
- When you are ready, shift your attention to your left foot. Follow the same sequence of muscle tension and release.

- Move slowly up through your body, contracting and relaxing the muscle groups as you go.

Instructions were given to make parent aware about knees, hips, spine, neck, arms, forearm, hands and face areas for PMR. They were assured it may take some practice time to master the technique. They were trained not to tense muscles other than those instructed in tape. Parents were given two sessions of deep breathing and progressive muscle relaxation per week for 3 weeks. This intervention happened following the routine Physiotherapy treatment of their child in the department. Thus, each parent was administered with PMR individually in comfortable chair in a cubicle and not in a group. After 3 weeks of hearing the audio in department, parental stress scale was filled again. Parents were also advised to practice this technique at home on their own without tape. The parent was supervised for participation of relaxation by investigator, hence audio was not given for home use.

Data from 30 parents could be analyzed.

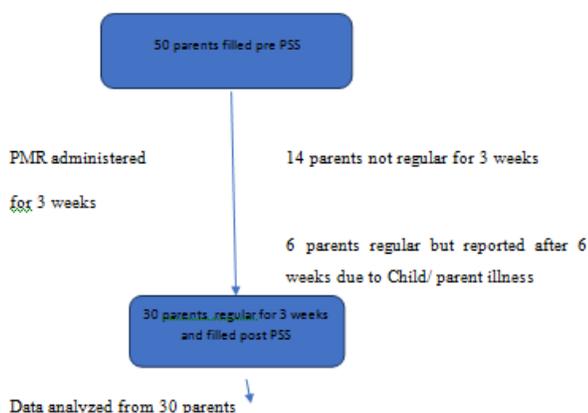


Figure 1: Data analyzed from 30 parents

RESULTS

Data analysis of pre and post parental stress scale values was performed using SPSS (Statistical Package for Social Sciences) for windows, version 17. Wilcoxon sign rank test was used. All the tests were carried out at 5% significance. Confidence interval of 95% was chosen. A total of 30 subjects could complete the study. Of these 14 mothers and 6 fathers were regular in getting their child for physiotherapy. All belonged to lower socio economic class according to kuppuswami classification. Pre-and post-parental stress scores were compared. There was a significant difference (p value <0.001).

Table 1: Pre and Post intervention parental stress scale mean score

	Pre Intervention	Post Intervention
Pss Score (Mean Value)	44.1	39.13

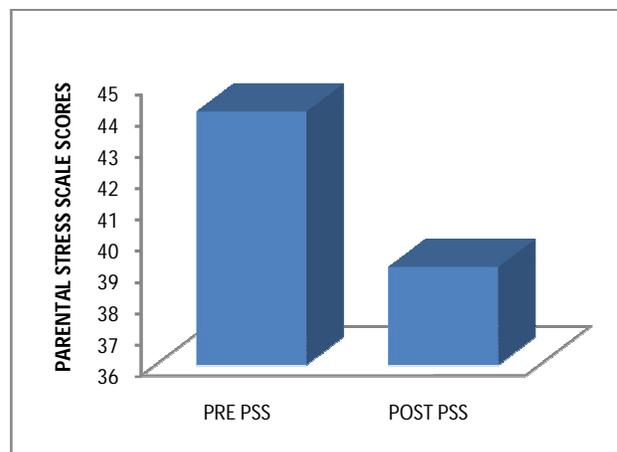


Figure 2:

Table 2:

N	30
CI lower mean	36.18
CI upper mean	42.08
Passed normality	No

Table 2: Wilcoxon signed rank summary

Theoretical mean	0
Actual mean	41
Sum of positive ranks	465
Sum of negative ranks	0
P value	0.006
Exact significance	Yes

DISCUSSION

The results of our study show that there is a significant difference in the pre-and post-parental stress scale scores. The mental component requires that the individual should focus to differentiate between the feeling of tension and relaxation¹⁰. When individual contracts one muscle group it causes tension in muscle fibers. This results in complex interaction of central and peripheral nervous system along with skeletal system. According to Jacobson (1941)¹¹ complete relaxation is impossible thinking of other issues. Relaxation causes reduction in skeletal muscle tone, this leads to loss of ergotropic tone of hypothalamus and reduction in hypothalamic discharge. This eventually leads to parasympathetic activation therefore reduction in heart rate, blood pressure and increase in nutrition absorption by increasing the activity of digestive system¹². RhoadsCJ¹³ in 2013 stated that relaxation of muscles releases neurotransmitter like dopamine, serotonin, nor adrenaline, acetylcholine, GABA, endorphins. These are called as “feel good” hormones because they cause a feeling of contentment and wellbeing. The relaxation response (RR) counteracts the stress response by decreasing NE responsivity, through constitutive nitric oxide pathways on a molecular basis,

RR leads to NE and cortisol activity reduction. It may release constitutive Nitrous Oxide which have an ameliorating effects on stress related diseases. Thereby, the RR may positively influence stress-related pathophysiological disease processes^{14,15,16,17}. In the recent study where effect of progressive muscle relaxation was seen on cerebral activity using fMRI investigation. They found changes in the brain activity limited to specific parts of the cerebral cortex and limbic system. It also states that the progressive muscle relaxation gradually decreases the activity in the superior frontal gyrus (SFG), inferior frontal gyrus (IFG), and posterior cingulate cortex (PCC). In a region of interest (ROI) analysis, interactions between sessions were observed in the putamen, anterior cingulate cortex (ACC), postcentral gyrus (PCG), and insula. Homeostasis i.e. healthy balanced bodily state is 'key' in stress. This includes associated nervous system activity and relaxation response (RR) pathways. Figure a) Figure a) shows that in homeostasis system, there are no stressors present to activate these responses. Theoretical constructs in life are not usually of static nature Figure b) Figure b shows a state of, homeostasis achieved via activation of allostatic stress response pathways, leading to adaptation therefore also called as dynamic balance. This system is characterized by a high degree of flexibility, as seen in healthy subjects or mild disease states. In homeostasis system, there is adequate balance between the stressors and adaptation leading to efficient turning on and shutting off these activated responses. Acute disease processes or acute stress may successfully be processed, and RR techniques may facilitate this state. PMR thus can provide with a means of realizing undue stress – emotional as well as physical. The technique educates the parent to take control of bodily reaction especially when the stressful situation of parenting the child with disability cannot be completely changed. However other factors associated with stress were not investigated.

CONCLUSION

The perceived stress by parents reduced as seen in improvement of PSS score. Thus, in our study progressive muscle relaxation helped the parents of children with disability. Awareness program of progressive muscle relaxation for 3 weeks was effective statistically in reducing stress response. Physiotherapists may study correlation of bodily pain and stress levels. Also impact of reduced stress on quality of life can be further probed in future studies.

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