European Journal of Oncology Nursing 26 (2017) 9–18

Contents lists available at ScienceDirect

European Journal of Oncology Nursing

journal homepage: www.elsevier.com/locate/ejon

# Effectiveness of a relaxation intervention (progressive muscle relaxation and guided imagery techniques) to reduce anxiety and improve mood of parents of hospitalized children with malignancies: A randomized controlled trial in Republic of Cyprus and Greece

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ARTICLE INFO

*Article history:*
Received 11 September 2015
Received in revised form
22 September 2016
Accepted 31 October 2016

ABSTRACT

*Purpose:* To explore the effect of Progressive Muscle Relaxation (PMR) and Guided Imagery (GI),in reducing anxiety levels among parents of children diagnosed with any type of malignancy receiving active treatment at a Paediatric Oncology Unit in Republic of Cyprus and in Greece.
*Method:* A randomized non-blinded control trial was conducted between April 2012 to October 2013, at two public paediatric hospitals. Fifty four eligible parents of children hospitalized with a malignancy were randomly assigned to the intervention (PMR and GI) (n = 29) and a control group (n = 25). The study evaluated the changes in anxiety levels(HAM-A) and mood changes(POMSb).
*Results:* There was a statistically significant difference in the mean scores of the subjects in the intervention group in HAM-A scale between the T0 (14.67 ± 9.93) and T1 (11.70 ± 8.15) measurements (p = 0.008) compared to the control group in which a borderline difference (16.00 ± 11.52 vs 13.33 ± 8.38) was found (p = 0.066). The effect size for the intervention group was low to moderate (0.37). Regarding mood changes, there was a statistically significant difference in tension for parents in the intervention group between T0 and T1 (11.15 ± 5.39 vs 9.78 ± 4.26), (p = 0.027). Furthermore, the parents in the intervention group were significantly less sad following the intervention (T1) (2.81 ± 1.07 vs 2.19 ± 1.21), (p = 0.001), and felt significantly less tense (2.93 ± 0.91 vs 2.26 ± 0.90), (p = 0.001) and anxiety (2.63 ± 1.21 vs 2.19 ± 1.07), (p = 0.031) compared to those in the control group.
*Conclusions:* These findings provided evidence on the positive effect of the combination of PMR and GI in reducing anxiety and improving mood states in parents of children with malignancy.


## 1. Introduction

Malignancy is a relatively rare disease which may appear during childhood or teen years, and manifests different biological characteristics than malignancy in adults (Pritchard-Jones et al., 2013). The term Childhood Malignancy (CM) is often used to describe forms of malignancy that occur before the age of 15 (Siegel et al., 2011) and represent approximately 2% of all malignancies in the population of developing countries and 0.5% of developed countries (Ferlay et al., 2010). In teenagers (aged 15–19 years old) malignancy incidence rates range between 90 and 300 new cases per million among young boys, and between 88 and 270 new cases per million among young girls (Curado et al., 2007).

CM is a stressful situation influencing the life of all family members (Cornman, 1993; Clarke-Steffen, 1997; Scott-Findlay and Chalmers, 2001; Woodgate and Degner, 2003a). CM is a constant source of stress due to its connection to death and to the fact that it is perceived as an incurable disease, as a source of intense pain (Grootenhuis and Last, 1997a; Woodgate and Degner, 2003a).

According to the literature, parents experience feelings of pain,

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http://dx.doi.org/10.1016/j.ejon.2016.10.007
1462-3889/

anxiety, depression, guilt, anger and weakness (Pai et al., 2007; Vrijmoet-Wiersma et al., 2008; Norberg and Boman, 2008; Pöder et al., 2008). These feelings are believed to be mainly experienced at a great extent right after their child's diagnosis with malignancy, and they partially subside in a year and reach pre-diagnosis levels (Dolgin et al., 2007; Patino-Fernandez et al., 2008; Pöder et al., 2008). Longitudinal studies showed that stress levels during the diagnosis of malignancy decrease through time and reach normal levels five years post-diagnosis (Visser et al., 2003; Vrijmoet-Wiersma et al., 2009). The vulnerability of parents to handle these intense emotional situations affects their psychological health status seriously (Peek and Mazurek 2010).

The ability of parents to manage their psychological state during their child's treatment is vital not only for their comfort but also, because it may have an impact on their child's well-being (Vance et al., 2001) and long-term psychological adjustment. There is research evidence to support that long-lasting psychological tension in parents is related to adjustment difficulties by children diagnosed with malignancy and their siblings at an emotional and social level (Noojin et al., 1999; Robinson et al., 2007).

According to Lazarus and Folkman (1984), stress may be a result of the differentiation between the person and his/her environment. When the sense of threat is not balanced by a sense of support and the ability to deal with a difficult situation, stress is a usual psychological reaction. As a negative feeling, stress generates in turn more negative feelings (e.g. anxiety and depression) that are consequently barriers for the psychological health of children and parents. Thus, an early relaxation intervention, aiming at reducing parental stress levels, is crucial in order to support the parents during this challenging period (Kazak et al., 2007). The benefits of such an intervention can be dual fold, since not only parents can feel better after their active effort to fight against the disease but, they can also help their children face and survive the hardships.

PMR technique has been used since the early 1920's. It is used to manage stress, to decrease tension and anxiety, to interrupt obsessive negative thoughts and to enhance the coping ability (Snyder, 1992; Parle et al., 1996; Walker et al., 1999). PMR involves physiological effects opposite to those effects caused by psychological stress. In particular, it decreases the Sympathetic Nervous System activity while increasing the Parasympathetic Nervous System activity: a consciously directed way which first tenses a group of muscles and then, consciously releases the tension in that muscle group. Therefore, PMR decreases heart rate, blood pressure, oxygen consumption and sweat gland activity, it changes the patterns of brain waves, and finally, it decreases motor-physical activity (Benson et al., 1977; Davidson et al., 1979).

According to Jacobson (1938), “once the body achieves a state of neuromuscular homeostasis, the mind will follow suit”. Through GI (Guided Imagery), the mind is directed to intentionally invoke images in order to bring positive change. The imagination is used to conjure places, objects or events that are not externally present, aiming at the influence of psychological and physiological states (Achterberg et al., 1985; Post-White, 2002; Richardson, 1994). GI is a commonly used intervention and many health benefits have been reported.

Serra et al. (2012) evaluated the impact of GI on patients who received radiotherapy for breast cancer. They noticed reduced breathing and heart rate, as well as reduced SBP and DBP. Pawlow and Jones (2002) aimed to study if practicing relaxation techniques, in two different occasions, could lead to reduction of subjective and objective stress indicators, in 46 participants. They found that a relaxation exercise of short duration caused significantly lower heart rate, stress, self-reported stress and cortisol levels than the control group, along with increased levels of self-reported relaxation.

A literature review (Tsitsi et al., 2014) that aimed to review Randomized Controlled Trials (RCTs) by assessing the effectiveness of complementary and alternative medical interventions (CAM) for reducing anxiety in parents of children with malignancy, revealed a limited number of RCTs in the literature and unfortunately, the majority of these trials were pilot studies. Thus, they failed to provide any sufficient information to assess the effectiveness of CAM interventions. A variety of stress reduction techniques were reported. Overall, 5/9 of the studies reported the use of massage therapy (Field et al., 2001; Phipps et al., 2005, 2010; Post-White et al., 2008; Mehling et al., 2012). In two out of the five studies which used massage therapy on children as an intervention, massage was combined with relaxation/imagery in the first (Phipps et al., 2010) and in the second (Mehling et al., 2012), parents delivered acupressure to their children. Two other studies used breathing techniques/guided imagery, another one used relaxation training (Kazak et al., 1996; Streisand et al., 2000) and the last one (Ndao et al., 2010) used inhalation aromatherapy. Moreover, seven out of the nine studies found no significant changes in parents' anxiety levels and only two pilot studies reported significant changes in parents' anxiety and depressed mood levels. Specifically, Field et al. (2001), and Post-White et al. (2009), assessed the effects on anxiety and depressed mood in parents of children with leukemia, while teaching parents to give massage therapy to their children or while parents received massage. Their results suggested that the parents' anxiety and depressed mood decreased after massaging their child (Field et al., 2001) or while receiving massage (Post-White et al., 2009).

The current study explored the effectiveness of the combination of PMR and GI, in reducing anxiety levels among parents of children diagnosed with any type of malignancy receiving active treatment at paediatric oncology units in two paediatric hospitals.

### 1.1. Research questions

The study was designed to provide answers to the following research questions:

1. How effective is the combination of PMR and GI in reducing anxiety in parents of children with malignancy compared to usual care as a control arm?
2. How effective is the combination of PMR and GI in improving the mood state of parents of children with malignancy compared to usual care as a control arm?
3. What is the effect of the combination of PMR and GI on the following vital signs as a proxy measure of anxiety: diastolic/systolic blood pressure, heart rate and skin temperature, in the intervention group compared to the provision of usual care in the control group?

## 2. Sample and methods

### 2.1. Study design and participants

This randomized non-blinded control trial was conducted between April 2012 to October 2013, at two public hospitals in Republic of Cyprus and Greece. Parents of children hospitalized with a malignancy were randomly assigned either to the intervention or the control group (‘standard psychological support’ provided from their own physician, the nurses and the psychologist of the department). Inclusion criteria were as follows: willingness to participate, having a child 0–18 years old with childhood malignancy, having a child with childhood malignancy being hospitalized for at least 3 weeks, able to speak and write Greek fluently, no previous experience of Complementary and Alternative-CAM