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Relaxation Technique as Palliative Treatment to Lessen Cancer Related Symptoms- A Review of RCT's

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ABSTRACT

Background: Cancer is a major public health concern worldwide both in developed and developing countries majorly affecting the elderly population. Despite improvements in cancer detection and treatment, patient life expectancy has not grown without signs of a decline in quality of life and issues with psychological adaption. Chemotherapy considered as most distressing form of Cancer management, is extensively used for treating advanced stages of cancer along with radiation therapy and surgical approaches. All the cancer treatment leads to different cancer related symptoms of different severity. Drug therapies such as anti-depressant and anti-anxiety medication are becoming more popular approaches to treat cancer related symptoms. But pharmacologic treatments on their own often don't provide adequate relief for cancer-related symptoms and may cause various side effects. Progressive muscle relaxation is one of the techniques to manage Quality of life. It is involving use of tension and relaxation of 16 different groups of muscles of the body. Cognitive and behavioural techniques are safe treatment options in cancer patients for symptomatic management of cancer related health problems.

Methodology: A computer-based search of the psychological and medical electronic literature databases, including Pubmed, Cochrane database, SCIRE, PEDro, CINAHL, EMBASE, Science Direct, Scopus, Web of Science and Google Scholar. All studies available till June 2021 that fulfilled with the inclusion criteria were included in this review.

Results: 16 studies which were Randomized Controlled Trial got included in this review, the quality which was analysed using the Scoring method given by Bigby and Gadenne. On analysing the quality of these studies 12 were found to be of good quality whereas 4 studies were fair in quality.

Conclusion: Relaxation technique noted by different articles have shown to be beneficial in reducing the impact of cancer related symptoms in the early or the moderate phase of cancer of the disease immaterial to 3 main treatment option they are undergoing through. More RCT's which are homogeneous in nature are required to reach a concrete conclusion.

Keywords: Cancer, breast, prostate, symptoms, relaxation technique, Quality of life, pain relief, sleep, psychological problems

INTRODUCTION

Cancer being a major public health concern Worldwide is a terminology used for large group of diseases with different aetiologies, clinical presentation, management and prognosis with potential to affect any region of the body [1]. It alone was the reason for 9.6 million losses of lives in 2018 [2]. It is considered as the second leading cause of mortality in the world as it has quick ascending incline as one of the health problems among the Elders and is expected to be on large scale in the near future. Almost 60% of the 11 million cancer patients found in USA are older adults [3]. Breast cancer found among females is the most commonly occurring cancer followed by Prostate cancer common among males [3]. In the developing countries high mortality rates are prevalent as cancer is diagnosed late [4].

Even though patient's life expectancy has increased as a result of advances in cancer diagnosis and management, there are evidences related to deterioration in subject's performance, quality of life and psychological adaptation problems as a result of cancer associated

problems and side effects of different managements, duration of the disease [1, 3]. Chemotherapy considered as most distressing form of Cancer management [5], is extensively used for treating advanced stages of cancer along with radiation therapy and surgical approaches [4]. It is used commonly to prevent tumor recurrence and metastasis following surgical resection for these patients. Courses of chemotherapy or radiation therapy affects patient's quality of life as it lead to a range of adverse reactions including bone marrow suppression, gastrointestinal upset, hair loss, anxiety, depression, anger, apprehension, fear, frustrations and stress, pain, insomnia, fatigue, Anorexia, nausea, vomiting and low libido or sexual dysfunction etc. [2, 4, 6-9].

High level of fatigue found in the early stages of cancer leads to diminished functional performance levels of the patients [10]. 75% to 80% of patients receiving radiation therapy or cytotoxic chemotherapy or management with immune-modulators as part of the cancer management feel early fatigability as most frequently occurring problem, which developed with or post

intervention which is not relieved by sleep or rest [8, 11, 12]. It is mostly found as clusters along with the other symptoms, described earlier. Sleep disorder is found among 95% of patients with advanced cancer. Prevalence of pain in cancer patients is roughly evaluated to be as high as 53%–60%. Pain could affect sleep and raises fatigue [13].

Cancer pain is highly prevalent in hospitalized patients [14]. Cancer pain can be affected by psychosocial factors like coping and social support [15]. Sleep disorders are commonly found in advanced cancer patient with a range of 23% to 95% having altered sleep related to difficulty in sleeping [16]. Cancer patients suffer from high burden of symptoms which could occur as complications, initially after therapy or during long term therapy may last from months to years [17].

Drug therapies such as anti-depressant and anti-anxiety medication are becoming more popular [6]. But pharmacologic treatments on their own often don't provide adequate relief for cancer-related symptoms and may cause various side effects, like respiratory depression, constipation, nausea, vomiting, weakness, confusion, difficulty urinating, and itching [13]. To manage fatigue in the cancer patient's pharmacological treatment alone is not completely effective. Hence to manage fatigue studies have shown physical

exercise and relaxation methods (including relaxation and breathing exercise-RBE) to be effective [18].

Relaxation response therapy, Meditation, and Reiki therapy techniques reduces the negative effects of stress [19]. Progressive muscle relaxation is one of the techniques to manage Quality of life. It is involving use of tension and relaxation of 16 different groups of muscles of the body [20]. Cognitive and behavioural techniques are safe treatment options in cancer patients for symptomatic management of cancer related health problems. PMRT involve voluntary, systematic and continuous stretching and relaxing of the muscles until the whole body becomes relaxed [11].

Use of Relaxation techniques in form of Diaphragmatic breathing for the treatment of symptoms like vomiting and nausea in patients undergoing chemotherapy have proven to be a successful approach. This technique is simple to learn and extensively used to decrease co morbidities like depression, anxiety and stress in cancer patients undergoing chemotherapy [4]. Even though a beneficial influence of various psychologic interventions on postoperative recovery in the cancer patients has been documented, there is little known about their differential effectiveness [21].

PMR is a systematic technique bringing about deep mental and physical state of relaxation among various conditions reduce

muscular tension in muscle spasm, induces mental relaxation, improves sleeps and improves exercise tolerance of the patient thereby improving functional capacity and quality of life [22, 23].

In reviews done by Paulo *et al.* [24], Jacobsen P B *et al.* [25], Casman and Nurhaeni N [26], Elkins G *et al.* [27], Anandarajah G [28], Ferioli M *et al.* [29], Mustian *et al.* [30], Samuel *et al.* [31], Montero-Marin *et al.* [32], Luebbert K *et al.* [33], Boroń- Krupińska K and Kulmatycki L [34], most of them have seen the effect of Relaxation therapy alone or in combination with other interventions or just other intervention, on the cancer symptoms. Thus the purpose of this review is to search randomized control trials to see the effect of Relaxation therapy on reducing cancer related symptoms like fatigue, anxiety, depression, sleep, self efficacy and thereby improving the Quality of life in these subjects who undergo chemotherapy, radiotherapy or surgical interventions.

METHODS

Inclusion Criteria

In order to be included, studies had to meet the following criteria: (1) Participants suffering from any form of cancer; (2) The study should be giving any form of Relaxation therapy; (3) RCT's published from the year 2005 to 2021; and (4) The study had to be published in English or translated in English.

Exclusion Criteria

The criteria for excluding the studies were as follows: (1) Studies done on the Pediatric Population (2) Participants suffering other diseases other than cancer. (3) Relaxation therapy was not included as a technique of treatment; (4) Studies published older than 2005. (5) Studies not published in English or not translated to English.

Selection of Studies

A computer-based search of the psychological and medical electronic literature databases, including Pubmed, Cochrane database, SCIRE, PEDro, CINAHL, EMBASE, Science Direct, Scopus, Web of Science and Google Scholar. All studies available till June 2021 that fulfilled with the inclusion criteria were included in this review. The electronic databases were searched using the following key words: Cancer patients, Relaxation technique, cancer related symptoms and Quality of life. The initial search identified 52 studies. Initially, the search results were screened based on title and abstract. After screening for the duplicate articles and articles with the abstract only, 32 studies were selected. Out of 32 studies, 16 studies meeting the inclusion criteria were reviewed for the full text which got included in this review (**Figure 1**).

RESULTS

16 studies which were Randomized Controlled Trial (Level II of the evidences

in the pyramid of evidences) got included in this review (**Table 1**). Quality of the studies for the Randomized controlled trial was analysed using the Scoring method given by Bigby and Gadenne. It was found that on analysing the quality of these studies 12 were found to be of good quality whereas 4 studies were fair in quality as there was no clear specification regarding the blinding in these studies (**Table 2**).

Sample Characteristics

The patient population commonly included in different studies in both the Randomized controlled trial groups had patients suffering from various kinds of cancer like Colorectal Carcinoma, breast cancer, Prostrate cancer patient undergoing radiotherapy, gynaecological cancer such as ovarian carcinoma and cervical carcinoma, metastatic cancer with an estimated prognosis of less than 6 months, intestinal and gastric cancers, oncological and/or hematologic malignancies or solid tumors, Leukemia and Lymphoma, thyroid cancer, Head & neck cancer and all kinds of cancer. Almost 7 randomized studies included breast cancer patients as the Cancer population which shows that the prevalence of breast cancer being very high among different cancers.

The age groups of these patients belonged to varied from ≥ 18 years of age to >75 years of

age group but most of them fell in the age group of 30 years to 60 years. The patients were undergoing or expected to undergo chemotherapy or radiotherapy or surgical interventions. Sample size for all the studies was different with only three studies, sample size was ≥ 100 . The study population in these studies included different types of Cancers, except for one study including 100 breast cancer patients which shows the high prevalence of this type of cancers.

Intervention Characteristics

Different types of relaxation training (interventions) were given to the patients in different studies with relaxation technique being given alone for 5 studies in RCT group while for the rest of the studies relaxation technique was compared with or given in combination with the other complimentary and alternate techniques like guided imagery, analgesic imagery, Reiki sessions, Monochords sounds, IIG and DIG, nursing care, usual/ routine care. The intervention given varied with duration ranging with the lowest from 2 days to a maximum of 6 Months duration, for few of the studies the intervention was started immediately after the Chemotherapy. Most of the interventions were commonly carried out between the duration of 1 week to 4 weeks (**Table 1**).

Table 1: shows the details about the RCT studies included in the review

Source of Article (Author/ Country/ & year	Study Design with Comparator	Participants/ Sample size/ Characteristics	Type of Cancer Patients	Type of intervention/ relaxation exercise	Length of Intervention	Outcomes	Findings	Level of Evidence
Hasse O <i>et al.</i> , Germany 2005 [21]	Randomized, controlled, partially blinded trial	N= 74, (22 allocated to Guided Imagery, 29 to Relaxation and 23 allocated to Control) Age groups (<60, 60–75, >75 years),	Patients admitted for Colorectal Carcinoma	Two tapes containing either a 12-minute guided Imagery or 12-minute progressive muscle relaxation was used as brief psychologic interventions.	1 week	Peri-operative stress; Analgesic requirement, pain perception, pulmonary function, duration of postoperative ileus, and fatigue after Conventional resection of colorectal carcinoma in elderly cancer patients was assessed for.	Brief psychologic interventions such as guided imagery and relaxation yielded a very positive patient response but did not show a clinically relevant influence on the postoperative physiologic course of elderly Patients undergoing conventional resections of colorectal cancer.	II
Yoo HJ, South Korea, 2005 [35]	Randomized controlled trial	N=60 (30 patients each in experimental and control group) Female, age 30 years and above	Breast cancer, who received six cycles of cyclophosphamide, methotrexate, and 5-fluorouracil (CMF)	Each patient in the experimental group received a PMRT and GI session with the therapist 1 h before chemotherapy Administration (at hospital) and on each of the next chemotherapy cycles (at hospital), for a total of six PMRT and GI sessions. The PMRT and GI group received the antiemetic treatment according to the standard protocol 30 min before chemotherapy.	6 cycles of Chemotherapy Session	The anticipatory nausea and vomiting (ANV) and post chemotherapy nausea and vomiting (PNV) of breast cancer patients and to measure their effects on the patients' quality of life (QoL); "Multiple Affect Adjective Checklist" (MAACL) comprising of self-report index of anxiety (20 items), depression (20 items), and hostility (30 items), a 7-point constructed Likert scale, 3-day post chemotherapy home record rating scale	These results indicate that PMRT and GI were associated with both the improvements in anticipatory nausea and vomiting (ANV) and post chemotherapy nausea and vomiting (PNV) and in the QoL of patients with breast cancer.	II
Beard <i>et al.</i> , US, 2011 [19]	Pilot randomized clinical study	N=54 (18 each in Relaxation Response Therapy group, Reiki therapy group and Control group) (not clearly specified but more than 30 years of age)	Men undergoing radiotherapy for prostate cancer	Reiki sessions were given in a quiet, private room twice weekly for 8 consecutive weeks for a maximum total of 16 sessions. Twice weekly sessions were recommended by the Reiki practitioners as a reasonable norm of practice and to counterbalance the RRT, which was given only once per week but included recommended daily practice of the relaxation response and journaling.	8 weeks	Anxiety, Depression and Quality of life; Spielberger State Anxiety Inventory (STAI); Center for Epidemiologic Studies Depression (CES-D) scale; and Functional Assessment of Cancer Therapy-General (FACT-G) Scale.	Relaxation response therapy improved emotional well being and eased anxiety in participants. Reiki therapy also had a positive effect in anxious patients. A larger study to verify and better define the benefits of these therapies in men with prostate cancer is warranted.	II
Lee E-J, UK, 2012 [5]	Randomized controlled trial	N=40 (20 patient in each group) not exceeding 65 years of age	breast cancer or gynaecological cancer, such as ovarian carcinoma and cervical carcinoma, who were about to receive chemotherapy for the first time in their life.	One group listened to recorded MC sounds (n = 20) and the other group listened to recorded PMR (n = 20).	18 weeks	Anxiety was assessed using German version of the State Anxiety Inventory Spielberger's State Anxiety Inventory (SAI) and a questionnaire about the patient's physical and psychological states. Multi variate electroencephalogram (EEG) signals were recorded.	This study shows that both listening to recorded MC sounds and practising PMR have a useful and comparable effect on gynaecologic oncological patients during chemotherapy, with partially overlapping but also notably divergent neural correlates.	II
Herizchi S <i>et al.</i> , Iran, 2012 [36]	Randomized clinical study	N=60 ages of 15-65 years (M=17 and M= 16 while F=13 and F=14 in the interventional and control group respectively	All type of Cancer previously received at least two rounds of chemotherapy.	The case group were divided into small groups of 3-6 individuals and trained in PMR. Participants were requested to perform PMR alone two to three times a day during the time, they were inpatients and following discharge. They were contacted after discharge with reminders to perform PMR.	3 Months	Anxiety and depression dimensions with the Hospital Anxiety & Depression Scale (HADS) and QOL was graded with the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30)	Progressive muscle relaxation training can improve anxiety and depression in cancer patients.	II

Ducloux D <i>et al.</i> , Switzerland, 2013 [16]	Prospective randomized study	N=18 included patients (M=3 patient and F=6 patient total=9 in each group) elderly patients (mean age 66 ± 10.7)	Patient diagnosed with metastatic cancer with an estimated prognosis of less than 6 months	The IIG had the intervention from day 3 to 6 and the DIG had the intervention from day 6 to 9. At day 3 for the IIG and day 6 for DIG, the patient benefit from =1-hour training session.	9 days	Global satisfaction of patients with their sleep measured with an NRS rating from 0 (best sleep) to 10 (worst sleep) was collected daily from day 1 to day 9. A sleep diary was completed by the patient daily. Pain and dyspnea were also rated from 0 to 10 on an NRS part of the Edmonton Symptom Assessment completed Daily.	The assessment and management of sleep disorder should be integrated early in the disease. Further work is required to develop techniques that can be easily used, to improve sleep in patients with an advanced cancer and further studies are necessary to determine whether relaxation therapy has an effect on sleep satisfaction.	II
Song Q H, China, 2013 [6]	Prospective randomized study	N=100 (50 in Control group & 50 in experimental group), age ranged from 25 to 70 years	Patients with breast cancer	Patients in the control group received routine nursing care; those in the experimental group received routine nursing care plus relaxation training, which comprised controlled abdominal breathing and progressive muscle relaxation.	After every chemotherapy	State-Trait Anxiety Inventory and Rotterdam Symptom checklists were administered to patients in both groups before and after chemotherapy to assess mental and physical health status.	Relaxation training during chemotherapy can reduce anxiety and other adverse events in postoperative breast cancer patients. This should be considered a valuable complementary approach in improving patient care.	II
Nooner <i>et al.</i> , US, 2016 [13]	Exploratory pilot study	N=12 21 years or older	Hematologic malignancies or solid tumors	Twelve adult patients with cancer were randomized to one of four groups: a guided imagery intervention, a relaxation intervention, a combined intervention using guided imagery and relaxation, or usual care.	2 Months	Pain, fatigue, and sleep scores were collected at baseline and at 30 and 60 days using the Patient-Reported Outcomes Measurement Information System (PROMIS) Pain Interference Short Form, PROMIS Fatigue Short Form, and PROMIS Sleep Disturbance Short Form tools.	Patients reported a high degree of satisfaction with the relaxation and guided imagery interventions. Patients in the relaxation and guided imagery or combined groups showed a trend toward improvement in fatigue and sleep disturbance scores. Pain remained a problem for the majority of patients.	II
Charalambous <i>et al.</i> , Cyprus, 2016 [37]	Randomized controlled trial	N=208 (104 patients each in interventional and control group), Age group 41 - 60	Clinical diagnosis of breast (clinical stage T3N1M0) or prostate cancer (clinical stage T3a, Gleason score _ 8)	The intervention included a 2-minute breathing exercise, followed by a 10-minute progressive muscle relaxation exercise and a 15-minute pleasant guided imagery session. The control group only received the usual (standardised) treatment	18 month	Numeric pain scale for pain, Cancer Fatigue Scale (CFS) for Fatigue, Zung self-rating anxiety scale for anxiety, Beck Depression Inventory-II for depression, Revised Rhodes index of nausea, vomiting and retching (INVR) for nausea, vomiting & retching, EORTC QLQ-C30 module for HRQoL.	The combination of GI and PMR can be effective in the management of a cluster of symptoms in cancer patients receiving chemotherapy. These techniques can complement existing management measures to achieve a comprehensive management of this symptom cluster and increase patients HRQoL.	II
Shahriari M, Iran, 2017 [3]	Randomized controlled trial	N=50 (25 in each group), age over 65 years.	Breast or prostate cancer	Progressive muscle relaxation, guided imagery, and deep diaphragmatic breathing were given to the study group, but the control group received three usual sessions of lifestyle and life experiences were given	6 weeks	Quality of life; European Organization for Research and Treatment of Cancer and QoL Questionnaire-Core questionnaires were used	Concurrent application of progressive muscle relaxation, guided imagery, and deep diaphragmatic breathing would improve QoL in the elderly with breast or prostate cancer.	II
G. De Paolis <i>et al.</i> , Italy, 2019 [38]	multicentre non-pharmacological randomised controlled trial	N=104, (53 in Interventional group while 51 in usual care group) age>18 years	Patient diagnosed with Cancer	Group A patients (n=53) were administered the Revised Edmonton Symptom Assessment Scale (ESAS-r) and the numerical rating scale (NRS) for pain immediately prior to (T1) and 2 h following an individual PMR-IGI session (T3). Group B patients (n=51) received usual care and were assessed using the same tools.	24 hours following intervention	Pain Intensity Difference through Numerical rating scale (NRS), Distress (anxiety and depression through Total Symptom Distress Score (TSDS) of the Revised Edmonton Symptom Assessment Scale (ESAS-r)	The results of this trial suggest that PMR-IGI may be considered as an effective adjuvant in alleviating pain-related distress in terminal cancer patients. Further studies should be performed to assess the effectiveness of repeated interventions.	II

Harorani M <i>et al.</i> , Iran, 2019 [39]	Randomized clinical trial study	N=80, (40 patients each in interventional and control group), aged 30–60 years	Patients with cancer.	In the experimental group, the patients implemented relaxation techniques once a day for 30 min during 60 consecutive days in addition to receiving routine care, while patients in the control group received only routine care.	60 days	Self-esteem was assessed using the Persian version of the Coopersmith Self-Esteem Inventory (CSEI)	The relaxation seems to be potentially effective in promoting self-esteem of patients with cancer. Further studies, particularly randomized clinical trials with higher sample size and more power, are needed to confirm the obtained findings.	II
M. Noruzi zamenjani <i>et al.</i> , Iran, 2019 [1]	Experimental double group study/ RCT	N= 80 M=43 (21 in experimental & 22 in Control group) F=37 (19 in experimental & 18 in Control group) Age (30-60)	Leukemia and Lymphoma and other cancers	Jacobson's relaxation technique to the Experimental group & routine care procedures to the control group	2 Months	Strategies Used by People to Promote Health (SUPPH) questionnaire as a standard instrument for evaluating the efficacy of self-care	Muscle relaxation can enhance self-efficacy of cancer patients. Therefore, it can be used as an alternative method for patients who are willing to use this technique.	II
Xie <i>et al.</i> , China, 2020 [40]	Randomized clinical trial	N=91 Adults (47 in the self-care education group and 44 in the control group).	Gastrointestinal cancer patients	The enrolled patients were briefly informed about the global design of self-education. A package of self-care measures including muscular progressive relaxation, music, and education on nutrition was adopted from a previous study.	12 weeks	Quality of life & Fatigue; European Organization for Research and Treatment of Cancer (EORTC), quality of life questionnaire QLQ-C30.	the beneficial effects of the self-care education in both quality of life and antifatigue in gastrointestinal cancer patients under chemotherapy. The self-care education could be considered as a complementary approach during combination chemotherapy in gastrointestinal cancer patients.	II
Jaya P, Thakur A, India, 2021[8]	Single blinded randomized control trial	N= 50 (25 patients each in intervention & control group), age range was 35–75 years.	Breast and Head & neck cancer	The intervention group patients received P.M.R. therapy of 20 min. given for 3 times/week of total period of 3 weeks, whereas the control group received conventional treatment with no added intervention.	3 weeks	Fatigue & Psychological distress, fatigue symptom inventory and hospital anxiety and depression scale used as an outcome measures.	P.M.R. and conventional treatment were similarly efficacious in decreasing fatigue and psychological distress related to cancer patients who were hospitalized undergoing radiotherapy.	II
Bahçacı <i>et al.</i> , 2021 [41]	Two-armed, assessor-blinded, randomized controlled study	N=44 (22 in each interventional & Control group)	Post-menopausal Breast Cancer Receiving Aromatase Inhibitor Therapy	The study group (n=22) performed a combined (one-day supervised, and 3 days home-based) PRE program 4 days/week, for six weeks. The control group (n=22) was given advice about relaxation in daily life.	6 weeks	Pain, quality of life (QoL) and emotional status (ES) were assessed using the Brief Pain Inventory (BPI), Functional Assessment of Chronic Illness Therapy (FACT) and Hospital Anxiety and Depression (HAD) scales, respectively.	PRE significantly decreased pain scores in BC patients receiving AI. Although the reduction in pain is a valuable data even in the 6-week period in those cases, the long-term effects of relaxation techniques need to be followed.	II

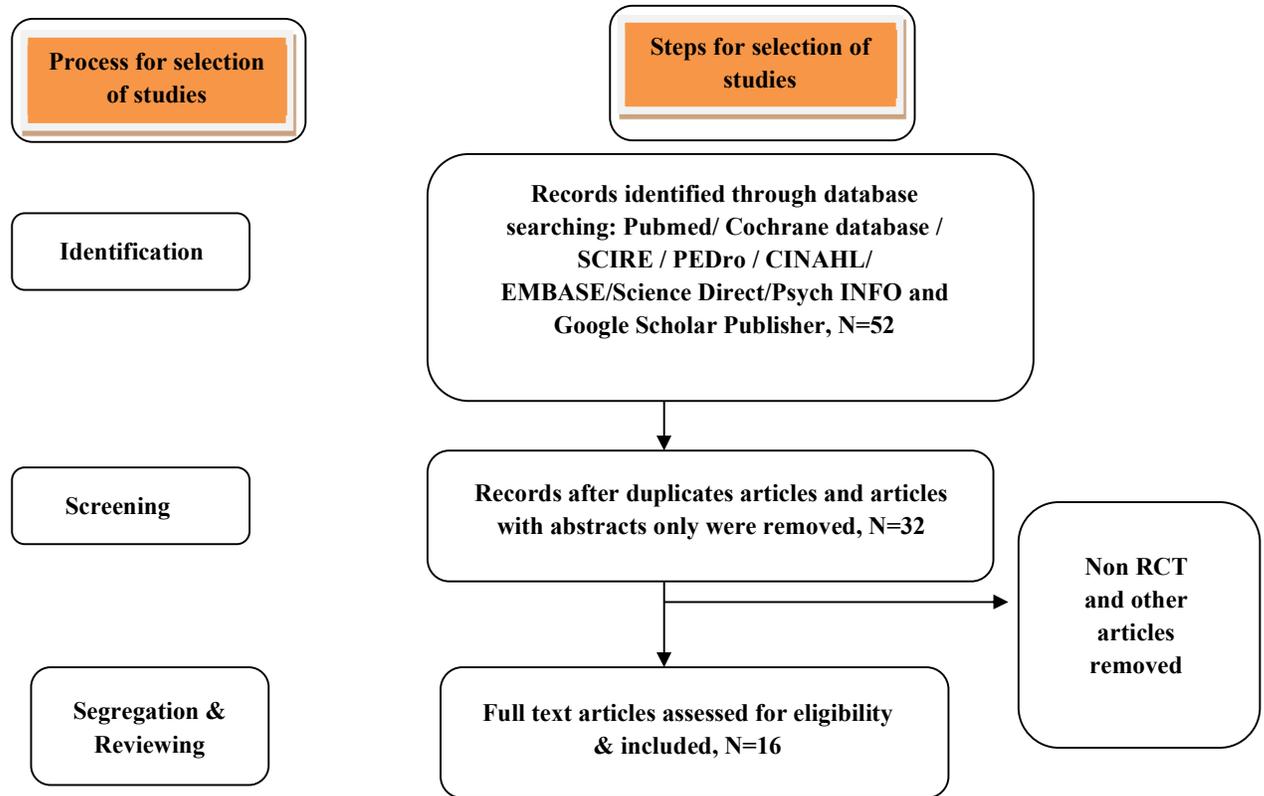


Figure 1: Flowchart of the literature search and the selection of the studies

Table 2: Showing the Quality of the RCT included in this review

Source of Article (Author/ Country/ & year	Bigbay & Gaedenn Score (Out of 20)	Quality of the Study	Source of Article (Author/ Country/ & year	Bigbay & Gaedenn Score (Out of 20)	Quality of the Study
Hasse O <i>et al.</i> , Germany 2005 [21]	16	Good	Charalambous <i>et al.</i> , Cyprus, 2016 [37]	18	Good
Yoo HJ, South Korea, 2005 [35]	18	Good	Shahriari M, Iran, 2017 [3]	18	Good
Beard <i>et al.</i> , US, 2011 [19]	16	Good	G. De Paolis <i>et al.</i> , Italy, 2019 [38]	17	Good
Lee E-J, UK, 2012 [5]	18	Good	Harorani M <i>et al.</i> , Iran, 2019 [39]	18	Good
Herizchi S <i>et al.</i> , Iran, 2012 [36]	15	Fair	M. Noruzi zamenjani <i>et al.</i> , Iran, 2019 [1]	18	Good
Ducloux D <i>et al.</i> , Switzerland, 2013 [16]	15	Fair	Xie <i>et al.</i> , China, 2020 [40]	15	Fair
Song Q H, China, 2013 [6]	15	Fair	Jaya P, Thakur A, India, 2021 [8]	17	Good
Nooner <i>et al.</i> , US, 2016 [13]	16	Good	Bahcaci <i>et al.</i> , 2021 [41]	17	Good

OUTCOME CHARACTERISTICS

Different types of Outcome measures were used for to assess different symptoms like anxiety, depression, pain, sleep, self efficacy, functional performance and quality of life. No homogeneity was found among the different studies related to any of the specific outcome measures used (Table 1).

DISCUSSION

There are different relaxation practices and mindfulness practices which elicits relaxation response. Different relaxation practices include Progressive muscle relaxation, Diaphragmatic breathing exercise, guided imagery and single pointed meditation. All the practices attempt and

target on building up new improved emotional and physical states of calmness and decreased stressor. Relaxation can be achieved during any daily activity where a person can sustain undivided attention and feels calmness because of the activation of the parasympathetic system. The activities varies from gardening, cooking, cleaning, reading etc. among different persons can given relaxation [42].

Progressive muscle relaxation is a technique in which one intentionally tenses and relaxes different muscle groups to produce the feeling of release of tension in the muscles and leads to relaxation. During diaphragmatic breathing a subject slowly and deeply takes the breathe to induce calmness. While in Guided imagery practices relaxation is elicited by the use mental visualizations along with the diaphragmatic breathing. Single-pointed meditation in a technique in which attention is maintained on one focal point by the repetition of a word or phrase or focusing on breathing (eg, a mantra, counting). One adopts a passive attitude by which unwanted thoughts or images can set apart [42].

The effectiveness of teaching personal control over cancer symptoms, such as pain, fatigue, and sleep disturbance, through relaxation, imagery, and distraction in the advanced cancer patients have been documented in the research. Relaxation and guided imagery techniques are used to

distract the patient's attention away from the cancer related problems and help them to cope with unpleasant notions and affection associated with their symptoms [13].

The PMR session was carried out for 20 minutes as the different muscle groups took up to 20 minutes to get completely relaxed and to assist the patient in achieving a position of relaxation. Studies have shown difficulty in learning PMR on the first attempt but during the consequent attempts the subjects found it easy to perform. Effect of PMR needs to be analysed on immediate basis although its intermediate effect have been recorded after completion of 3 weeks sessions.⁸ Jacobson's muscular relaxation is found to be the least effective as most of individuals face difficulty in attaining focused attention however the effects are very changeable when it is applied [43].

The breathing technique has minimum effect on attentional focus or emotional containment in patients when compared to other two relaxation techniques. The only effect is found during the instruction period where the subjects are asked to revise the technique to make sure that the breaths in/out instructions are understood properly. Hence this is a good technique to focus subject's attention quickly [43]. Relaxation techniques with guided imagery when used individually, blended and/or incorporated with other treatment is used in cancer patients

undergoing chemotherapy and in other management such as surgery and radiotherapy, and most of them showed positive results [7].

Cancer patient perceives the Psychological stress when the environment is perceived as frightening and shattering i.e. more demanding than the resources available, which affects their health. Individual differences related to attitudes, motivations and experiences plays important role in perception and evaluation of demands. This demand evaluation have impact on emotional responses, coping styles and ultimately on health outcomes [4]. Thyroid cancer which is higher in women starts in the thyroid gland, has higher incidence within all head and neck malignancies. Cancer acts a stressor in patients who are diagnosed early with cancer & undergo surgery. Patients feel different emotions from the pain as a result of low psychological tolerance. A vicious cycle is formed as fear, depression, anxiety and resistance affects patients sleep quality and daily life. Quality of life gets further affected as a result of disturbed sleep with passage of time [2].

Depression and anxiety when masked by cultural and societal factors inversely affects the prognosis, survival rates and quality of life. Patients those are hesitant to take treatment for these problems leads to the use of more complex management beyond the

pharmacological interventions. Non pharmacological measures include massage, Reiki, and cognitive behavioural therapies like Progressive muscle relaxation and Guided Imagery. The last two have been found to improve immune system, health related quality of life and in controlling different cancers and its management linked negative effect namely pain, nausea and vomiting and fatigue. An Increased level of emotional distress is seen even after management in the Cancer patients. With the time intervention effects gets increased but still it needs to be continued after discharge also. Long lasting effects of the PMR and GI needed to be assessed [45]. PMR training works on the theory of reciprocal inhibition in which it is proposed that the psychological states and muscular activities interact with each other through the nervous system, hence it significantly diminishes anxiety and depression [45].

PMR induces relaxation & helps reducing anxiety and depression in the musculoskeletal disorders having psychological background as it has its base on the principle of reducing neuromuscular hypertension [8]. The reason for the relaxation therapy in reducing the level of anxiety and stress was increase in parasympathetic nervous system activity which resulted in lowered muscle tension, respiratory rate, heart rate, blood pressure, psychomotor, distress, weakness and

negativity. Thus it leads to experience feelings of peacefulness by attaining more positivity [20]. Relaxation training controls impairments related to muscular tension by regular cycles of tension and relaxing the muscles. It lowers heart and breathing rates, reduces muscular tension and keeps ones selves away from negativity [6].

Progressive muscle relaxation is useful in stabilization of the physical conditions in the peri-operative phase, also the fluctuating range of the physical indicators gets narrowed and thus guarantees smoothness and safety of surgery. PMR training helps subjects to keep the muscles relaxed as the subject is able to continue the stress-muscle-tension cycle consciously. Quick and better sleep is achieved by decreasing the activation of cerebral cortex which gets activated as a result of varying tension stimulation hence improves different functions, reduces bad moods and improves sleep quality and overall quality of life [44].

Progressive Muscle Relaxation (PMR) training is given during thyroid cancer surgery in which the muscular system is deliberately and methodically relaxed, lowering the stress levels and lessening negative effects on the body and mind. Regular practice of relaxation techniques like PMRT help to decrease the side effects related to chemotherapy and thereby reducing limitation in Activities of Daily

Living is commonly reported in Cancer patients. It helps to reduce stress, induce sleep by tensing and relaxing each group of muscles of body [2].

PMR and analgesic imagery interventions both cognitive-behavioral strategies were significantly more effective in improving pain outcomes than the control condition. Greater imaging ability in persons when compared to that having lower imaging ability found to create better mental images of changing sensations and numbness. Greater attentiveness and attempt for practising imagery exercise is permitted as there is optimism regarding favourable effects and lesser synchronous distressing manifestations [14].

On the contrary Relaxation technique and guided imagery were not found to be beneficial in the postoperative colorectal cancer patients as injury imposed by the complexity of the surgery and the fear of dying in this aged cancer patients could be so severe that the additive psychological intervention were not beneficial in decreasing post operative pain and need of analgesics [21].

Relaxation technique was found to be ineffective when used alone in improving QoL in Cancer patients who underwent chemotherapy; the probable reason was difference in the social and cultural behaviour and attitudes of people belonging to different countries. Even it was suggested

regarding the correct timing to administer Relaxation technique as it had no benefit in reducing stress, anxiety and QoL in the post chemotherapy phase because of the severity of the complications of chemotherapy. In old aged cancer patients, Relaxation technique effects are dependent on the physical and psychological conditions along with the cultural, environmental, psychological and personal differences, and individuals' knowledge about health as well as the patients QoL scores [3].

Strength of the study:

SANRA scale [46] modified in 2014 for the analysis of quality of narrative review was kept in the mind while writing this narrative review. This scale has six items which assess the construct of the narrative review to improve the quality of the published reviews. This study took into consideration effectiveness of Relaxation technique on different cancer related symptoms which are found individually or in combination with other symptoms in the different types of cancer patients.

Limitations of the Study

The study's quality was kept into consideration from the beginning but still there were some limitations which are described as follows: Studies published in different languages other than English which showed the effectiveness of relaxation technique in the cancer patients were not taken into consideration. Studies

other than RCT were also not taken into consideration in this review.

Future research

Good Quality long term Randomized control trials with large sample size and considering different cancer related symptoms in particular type of cancer to see the effectiveness of relaxation techniques are the need of the hour. Also the effectiveness of relaxation technique needs to be examined in both the physical and psychological aspects of cancer related symptoms. This can be done by comparing the effectiveness of relaxation technique independently or in combination with different form of exercise therapy interventions.

CONCLUSION

Relaxation technique had been found to be beneficial in reducing the impact of cancer related symptoms in cancer affected group in the early or the moderate phase of the disease whether the patient is treated with chemotherapy, radiation therapy or surgical interventions. Relaxation technique does stimulates the parasympathetic nervous systems thereby providing the very much needed relaxation for the short term (as long term effects still needs to be proven) in different types of cancer patients. Further good quality RCT's are required, looking into the long term effect of the relaxation techniques on both the physical and psychological aspects of cancer related

symptoms together in the cancer patients in the advanced stage also. More RCT's which are homogeneous in nature are required to reach a concrete conclusion.

Conflicts of Interest

The author hereby states that he have no potential conflicts of interest to declare.

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Ethical Approval

Not applicable, because this article does not contain any studies with human or animal subjects.

Informed Consent

Not applicable, because this article does not contain any studies with human or animal subjects.

Trial Registration

Not applicable, because this article does not contain any clinical trials.

REFERENCES

- [1] Zamenjani M N, Masmouei B, Harorani M, Ghafarzadegan R, Davodabady F, Zahedi S, Davodabady Z. The effect of progressive muscle relaxation on cancer patients' self-efficacy. *Complement Ther Clin Pract.* 2019 Feb;34:70-75
- [2] Bhatia M, Verma M, Kumar R. Effectiveness of progressive muscle relaxation therapy on physical symptoms among cancer patients receiving chemotherapy admitted in Cancer Unit of Institute of Liver and Biliary Sciences, Delhi. *Int J Sci & Healthcare Res.* 2020; 5(4): 221-232.
- [3] Shahriari M, Dehghan M, Pahlavanzadeh S, Hazini A. Effects of progressive muscle relaxation, guided imagery and deep diaphragmatic breathing on quality of life in elderly with breast or prostate cancer. *J Edu Health Promot* 2017;6:1-6
- [4] FE Larios-Jiménez *et al.* Efficacy of relaxation techniques in the reduction of tension, anxiety and stress perceived by patients with cancer under chemotherapy treatment. *Gac Mex Oncol.* 2018;17:93-99
- [5] Lee EJ, Bhattacharya J, Sohn C, Verres R. Monochord sounds and progressive muscle relaxation reduce anxiety and improve relaxation during chemotherapy: a pilot EEG study. *Complement Ther Med.* 2012 Dec;20(6):409-16.
- [6] Song QH, Xu RM, Zhang QH, Ma M, Zhao XP. Relaxation training during chemotherapy for breast cancer improves mental health and lessens adverse events. *Int J Clin Exp Med.* 2013;6(10):979-984.

- [7] Nicolussi A, Sawada N O, Coelho Cardozo FM and Paula J M. Relaxation with guided imagery and depression in patients with cancer undergoing chemotherapy. (2016). *Cogitare Enferm.* 2016 Oct/dec; 21(4): 01-10.
- [8] Jaya P, Thakur A. Effect of progressive muscle relaxation therapy on fatigue and psychological distress of cancer patients during radiotherapy: A randomized controlled trial. *Indian J Palliat Care* 2020;26:428-32.
- [9] ParaÂs-Bravo P, Salvadores-Fuentes P, Alonso-Blanco C, Paz-Zulueta M, Santibañez-MarguÈello M, Palacios-Ceña D, *et al.* (2017) The impact of muscle relaxation techniques on the quality of life of cancer patients, as measured by the FACT-G questionnaire. *PLoS ONE* 12(10):1-13
- [10] Ozalevli S. Impact of physiotherapy on patients with advanced lung cancer. *Chron Respir Dis.* 2013;10(4):223-32.
- [11] Demiralp M, Oflaz F, Komurcu S. Effects of relaxation training on sleep quality and fatigue in patients with breast cancer undergoing adjuvant chemotherapy. *J Clin Nurs.* 2010 Apr;19(7-8):1073-83.
- [12] Andersen C, Rørth M, Ejlersen B, Stage M, Møller T, Midtgaard J, Quist M, Bloomquist K, Adamsen L. The effects of a six-week supervised multimodal exercise intervention during chemotherapy on cancer-related fatigue. *Eur J Oncol Nurs.* 2013 Jun;17(3):331-9.
- [13] Noonan AK, Dwyer K, DeShea L, Yeo TP. Using relaxation and guided imagery to address pain, fatigue, and sleep disturbances: A pilot study. *Clin J Oncol Nurs.* 2016 Oct 1;20(5):547-52.
- [14] Kwekkeboom K L, Wanta B, Molly Bumpus M, Individual difference variables and the effects of progressive muscle relaxation and analgesic imagery interventions on cancer pain. *J. Pain Symptom Manag.*, 2008; 36(6): 604-615
- [15] Fischer DJ, Villines D, Kim YO, Epstein JB, Wilkie DJ. Anxiety, depression, and pain: Differences by primary cancer. *SCC.* 2010 Jul;18(7):801-10.
- [16] Ducloux D, Guisado H, Pautex S. Promoting sleep for hospitalized patients with advanced cancer with relaxation therapy: experience of a randomized study. *Am J Hosp Palliat Care.* 2013; 30(6): 536-40.

- [17] Mehnert, A., Koch, U., Schulz, H. *et al.* Prevalence of mental disorders, psychosocial distress and need for psychosocial support in cancer patients – study protocol of an epidemiological multi-center study. *BMC Psychiatry*, 2012; 12, 70 .
- [18] Mulhaeriah, Afyanti Y, Achmad EK, Sangkala MS. Effectiveness of relaxation breathing exercise on fatigue in gynecological cancer patients undergoing chemotherapy. *IJNSS*, 2018, 5(4): 331-335
- [19] Beard C., Stason W.B., Wang, Q., Manola, J., Dean-Clower, E., Dusek, J.A., DeCristofaro, S., Webster, A., Doherty-Gilman, A.M., Rosenthal, D.S. and Benson, H. (2011), Effects of complementary therapies on clinical outcomes in patients being treated with radiation therapy for prostate cancer. *Cancer*, 117: 96-102.
- [20] Isa MR, Moy FM, Abdul Razack AH, Zainuddin ZM, Zainal NZ. Impact of applied progressive deep muscle relaxation training on the level of depression, anxiety and stress among prostate cancer patients: a quasi-experimental study. *Asian Pac J Cancer Prev*. 2013; 14(4):2237-42.
- [21] Haase O, Schwenk W, Hermann C, Müller JM. Guided imagery and relaxation in conventional colorectal resections: a randomized, controlled, partially blinded trial. *Dis. Colon Rectum*. 2005 Oct; 48(10):1955-1963.
- [22] Li Y, Wang R, Tang J, Chen C, Tan L, Wu Z, Yu F, Wang X. Progressive muscle relaxation improves anxiety and depression of pulmonary arterial hypertension patients. *Evid Based Complement Alternat Med*. 2015; 2015:1-8.
- [23] Xiao CX, Lin YJ, Lin RQ, Liu AN, Zhong GQ, Lan CF. Effects of progressive muscle relaxation training on negative emotions and sleep quality in COVID-19 patients: A clinical observational study. *Medicine (Baltimore)*. 2020 Nov 20;99(47):e23185.
- [24] Costa AI, Reis PE. 24. *Rev Dor. São Paulo*, 2014; 15(1):61-4
- [25] Jacobsen P.B., Donovan K.A., Swaine Z.N., Watson I.S. Management of anxiety and depression in adult cancer patients: toward an evidence-based approach. in: chang a.e. *et al.* (eds) *oncology*. Springer, New York, NY. 2006; 1552-1579
- [26] Casman and Nurhaeni N. Best effect of progressive muscle

- relaxation (pmr) on children: A systematic review. In proceedings of the 1st International conference of ICINNA, 2018; 12-17
- [27] Elkins G, Fisher W, Johnson A. Mind-body therapies in integrative oncology. *Curr Treat Options Oncol.* 2010 Dec;11(3-4):128-40.
- [28] Anandarajah G, Mennillo HA, Rachu G, Harder T, Ghosh J. Lifestyle Medicine Interventions in patients with advanced disease receiving palliative or hospice care. *Am J Lifestyle Med.* 2019 Feb 15;14(3):243-257.
- [29] Ferioli M, Zauli G, Martelli AM, Vitale M, McCubrey JA, Ultimo S, Capitani S, Neri LM. Impact of physical exercise in cancer survivors during and after antineoplastic treatments. *Oncotarget.* 2018 Feb 8;9(17):14005-14034.
- [30] Mustian KM, Sprod LK, Janelins M, Peppone LJ, Mohile S. Exercise recommendations for cancer-related fatigue, cognitive impairment, sleep problems, depression, pain, anxiety, and physical dysfunction: A review. *Oncol Hematol Rev.* 2012;8(2):81-88.
- [31] Samuel SR, Gururaj R, Kumar KV, Vira P, Saxena PUP, Keogh JWL. Randomized control trial evidence for the benefits of massage and relaxation therapy on sleep in cancer survivors-a systematic review. *J Cancer Surviv.* 2020 Dec 2.
- [32] Montero-Marin J, Garcia-Campayo J, Pérez-Yus MC, Zabaleta-Del-Olmo E, Cuijpers P. Meditation techniques v. relaxation therapies when treating anxiety: a meta-analytic review. *Psychol Med.* 2019 Oct;49(13):2118-2133.
- [33] Luebbert K, Dahme B, Hasenbring M. The effectiveness of relaxation training in reducing treatment-related symptoms and improving emotional adjustment in acute non-surgical cancer treatment: a meta-analytical review. *Psychooncology.* 2001 Nov-Dec;10(6):490-502.
- [34] Krupińska K, Kulmatycki L. Effectiveness of progressive muscle relaxation (Pmr) in alleviating psychophysical disorders-A systematic review (1982-2012). *GJRA,* 2014; 3(10): 2277-8160
- [35] Yoo HJ, Ahn SH, Kim SB, Kim WK, Han OS. Efficacy of progressive muscle relaxation training and guided imagery in reducing chemotherapy side effects

- in patients with breast cancer and in improving their quality of life. *SCC*. 2005 Oct;13(10):826-33.
- [36] Herizchi, S., Asvadi, I., Piri, I., Golchin, M., Shabanlui, R., Sanaat, Z. Efficacy of progressive muscle relaxation training on anxiety, depression and quality of life in cancer patients undergoing chemotherapy at tabriz hematology and oncology research center, Iran in 2010. *Middle East J. Cancer*. 2012; 3(1): 9-13.
- [37] Charalambous A, Giannakopoulou M, Bozas E, Marcou Y, Kitsios P, Paikousis L. Guided imagery and progressive muscle relaxation as a cluster of symptoms management intervention in patients receiving chemotherapy: A randomized control trial. *PLoS One*. 2016 Jun 24;11(6):e0156911.
- [38] De Paolis G, Naccarato A, Cibelli F, D'Alete A, Mastroianni C, Surdo L, Casale G, Magnani C. The effectiveness of progressive muscle relaxation and interactive guided imagery as a pain-reducing intervention in advanced cancer patients: A multicentre randomised controlled non-pharmacological trial. *Complement Ther Clin Pract*. 2019 Feb;34:280-287.
- [39] Harorani M, Noruzi Zamenjani M, Golitaleb M, Davodabady F, Zahedi S, Jadidi A, Rezaei M. Effects of relaxation on self-esteem of patients with cancer: a randomized clinical trial. *SCC*. 2020 Jan;28(1):405-411.
- [40] Xie J, Zhu T, Lu Q, Xu X, Cai Y, Xu Z. The effects of add-on self-care education on quality of life and fatigue in gastrointestinal cancer patients undergoing chemotherapy. *BMC Complement Med Ther*. 2020 Jan 16;20(1):15.
- [41] Bahçacı U, Uysal S A, İyigün Z E, *et al*. Progressive relaxation training in patients with breast cancer receiving aromatase inhibitor therapy-randomized controlled trial. *Authorea*. June 25, 2021; 1-10.
- [42] Luberto CM, Hall DL, Park ER, Haramati A, Cotton S. A perspective on the similarities and differences between mindfulness and relaxation. *Glob Adv Health Med*. 2020 Feb 5;9:2164956120905597.
- [43] Montserrat Aiger, María Palacín, Paloma Pifarré, Marta Llopart, Marc Simó. Effectiveness of relaxation techniques before diagnostic screening of cancer

- patients. *Suma Psicológica*, 2016; 23(2): 133-140
- [44] Charalambous A, Giannakopoulou M, Bozas E, Paikousis L. A randomized controlled trial for the effectiveness of progressive muscle relaxation and guided imagery as anxiety reducing interventions in breast and prostate cancer patients undergoing chemotherapy. *Evid Based Complement Alternat Med*. 2015;2015:49.
- [45] Xiong, Cunjin, L. Yan, Songlin Gong, Jie Lin, M. Ye and P. Zheng. “Effect of progressive muscle relaxation (PMR) on mental health, sleep quality and quality of life in patients who underwent thyroid cancer surgery.” (2020). *Int J Clin Exp Med* 2020;13(8):5831-5837
- [46] Baethge *et al.* SANRA- a scale for the quality assessment of narrative review articles. *Res. Integr. Peer Rev.* 2019; 4(1):5