



# **Impact of Pre-Operative Coping Strategies and Exercises on Post-Operative Recovery and Quality of Life of Patients with Cancer having Depression**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. Author AB suggested the design of the study. Authors RB and AB led to the creation and design of the study. Author RB wrote the manuscript of this article. The entire manuscript was reviewed and confirmed by authors RB and AB before circulation. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Background:** Cancer is a broad term that refers to a variety of diseases that can occur in any part of the body. Depressed symptoms are more common in cancer patients than in the general population, and depression is linked to a worse prognosis. The patient has anxiety, depression and other mental health disturbances when diagnosed with the fatal disease. The research scales in this paper focus on how to improve the quality of life and manage mental health problems like depression a patient goes through by pre-operative coping strategies for depression and finding out post-operative impact of it is explored.

**Aims & Objectives:** to study effect of pre-operative coping strategies and exercises on post-operative improvement in patient's mental stability and overall health.

**Methods:** The participants (n=20) will be recruited in the study suffering from cancer and meeting the inclusion criteria. Assessment will be done using various scales and treatment in the form of

coping strategies will be implemented pre operatively and evaluated post-operatively. The protocol will cover 6 weeks of treatment. In the rehabilitation period, we will evaluate the stress and depression levels affecting the QoL of cancer patients.

**Result:** Expected result includes the coping strategies and exercises given pre operatively improves the post-operative recovery and quality of life of cancer patients having depression

**Conclusion:** We can conclude that this method will help to improve quality of life and lower the effects of depression and betters the treatment results.

*Keywords: Depression; anxiety; stress; exercise intervention; quality of life; cancer recovery.*

## 1. INTRODUCTION

Cancer is a wide range term that encompasses a list of diseases that can manifest itself in any part of the body. Malignant tumours and neoplasm are two other words which are used. One of the hallmarks of cancer is the rapid emergence of aberrant cells that expand beyond their normal boundaries, which allow them to infect the neighbouring parts of the body and migrate to nearby organs; this is called as metastasis [1]. Metastases are a kind of cancer that has spread throughout the body and is the most common cause of death. Cancer is caused by a multi-stage process that often progresses from a pre-cancerous lesion to a malignant tumour in which normal cells are transformed into tumour cells. These changes are the result of three types of external stressors interacting with a person's inherited factors, including: UV and ionising radiation are examples of physical carcinogens; chemical carcinogens are exclusive examples of chemical carcinogens. biological carcinogens, such Chemical carcinogens, like asbestos, tobacco smoking components, aflatoxin (a food contaminant), and also arsenic, as well as infections from certain viruses, bacteria, or parasites (a drinking water pollutant) [2].

Individual aetiological factors are difficult to assess, but the interplay of multiple risk factors may be detected. Individual variables, such as genetic predisposition, as well as environmental, exogenous, and endogenous variables, all contribute to cancer development.

Over the years, epidemiological research on the formation of malignant tumours has concentrated on the major determinants of cancer incidence and the mortality rate based on environmental and genetic factors. According to found current knowledge, external environmental variables cause 80-90 percent of malignant cancers (carcinogens). Environmental factors resulting from human behaviour are the key elements responsible for the development of malignant neoplasia in humans, according to

epidemiological studies Smoking, excessive alcohol intake, nutrition, and reproductive behaviour have all been linked to the development of malignant neoplasia in human populations. Depressed symptoms are more common among cancer patients and depression is associated with a bad prognosis in the general population [3].

The rise in prevalence isn't entirely due to the psychosocial stress that comes with a diagnosis. Pro-inflammatory cytokines are proven biomarkers of elevated inflammation in cancer patients, as they cause illness behaviour with symptoms that are similar to clinical depression. According to a growing body of research, chronic inflammatory processes related to stress may also underlying depression symptoms in general, and in cancer patients in particular [4]. For example, Anxiety and depression problems are common among breast cancer patients, and if left untreated, they can hasten the disease's progression and treatment outcomes. Understanding the psychosocial factors that influence these common psychiatric conditions might help you plan for therapy and improve your chances of success [5].

The most common mental well-being criteria were fear of cancer spreading, surgery-related pain, recurrence, fear of a second cancer, effects on self-esteem, and concern about future testing .According to the social well-being subscale, the most severe disruption was identified in the area of family distress [6].

Symptoms may intensify and the patient's physical status may deteriorate throughout cancer treatment and as the disease develops. The impact of age, symptoms, and proximity to death on patients' and family members' physical and mental health must be fully investigated [7]. The patient has anxiety depression and other mental health disturbances when diagnosed with the fatal disease. The research scales in this paper focus on how to improve the quality of life and manage mental health problems like

depression a patient goes through by pre-operative coping strategies for depression and finding out post-operative impact of it is explored. This study reassessed the before and after surgery, patients with cancer had different levels of burden, stress, and depression. The connection between psychosocial ailments Quality of life (QOL), as well as knowledge, use, and need for psychological support, have all been investigated, and various coping strategies have been implemented to investigate the pre-operative and post-operative improvement in patients mental stability and quality of life and overall health [8].

### 1.1 Aim

To study is impact of pre-operative coping strategies and exercises on post-operative recovery and quality of life of patients with cancer having depression.

## 2. METHODOLOGY

### 2.1 Study Setting

The Acharya Vinoba Bhave Rural Hospital in Sawangi, Meghe, Wardha, Maharashtra, will be

#### Study Period: 6 Months

used to enrol 20 volunteers. Participants will be told about the study's goals and methodology before being accepted, and they will sign written patient permission forms. Cancer patients who are pre-operative and those who met the inclusion and exclusion criteria were included in the analysis. They will be analysed on the scales used pre and post operatively. The primary researcher, a physiotherapy final year student, will do the randomization and distribution. Prior to the start of the analysis and after it is completed, outcome assessments will be measured.

### 2.2 Study Design and Sample Size

The design of the study is experimental study enrolling 20 participants. The participants in the study with diagnosed case of cancer who are pre-operative for cancer and prior to surgery, depression and anxiety levels will be analysed using the scales.

After the surgery post operatively after two weeks of recovery, the depressive and anxiety levels and QOL will be measured again using scales.

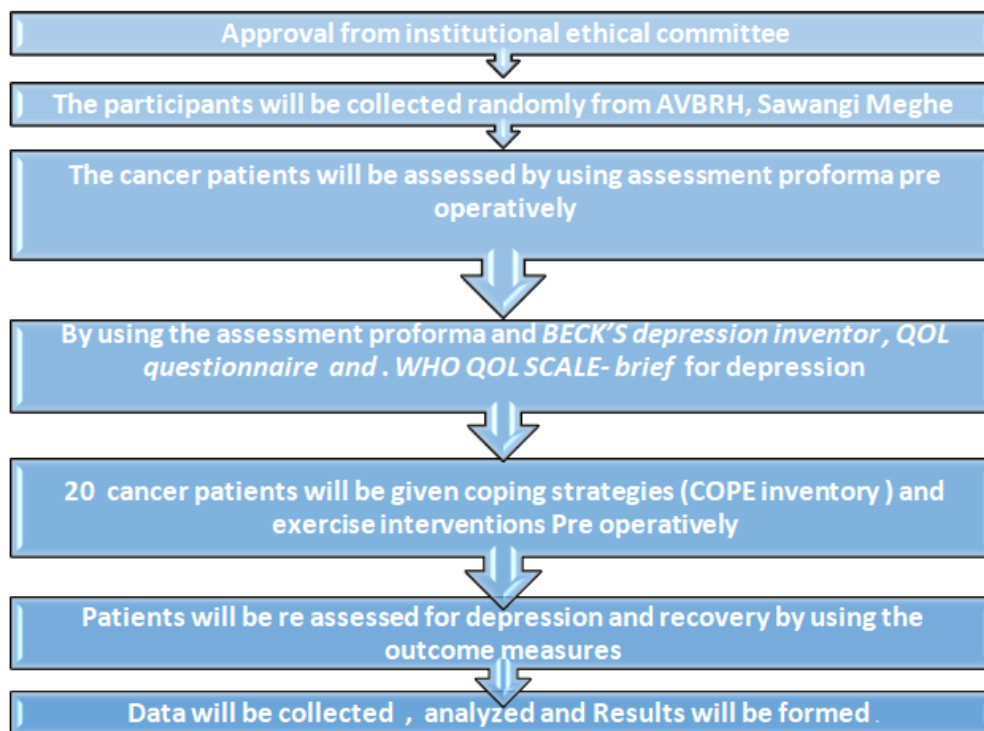


Fig. 1. Flow chart showing study design concept

## 2.3 Participants

Acharya Vinoba Bhave Rural Hospital Sawangi, Meghe, Wardha would be the source of 20 participants. Cancer patients who are pre-operative and those who met the inclusion and exclusion criteria should be included.

The inclusion criteria of participants include the cancer patients undergoing surgery; the pre-operative patients of both the genders: male and female of age group 65 to 85 years. We shall include patients who are willing to participate in the study and those who have the ability to understand and obey instructions given.

We shall exclude the subjects who have Pre-existing severe medical conditions which affect the mental health of patient other than cancer like Cerebrovascular Diseases, Dementia, Chronic metabolic disorder etc. and the ones who have previous history of surgery.

## 2.4 Participant Timeline

As study duration is of 6 months and intervention duration is so participant will be enrolled mostly during first 4 months of study so 6 week intervention will be completed successfully.

Assessment will be done on 1st day of visit then in 3<sup>rd</sup> week and last on 6<sup>th</sup> week of intervention. Participant will have to visit 5 days a week for 6 weeks for treatment.

## 2.5 Recruitment

The oncologists and health care practitioners working under DMIMSU are invited to refer the prospective patients to our In-patient department (IPD) and Out-patient department (OPD). The patients who are already undergoing surgery will be systematically assessed for the eligibility in the study as per inclusion and exclusion criteria. After enrolment in the study participants will be randomized accordingly and will undergo the assessment and rehabilitation program for 6 weeks with intermediate assessments. Informed patient consent will be taken before allocation and after explaining the purpose of the study, procedure, prospective benefits and after effects of intervention.

## 2.6 Implementation

Randomization will be supervised by the research coordinator and principal investigators.

Participants will be asked to give proper data and fill the proposed scales for complete assessment and data collection.

## 2.7 Study Procedure

The 20 participants in the study with diagnosed case of cancer who are pre-operative for cancer and prior to surgery, depression and anxiety levels will be analysed using the scales.

After the surgery post operatively after two weeks of recovery, the depressive and anxiety levels and QOL will be measured again using scales.

## 2.8 Interventional Design

### 2.8.1 Cope inventory scale

Exercise is not only safe and possible during cancer treatment, but it can also improve your physical function and quality of life, according to research.

Excessive rest can result in a loss of body function, muscle weakening, and a reduction in range of motion.

It is necessary for mental health and can help with stress reduction. It has been shown in studies to help with weariness, alertness, and focus, as well as overall cognitive performance. When your energy or capacity to concentrate has been sapped by stress, this can be extremely beneficial.

### 2.8.2 Relaxation by breathing exercises

To control breathing when you get stressed or anxious, perform the following [9]:

1. Take a seat somewhere peaceful and comfy. One hand should be on your chest, while the other should be on your stomach. When you take a deep breath in, your stomach should move more than your chest.
2. Inhale slowly and steadily via your nose. As you breathe in, keep an eye on and feel your hands. While the hand on your chest should stay still, the hand on your stomach should move slightly. Breathe out through your mouth slowly.
3. Do this for at least 10 times, or until you see a reduction in your anxiety.

4. Practice pranayama (breathing exercises). Inhale through one nostril while closing the other with your thumb, then exhale through the opposite nostril while shutting the other with your other finger.

## 2.9 Progressive Relaxation Technique

Progressive muscle relaxation (PMR) is an exercise used to alleviate disturbing and disruptive emotional symptoms such as anxiety or insomnia in all conditions. [10].

### Step 1

Get comfortable. You don't have to lie down to do PMR; you may perform it sitting up in a chair as well. Make sure you're in a distraction-free environment. If it's easier for you, close your eyes. [11].

### Step 2

Breathe. Inhale deeply through your nose, feeling your abdomen rise as you fill your diaphragm with air. Then slowly exhale from your mouth, drawing your navel toward your spine. Repeat three to five times.

### Step 3

Muscles should then be contracted and loosened. It is a better to set up with your feet. While clinching your toes, press your heels into the ground. For a few breaths, squeeze firmly, then let go. Inwardly flex your feet, pointing your toes toward your head. Before letting go, hold for a few seconds.

### Step 4

Continue making your way up to your body, contracting and loosening each muscle group. Legs, buttock, abdomen, back, hands, arms, shoulders, neck, and face should be exercised in the order listed: legs, glutes, abdomen, back, hands, arms, shoulders, neck, and face. Try to keep each muscle group stiff for a few breaths before releasing it gradually. Rep for any parts that are noticeably thicker.

### Step 5

Try some few more shallow breaths and observe how so much peaceful and more relaxed you feel.

## 2.10 General Mobility Exercises

Mobility Most of the most vital elements of fitness is the ability to have complete range of motion in your muscles and joints. To help you exercise more successfully, avoid accidents, and reduce joint pain, undertake flexibility exercises three to four times each week. [12]. Arm, limb, and torso (core) flexibility stretches should all be addressed. In each round, you might perform 1–3 reps of 4–6 various stretches. Any form of stretches one performs is better than doing nothing.

### 2.10.1 Tips for stretching

Start by warm up exercises. During the cool-down period, try to stretch and

Maintain a normal breathing pattern. Then take a deep inhale and don't hold your breath.

Stretch slowly and steadily while maintaining proper posture. Avoid bouncing.

Stretch only to the point of mild discomfort, not to the point of pain.

Shoulder stretch, Biceps and pectorals stretch, Triceps stretch, Quadriceps stretch

Calf stretch, Hamstring stretch, Lower back stretch

Exercises are especially more crucial if the patient has already received radiation therapy prior to surgery to assist maintain flexibility. The area being treated is affected by radiation for a long time. As a result, it's critical to adopt a regular exercise routine to maintain mobility after radiation treatments. Walking, mild stretching, and yoga are examples of gentle exercise that feel comfortable [13].

Chemotherapy side effects differ from person to person. During treatment, the patient may feel tired and queasy, and he or she may be unable to be physically active. Gentle activity, such as walking, can help you feel more energised and less weary [14].

### 2.10.2 Exercises in supine lying

#### 2.10.2.1 Exercises for ankle

- Quickly move up and down both ankles. Toes pointing forth and backward. For each leg, perform ten times.

- Spin your feet in a circular and anti-clockwise direction. Rep with each leg and direction ten times.

#### 2.10.2.2 Exercises for knees

- Flexing and extending your knees is a good exercise. Try ankle weights after you've built up little strength without them. Perform using both leg one by one and repeat 20 reps for both leg.
- Press your knee towards the bed, To preserve your leg straight, raise it roughly 20cm off the bed using your foot and toes (8 inches).
- Five times each leg, flex and stretch your knee.

#### 2.10.2.3 Exercises for Lower Limbs

- Elevate your ankle and toenails from off bed, gently push your knee into the mattress, and contract your thigh muscle, permitting your ankle to lift slightly. both leg five times
- Stretch your leg out to the side as far as feasible, then restore to the center point. ten times with each leg. After you've established resistance without weights, choose a resistance band using ankle weights.
- Put a towel, a rolled-up blanket, or a cloth beneath your knee. Squeeze your thigh muscle and straighten your knee by bringing your foot and toes up (keep knee on the pillow or blanket). 5 times per limb, maintain for a count of 5 and then progressively relax.

### 2.11 Back and Gluteal Exercise

- Cross your legs and elevate your back as much as feasible on the mattress. Count to ten with your fingertips.
- Relax on one bedside table and shift your bodyweight from the other. Rep 5 more times.
- Lie face down on the bed and use your arms to raise the upper section of your body. Rep 5 more times.

### 2.12 Exercises Sitting on Chair

#### 2.12.1 Leg exercises

- Tighten your thigh muscle and straighten your knee by pulling your toes up. Hold for

three counts before progressively relaxing your leg, ten times per leg.

- While seated on a chair, slowly stand up and then sit down. Count to ten.

#### 2.12.2 Exercises for upper limb

- Raise each arms overhead, outward and downward. Rep 10 times more. After you've established resistance without loads, you could add free weights.
- With your palms facing up, hold a long scooped newspaper or wand in each hand. Lift the wand as high as you can beyond your head. Hold the position for 5 seconds. Lower your arms and continue 5–7 times more. It's also possible to do it while lying down on the couch.
- Take a seat in a chair with your spine against the back of the seat, close to the surface. Place your arms, palm facing, on the table. Without shifting your trunk, use a microfiber towel to push the affected arm forward and away from the table. Your shoulder blade shall move while you're doing it. With your arm relaxed, complete 5–7 repetitions.

#### 2.12.3 Neck exercises

- Shift your head from left to right, then up and down. Count to ten.
- Stretch your neck from side to side and aim to stretch it from ear to shoulder. Count to ten.

#### 2.12.4 Back exercises

Putting your palms in front of you and take a seat in a chair. Raise your arms slowly beyond your head, stretching them out. When your hands are over your head, bend your spine to the right while keeping your arms overhead. Return to the starting position by bowing to the left. Repeat 5–7 more times.

- Curl arms in the front of chest and lean forward as much as possible before standing up. Do 10 times.

### 2.13 Outcomes

#### 2.13.1 Primary outcome measures

- 1. **BECK'S depression inventor** is a 21-item self-report survey which is used to verify the presence and depth of

depressed characteristics. People receive two weeks to respond to each topic. It comprises numeric data as well as qualitative components based on numerical connections. Attempting to make numbers more comprehensible.

- 2. QOL questionnaire Connections among psychometric characteristics and healthy practices It was created in our historical environment, and its psychometric properties were studied. The analysis of the connection between perceived quality of life and healthy behaviour patterns is a secondary goal. Many individuals in the digital age exhibit indicators of leading a chaotic life, which may include excessive work hours, transportation, contradictory work and family lives, hasty meals, sleep deprivation, little spare time, and so on. Those indicators, taken together, tend to confirm an undesirable behavioural habit.
- 3. WHO QOL SCALE- brief - The WHO Quality of Life Instrument is a shortened generic QOL scale created by the World Health Organization. The scores for each domain are scaled in a positive way. To make domain scores comparable to the scale's scores, the mean scores are multiplied by four. It evaluates a person's quality of life (QOL) in relation to their culture, value systems, personal objectives, standards, and concerns.

### 2.13.2 Secondary outcome measures

- **COPE Inventory** the COPE Inventory (Coping Orientation to Problems Experienced) is a self-report questionnaire that assesses a wide range of coping reactions. It is currently one of the most widely used and well-validated measures of coping methods. The Coping Strategies Inventory is indeed a 72-item self-report questionnaire that measures compensatory thinking and behavior in response to a stressful situation. There are two items on each of the 14 scales, with total values ranging from 2 (lowest) to 8 (highest) (maximum). Higher values reflecting that that specific coping strategy is adopted more typically. The Resulting data on each scale are calculated by adding the applicable items for each scale. There are no objects with a reverse score.

## 2.14 Data Collection and Management

### 2.14.1 Data collection

The evaluation data will be obtained from a pre-established spreadsheet with variable baseline characteristics. Research data will be placed in a secure database. Non-electronic records, such as hard copies of assessment forms, signed informed consent, etc., will be stored safely in the study setting.

### 2.14.2 Data management

Data collection and reporting will be carried out under the supervision of the principal investigators. The research reports must be carefully checked for accuracy. The Excel spreadsheet will be published at the conclusion of the study and given to the statistician for the required analysis. Checklist can be used to avoid lost data due to incorrect staff procedures.

## 2.15 Statistical Analysis Plan

Data analysis will be undertaken utilizing qualitative and interpretation statistical data through using Chi-square test and the student's unpaired t test. The device used for interpretation will be SPSS24. Oversion, Graph pad prism version 7.0 and  $p < 0.005$  are considered to be of relevance ( $p > 0.005$ ).

### 2.15.1 Bias

Measures will be taken to prevent this from happening attrition bias by giving reminder calls prior to each intervention and by providing travel assistance to those who need it. So, we expect a low percentage of dropouts.

## 3. RESULTS

Successful completion of this study will provide evidence on the best treatment strategy out of improving QOL and depression levels in Cancer survivors post operatively .This research could be useful in the treatment of cancer patients with Depression and anxiety in the pre-operative stage to get positive results post operatively and better In the hospital setting, QOL may aid in improving self-confidence and recovery rates, as well as preventing mental health deterioration in patients' quality of life.

Once the study result is complete data will be analysed using chi square test. The device used for interpretation will be SPSS 24. 0 version, Graph pad prism version 7.0 and  $p < 0.005$  are considered to be of relevance ( $p > 0.005$ ) and will be submitted in form of research paper.

#### 4. DISCUSSION

The mental health widely affects the recovery of any medical condition and when we study the patients of life threatening disease like cancer, the fear of failure, spread of disease and chances of mortality largely affects the mind of patients undergoing treatment. The point of this research is to evaluate the impact of pre-operative coping strategies and exercises on post-operative recovery and quality of life of patients with cancer having depression. After assessing and using various quality of life scales and certain coping strategies were planned like Relaxation techniques, general mobility exercises, Yoga and stretching exercises. : The relaxation techniques have the capacity to improve the self-esteem of cancer patients[15]. Self-efficacy is seen to be one of the most important factors influencing a patient's health. Cancer sufferers' self-efficacy can be improved by muscle relaxation. Anxiety, despair, and exhaustion are common symptoms among cancer patients[16]. Patients are increasingly turning to supportive therapy to help them cope with their symptoms. Yoga therapy has the potential to help cancer patients with anxiety symptoms, and more study into this area is needed(14). When compared to no therapy, yoga is suggested as a helpful strategy for improving health-related quality of life and reducing fatigue and sleep disturbances. when compared to psychosocial/educational therapies for lowering sadness, anxiety, and exhaustion [17]. When compared to no therapy, evidence of moderate quality supports the use of yoga as a supportive intervention for enhancing health-related quality of life and lowering fatigue and sleep disruptions [18]. When compared to control settings, research show that exercise therapy may improve sleep disturbances but not sleep quality in cancer patients. [11]. However the effect is tiny. therefore we can conclude that coping strategies help improve quality of life and lower the effects of depression and better the treatment results[12]. Despite these challenges, the research's primary purpose was to assess the severity of the condition in preoperative cancer

victims [13]. Poor mental health awareness and stigmatising attitudes regarding mental condition are more common in the community, prompting the need to prevent mental illness and educate people about mental health and treatment alternatives. [19]. The Standard of Living (QoL) is a vital and line with the wishes health outcome metric in acute management [20]. In clinical outcomes, wellbeing (QoL) is a crucial and frequently requested health outcome measure. A sound mind allows a person to go about their everyday schedule without constraint. [21].

#### 5. CONCLUSION

We can conclude that this method will help to improve quality of life and lower the effects of depression and betters the treatment results.

#### CONSENT

Principal Investigator will obtain the informed consent from the patient and one of the relatives on a printed form with signature and given the proof of confidentiality. The participant and one of his or her relatives will be informed about the study, and the primary investigator will collect personal information as part of the procedure. The confidentiality declaration, as well as the signatures of the principle investigator, patient, and two witnesses, will be included on the permission form. If you're obliged to share certain data for the study, consent will be obtained from the patient with complete assurance of his/her confidentiality.

#### ETHICAL APPROVAL

The ethical committee board will provide their authorization. The major findings of the research can be accessed by both the DMIMS who will fund the research and the people who will participate in the study. Data is kept for a minimum of five years for the registered subjects. Following the completion of data collection and statistical analysis, a completion report will be prepared and sent for publication after being reviewed by the institutional research cell.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.



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