A Case Study of Multidisciplinary Rehabilitation in Ovarian Cancer: Motion Therapy and Psychological Approaches for Chemotherapy-Induced Neuropathy

Baneeha Zainab[1], Um I Lela[2], Kiran Shahzadi[3], Gul-e-Roiba DPT[4]

[1]MPhil Psychology Visiting Lecturer, Gift University Gujranwala, [2]PHD Psychology Associate professor, associate Dean, GIFT University Gujranwala, [3]FCPS Consultant Oncologist, Gujranwala Institute of Nuclear Medicine and Radiotherapy (GINUM), [4]Riphah International University, Lahore

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Abstract

This case study evaluates the impact of a multidisciplinary rehabilitation approach combining Dance/Movement Therapy (DMT) and psychological motion therapy on an ovarian cancer patient having chemotherapy-induced peripheral neuropathy (CIPN). The patient, U.B, had a five-week intervention targeted at improving physical functioning, lowering neuropathic pain, and raising overall quality of life. Baseline assessments included tests of grip strength, knee and shoulder flexion, psychological well-being using the Hospital Anxiety and Depression Scale (HADS), neuropathic pain using the DN4 scale, and quality of life using the EORTC QLQ-C30. The intervention comprised weekly sessions integrating DMT and psychological approaches, followed by weekly examinations to track development. Results demonstrated considerable increases in physical functioning, with grip strength increasing by 4 kg in both hands and notable advances in knee and shoulder flexion. Psychological well-being showed great progress, with HADS ratings for anxiety and depression falling significantly. The DN4 neuropathic pain score reduced from 8 to 5, showing a considerable reduction in pain. Quality of life metrics improved across several areas, including physical activities, work and leisure, and general health. The overall health score climbed from 4 to 6, while the quality-of-life score improved from 3 to 5. This study illustrates the usefulness of a holistic rehabilitation approach in treating CIPN and enhancing the quality of life for ovarian cancer patients. The confluence of physical and psychological therapy offers a complete strategy for treating the numerous issues associated with CIPN. These findings imply that multidisciplinary therapies should be used in cancer rehabilitation programs to enhance patient outcomes. Further study with larger samples and randomized controlled trials is necessary to validate these results and explore the long-term advantages of such therapies.

Keywords: Multidisciplinary Rehabilitation, Dance/Movement Therapy (DMT), Chemotherapy-Induced Peripheral Neuropathy (CIPN) Ovarian Cancer, Psychological Motion Therapy

Introduction

Ovarian cancer is a type of cancer that begins in the ovaries, the female reproductive organs that produce eggs. It is considered one of the most deadly gynaecological cancers due to the difficulty in detecting it early and the aggressive nature of the disease It is the oldest and fifth cause of cancer-related deaths among women in the USA, with 21,750

Corresponding Author: Baneeha Zainab MPhil Psychology Visiting Lecturer, Gift University Gujranwala.

Email: Baneeha.zainab@gift.edu.pk

to 13,940 new cases of the disease expected in the U. S. A, and about 13,940 deaths due to the disease in 2020[1]. Grace period of the disease does not show the symptoms; thus, many people are diagnosed in advanced stages which makes treatment more difficult and lowers the survival rate [2].

The standard treatment modality involves the surgical removal of the malignancy, with the latter being mainly used to assisting its management (3). Chemotherapy goal is to attack the rogue cancer cells that divide quickly and grow fast by harming them or stopping them from growing and eventually leading to their death. On the one hand, this non-targeted way of action can cause negative effects on healthy cells and these cells that most dangerously repeat division run on the risk of exposure to the peripheral nervous system [4].

Chemotherapy-induced peripheral neuropathy (CIPN) represents one of the most challenging side effects to overcome, as agents, like this one, cause damage to peripheral nerves, which in turn leads to numbness, tingling, and pain in different body parts of the patient [5]. The treatment of these problems may serve for the variety of clinical symptoms, which can negatively impact life quality of a patient significantly, making physically impossible to walk, write or even hold a cup [2]

The scope of the CIPN is determined by different factors and including the chemotherapeutic agent type, the overall dose, and individual's genetic disposition [6]. Some chemotherapeutic drugs, like platinum derivative compounds (e. g. "cisplatin"), are used in treating ovarian cancers. g. Genotoxicity is a property most often observed with platinum (e. g., cisplatin, carboplatin), taxanes, and camptothecins. g. Unlike cisplatin side effects (blurred vision, nausea, and constipation), CIPN (caused by paclitaxel, docetaxel medications) appear to be linked to a greater risk [7].

Although CIP is serious disorder that can badly affect certain aspects of life, patients, nonetheless, have a limited number of effective treatments they can turn to. Pain management and physical therapy are some examples of supportive care that fights against symptoms but is not targeted against the actual nerve damage [8] CIPN treatment options are becoming more available as research continues focusing on formulating new CIPN-preventing or lessening agents, and investigating the possibility of using the most suitable drug dosing regimens [3].

Comprehensive rehabilitation programs, which frequently involve a multidisciplinary approach, have been demonstrated to be beneficial in controlling the symptoms of CIPN and improving patient outcomes. These programs often comprise a combination of physical therapy, occupational therapy, and pain management measures [9].

By addressing the physical, functional, and psychological aspects of CIPN through a comprehensive rehabilitation program, healthcare providers can help patients regain their independence, participate more actively in their lives, and cope more effectively with the challenges posed by their cancer treatment [9]. This, in turn, can contribute to improved outcomes, higher well-being, and a better overall quality of life for patients with ovarian cancer.

This case study presents the medical journey of U.B, a middle-aged female diagnosed with recurrent ovarian cancer and CIPN. The study aims to provide insights into the diagnostic process, treatment strategies, and challenges faced in managing recurrent CIPN.

Informed consent was obtained from the patient prior to her inclusion in the study. patient was provided with detailed information regarding the study's purpose, procedures, potential risks, and benefits. She was given ample opportunity to ask questions and was assured that her participation was voluntary. This process ensured that the patient' decision to participate was made with full understanding and without any coercion.

Patient Information

- **Name:** U.B
- **Age:** 45-47 years
- **Gender:** Female
- **Marital Status:** Married
- **Occupation:** Housewife
- **Socioeconomic Status:** Middle

Medical History

- **History of Present Illness:** She was initially diagnosed with ovarian cancer in 2022. She underwent surgical removal of the uterus and both ovaries. Recently, she presented with symptoms indicative of cancer recurrence.
- **Past Medical and Surgical History:** No significant past medical history.
- **Family History:** No known family history of cancer.

Clinical Presentation

- **Presenting Symptoms:**
  - Recurrence of pelvic mass
  - Moderate ascites (fluid accumulation in the abdomen)
- **Physical Examination Findings:**
  - Abdominal distension due to ascites
  - Absence of uterus and ovaries

Diagnostic Workup

- **Laboratory Tests:**
  - Elevated CA-125 levels:
    - 514.2 U/ml (22/12/2023)
    - Previous levels: 2276 U/ml, 83.4 U/ml
- **Imaging Studies:**
  - **MRI Pelvis with IV Contrast (04/01/2024):**
    - Soft tissue enhancing mass (63x56 mm) in pelvis.
    - Moderate ascites
  - **USG Abdomen/Pelvis (22/12/2023):**
    - Complex soft tissue mass (7x5.2 cm) in pelvis
    - Moderate ascites
  - **Cancer Registry Visit Information Report:**
    - High-grade serous carcinoma
    - Extensive omental deposits and ascites

Diagnosis

- **Diagnosis:** Recurrent malignant ovarian neoplasm
  - Chemotherapy Induced Peripherial Neuropathy Grade-3
- **Staging:** Stage IIIC, grade 4

Treatment Plan

- Chemotherapy:
  - Neoadjuvant chemotherapy with paclitaxel and carboplatin
  - Planned for 6 cycles with a 21-day gap.

This case report discusses the history and rehabilitation of a patient with advanced Ovarian cancer who acquired severe CIPN during chemotherapy. It explains her management through a complete outpatient strategy combining graded Motion therapy, joint mobilizations, and psychosocial support over 5 weeks. The objective is to add to information on real-world use of a complete biopsychosocial model for CIPN. Comprehensive reporting provides analysis of therapeutic elements driving results to advise future care. Patient identifiers have been concealed to maintain confidentiality.

Initial Presentation:

The main complaints were decreased hand grip strength, trouble with fine motor skills (a sign of grade neuropathy), and mental discomfort, which includes depressive and anxious thoughts as well as low quality of life.

Methods

Tests and Investigations:

Physical Examination: Hand and Foot Assessment: This is done with a goniometer to determine the range of motion for the knee and shoulder flexions, and a hand dynamometer to measure grip strength. A licensed physiotherapist did these evaluations.

Psychological Assessment: Hospital Anxiety and Depression Scale (HADS): Used to evaluate levels of anxiety and depression [10]

Neuropathic Pain Assessment: (DN4) questionnaire: Assessed characteristics and severity of neuropathic pain [11]

Quality of Life Assessment: Implemented a relevant scale to measure the impact of her condition on her daily activities and general well-being [12]

Oncological Follow-up: Likely included routine imaging and blood tests to evaluate cancer growth and therapy effects.

Diagnosis:

Process of Diagnosis:

Clinical Assessment: A trained psychologist conducted an extensive clinical assessment. This includes a thorough assessment of the patient's past medical history, present symptoms, and history of stage IV ovarian cancer treatments.

Physical Evaluation: The physiotherapist measured U.B.'s grip strength with a hand dynamometer to get quantitative information on how her hands functioned. The range of motion in the hands and feet was measured using a goniometer to determine the flexibility and mobility of each joint.

Neurological Evaluation: The therapist performed a test for chemotherapy-induced peripheral neuropathy (CIPN) based on the patient's medical history. This entails assessing motor and sensory capacities and recording any deviations that are in line with neuropathic pain.

Diagnostic Criteria Met:

For Chemotherapy-Induced Peripheral Neuropathy (CIPN):

Abnormalities or limitations of the symmetrical and distal senses. Hand dynamometer measurements show a decrease in hand grip strength. Alterations in the range of motion of the joints, measured by a goniometer. A history of chemotherapy, as this is a known neuropathy risk factor.

For Psychological Distress (Anxiety and Depression):

Elevated scores on the Hospital Anxiety and sadness Scale (HADS), suggesting substantial levels of anxiety and sadness.

Type/Stage of Condition:

Neuropathy: Moderately impaired function is an indicator of grade 3 neuropathy brought on by chemotherapy. The patient's symptoms, such as decreased strength and mobility in the hands and feet, are the basis for this grade.

Psychological Status: Not officially diagnosed, but the HADS scores indicate that she is suffering from a significant mental health issue that necessitates help.

The clinical presentation, the patient's history of chemotherapy treatment, and objective tests using a hand dynamometer and goniometer were used to make the diagnosis of CIPN. Utilizing HADS, the psychological distress was evaluated as a component of the overall diagnostic and treatment plan.

Treatment

Treatment Plan and Interventions Utilized for Patient:

Day 1: Building Trust in Self and Treatment

Total Duration: 1 hour 5 minutes

Introduction to Psychological Concepts of Trust and Healing: 20 minutes

Guided Relaxation and Mindfulness: 15 minutes

Movement Therapy focusing on Body Awareness and Trust-Building: 15 minutes.

Reflection and Group Discussion: 15 minutes

Day 2: Fostering Self-Efficacy

Total Duration: 1 hour 5 minutes

Discussion on Self-Efficacy in Psychology: 20 minutes

Mindfulness and Centring Activities: 15 minutes

Movement Therapy emphasizing Empowerment: 15 minutes.

Personal Reflection and Sharing: 15 minutes.

Day 3: Enhancing Self-Esteem and Body Image

Total Duration: 1 hour 5 minutes

Body Positivity and Mental Health Discussion: 20 minutes

Guided Visualization for Self-Acceptance: 15 minutes

Movement Therapy celebrating Body Capabilities: 15 minutes.

Group Reflection and Support: 15 minutes.

Day 4: Emotional Resilience and Mental Well-being

Total Duration: 1 hour 5 minutes

Introduction to Emotional Resilience in Psychology: 20 minutes

Stress Management Techniques: 15 minutes.

Movement Therapy for Emotional Expression: 15 minutes

Reflection and Group Discussion: 15 minutes

Day 5: Cultivating Hope and Positivity

Total Duration: 1 hour 5 minutes

Psychological Aspects of Hope and Positivity: 20 minutes

Positive Affirmations and Mindfulness: 15 minutes

Movement Therapy: Hope-Inspiring Movements: 15 minutes

Closing Reflection and Celebratory Activity: 15 minutes

Procedures and drugs:

No drugs are offered for the treatment of neuropathy. The focus is mostly on psychological and physical treatment approaches. The processes include guided relaxation, mindfulness exercises, movement therapy with specific themes for each day, visualization techniques, and discussions for psychological support.

Duration of Treatment:

The treatment program is conducted over five consecutive days, with each session lasting around 1 hour and 5 minutes. This intensive week-long program seeks to give a condensed yet comprehensive approach to addressing both the physical symptoms of neuropathy and the psychosocial aspects of illness. The treatment strategy stresses a complete approach, integrating psychological support with physical therapy to increase overall well-being and quality of life.

Intervention:

- **Duration:** 5 weeks
- **Frequency:** Weekly sessions
- Components:
  - **Dance/Movement Therapy (DMT):** Sessions focusing on improving physical functioning through structured movement activities.
  - **Psychological Motion Therapy:** Activities aimed at enhancing psychological well-being and addressing neuropathic pain through mindfulness, relaxation, and cognitive-behavioural techniques.

Results

Progress: Response to Treatment and Improvements

Initial Response to Treatment:

Physical Functioning: Demonstrated considerable gains, especially in grip strength (from 7 kg to 11 kg in the left hand and from 8 kg to 12 kg in the right hand) and joint range of motion. There were significant increases in both knee and shoulder flexion.

- **Grip Strength:**
  - Right Hand: Increased from 8 kg to 12 kg.
  - Left Hand: Increased from 7 kg to 11 kg.
- **Range of Motion:**
  - **Knee Flexion:**
    - Right Knee: Increased from 110° to 120° (Improved by 10°)
    - Left Knee: Increased from 115° to 123° (Improved by 8°)
  - **Shoulder Flexion:**
    - Right Shoulder: Increased from 140° to 150° (Improved by 10°)
    - Left Shoulder: Increased from 145° to 153° (Improved by 8°)

Psychological Well-being: Positive changes were observed in terms of lowered anxiety and depression levels, with the Hospital Anxiety and Depression Scale (HADS) scores dropping in both categories.

- **HADS - Anxiety:** Reduced from 14 to 9
- **HADS - Depression:** Reduced from 13 to 6

Neuropathic Pain: There was a considerable reduction in the severity of neuropathic pain, as evidenced by the DN4 score lowering from 8 to 5.

Significant Improvements:

- **Grip Strength:** Increased by 3-4 kg in both hands, showing better muscle strength and function.
- **Range of Motion:**
  - Knee Flexion Right: Increased from 100° to 112° (Increased by 10°)
  - Knee Flexion Left: Increased from 115° to 123° (Increased by 8°)
  - Shoulder Flexion Right: Increased from 140° to 150° (Increased by 10°)
  - Shoulder Flexion Left: Increased from 145° to 153° (Increased by 8°), showing greater joint mobility.

Quality of Life: As assessed by the EORTC QLQ-C30, there was a considerable improvement in quality of life, with physical and daily activity scores improving and symptoms ratings dropping.

- **EORTC QLQ Physical Activities (Q1-Q5):** Scores decreased, indicating improvement.
- **Work & Leisure (Q6-Q7):** Scores decreased, indicating improvement.
- **Symptoms (Q8-Q28):** Scores decreased, indicating improvement.

Overall Health and Quality of Life (Q29 and Q30):

- **Overall Health (Q29):** Improved from 4 to 6 (Good)
- **Quality of Life (Q30):** Improved from 3 to 5

Mental Health: Reduction in anxiety (from 14 to 9) and depression (from 13 to 6) on the HADS scale.

Setbacks:

No noteworthy setbacks were mentioned in the assessment. The patient demonstrated consistent gains across most parameters.

Objective and Subjective Assessment Measures:

Objective Measures: Grip strength and wrist ROM measures, DN4 neuropathic pain score.

Subjective Measures: EORTC QLQ-C30 responses for daily activities, work and leisure activities, symptoms, general health, and quality of life; HADS scores for anxiety and depression.

Overall Analysis:

The patient displayed considerable improvements in both physical and psychological aspects post-treatment. The increase in grip strength and wrist mobility, reduction in pain levels, and improvements in mental health markers imply a good response to the treatment. The general quality of life also improved, as demonstrated by the EORTC QLQ-C30 scores. The patient's continuous growth across both objective and subjective criteria reflects the success of the comprehensive treatment approach.

Physical Measures

Table-1

Measure	Baseline	Post-Treatment	Improvement
Grip Strength (Right)	8 kg	12 kg	+4 kg
Grip Strength (Left)	7 kg	11 kg	+4 kg
Knee Flexion (Right)	100°	112°	+12°
Knee Flexion (Left)	115°	123°	+8°
Shoulder Flexion (Right)	140°	150°	+10°
Shoulder Flexion (Left)	145°	153°	+8°

Table-2: Psychological Measures

Measure	Baseline	Post-Treatment	Improvement
HADS – Anxiety	14	9	-5 points
HADS – Depression	13	6	-7 points
DN4 Neuropathic Pain	8	5	-3 points

Table-3: Quality of Life Measures

Measure	Baseline	Post-Treatment	Improvement
Physical Activities	2-4 (Varied)	Improved	Scores decreased
Work & Leisure	3-4	Improved	Scores decreased
Symptoms	2-5 (Varied)	Improved	Scores decreased
Overall, Health	4	6 (Good)	+2 points
Quality of Life	3	5	+2 points

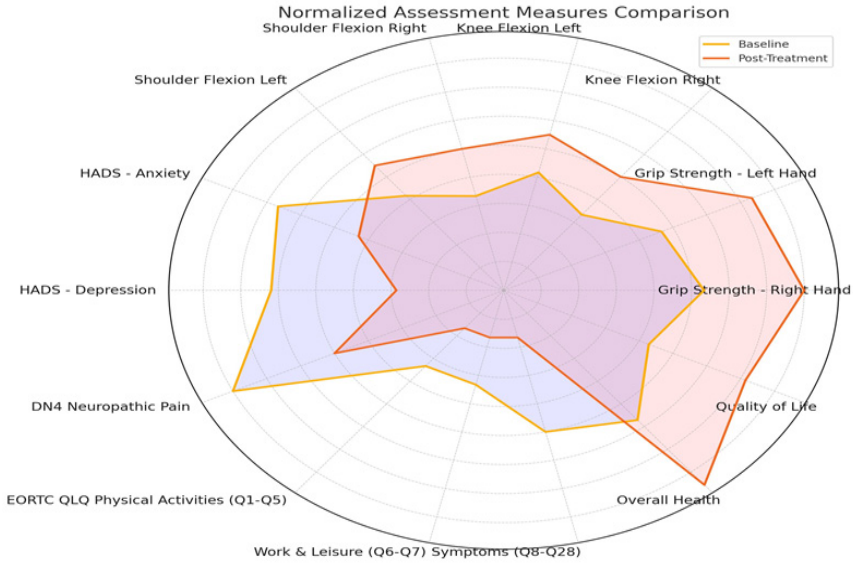

Figure-1

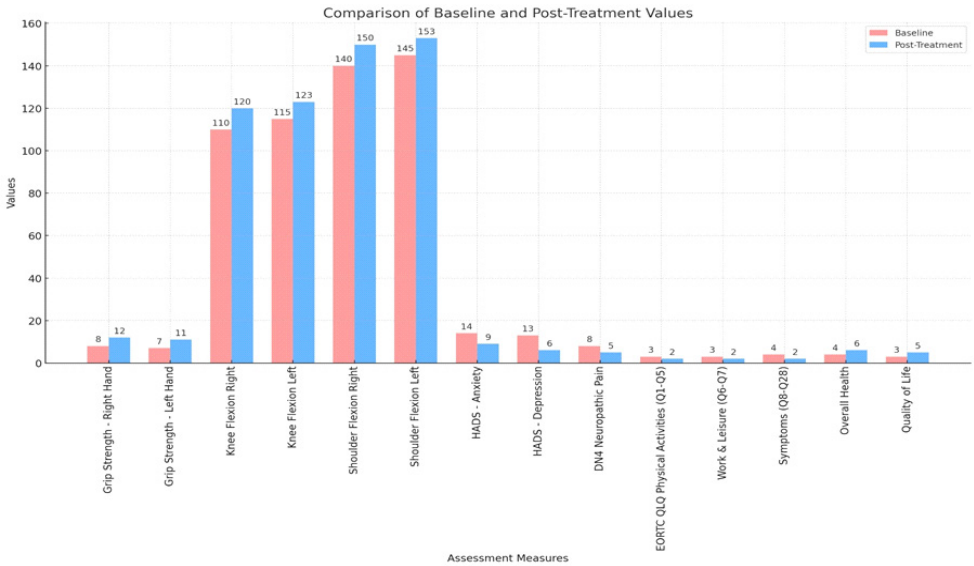

Figure-2

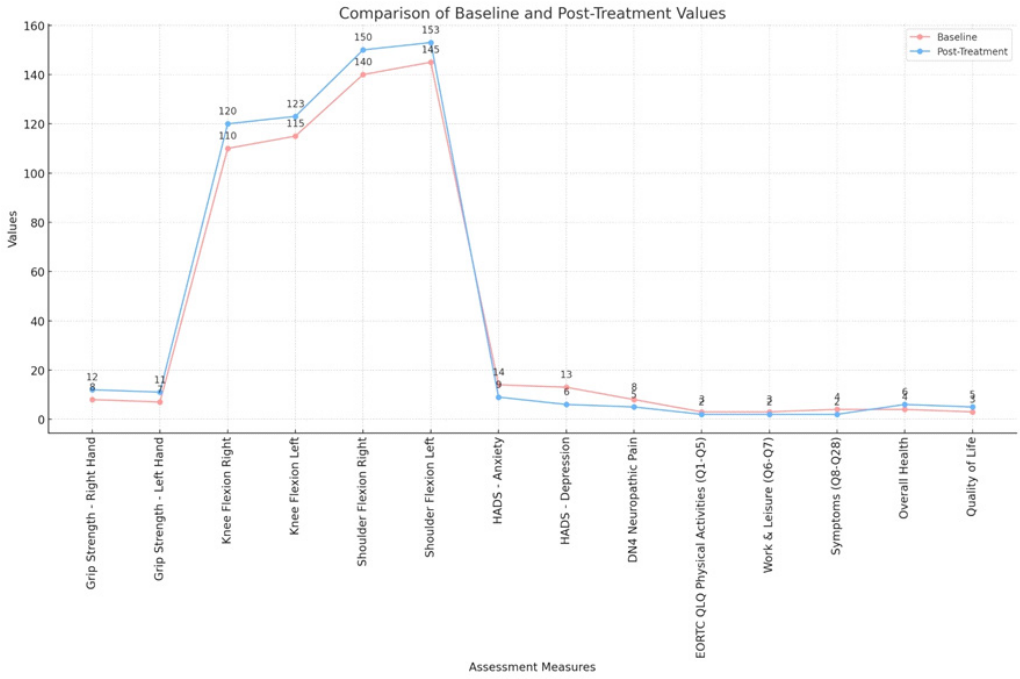

Figure-3

Table-4: Weekly-Feedback [9]

Sr	Questions	Week 1	Week 2	Week 3	Week 4	Week 5
1.	How do you feel right now compared to before the session?	Slight improvement	Noticeable improvement	Marked improvement	Significant progress	Great improvement
2.	Did you experience any discomfort or pain during our session today?	Moderate discomfort	Mild discomfort	Minimal discomfort	No discomfort	No discomfort
3.	What activities or parts of the session did you find most beneficial?	Breathing exercises	Stretching routines	Endurance training	Combined techniques	All exercises
4.	Have you noticed any improvements in your daily activities or overall functioning since our last session?	Minor daily improvements	Better hand coordination	Enhanced daily function	Easier daily activities	Much easier activities
5.	Are there any new challenges or symptoms you have experienced since our last meeting?	Some fatigue	Decreased fatigue	No new symptoms	No issues	Feeling great
6.	How are you feeling emotionally? Are there any changes in your mood or stress levels?	Calmer	More relaxed	Happier	Very positive	Extremely positive

Continue.....

7.	Do you have any questions or concerns about your treatment or recovery process?	Some concerns	Fewer concerns	Clear understanding	No concerns	Fully confident
8.	Are you comfortable with the pace and progression of your therapy?	Adapting	Becoming more comfortable	Comfortable	Very comfortable	Extremely comfortable
9.	What are your goals or hopes for the next session or in the coming weeks?	Strengthening muscles	Improving balance	Enhancing endurance	Maintaining gains	Continuing progress
10.	Are you comfortable with the pace and progression of your therapy?	Adapting	Becoming more comfortable	Comfortable	Very comfortable	Extremely comfortable

Discussion

This case study includes a complete examination of a multimodal rehabilitation approach incorporating Dance/Movement Therapy (DMT) and psychological motion therapy in managing chemotherapy-induced peripheral neuropathy (CIPN) in a patient with recurrent ovarian cancer. U- Bi's example demonstrates the potential benefits of merging physical and psychological therapy to boost physical functioning, reduce neuropathic pain, and improve overall quality of life. The intervention revealed considerable improvements in physical functioning, as evidenced by the increased grip strength in both hands and enhanced range of motion in the knees and shoulders. These benefits can be attributed to the planned movement activities and strength exercises introduced into the DMT sessions. The considerable improvement in grip strength, with increments of 4 kg in both hands, and notable enhancements in knee and shoulder flexion, illustrate the effectiveness of physical rehabilitation in addressing the muscular weakness and joint stiffness often associated with CIPN. These changes not only enhance the patient's capacity to do daily activities but also contribute to overall physical resilience. Psychological well-being showed remarkable progress during the intervention period. The large reduction in anxiety and depression scores on the Hospital Anxiety and Depression Scale (HADS) highlights the importance of addressing mental health alongside physical symptoms. The psychological motion therapy sessions, which included mindfulness and relaxation techniques, undoubtedly had a vital impact in relieving stress and creating a more optimistic view. The patient's comments demonstrating mood changes and reduced stress levels further confirms the beneficial impact of adding psychological assistance into the rehabilitation program. A substantial reduction in neuropathic pain was noted, with the DN4 Neuropathic Pain score reducing from 8 to 5. This improvement is particularly significant given the hard nature of maintaining CIPN. The combination of physical and psychological therapy may have contributed to this outcome by increasing nerve function and lowering pain perception. The DMT sessions' focus on mild movements and exercises matched to the patient's pain tolerance likely helped lessen pain levels, while the psychosocial interventions gave techniques for coping with discomfort. Quality of life, as measured by the EORTC QLQ-C30, showed remarkable improvement across many areas, including physical activities, work and leisure, and general health. The patient's reports of simpler daily activities and a more pleasant attitude demonstrate the comprehensive benefits of the interdisciplinary approach. The improvement in the overall health score from 4 to 6 and the quality-of-life score from 3 to 5 demonstrate the intervention's efficacy in boosting the patient's well-being. These data imply that a comprehensive

rehabilitation strategy that addresses both physical and psychological components can greatly enhance the quality of life for cancer patients undergoing CIPN.

Implications

This case study illustrates the necessity of adopting a comprehensive approach to cancer rehabilitation. The merging of DMT and psychological motion therapy provides a dynamic framework for addressing the multiple issues presented by patients with CIPN. Health providers should consider implementing such multidisciplinary interventions into their treatment regimens to maximize patient outcomes. Tailoring the therapy to individual needs and regularly monitoring progress are key for obtaining persistent gains.

Limitations and Future Directions

While the results of this one case study are promising, they should be read with caution. The findings are based on the experience of one patient, and larger research are needed to generalize the results. Future research should focus on randomized controlled trials to examine the efficacy of interdisciplinary rehabilitation treatments in varied patient populations. Additionally, investigating the long-term consequences of such therapies will provide vital insights into their sustainability and impact on chronic pain management.

Conclusion

This case study illustrates the tremendous benefits of a comprehensive rehabilitation approach in addressing CIPN in an ovarian cancer patient. The combination of Dance/Movement Therapy and psychological motion therapy led to marked improvements in physical functioning, psychological well-being, neuropathic pain, and overall quality of life. This holistic strategy underlines the potential for integrated therapy to enhance patient outcomes and provides a helpful paradigm for future rehabilitation programs.

Ethical Clearance: Ethical clearance for this study was obtained from the GINUM and ORIC , ensuring that all research procedures adhered to ethical guidelines and standards for conducting research involving human participants.

Source of Funding: This research was self-funded ensuring the independence of the study from any external influence or bias.

Conflict of Interest: The authors declare no conflicts of interest. This declaration ensures transparency and maintains the integrity of the research process and findings.

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