

# Role and importance of Physiotherapy during Palliative Care in India: A Review

Dr. Tabassum Saher, Dr. Sheetal Kalra, Dr. Joginder Yadav, Shalu Thariwal,  
Khumanshi Yadav, Pinky Tanwar

## **Abstract— Background and purpose of the study**

The importance of physiotherapy in life limiting diseases prevention and management has become generally well accepted. Palliative care is the multidisciplinary therapeutic approach for people with life limiting illness. It focuses on providing relief from symptoms such as pain, fatigue, physical stress and mental stress at any stage of illness. There has been limited research conducted to investigate the importance of role of physiotherapy in palliative care setting. So, the purpose of this study is to contribute a review to the current research involving the importance of physiotherapy during palliative care in patients who are suffering from life limiting illnesses

**Methods:** There are number of research interventions and publications examining the benefits of physical activity in life threatening illnesses. This article reviewed included a variety of study designs like randomized control trials (RCTs), retrospective studies, pilot study, case reports, observational studies, feasibility studies and prospective cohort studies evaluating programs. We have included 20 articles for this study. This study has been completed by independently screening and reviewing the eighteen year studies that were published between the years 2001 to 2018 related to the role of physiotherapy during palliative care. The databases and journals searched included Google Scholar, PUBMED, MEDLINE and PEDro. Outcomes measures of this study are physical function, fatigue, pain and QOL.

**Results:** Throughout all of the 20 reviewed articles, it was reported that physiotherapy results in improvements in a variety of aspects of patient's functions and relief of symptoms. These benefits signify the valuable role that physiotherapy plays in caring for patients during palliative care and the impact it can have on patients' functions and symptom management. This study strongly indicates the role of physiotherapy in improving independency of the patients and overall quality of life.

**Index Terms—** Palliative Care, Quality Of Life, Life Limiting Illnesses, Exercises.

## I. INTRODUCTION

Highlight WHO's definition of palliative care is an

Dr. Tabassum Saher, Assistant Professor, Faculty of Physiotherapy, SGT University Gurugram

Dr. Sheetal Kalra, Professor, Faculty of Physiotherapy, SGT University Gurugram

Dr. Joginder Yadav, Dean, Faculty of Physiotherapy, SGT University Gurugram

Shalu Thariwal, BPT Students, Faculty of Physiotherapy, SGT University Gurugram

Khumanshi Yadav, BPT Students, Faculty of Physiotherapy, SGT University Gurugram

Pinky Tanwar, BPT Students, Faculty of Physiotherapy, SGT University Gurugram

approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual. Palliative care provides relief from pain and other distressing symptoms affirms life and regards dying as a normal process intends neither to hasten or postpone death integrates the psychological and spiritual aspects of patient care offers a support system to help patients live as actively as possible until death offers a support system to help the family cope during the patients illness an in their own bereavement uses a team approach to address the needs of patients and their families, including bereavement counseling. Palliative care is total care considering the physical, psychological, social and existential needs. The care could be said to be built on the four corner stones, symptom control, team work 24 hours a day, continuity and support for the family.(1) Some other members who are very useful but are not a part of the core team are: Clinical psychologists, Clinical Pharmacists, Physiotherapist and Occupational therapists. (2) Patients who are suffering from cancer get chronic functional impairment caused by the disease or by medical or chirurgical treatments. (3) This makes rehabilitation and physiotherapy very important. Physiotherapy during palliative care is a comparatively new concept now more often used in palliative care, even if it is described already in the 1960s. The aim of having a rehabilitative approach when treating patients in palliative care is to set the goal for treatment so that the patient can keep or improve functions and reduce the consequences of the disease for as long as possible. The goal for the physiotherapeutic treatment is to keep as much independency as possible to make the important activities for the patient easy. (4) Physiotherapy in the palliative setting should aim to enhance the patient's quality of life. This may be achieved by improving function, or where this is not possible, by improving the patient's and carer's ability to cope with the patient's deterioration. A fundamental goal of palliative care is the relief of pain and other symptoms.

## **Physiotherapy aims to:**

1. Maintain an optimum respiratory function
2. Maintain optimum circulatory functions
3. Prevent muscular atrophy
4. Prevent muscle shortening
5. Prevent joint contracture
6. Influence the pain control
7. Improve the mobility of the patient.
8. Improve the quality of life of the patient.
9. Improve the functional independence.

10. Educate about and participate in the care.

The overall aim for physiotherapy in palliative care is to help the patient reach the best possible quality of life for the rest of the patient’s life, to look after the physical as well as the psychological side for as long as possible. (5) Today, the involvement of physiotherapists in the field of oncology is diverse and includes specific roles which are evidence based and commonly applicable, including:

- Prevention – through whole body and target specific exercise and education programs.
- Acute and post acute care – postoperative cardiopulmonary intervention; return to physical function post surgery through targeted large muscle mass exercise programs; specific management for recovery of musculoskeletal and neuromotor function (e.g. Following mastectomy); biopsychosocial approaches to pain management.
- Acute institutional and community based rehabilitation-through simple measures. (E.g. Wheelchair retraining after spinal cord compression, gait re-training following neurological dysfunction)
- Palliative care - by utilizing all of the above applications and including other physiotherapy specific skills in symptom control management. (6)

**Methodology:**

The number of research interventions and publications examining the benefits of physical activity for patients in palliative care has been rising steadily. This study was completed by independently screening and reviewing the eighteen year studies that were published between the years 2001 to 2018 related to the role of physiotherapy during palliative care. Total 20 articles were selected in this review (Table 1.1). The databases and journals searched included Google Scholar, PUBMED, MEDLINE and PEDro. The articles reviewed included a variety of study designs, including retrospective chart reviews, observational studies, cohort study, feasibility studies, case studies, and randomized trials. Outcomes measures were parameters of physical capacity including aerobic fitness, strength and standard measures of physical function, pain, cancer related fatigue

and overall QOL. Most of the studies discussed the effects of exercise on physical function, cancer related fatigue, pain and all aspects of QOL. Studies reviewed consistently identified improvements in measures of aerobic capacity, strength, endurance, breathlessness and physical function for advanced cancer patients, with exercise interventions. Majority of studies have focused on the improvement in physical function and overall quality of life which has the direct relevance for participating in activities of daily living of the patients. Thus, improvement in physical function and maintenance of independence are the primary goals for providing exercise interventions. Studies support the role of physiotherapy in management of symptoms like pain by using TENS (Transcutaneous electric nerve stimulation) and reducing side effects of the cancer therapy. In this study, 4 studies have described the effects of exercise in reducing cancer related fatigue in cancer patients both during and after treatment of cancer. Recent reviews evaluating the value of exercise high-intensity strength training program seems to be an effective means to improve muscle strength, cardiopulmonary function, and for health related QOL for patients receiving cancer treatment. A study examines effects of a scheduled aerobic exercise and strength training intervention on cancer-related fatigue, physical fitness, and physical activity levels during adjuvant breast cancer chemotherapy. Exercise interventions also included gait training, balance training, coordination training, muscle strengthening, mobility training, massage and mindfulness techniques which are beneficial for the maintenance of normal physical function and QOL and to restore the physical capacity of the patient. Exercises in palliative care improve all aspects of the QOL of the patients and maintain well being of a person. Home based exercises and programs are also play an important role in rehabilitation of these patients. So, physiotherapy during palliative care plays a great role in maintaining physical, mental and social behaviour of a patient with life limiting illnesses. A multidimensional approach, palliative care, is the most effective method to achieve changes in clinical practice for end-of-life care.

**Table 1 Summary Table for Articles Included in this study**

Included articles	Design	Sample characteristics	Purpose	Intervention	Outcomes	Conclusion
Joan Ilobera etal. (2018) <sup>10</sup>	RCT	30 participants of palliative health care will be assigned.	To improve quality of life.	Appointment of palliative care leaders , identification of patients need	The proposed intervention introduces PC leaders to health care centers. PC leader is a part of the PC scientific and professional community	A multidimensional approach is the most effective method to achieve changes in clinical practice for end-of-life care(7)
Chang Hyun Lee etal. (2018) <sup>6</sup>		Advanced cancer patients were recruited and received evaluation for	To evaluate the compliance and satisfaction of	Investing compliance	Satisfaction and compliance	Patients with longer survival time showed better compliance.

		rehabilitation perspective	rehabilitation recommendation for advanced cancer in palliative care unit			(8)
Marin Golcic(2018) <sup>5</sup>	Retropective study	536 patients who performed physical exercise	Recent research support the benefit of physiotherapy in palliative care as majority of hospice patients is able to perform physical therapy.	Physical exercise program performed during palliative care	Aerobic capacity improved	Perform active exercise on initial physiotherapy session living on average 9 days longer than the habit.(9)
Anna Pyszona etal. (2017) <sup>5</sup>	RCT	30 patients with advanced stage of cancer receiving palliative care	Cancer related fatigue is common symptom in patients with advanced cancer sign decreased QOL	Physiotherapy programme involved Active exercises, Myofascial release, PNF to the intervention group	After 12 days, a significant decrease in fatigue scores (BFT) reduced severity of fatigue and drowsiness, patients in the therapy group rated their well-being higher.	Improvement in cancer related fatigue, this study suggests that physiotherapy is safe and effective method for the management of CRF.(10)
Darshpreet Kaur etal. (2016) <sup>4</sup>	Case report	40 year old female patient	To find out the effect of PT and its role to reduce the muscle fatigue, balance maintain and QOL	Training exercise and psychological support	Improve fatigue, balance, improve static posture control during vestibular challenges, head coordination	Palliative care approach has much to offer the people in advanced cancer.(11)
Karen Turner etal. (2016) <sup>4</sup>	Qualitative study	9 patients with advanced cancer	To find out the effect of physiotherapy on all the aspects of QOL	Effect of exercise program during palliative care on all the aspects of QOL	Positive effects on quality of life, physical improvement	The finding highlight that exercise in palliative care enhances many aspects of QOL of patients.(12)
Joachim Wiskeman n (2016) <sup>10</sup>	Randomized controlled trail	250 patients with confined NSCLC with stage 3a,3b,4	To evaluate the benefit of a 24 week exercise interventions palliative care	Combined resistance and endurance training in one group. in control group only telephonic conservation	Improve quality of life, physical performance, psychosocial and immunological parameters.	Group with exercise program shows benefit effect on the immune function caused by physical exercise. (13)
Kerry McGrillin etal.	Observational study	40 critically in patients with a palliative	To assess the physical performance	10 gym based exercise programme	Improvement in fatigue	Exercise program can improve

## Role and importance of Physiotherapy during Palliative Care in India: A Review

(2014) <sup>2</sup>		diagnosis	fatigue and QOL	including strengthening bilateral upper and lower limb and core.		physical function and well being and reduce fatigue among the patients. (14)
Ryuichi Sekine et al. (2014) <sup>7</sup>	Cohort study	199 patients were recruited	To clarify the changes in the functional status and QOL of patient with metastatic advanced cancer.	Patient received patient tailored rehabilitation therapy, focus on patient physical function.	Changes in functional status, improve in ADL and QOL of the patient	Terminally ill patients with cancer who receive rehabilitation program maintained their overall QOL despite an objective decline in physical function status. (15)
Anne Marie Lunde Husebø et al. (2014) <sup>5</sup>	RCT	Sixty-seven women were randomized to an exercise intervention group and a control group.	To investigate effects of a scheduled home-based exercise intervention in breast cancer patients during adjuvant chemotherapy , on cancer-related fatigue, physical fitness, and activity level.	Effects of home based exercises on cancer-related fatigue, physical fitness, and activity level.	Improvement in physical fitness and activity levels were found.	The findings suggest that generally recommended physical activity levels are enough to relief cancer-related fatigue and restore physical capacity in breast cancer patients (16)
Karen M. Mustian et al. (2013) <sup>5</sup>		Suggests the role exercises in reducing side effects of treatment in cancer patients.	To find out the role of exercise in reducing side effects like CRF, pain, sleep problems, etc, and improves QOL for cancer patients during treatment and recovery.	Exercise recommendations to reduce side effects during treatment.	Aerobic exercises like walking, running, cycling, and swimming, resistance training, and mindfulness are beneficial.	This study strongly indicates the benefits of aerobic exercises, resistance training and mindfulness based exercises in reducing side effects of cancer treatment in cancer patients.(17)

Michael I Bennett et al. (2010) <sup>6</sup>	RCT	Twenty four patients were randomized	To assess feasibility of TENS in cancer bone pain patients.	Eligible patients received active TENS and placebo effect for 1 hour at the site of pain, between a interval of 3days.	Outcomes measures were difference in active TENS and placebo effect.	This study suggests that TENS has a potential to decrease pain on movement more than pain on rest.(18)
Jennifer S. Temel et al. (2010) <sup>12</sup>	RCT	151 patients were randomized.	To examine the effects of early palliative care in early diagnosis metastatic non small cell lung cancer.	Participants completed baseline questionnaires before randomization. Follow-up assessments of quality of life and mood were performed at 12 weeks.	Quality of life and mood were assessed at baseline	Patients assigned to early palliative care had a better improvement in quality of life and mood than did patients assigned to standard care.(19)
Anna Pyszoro (2009) <sup>3</sup>	Case report	Total part -3 analyze the effect of physical activity during palliative care	To find out the gradual physical interventions and its benefit in the advanced support	Effect of physiotherapy treatment were seen during palliative care on all these 3 patients	Pain, restricted ROM , chest pt	This study reveals that Physiotherapy has a positive effect on end stage cancer patients and it helps to relieved death to the patient. (20)
Anne English Doue et al. (2008) <sup>1</sup>		Cancer patients under breathlessness are selected	Physiotherapy management of breathlessness	Breathlessness clinic was set up.	Benefits in breathlessness training	Most patients benefits from receiving breathlessness training. (21)
Ingrid C. De backer et al.(2007) <sup>6</sup>	Experimental training program	Fifty seven patients were completed the program.	The purpose of this study is to evaluate the effectiveness of an 18-week high-intensity strength training program in cancer survivors	The training program consisted of high-intensity strength and interval training for 18 weeks.	Outcome measures were changes in muscular strength (one-repetition maximum), cardiopulmonary function (VO2 max), maximal short exercise capacity (MSEC), body composition and health-related quality of life	It is concluded that high-intensity strength training program seems to be an effective means to improve muscle strength, cardiopulmonary function, and HRQOL.(22)

Samyra H.J. Keus et al. (2007) <sup>5</sup>	Evidence based literature	A systematic literature search yielded 6 systematic reviews and 23 randomized controlled trials	To find out the role of physiotherapy in Parkinson's disease.	Exercise recommendations for Parkinson patients to improve QOL.	(HRQOL) Outcomes measures were transfers, posture, reaching and grasping, balance, gait, and physical capacity.	Suggests the role of exercises in improving gait; cognitive movement strategies to improve transfers; exercises to improve balance; and training of joint mobility and muscle power to improve physical capacity.(23)
Line M. Oldervoll et al. (2006) <sup>6</sup>	Pilot study	Thirty four patients had participated.	To assess the effects of physical exercise program on physical performance and QOL.	50 min group exercise program twice a week in 6 weeks.	Outcomes measures were physical performance, fatigue and QOL.	Walk length increased, emotional functioning improves, physical fatigue reduced and improvement in overall wellbeing of incurable cancer patients.(24)
Julie Bernhardt et al. (2004)	Observational study	64 patients were recruited within 14 days after stroke.	The purpose of this study was to determine the physical activity patterns of stroke patients.	5 metropolitan stroke units and observed them for 2 consecutive days at 10-minute intervals	Outcomes measures were physical activity and location of physical activity and identify factors that might influence levels of physical activity.	Only 9 patients were restricted to bed. patients spent 50% resting in bed, 28% sitting out of bed, and only 13% engaged in activities.(25)
Dimeo et al (2001) <sup>1</sup>	Evidence based	Exercise effects on the patient's physical performance and CRF.	The purpose of this study is to describe the effects of exercise on cancer related fatigue and physical performance..	Evidence that physical exercise programs help prevents the manifestation and reduces the intensity of cancer-related fatigue.	Outcomes measures were CRF and physical performance.	Endurance exercise is a promising new approach to treating cancer-related fatigue.(26)

## II. DISCUSSION

The number of research interventions and publications examining the benefits of physical activity for patients in palliative care has been rising steadily. The results of this systematic review indicate that exercise as an intervention holds promise for preventing or delaying decline in aerobic fitness, strength, and physical function, pain, fatigue and may improve QOL for those whose life will be shortened by a

cancer. More than 100 million people across the world would benefit from hospital and palliative care annually. It is estimated that in India around 1 million people are diagnosed especially with cancer every year. Earlier palliative care was perceived as treatment, which was to lead to full recovery of patient but know palliative care purpose is to improve overall quality of life of the patient until death. One of the elements of multifaceted symptom management in palliative care is physiotherapy. The main aim of physiotherapy is to improve

quality of life by alleviating the symptoms and allowing optimising patient's level of physical function and taking into consideration the interplay between the physical, psychological, social, and vocational domains of function. The purpose of this study was to contribute a review to the current research involving physical therapy and end-of-life care in terms of its efficacy, its value, and how this value is perceived by patients and their caregivers in India. This was completed by analyzing the currently available literature on this topic from 2001 to 2018. These articles support physiotherapy during palliative care and hospice care settings and describe the impact of physiotherapy during palliative care in these settings. During the review a trend was identified between multiple studies in which several physical therapy interventions were commonly implemented. The most frequently discussed interventions included the strengthening/therapeutic exercises patient and family/caregiver education. In addition to these most frequently used interventions, other therapy techniques such as breathing techniques including the respiratory exercises, aerobic exercises, resistance training, range of motion exercises, endurance training, manual massage techniques, and bed mobility training were all mentioned in more than one study in this review. There is a growing awareness of the benefits of exercise for the patient with life limiting illnesses; exercise, including aerobic and resistance training, is recommended for the patients. For those with advanced disease, exercise has the potential to prevent or reverse functional decline, control symptoms, and help maintain independence. Physiotherapy found to have a positive influence on quality of life and perceived well being in a wide range of patient populations requiring palliative care such as cancer, HIV, neurological disorders, cardiopulmonary conditions and mental illnesses. The scope of physiotherapy practice is influenced by the ratio of qualified physiotherapists to the population. The number of physiotherapists per head of population in India is 1:212,000 (28). This often is an underestimated scope for a profession in a country with ever-growing demands for palliative care. This fact should give enough impetus to budding physical therapists to enter into the healing world of palliative care. The continuously growing numbers of in patients requiring palliative care in India necessitates professional involvement on the part of the physical therapists and mutual understanding from palliative care team members to bring about a policy change and to streamline implementation at ground-level. The home palliative care teams had a crucial role in providing a sense of being accompanied instead of being left alone in the difficult situation of dealing with an advanced life-limiting disease at home. It means that professional help was easily accessed and that they were visited at home. These findings further enhance the understanding for the need of these therapeutic treatments in caring for this patient population. Three barriers for palliative care was discussed by Meier *et al*, in 1997 (29) which in turn can be applicable towards the integration of physiotherapy into palliative care such as: professional knowledge and skills in palliative care among therapists and other team members; professional and public attitudes about the goals of physical

therapy; and financial and structural attributes of the health care industry. Research has shown that, for people with cancer (including advanced-stage cancer), exercise can decrease anxiety, stress, and depression while improving levels of pain, fatigue, shortness of breath, constipation, and insomnia. People diagnosed with cancer should discuss with their oncologist safe, easy ways they can incorporate exercise into their daily lives.(27) Exercise interventions can support independence, prevent further health complications, and provide a means to help patients "live well" for as long as possible.

### III. CONCLUSION

This article review supports the importance of physiotherapy during palliative care. Studies included in this review are investigating the effects of physical exercise in the palliative care setting. Research has focused on the impact of physical activity either prior to or early in the disease diagnosis and during treatment. Exercise interventions improve physical independence and symptom management to prevent further health complications of the diseases. Seeking the advice and care of a physiotherapist where there are obvious indications for physiotherapy effectively utilizes the breadth of knowledge and experience available in health care practice today for the ultimate benefit of 'palliative patients'.(6) Physiotherapy in palliative care contributes positively to facility/team based, as well as community based and sole practitioner care environs.

#### **Future studies are warranted on the following aspects:**

Further studies are needed to assess knowledge, attitudes, beliefs and experiences toward palliative care among physiotherapists. Evolution of a palliative care training program for the physiotherapists should be considered. There should be qualitative research on experiences of palliative care team members with physiotherapists. Further studies can be done to differentiate the Influence of physiotherapy on patient and caregiver perceptions and quality of life in different palliative care conditions.

### REFERENCES

- [1] G National cancer control programs: policies and managerial guidelines, 2nd ed Geneva. World Health Organisation 2002. Svensk översättning: Kenne-Sarenmalm E, Fürst CJ, Strang P, Ternstedt BM.
- [2] Kaasa S (red). Palliativ behandling och vård. Studentlitteratur 2001. Physiotherapy in palliative care a clinical handbook Ulla Frymark, Lillian Hallgren, AnnCharlotte Reisberg, 33
- [3] Doyle D, Hanks G, Cherny N, Calman K. Oxford textbook of palliative medicine. Third edition 2004.
- [4] Bruera E, Higginson I, Ripamonti C, von Gunten C. Textbook of palliative medicine, Oxford university press in USA 2006.
- [5]
- [6] Palliativ vård relaterat till tumörsjukdo men personal handbok Skåne sept 07. [www.stockholmsjukhem.se/spn](http://www.stockholmsjukhem.se/spn)
- [7]
- [8] Laakso L. The role of physiotherapy in palliative care. Australian family physician. 2006 Oct 1;35(10):781.not included6
- [9] Llobera J, Sansó N, Ruiz A, Llagostera M, Serratusell E, Serrano C, Roselló ML, Benito E, Castaño EJ, Leiva A. Strengthening primary health care teams with palliative care leaders: protocol for a cluster randomized clinical trial. BMC palliative care. 2018 Dec;17(1):4.
- [10] Lee CH, Kim JK, Jun HJ, Lee DJ, Namkoong W, Oh JH. Rehabilitation of Advanced Cancer Patients in Palliative Care Unit. Annals of rehabilitation medicine. 2018 Feb 1;42(1):166-74.

- [11] Golčić M, Dobrila-Dintinjana R, Golčić G, Gović-Golčić L, Čubranić A. Physical Exercise: An Evaluation of a New Clinical Biomarker of Survival in Hospice Patients. *American Journal of Hospice and Palliative Medicine*. 2018 Apr 26;1049909118772566.
- [12] Pyszora A, Budzyński J, Wójcik A, Prokop A, Krajnik M. Physiotherapy programme reduces fatigue in patients with advanced cancer receiving palliative care: randomized controlled trial. *Supportive Care in Cancer*. 2017 Sep 1;25(9):2899-908.
- [13] Kaur D, Kumar G, Billore N, Singh AK. Defining the role of physiotherapy in palliative care in multiple sclerosis. *Indian journal of palliative care*. 2016 Apr;22(2):176.
- [14] Turner K, Tookman A, Bristowe K, Maddocks M. 'I am actually doing something to keep well. That feels really good': Experiences of exercise within hospice care. *Progress in palliative care*. 2016 Jul 3;24(4):204-12.
- [15] Wiskemann J, Hummler S, Diepold C, Keil M, Abel U, Steindorf K, Beckhove P, Ulrich CM, Steins M, Thomas M. POSITIVE study: physical exercise program in non-operable lung cancer patients undergoing palliative treatment. *BMC cancer*. 2016 Dec;16(1):499.
- [16] McGrillen K, McCorry NK. A physical exercise programme for palliative care patients in a clinical setting: Observations and preliminary findings. *Progress in Palliative Care*. 2014 Dec 1;22(6):352-7.
- [17] Sekine R, Ogata M, Uchiyama I, Miyakoshi K, Uruma M, Miyashita M, Morita T. Changes in and associations among functional status and perceived quality of life of patients with metastatic/locally advanced cancer receiving rehabilitation for general disability. *American Journal of Hospice and Palliative Medicine*. 2015 Nov;32(7):695-702.
- [18] Husebø AM, Dyrstad SM, Mjaaland I, Søreide JA, Bru E. Effects of scheduled exercise on cancer-related fatigue in women with early breast cancer. *The Scientific World Journal*. 2014;2014.
- [19] Mustian KM, Sprod LK, Janelsins M, Peppone LJ, Mohile S. Exercise recommendations for cancer-related fatigue, cognitive impairment, sleep problems, depression, pain, anxiety, and physical dysfunction: a review. *Oncology & hematology review*. 2012;8(2):81.
- [20] Bennett MI, Johnson MI, Brown SR, Radford H, Brown JM, Searle RD. Feasibility study of transcutaneous electrical nerve stimulation (TENS) for cancer bone pain. *The Journal of Pain*. 2010 Apr 1;11(4):351-9.
- [21] Temel JS, Greer JA, Muzikansky A, Gallagher ER, Admane S, Jackson VA, Dahlin CM, Blinderman CD, Jacobsen J, Pirl WF, Billings JA. Early palliative care for patients with metastatic non-small-cell lung cancer. *New England Journal of Medicine*. 2010 Aug 19;363(8):733-42.
- [22] Pyszora A, Graczyk M, Krajnik M. What is the role of a physiotherapist in palliative care? Cases report. *Advances in Palliative Medicine*. 2009;8(1):31-4.
- [23] English A. Physiotherapy management of breathlessness in palliative care. *Advances in Palliative Medicine*. 2008;7(2):43-6.
- [24] De Backer IC, Van Breda E, Vreugdenhil A, Nijziel MR, Kester AD, Schep G. High-intensity strength training improves quality of life in cancer survivors. *Acta Oncologica*. 2007 Jan 1;46(8):1143-51.
- [25] Keus SH, Bloem BR, Hendriks EJ, Bredero-Cohen AB, Munneke M, Practice Recommendations Development Group. Evidence-based analysis of physical therapy in Parkinson's disease with recommendations for practice and research. *Movement disorders*. 2007 Mar 15;22(4):451-60.
- [26] Oldervoll LM, Loge JH, Paltiel H, Asp MB, Vidvei U, Wiken AN, Hjermsstad MJ, Kaasa S. The effect of a physical exercise program in palliative care: a phase II study. *Journal of pain and symptom management*. 2006 May 1;31(5):421-30.
- [27] Bernhardt J, Dewey H, Thrift A, Donnan G. Inactive and alone: physical activity within the first 14 days of acute stroke unit care. *Stroke*. 2004 Apr 1;35(4):1005-9.
- [28] Dimeo FC. Effects of exercise on cancer-related fatigue. *Cancer: Interdisciplinary International Journal of the American Cancer Society*. 2001 Sep 15;92(S6):1689-93.
- [29] Albrecht TA, Taylor AG. Physical activity in patients with advanced-stage cancer: a systematic review of the literature. *Clinical journal of oncology nursing*. 2012 Jun 1;16(3):293.
- [30] Higgs J, Refshauge K, Ellis E. Portrait of the physiotherapy profession. *J Interprof Care*. 2001;15:79-89.
- [31] Meier DE, Morrison RS, Cassel CK. Improving palliative care. *Ann Intern Med*. 1997;127:225-30.