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## RESEARCH ARTICLE

# EFFECTIVENESS OF MODERATE WALKING EXERCISE PROGRAM (MWEP) ON FATIGUE AND QUALITY OF SLEEP AMONG CANCER PATIENTS RECEIVING CHEMO-RADIATION

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**ABSTRACT**

**Introduction:** Fatigue and poor sleep is highly prevalent in cancer patients receiving chemo-radiation and it has a significant impact on patient's quality of life. In literature, exercise has been recognized as one of the most effective intervention to combat against these commonest symptoms either related to cancer or its therapy. **Aim:** Keeping the importance of exercise during cancer therapy in mind, study is aimed to assess the effectiveness of 'moderate walking exercise program (MWEP)' on fatigue and quality of sleep among cancer patients receiving chemo-radiation in a tertiary care hospital of Punjab, India. **Material and Method:** A quasi-experimental, two group pre-test post-test control group design was adopted to collect the data from 60 conveniently selected eligible adult cancer patients who were receiving chemo-radiation in selected study setting. Ludwig Von Bertalanffy General System Model (1968) was adopted to guide the study. Data were collected using socio-demographic profile sheet, BFI (Brief Fatigue Inventory) and VSH (VerranSynydern and Halpern) Sleep Scale. **Result:** Study revealed that the fatigue scores of cancer patients significantly lowered ($p \leq 0.05$) following the intervention of MWEP on 15th day of the chemo-radiation. MWEP also found to improve sleep quality on 15th day during chemo-radiation ($p \leq 0.05$). **Conclusion:** Study concludes that the moderate walking exercise program is very effective as an intervention to reduce fatigue and improve quality of sleep and should be followed by cancer patients receiving combined chemotherapy and radiation therapy treatment. **Recommendations:** MWEP should be followed by cancer patients to manage fatigue and decreased quality of sleep. Nurses should be highly involved in oncology wards for encouraging the patients to sustain MWEP in order to improve quality of life.



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## INTRODUCTION

Cancers figure among the leading causes of morbidity and mortality worldwide, with approximately 14 million new cases and 8.2 million cancer related deaths in 2012 worldwide. As the incidence of cancer rises and as physicians treat it more aggressively, more patients will experience complications of cancer or of its therapy (Stewart and Wild, 2014). Treatments for cancer often include surgery, chemotherapy, radiation therapy, hormone therapy and/or a combination of these modalities. These treatments lead to a myriad of physical and psychological side effects which subsequently interfere with a cancer patient's ability to complete treatments as prescribed, function independently, perform activities of daily living, and live with a high Quality of life. Among the most onerous side effects stemming from cancer and its treatments are cancer-related fatigue, cognitive impairment, sleep problems, depression, pain, anxiety, and physical dysfunction including impaired muscular function, reduced cardiopulmonary function, and decreased bone mineral density. Of all of the symptoms related to cancer and its treatment, fatigue and sleep disturbance are two of the most frequent side effects experienced by patients with cancer. Cancer-related fatigue (CRF) is an extreme tiredness that contributes to morbidity and mortality due to resulting inactivity. Although sleep disruption is common in these patients, it has been a neglected problem and between thirty and fifty percent of cancer patients report sleep disruption (King *et al.,* 1997). Such sleep disturbance may be related to psychiatric disorders such as depression and anxiety (Mock *et al.,* 2003). However, regardless of cause, sleep disturbance is often unrecognized or poorly managed (Mock *et al.,* 1997). Exercise studies with cancer patients have reported positive effects of exercise on mood, chemotherapy side effect severity, weight gain, functional ability, and quality of life and has been recognized as one of the most effective interventions for decreasing cancer-related fatigue (Pi Hua Chang *et al.,* 2008) and may improve sleep quality through the regulation of pro-inflammatory cytokines (Joseph *et al.,* 1983). Physical exercise of moderate intensity may have a positive

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influence on sleep quality through altered plasma concentrations of mediators of sleep (Joseph, 1983). Walking has been found to effectively improve a person's physical function, decreased fatigue, and improved emotional status (Winningham *et al.,* 1994). However, most studies on walking used a treadmill for training (Vassilopoulou, 1994), for most hospitals, a treadmill is not a standard equipment and it is not available to most hospitalized patients. A culturally acceptable and easily applied program, such as walking is urgently needed to decrease the chemotherapy-related side-effects. So, under the light of above mentioned facts and figures, the present interventional study arises is aimed to determine the effectiveness of the moderate walking exercise program on cancer-related fatigue and diminished quality of sleep among cancer patients receiving chemoradiation.

## MATERIALS AND METHODS

A Quasi-experimental approach having two group pre and post-test design with multiple points of data collection was used to assess the effectiveness of moderate walking exercise program (MWEP) on fatigue and quality of sleep among cancer patients receiving chemoradiation (concurrent chemotherapy) at a medical college hospital of punjab, India. A total sixty adult cancer patients (>18 years of age), receiving first day of the radiation therapy (in current chemoradiation treatment plan) and those willing to participate were selected by convenient sampling method. Patients who were not able to do a moderate walk due to debilitating conditions, were not able to cooperate due to any physical or mental condition or were receiving sedatives for the treatment of sleep disturbance under physician's prescription were excluded from the study. Eligible cancer patients were identified using screening sheets and data were collected in two steps (in first step data were collected from subjects in control group and in second step data were collected from subjects in experimental group) using following assessment tools:

**Tool 1: Socio- demographic Profile sheet**

It is used to measure socio-demographic and clinical details of the cancer patients. It consists of seven items such as age, gender, religion, marital status, residence, education, occupation, monthly family income, type of family, lifestyle pattern, exercise pattern, site of cancer, staging of cancer, duration of cancer diagnosis, any other chronic illness present, intake of stimulant before bed-time during the last week and use of any sleep-inducing drugs. The time taken to complete the tool was 4-5 minutes.

**Tool 2: Brief Fatigue Inventory (BFI)**

It is a standardized tool developed by the Anderson centre of cancer research. This tool includes 9 items inquiring about the scores of fatigue in the past 24 hours (3 items) and its interference with daily life (6 items). A higher score indicates more severe fatigue. It is 0-10 point numeric rating scale with 0 being no fatigue‖ and 10 being "fatigue as bad as you can imagine" Three items assess the amount of fatigue which interferes with the different aspects of patient's life in the last 24 hours. The interference (Six) items include general activity, mood, walking ability, normal work, relations with other people and life enjoyment. The score refers to the total score on fatigue items in BFI standardized scale by cancer patients. Each item on scale has been allotted score of 10 mark, maximum marks 90 and minimum mark 0. The time taken to complete the tool 2 was 3-4 minutes. The tool is highly reliable as it has been reported to have an internal consistency of 0.96 (Chronbach's coefficient alpha) (Minton and Stone, 2008).

**Tool 3: VSH (Verran and Snyder–Halpern) Sleep scale**

It is a standardized scale developed by Snyder-Halpern and Verran to evaluate the quality of sleep of the cancer patients. The scale has 15 items regarding sleep which has been divided into three sub-categories i.e. non disturbed sleep of the previous night, effectiveness of the sleep and compensatory sleep during the day. It uses a 10cm horizontal visual analog scale to obtain a 0 to 100 point score as the response to each item. Each item on scale has been allotted score of hundred mark, maximum marks 100 and minimum mark 0 for each item. The time taken to complete the tool 3 was four to five minutes. The scale evidenced theta reliabilities of 0.87 and 0.86 for Disturbance and 0.75 and0 0.69 for Effectiveness. Reliabilities for the Supplementation scale were inconsistent across the groups.

**Content Validity:** The content validity of the tool no. 1 i.e. the socio-demographic profile was determined by the six experts from nursing and from medical profession. The content language appropriateness, clarity and relevance were ascertained by the language expert.

**Reliability:** The reliability of the tool no. 1 i.e. the socio-demographic profile was calculated with the help of test-retest method and was found to be 0.84 and was found to be significantly reliable. The reliability of the tool no. 2 i.e.- BFI (Brief Fatigue Inventory) was calculated for the present study by the investigator and was found out to be 0.86 on the basis of split-half method and was found to be significantly reliable. The reliability of the tool no. 3 i.e.- VSH (Verran and Snydern Halpern) sleep scale was calculated for the present study by the investigator and was found out to be 0.78 on the basis of split-half method and was found to be significantly reliable.

**Tool Translation:** The translation in Punjabi language and back translation in English of all the tools was done by the Punjabi and English language experts to ensure the consistency of the content of the tool. The study protocol was approved by institutional ethical committee and required administrative approval was taken from the concerned university and hospital authorities. A written informed consent was obtained from all the patients before enrolment in the study. The tryout of all three scales was done on 10 subjects to confirm the understandability of the tools to the respondents and to note the time taken by a single respondent to complete the questionnaires. Data were first collected from the participants in control group. Pre- test was done at day 1 and post-test data was collected at day 15$^{th}$ of radiation therapy under current chemoradiation treatment plan. After completion of Post-test for all the participants in control group, participants were enrolled in experimental group to prevent the contamination of the subjects. Data collection was done in experimental group in the manner same as the control group except that participants in experimental group undergone MWEP in addition to conventional care whereas participants in control group received only conventional care. Punjabi version of all three assessment tools was used to collect the data. participant information sheet was read aloud, any queries were sorted out and written informed consent was taken from all the

participants in both the groups. Privacy and confidentiality of participants is maintained and data is used only for research purpose. Appropriate descriptive and inferential statistics were used to analyze data through SPSS (21) software. p value <0.05 was considered as level of significance.

**Intervention of MWEP:** Moderate walking exercise program (MWEP) comprised of a planned intervention which included a thirty minutes walk for three days per week for a total of two weeks duration. Demonstration of the intervention was given to the subject and the redemonstration was taken immediately from the subject while alongside assessing the walking ability of the subject. For the intervention, a lawn adjacent to the emergency department of the hospital with greenery was preferred over any other area as this put in extra benefits of natural surroundings on the subjects. The length of the lawn was two hundred metres and an average total distance of 2 to 2.5 kilometers was walked by the subjects depending on their ability during the thirty minutes of the intervention which completed the requirement for the MWEP.

## RESULTS

**Baseline Comparison:** Table 1 presents baseline comparison of socio-demographic profile and Table 2 presents baseline comparison of clinical profile of cancer patients between control and experimental groups. As shown in table 1 and table 2, both the group were found to be homogenous with regards to all of these socio-demographic and clinical profile variables as reflected by values of chi-square test and p values. Table 3 presents comparison of mean fatigue score and mean quality of sleep score in experimental and control group at baseline (on day 1 of chemoradiation). As depicted in table 3 by t-test values and p-values, there was no significant difference between experimental and control group with regards to fatigue and sleep quality (effective sleep and non-disturbed sleep) at day 1 of chemoradiation and both experimental and control groups were found to be homogenous with regards to fatigue scores, non-disturbed sleep and effective sleep but compensatory sleep was found significantly high in subjects of experimental group at baseline. The compensatory sleep was significantly more in experimental group subjects which reflect subjects in experimental groups were already having poor quality of sleep at the beginning of study.

**Effectiveness of Moderate Walking Exercise Program (MWEP) on fatigue and quality of sleep among cancer patients receiving chemoradiation:** Table 4 depicts that there was a significant difference in fatigue score (t=10.22, p=<0.001) between experimental and control group on fifteenth day. Hence it can be concluded that moderate walking exercise program is effective in reducing fatigue in experimental group on fifteenth day as compared to control group. Similarly, there was a significant difference in sleep (non-disturbed, effective and compensatory sleep) scores between experimental and control group on fifteenth day of moderate walking exercise. Hence, it can be concluded that moderate walking exercise program is effective in improving quality of sleep in experimental group on fifteenth day as compared to control group.

## DISCUSSION

The present study revealed that all (100%) subjects had some level of fatigue. These findings are supported by Ahlberg *et al.* (2003) and Marrow *et al.* (2007) who concluded that 70% to 100% cancer patients experience fatigue. Furthermore one study by Radbruch *et al.* (2008) also enumerated that fatigue is one of the most frequent symptom and is presenting 99% cancer patients receiving radio-chemotherapy.

**Table 1. Baseline comparison of socio-demographic profile of cancer patients between experimental and control group (N=60)**

| Socio-demographic variables of cancer patients | | Group | | $\chi^2$/ t-test | p value |
|---|---|---|---|---|---|
| | | 'Control' (n=30) *f* (%) | 'Experimental' (n=30) *f* (%) | | |
| **Age** | 20-40 years | 1 (3.3) | 0 (0) | 6.012 | 0.198 |
| | 41-60 years | 22 (73.3) | 23 (76.6) | | |
| | 61-80 years | 7 (23.3) | 7 (23.3) | | |
| **Gender** | Male | 12(40%) | 13(43.3%) | 0.793 | 0.069 |
| | Female | 18(60) | 17(56.7%) | | |
| **Marital status** | Married | 23 (76.6) | 21(70%) | 3.506 | 0.320 |
| | Unmarried | 3(10%) | 3(10%) | | |
| | Widow/widower | 1(3.35) | 3(10%) | | |
| | Separated/Divorced | 2(6.7%) | 3(10%) | | |
| **Religion** | Sikh | 17(56.6%) | 18(60%) | 0.930 | 0.448 |
| | Hindu | 6(20%) | 7 (23.3) | | |
| | Christian | 4(13.3%) | 3(10%) | | |
| | Muslim | 3(10%) | 2(6.6%) | | |
| **Occupation** | Unemployed / retired | 3(10%) | 2(6.7%) | 4.514 | 0.478 |
| | Professional | 2(6.7%) | 1(3.3%) | | |
| | Self employed | 2 (6.7%) | 2 (6.7%) | | |
| | Homemaker | 18(60%) | 17(56.7%) | | |
| | Student | 13(5.8) | 11(4.9) | | |
| | Agriculture | 2 (6.7%) | 6 (20%) | | |
| **Monthly Family Income (INR)** | Upto 20,000 | 12(40%) | 10(33%) | 3.447 | 0.328 |
| | 21000-30000 | 14(46.6%) | 12(40%) | | |
| | 31000-40000 | 2(6.7%) | 5(16.6%) | | |
| | >40000 | 2(6.7%) | 3 (10%) | | |
| **Type of family** | Nuclear | 22(73.3%) | 19(63.3%) | 1.675 | 0.433 |
| | Joint | 4(13.3%) | 6(20%) | | |
| | Extended | 4(13.3%) | 5(16.6%) | | |
| **Residence** | Rural | 14(46.6%) | 14(46.6%) | 0.667 | 0.717 |
| | Urban | 13(43.3%) | 11(36.7%) | | |
| | Semi-urban | 3(10%) | 5(16.7%) | | |

**Table 2. Baseline comparison clinical profile of cancer patients between experimental and control group (N=60)**

| Clinical variables of cancer patients | | Group | | $\chi^2$/ t-test | p value |
|---|---|---|---|---|---|
| | | 'Control' (n=30) *f* (%) | 'Experimental' (n=30) *f* (%) | | |
| **Lifestyle pattern** | Fully active | 13 (43.3%) | 16 (53.3%) | 1.710 | 0.635 |
| | Restricted but ambulatory | 10 (33.3%) | 10 (33.3%) | | |
| | Ambulatory but capable of self care | 6 (20.0%) | 4(13.3%) | | |
| | Capable of limited self-care | 1 (3.3%) | 0 (0%) | | |
| | Completely disabled due to disease | 0 (0%) | 0 (0%) | | |
| **Exercise pattern** | No exercise | 18(60%) | 21(70%) | 2.204 | 0.332 |
| | Upto 20 mins of walk | 7 (36.7%) | 6 (20 %) | | |
| | Yoga | 5 (16.7%) | 3 (10%) | | |
| | Any others (specify) | 0 (0%) | 0 (0%) | | |
| **Type of cancer** | Head and neck cancers | 17 (56.6%) | 15 (50%) | 0.840 | 0.645 |
| | Cancer of cervix | 6 (20 %) | 7 (23.3%) | | |
| | Other reproductive cancers | 3(10%) | 2(6.7%) | | |
| | Others | 4(13.3%) | 6 (20 %) | | |
| **Staging of cancer** | Stage –I | 4(13.3%) | 7 (23.3%) | 4.849 | 0.183 |
| | Stage –II | 13(43.3%) | 14 (46.7%) | | |
| | Stage –III | 11 (36.7%) | 9 (30%) | | |
| | Stage –IV | 2(6.6%) | 0 (0%) | | |
| **Duration since cancer diagnosed initially** | <1year | 25 (83.3%) | 23 (76.7%) | 3.194 | 0.202 |
| | 1-5year | 5 (16.7%) | 4 (13.3%) | | |
| | 6-10years | 0 (0%) | 3 (10%) | | |
| | 10 years and above | 0 (0%) | 0 (0%) | | |
| **Any other chronic illness present? :** | None | 20(66.7%) | 21(70%) | 2.224 | 0.695 |
| | Diabetes Mellitus | 6(20%) | 6(20%) | | |
| | Hypertension | 2 (6.7%) | 3(10%) | | |
| | Renal Problems | 0 (0%) | 0(0%) | | |
| | Psychological problems | 1(1.3%) | 0(0%) | | |
| | Any other | 1(1.3%) | 0(0%) | | |
| **Taking any OTC drugs for falling asleep:** | None | (56.6%) | 18(60%) | 3.447 | 0.328 |
| | Alparax | 12 (40%) | 11(36.7%) | | |
| | Lozex | 1(3.3%) | 1(3.3%) | | |
| | Any other | 0(0%) | 0(0%) | | |
| **Intake of stimulants:** | Never | 15(50%) | 20(66.7%) | 0.000 | 1.00 |
| **(before bedtime during the last week)** | Sometimes | 11(36.7%) | 7(23.3%) | | |
| | Most of times | 4(13.3%) | 3(10%) | | |
| | Everytime | 0(0%) | 0(0%) | | |

**Table 3. Comparison of mean fatigue and mean quality of sleep in experimental and control group at baseline (on day 1 of chemoradiation)**

| Outcome variables | Group | | Independent t-test | p value |
|---|---|---|---|---|
| | 'Control' (n=30) Mean (SD) | 'Experimental' (n=30) Mean (SD) | | |
| Fatigue | 62.60±12.40 | 61.80±14.29 | 0.231 | 0.818NS |
| Non-disturbed sleep | 532.00±55.60 | 535.33±53.73 | -0.236 | 0.814NS |
| Effective sleep | 123.67±19.91 | 124.33 ±18.51 | -0.134 | 0.894NS |
| Compensatory sleep | 42±10.85 | 50±11.04 | -2.262 | 0.027* |

Significant at p value <0.05

**Table 4. Comparison of mean fatigue score and mean quality of sleep score at post test (on day fifteenth) of chemoradiation between experimental and control group**

| Outcome variables | Control (n=30) Mean (SD) | Experimental (n=30) Mean (SD) | t-test | p value |
|---|---|---|---|---|
| Fatigue | 71.67±13.1 | 37.43±12.83 | 10.221 | <0.001 |
| Non-disturbed sleep | 471.67±54.65 | 570.00±58.31 | -6.739 | <0.001 |
| Effective sleep | 97.00±22.76 | 169.33±38.23 | -8.904 | <0.001 |
| Compensatory sleep | 67.00±15.79 | 49.67± 14.73 | 4.396 | <0.001 |

***Significant at p value <0.001

The present study showed that all study subjects had some level of insomnia. This finding is supported by Theoblad *et al.* (2004) who proved that insomnia is common among cancer patients and approximately present in 50% to70% of cancer population and Stockler and O'Connel 2007. The findings of the present study revealed that moderate walking exercise program was effective to reduce fatigue and improve the quality of sleep. The present study also revealed that the moderate walking exercise program is one of the most convenient methods for lowering cancer related fatigue. This was demonstrated by Windsor *et al.* (2004) that men with prostate cancer who followed advice to rest and take things easy if they became fatigued, demonstrated a slight deterioration in physical functioning and a significant increase in fatigue at the end of radiotherapy. Also, this was revealed by Yeun *et al.* (2007) who found that resistance exercises to be a viable strategy for improving functional capacity in breast cancer survivors, while aerobic exercises such as walking may be more effective in attenuating cancer-related fatigue. These finding are also supported by Mock *et al.* (2001) that by using a home-based moderate walking intervention and concluded that amongst breast cancer women on adjuvant CT and RT, the home-based moderate walking exercise intervention had significant effects on physical functioning, quality of life and

emotional distress in these subjects. In the present study it was reiterated that the moderate walking exercise program has a positive effect on the sleep quality in the cancer patients receiving treatments. This was supported by Tang *et al.* (2010) who a home-based walking exercise intervention for 8 weeks. Patients in the exercise group reported significant improvements in sleep quality and the mental health dimension of quality of life ($p < 0.01$).

**Conclusion**

Study concluded that moderate walking exercise programme is highly effective to reduce fatigue and improve quality of sleep in experimental group among cancer patient receiving chemotherapy. Study recommends that moderate walking exercise programme is very highly effective in reducing fatigue and improving quality of sleep among cancer patients receiving chemotherapy, so more nurses should be made aware of this intervention in oncology ward to provide intervention of moderate walking exercise programme. Moderate walking exercise programme should be added as non-pharmaceutical intervention to manage fatigue and quality of sleep among cancer patients receiving chemotherapy and radiation therapy. The findings reported highlight the need for further research focusing on the long-term effectiveness of moderate walking exercise program on fatigue and quality of sleep. Large scale studies should be conducted in consideration of other contributing variables for fatigue and quality of sleep. Despite the conscious effort to maintain rigor during study, some research limitations need to be mentioned. First, the data were collected through self report method and researcher had to trust on the response of participants. One study setting was taken and the effect of moderate walking exercise programme was assessed only for two weeks duration that doesn't cover the longitudinal effect of the intervention. This can limit the generalizability of the findings to a larger population in variety of settings

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## REFERENCES

Ahlberg K, Ekman T, Johansson FG. 2003. Review Assessment and management of cancer-related fatigue. *The Lancet,* 362(9) 640–650.

Joseph CD. 1983. Psychological supportive therapy for cancer patients. *Indian Journal of Cancer,* 20(4):268–70.

King AC, Oman RF, Brassington GS, Bliwise DL, Haskell WL. 1997. Moderate-intensity exercise and self-rated quality of sleep in older adults: A randomized controlled trial. *Journal of American Medical Association,* 6(10)277:32–37.

Lukas Radbruch, 2008. Fatigue in palliative care patients — an EAPC approach. *Sage journals,* 22(1): 13-32.

Minton O. and Stone P. 2008. A systematic review of the scales used for the measurement of cancer-related fatigue (CRF). *Annals of Oncology review,* 4(6):550-590.

Mock V, Dow KH, Meares CJ. 1997. Effects of exercise on fatigue, physical functioning, and emotional distress during radiation therapy for breast cancer. Oncology Nursing Forum, 24(3):991–1000.

Mock V, *et al.* Cancer-related fatigue clinical practice guidelines in oncology. *Journal of National Comprehensive Cancer Network,* 2003; 1(2):308–331.

Mock V, Pickett M. 2001. Fatigue and Quality of Life Outcomes of Exercise During Cancer Treatment. *Cancer*, 9(3):119–127.

Pi Hua Chang, *et al.* 2008. Effect of a walking intervention on Fatigue-Related Experiences of Hospitalized Acute Myelogenous Leukemia patients undergoing Chemotherapy: A Randomized Control Trial. *Cancer*, 11(5):524-534.

Pierrea PJ, Morrowa GR. 2007. Fatigue: The Scale of the Problem. The oncologist, 12 (1): 4-10.

Stewart BW. and Wild CP. 2014. World Cancer Report (Coutesy: WHO). The Health Well, (http://tinyurl.com/p8x23zk).

Stockler MR, O'Connel R. 2007. Effect of sertraline on symptoms and survival in patients with advanced cancer, but without major depression: a placebo-controlled double-blind randomised trial. Springer, 8(7):603-612.

Tang MF, Liou TH, Lin CC. 2010. Improving sleep quality for cancer patients: benefits of a home-based exercise intervention. *Supportive Care in Cancer,* 18(10):1329-1339.

Theobald DE. 2004. Insomnia in Cancer Patients Cancer pain, fatigue, distress, and insomnia in cancer patients. *The Lancet Oncology,* 6(1):S15–S21.

Vassilopoulou SR. 1994. Endocrine effects of cytokines. Oncology (Williston Park), 810(6):43–46. 49–50.

Windsor PM. 2004. Randomized, controlled trial of aerobic exercise for treatment-related fatigue in men receiving radical external beam radiotherapy for localized prostate carcinoma. *Cancer Journal,* 101(3)550–557.

Winningham ML., Nail IM. Burke, *et al.* 1994. Fatigue and the cancer experience; state of the knowledge, *Oncol Nurse Forum*, 21 (1):23-36.

Yuen, Keung H. Home-based Exercise to Alleviate Fatigue and Improve Functional Capacity among Breast Cancer Survivors. Journal of Allied Health. 2007;36(4):257E-275E(19).

http://www.cancer.gov/cancertopics/pdq/supportivecare/fatigue/Patient/page2 (retrieved on 15th may 2015).

http://www.cancer.org/treatment/treatmentsandsideeffects/physicalsideeffects/fatigue/feeling-tired-vs-cancer-related-fatigue (retrieved on 10th may, 2015).

http://www.cancer.org/treatment/treatmentsandsideeffects/physicalsideeffects/fatigue/feeling-tired-vs-cancer-related-fatigue (retrieved on 10th may, 2015).

http://www.oncolink.org/resources/article.cfm?id=1048 (retrieved on 2nd may 2015)

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