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Original Research Article

EFFECT OF PROPRIOCEPTIVE TRAINING ON BALANCE IN CANCER PATIENTS WITH CHEMOTHERAPY INDUCED PERIPHERAL NEUROPATHY

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ABSTRACT

Background: In Cancer patients as there is rising prevalence of chemotherapy-induced peripheral neuropathy (CIPN) have sensory and motor deficits which lead to inappropriate proprioceptive feedback, risk of fall and impaired postural control.

Aim and Objectives: To find effect of proprioceptive training on balance in cancer patients with chemotherapy induced peripheral neuropathy.

Methodology: 45 participants were selected between the age 41-60 years (mean age 54.03) and informed consent was taken. Pre-intervention BBS, mTNS, and FRT score were calculated. Total 15 sessions of proprioceptive training for 3 weeks was given in which Single limb stance, lunges and base of support exercises. BBS, mTNS and FRT were noted post-treatment.

Results: BBS difference for pre-treatment is 37.13 and post is 43.8(p value<0.0001), mTNS difference for pre-treatment is 14.33 and post is 11.13 (p value<0.0001) and FRT difference for pre-treatment is 10.9 and post is 13(p Value<0.0001).

Conclusion: In this study we concluded that there is significant effect of proprioceptive training on balance in chemotherapy induced peripheral neuropathy.

KEY WORDS: Proprioception, Balance, Cancer, Chemotherapy, Peripheral Neuropathy.

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INTRODUCTION

Cancer is a term which is used to describe more than 100 different diseases having common characteristic of the uncontrolled malignant cell growth. The word 'cancer' means crab, which is reflecting its true character of cancer since 'it sticks to the part stubbornly like a crab [1].

Some of the chemotherapy and other drugs which are used to treat cancer can damage peripheral nerves. This is known as chemotherapy-induced peripheral neuropathy (CIPN). This is a disabling side effect of cancer treatment.

As there is rising prevalence of cancer, many individuals are living with the side effects of cancer and its treatment. One of the possible side effects is chemotherapy-induced peripheral neuropathy (CIPN) [2].

Cancer patients with chemotherapy-induced peripheral neuropathy (CIPN) have sensory and motor deficits leading to inappropriate proprioceptive feedback, impaired postural control and fall risk.

Chemotherapy-induced peripheral neuropathy (CIPN) is the commonest neurological and clinically relevant side effect due to many commonly used chemotherapeutic agents. Moreover, little effort has been done to investigate the potentially beneficial effects of specific exercises to counteract the CIPN symptoms.

A large group of disorders of heterogeneous origin which can manifest themselves with sensory or motor deficits depend on the predominantly affected nerve fiber modality which is encompassed by peripheral neuropathies. It represents a highly prevalent disease group which can be associated with significant disability and poor recovery. Exercise has the potential to improve side effects of PNP.

MATERIALS AND METHODS

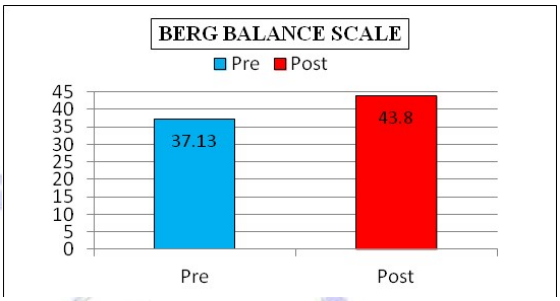
The study conducted was an experimental (pre-post) study.45 participants were taken, out of which only 30 participants were willing to participate in study. They were scrutinized for inclusion and exclusion criteria and those who met the criteria [age 41-60 years, both genders] were explained the purpose of the study and were included in it. Before implementing the study, the participants were asked to fill a written informed consent. Prior to and after three weeks of intervention, the participants balance and neuropathic symptoms were assessed **Procedure:** Participants were first demonstrated and then taught the proprioceptive exercises for balance like single limb stance, standing with narrow and wide base of support, side lunges and forward lunges. Whereas the single limb stance and standing with narrow and wide base of support both were performed for 30 sec and 5 repetitions of each were performed and then the balance and neuropathic symptoms were assessed at the end of last session.

Data Analysis: The data was analyzed by using Graph Pad I stat 3.0 version. Mean and Standard deviation were found out as well paired "t" and "p" values were applied to find out the relationship between pre and post values for BBS, mTNS and FRT

RESULTS

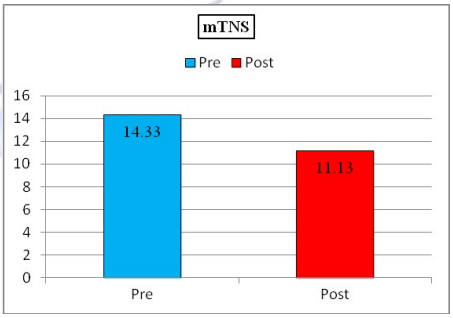
A total of 30 samples were taken out, overall participants showed an extremely significant effect on the Modified Total Neuropathic Score (mTNS) and significant effect on Berg Balance Scale and Functional reach out.

Graph 1: Comparison of mean of pre and post Berg Balance Scale (BBS).



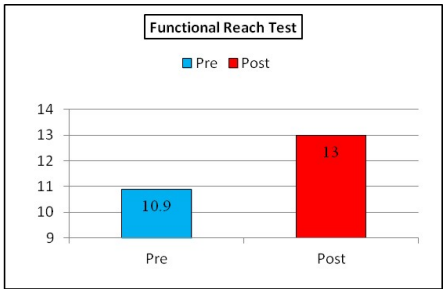
Graph No.1 showed that out of 30 subjects, which were assessed using berg balance scale where the pre-treatment average is 37.13 and post-treatment average is 43.8 with p-value < 0.0001 which is considered extremely significant.

Graph 2: Comparison of mean of pre and post Modified Total Neuropathy Score (mTNS)



Graph No.2 showed that out of 30 subjects, which were assessed using modified total neuropathy score pre-treatment the average is14.33 with P value >0.10 and post-treatment the average is 11.133 with p-value <0.0001 which is considered extremely significant.

Graph 3: Comparison of mean of pre and post Functional Reach Test (FRT).



Graph No.3 showed that out of 30 subjects, which were assessed using Functional Reach Test the pre-treatment average is 10.9 and post treatment average is 13 with p-value <0.0001 which is considered as extremely significant.

Hence this experimental study of three weeks gave a result that there are significant effect of proprioceptive balance training on chemotherapy induced peripheral neuropathy.

DISCUSSION

This study evaluated the effect of proprioceptive balance training on chemotherapy induced peripheral neuropathy. 45 samples were taken for this study between the age group of 41-60 years (mean age 54.03) who have taken at least 6 chemotherapy sessions as in which all type of cancer patients were included according to the inclusion criteria.S Vasquez et.al, studied that Peripheral neuropathy is a common when 3 or more chemotherapy cycles are taken, potentially reversible side-effect of some chemotherapeutic agents. Out of 45 samples 5 subjects were critically ill 4 subjects passed away and 6 subjects discontinued the follow up.

After comparing the pre and post intervention using paired t test for Berg Balance Scale (p value=0.0001), mTNS (p value=0.0001), FRT (p value=0.0001). Cammisuli S. et. alconcluded that there was preliminary evidence that intensive rehabilitation based on Visual computerized – feedback balance training shows significant improvement in balance [3].

Visovsky C.et.al, concluded that there was improvement in balance after the strengthening which also showed reduction in neuropathic symptoms among the patient who completed the study [4,5].

Fiona Streckmann. et.al concluded that balance exercise shows highest effect on motor as well as sensory symptoms on all types of peripheral neuropathies. A study focusing on strength or combination of endurance and strength shows a lower impact [2,6].

CONCLUSION

The study concluded that proprioceptive balance training protocol of 3 weeks had an extremely significant effect on chemotherapy induced peripheral neuropathy.

ABBREVATIONS

CIPN – Chemotherapy Induced Peripheral Neuropathy
PNPs – Peripheral Neuropathies
BBS – Berg Balance Scale
mTNS – Modified Total Neuropathy Score
FRT – Functional Reach Test

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Conflicts of interest: None

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