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Research Article

EFFECT OF LIFESTYLE INTERVENTIONS ON DIABETIC PERIPHERAL NEUROPATHY IN PATIENTS WITH TYPE 2 DIABETES, RESULT OF A RANDOMIZED CLINICAL TRIAL¹Dr. Marium Khalid, ²Dr. Khawar Rafique, ³Dr. Rao Muhammad Nouman Shahid¹MBBS; King Edward Medical University Lahore, Pakistan²MBBS; Lahore medical and dental college Lahore, Pakistan.³MBBS; Dera Ghazi Khan Medical College, Dera Ghazi Khan, Pakistan.

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Abstract:

Of the 21st century Diabetes mellitus (DM) has been one of the largest public health emergencies globally. At present approximately 415 million adults are suffering from DM whereas it has been declared that by 2049 the number will increase up to 642 million. The current study has showed that in spite of high levels of disorders among diabetic patients a minimum use of effective and safe interventions such as lifestyle modifications can help in reducing the severity of diabetic peripheral neuropathy and increase the consolation among them. Literature has reported that the severity of neuropathic pain impulse the physician to prescribe drugs to manage the condition which are gabapentin or pre-gabalin, these drugs have some kind of adverse effects such as drug resistance, dependence and addiction. The study has showed that lifestyle modification can fortunately come up with decrease in the severity of DPN patients.. Reduction in the severity of DPN following lifestyle intervention in this study can contribute in enhancing quality of life regarding DPN is a major cause of reduced quality of life due to pain, sensory loss, gait instability, fall-related injury, and foot ulceration and amputation.

Corresponding author:***Dr. Marium Khalid,**

MBBS; King Edward Medical University Lahore, Pakistan

QR code



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INTRODUCTION:

Of the 21st century Diabetes mellitus (DM) has been one of the largest public health emergencies globally. At present approximately 415 million adults are suffering from DM whereas it has been declared that by 2049 the number will increase up to 642 million. [1]

Diabetic neuropathies are a heterogeneous group of disorders of varying etiology and clinical presentation. In the developed countries among the diabetic patients, 60% of them are more prevalent towards diabetic neuropathy which consequences contribute to considerable morbidity and mortality and results in huge economic burden. One of the most common forms of diabetic neuropathy is symmetrical diabetic peripheral neuropathy. The most affecting part is lower limb which causes subsequent ulcer, amputation and disability. The major cause of morbidity is disability. [2][3][4]

Diabetic neuropathy extremely lowers the quality of life and the self-management of the quality of diabetes. It results in exacerbating of the prognosis of other diabetic complication [5]. Diabetic neuropathy was explained by the following characteristics which is (a) pain, paresthesia, or numbness; (b) zero tendon reflexes; (c) abnormal vibration perception threshold [6]. Literature has reported that having better control over glucose can enhance the nerve function in patients suffering from diabetes mellitus [7]. Whereas literature has strong evidence about the glycemic control if there is intense glycemic control it will reduce the risk of having diabetic neuropathy in patients with type 1 disease as well as with type 2 disease [8] [9]. There are 40% premature deaths in US because of unhealthy diet which includes cholesterol in rich food, unhealthy food, smoking and sedentary life style and the number is increasing due to consistent imbalance in health.

On the other hand, healthy lifestyles are broad and potentially unobservable orientations that organize patterns of behaviors that derive from knowledge and norms about what constitutes healthy, stress relieving, or pleasurable behaviors[10] The aim of this study was to determine the effect of lifestyle interventions based on; lowering blood sugar, increasing physical activity, lowering weight, and proper caring of feet on the severity of diabetic peripheral neuropathy in patients with type 2 diabetes.

MATERIAL AND METHODS DESIGN:

The study was randomized clinical trial. Participants who met the inclusion criteria were recruited in the study. The two groups controlled group and treatment group was randomized by computer.

The inclusion criteria was; Adults (≥ 21 years and older) with diabetic neuropathy, without any ulcer on their foot. Patients were excluded if they had known non-diabetic causes of neuropathy (for example, vitamin deficiencies, uremia, thyroid disease, lumbar or cervical radiculopathy, inflammatory neuropathy or presence of alcoholism). The sample size was 90 (half in each treatment group) during the duration of the study the participants were not allowed to interact with each other. A written informed consent was signed after explaining the purpose of the study. Modified Toronto clinical neuropathy score (mTCNS) questionnaire was used. The Toronto Clinical Neuropathy Score (TCNS) is a sensitive scoring system used to diagnose diabetic neuropathy, and to measure changes in such early diabetic sensorimotor polyneuropathy (DSP) pathophysiology. TCNS can be used as a bedside tool which is not even very expensive [11, 12, 13] mTCNS consists of graded symptoms (foot pain, numbness, tingling, weakness, ataxia and upper limb symptoms) and a sensory test (pinprick, temperature, light touch, vibration and position sense) score associated with DPN in the judgment of the examiner. The scale varies from 0 (no signs or symptoms) to 33 (maximal symptoms and signs) [14]

Intervention

The lifestyle interventions applied in the intervention group beginning 4 educational sessions on lifestyle that emphasize strategies for; lowering blood sugar, increasing physical activity, promoting weight loss, and feet caring. Each session was lasted for 1.5 hour. Then patients followed for 12 weeks. During this period, they received individualized counseling on mentioned lifestyle interventions. All participants of intervention group received individualized counseling with goals of reducing weight by 7%, increasing weekly exercise to 150 min, and proper daily feet caring. They received dietary counseling based on their preferences individually, too. Participants in the control group received their routine care and education, without any more education or consulting on lifestyle. Diabetic neuropathy symptom severity in both groups measured using Modified Toronto Clinical Neuropathy Score (mTCNS) at the beginning of study and at the end of counseling for 12 weeks.

RESULTS:

The result of the current study has showed that there were 79.1 % of participants in the control group, and 70.3% of intervention group were female. 20.9% of participants in control group, and 30.7% in intervention group were illiterate. The mean standard deviation of the control group was

(45.8±12.3) and the mean standard deviation of the intervention group was (50.38±6.9) hence, there was no significant association between two groups among the age of participants.

The mean standard deviation of diabetes duration in the intervention group was (20±3.6) and the mean standard deviation of diabetes duration in the control group was (17.4± 4.89). The results indicate that there is no remarkable difference between the two groups in the duration of diabetes P=0.08. Maximum of the participants were married in the both groups.

The independent t test was used to analyze the impact of interventions applied.

Between the two groups of the study the mean of severity diabetic peripheral neuropathy was remarkably different in them.

But in the comparison of the mean of diabetic peripheral neuropathy, the results before giving the intervention and after giving the intervention was significantly different. After applying life style modification in the intervention group there was remarkable decrease in the severity of diabetic peripheral neuropathy.

There was a reverse in the classification of severity from severe to moderate, from moderate to mild or to absence of neuropathy symptom level.

For example, before the intervention, there were 14 participants with moderate neuropathy, that 6 patients had not any neuropathy symptom (absent of neuropathy) and 8 of them had mild neuropathy, after the end of lifestyle intervention.

Comparing the severity of DPN in the control group, before and after lifestyle intervention; the severity of neuropathy had not any change or it increased to a higher level of severity after the end of lifestyle intervention. For example, before the intervention, there were 15 participants with mild neuropathy, that DPN severity in 8 of them reached to moderate level and DPN severity in the rest of 7 patients had not any change after the end of lifestyle intervention.

DISCUSSION:

The contributing factors in the development and progression of preventable disease are unhealthy lifestyle which includes smoking, high cholesterol containing diet, sedentary life style, no physical activity and chronic stress.

Many physicians support healthy life style to the individuals who are already at the risk of developing preventable disease but somehow many

of the patients are unable to responsive to such strategies, they are unable to either maintain it or start appropriate healthy changes.

Current study results are similar with the study findings of Smit *et al.* on lifestyle intervention for pre-diabetic neuropathy in 2006, indicated; diet and exercise counseling for patients with impaired glucose tolerance results in cutaneous re-innervation and improved pain.[15] Also, Juster-Switlyk and Smit in 2016 suggested that; weight loss and exercise are helpful strategies for patients with neuropathy in the setting of both diabetes and pre-diabetes.[16,17] Also, our results is consistent with other studies which improvement in health status after lifestyle interventions have seen in their results such as; A) Study of Khanji *et al.* on lifestyle advice and interventions for cardiovascular risk reduction, B) Study of Howells *et al.* [18,19,20] on the clinical impact of lifestyle interventions for the prevention of diabetes, C) Study of Kolb and Martin on Environmental/lifestyle factors in the pathogenesis and prevention of type 2 diabetes [21,22]

CONCLUSION:

The current study has showed that in spite of high levels of disorders among diabetic patients a minimum use of effective and safe interventions such as lifestyle modifications can help in reducing the severity of diabetic peripheral neuropathy and increase the consolation among them.

Literature has reported that the severity of neuropathic pain impulse the physician to prescribe drugs to manage the condition which are gabapentin or pre-gabalin, these drugs have some kind of adverse effects such as drug resistance, dependence and addiction. The study has showed that lifestyle modification can fortunately come up with decrease in the severity of DPN patients.. Reduction in the severity of DPN following lifestyle intervention in this study can contribute in enhancing quality of life regarding DPN is a major cause of reduced quality of life due to pain, sensory loss, gait instability, fall-related injury, and foot ulceration and amputation.

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