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Original Article

Prevalence and Severity of Diabetic Peripheral Neuropathy & its impact on Quality of life of Diabetics in Hayatabad, Peshawar

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Abstract
Background: Diabetes Mellitus may lead to long-standing complications, comprising of diabetic nephropathy, diabetic retinopathy and diabetic peripheral neuropathy and a few other diabetic vascular abnormalities. Diabetic peripheral neuropathy is most common chronic and long-term complication of diabetes mellitus and it is the leading cause of mortality, morbidity and consequently disability causing huge economic burden on the health system.
Objective: To determine the prevalence of diabetic peripheral neuropathy in diabetic population and to assess its severity and its impact on Quality of life.
Methodology& setting: Prevalence, severity of diabetic peripheral neuropathy and its impact on QOL of Diabetic population were determined in a sample of 386 diabetic patients using non-probability Convenience sampling, living in Hayatabad, Peshawar. In this cross-sectional study self-designed questionnaire using LANSS pain scale and McGill Pain Scale was used. The study 'duration was 4 months from September 1st to December 30th2017.
Results: The prevalence of Diabetic Peripheral Neuropathy in Diabetic Population is 39.9%. 22% of the subjects reported having moderate symptoms related to DPN. 14.8% participants described the DPN, somewhat affecting their quality of life.
Conclusion: Diabetic Peripheral Neuropathy is highly prevalent in the diabetic population, majority falling in age range 45-65, of Hayatabad, Peshawar. The most common variety of symptoms described by the participants were numbness and pins and needles.
Keywords: Diabetes Mellitus, Diabetic Peripheral Neuropathy, Quality of Life, Numbness, Paraesthesia

Introduction

Diabetes mellitus (DM) is a serious metabolic disorder occurs either due to insulin deficiency or due to peripheral resistance to insulin or often both.[1,2] The disease attains a reasonable attention from the government and health care sector but still it is associated with high mortality and morbidity rates.

Diabetic peripheral neuropathy (DPN) is most common chronic and long term complication of diabetes mellitus and it is considered leading cause of high morbidity and mortality rate, causing huge economic burden on the government.[3] DPN presents with various symptoms some being very painful and debilitating while some are painless and cause no serious negative effect on person's life.[4] Moreover, it is not necessary that DM is the cause of all kind of neuropathies.[4,5]

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Various other inflammatory, hereditary and other metabolic neuropathies may coexist along with DPN and they should be actively differentiated from DPN.[5]

Sign and symptoms include neuropathic pain, paraesthesia, hyperalgesia, allodynia, diabetic foot. In more advance stage of DPN leads to ulceration and amputation.[2] These symptoms greatly affect the quality of life (QOL) because of paresthetic symptoms that can be equally unacquainted and agonising.[6] Diminished sensations accompanied by compromised peripheral vascular function can contribute to foot ulcers.[7] Neuropathic pain occurs in about 10% population suffering from DM.[8]

A few epidemiological studies have suggested that after 15 to 20 years of DM prevalence of DPN is around 50%.[9] Daousi et al. conducted a study in primary care practices in Liverpool, U.K. to find out the prevalence, severity and treatment options for 'chronic painful neuropathy' in a community sample. They compared prevalence in people with DM with control group not suffering from DM. The prevalence calculated were 16.2% and 4.9%, respectively. It is a

realistically significant difference.[10] They evaluated severity of symptoms and neuropathic disabilities using the same instruments as were used by Young et al.[11] Another study showed the prevalence of DPN for clinic based studies and population-based studies to be 8 to 68% and 13 to 45% respectively. The prevalence of lower limb amputation was shown to be very low ranging from 0.2–4.8%. The incidence rate of amputation ranges from 46 to 936 per 100,000 annually. The values reported are solely dependent on diagnostic instruments used, the population studies and the definitions that are used. It is also noted that the values seem to increase with increase in age and duration of DM.[12-14] Government health budgets are highly burdened due to the complications occurring as a result of DPN. After macro vascular diseases and diabetic nephropathy, DPN is ranked third amongst the complications of DM that cause great lifetime expenditure of resources but enhancements for early detection of DPN and efficient glucose control might lead to prevention of clinical neuropathy and its associated complications.[15,16] If the DPN progresses into diabetic foot consequently leading to amputation, can cause a heavy expenditure on its long-term treatment. Nonetheless, increased glucose control can influence the prevention of the progress of diabetic neuropathy and diminish the vibration threshold abnormalities and nerve conduction if DPN may possibly be identified in the early phase.[15]

A study at the Diabetes Management Centre, Services Hospital, Lahore, Pakistan determined the frequency of Diabetic Peripheral Neuropathy presenting in diabetic patients, which was found to be 187 (74.8%) out of the total 250 patients studied.[2] Apart from the above mentioned study no relevant studies have been identified showing the overall prevalence of Diabetes mellitus or its long term complications, common of which is Diabetic Peripheral Neuropathy and the impact it has on the lives of the sufferers.

This study may lead to further studies and plans for proper preventive and curative measures to minimize and treat DPN. Moreover, this study helps to clarify the burden that DPN places on government and society.

Material & Method

This cross-sectional survey was carried out in Hayatabad, Peshawar from the period of September 1st to December 30th2017. 386 diabetic patients were included in this study. Participants were selected using non-probability Convenience Sampling. The selection of the participants for this study was done irrespective of the gender and age. Patients having peripheral neuropathy caused by any condition other than diabetes were excluded. Data collection was done with the help of self-designed Questionnaires using 'LANSS (The Leeds Assessment of Neuropathic Symptoms and Signs) pain scale questionnaire' and 'McGill Quality of Life Questionnaire'.(17) LANSS pain scale assists to determine whether the nerves carrying pain signals are working normally or not. It is important to find this out in case different treatments are needed to control the pain. This scale also determines the Quality of pain, skin appearance, temperature and sensitivity. It also encompasses sensory testing which includes tests for examining allodynia and pin prick threshold. McGill Quality of Life Questionnaire is used in life threatening diseases to measure the quality of life of palliative care patients. Piloting was carried out on 5 participants to validate the questionnaire.

The data was analyzed by SPSS (version 20). Descriptive statistics were calculated. Quantitative variables of this study were age and duration of diabetes. These were presented as mean and standard deviation. Prevalence of neuropathy, its severity and its effect on quality of life were calculated and its variants were presented by percentage.

RESULTS

386 diabetic patients from Hayatabad, Peshawar, were included in this study.

Results showed that, out of 386 participants, 374 participants suffered from type II diabetes while just 12 participants had type I diabetes. Mean age of the participants was 56.22 ±11.67 and majority of participants were between the age group of 45 to 65.

The prevalence of Diabetic Peripheral Neuropathy was 39.9% (154 out of 386).

Table:1 Prevalence of Diabetic Peripheral Neuropathy

Diabetic Peripheral Neuropathy	Frequency	Percentage
No	232	60.1
Yes	154	39.9
Total	386	100.0

Out of 154 (39.9%) participants who had DPN, 106 (27.5%) had paraesthesia in their feet only while 44 (11.4%) had the symptoms in their hands and feet both. Just 3 (0.8%) of the participants had the symptoms in their hands.

32 (8.3%) participants out of 154, had DPN for less than a year, 56 (14.5%) had DPN between the duration of 1 to 5 years while 65 (16.8%) participants had DPN for more than 5 years.

97 (25.1%) participants reported their symptoms as pins and needles, 31 (8.0%) reported their symptom as tingling while 19 (4.9%) were unsure about their symptoms.

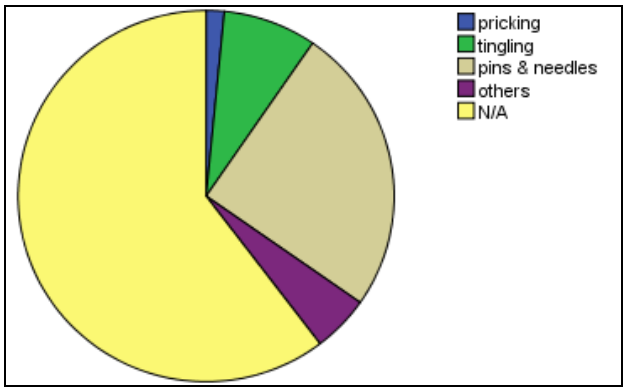

Figure-1: Quality of pain (How does your pain feel like?)

79 (20.5%) participants had a complaint of symptoms only at night, 61 (15.8%) participants had complaint of their symptoms throughout the day while some had complaint of their symptoms either upon wakening (1.3%) or had bouts of symptoms at different times of the day (1.3%).

Table-2: Symptoms of Diabetic Peripheral Neuropathy during 24 hours

DPN symptoms during 24 hours	Frequency	Percentage
upon wakening	5	1.3
only night	79	20.5
all day	61	15.8
other	5	1.3
Total	386	100.0

85 (22.0%) participants described the intensity of their symptoms as moderate, 43 (11.1%) described the intensity as mild while 25 (6.5%) participants described their symptoms as severe.

Table-3: Intensity of Diabetic Peripheral Neuropathy

Intensity	Frequency	Percent
0-3	43	11.1
4-6	85	22.0
7-10	25	6.5
Total	386	100.0

78 (20%) participants reported the symptoms of DPN interfere with their sleep while 75 (19.4) participants reported that symptoms of DPN do not interfere with their sleep.

39 to 69 (10.1% to 17.9%) participants reported a change in temperature of their affected area and increased sensitivity respectively while 84 to 104 (21.8% to 60.4%) participants had no such complaint.

A total of 57 (14.8%) participants reported somewhat effect on DPN on their QOL. 22 (5.7%) participants reported DPN having quite a lot of effect on their lives. 19 (4.9%) reported that DPN has very much affected their QOL. 28 (7.3%) reported very little effect of DPN on their QOL while almost the same percentage reported no effect on their QOL.

Table-4: Eeffects of Diabetic Peripheral Neuropathy on Quality of Life

Effect on Quality of Life	Frequency	Percentage
not at all	27	7.0
very little	28	7.3
Somewhat	57	14.8
quite a lot	22	5.7
very much	19	4.9
Total	386	100.0

In about 66 to 70 (17.1% to 17.9%) participants DPN lead to depression, nervousness and confusion while 28 to 30 (23%) participants lead a normal life.

Discussion

Diabetes mellitus leads to involvement of the peripheral nervous system of the body which in turn causes symptoms like numbness, paraesthesia, and pins and needles to appear.[2] DM is assumed to be the leading cause of various complications like end-stage renal disease owing to Diabetic Nephropathy, blindness caused by Diabetic Retinopathy, and lower leg and foot amputation due to Diabetic Peripheral Neuropathy and even after the introduction of various treatment approaches all these complications contribute to the high rate of morbidity and mortality in diabetic patients.[18]

In our study, the mean age of participants was 56.22 ±11.67 years. As compared to a study carried out in Lahore, Pakistan the average age of participants was 49.52±7.933 years.[2] It is somewhat less than the mean age of participants in our study. Another study

conducted by Elaine Cristina Salzedas Muniz et al showed mean age of 60.9 years which is slightly more than our study.[19]

Our study showed 39.9% of prevalence of DPN while an international study conducted by Feray Soyupek et al showed frequency of 80.4%,(20) which is quite different from ours. According to a national study results, the frequency of DPN was found to be 78.4% and this result also differs immensely from ours.[2] Daousi et al. conducted a study in primary care practices in Liverpool, U.K. to find out the prevalence, severity and treatment options for 'chronic painful neuropathy' in a community sample. They compared prevalence in people with DM with control group not suffering from DM. The prevalence calculated were 16.2% and 4.9%, respectively. It is a realistically significant difference.[10]

In our study symptoms of DPN, i.e., pins and needles and numbness were present in 25.1% participants while tingling and paraesthesia were present in about 8.0% of participants. While a national study showed a frequency of burning pain as a symptom of DPN to be 46.4%, frequency of numbness was found to be 45.6% while frequency of tingling was 24.4% which are comparable to our study.[2] In numerous international studies frequency of paraesthesia and other varieties of symptoms of DPN like coldness, sharp pain, sensitivity, dullness, burning pain have been calculated.

Our study showed the severity of DPN to be mild with a frequency of 11.1%, moderate with a frequency of 22.0% and severe with a frequency of 6.5% respectively. While a study conducted by Davies et al showed frequency of 36.4% for mild neuropathy, 13.8% for moderate neuropathy and 10.0% for severe neuropathy.[21] Daousi et al. evaluated the severity of DPN present for more than a year using a visual analogue scale (VAS) to report the maximum pain in the previous 24 hours. The mean score was 3.5 and the maximum score reported was 5.6.[10]

Prior studies have showed that DPN causes negative effects on QOL. Our study showed that 14.8% participants reported somewhat effect of DPN on their QOL while 7.3% of participants reported very little, whereas 5.7% of them reported DPN effecting their QOL quite a lot. Benbow et al conducted a study which showed DPN causes adverse effects on QOL in diabetic patientsas compared to control group.[8] Statistically significant correlations between intensity of pain and health status of a patient were shown by Galer et al.[22] the study carried out by Galer et al. showed significant negative effect of DPN on QOL when compared with control group with no pain.[22] Veves et al. proposed that increased DPN is associated with pain, numbness, paraesthesia and consequent negative effect on the QOL.[11]

It is specified that pathological processes which cause the neuropathic pain, appear as early signs and symptoms in the course of DPN but become more prominent with the increasing duration and intensity of DPN. Declining levels of glucose in the body along with a longer duration of DM are associated with increased chances of developing DPN. These metabolic disturbances are quite thoroughly interlinked making it nearly impossible for a cross-sectional study like this one to separate the 'cause-and-effect' relationship of these comorbidities.[21]

This study aids to clarify the burden that DPN places on government and society. Moreover, further research is required for better understanding of various aspects which influence DPN in diabetic population. These future researches will enable the government to introduce new pharmacotherapeutic treatments and diagnostic modalities. It will decrease the morbidity and mortality rate and will cause a positive effect on QOL.

Conclusion

Diabetic Peripheral Neuropathy is present in majority of the diabetic population of Hayatabad, Peshawar. Most of them belong to ages between 45 and 65, irrespective of the gender. The most common variety of symptoms reported were pins and needles and numbness. This study provides basis for future studies.

Limitations

This study has several limitations which caused the results not to be very precise as expected. Some of the limitations encompass, shortage of time, research duration being 6 months), lack of cooperation by the participants, lack of resources of researchers and some security issues.

Recommendations

Future research should be focus to select more sample size and different population national wide to see cultural and geographical differences in relation to diabetic population. Providing good security system especially to females while conducting various researches and awareness of people regarding researches can overcome many health issues. This also

cause a good effect on the quality of future researches carried out in this community.

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