INTRODUCTION

Diabetic neuropathy is an important microvascular complication of diabetes mellitus. It is a major contributor to foot ulceration and lower limb amputation in persons with diabetes. As the population of diabetes is increasing worldwide, the prevalence of diabetes-related microvascular complications is also on the rise. Duration of diabetes mellitus is an important risk factor for all diabetes-related microvascular complications such as neuropathy, retinopathy, and nephropathy. Up to 7.5% of patients with type II diabetes mellitus have clinical neuropathy at the time of diagnosis and this rate increases to 50% among patients who have had diabetes for 25 years.

Various screening modalities for diabetic neuropathy include recording of symptoms or signs, nerve conduction studies, quantitative sensory testing, and autonomic testing. Quantitative assessment of vibration perception threshold (VPT) is a widely applied tool in the screening for, and staging of, diabetic sensory neuropathy, particularly in epidemiological studies. Values of VPT of more than 25 V are associated with a 6-10-fold risk of developing a foot ulcer. These findings suggest the role of “severity” of diabetic neuropathy in the etiology of its complications. However, there is paucity of population-based data from Pakistan regarding the prevalence based on the severity of diabetic neuropathy and the influencing risk factors. The present study was done to assess the prevalence of severity of diabetic neuropathy (mild, moderate, and severe) in patients with type 2 diabetes mellitus and report the risk factors that influence it.

MATERIALS AND METHODS

Study subjects were recruited from the Diabetic Clinic, Ghulam Mohammad Mahar Medical College Hospital, Sukkur, from January 2009 to December 2011. The
Catchment area of above hospital is about 6 districts of Northern Sindh. A total of 1401 type II diabetic patients above the age of 40 years regardless of the duration of diabetes, underwent diabetic neuropathy assessment. The study was approved by the Institutional Review Board, and informed consent was obtained from the subjects as per the Helsinki declaration.

Procedures pertaining to the present study are described below.

DIABETIC NEUROPATHY ASSESSMENT
Diabetic neuropathy assessment was done by measuring VPT using sensitometer. The VPT was measured by a single observer by placing biothesiometer probe perpendicular to the distal plantar surface of the great toe of both legs. The VPT was measured at a voltage level when patient felt the first vibration sensation. The mean VPT measure of three readings of both legs was considered for the analysis. Diabetic neuropathy was considered as present if the VPT value was >20 V. The severity of neuropathy was graded into 3 levels: mild neuropathy (VPT score, 20-24.99 V), moderate neuropathy (VPT score, 25-38.99 V), and severe neuropathy (VPT score, >39 V). 7

DIABETIC RETINOPATHY GRADING
All patients had undergone direct fundoscopy. The suspicious cases were sent to eye opd, so that their fundi photographed by indirect fundoscopy. The diagnosis of diabetic retinopathy was based on the modified Klein classification 8.

NON-SIGHT THREATENING DIABETIC RETINOPATHY
Non-sight threatening diabetic retinopathy included cases of mild or moderate non-proliferative diabetic retinopathy 9.

SIGHT THREATENING DIABETIC RETINOPATHY
Sight-threatening diabetic retinopathy (referable diabetic retinopathy) was defined as severe non-proliferative diabetic retinopathy, proliferative diabetic retinopathy, and clinically significant macular edema 9.

ALBUMINURIA
The patient was considered normoalbumuric if Albumin Creatinine Ratio (ACR) was less than 30 mg/g, microalbumuric if the ACR was between 30 and 300 mg/g, and macroalbumuric if the ACR was above 300 mg/g 10.

STATISTICAL ANALYSIS
Statistical analyses were performed using the statistical software (SPSS for Windows, ver. 13.0 SPSS Science, Chicago, IL, USA). The results were expressed as mean + SD if the variables were continuous and as percentage if the variables were categorical. Student's t-test for comparing continuous variables and X2 test to compare proportions amongst groups were used. Both univariate and multivariate logistic regression analyses were performed to study the effect of various risk factors using neuropathy as a dependent variable. From the univariate analysis, variables with P values <0.1 were included in the multivariate logistic regression analysis to derive at the parsimonious model. P value of <0.05 was considered significant.

RESULTS
The mean age of the total study population (N=1401) was 56.3 + 10 years; 746 (53.2%) were men. Table I shows the prevalence of diabetic neuropathy (severity wise) in the study population. In the overall group, the prevalence of diabetic neuropathy was 18.84% (95% CI: 16.79-20.88); the prevalence was significantly higher in persons with known diabetes than in those with newly detected diabetes (19.77 vs. 14.40, P = 0.05). The prevalence of mild diabetic neuropathy was 5.9% (95% CI: 4.68-7.15), moderate diabetic neuropathy was 7.9% (95% CI: 6.50-9.33), and severe diabetic neuropathy was 5% (95% CI: 3.86-6.14). The prevalence of severe diabetic neuropathy was...
significantly high in persons with known diabetes than in those with newly detected diabetes (5.53 vs. 2.47, \( P = 0.04 \)).

Table II summarizes the univariate analysis of risk factors influencing the severity of diabetic neuropathy. Significant risk factors common to all the three neuropathy groups were: advancing age (\( P < 0.0001 \)), longer duration of diabetes mellitus (\( P < 0.0001 \)), use of insulin (\( P = 0.006 \)), high systolic blood pressures (\( P =0.008 \)), presence of macroalbuminuria (\( P <0.0001 \)), and presence of diabetic retinopathy (\( P <0.0001 \)).

Table III shows the multivariate analysis of risk factors influencing the severity of diabetic neuropathy. Increasing age per year (\( P < 0.0001 \)) was statistically significant risk factor for all types of diabetic neuropathy – mild, moderate, and severe. For severe diabetic neuropathy, other significant factors were duration of diabetes mellitus (\( P =0.027 \)), macroalbuminuria (\( P=0.001 \)), and presence of diabetic retinopathy (\( P = 0.020 \)).
REFERENCES


Table III. Multivariate analysis of risk factors for severity of diabetic neuropathy

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>1.05(1.03-1.08)</td>
<td>1.09(1.07-1.11)</td>
<td>1.11(1.08-1.14)</td>
</tr>
<tr>
<td>Duration of DM (years)</td>
<td>1.02(0.98-1.06)</td>
<td>1.02(0.99-1.05)</td>
<td>1.04(1.00-1.08)</td>
</tr>
<tr>
<td>Insulin users</td>
<td>0.65(0.19-2.25)</td>
<td>1.53(0.65-3.59)</td>
<td>2.03(0.84-4.89)</td>
</tr>
<tr>
<td>Systolic BP (mm Hg)</td>
<td>1.00(0.99-1.01)</td>
<td>1.00(0.99-1.01)</td>
<td>1.00(0.99-1.01)</td>
</tr>
<tr>
<td>Microalbuminuria</td>
<td>1.54(0.88-2.69)</td>
<td>1.21(0.71-2.06)</td>
<td>1.62(0.86-3.05)</td>
</tr>
<tr>
<td>Macroalbuminuria</td>
<td>1.14(0.025-5.19)</td>
<td>2.11(0.72-6.19)</td>
<td>5.13(2.01-13.05)</td>
</tr>
<tr>
<td>Presence of DR</td>
<td>1.16(0.63-2.12)</td>
<td>1.00(0.57-1.74)</td>
<td>2.03(1.12-3.69)</td>
</tr>
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</table>


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NOTIFICATION

It is notified that article with the title of "Mushtaq A, Ayyaz S, Khan SA. PLEURAL EFFUSION; PATTERN AT NISHTAR HOSPITAL, MULTAN Professional Med J Nov-Dec 2012; 19(6):812-815" has been withdrawn and cancelled with decision of Editorial Board on 09th Apr, 2013. Please do not cite this article in future. It has also been removed from website.

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The Professional Medical Journal