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Research Article

INCIDENCE OF NEPHROPATHY IN DIABETIC PATIENTS

Zia Ur Rahman¹, Mohammad Haroon², Anees Muhammad^{3*}, Habib Ullah Khan⁴,
Ihteshamul Haq⁵, Malik Zeb Khan⁶

¹Laboratory Technologist, Islamabad Diagnostic Center, Islamabad, Pakistan, ²Assistant Professor, Department of Medicine, Medical Teaching Institution, Khyber Teaching Hospital, Khyber Medical College, Peshawar, Pakistan, ³Research Assistant, Deptt of Medical Lab Technology, The University of Haripur, Haripur, Pakistan, ⁴Incharge PCR Lab, Department of Pathology, Medical and Teaching Institution, Khyber Teaching Hospital, Peshawar, Pakistan ⁵M.Phil Scholar, Department of Genetics, Hazara University, Mansehra, Pakistan, ⁶Professor, Pathology Department, Institute of Kidney Diseases, Hayatabad Medical Complex, Peshawar, Pakistan.

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Abstract:

Objective: To determine the burden of diabetes mellitus (type I and II) and incidence of nephropathy in diabetic patients Peshawar.

Methodology: A cross-sectional study carried out on known diabetic patients in Peshawar. This study was conducted on 267 diabetic patients in duration of one year (from January 2018 to February 2019). Both diabetes mellitus type I and type II patients was included in study. Informed consent was taken from all patients before sample collection. Collected samples were further processed in pathology department. Collected data was analyzed by statistical package for social sciences software version 21.

Results: Out of total 267 diabetic patients, diabetes mellitus type I was observed in 43 (16.1%) patients while diabetes mellitus type II was examined in 224 (83.9%) patients. The incidence of nephropathy was found in 33 (12.4%) patients with highest percentage in female (57.5%).

Conclusion: Diabetes mellitus type II was three times more common than diabetes mellitus type I. Nephropathy incidence is manageable but high risk to female diabetic patients.

Key words: Incidence, Nephropathy, Diabetes mellitus, Peshawar.

Corresponding author:**Anees Muhammad,**

Research Assistant, The University of Haripur, Haripur, Pakistan

Email: aneesafri15295@yahoo.com

Cell: +92344-9112106.

QR code



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INTRODUCTION:

Diabetes mellitus (DM) is a worldwide growing epidemic and characterized by high level of glucose in circulation due to abnormal insulin secretion or poor response of tissue to insulin (Soriguer et al., 2012). International Diabetes Federation reported in 2014 that about 8.2% of adults (age=20-79 year) were diabetic patients (da Rocha Fernandes et al., 2016). Mainly DM has two types e.g. Diabetes mellitus type 1 and type 2. In Type 1 diabetes mellitus, there is no production of insulin whereas in Type 2 diabetes mellitus there is insufficient insulin or cells do not respond to insulin present in the body (insulin resistance). Type 2 DM is about 80% whereas Type 1 diabetes accounts for 10% of cases and specific diabetes such as gestational diabetes accounts for 5% (Chako et al., 2014). Type-1 or insulin dependent diabetes mellitus (IDDM) mainly emerge in early adult life (Rehman et al., 2005). Diabetes is increasing continuously due to various factors such as population growth, aging, urbanization and increasing prevalence of obesity and physical inactivity (Wild et al., 2004).

Diabetic nephropathy is described by proteinuria, hypertension, progressive loss of renal function, along with high incidence of cardiovascular morbidity and mortality. The four most important risk aspects and markers for these consequences are hyperglycemia, hypertension, hyperlipidemia and proteinuria (De Zeeuw et al., 2004). Diabetic nephropathy is a clinical syndrome characterized by persistent albuminuria, a constant decline glomerular filtration rate (GFR), elevated arterial blood pressure and increased relative mortality of cardiovascular patients. This follows with a more rapid progression of other secondary complications, (retinopathy, diabetic foot, neuropathy and hypertension (El-Menyar et al., 2016). Microvascular complications such as Retinopathy, nephropathy and neuropathy are chronic complications responsible for high morbidity and mortality in type 1 diabetes (Lipner et al., 2015).

Diabetes nephropathy ultimately occurs with lesions that developed before many years. The usual history of nephropathy in insulin dependent diabetes mellitus (IDDM) is describe by a extended duration of medical stillness during delicate defects occur including increased GFR and resting microalbuminuria or exercise-induced along with an amplified kidney size (da Rocha Fernandes et al., 2016). Diabetic nephropathy usually develops in 30-50% with history of 15 to 25 years of diabetes mellitus (Sandholm et al., 2017). Diabetic nephropathy is one of an etiological factor of end stage renal disease (ESRD) in the United State with prevalence of 158 per million. Diabetic

patients are more susceptible to chronic kidney disease (Van Buren and Toto, 2011).

Limited data are available about nephropathy incidence in diabetes mellitus type I in our population. Moreover, it is important to known that burden of diabetes across different regions of the world. Additionally, this study will help us in future to identify new prevention opportunities. Therefore, current study was design to evaluate the burden of diabetes and incidence of diabetic nephropathy in Type I and Type II diabetes patients in Peshawar.

MATERIALS AND METHODS:**Study site and design:**

This cross-sectional study was conducted on confirm diabetic patients in district Peshawar in period of one year (January 2018-February 2019).

Study Population:

Known diabetic patients visiting to hospital for their routine checkup were signed for this study after taking informed consent from patient/guardian in mentioned duration.

All those patients who are not diabetic and those not willing to be the part of this study were excluded from current study. Data and samples were collected from outdoor patients and samples were processed in pathology department of Hayatabad Medical Complex, Peshawar.

Sample size:

Total of 267 blood samples of Diabetic patients were collected.

Sample collection and Procedure:

About 5 mL of venous blood was collected aseptically in vacutainer tube using venipuncture technique. Serum was stored after proper centrifugation. Along with blood sample, urine samples of the same patients were also collected in a sterilize containers. To study the diabetic nephropathy, the three most clinically important parameters were checked (serum creatinine, urea and urine albumin) using commercially available biochemistry kits of Randox Company and processed on Spectrophotometer (Microlab 200), while urine sample was checked for the presence of albumin by dip stick method.

Statistical analysis:

Data collected from above mentioned assays was analyzed by using ratios and percentages calculated for different variables and were analyzed by statistical package for social sciences (SPSS) version 21.

RESULTS:

A total of 267 known diabetic patients were followed during study period. Out of 267 known diabetic patients, 82(30.7%) were male and 185 (69.3%) were

female. Out of total, 43 (16.1%) was Type I diabetic patients whereas 224 (83.9%) were Type II diabetic patients as shown in figure No.1.

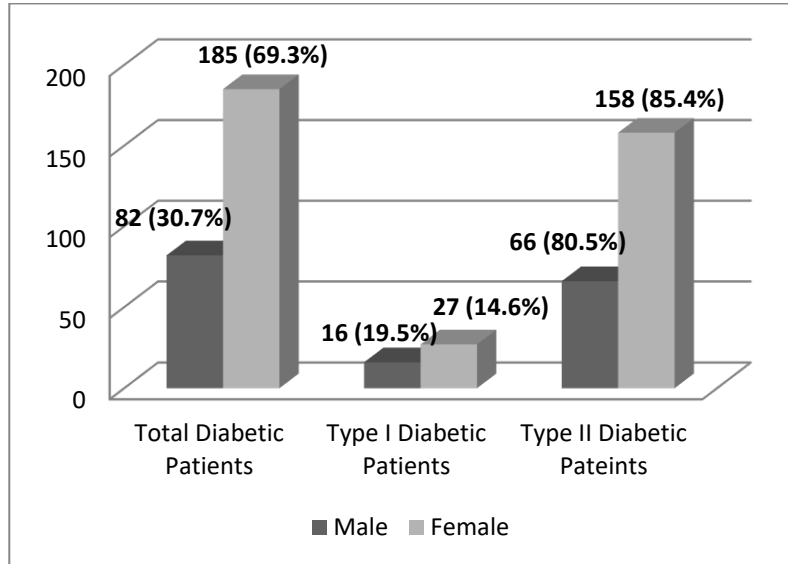


Figure No.1: Distribution of diabetic patients according to gender and types of diabetes

After follow up 267 known diabetic patients, 33 (12.4%) patients have high level of serum creatinine and urea along with the high concentration of albumin amount in urine were consider as nephropathic patients in this study as shown in figure No.2.

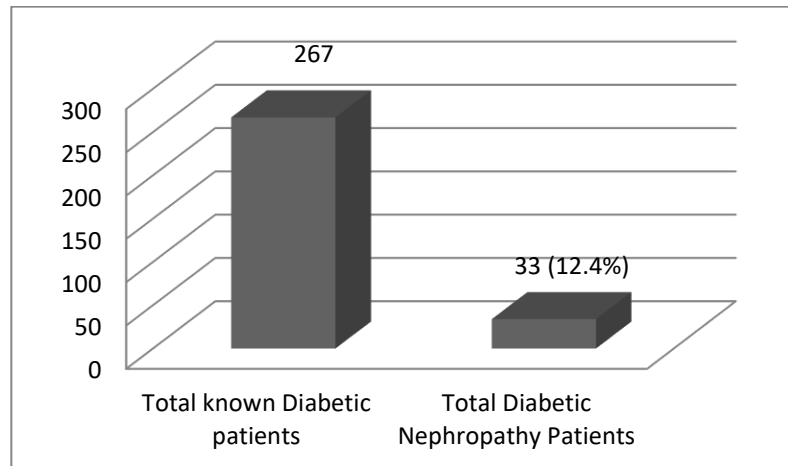


Figure No.2: Burden of Nephropathic patients in diabetic mellitus patients

Out of 33 nephropathic patients, 11 (32.3%) were Type I diabetic nephropathy patients whereas 22 (66.7%) were Type II diabetic nephropathy as show in figure No.3.

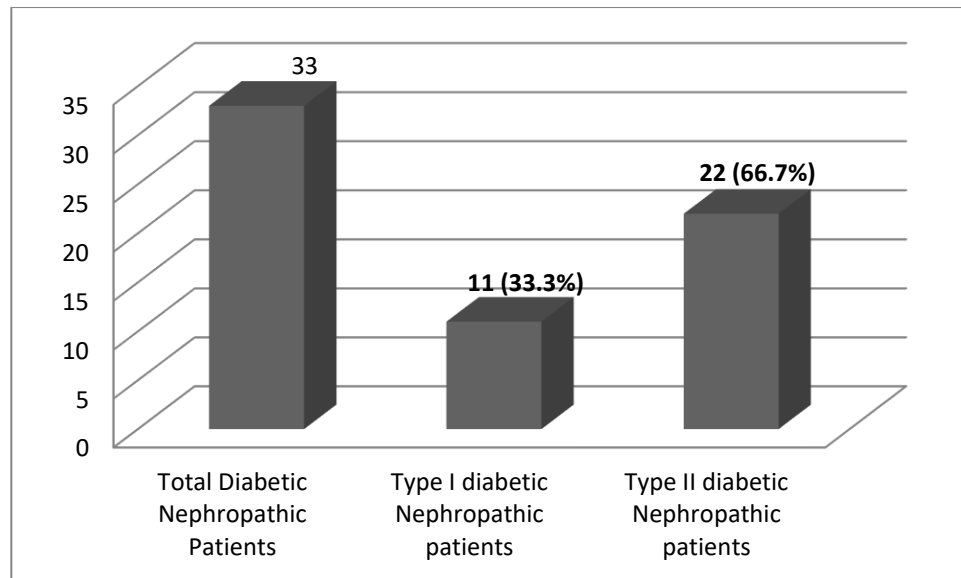


Figure No.3:Nephropathic patients were distributed according to the type of diabetes

In total nephropathic patients (n=33), 14 (42.4%) were male while 19 (57.6%) were female in current study as shown in Table No.1.

Table No.1:Distribution of Nephropathic patients according to gender wise.

Total Diabetic Nephropathic Patients	Male Diabetic Nephropathic Patients	Female Diabetic Nephropathic Patients
33	14 (42.4%)	19 (57.6%)

DISCUSSION:

This current study determined the burden of diabetic mellitus type I and type II along with the observation of incidence of the nephropathy (kidney diseases) in both male and female diabetic patients. Different studies reported from various countries with variable burden and incidence of nephropathy.

Present study result shows that frequency of diabetes type II (83.9%) are more as compared to the diabetes type I (16.1%). Rehman et.al (2004) reported from Peshawar that 35.6% frequency of diabetes type I (Rehman et al., 2005), which is 2 times greater than current study. This variation could be due to differentiation of sample size, kits and method of identification.

High percentage of diabetic patients (type I and II) was female (69.3%) after comparing with male population (30.7%) in our study. Rehman et.al (2004) reported from Peshawar that percentage of diabetic male (58.9%) are high as compared to female level

(42.1%) (Rehman et al., 2005). This could be due to high population of male in his study. Female are prone to diabetes as compared to male was revealed by other studies like present study (Li et al., 2016).

The results of this follow up study revealed that the incidence of nephropathy is 12.4% in diabetic patients. In addition to above mentioned findings, 66.7% nephropathy was observed in diabetes mellitus type I patients while diabetes mellitus type II was in 33.3%, it could be due to high prevalence of diabetes mellitus type I. Study revealed from Oman that incidence of nephropathy is 42.5% (Alrawahi et al., 2012), which is high as compared to present report. It might be due to differentiation in diagnostic tools and ethnicity. Enlarge scale study conducted by Wu AY et.al in Asian which revealed variation in results of different countries (14.2% in Iran, 24.2% in Pakistan, 36.3% in India and 56.5% in Korea) (Wu et al., 2005).

High percentage of nephropathy was found in female diabetic patients in a current study. Greater risk to female also reported by different researchers from

other regions of the world (Alrawahi et al., 2012, Soriguer et al., 2012) which could be due to weak glycemetic and systolic blood pressure control in female (Goñi et al., 2016). The risks of nephropathy between sexes influence by different factors such as hormones, genetic and environmental factors (Hovind et al., 2004).

The main strength of present study is that many patients were followed in several intervals of study duration. Another positive feature is that gender was also studied. Moreover, this study also determined the current situation of the both diabetes mellitus type I and type II along with nephropathy. Despite the strength of this study, some limitations are also noteworthy. Less sample size, insufficient duration of study for prospective study, no clinical history was observed and risk factors were also not studied. Further studies are required to evaluate diabetes in pediatric age along with genetic diseases, clinical and family history of patients. Need unusual attention to risk factors responsible for high nephropathy in female diabetes after these findings of current study. Moreover, implementation of better and more successful management strategies for patients with diabetes is important.

CONCLUSION:

This study provides the up-to-dated information regarding the burden of diabetes, its types and incidence of nephropathy in diabetic patients. The prevalence of diabetes mellitus was observed while the nephropathy incidence was 12.4% in diabetic patients. Nephropathy incidence is quiet lower than other reported studies. Despite of less burden still need future management regarding prevention and treatment of diabetes and nephropathy in diabetes especially in females.

REFERENCES:

1. ALRAWAHI, A. H., RIZVI, S. G. A., AL-RIYAMI, D. & AL-ANQOODI, Z. 2012. Prevalence and risk factors of diabetic nephropathy in omani type 2 diabetics in Al-dakhiliyah region. *Oman medical journal*, 27, 212.
2. CHAKO, K. Z., PHILLIPO, H., MAFURATIDZE, E. & ZHOU, D. T. 2014. Significant differences in the prevalence of elevated HbA1c levels for type I and type II diabetics attending the Parirenyatwa Diabetic Clinic in Harare, Zimbabwe. *Chinese Journal of Biology*, 2014.
3. DA ROCHA FERNANDES, J., OGURTSOVA, K., LINNENKAMP, U., GUARIGUATA, L.,

- SEURING, T., ZHANG, P., CAVAN, D. & MAKAROFF, L. E. 2016. IDF Diabetes Atlas estimates of 2014 global health expenditures on diabetes. *Diabetes research and clinical practice*, 117, 48-54.
4. DE ZEEUW, D., REMUZZI, G., PARVING, H.-H., KEANE, W. F., ZHANG, Z., SHAHINFAR, S., SNAPINN, S., COOPER, M. E., MITCH, W. E. & BRENNER, B. M. 2004. Proteinuria, a target for renoprotection in patients with type 2 diabetic nephropathy: lessons from RENAAL. *Kidney international*, 65, 2309-2320.
5. EL-MENYAR, A., AL SUWAIDI, J., ALBINALI, H. & AL-THANI, H. Diabetes Mellitus: Unwanted Visitor in the Tertiary Heart Hospitals. Qatar Foundation Annual Research Conference Proceedings, 2016. HBKU Press Qatar, HBPP3157.
6. GOÑI, M. J., FORGA, L., IBAÑEZ, B., CAMBRA, K., MOZAS, D. & ANDA, E. 2016. Incidence and risk factors involved in the development of nephropathy in patients with type 1 diabetes mellitus: follow up since onset. *Canadian journal of diabetes*, 40, 258-263.
7. HOVIND, P., TARNOW, L., ROSSING, P., GRAAE, M., TORP, I., BINDER, C. & PARVING, H.-H. 2004. Predictors for the development of microalbuminuria and macroalbuminuria in patients with type 1 diabetes: inception cohort study. *Bmj*, 328, 1105.
8. LI, L., JICK, S., BREITENSTEIN, S. & MICHEL, A. 2016. Prevalence of diabetes and diabetic nephropathy in a large US commercially insured pediatric population, 2002–2013. *Diabetes care*, 39, 278-284.
9. LIPNER, E. M., TOMER, Y., NOBLE, J. A., MONTI, M. C., LONSDALE, J. T., CORSO, B. & GREENBERG, D. A. 2015. Linkage analysis of genomic regions contributing to the expression of type 1 diabetes microvascular complications and interaction with HLA. *Journal of diabetes research*, 2015.
10. REHMAN, G., KHAN, S. A. & HAMAYUN, M. 2005. Studies on diabetic nephropathy and secondary diseases in type 2 diabetes. *Int. J. Diab. Dev. Ctries*, 25, 25-29.
11. SANDHOLM, N., VAN ZUYDAM, N., AHLQVIST, E., JULIUSDOTTIR, T., DESHMUKH, H. A., RAYNER, N. W., DI CAMILLO, B., FORSBLOM, C., FADISTA, J. & ZIEMEKE, D. 2017. The genetic landscape of renal complications in type 1 diabetes. *Journal of the American Society of Nephrology*, 28, 557-574.
12. SORIGUER, F., GODAY, A., BOSCH-COMAS, A., BORDIÚ, E., CALLE-PASCUAL, A.,

- CARMENA, R., CASAMITJANA, R., CASTAÑO, L., CASTELL, C. & CATALÁ, M. 2012. Prevalence of diabetes mellitus and impaired glucose regulation in Spain: the Di@bet.es Study. *Diabetologia*, 55, 88-93.
13. VAN BUREN, P. N. & TOTO, R. 2011. Hypertension in diabetic nephropathy: epidemiology, mechanisms, and management. *Advances in chronic kidney disease*, 18, 28-41.
14. WILD, S., ROGLIC, G., GREEN, A., SICREE, R. & KING, H. 2004. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes care*, 27, 1047-1053.
15. WU, A., KONG, N., DE LEON, F., PAN, C., TAI, T., YEUNG, V., YOO, S., ROUILLON, A., WEIR, M. & INVESTIGATORS, M. 2005. An alarmingly high prevalence of diabetic nephropathy in Asian type 2 diabetic patients: the MicroAlbuminuria Prevalence (MAP) Study. *Diabetologia*, 48, 17-26.