



JETROMI

Journal of Endocrinology, Tropical Medicine, and Infectious Disease



Clinical Profile of Diabetic Papillopathy Patients at a Tertiary Care Hospital in Indonesia

Lukisiari Agustini^{1}, Maasa Sunreza Millenia², Muhammad Rizqy Abdullah¹, Hermawan Susanto³*

¹ Department of Ophthalmology, Faculty of Medicine, Universitas Airlangga –Dr. Soetomo General Hospital, Surabaya, Indonesia

² Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

³ Department of Internal Medicine, Faculty of Medicine, Universitas Airlangga –Dr. Soetomo General Hospital, Surabaya, Indonesia

ABSTRACT

Background: Diabetic Papillopathy (DP) is a rare complication of Diabetes mellitus (DM) which affects visual function. The purpose of this study was to describe the profile of DP patients at a tertiary care hospital in Surabaya, Indonesia.

Methods: A descriptive retrospective study using electronic medical records of DP patients at the eye outpatient unit of Dr. Soetomo General Hospital in Surabaya between 2017 and 2020. Demographic data such as clinical characteristics, and history of DM were included. Levels of fasting blood glucose (FBG), 2-hour post-prandial blood sugar (PPG), and HbA1c were taken. Examination of the optic disc and retina determines the diagnosis of DP.

Results: There were 27 cases of DP with the mean age of the patients being 49.3±9.3 years, predominance in the 46-55 years group (59.26%). Patients with DP had average systolic and diastolic blood pressure was 131.74±21.94 mmHg, and 86.00±15.89 mmHg, and an average BMI of 24.6 ±3.54 kg/m² (62.96%). Most patients had a history of type 2 DM (96.29%), mean fasting blood sugar (FBG) and postprandial blood (PPG) was 225±83.3 mg/dL, and 147.81±59.72 mg/dL; and HbA1c 8.6±1.5 mg%.

Conclusion: DP findings are relatively low in DM patients, however, DP could result in decreased visual acuity and quality of life so a proper ocular examination is important in DM patients.

Keywords: Diabetic Papillopathy; Diabetes Mellitus; Optic Disc Edema; Diabetic Retinopathy; HbA1c

ABSTRAK

Latar Belakang: Papilopati Diabetik (PD) merupakan komplikasi langka dari Diabetes melitus (DM) yang mempengaruhi fungsi penglihatan. Tujuan dari penelitian ini adalah

*Corresponding author at: Department of Ophthalmology, Faculty of Medicine, Universitas Airlangga –Dr. Soetomo General Hospital, Surabaya, Indonesia

E-mail address: lukisiari.agustini@fk.unair.ac.id

untuk mendeskripsikan profil pasien PD dari rumah sakit perawatan tersier di Surabaya, Indonesia.

Metode: Studi retrospektif deskriptif menggunakan rekam medis elektronik pasien PD di Unit Rawat Jalan Mata Rumah Sakit Umum Dr. Soetomo Surabaya antara tahun 2017 dan 2020. Dimasukkan data demografis seperti karakteristik klinis, dan riwayat DM. Diambil kadar glukosa darah puasa (KGP), gula darah post-prandial (GPP) 2 jam, dan HbA1c. Pemeriksaan cakram optik dan retina menentukan diagnosis PD.

Hasil: Ada 27 kasus PD dengan usia rata-rata pasien adalah $49,3 \pm 9,3$ tahun, dominasi pada kelompok 46-55 tahun (59,26%). Pasien dengan DP memiliki tekanan darah sistolik dan diastolik rata-rata adalah $131,74 \pm 21,94$ mmHg, dan $86,00 \pm 15,89$ mmHg, dan IMT rata-rata $24,6 \pm 3,54$ kg / m² (62,96%). Sebagian besar pasien memiliki riwayat DM tipe 2 (96,29%), gula darah puasa rata-rata (FBG) dan darah postprandial (PPG) adalah $225 \pm 83,3$ mg / dL, dan $147,81 \pm 59,72$ mg / dL; dan HbA1c $8,6 \pm 1,5$ mg%.

Kesimpulan: Temuan PD relatif rendah pada pasien DM, namun PD dapat mengakibatkan penurunan ketajaman penglihatan dan kualitas hidup sehingga pemeriksaan okular yang tepat penting dilakukan pada pasien DM.

Kata kunci: Papilopati Diabetik; Diabetes Melitus; edema cakram optik; Retinopati Diabetik; HbA1c

Received 23 August 2023 | Revised 05 December 2023 | Accepted 10 December 2023

1 Introduction

Diabetes mellitus (DM) remains a global burden, estimated by the International Diabetes Federation (IDF) with at least 537 million people in the age range 20-79 years in 2021 and estimated in 2030 there will be 643 million and an increase to 783 million people in 2045. In 2021, Indonesia is ranked as 5th of 10 countries with the most DM burden globally [1].

Chronic DM complications could affect several organs both vascular and non-vascular. Vascular disorders include microvascular (retinopathy, neuropathy, and nephropathy) and macrovascular (congestive heart disease, peripheral arterial disease, and cerebrovascular disease). Non-vascular disorders were infections, skin changes, and hearing [2]. One-third of DM patients are complicated with diabetic retinopathy that threatens their vision [3]. However, diabetic retinopathy is not the only ocular complication of DM. Manifestations of other ocular complications due to DM are as varied as cataracts, glaucoma, ocular surface disease, and diabetic papillopathy (DP). DP is swelling of the optic disc due to complications of diabetes mellitus which could occur either unilateral or bilateral and can be found with or without visual disturbances [4]. DP is still considered a rare complication of DM with a previous study showing only 1% of the 3.235 DM patients [5]. DP is a diagnosis of exclusion, hence other causes such as inflammation, infection, increased intracranial pressure, neovascularization of the disc, traction, optic disc drusen, and a range of other causes of pseudo-papilloedema are primarily considered [6].

This study aims to determine the profile of DP patients in the eye outpatient unit of Dr. Soetomo General Hospital Surabaya.

2 Methods

This study used a retrospective study design using secondary data obtained from electronic medical records at the eye outpatient unit of Dr. Soetomo General Hospital Surabaya in the January 2017- December 2020 period. The study population was all patients with swelling or atrophy of the optic disc with a history of diabetes mellitus in the eye outpatient unit. 27 patients with a diagnosis of DP from medical records were obtained. Ethical clearance was obtained from the Medical Ethics Committee of Dr. Sutomo General Hospital (KEPK) number 1053/109/X/2021 (2nd Version). The data collected included patient demographics, gender, age, physical examination including systolic and diastolic blood pressure, height, and weight. Height and weight data were used to determine the Body Mass Index (BMI) of patients. The patients were grouped into four BMI categories, including underweight (<18.5 kg/m²), normal weight (18.5-24.9 kg/m²), overweight (25-29.9 kg/m²), and obesity (>30 kg/m²). Data included were the type of DM, duration of DM which was grouped into three groups (<5 years, 5-10 years, and >10 years), HbA1c levels which were grouped into three groups (<6 mg% (good), 6-8 mg% (moderate), and > 8 mg% (severe), FBG, and PPG. Fundus examination data included were the location of the papillopathy (right eye/OD, left eye/OS, or bilateral/ODS) and the presence of diabetic retinopathy. The hypertension classification used the International Society of Hypertension Global Hypertension Practice Guidelines 2020.

The patient data obtained was shown in descriptive analysis. The data is presented in the form of narratives, tables, and diagrams. In numerical data analysis presented with the Mean, Standard Deviation (SD), Median, Maximum, and Minimum. If the SD value is higher than the Mean, the Median with Maximum and Minimum data is used to adjust the data.

3 Results

Based on the data obtained, the number of diabetic papillopathy patient at Dr. Soetomo General Hospital Surabaya during four years were 27 patients. Within four years, the number of patients diagnosed with DP was varied, which shown in Figure 1. In 2017, 12 patients (44.44%) were diagnosed with DP, however, there was a decline in case numbers for the next three consecutive years afterward.

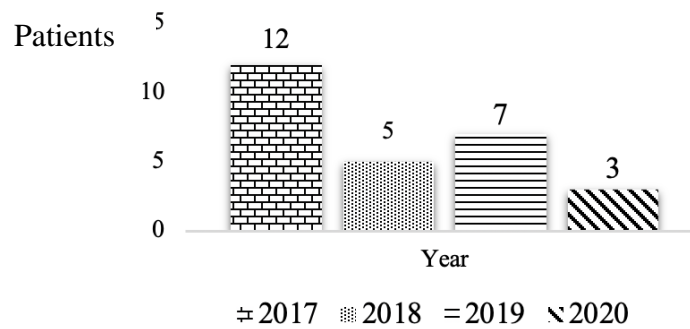


Figure 1 Distribution of DP Patients in Four-Year Period

Based in Table 1, describes the demographics and clinical characteristics distribution of DP patients at the eye outpatient unit of Dr. Soetomo Surabaya General Hospital. There were mostly female patients (51.86%) compared to male (48.14%). As patients were categorized into nine age ranges, the early elderly group had the largest proportion of DP patients (46-55 years), normal blood pressure (55.55%), and normal weight (62.96%).

Table 1 Demographic and Clinical Characteristic

Characteristic	n	(%)
Gender		
Male	13	48.14
Female	14	51.86
Age (years)		
Toddler (0-5)	0	0
Children (6-11)	0	0
Early teens (12-16)	1	3.71
Late teens (17-25)	0	0
Early adulthood (26-35)	4	14.81
Late adulthood (36-45)	0	0
Early elderly (46-55)	16	59.26
Late elderly (56-65)	6	22.22
Seniors (> 65)	0	0
Blood Pressure		
Normal blood pressure	15	55.55
Pre-Hypertension	1	3.71
Stage 1 Hypertension	4	14.81
Stage 2 Hypertension	7	25.92
BMI		
Underweight	1	3.71
Normal weight	17	62.96
Overweight	6	22.22
Obesity	2	7.40
Unknown	1	3.71
Total	27	100

Bases in Table 2, consist of information about the history of DM and the fundus examination data. History consisted of grouping types of DM, duration of DM, and HbA1c levels along with the average FBG level and PPG level. The number of type 2 DM patients dominates the DP patients (96.29%) compared with type 1 DM patients (3.71%). Duration of DM patients were grouped into three groups with the highest number found in the group of patients diagnosed with DM <5

years (51.85%) followed by group 5-10 years (25.92%). Most of them had moderate metabolic control (48.14%).

Table 2 History of DM and patient's fundus examination

Characteristic	n	(%)
Type DM		
T1 DM	1	3.71
T2 DM	26	96.29
Duration of DM (Year)		
<5 years	14	51.85
5-10 years	7	25.92
>10 years	6	22.22
HbA1c		
Good metabolic control	0	0
Moderate metabolic control	13	48.14
Poor metabolic control	14	51.86
Finding DR		
NPDR	3	11.11
PDR	0	0
Absent	24	88.89
Total	27	100

Based on Figure 2, Fundus examination data was obtained to locate the patient's DP with most cases shown as a bilateral DP (59.25%). The fundus examination data with a history of non-proliferative diabetic retinopathy was found in three patients (11.11%) while the other 24 patients (88.89%) did not have a history of diabetic retinopathy.

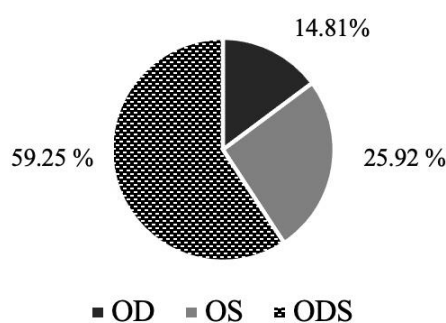


Figure 2 Laterality of Diabetic Papillopathy

4 Discussion

The number of incidents of DP in the Eye Outpatient Unit of Dr. Soetomo Surabaya General Hospital in four years was 27 cases. These findings are higher than previous studies conducted by Huemer *et al.* (2021) in 22 patients [6], Bayraktar *et al.* (2002) in 16 patients [7], and Regillio *et al.* (1995) in 19 patients [8]. A higher number of cases in our study may be due to the high prevalence of DM in Indonesia was high which reached 19,465 people out of the 1,000,000 population [1]. As a comparison, a study by Bayraktar *et al.* (2002) was conducted in Turkey [7], based on IDF data (2021) the prevalence of DM in Turkey is half of the prevalence of DM in

Indonesia [1]. The number of DP cases found may be decreased during the study period due to the impact of the COVID-19 Pandemic. The implementation of the work-from-home in Indonesia has an impact on 70% of DM patients experiencing difficulties in managing diabetes and complications related to DM [9]. According to our research, there is no difference between the proportion of males (48.14%) and females (51.86%). Similar to the earlier study by Huemer *et al.* (2021), the results did not influence based on the proportion of males and females [6]. The prevalence of DM worldwide according to IDF (2021) was male (10.8%) greater than female (10.2%) [1]. According to a previous study, gender has no effect on diabetic papillopathy [10], but according to Singh *et al.* (2020), men have two or three times greater risk of microvascular complications due to DM than women [11].

Diabetic papillopathy patients were mostly found in the 46-55 years age range (59.26%), followed by the 56-65 years (22.22%), and the 26-35 years (14.81%). This result was similar to DM cases prevalence worldwide by IDF which were dominated by patients aged 45-64 years [1]. In the age range of 12-16 years, one patient aged 12 years old who was the only type 1 DM patient was found. The average age of the patients was 49.3(±9.3) years, which was higher than the previous study which was conducted on type 1 DM patients with a mean age was 29 (23-27) years [10].

In clinical blood pressure criteria, most patients with DP had normal blood pressure (55.55%), followed by stage 2 hypertension (25.92%), and stage 1 hypertension (14.81%). The mean systolic blood pressure (SBP) and mean diastolic blood pressure (DBP) values were 131.74 ±21.94 mmHg and 86.00 ±15.89 mmHg, which did not differ significantly from the study conducted at the Endocrinology and Diabetic Unit in Soetomo General Hospital on Diabetic Ocular Renal Surabaya Study (DiORS Study) which showed the mean systolic pressure is 139.29(±20.30) mmHg and the mean diastolic pressure is 85.18(±14.50) mmHg [12]. The similarity may be that both studies were conducted in the same hospital. Several factors such as glucose and HbA1c levels, blood pressure, and lipid control, remain key factors in determining the development and progression of diabetic ocular changes [13]. The BMI data was dominated by normal weight (62.96%). Several studies have shown that the prevalence of DM is found in people with obesity, but in ocular DM complications (diabetic retinopathy) high BMI is not associated with the risk of diabetic retinopathy [11,14].

In terms of DM type, this study was dominated by type 2 DM patients (96.29%). These results were similar to a study by Bayraktar *et al.* (2002) which found the ratio of the number of cases of type 2 DM to type 1 DM was 30:1 [7]. This can be caused by the findings of the IDF study which shows the number of T2 DM worldwide is currently 95% of the total DM patients [1]. Both types of DM did not have different characteristics of DP which are generally found in acute onset and develop bilaterally or unilaterally, but reduced visual fields and regressed papillopathies generally occur in patients younger than 50 years [15].

Most DP patients had a history of DM less than 5 years (51.9%). The mean value of the patient's duration of DM is 4 (0.16-25) years. A previous study by Bayraktar *et al.* (2002) showed that the mean DM duration in DP patients was 10.0 ± 8.6 years [7] while Ostri *et al.* (2010) found an average of 12.6 (5-23) years [10]. A previous study showed DM duration was not considered as a main risk factor for DP, but prolonged poor metabolic control conditions have the highest risk factor [15].

Patients from this study had an average FBG of 225(83,3) mg/dL, an average 2-hour post-prandial glucose 147,81(59,72) mg/dL, and an average HbA1c level of 8.6(1.5) mg%. This is considered a poor metabolic control group dominating DP patients (51.9%). These results are also consistent with previous studies by Bayraktar *et al.* (2002) in the poor metabolic control group, which was 50% [10].

Higher HbA1c levels were independently associated with lower education, not attending diabetes lectures or classes the year prior, believing oneself to adhere to diet and insulin poorly, not having private medical care, and not checking HbA1c levels the year prior. Two independent factors that are strongly connected to high levels of HbA1c are low insulin levels and poor diet compliance [16].

In this study, there were three DP patients accompanied by NPDR (11.11%). In contrast to the study by Bayraktar *et al.* (2002), it was found that the NPDR was 54% and the PDR was 9% [10]. This difference may be because in our study many patients were found with DM less than 5 years which might be due to the late diagnosis of DM. In a previous study, diabetic retinopathy does not appear in every DP case, only 63-80% of cases of diabetic papillopathy. However, the absence of diabetic retinopathy cannot rule out DP as a cause of swelling of the optic disc [17].

From this study, the authors obtained 43 eyes in 27 diabetic papillopathic patients with a predominance in bilateral distribution (59.25%). Unilateral case findings were found in OS (25.92%) and OD (14.81%). This finding is different from the study by Regillo *et al.* (1995) which was dominated by unilateral (57.89%) [8], while the study by Bayraktar *et al.* (2002) found an equal number of bilateral and unilateral findings [10]. The incidence of diabetic papillopathies occurs in 0.49% of all DM patients in our study which is similar to the previous study with 0.5% of DM patients [10].

5 Conclusion

Diabetic papillopathy is a rare ocular diagnosis that occurred from complications of DM, and in this study found relatively low in DM patients. It is very important to understand the finding of swelling or hyperemia of the optic disc in DM patients. Proper glucose regulation and a proper ocular examination are essential for preventing further ocular complications that affect quality of life.

REFERENCES

- [1] International Diabetes Federation. IDF Diabetes Atlas 10th Edition. 2021
- [2] Jameson JL, Fauci AS, Kasper DL, Hauser SL, Longo D, Loscalzo J. Harrison's Manual Of Medicine 20th edition. McGraw-Hill Education. 2020
- [3] American Academy of Ophthalmology. Basic and Clinical Science Course, Section 12: Retina and Vitreous. American Academy of Ophthalmology. 2021
- [4] Sayin N, Kara N, Pekel G. Ocular complications of diabetes mellitus. *World Journal of Diabetes*, 2015;6(1), 92–108. DOI:<https://doi.org/10.4239/wjd.v6.i1.92>
- [5] Feldman-Billard, S., & Dupas, B. Eye disorders other than diabetic retinopathy in patients with diabetes. *Diabetes & Metabolism*, 2021.47. DOI: <https://doi.org/10.1016/j.diabet.2021.101279>
- [6] Huemer, J., Khalid, H., Ferraz, D., Faes, L., Korot, E., Jurkute, N., Balaskas, K., Egan, C. A., Petzold, A., & Keane, P. A. Re-evaluating diabetic papillopathy using optical coherence tomography and inner retinal sublayer analysis. *Eye (Basingstoke)*, June, 2021.1–10. DOI: <https://doi.org/10.1038/s41433-021-01664-1>
- [7] Bayraktar, Z., & Alacali, N. Diabetic Papillopathy in Type II Diabetic Patients. *The Journal of Retinal and Vitreous Diseases*, 2002.22(6):752–8.
- [8] Regillo, C. D., Brown, G. C., Savino, P. J., Gordon, A., Benson, W. E., Tasman, W. S., & Sergott, R. C. Diabetic Papillopathy Patient Characteristics and Fundus Findings. *Arch Ophthalmol*, 1995.113:889–95.
- [9] Kshanti, I. A., Epriliawati, M., Mokoagow, M. I., Nasarudin, J., & Magfira, N. The Impact of COVID-19 Lockdown on Diabetes Complication and Diabetes Management in People With Diabetes in Indonesia. *Journal of Primary Care and Community Health*, 2021.12:1–10. <https://doi.org/10.1177/21501327211044888>
- [10] Ostri, C., Lund-andersen, H., Sander, B., Hvidt-nielsen, D., & Larsen, M. Bilateral Diabetic Papillopathy and Metabolic Control. *American Academy of Ophthalmology*, 2010.117(11), 2214–2217. <https://doi.org/10.1016/j.optha.2010.03.006>
- [11] Singh, S. S., Lennep, J. E. R., Lemmers, R. F. H., Herpt, T. T. W. Van, Lieverse, A. G., Sijbrands, E. J. G., & Hoek, M. Van.. Sex difference in the incidence of microvascular complications in patients with type 2 diabetes mellitus : a prospective cohort study. *Acta Diabetologica*.2020.<https://doi.org/10.1007/s00592-020-01489-6>
- [12] Ardiany, D., Pranoto, A., Soelistijo, S. A., & Widjaja, S. A. Association between neutrophil-lymphocyte ratio on arterial stiffness in type-2 diabetes mellitus patients: a part of DiORS Study. *International Journal of Diabetes in Developing Countries*, 2021. 8. <https://doi.org/10.1007/s13410-021-00965-1>
- [13] Giuliani, G. P., Sadaka, A., Chang, P. Y., & Cortez, R. T. Diabetic Papillopathy: Current and New Treatment Options. *Current Diabetes Reviews*, 2011.7:171–5.
- [14] Zhou, Y., Zhang, Y., Shi, K., & Wang, C. Body mass index and risk of diabetic retinopathy. *Medicine*, 2017;96(22):e6754
- [15] Mafriaci, M., Toscani, L., & Lorenzi, U. Bilateral diabetic papillopathy developed after starting insulin treatment. Potential toxic effect of insulin? A case report. *European Journal of Ophthalmology*, 2020:1–5. <https://doi.org/10.1177/1120672120984383>
- [16] Andrade, C. S., Ribeiro, G. S., Antonio, C., Teles, S., Celestino, R., Neves, S., Duarte, E., & Jr, M. Factors associated with high levels of glycated hemoglobin in patients with type 1 diabetes : a multicentre study in Brazil. *BMJ Open*, 2017;7:1–10. <https://doi.org/10.1136/bmjopen-2017-018094>
- [17] Becker, K. N., & Nichols, J. Review of diabetic papillitis. *Disease-a-Month*, 2021. 67(5);101141. <https://doi.org/10.1016/j.disamonth.2021.101141>