Published online in http://ijam.co.in ISSN No: 0976-5921

International Journal of Ayurvedic Medicine, Vol 15 (4), 2024; 991-995

To ascertain the prevalence of diabetic retinopathy among the different *dehaprakriti* - A cross sectional study

Research Article

Jaykumar Ade[1], Srujali Gat[2], Satish Hadimani[3], Raviraj Pardeshi[4], Revensiddha Usturge[5], Anand Madgundi[6], Bhojraj Chaudhari[7], Santosh Swami[8]

1. Assistant Professor, Kriya Sharir Department, 3. Assistant Professor, Shalakya Department,
5. Associate Professor, Agadtantra Department, 6. Assistant Professor, Rachna Sharir Department,
7. Assistant Professor, Rognidan Department, 8. Associate Professor, Kayachikitsa Department
SGR Ayurved College, Solapur, Maharashtra. India.
2. PG Scholar, Panchakarma Department, S. S. Ayurved College, Hadapsar, Pune, Maharashtra. India.
4. Professor, Kriya Sharir Department, Indutai Gaikwad Patil Ayurved College, Nagpur, Maharashtra. India.

Abstract

Diabetic retinopathy (DR) is a common cause of vision problems worldwide. One in three diabetics has symptoms of diabetic retinopathy. *Dehaprakriti* is a unique concept of Ayurved. By knowing the concept of *Dehaprakriti* one can maintain homeostasis. Aim: Determination of the prevalence of diabetic retinopathy in the different *Dehaprakriti*. Materials and Methods: A simple randomisation study was conducted at SGR Ayurved College & Hospital Solapur, Maharashtra with appropriate consent. According to inclusion criteria, people with Diabetes Mellitus were screened. Fundoscopy was performed on all diabetic patients. Each patient with Diabetes Mellitus underwent funduscopy. The presence or absence of changes in diabetic retinopathy was noted in each patient. Identified subjects with diabetes retinopathy underwent detailed examination by *Dehaprakriti*. The study of *Dehaprakriti* was based on a proforma approved by the Maharashtra University of Health Sciences, Nashik. Result: For the study, 106 individuals with Diabetes Mellitus in total were enrolled. Of them, sixty patients exhibited signs of diabetic retinopathy. The overall prevalence of 56.6 percent was associated with diabetic retinopathy. 25% of people in *Kaphavaat Dehaprakriti* had diabetic retinopathy. *Pittakapha* is the *Dehaprakriti* that is least impacted. The group's prevalence was 10%. Conclusion: Changes in DR are observed to a greater extent in *Kaphvaat Dehaprakriti* individuals.

Keywords: *Dehaprakriti*, Diabetic retinopathy, Vision impairment.

Introduction

The Indian subcontinent is home to the ancient Ayurvedic medical system. It is a science of life. India is going through a lot of social, economic, and demographic shifts. Faster urbanization, more industrialization, rising incomes, greater access to education, and better health care are the main aspects of this. Among non-communicable diseases, Diabetes Mellitus is one of the most prevalent worldwide. A complex interplay of genetics, environmental factors, and lifestyle choices results in a group of common metabolic disorders known as Diabetes Mellitus. Reduced insulin secretion, decreased glucose utilization, and increased glucose production are some of the factors that can contribute to hyperglycemia, depending on the aetiology (1). India is on its way to becoming the diabetic capital of the world. According to the WHO, Diabetes Mellitus (DM) affected 31.7 million people in India in 2000. This number is estimated to rise to 79.4 million by 2030, the highest number of any country in the world (2, 3).

Long-term complications are more likely in all forms of diabetes. These usually appear years later, but for those who haven't been diagnosed yet, they might be the first symptoms. Life-threatening complications such as neuropathy, nephropathy, and retinopathy, as well as pathological changes involving small and large vessels that lead to myocardial problems and cerebrovascular accidents, aggravate diabetes. It is imperative in the modern era to offer hospitable effects that enhance the general health status of individuals with diabetes. Even with the development of diabetic control medications in modern science, the disease still has serious side effects. Over time, diabetic retinopathy (DR) is predicted to develop in nearly two-thirds of Type 2 and nearly all Type 1 diabetics (4). Retinopathy is a serious complication that affects patients' vision and eventually leads to blindness.

The Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study, conducted in three states (Tamil Nadu, Maharashtra and Jharkhand) and one Union Territory (Chandigarh), found a variable

*** Corresponding Author:**
Jaykumar Ade
Assistant Professor,
Kriya Sharir Department,
SGR Ayurved College, Solapur, Maharashtra.
Email Id: drjayade@gmail.com

prevalence of diabetes: 10.4% in Tamil Nadu, 8.4% in Maharashtra, 5.3% in Jharkhand and 13.6% in Chandigarh (5). Diabetic Retinopathy (DR) is the leading cause of vision loss in adults aged 20–74 years (6). From 1990 to 2010, DR was the fifth leading cause of preventable blindness and the fifth leading cause of moderate to severe visual impairment (7). In 2010, of an estimated 285 million diabetics worldwide, more than a third had signs of DR, and a third of them suffered from vision-threatening diabetic retinopathy (VTDR), defined as severe non-proliferative DR or proliferative DR (PDR) or that Presence of diabetic macular edema (DME) (8). An epidemiological study to estimate the prevalence of DM and diabetic retinopathy (DR) in rural India is not available. Secondly, the changing lifestyle and urbanisation of rural culture are gradually affecting the rural population (9 10). In the 21st century, diabetic retinopathy plays a crucial role in blindness. So, it is a burning issue before society.

Prakriti is a unique concept of Ayurved that can be used to determine the status of *doshas* (biological humors) Seasonal and daily routines can be adjusted based on an individual's *Prakriti*. There is no estimate of the prevalence of DR in India among the various *Dehaprakriti* yet. This study was chosen to understand the significance of this idea and to see how it can benefit patients with diabetic retinopathy. Understanding the prevalence of diabetic retinopathy (DR) among different Prakriti body types can help individuals with diabetes modify their lifestyles to prevent the occurrence of DR in the future. Recognising the relationship between Prakriti and DR patients can assist in avoiding further complications. This study aims to raise awareness among the general public and diabetic patients about the potential complications associated with their *Prakriti*.

Aim and objectives:

- Determination of the prevalence of diabetic retinopathy in the different *dehaprakriti*.
- Highlighting the importance of investigating diabetic retinopathy in the context of *dehaprakriti*.

Methodology

This was a cross-sectional study. Desired number of patients with *Madhumeha* (Diabetes Mellitus type II) were enrolled at SGR Ayurved College & Hospital Solapur, which is a referral centre for different geographical administrative regions of Solapur, Maharashtra. An accessible population of diagnosed patients with *Madhumeha* (Diabetes Mellitus type II) at SGR Ayurved College & Hospital, Solapur, Maharashtra was the study population for this project. Individuals who met the inclusion criteria and gave their consent to participate in the study were enrolled after confirming the diagnosis - *Madhumeha* (type II Diabetes Mellitus). Maharashtra University of Health Sciences in Nashik provided funding for this study under the terms of a "Short Term Research Grant." Sixty patients suffering from diabetic retinopathy were chosen. Simple random sampling method was used for selection of subject. This project included patients suffering from *Madhumeha* (Diabetes Mellitus type II) with fasting blood sugar above 110 mg/dl and postprandial blood sugar above 140 mg/dl. Blood glucose was estimated using the GOD POD method. Patients with *Madhumeha* (Diabetes Mellitus type II) between the ages of 35 and 75 years, regardless of gender, religion and socioeconomic conditions and whose fasting blood sugar level above 110 mg/dl, and PP blood sugar above 140 mg/dl were included. Patients with type I Diabetes Mellitus, having kidney failure & patients on insulin therapy was excluded.

This cross sectional study of diabetic patients was carried out in between 2017 to 2018 after receiving the approval from Institutional Ethics Committee. According to the inclusion criteria, patients were enrolled and blood glucose levels were checked. Each patient with Diabetes Mellitus underwent fundoscopy. Fundoscopy was performed in the Ophthalmology Department of SSNJ Hospital. The presence or absence of changes in diabetic retinopathy was noted in each patient. 106 patients with DM were screened. After achieving the target sample size of 60 patients (among 106 screened), the patients having diabetic retinopathy were subjected to detailed examination of *Dehaprakriti*. The examination of *Dehaprakriti* was done on the basis of the proforma prepared by MUHS, Nashik.

Ethical consideration

Ethical approval was obtained from the Institutional Ethical Committee (IEC) of SGR Ayurved College Solapur. Written informed consent was also obtained from each study participant, explaining essential the purpose of the study, elements of confidentiality, data protection, voluntary participation, etc.

Data analysis

Data were analysed using patient baseline characteristics (age, gender, socioeconomic status, marital status) and various *Dehaprakriti*. Frequency or counts and percentages were used to summarise categorical variables. The overall prevalence of patients with diabetic retinopathy was estimated using a 95% confidence interval. The prevalence of diabetic retinopathy for different *Dehaprakriti* was also calculated.

Observation & Result

Table 1: Prevalence of Diabetic Retinopathy

Diabetic Retinopathy	Frequency	Percentage
Yes	60	56.6
No	46	43.4
Total	106	100.0

From the table above, a total of 106 patients with Diabetes Mellitus were included. Of these, 56.6% were found having diabetic retinopathy.

Table 2: Prevalence of Diabetic Retinopathy in different *Dehaprakriti*

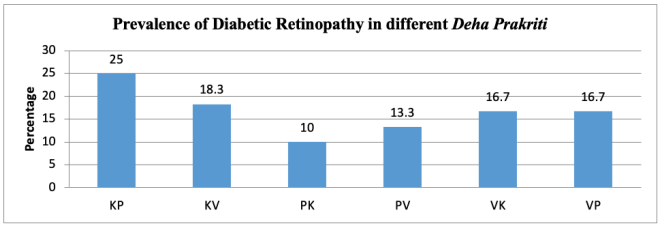
Dehaprakriti	Frequency	Percentage
KP	15	25
KV	11	18.3
PK	6	10
PV	8	13.3
VK	10	16.7
VP	10	16.7
Total	60	100.0

Association between *Prakriti* and DR

The research scholar has attempted to determine the association between *Prakriti* and diabetic retinopathy (DR). To evaluate this association, a chi-square test was applied.

The results showed a chi-square statistic (χ^2) of 4.60 and a p-value of 0.467. It was observed that there is no statistically significant difference in the prevalence of diabetic retinopathy among the six *Deha Prakriti* groups.

Figure 1: Prevalence of Diabetic Retinopathy in different *Deha Prakriti.*



From the above table and figure, majority of the study participants belonged to KP Prakriti category (25%), followed by KV (18.3%), VP & VK (16.7%), PV (13.3%)) and PK (10%).

Discussion

The prevalence of Diabetic Retinopathy was 58.6% overall. 25% of *Kaphapitta* individuals and 18.3 % of *Kaphavata* individuals were having Diabetic Retinopathy, according to *Prakriti*. It means that *Kapha Prakriti* individuals were more affected than any other *Prakriti*. *Kapha Prakriti* individuals possessed attributes like *Manda, Stimita, Sara,* and *Sandra*, hence they were affected by Diabetic Retinopathy.

Characteristics of People with Kapha Prakriti and Their Propensity for Diabetic Retinopathy: People with *Kapha Prakriti* frequently display characteristics like a slow metabolism, a tendency to gain weight, and a sedentary lifestyle. These traits are associated with a higher chance of developing Diabetes Mellitus (DM), especially when paired with a diet heavy in dairy and sweets, which aggravates the *Kaphadosha*. The classics have mentioned that obesity, inactivity, and an ostentatious lifestyle are major causes of diabetic mellitus. This is consistent with the characteristics of people who are *Kapha Prakriti* (11, 12).

Since Diabetes Mellitus is categorised as a *Kaphadosha* disease, people who are *Kapha Prakriti* are more likely to like sweet foods like curd, sugar, and milk. This can vitiate the *Kaphadosha* and worsen the condition. Improper management of Diabetes Mellitus can result in development of complications like diabetic retinopathy (DR). Globally, Diabetic Retinopathy is the main cause of blindness in both developed and developing nations. Diabetic Retinopathy frequently arises from untreated DM over an extended period of time, in contrast to DM, which develops over a chronic period.

Data shows that the prevalence of DR varies between different Prakriti types

Kapha Pradhan Pitta Prakriti: 25% - *Kapha Pradhan Vata Prakriti*: 18.3% - *Vata Pradhan Kapha Prakriti:* 16.7% - *Vata Pradhan Pitta Prakriti*: 13, 3% - *Pitta Pradhan Kapha Prakriti:* 10%

In this study, *Kaphadosha* is the most common *Dosha* found. Classical Ayurvedic texts categorise *Prameha*, which includes DM, as a *Kaphadosha* disorder. According to *Aacharya Charka*, those who have a *Kapha Pradhan Prakriti* are more vulnerable to *prameha* and other *Kaphadosha* disorders as well as their complications. Among the individuals screened none of the patient observed as isolated (single *Doshic-Ekal*) *Prakriti*.

Due to their innate traits of being *Manda* (sluggish), *Sthira* (stable), and *Jada* (dull), *Kaphadosha* disorders, including DM, are frequently difficult to treat. Reduced digestive fire, or *Agnimandya*, is a prominent symptom of *Kapha Prakriti* and can result in *Dhatwagnimandya*, or decreased tissue metabolic function. This condition may lead to more issues and the build-up of waste materials (*Dhatumala*).

Haemorrhage, exudates, and venous beading are among the symptoms of diabetic retinopathy (DR), which is caused by the vitiation of *Raktavaha Strotas*, (blood channels). People who are *Kapha Pradhan Pitta* and *Kapha Pradhan Vata Prakriti* have a higher incidence of DR due to the combined effect of aggravated *Kapha and Pitta doshas*. *Pitta dosha*, which is associated with the eyes due to its *Teja* (fire) quality, is significant in the development of Diabetic Retinopathy.

On the other hand, because of improved *Agni* (digestive power) and a decreased tendency for *dosha* malformation, *Pitta Pradhan Prak*riti exhibits a lower incidence of DR (10%). A similar trend was observed in the previous study, with *Kapha*-predominant *Pitta* showing a higher incidence (13, 14)

There is no statistically significant difference in the prevalence of diabetic retinopathy among the six Deha *Prakriti* groups, which leads us to fail to reject the null hypothesis. The differences observed are likely due to chance. The prevalence rates range from 10% in the PK group to 25% in the KP group. Although this variation is not statistically significant, the higher prevalence in certain groups (e.g., KP) may still be clinically important, particularly if it correlates with known biological or lifestyle factors.

While the lack of statistical significance indicates no strong evidence for differences in prevalence across

the groups, clinical significance should still be assessed based on the population's risk profile and the practical implications of the observed trends.

The total sample size (n = 60) is relatively small, which may limit the study's power to detect significant differences. A larger sample size might reveal meaningful trends that are not evident in this study. There are clinically relevant differences that were not statistically detected; therefore, a larger study should be conducted to confirm these findings.

Clinical differences among the various *Prakriti* were noted during data collection. Patients with diabetic retinopathy and *Kapha Pitta Prakriti* exhibited severe haemorrhage, exudates, and venous bleeding. In contrast, those with *Kapha Vata Prakriti* displayed minimal haemorrhage and dry exudates. Additionally, aneurysms were observed in patients with *Pitta*-predominant *Prakriti*, while dot and blot haemorrhages were noted in those with Vata-predominant *Prakriti*.

In summary, effective DR management requires prevention. According to VISION 2020 (Working together to eliminate avoidable blindness) up to 80% of the world's blindness is avoidable. Avoidable blindness is defined as blindness which can be either treated or prevented by known, cost-effective means. Although there are many other causes of vision impairment, VISION 2020 seeks to address the main causes of avoidable blindness, in order to have the greatest possible impact on vision loss worldwide. Diabetic retinopathy is one among the target diseases for VISION 2020 (15).

Conclusion

In conclusion, the correlation between the risk of diabetic retinopathy (DR) and *Kapha Prakriti* underscores the important role that distinct constitutional types play in both the susceptibility to and management of disease. Because *Kaphadosha* is aggravated and affects metabolic processes, people who are *Kapha Prakriti*—characterised by a sedentary lifestyle, slow metabolism, and a diet high in sweets and dairy products—are more likely to develop Diabetes Mellitus and its complications, including DR. Given the strong correlation between *Kaphadosha* and diabetic complications, the data indicates that DR is most common in *Kapha Pradhan Prakriti*, with notable percentages in *Kapha Pradhan Pitta* and *Kapha Pradhan Vata Prakriti*. The fact that *Vata Pradhan* and *Pitta Pradhan Prakriti* types have lower incidences of DR highlights the importance of dosha balance and digestive strength in preventing disease. The results highlight the significance of taking preventative actions in the management of diabetes and its complications. Early intervention, lifestyle changes, and dietary modifications specific to one's Prakriti can significantly lower the risk of developing DR.

Acknowledgement

Seth Govindji Raoji Ayurved Mahavidyalaya, Solapur & Maharashtra University of Health Sciences, Nashik.

Financial support

This project was funded by Maharashtra University of Health Sciences, Nashik under scheme of short term research grant.

Operational definition

- *Prakriti—Prakriti* (phenotype-based Ayurveda body constitution) is an individual's uniqueness, and it deals with somatic and psychological development (16)
- Diabetic retinopathy - Diabetic retinopathy is now recognised to be an inflammatory, neuro-vascular complication with neuronal injury/dysfunction preceding clinical micro vascular damage (17)

Limitation of study

As this study was conducted for short term research grant purpose so small sample size was taken. Only the Solapur population of Maharashtra, India, is included in the study. In the future, the study might be carried out with a larger sample size, and samples might be gathered from all district of Maharashtra or all state of nation to get more accurate results.

Abbreviations

- *KP- Kapha Pradhan Pitta Anubandhi*
- *KV- Kapha Pradhan Vata Anubandhi*
- *VP- Vaat Pradhan Pitta Anubandhi*
- *VK- Vaat Pradhan Kapha Anubandhi*
- *PV- Pitta Pradhan Vaat Anubandhi*
- PK- *Pitta Pradhan Kapha Anubandhi*
- DR- Diabetic Retinopathy
- DM- Diabetes Mellitus

Author Contribution

The conceptualisation of the project was done by JSA, SSG. Conceptualisation of the manuscript was by JSA SSG BAC. Literature search was done by AKM. The data acquisition was done by SSH, SSG. The statistical analysis was by JSA RRU. Manuscript preparation was by JSA RRU. The manuscript editing was by SIS and the manuscript review was done by RP

References

1. Harrison's principle of internal medicine by Kasper, Braunwald, fauci, Hauser, Longo, Jameson, 16 Edition , Second volume, page 2152
2. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030 Diabetes Care. 2004;27:1047–53
3. Prevention of Blindness from Diabetic Retinopathy. Report of a WHO Consultation, Geneva 2005
4. Guidelines for the Comprehensive Management of Diabetic Retinopathy in India. A VISION 2020 the Right to Sight India Publication 2008
5. Anjana, R.M., Pradeepa, R., Deepa, M. *et al.* Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: Phase I results of the Indian Council of Medical Research–INdia DIABetes (ICMR–INDIAB) study. *Diabetologia*

54, 3022–3027 (2011). https://doi.org/10.1007/s00125-011-2291-5

6. Cheung N, Mitchell P, Wong TY. Diabetic retinopathy. *Lancet.* 2010; 376(9735):124–36. doi: 10.1016/S0140-6736(09)62124-3.
7. Bourne RR, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, et al. Causes of vision loss worldwide, 1990–2010: a systematic analysis. *Lancet Glob Health.* 2013; 1(6):e339–49. doi: 10.1016/S2214-109X(13)70113-X.
8. Yau JW, Rogers SL, Kawasaki R, Lamoureux EL, Kowalski JW, Bek T, et al. Global prevalence and major risk factors of diabetic retinopathy. *Diabetes Care.* 2012;35(3):556–64. doi: 10.2337/dc11-1909.
9. Namperumalsamy P, Kim R, Vignesh TP, et al. Prevalence and risk factors for diabetic retinopathy: a population based assessment from Theni District, South India. Br J Ophthalmol 2009;93:429–34.
10. Mohan V, Shanthirani S, Deepa R, et al. Intra-urban differences in the prevalence of the metabolic syndrome in southern India: the Chennai Urban Population Study. Diabet Med 2001;18:280–7.
11. Astangasamgraha of Vrddha Vagbhata with the Sasilekha Sanskrit commentary by Indu prolougue in Sanskrita and English by Prof.Jyotir Mitra, Chowkhamba Sanskrit Series Office, Varanasi, Edition :2019, Sharirsthana, chapter 6, verse 6-9, Page no 311.
12. Acharya Vidyadhara Shukla and Prof. Ravidutta Tripathi, Charaka Samhita vol. 2, Chaukhamba Sanskrita Pratishthan Dehli, 2013, chikitsasthana adhyaya 6, verse no.4, page no.167.
13. Pradeep K Association of Prakriti in the occurance of retinopathy in diabetic patients- a case series study wjpmr, 2016,2(6), 79-80
14. Pradeep. K Anura P Bale Association of Prakriti and life style in the determinant of retinopathy in diabetic patients, JETIR March 2019, Volume 6, Issue 3 57-63
15. The International Agency for the Prevention of Blindness (IAPB), http://www. Iapb.org/vision-2020 [Accessed online on 23 May 2016].
16. Kuttikrishnan M, Sridhar R, Varghese E. Jatharagni and Prakriti of young Indian adult population: A descriptive cross-sectional study. J Ayurveda Integr Med. 2022 Jan-Mar;13(1):100438. doi: 10.1016/j.jaim.2021.04.008. Epub 2022 Jan 29. PMID: 35101333; PMCID: PMC9034458.
17. Sinclair SH and Schwartz SS (2019) Diabetic Retinopathy–An Underdiagnosed and Undertreated Inflammatory, Neuro-Vascular Complication of Diabetes. Front. Endocrinol. 10:843. doi: 10.3389/fendo.2019.00843.

*****