Clinical Medicine Insights
Received 16 Apr 2022 | Revised 18 May2022 | Accepted 30 May 2022 | Published Online 14 June 2022

DOI: https://doi.org/10.52845/CMI/2022-3-2-4
CMI 03 (02), 304–311 (2022)
ISSN (O) 2694-4626

RESEARCH ARTICLE

Prevalence and Determinants of Retinopathy among Patients with Diabetes Mellitus: Thiqar 2022

Wajida Saa'd Bunyan[1*] | Ali Abed Saadoon[2] | Muslim Nahi Saeed[3] | Zahraa Jumaa Flayh[4] | Hussain Ameer abd Alrazzaq[4]

[1.]Assist profersor, MBCHB, Msc. Ophthalmogist, Department of surgery
[2.] Professor, community physician, MBCHB,Ph.D
[3.] Assist professor, Family physician, MBCHB, Ph.D
[4.]Medical student All affiliated to College of medicine, university of Thi-Qar

Abstract

Background: Retinopathy among patients with type 2 diabetes appears to be a public health problem in Iraq; it is serious eye disease lead to sever visual impairment and blindness if not detected early. Objective: To estimate the prevalence of retinopathy among patients with type 2 diabetes mellitus who attended National Center of Diabetes of Thi_qar and to determine the risk factors of diabetic retinopathy.

Methods: This cross-sectional study was conducted at national center of diabetes of Thi_qar between April and may 2022. 162 type 2 Iraqi diabetic patients both sexes were included in this study. Diabetic Retinopathy was diagnosed by an ophthalmologist depending on the International Clinical Diabetic Retinopathy Severity Scale approved by AAO and I CO. Socio-demographic, clinical and laboratory data were obtained from patients themselves, these variables include Socio-demographic, (sex and age), the participants residence, clinical data include, smoking, Hypertension or if the patient is currently using prescribed antihypertensive drugs, if have retinopathy and nephropathy, height and weight are measured.

Result: From 492 patients with diabetes mellitus, 272 patients (55.2%) had retinopathy (48 males, 42 females). The mean±SD of the age was 53.85 years. More than two third of patients were above 48 years old. 54.4% were hypertensive,26.6% cigarette smokers and 2.22% electronic hooka

Conclusion: This study showed high prevalence of diabetic retinopathy among type 2 diabetic patients, with poor control of blood glucose, high triglyceride, longer diabetes duration, hypertension, insulin treatment and age and gender as factor to develop retinopathy.

Keywords: Ritinopathy, DM, Thiqar ,2022

1 | INTRODUCTION

Diabetic retinopathy (DR) is a microvascular disorder caused by the long-term effects of diabetes, which results in vision-threatening retinal degeneration and eventually blindness. (1) Many studies have found that hypertension, obesity, male sex, high triglyceride levels, HbAlc greater than 7%, smoking, nephropathy and long-term diabetes are all risk factors for DR (2_8). Diabetic retinopathy affects people who have diabetes mellitus, whether they are diagnosed or not. The risk of developing diabetic retinopathy is directly related to the patient's age and diabetes duration, as well as poor glycemic control and blood pressure fluctuations (9). Diabetic retinopathy is the main cause of blindness in working age adults around the world, about 93 million people with diabetic retinopathy.

The Middle East is home to six of the top ten countries with the highest diabetes prevalence (Bahrain, Kuwait, Lebanon, Oman, Saudi Arabia, and United Arab Emirates). The prevalence of diabetic retinopathy is about 19% in the UAE to 64% in Jordan, 37%in Iraq, 29.6 in Iran, 55% in Yemen (10). Diabetic retinopathy is diagnosed by an ophthalmologist or optometrist by using comprehensive dilated eye exam, this should be occur shortly after diagnosis with DM in patient with type 2 DM, Early detection and treatment can help to prevent complications and slow the disease's course (11).

Primary, secondary, and tertiary preventative efforts for the DR epidemic can all be generally characterized. Primary, secondary, and tertiary preventative efforts for the DR epidemic can all be generally characterized. The goal of primary prevention is to prevent or delay the start of the disease (in this case, mild DR in those with diabetes). It necessitates a greater understanding of the risk of DR and blindness in diabetic patients, system-level lifestyle changes such as increased physical activity or dietary changes, pharmaceutical therapies for glycemic and blood pressure control, and systematic screening for the beginning of DR. Secondary prevention requires the implementation of programs to slow the progression of DR, with a focus on systemic risk factor control, regular DR screening to track the progression of mild DR to vision-threatening stages, and the development and implementation of evidence-based management guidelines. Ophthalmologists have focused on tertiary prevention of DR blindness based on timely laser photocoagulation treatment and ocular surgery, but increasingly on the widespread use of anti-VEGF for VTDR, including DME and PDR, especially in high-income nations.

AIM

The aim of this study is to estimate the prevalence of retinopathy among patients with type 2 diabetes mellitus among 224 people in Thi_qar.

Justification

Retinopathy among patients with type 2 diabetes appears to be a public health problem in Iraq; it is serious eye disease lead to sever visual impairment and blindness if not detected early.

2 | METHODOLOGY

Study design: descriptive, Cross -sectional study Study patterns: face to face interview Place & Time of study: The study took place in Thi qar governate , study began at 20th of January 2022 and ended at 28th of April 2022 Study Population: diabetic patient in thi-qar. Exclusion outside thi-qar This cross sectional study was conducted on 492 diabetic patients attending to Diabetes center in Thi_qar between April and may 2022. These patients were initially diagnosed as diabetics by physician and diagnosis of retinopathy was done by an ophthalmologist. Sample as a convenience sample, collected through face to face interview for 5 days per week.

Supplementary information The online version of this article (10.52845/CMI/2022-3-2-4) contains supplementary material, which is available to authorized users.

Ethical Consideration: Ethical consent had been attained from the scientific committee of community medicine department / College of Medicine / Thiqar University and also from The Associate scientific Dean of the Same College, and take from counselling of ophthalmology by Al-Habbobi hospital, with agreement of patient to be one of my samples in research.

variables of interest: Age, gender, socioeconomic status, marital status, occupation, type of DM, duration, type of treatment, signs of retinopathy, Diabetic Retinopathy (DR) is a specific microvascular ocular complication associated with diabetes.1 The global prevalence of chronic microvascular complications like DR is increasing due to the increasing prevalence of diabetes worldwide as well as the increased survival of people with diabetes. Laboratory data were obtained from patients files in diabetic and endocrinology center, these variables include Socio-demographic, (sex and age), the participants residence, clinical data include, smoking, Hypertension or if the patient is currently using prescribed antihypertensive drugs, if have retinopathy and nephropathy, height and weight are measured. All patient underwent blood investigation HbA1c (good glycemic control if HbA1c is less than 7%) and triglycerides (TG) investigation.

The prevalence of DR was calculated using the number of patients with DR as the numerator and the total number of T2DM as the denominator. **Statistical Analysis:** ualitative data had been analyzed by using SPSS (statistical package for social science), were percentage and chi square had been calculated, p value <0.05 is significant.

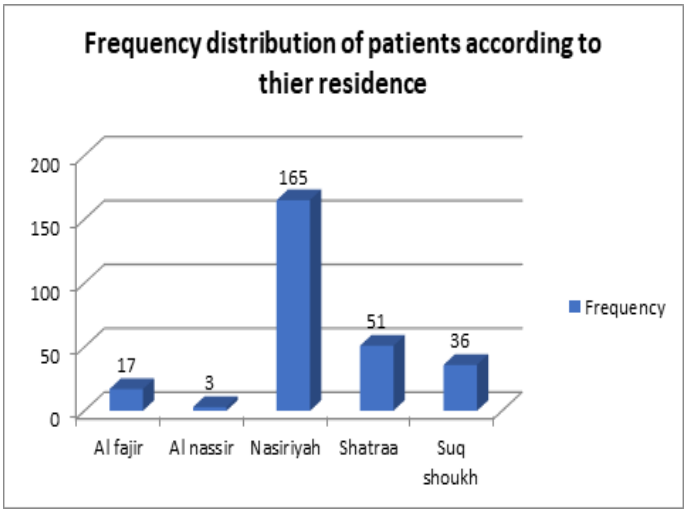
Epidemiological Analysis:

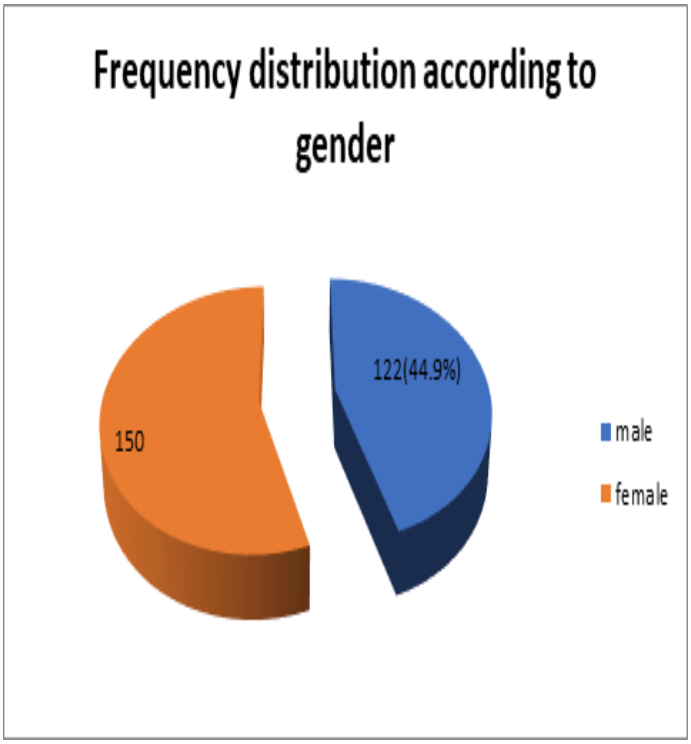
$$\text{Prevelance} = \frac{\textit{diabetic patient develope retinopathy}}{\textit{total population}}$$

$$\text{Percentage} = \frac{\textit{patient who develpoe diabetic retinopathy}}{\textit{diabetic patient}} \; x\; 100\%$$

3 | RESULTS

In total, 492 diabetic patient consulting the ophthalmological unite randomly selected different types diabetic patients were included (272) of them were with diabetic retinopathy. Their ages ranged from 15 to 82 years, with a mean SD of 53.82 (12.51) years and a median of 53 years. 55.2% (n = 272) of them were diagnosed with DR. As seen in table, the mean age of male and female diabetic retionpathy patients were 56.02 years and 58.92 years. The mean age of patients with DR was significantly higher (P < 0.001) in comparison to patients without DR (57.37 vs. 53.82 years) Prevalence of diabetic retinopathy among diabetic patients from the type 2 diabetic patients recruited in the study the prevalence of DR was (55.5%). The prevalence of DR was higher among patients' males and patients with hypertension and nephropathy. From the total participants, 54.4% had hypertension as a co-morbidity, 53.3% had nephropathy, and 71.1% had family history of DM. However, in this study factors such as, gender, occupational status, alcohol drinking status, types of diabetes, and having awareness about diabetic retinopathy did not show statistically significant association with DR either on a bivariable or a multivariable logistic regression analysis.





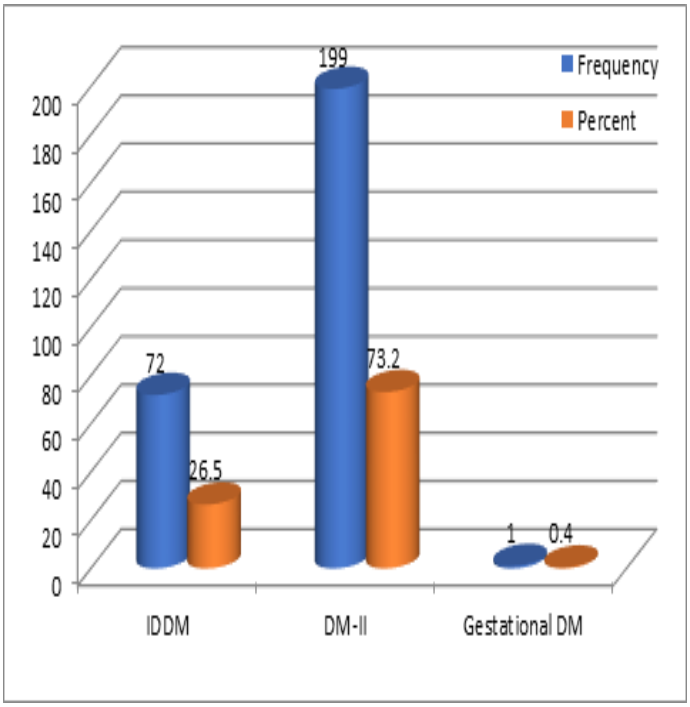
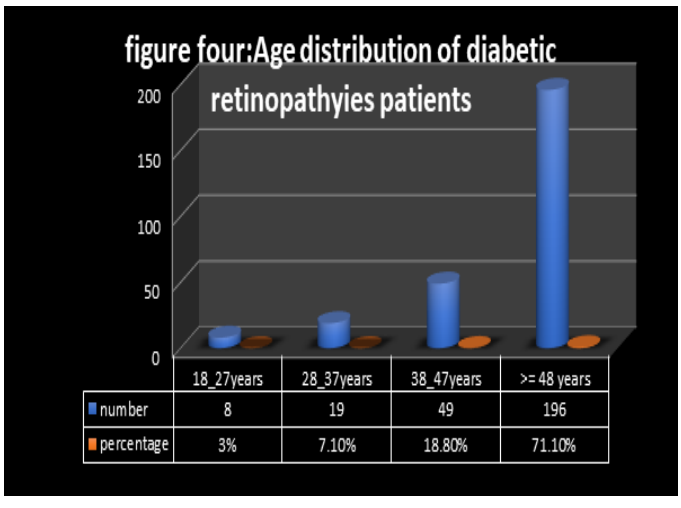


Figure three retinopathy according to types of DM

Variables	Frequency	Percent	P value
Age			
18_27	8	3%	0.032
28_37	19	7.1%	
38_47	49	18.8%	
>= 48	196	71.1%	
Occupational status			
Employer	82	30%	0.42
Retired	33	12.2%	
House wife	94	34.4%	
Free work	63	23.3%	
Other disease			
Hypertension	148	54.4%	0.021
Nephropathy	145	53.3%	
Cardiovascular problem	125	46%	
CNS problem	35	13.3%	
Control status			
Uncontrolled DM	70	25.7%	0.027
Fair controlled DM	139	51%	
Controlled DM	63	23.3%	
Family history			
Present	193	71.1%	0.011
Absent	79	28.8%	
Smoking			
Not smoker	194	71.1%	0.001
Cigarrates smoker	72	26.6%	
Electronic hooka	6	2.22%	
Drinking Alcohol			
Drinker	0	0	0.0001
Non drinker	272	100 %	
Sample size = 90			

Table show distribution of age, gender, occupational status, control, association with other disease, smoking and drinking alcohol among diabetic retinopathy patient.



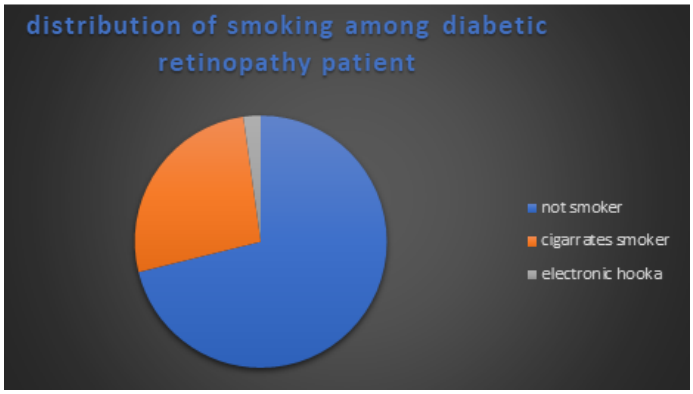


Figure five: Diabetic retinopathy according to smoking status

4 | DISCUSSION

This study was a single-center registry-based study in diabetic retinopathy among diabetes patients who attended the Diabetic Clinic in thi_qar. The prevalence of Diabetic Retinopathy in type 2 diabetic patients was 55.5%. considerable increase in the burden of diabetic complications including DR. Comparison among studies is difficult because the prevalence of retinopathy has varied widely depending on the methodology and populations. The prevalence of diabetic retinopathy in this study is higher than prevalence of retinopathy among type 2 diabetes of other articles, The higher prevalence reported in this study could be due to the difference in the selection of study sample. The prevalence of DR in this study is comparable to the RJ, et. al. study in 2003 in Australia (2). Other study in Africa also have shown lower prevalence of DR from this study (4). Other study shows a lower prevalence of DR among type 2 diabetic patients (5). Sparrow et. al. (2003) in England found a higher overall rate of retinopathy (3). The patient's age was linked to the development of DR (P=0.002). According to certain studies, there is a link between DR and age. Aging, high blood glucose, and high blood pressure promote microvascular loss of blood vessels, which worsens with time, hence diabetic retinopathy is primarily caused by aging and the length of diabetes (6,12). Gender may also identify as a risk factor in our study, which is similar to Sparrow study concluded that the severity of DR was related to male sex (3).

This finding also echoed a Malaysian study in a teaching hospital whereby the risk of developing DR was higher among the older population due to the vascular changes in the retinal circulation (13). With advancing age, DR can result in blindness in the elderly if left untreated.

Aside from that, our research found that the length of time from T2DM diagnosis was linked to DR. The likelihood of developing DR increases as the length of T2DM diagnosis increases. This was in line with previous research, however in the other investigations (14,13,15) the OR was larger.

Furthermore, diabetes treatment is crucial in the development of DR. The HbA1c level can be well controlled if diabetes is well managed. Poor diabetes care, on the other hand, can result in suboptimal HbA1c levels, which can increase the risk of developing DR. This study found a robust link between HbA1c and the development of DR, similar to earlier research (14, 15). A drop in HbA1c of 1.0 percent was linked to a 37.0 percent reduction in microvascular problems (16).

HbA1c levels, on the other hand, are ambiguous and may be a non-significant finding in DR (13). Furthermore, the primary factor of DR was lifetime exposure to high blood glucose levels. This study found that early intervention in blood sugar control is critical for reducing the incidence of diabetes mellitus. To put it another way, glycemic management is protective against DR (17). Strict nutrition control, a healthy lifestyle, physical activity, and low stress levels can all help. Aside from lifestyle changes and pharmacological therapy, more extensive non-pharmacological care options for DR include pancreas transplant and islet cell transplantation (18). In comparison to medication therapy, islet cell transplantation has demonstrated encouraging effects in delaying the progression of DR. Patients who got the transplant, on the other hand, had superior baseline HbA1c control than the non-transplanted group in the above-mentioned study (19). As a result, more research is needed to get a better understanding of the effect of islet cell transplantation on DR (18).

In terms of medical care, the broad availability of continuous insulin pump therapy has been linked to a lower DR rate and better outcomes than conventional insulin therapy (19). To keep diabetes under control, the medical staff and patients must collaborate closely. Long-term, the advantages of intensive blood sugar control with lower glucose variability can arrest the progression of DR and other DM consequences such diabetes nephropathy, peripheral vascular disease, and coronary heart disease (20). Moreover, this study highlighted the association between DR and diabetic nephropathy. This was aligned with the Asian Korean study that reported a 19.3% prevalence rate of DR among patients with nephropathy (21). The pathophysiology of both DR and diabetic nephropathy is similar. In advanced retinopathy when structural changes are detected in the cell membrane of the eye, similar changes will also be seen in the kidney cells (22, 23). Hypertension was found to have a strong link with the severity of retinopathy in this investigation. Studies in the Asian population revealed that diabetes patients with hypertension have twice the chance of developing retinopathy (24, 25). In Western countries, similar findings have been recorded (26,14). Hypertensive individuals have impaired retinal autoregulation, leaving them unable to defend themselves from fluctuations in blood pressure caused by hyperglycemia in diabetic patients, which compromises retinal perfusion regulation (27). finally, this study did not explore the association between geographical factors and DR. Therefore, future research should explore the impact of geographical factors towards the development of DR in Sabah. Based on the study results, necessary modifications in the management plan of DR can significantly improve the quality of life of diabetic patients.

Also another important notes were The patient's age was linked to the development of DR. According to certain studies, there is a link between DR and age. Aging, high blood glucose, and high blood pressure promote microvascular loss of blood vessels, which worsens with time, hence diabetic retinopathy is primarily caused by aging and the length of diabetes (28,29). Gender was not identified as a risk factor in our investigation, which concurs with Anchorman et alfindings.'s in Isfahan (30). Sparrow's study, on the other hand, found that the severity of DR was linked to male sex (31).

Most studies on diabetic changes in the eye show that high blood pressure is significantly associated with diabetic retinopathy, and consider hypertension to be an established risk factor for DR because it causes blood vessel destruction, especially when it is associated with high blood glucose (32,33). Hypertension showed a significant association with DR, but these findings contradict those of the Segato et al. study, which found that hypertension was not related to DR (34)

5 | CONCLUSION

DR was found to affect one-third of patients who attended the Diabetic Clinic of Thi_qar. The prevalence of DR increased with longer duration of diabetes, high HbA1c level, presence of significant albuminuria, and impaired protective sensation and may have association with gender, age and other disorder like nephropathy and hypertension. Diabetic patients should be encouraged to stringently control their diabetes and comorbidities. Appropriate management of associated risk factors can alleviate DR and other cardiovascular complications.

RECOMMENDATION

Recommend going further in this study to record many populations and for longer duration and to include other risk factors apart from the duration of the disease to induce DR.

we can reduce the prevalence of diabetic retinopathy by developing an integrated health and social care pathway, further education and better communication between all the relevant parties hence it is extremely crucial to spread knowledge regarding diabetic retinopathy through television, newspaper, posters in all hospitals and other health centers as it will motivate and encourage the diabetic patients to undergo a timely eye examination and thus engage individuals so an

initial details and comprehensive eye examination should be performed and project to encourage the physicians to send the patients for retinal checkups to diagnose them earlier and also, educate the patients about the screening schedules of DR. Subsequent examinations for type I and type II diabetic patients should be repeated annually in the absence of retinal changes, otherwise shorter intervals are recommended (35,36).

REFERENCES

1. Eisma JH,Dulle JE,Fort PE, Current knowledge on diabetic retinopathy from human donor tissues. World journal of diabetes. 2015 Mar 15
2. Tapp RJ, Shaw JE, Harper CA, de Courten MP, Balkau B, McCarty DJ, Taylor HR, Welborn
3. TA &Zimmet PZ: The prevalence of and factors associated with diabetic retinopathy in the Australian population. Diabetes Care, 2003; 26:1731-37.
4. Sparrow JM, McLeod BK, Smith TD, Birch MK &Rosenthal AR: The prevalence of diabetic retinopathy and maculopathy and their risk factors in thetype 2diabetic patients of an English town. Eye, 2003, 7 (Pt1): 158-63.
5. Sidibe EH: Diabetic retinopathy in Dakar and review of African literature: epidemiologic elements. Diabetes Metab, 2000, 26:322-24.
6. Norymberg CK, Neumann E & Dekel H: Complication-free duration and the risk of development of retinopathy in elderly diabetic patients. Arch Intern Med, 2008, 158:641-44.
7. Wright AD& Dodson PM: Me and ACCORD Eye studies. Eye (Lond), 2011; 25:843-49.
8. Janghorbani M, Amini M, Ghanbari H &SafaieeH: Incidence of and risk factors for diabetic retinopathy in Isfahan, Iran. Ophthalmic Epidemiol, 2003, 10:81-95.
9. Robyn J, Jonathan E, Alex H, et. al. The prevalence of and factors associated with diabetic retinopathy in the Australian population. Diabetes care, 2003; 26(6):1731-37.
10. Wang Y,Lin Z,Zhai G,Ding X,Wen L,Li D,Zou B,Feng K,Liang Y,Xie C, Prevalence of and risk factors for diabetic retinopathy and diabetic macular edema in patients with early and late onset diabetes mellitus. Ophthalmic research. 2020 Apr 30;
11. Lee R, Wong Tien Y Sabanayagam C. Eye Vis (Lond). 2015; 2:17.
12. American Diabetes Association Professional Practice Committee. Diabetes Care. 2022; 45(Supplement_1): S185-S194. Doi: 10.2337/ dc22-S012.
13. Abu El Asrar AM, Al-Rubeaan KA, Al-Amro SA, Kangave D & Moharram OA: Risk factors for diabetic retinopathy among Saudi diabetics. Int Ophthalmol, 2009;22:155-61.
14. Abougalambou SSI, Abougalambou AS. Risk factors associated with diabetic retinopathy among type 2 diabetes patients at teaching hospital in Malaysia. Diabetes Metab Syndr Clin Res Rev. 2015;9(2):98–103.
15. Yau JWY, 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.
16. Raman R, Ganesan S, Pal SS, Kulothungan V, Sharma T. report no 2. BMJ Open Diabetes Res Care. 2014;2(1): e000005.
17. Stratton IM, Adler AI, Neil HAW, Matthews DR, Manley SE, Cull CA, et al. Prospective Observational Study . BMJ Open. 2000; 321:405–12.
18. Ferris FL, Nathan DM. Preventing Diabetic Retinopathy Progression. Ophthalmology. 2016;123(9):1840–2.
19. Fiorina P, Shapiro AMJ, Ricordi C, Secchi A. The clinical impact of islet transplantation. Am J Transplant. 2008;8(10):1990–7.
20. Robertson RP. Islet Transplantation a Decade Later and Strategies for Filling a Half-Full Glass. Diabetes. 2010; 59:1285–91.
21. Zabeen B, Craig ME, Virk SA, Pryke A, Chan AKF, Cho YH, et al. Insulin pump therapy is associated with lower rates of retinopathy and peripheral nerve abnormality. PLoS One. 2016;11(4):1–10.

22. Lee WJ, Sobrin L, Lee MJ, Kang MH, Seong M, Cho H. The relationship between diabetic retinopathy and diabetic nephropathy in a population-based study in Korea (KNHANES V-2, 3). Investig Ophthalmol Vis Sci.2014;55(10):6547 –53.
23. Lim MCC, Shu YL, Cheng BCL, Wong DWK, Sze GO, Chong LA, et al. Diabetic retinopathy in diabetics referred to a tertiary centre from a nationwide screening programme. Ann Acad Med Singapore. 2008;37(9):753–9.
24. Klein R, Knudtson MD, Lee KE, Gangnon R, Klein BEK. The Wisconsin Epidemiologic Study of Diabetic Retinopathy XXII. Ophthalmology. 2008;115(11):1859–68.
25. Raman R, Rani PK, Reddi Rachepalle S, Gnanamoorthy P, Uthra S, Kumaramanickavel G, et al. 2009;116(2):311–8.
26. Wong TY, Cheung N, Tay WT, Wang JJ, Aung T, Saw SM, et al. 2008;115(11):1869–75.
27. Eva M. Kohner M, Stephen J. Aldington D, Irene M. Stratton Ms, Susan E. Manley P, Rury R. Holman M, David R. Matthews M, et al. United Kingdom Prospective Diabetes Study. ARCH OPHTHALMOL. 1998;116:297–303.
28. Wright AD& Dodson PM: Me and ACCORD Eye studies. Eye (Lond), 2011; 25:843-49.
29. Abu El Asrar AM, Al-Rubeaan KA, Al-Amro SA, Kangave D & Moharram OA: Risk factors for diabetic retinopathy among Saudi diabetics Ophthalmology, 2009;22:155-61.
30. Janghorbani M, Maini M, Ghanbari H &Safaiee H: Incidence of and risk factors for diabetic retinopathy in Isfahan, Iran. Ophthalmic Epidemiol, 2003, 10:81-95.
31. Sparrow JM, McLeod BK, Smith TD, Birch MK &Rosenthal AR: The prevalence of diabetic retinopathy and maculopathy and their risk factors in thetype 2diabetic patients of an English town. Eye, 2003, 7 (Pt1): 158-63
32. International Council of Ophthalmology (ICO) International Clinical Guideline: Diabetic retinopathy (initial and follow up evaluation). Available as at: http//www.icoph.org/:/guide/ guidedi.htmlat,2006;15:105
33. Van leiden HA, Dekker JM, Moll AC, Nijpels G, Heine R, Bouter L, et. al.: Blood pressure, lipid and obesity are associated with retinopathy: The hoom study. Diabetes care,2002; 25(8):1320-25.
34. Segato T, Midena E, Grigoletto F et. al.:The epidemiology and prevalence of diabetic retinopathy in the Veneto region of North East Italy. Veneto group for diabetic retinopathy. Diabet Med, 2008; 8:511-16.
35. Curtis TM, Gardiner TA, Stitt AW. Microvascular lesions of diabetic retinopathy: Clues towards understanding pathogenesis? Eye. 2009;23(7):1496–508.
American Diabetes Association. Standards of medical care in diabetes—2016. Diabetes Care. 2016;39(suppl 1):S1-S106.

How to cite this article: Bunyan, W. S. ., Saadoon, A. A. ., Saeed, M. N. ., Flayh, Z. J. ., & Alrazzaq, H. A. abd . (2022). Prevalence and Determinants of Retinopathy among Patients with Diabetes Mellitus: Thiqar 2022. Clinical Medicine Insights, 3(2), 304–311. https://doi.org/10.52845/CMI/2022-3-2-4