

Knowledge of diabetic patients users of the Health Unic System about diabetic retinopathy

Conhecimento dos pacientes diabéticos usuários do Sistema Único de Saúde acerca da retinopatia diabética

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ABSTRACT

Objective: To evaluate the level of knowledge of diabetic patients treated at the Unified Health System (SUS – Sistema Único de Saúde) in the city of Boa Vista / Roraima, about Diabetic Retinopathy (DR). **Methods:** This is a cross-sectional, descriptive, quantitative study conducted through the application of a semi-structured questionnaire for 150 diabetic individuals, SUS users, from the city of Boa Vista - RR, during the year 2017. Statistical analyzes were performed using the Microsoft Excel and EpiInfo 7® programs, setting the 5% level for the rejection of the null hypothesis. **Results:** Of the total sample, 76.7% of the individuals did not have any knowledge about DR, 19.3% had some type of knowledge, but did not have the pathology, 2.7% knew, had DR and was receiving treatment, 1.3% knew, had DR and was not receiving treatment. About orientation, 40.6% of the participants never received any information about the risk of vision loss. About the type of Diabetes, 44.7% of the participants did not know what type they had, 42% reported having DM 2 and 13.3% DM1. On glucose control, 59.4% could not maintain it. It was evidenced an association between glucose control and DR knowledge, between the time of DM installation and knowledge about DR, and between having consulted an ophthalmologist and knowing about DR. **Conclusion:** The level of knowledge about DR is very low, a worrying factor because it is one of the most important complications of diabetes. It is observed that the health system is not being efficient as facilitator of this knowledge.

Keywords: Diabetes mellitus; Diabetic retinopathy; Knowledge; Unified Health System

RESUMO

Objetivo: Avaliar o nível de conhecimento dos pacientes diabéticos, atendidos no Sistema Único de Saúde (SUS) na cidade de Boa Vista/Roraima, acerca da Retinopatia Diabética (RD). **Métodos:** Trata-se de um estudo transversal, descritivo, de caráter quantitativo, realizado através da aplicação de um questionário semi-estruturado para 150 indivíduos diabéticos, usuários do SUS, da cidade de Boa Vista – RR, durante o ano de 2017. As análises estatísticas foram realizadas utilizando os programas Microsoft Excel e EpiInfo 7®, fixando-se o nível de 5% para a rejeição da hipótese de nulidade. **Resultados:** Do total amostral pesquisado, 76,7% dos indivíduos não possuía nenhum conhecimento sobre a RD, 19,3% tinha algum tipo de conhecimento, mas não possuía a patologia, 2,7% conhecia, possuía a RD e fazia tratamento e 1,3% conhecia, possuía a RD e não se tratava. Quanto a orientação, 40,6% dos participantes nunca recebeu nenhuma informação sobre o risco de perda da visão. Acerca do tipo de Diabetes, 44,7% dos participantes não sabia que tipo possuía, 42% relatou ter DM 2 e 13,3% DM1. Sobre o controle da glicose, 59,4% não conseguia mantê-lo. Foi evidenciada associação entre o controle da glicose e o conhecimento sobre RD, entre o tempo de instalação da DM e o conhecimento sobre RD e entre ter consultado um oftalmologista e conhecer sobre a RD. **Conclusão:** O nível de conhecimento sobre a RD é muito baixo, fator preocupante por tratar-se de uma das complicações mais importantes do Diabetes. Percebe-se que o sistema de saúde não está sendo eficiente como facilitador deste conhecimento.

Descritores: Diabetes mellitus; Retinopatia diabética; Conhecimento; Sistema Único de Saúde

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INTRODUCTION

D iabetes Mellitus (DM) is undoubtedly one of the greatest health problems worldwide. According to the Diabetes Federation, more than 250 million people live with the disease, and according to projections, this number could reach 380 million by the year 2025. According to the Brazilian Diabetes Society (SBD), Brazil is the 4th among the nations with the highest prevalence of diabetes: 13.7 million Brazilians, and many of these patients were not even diagnosed yet.⁽¹⁾

It is known that one of the most important microvascular complications of diabetes mellitus is Diabetic Retinopathy (DR), considered the most frequent cause of blindness affecting the working population of industrialized countries. The United States alone account for approximately 8,000 new cases of blindness per year.^(2,3)

It is known that DR is predominantly a type of retinal microangiopathy, since small blood vessels are vulnerable to damage from excess glucose in the body. Mechanisms of cell damage include intracellular accumulation of sorbitol, oxidative stress (due to excessive free radicals), accumulation of advanced glycation products, and excessive activation of various isoforms of the protein Kinase C.⁽⁴⁾

However, it is known that the efficacy of treatment for both Diabetes Mellitus and its complications such as DR does not depend only on the intervention of the medical professional. Knowledge, as well as patient care about their own pathological condition, strongly influence both DR prevention and treatment. In addition, family participation is an essential point to encourage care more regularly. Correct screening is so important that the risk of diabetes blindness can be reduced to less than 5% when the diagnosis is made in a timely manner and the treatment is correct before irreversible alterations can occur.⁽⁵⁾ Therefore, DR screening plays a major role in preventing blindness, although studies have shown that this recommendation is far from being followed as seriously as it should.⁽⁶⁾

The risk of loss of vision can be significantly reduced with strict glucose control and regular appointments with the ophthalmologist. It is known that diabetes duration and glycemic control are the two most important factors when related to the development and severity of DR. In general, to every 1% reduction in glycosylated hemoglobin there is a reduction in the risk of retinopathy onset of 35% and of progression of 39%.⁽⁷⁾

This scenario is worrying, as about 50% of diabetes patients will develop some degree of DR throughout their lives. In addition, the diabetic patient is almost 30 times more likely to become blind when compared to a non-diabetic patient: the percentage of diabetic patients with some degree of diabetic retinopathy increases according to the duration of the disease. In Brazil, it is estimated that blindness among diabetic patients can reach the prevalence of 4.8%.⁽¹⁾

The implementation of actions aimed at the detection of incapacitating diseases such as DR, as well as the effective link between primary and secondary care systems, may produce favorable results for health and for the improvement of the quality of life of patients.⁽⁸⁾ Thus, the present study aimed to evaluate the level of knowledge of users of the Brazilian Unified Health System - SUS (primary and secondary care) in the city of Boa Vista-Roraima diagnosed with Diabetes 1 and 2 regarding DR, as well as evaluate if the health professionals who treat them give

adequate guidance on the mechanisms of prevention and control of this complication.

METHODS

This is a cross-sectional, descriptive, quantitative study carried out by means of a semi-structured questionnaire for 150 diabetic individuals older than 18 years and users of SUS in the city of Boa Vista - RR during the year 2017. The participants of the research were selected and data was collected at the endocrinology ambulatory of Hospital Coronel Mota (HCM), at Unidade Básica de Saúde in the neighborhood 31 de Março, at Unidade Básica de Saúde of in the neighborhood of Buritis, and at Unidade Básica de Saúde in the neighborhood of 13 de Setembro.

Statistical analyzes were performed using the Microsoft Excel and EpiInfo 7® programs, with the level of 5% for rejection of the null hypothesis. The study was approved by the Research Ethics Committee of Universidade Federal de Roraima.

RESULTS

Concerning the participant knowledge on what type of diabetes mellitus they have, if DM type 1 or DM type 2, 13.3% of 150 individuals answered that they had DM type 1, 42% DM type 2, and the majority of participants (44.7%) reported not knowing what type of diabetes they had.

Regarding the treatment for diabetes, 114 participants (76%) reported having undergone treatment since diagnosis, 33 people (22%) reported having adhered to the treatment but not immediately after diagnosis, and a minority of 3 participants, which is equivalent to 2% of the sample universe, stated that they did not have any type of treatment even though they know they have DM.

Another important factor addressed was glucose control. In this regard, the majority of participants (59.4%) reported not being able to keep control, that is, their glucose level was not controlled. Whereas 40.6% of participants reported that their glucose was controlled, therefore demonstrating dangerous values for the scenario of prevention and quality of life (Figure 1).

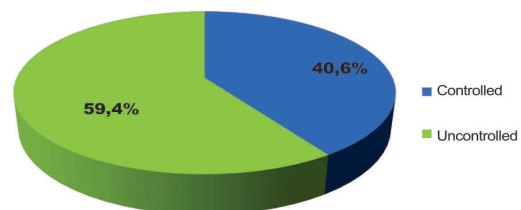


Figure 1: Glucose control profile of diabetic patients treated at the Brazilian Unified Health System – Roraima

When questioned about the possibility of DM causing some type of ocular complication, 141 participants (representing 94% of the sample studied) stated that it could cause some vision problems, whereas 9 (6%) reported not knowing if DM could cause ocular problems. As for those who stated that DM can cause vision problems, 22.7% said that this condition may cause vision impairment, 56.7% said that DM can cause blindness, 10% reported knowing that DM can cause vision problems, but they could not say what type of problem could be caused, and 4.6% said that DM can cause diabetic retinopathy (Figure 2).

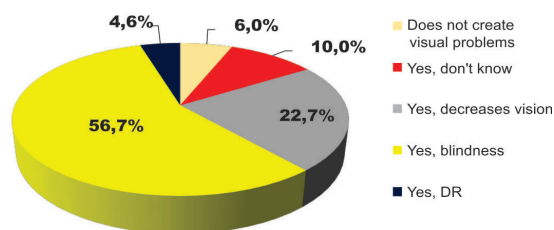


Figure 2: Knowledge presented by diabetic patients treated at the Brazilian Unified Health System - Roraima about visual problems related to diabetes.

Regarding knowledge on DR, the present study indicates that 115 participants (76.7%) did not know anything nor heard about the pathology, 29 (19.3%) knew and did not have the disease, 4 participants (2.7%) knew, had DR and regular treatment, whereas 02 (1.3%) knew they had DR, but did not undergo any type of treatment against the pathology (Figure 3).

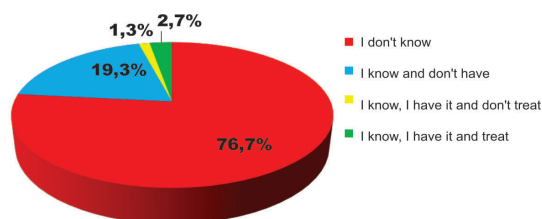


Figure 3: Knowledge presented by diabetic patients users of the Brazilian Unified Health System - Roraima on diabetic retinopathy.

Regarding the health education process as a DR prevention mechanism, when participants were asked if any health professional had explained to them about the existence of a relation between DM and the risk of vision loss, 40.6% of participants (61 people) stated that they had never had such an explanation, whereas 89 (59.4%) said they had been advised. Among those who said they had some explanation, 37 (41.57%) reported having been advised by a UBS health professional, 24 (26.9%) by the ophthalmologist, followed by 23 (25.8%) who reported having been advised by the endocrinologist. On the other hand, 05 participants (which is equivalent to a percentage of 5.73%) reported getting information by other means, such as TV and the internet.

Still regarding information and education in health as a prevention tool, the participants were asked if they knew the existing treatments for diabetic retinopathy. At this point, the absolute majority (92.6%) reported not knowing any type of intervention for the disease. On the other hand, only 4% of patients stated knowing how to use the Laser Ray method, 2% of those interviewed reported treatment with glycemic control, followed by 0.7% who reported surgical treatment, and 0.7% who reported knowing other forms of treatment, such as the use of eyedrops (Figure 4).

The eighth question in the present study aimed to know if the patient had an appointment with the ophthalmologist after the diagnosis of Diabetes to investigate possible eye complications. Of 150 participants, 125 (83.3%) answered yes, that is, they had already had an appointment with an ophthalmologist. However, 25 participants (16.7%) stated that they had never had an appointment with an ophthalmologist. Participants who reported having an appointment with an ophthalmologist after diagnosis of diabetes were asked if “during the appointment with the ophthalmologist any vision problems resulting from diabetes

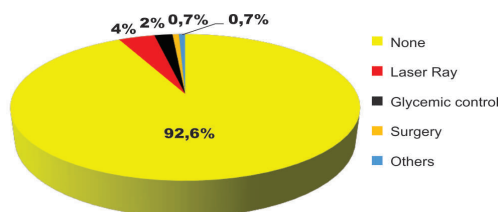


Figure 4: Knowledge presented by diabetic patients users of the Brazilian Unified Health System - Roraima on treatments for diabetic retinopathy.

was detected?”. Most people (60.8%) answered that no vision problem was diagnosed. On the other hand, 39.2% of participants reported being already diagnosed with some type of alteration in their vision such as cataract (5.6%), vision loss (5.6%), DR (4.8%), and blindness (2.4%). It should be noted that 20.8% of participants stated having been diagnosed with a vision problem, but not knowing which one.

Finally, participants were asked how frequently they had appointments with an ophthalmologist. The results obtained indicate that 69 participants (46%) returned to the ophthalmologist every 12 months, followed by 22 (14.7%) every two years, 18 (12%) every six months, 09 (6%) every three months, and 07 (4.7%) every four years. It is worth mentioning that 25 participants (equivalent to 16.6% of the sample universe) reported never having had an appointment with an ophthalmologist (Figure 5).

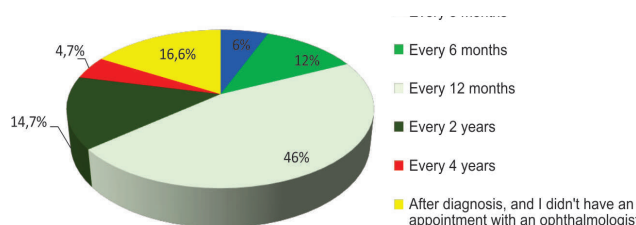


Figure 5: Frequency with which diabetic patients users of the Brazilian Unified Health System - Roraima have appointments with an ophthalmologist.

When the chi-square test was performed setting the 5% level for the rejection of the null hypothesis, a significant association between glucose control and knowledge about DR was observed ($p = 0.002$), so that people who had knowledge on DR had more control of their glucose between the time of onset of DM and knowledge about RD ($p = 0.002$), indicating that the longer the individual lives with DM the more knowledge they have on DR, and between having an appointment with an ophthalmologist and knowing about DR ($p = 0.001$), since participants who had an appointment with an ophthalmologist presented greater knowledge on DR. On the other hand, there was no statistically significant association between the gender of participants and the level of knowledge about DR.

DISCUSSION

The findings of the present study indicate that most of participants (44.7%) do not know what type of diabetes they have, and this result is corroborated by a study involving diabetic patients in Florianópolis, in which 53.2% of a sample of 357 individuals did not know what type of Diabetes they had⁹. This is a cause for concern, since the prevalence of DR varies according

to the type of diabetes, so that approximately 15 years after the onset of diabetes about 80% of Type 2 patients and up to 97% of DM-1 patients present some degree of alteration with retinopathy.^(2,10-13) Thus, having more information about the pathology as well as knowing the type of diabetes you have can help in the prevention of DR.

It is important that the treatment of Diabetes be initiated soon after the diagnosis, since the amount of diabetic patients with some degree of DR increases due to negligence and the time since the onset of the disease. It is known that the diabetic patient is almost 30 times more likely to become blind when compared to a non-diabetic patient.⁽¹⁾ Fortunately, however, the risk of blindness due to DR can be significantly reduced if Diabetes is treated and DR detected early.^(6,14) The results obtained in the present study indicate that 98% of a sample universe of 150 diabetic individuals reported receiving treatment, a fact that can act as a protective measure for the onset of DR.

However, although 98% of participants stated that they were taking treating DM, only 59.4% reported keeping their glucose under control. It is known that the DR is a late complication of diabetes, and the presence of chronic hyperglycemia is mandatory in the pathophysiology of the disease, since there is no report in the literature of clinical DR in humans without history of chronic hyperglycemia present.⁽⁷⁾ Thus, glycemic control is essential for the prevention of DR.^(11,15,16) In addition to glycemia, factors such as the age of the diabetic patient (worse in the pre-pubertal phase), the duration of the disease, the patient's race (unfavorable prognosis in the black race), gender (more severe in women), and finally systemic arterial hypertension have been related to a less favorable progression of DR.^(17,18)

The Ministry of Health recommends that actions be developed to inform the community about the prevention of the disease, identifying the groups at risk, making the early diagnosis and the therapeutic approach, including medication. In addition, it emphasize the idea of continued care, educating and preparing the patients and their families to have autonomy in self-care, thus avoiding complications and promoting health for a better quality of life for the population as a whole.⁽¹⁹⁾ Therefore, the role of the primary care physician is mandatory for the detection of DR.⁽³⁾ This statement reinforces the results obtained in the present study, which point out that among the 89 participants who reported having received some guidance on the existence of a possible relation between DM and the risk of vision loss, 37 of them (41.57%) were guided by primary care professionals, with being this percentage higher than those who were advised by ophthalmologists (26.9%) or endocrinologists (25, 8%).

With regard to the knowledge about a possible relation between DM and the occurrence of vision problems, 141 participants (94%) stated that DM can cause visual problems, whereas only 9 (6%) reported not knowing this fact. Although most understand the relation between DM and visual problems, 115 individuals (76.7%) answered that they did not know or have never heard of DR, a result that is extremely concerning from the point of view of prevention. This data corroborates the results of Guedes et. al., who point out that only 20% of people interviewed in a unit of Programa Saúde da Família had some knowledge on DR,⁽¹⁹⁾ as well as Umaefulam,⁽²⁰⁾ Dias et. al.⁽⁹⁾ and Pereira et al.⁽²¹⁾ who detected that the great majority of diabetic patients have low or no level of knowledge on DR.

Still in the scope of knowledge about DR, the vast majority (92.6%) of the study participants reported not knowing any type

of intervention for the disease. On the other hand, only 4% of patients stated knowing how to use the Laser Ray method, 2% reported glycemic control as a form of treatment, followed by 0.7% who reported surgical treatment, and 0.7% who reported knowing other forms of treatment, such as the use of eyedrops. This result is consistent with the results of a study carried out on an endocrinology ambulatory where few people have made inferences on the laser and photocoagulation, and many pointed out the use of glasses and eyedrops, thus demonstrating little knowledge on the subject.⁽²¹⁾

Aknowledging the importance of this outcome, a study entitled Diabetes Control and Complication Trial (DCCT) was conducted in the United States of America with patients with DM1, demonstrating a reduction of 50 to 70% in the risks of development or progression of retinopathy and other complications, such as nephropathy and neuropathy when the patient is well informed and able to control blood glucose levels adequately with an intensive insulin regimen.^(22,23) Thus, it becomes clear that knowledge on DM is an important protective factor against the development of the DR.⁽¹⁵⁾

Although evidence points to the effectiveness of periodic screening for DR to prevent blindness, adherence rates fall consistently below the recommended screening levels. In Chile in 1999, for example, 36.5% of the diabetic population had never been examined by an ophthalmologist;⁽²⁴⁾ in Canada in 2007, only 66% of people with DM had undergone ophthalmologic examination;⁽⁶⁾ another study in the USA reported that between 39% and 79% of people with DM did not meet screening recommendations.⁽²⁵⁾

The results of this study diverge positively from the scenario mentioned in the previous paragraph, since 125 (83.3%) of a total of 150 participants answered that they had already had an appointment with an ophthalmologist, whereas 25 participants (16.7%) stated that they had never had an appointment.

Finally, participants were asked how frequently they had appointments with an ophthalmologist. The results obtained indicate that 69 participants (46%) returned to the ophthalmologist every 12 months, a period recommended by the literature, followed by 22 (14.7%) every two years, 18 (12%) every six months, 09 (6%) every three months, and 07 (4.7%) every four years. In a study carried out by Verdagner et. al. in Chile, 36.5% of the diabetic population had never been examined by an ophthalmologist, only 9.2% were examined in the last 12 months, and 40.6% underwent at least one ophthalmologic examination in the last 6 years.⁽²⁴⁾

The medical literature recommends for patients diagnosed with DM type 1 that the first eye fundus examination should be carried out after puberty or 5 years after the disease onset. However, in patients with DM2, the eye fundus examination shall be carried out immediately after diagnosis. In addition, patients with complaints of visual impairment should be referred for emergency follow-up regardless of age or type of diabetes. According to the current protocols, the patient's returns after the first appointment should occur so that the interval does not exceed one year, reducing this time according to the severity of the case.⁽⁷⁾ Therefore, only 46% of participants of the present study, taking into account the 125 that have already been examined by an ophthalmologist, comply with what is recommended by medical consensus.

Ageing, waiting for the patient to present low vision to refer them to the ophthalmologist is not the best choice, since such conduct can cause irreversible loss and substantial decrease in

the patient's quality of life. Although periodic examination and treatment of the retinopathy do not eliminate all cases of visual loss, they considerably reduce the number of blind patients due to the uncontrolled disease.⁽¹⁾ The main value of DR screening for the health system is reducing the costs due to better management of people with DM, as well as reducing complications such as blindness.^(3,10)

It should be emphasized that in addition to screening, spreading of information about DR among diabetic patients is important as a protective factor, and should not be neglected in any hypothesis.⁽²⁰⁾ Rodriguez et. al. demonstrate with their findings that effective health education work has considerably reduced the prevalence of DR in Cuba.⁽¹⁵⁾

There are few studies currently available in the literature about the knowledge that diabetic patients have about DR, since most research available on the subject focuses on the prevalence and diagnostic methods. This fact can be considered a limitation to establish discussion parameters in the present study.

CONCLUSION

We concluded that the level of knowledge on DR and its forms of treatment in the sample analyzed is low. It is important to note that almost half of the study participants do not even know what type of Diabetes they have. Another factor to be highlighted is that despite the great majority of individuals undergoing treatment for DM, only a minority can keep glucose under control, a fact that may increase the onset of DR.

As for the education process, the main source of information reported by the participants was the UBS health professional, followed by the ophthalmologist and the endocrinologist. Despite that, most participants have not heard of DR even once, and do not go on appointments with an ophthalmologist within the recommended period, every 12 months. Thus, it is clear that the health system is not being efficient as a facilitator of this knowledge.

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REFERENCES

1. Conselho Brasileiro de Oftalmologia (CBO). Cegueira e baixa visão no Brasil – Retinopatia diabética. São Paulo: CBO; 2012.
2. Mendanha DB, Abrahão MM, Vilar MM, Nassaralla Junior JJ. Fatores de risco e incidência da retinopatia diabética. *Rev Bras Oftalmol.* 2016; 75(6): 443-6.
3. Muñoz de Escalona-Rojas JE, Quereda-Castañeda A, García-García, O. Actualización de la retinopatia diabética para médicos de atención primaria: hacia una mejora de la medicina telemática. *Med Fam.* 2016;42(3):172-6.
4. Bowling, B. Kanski: Oftalmologia clínica - uma abordagem sistemática. 8a ed. Rio de Janeiro: Elsevier; 2016.
5. Sociedade Brasileira de Diabetes. Diretrizes da Sociedade Brasileira de Diabetes, 2015 -2016. São Paulo: A.C Farmacêutica; 2016.
6. Canadian Diabetes Association. Canadian Diabetes Association 2008 clinical practice guidelines for the prevention and management of diabetes in Canada. Toronto: Canadian Diabetes Association; 2008.
7. Retinopatia Diabética. In: Sociedade Brasileira de Diabetes. Diretrizes da Sociedade Brasileira de Diabetes, 2015 -2016. São Paulo: A.C Farmacêutica; 2016.
8. Jimenez-Baez MV, Marquez-Gonzalez H, Barcenas-Contreras R, Morales Montoya C, Espinosa-Garcia LF. Early diagnosis of diabetic retinopathy in primary care. *Colomb Med (Cali).* 2015;46(1):14-8.
9. Dias AF, Vieira MF, Rezende MP, Oshima A, Muller ME, Santos ME, et al. Perfil epidemiológico e nível de conhecimento de pacientes diabéticos sobre diabetes e retinopatia diabética. *Arq Bras Oftalmol.* 2010;73(5):414-8.
10. Claramunt L J. Retinopatia Diabética desde la Prevención. Integrar la Pesquisa en los Centros de Diabetes. *Rev Med Clin Las Condes.* 2016;27(2):195-203.
11. Mozetic V, Daou JP, Martimbianco AL, Riera R. What do Cochrane systematic reviews say about diabetic retinopathy? *Sao Paulo Med J.* 2017;135(1):79-87.
12. Zheng Y, He M, Congdon N. The worldwide epidemic of diabetic retinopathy. *Indian J Ophthalmol.* 2012;60(5):428-31.
13. Keen H, Lee ET, Russel D, Miki E, Bennett PH, Lu M, et al. The appearance of retinopathy and progression to proliferative retinopathy: the WHO multinational study of vascular disease in diabetes. *Diabetologia.* 2001;44(2):S22-30.
14. Klein R, Klein BE, Moss SE, Cruickshanks KJ. The Wisconsin Epidemiologic Study of Diabetic Retinopathy: XVII. The 14-year incidence and progression of diabetic retinopathy and associated risk factors in type 1 diabetes. *Ophthalmology.* 1998;105(10):1801-15.
15. Rodríguez BR, Rodríguez VR, López MR, Villares YV, Rubio EA, Díaz RE, et al. Estrategia nacional para la prevención de ceguera por retinopatia diabética. *Rev Cubana Oftalmol.* 2015;28(1):129-137.
16. Ancochea G, Martín Sánchez MD. Results of a diabetic retinopathy screening. Risk markers analysis. *Arch Soc Esp Oftalmol.* 2016;91(1):15-9.
17. Ramos SR, Sabbag FP, Busato D, Miranda AB, Moreira Júnior CA. Retinopatia diabética: estudo de uma associação de diabéticos. *Arq Bras Oftalmol.* 1999;62(6):735-7.
18. Wilkinson CP, Ferris FL 3rd, Klein RE, Lee PP, Agardh CD, Davis M, et al.; Global Diabetic Retinopathy Project Group. Proposed international clinical diabetic retinopathy and diabetic macular edema disease severity scales. *Ophthalmology.* 2003;110(9):1677-82.
19. Guedes MF, Portes AJ, Couto AS Junior, Nunes JS, Oliveira RC. Prevalência da retinopatia diabética em Unidade do Programa de Saúde da Família. *Rev Bras Oftalmol.* 2009;68(2):90-5.
20. Umaefulam VO. Qualitative study on the awareness of eye health risks associated with type II diabetes in Lagos, Nigeria. *Rev Fac Cienc Salud.* 2015;2(2):78-83.
21. Pereira GA, Archer RL, Ruiz CA. Avaliação do grau de conhecimento que pacientes com diabetes mellitus demonstram diante das alterações oculares decorrentes dessa doença. *Arq Bras Oftalmol.* 2009;72(4):481-5.
22. Andrade NH, Zanetti ML, Santos MA. Percepção visual de pacientes com retinopatia diabética, segundo o referencial de Merleau-Ponty. *Rev Enferm UERJ.* 2008;16(2):249-54.
23. Axer-Siegel R, Herscovici Z, Gabbay M, Mimouni K, Weinberger D, Gabbay U. The relationship between diabetic retinopathy, glycemic control, risk factor indicators and patient education. *Isr Med Assoc J.* 2006;8(8):523-6.
24. Verdaguer J, Vicencio C, Zúñiga C, Molina E y Grupo Panamericano y Chileno del Día-D. Tamizaje para Retinopatía Diabética en Latinoamérica (Día D). Resultados. *Arch. Chil. Oftalmol.* 2001;58(1-2):39-44
25. Schoenfeld ER, Greene JM, Wu SY, Leske MC. Patterns of adherence to diabetes vision care guidelines: baseline findings from the Diabetic Retinopathy Awareness Program. *Ophthalmology.* 2001;108(3):563-71.

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