

REVIEW ON BLINDNESS IN PEOPLE WITH DIABETIC RETINOPATHY

Maja Belevska¹, Emilija Gjosevska-Dastevska², Zoran Velkovski³

Blindness is a medical and social problem, and usually it is the final stage of most ophthalmic diseases, with diabetic retinopathy (DR) being one of the four most common etiological reasons.

Proliferative diabetic retinopathy (PDR) is a terminal and most complex form of DR, which occurs within a period of 1-15 years from the diagnosis; however, the treatment can cause a definite loss of eyesight. The aim of the review was to analyze the epidemiological, demographic and clinical characteristics of people who have lost their eyesight because of DR as an etiological reason. The research represents a quantitative analytical cross-sectional study done in the year 2014, and included 60 people with blindness due to diabetic retinopathy. From a total of 311 blind people, 60 (19.29%) lost their eyesight caused by DR, which is the second cause of blindness. Thirty-six people or 58.3% were male, and 24 (41.7%) were female. Their mean age was 58.4 ± 17.1 years, i.e. men were aged 57 years (mean age $21 \pm 18,6$ years), women were aged 59 years (mean age 58 ± 16.5 years). Thirty-one people or 51.7% lost their eyesight during the period of 1-5 years from the diagnosis of PDR, 20 (33.33%) during the period of 6-10 years, and 9 (15%) within a longer period of 10 years. Thirty-two people or 53.3% were diagnosed with PDR, in 12 (20%) people PDR was concomitant with glaucoma, in 8 (13.3%) with cataract and in 8 (13.3%) people with other complications. *Acta Medica Mediana 2017;56(2):45-50.*

Key words: blindness, diabetic retinopathy, proliferative diabetic retinopathy

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Introduction

Blindness is a medical and social problem which has a multicausal etiology; it appears with various complexities, pathogenic mechanisms of long-lasting evolution and development. It mostly concerns and is a final stage in the treatment of various eye diseases, where diabetic retinopathy (DR) is one of the four most common reasons for definite loss of eyesight and the occurrence of blindness (1, 2).

Diabetes mellitus is an endocrinological disease where complications affect numerous organs, including the sense of sight, where it manifests with various forms of the ocular disease, of

which the most difficult is proliferative diabetic retinopathy (PDR) (3).

Changes in the retina appear because of changes in the wall and the endothelium of the precapillary arterioles, capillaries and post-capillary venulitis, which are manifested by the reduction of lumen, increased exultation and predisposition for the appearance of thrombocytosis (4, 5). The consequences are appearance of ischemic zones, oedematous and exudative areas, and the formation of new blood vessels (proliferative type). Those blood vessels have tendency to haemorrhage because of cachexia on their wall.

The ischemic, exudative-edematous and hemorrhagic changes can terminally result in degenerative and fibrous changes affecting the structure of the retina (6-8).

The proliferative type of diabetic retinopathy most commonly evolves with complications and with the appearance of secondary glaucoma, cataract, atrophie of the optical nerve and others which make treatment and prognosis of this disease (9).

Aim

The main aim of writing this paper was to understand the epidemical demographic and clinical characteristics in blind people, where the loss

of eyesight was caused by diabetic retinopathy as an etiological reason.

Material and Methods

The research in the review represents a quantitative analytical cross-sectional study, which was done in the year 2014 and is connected to the clinical, epidemiological and demographic characteristics in people with severe damage to their eyesight and blindness at the territory of the Skopje region, where almost one third of the population of R. Macedonia live. Sixty people from a total of 311 registered in this region with blindness caused by DR as an etiological reason were part of the research, for which appropriate medical documentation existed based on the diagnosed blindness.

The degree of eyesight damage was determined according to MKB-10 classification, where as blind people were classified those subjects who had visual sharpness in the better eye $<3/60$ (or $<0,05$) or reduction of the visual field to the central part $<10^\circ$, with the best correction, providing that the loss of vision is definitive and with medication, surgical or other therapy cannot be corrected (1, 2).

The results during research were registered into an electronic database, a statistical elaboration was made using a statistical software Statistica for Windows 7.0 and SPSS 17.0. The received results from the research were elaborated with appropriate procedures of descriptive and comparative statistics. A level of significance $p < 0.05$ was used to determine the statistical importance. The obtained results are shown in tables, graphs and numerically.

Results

The number of people with severe damage of the eyesight in 2014 is shown in Table 1 and Graph 1.

Table 1: The structure of people with damaged eyesight

Degree of damaged sight	Number	%
People with severe damage to the eight	294	48,6%
People with blindness	311	51,4%
Total	605	100.0%

According to MKB-10 classification in 2014, 294 people or 48.6% were diagnosed with severe damage to the eyesight, out of 311 people or 51.4% with blindness.

The etiological reasons for the occurrence of the definite loss of the eyesight in blind people is shown in Table 2 and Graph 2.

The reason for blindness in most examinees (83 people or 26.7%) was glaucoma; diabetic

retinopathy was found in 60 people or 19.29%; 53 people or 17.04% had hereditary eye diseases; 23 people or 7.4% were diagnosed with refractive anomaly; 21 people or 6.75% had the CNS diseases; 18 people or 5.79% had macular degeneration. In the smallest number of examinees, 10 people i.e. 3.22%, the reason for blindness was injury. There is a statistical significant difference with regard to etiological reasons (ophthalmological diseases) which led to blindness ($p=0.0123$). Regarding the correlation between gender (male/female) and etiological reasons, a statistical significance was not found for individual diseases (Pearson Chi-square =4.159, $df=7$, $p=0.0761$).

Diabetic retinopathy is the second most common etiological reason of blindness.

The structure of blindness caused by diabetic retinopathy was also analyzed by gender (Table 3 and Graph 3).

From a total of 60 people who are blind due to diabetic retinopathy, 36 or 58.3% were male and 24 or 41.7% were female.

The adult structure of all 311 people with blindness who were included in the research was separately analyzed and the results for those who lost their eyesight due to diabetic retinopathy are shown in Table 4 and 5 and Graph 4 and 5.

The mean age of the examinees was 59.8 ± 18.4 years, the minimum age was 5 years of age and the maximum was 88 years of age.

The mean age in men was 61.5 ± 17.9 years and 56.9 ± 18.9 years in women.

With $p < 0.005$, the analysis showed a statistically significant difference between the genders according to age (Mann-Whitney U Test $2=2.2633$ $p=0.0236$).

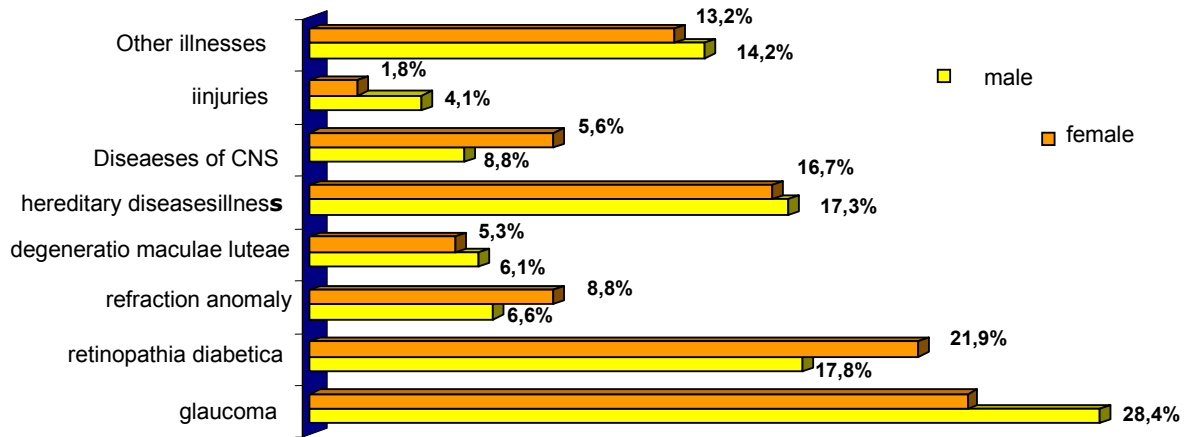
The mean age of people with blindness caused by diabetic retinopathy was 58.4 ± 17.1 years, i.e. 57.21 ± 18.6 in men, and 59.58 ± 16.5 in women.

The time period of blindness from the time of diagnosis of proliferative diabetic retinopathy up to the point of definite loss of eyesight was also analyzed in the research and these results are also shown in Table 6 and Graph 6.

In 31 blind people or 51.7%, the loss of eyesight happened during the period of 1-5 years from the diagnosis of proliferative diabetic retinopathy; in 20 people or 33,33% during the period of 6-10 years, and in 9 people or 15% during the period of 10 years. The above mentioned results are referred to the time period of the appearance of the first symptoms and weakening of the eyesight up to its definite loss. Because of the lack of relevant medical documentation, these results do not refer to the time period and the correlation between the diagnosis of diabetes in the examinees and the appearance of the first ophthalmologic symptoms. The clinical forms of proliferative diabetic retinopathy in examinees are given in Table 7 and Graph 7.

Table 2. Discussion according to etiological reasons for the cause of blindness

Reason for blindness		Gender		Total
		Male	Female	
Glaucoma	Number	56	27	83
	%	28,43%	23,68%	
Retinopathia diabetica	Number	35	25	60
	%	17,77%	21,93%	
Refraction anomalies	Number	13	10	23
	%	6,60%	8,77%	
Degeneratio maculae luteae	Number	12	6	18
	%	6,09%	5,26%	
Hereditary diseases	Number	34	19	53
	%	17,26%	16,67%	
Diseases of the CNS	Number	11	10	21
	%	5,58%	8,77%	
Injuries	Number	8	2	10
	%	4,06%	1,75%	
Other diseases	Number	28	15	43
	%	14,21%	13,16%	
Total	Number	197	114	311
	%	63,34%	36,66%	100%

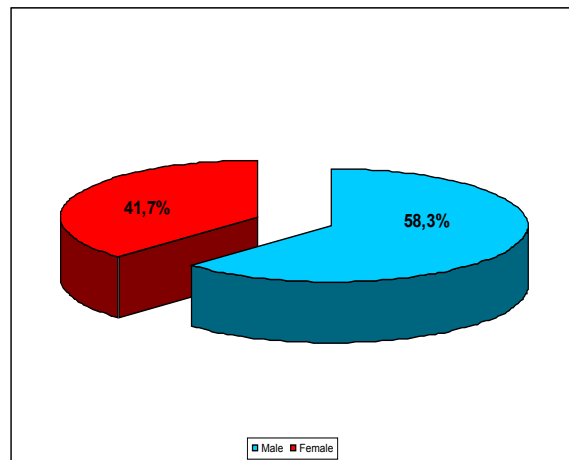


Graphic 2. Distribution according to etiological reasons for the occurrence of blindness

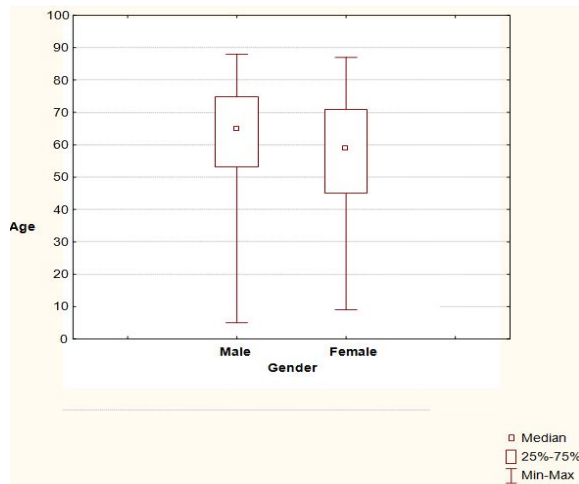
Table 3. The structure of blind people with DR by gender

Gender	Number	%
Male	60	58,3%
Female	36	41,7%
Total	96	100.0%

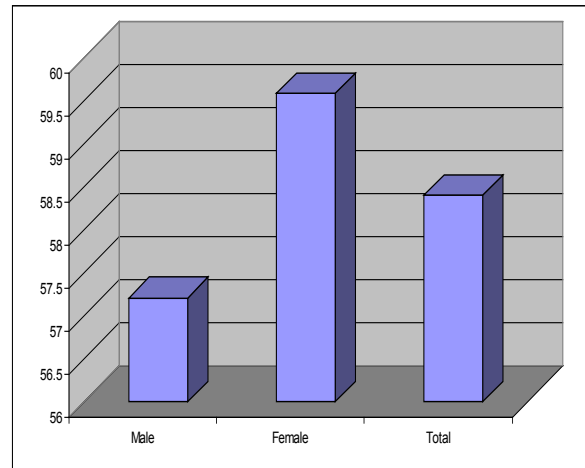
Diabetic retinopathy is a severe ophthalmic disease, and if not diagnosed timely and not treated adequately, it mostly evolves into a progressive proliferative and the most severe form of diabetic retinopathy. The same is concomitant with research, in 32 people i.e. 53,3% a proliferative form of diabetic retinopathy was diagnosed; in 12 people or 20% the same was concomitant with glaucoma; in 8 or 13.3% with cataract, and in 8 people or 13,3% with other complications.



Graphic 3 The structure of blind people with DR by gender



Graphic 4. Distribution of blind people by age



Graphic 5. Age structure of blind people with DR

Table 4. Distribution of people with blindness by age

Gender	Number	Average (Means)	Standard deviation (Std.Dev.)	Standard Error (Std.Err.)	Mediana (Median)	Minimum (Min)	Maximum (Max)
Male	197	61,50761	17,96215	1,279750	65	5	88
Female	114	56,87719	18,98865	1,778450	59	9	87
Total	311	59,81029	18,45044	1,046228	64	5	88

Mann-Whitney U Test Z=2,263332 p=0,023616

Table 5. Age structure of blind people with DR

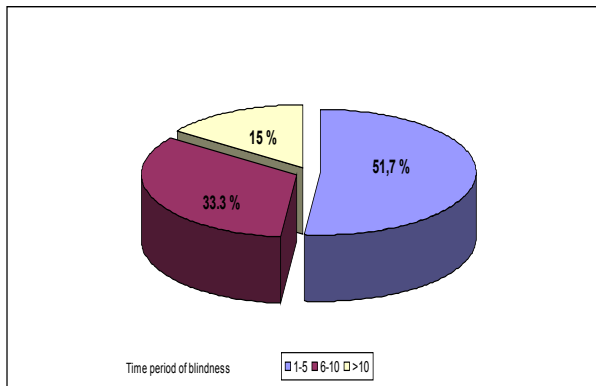
Gender	Average (Means)	Standard Deviation (Std.Dev.)
Male	57.21	18,6
Female	59.58	16,5
Total	58.4	17,5

Table 7. Clinical forms of PDR with blind people

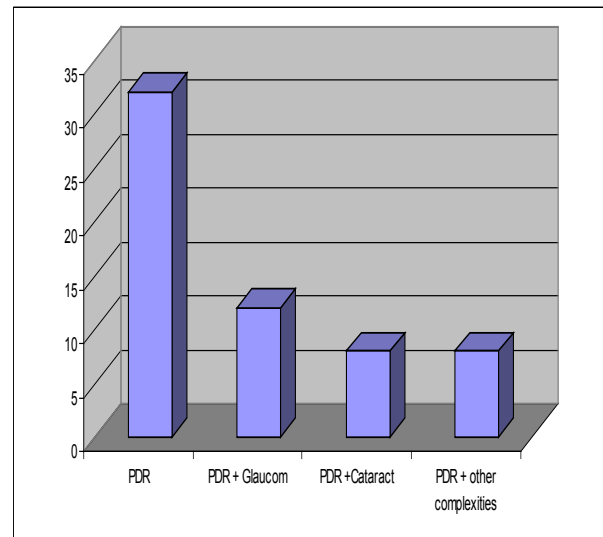
Clinical forms	Number	%
PDR	32	53,33
PDR + Glaucom	12	20,00
PDR +Cataracta	8	13,33
PDR + other complexities	8	13,33
Total	60	100

Table 6. Time period of blindness with people with PDR

Time period/years	Average (Means)	%
1-5	31	51,7
6-10	20	33,3
>10	9	15
Total	60	100



Graphic 6. Time period of blindness with people with PDR



Graphic 7. Clinical forms of PDR with blind people

Discussion

After 7-10 years from the appearance of diabetes mellitus type 1 and 15-20 years from the start of diabetes mellitus type 2, in 20% of type 1 patients and 50% of type 2 patients aged 20-65 years, there are eye changes in the form of diabetic retinopathy (8, 10, 11).

Diabetic retinopathy is manifested with typical changes at the bottom of the eye in the form of: non-proliferative, pre-proliferative and proliferative retinopathy where the changes are irreversible in 50% of the cases. As a risk factor for people with diabetes mellitus, of significance for the appearance of diabetic retinopathy are: the age at which the disease is diagnosed, the length of duration of the disease, pregnancy, arterial hypertension, lipid status, weight gain, nephropathy, smoking and others (12, 13).

In relation to age, after 10 years from the appearance of the disease, fifty percent of the population younger than 30 years suffer from visual impairments in the form of diabetic retinopathy, and after 30 years, visual impairments are present in 90% of patients. The most complex

form of diabetic retinopathy is the proliferative form, which is pre-sent in 5 - 10% of the total population of people with diabetes mellitus (14).

The referent reports from Germany show the fact that in people with diabetic retinopathy, the presence of blindness is 60.6/100 000, in England 64/100 000, in France (Leeds) 33.7/100 000 (15, 16).

Conclusion

Diabetic retinopathy, especially the proliferative type, however treated, mostly results into a definite loss of sight, which is why this disease represents one of the four most common reasons for the occurrence of blindness in the world. In our research, from a total of 311 blind people or 19.29%, 60 people have lost their sight because of it .e. it represented the second most common reason of blindness.

Out of this number, 31 people or 51.6% lost their sight within 1 -5 years, 20 or 33.3% within 6-10 years, 9 people or 15% after 10 years of establishing the diagnosis of proliferative form of diabetic retinopathy.

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SLEPILO KOD OSOBA SA DIJABETIČKOM RETINOPATIJOM: PREGLED

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Slepilo je medicinski i socijalni problem, koji obično predstavlja završni stadijum većine očnih bolesti, sa dijabetičkom retinopatijom (DR,) kao jednim od četiri najčešća etiološka uzroka.

Proliferativna dijabetička retinopatija (PDR) je terminalni i najsloženiji oblik DR, koji se javlja u periodu od 1-15 godina po postavljanju dijagnoze DR; međutim, njen tretman može da prouzrokuje definitivni gubitak vida. Cilj ovog pregleda je analiza epidemioloških, demografskih i kliničkih karakteristika osoba koje su izgubile vid zbog DR. Istraživanje predstavlja kvantitativnu analitičku transversalnu studiju sprovedenu 2014. godine na 60 osoba sa slepilom zbog DR. Od ukupno 311 slepih osoba, 60 (19,29%) je izgubilo vid zbog DR, koja je drugi po učestalosti uzrok slepila. Trideset šest osoba ili 58,3% bile su muškog pola, a 24 (41,7%) je bilo ženskog pola. Njihova prosečna starost bila je 58,4±17,1 godina, tj. muškarci su bili stari 57 godina (srednja starost, 21±18,6 godina), a žene 59 godina (srednja starost, 58±16,5 godina). Trideset jedna osoba ili 51,7% izgubila je vid u periodu od jedne do pet godina od dijagnoze PDR, 20 (33,33%) u periodu od 6-10 godina, a 9 (15%) u periodu dužem od 10 godina. Kod 32 osobe ili 53,3%, dijagnostikovana je PDR, kod 12 (20%) osoba PDR je postojala istovremeno sa glaukomom, kod 8 (13,3%) sa kataraktom, a kod 8 (13,3%) osoba sa drugim komplikacijama. *Acta Medica Medianae 2017;56(2):45-50.*

Ključne reči: *slepilo, dijabetička retinopatija, proliferativna dijabetička retinopatija*

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