Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

Characteristics Of Cataract Patients Suffering From Diabetes Mellitus

Andi Rezky Maulana[1], Sri Irmandha Kusumardhanu[2], Muh. Fadli Hidayat[3]
[1]Program Studi Pendidikan Profesi Dokter Umum, Fakultas Kedokteran, Universitas Muslim Indonesia,
[2,3]Departemen Ilmu kesehatan Mata Fakultas Kedokteran, Universitas Muslim Indonesia

Article Info
Keywords:
Characteristics,
cataract,
diabetes mellitus

ABSTRACT
The visual system is the various components of the eye that function in the process of vision by reacting to light, obtaining information about their environment and helping to recognize the outside world through a visual perception process called vision. Cataract disease is one of the disorders of the human eye, cataract is a condition where the lens of the eye is cloudy due to lens hydration (addition of fluid), lens protein denaturation or both. A metabolic disorder disease, diabetes mellitus, can occur due to a decrease in the insulin hormone produced in the pancreas. A cohort study by the Beaver Dam Eye Study also found an association between diabetes mellitus and cataract formation in adult patients. This literature review aims to determine the characteristics of cataract patients with diabetes mellitus such as gender, age, length of time suffering from diabetes mellitus, and type of cataract morphology. The method used was a literature review with a Narrative Review design to identify and summarize previously published articles on the characteristics of cataract patients with diabetes mellitus. From the 20 articles summarized, it was found that the characteristics of cataract patients suffering from diabetes mellitus were more common in female gender than male with an age range of 40 to 80 years, and the duration of diabetes mellitus in most cataract patients was ≥ 10 years, and the most common cataract morphology in diabetes mellitus is posterior subcapsular cataract.

Corresponding Author:
Andi Rezky Maulana
Program Studi Pendidikan Profesi Dokter Umum, Fakultas Kedokteran, Universitas Muslim Indonesia
aandirezkymaulana@gmail.com

INTRODUCTION

The visual system is the various components of the eye that function in the process of vision by reacting to light, obtaining information about its environment and helping to recognize the outside world through the process of visual perception called vision. The lens plays an important role in focusing light to be transmitted to the retina. The lens of the eye is a round, transparent part that is elastic and has no blood vessels. This lens is located behind the iris and pupil, and receives its nutrients from eye fluids called aqueous humor and vitreous humor[1].

Cataract disease is one of the disorders of the human eye, cataract is a condition where the eye lens experiences cloudiness caused by lens hydration (addition of fluid), denaturation

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

of lens proteins or both.[2]In a typical eye, light enters through the lens and travels to the retina, where it is converted into nerve signals that travel to the brain. To get a sharp photo, the lens must remain transparent. The retina receives a blurry image when the lens becomes cloudy due to cataracts.[3]

Based on data from the World Health Organization (WHO) in 2020, cataracts are the most common eye disorder that causes blindness and visual impairment. The prevalence of cataract blindness is 0.78% of the total prevalence of blindness that occurs worldwide, which is 1.5%. Cataracts are the leading cause of blindness in the world. This means that there are 39 million blind people worldwide with the main cause of blindness being cataracts at 51%.[4] Blindness due to cataracts can be caused by several factors such as a person's gender and age, long-term smoking behavior, exposure to ultraviolet light, and also one of them is caused by a history of diabetes mellitus.[5]

A metabolic disorder disease, namely diabetes mellitus, can occur due to a decrease in the insulin hormone produced in the pancreas. If the level of this hormone decreases in the body, it can cause glucose in the blood to not be stored perfectly and will increase glucose levels in the body. Accumulation of glucose in the bloodstream will cause circulatory disorders, namely thickening of the walls of blood vessels and causing the structure at the base of the blood vessel membrane to reduce tissue perfusion. Both of these things will interfere with the body's metabolism so that unwanted changes will occur over a long and serious period of time, one of which is causing damage to blood vessels in the eyes.[5]

*Wisconsin Epidemiologic Study of Diabetic Retinopathy*also conducted research on cataracts and found the incidence of cataracts in patients with diabetes mellitus. A cohort study by the Beaver Dam Eye Study also found a relationship between diabetes mellitus and cataract formation in adult patients. This study stated that the incidence and course of posterior subcapsular and cortical cataracts are associated with diabetes.[6]

The primary management of cataracts is by lens extraction through surgery. The goal of the procedure is to optimize visual function. The decision to perform surgery is not specific depending on the degree of visual acuity, but rather on how much the decrease interferes with the patient's activities.[7]

METHOD

This research is a Literature Review research with a Narrative Review design. This method is used to identify, review, evaluate, and interpret all available research. By using this method, a systematic review and identification of journals can be carried out, which in each process follows the steps or protocols that have been set.

The type of data in this research is in the form ofsecondary data, namely databases from various references, such as research journals, journal reviews, annual reports, books and data related to the characteristics of cataract patients suffering from diabetes mellitus. In the initial stage of searching for journal articles obtained through electronic databases, namely Google Scholar, 323 articles were found, Clinical Key 8 articles, PubMed 12 articles, and national survey results such as RISKESDAS and WHO were searched using the keywords: characteristics, cataracts and diabetes mellitus. After screening, 20 relevant articles were

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

obtained and became the material for analysis in this study. Content analysis was carried out using a synthesis table by comparing research methods, subjects and objects of research, and the variables studied included the characteristics of cataract patients suffering from diabetes mellitus.

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

RESULTS AND DISCUSSION

Results

NO	Authors	Title	Objective study	Subject	Method	Results
1	A. Yulia Puspitasari. S et al.	*Prevalence of Cataracts with Diabetes Mellitus at Ibnu Sina Hospital Makassar 2020-2022*	This study aims to determine the prevalence of cataracts with diabetes mellitus at Ibnu Sina Hospital Makassar in 2020-2022.	The research sample was cataract patients recorded in the medical records of Ibnu Sina Hospital Makassar in 2020-2022, totaling 42 samples that met the inclusion criteria. Cataracts with diabetes mellitus were 8 people while cataracts without diabetes mellitus were 34 people.	This research is a descriptive type of research using a cross-sectional approach.	The results of the study showed 10.96% of cataracts with diabetes mellitus. Based on gender, the highest incidence of cataracts with diabetes mellitus occurred in women, namely 5 people (22.7%). Based on age, cataracts with diabetes mellitus most often occurred in the age range of 56-65 years, as many as 5 people (17.9%).
2	I Gede Ananta Widjaksana, et al.	*Overview of Cataract Patients with a History of Diabetes Mellitus at Bali Mnadara Eye Hospital*	This study aims to determine the characteristics of cataract patients with a history of diabetes mellitus at Bali Mandara Eye Hospital.	The research sample was all cataract patients who examined themselves at the Bali Mandara Eye Hospital, totaling 69 people.	This research method is descriptive retrospective with a cross-sectional study design.	In this study, the results showed that patients who experienced cataracts with a history of diabetes mellitus were dominated by female patients, namely 40 people (58.0%) and patients with an age range of 50-60 years, namely 39 people (56.5%). Based on the classification suffered, patients with immature cataracts were the most commonly found, namely 55 people (79.7%). Based on blood sugar levels obtained

NO	Authors	Title	Objective study	Subject	Method	Results
						during the examination, most patients had high blood sugar levels, namely 44 people (63.8%).
3	A. Nurul Amaliah, et al.	*The Relation Between Diabetes mellitus Type 2 On the Incidence Cataract in Makaasar Eye Health Center in 2016*	The aim of this study was to examine the incidence of cataracts as a complication of diabetes mellitus at the Makassar Eye Health Center.	The population in this study were all new case patients in January-October 2016 totaling 10950 populations. With a sample size of 74 samples, divided into 37 case groups and 37 control groups.	This research is a descriptive analytical study with a case control approach.	From the results of the study, women suffered the most from cataracts, namely 23 people (62.2%). The age group that suffered the most from cataracts was 45-55 years, namely 20 people (54.1%). The results showed a significant relationship between the occurrence of cataracts and diabetes mellitus (p = 0.002) with an Odds Ratio (OR) of 4.563 (IC: 1.683 - 12.371).
4	Novia, et al.	*Relationship between Cataract Degree and Duration of Type 2 Diabetes Mellitus in Inpatient Installation*Eye Street of DR Soetomo Hospital Surabaya	This study aims to determine the relationship between the degree of cataract and the duration of type 2 diabetes mellitus.	The sample consisted of 29 samples according to the inclusion and exclusion criteria taken using the total sampling technique.	This study is an analytical observational study with a cross-sectional design.	In this study, it was found that 17 eyes of respondents who had a duration of type 2 diabetes mellitus ≥5 years experienced grade 5 cataracts (29.3%) and among 15 eyes of respondents who had type 2 diabetes mellitus <5 years, 6 of them (10.3%) experienced grade 1 cataracts with p value = 0.385 and correlation coefficient = 0.116.

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

NO	Authors	Title	Objective study	Subject	Method	Results
						There is a very weak correlation between the severity of cataracts and the duration of type 2 diabetes mellitus.
5	Norsela, et al.	*Relationship Between Diabetes Mellitus and Cataracts in Patients at the Eye Polyclinic of Ulin Banjarmasin Hospital in the 2021 Period*	This study aims to examine the correlation between diabetes mellitus and cataract disease in patients at the Eye Polyclinic of Ulin Banjarmasin Hospital.	The population in this study were all patients who were treated at the Eye Polyclinic of Ulin Banjarmasin Hospital from January to December 2021. The sample size was 48 people suffering from cataracts.	Researchers used an analytical observational research type with a cross-sectional method.	This study obtained results from 48 patients, 38 people (55.88%) suffered from diabetes mellitus and cataracts. Statistical tests using the chi-square test with a 95% confidence level, for the relationship between diabetes mellitus and cataracts, a p value of 0.282 was obtained.
6	Farah Diba Lazuardi, et.al	*Characteristics of Diabetics Cataract Patient at Siti Rahma Padang Hospital 2018-2019*	The purpose of this study was to determine the characteristics of diabetic cataract patients at the Siti Rahmah Padang Islamic Hospital in 2018-2019.	The population of this study were cataract patients with a history of type 2 diabetes mellitus at the Siti Rahmah Padang Islamic Hospital in 2018-2019. The number of research samples was 37 people.	Quantitative descriptive research was used in this study using a cross-sectional design through medical records as research data.	The results of this study showed that from 37 research samples, the characteristics of cataract patients who were most likely to be in the 56-65 year age group as many as 16 people (43.2%), female gender as many as 22 people (59.5%), random blood glucose levels <300 mg/dl as many as 22 people (59.5%), and had suffered from diabetes mellitus for >5 years as many as 20 people (54.1%).
7	Jin Yeon Gil, et al	*Factors Associated*	We aimed to investigate	The population of this	This research is a	From a total of 14,352 patients,

NO	Authors	Title	Objective study	Subject	Method	Results
		With Lower Risk of Cataract in Type 2 Diabetes: National Health Insurance Claims Data Study	associated factors such as comorbidities and concomitant medications to provide evidence for the prevention and management of cataract in diabetic patients.	study was patients diagnosed with cataracts after type 2 diabetes was defined as the case group and the control group included patients who were never diagnosed with cataracts. The sample size was 14,352 people.	randomized control study.	the results showed that the female gender suffered the most from DMT2 with cataracts 8,670 (60.4%), the age range was 60-69 years 8,346 (58.2%), with the most comorbid factors being hyperlipidemia 10,137 (70.6%), and the type of drug most commonly used was sulfonylurea 7,688 (53.57%).
8	Khalid Mohammad Alabdulwahhab, et.al.	*Senile Cataract in Patients With Diabetes with and without Diabetic Retinopathy: A Community-Based Comparative Study*	The aim of this study was to determine the prevalence of senile cataract in type 2 DM patients with DR compared to patients without DR.	Samples were selected from all health centers with the same proportion as the number of type 2 DM patients in each health center using systematic random sampling techniques.	This research is a descriptive-quantitative study with a cross-sectional design.	Results In 668 eyes, cataract and diabetic retinopathy were found in 35.5% and 32.2% of eyes. Diabetic retinopathy, age, duration of diabetes, and systolic blood pressure were found to be independent risk factors for cataract. Whereas, gender, BMI, insulin use HbA1c and diastolic blood pressure were not significantly associated with cataract. Cataract patients had significantly higher age at onset of diabetes. Most cataracts were cortical followed by PSC, while a small proportion were nuclear.
9	Siti Annisa Devi	*Characteristics of*	The purpose of this study	T2DM outpatients at Al-	This research is a	It was found that the highest

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

NO	Authors	Title	Objective study	Subject	Method	Results
	Trusda, et al.	*Patients with Type 2 Diabetes Mellitus in Al-Ihsan Regional General Hospital*	was to describe the characteristics of DMT2 patients who came to Al-Ihsan Regional Hospital in terms of age, gender, and comorbidities.	Ihsan Regional General Hospital, West Java Province between January 2017 and November 2020.	cross-sectional descriptive study.	prevalence and incidence of DMT2 in 2017 were 5,051 and 653 respectively; the most common gender in each year was female at 584–3,333 with the highest male:female ratio of 1:2 in 2017; the age group with the highest prevalence was 55–65 years at 3,468 (39.53%); and the five highest comorbidities were hypertension (35.68%), cataracts (6.01%), osteoarthritis (3.58%), pulmonary tuberculosis (2.92%), and dyspepsia (2.91%). The conclusion of this study is that the prevalence and incidence of DMT2 in Al-Ihsan Hospital are high with the most patients being female, elderly, and having comorbidities of hypertension and cataracts.
10	Ade Utia Detty, et al.	*Characteristics of Risk Factors for Cataract Sufferers*	The purpose of this study was to determine the characteristics of risk factors for cataract sufferers. This study is important because cataracts can cause	The population in this study was all cataract patients at Hospital X Bandar Lampung in 2019, totaling 498 people, and a sample of 83 people was obtained.	The type of research used in this study is descriptive with a cross-sectional design.	Results: showed that cataract sufferers aged >50 years were 63 people (75.9%). The gender of cataract sufferers was mostly female, 48 people (57.8%). The majority of cataract sufferers were without diabetes mellitus, 64

NO	Authors	Title	Objective study	Subject	Method	Results
			blindness and will increase from year to year.			people (75.9%). The majority of cataract sufferers had a history of hypertension, 45 people (54.2%). The majority of cataract sufferers had no history of trauma, 73 people (88%).
11	Farhat Fatima, et al.	*Prevalence in Risk Factor of Cataract in Type 2 Diabetes Mellitus: A Cross Sectional Study*	This study aims to estimate the prevalence of cataract in patients with type 2 diabetes mellitus and the risk factors that may be associated with it.	Patients with type 2 diabetes mellitus aged 40 years and above. The number of samples was 750 people.	The type of research used in this study is descriptive with a cross-sectional design.	Of the 750 patients with Type 2 Diabetes Mellitus enrolled in our study, 492 patients had cataract and 258 did not. A total of 242 (60.35%) were male and 250 (71.63%) were female. The prevalence of cataract in Type 2 Diabetes was 65.60%. Patients with OHA had a higher incidence of cataract (P=0.0021). There was a statistically significant association between a positive family history of diabetes and cataract (P=0.0271).
12	Alejandra Fernandez-Martinez, et.al	*Association Between Diabetes and Cataract in the Peruvian Population: Analysis of a National Survey*	The aim of this study was to determine the association between having DM and having cataracts in Peruvian adults over 50 years of age.	The sample of this study was diabetic patients. The number of samples was 8,775 people.	The type of research used in this study is observational analytic with a cross-sectional design.	Data from 8,775 Peruvian adults aged 50 and over were analyzed, of whom 1,322 reported a diagnosis of cataract. Of the total respondents, 9.2% reported being diagnosed with diabetes mellitus and 16.7% with cataract. The

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

NO	Authors	Title	Objective study	Subject	Method	Results
						crude model (p<0.001) and adjusted models 1 (p=0.007) and 2 (p=0.029) found an association between having diabetes mellitus and having cataract.
13	Junaid Khan, et al.	Risk of Cataract and Glaucoma Among Older Persons with Diabetes in India: A Cross-Sectional Study Based On LASI, Wave-1	The aim of this study was to provide public health evidence on the burden associated with diabetes and the risk of developing cataract and glaucoma in older adults aged 60 years and above in India.	The population was patients with cataract and glaucoma in older adults aged 60 years and above in India.	The type of research used in this study is analytical with a cross-sectional design.	The prevalence of cataracts and glaucoma was 29% among adults with diabetes compared to 22% among those without diabetes. In terms of gender, the prevalence of cataracts was relatively higher in women (25%) compared to men (21%). It is important to note that by adjusting for socio-economic and demographic characteristics, the odds of cataract (AOR 1.495; p-value <0.01) and glaucoma (AOR 1.554; p-value <0.01) significantly higher among older adults with diabetes compared to their peers.
14	Indah Lestari, et al.	*Levels of Diabetes Blood Sugar with Type of Cataract*	The aim of this study was to analyze the correlation between diabetic blood sugar levels and cataract types.	The sample in this study was some cataract patients who had a history of diabetes mellitus at the Undaan	The research design used is correlation analysis with a cross-sectional	The results of the study showed a close relationship between diabetes and cataracts, where 47.2% had high blood sugar levels, 40% had nuclear cataracts

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

NO	Authors	Title	Objective study	Subject	Method	Results
				Eye Hospital, Surabaya, totaling 125 people.	approach.	followed by cortical (30.4%) and PSC (29.6%) and of the 59 respondents with high blood sugar levels, 26 people had nuclear cataracts, with a p value of 0.001.
15	The Good Deeds of Alfaqeeh, et al	*Risk Factors and Complications of Cataract Disease in Type 2 Diabetic Patients in Taif City*	This study aims to detect risk factors and complications of cataract in type 2 diabetes patients in Taif city.	Diabetes mellitus, and data on cataracts and their risk factors and complications. The sample size was 110 people.	Retrospective study	The medical records of 110 diabetic patients were reviewed. A pre-designed checklist was prepared to collect demographic data, data on diabetes mellitus, and data on cataract and its risk factors and complications. Of the patients studied, 86.4% had type 2 DM, 63.6% had a duration of DM of more than 10 years, 50% were using antihyperglycemic agents as a treatment for DM, 87.3% reported that they were committed to the treatment used. Approximately half of the participants (49.1%) were exposed to sunlight, and 65.5% reported exposure to radiation. Approximately 45% of the participants (45.5%) reported that they had a family history of

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

NO	Authors	Title	Objective study	Subject	Method	Results
						cataract, of which 77.6% reported that those with cataract were first-degree relatives.
16	Dana K. Alsarhani, et al	*Outcomes of Cataract Surgery in Diabetic Patients in King Abdulaziz Medical City in 2019*	In this study, we aimed to analyze various complications after cataract surgery in diabetic patients and compare the outcomes of diabetic patients with comorbidities with diabetic patients without comorbidities.	All diabetic patients undergoing cataract surgery	Retrospective research with cross sectional study	This study analyzed 290 diabetic patients; the most common age group was over 65 years (150, 51.7%), with slightly more women (147, 50.7%). A total of 181 (62.7%) patients had complications after surgery, and 255 (87.9%) patients had comorbidities. The most commonly reported complication was corneal edema (181, 62.4%). In addition, hypertension was the most frequently reported comorbidity (206, 71%). We also found that complications after cataract surgery were more common in women (p = 0.025).
17	Tabassum Rashid, et al	*Impact of Clinico-biochemical Variations on the Etiopathogenesis of Cataract: a Case-Control Study*	This study aims to determine the impact of serum blood sugar, serum electrolytes, and serum calcium on the etiopathogenesis of cataracts.	A total of 300 cases diagnosed with cataract and 360 healthy controls were taken for this study.	Case control study research	From 300 research samples, it was found that cataract patients suffering from DMT2 were 207 people. Based on age, the most were > 50 years 161 (67.9%), based on gender, the most were male 108 (69.2%), for cataract

NO	Authors	Title	Objective study	Subject	Method	Results
						morphology, the most were in posterior subcapsular 162 people (72.0%).
18.	Ulfi Khasana Maswa, et al	*Relationship Between History Of Diabetes Mellitus With Cataract Events And Myopia At the "Yakkum" Orphanage in Purwodadi Hospital*	This research aims to know The relationship between a history of diabetes mellitus and the occurrence of cataracts in patients at the Panti Rahayu "Yakkum" Hospital, Purwodadi	The research sample was respondents who received treatment in the period 2020, using medical records containing information on age, gender, and the presence or absence of a history of DM in cataract patients at Panti Rahayu "Yakkum" Hospital, Purwodadi. Number of samples. Number of samples 72 people	Analytical observational research with an approach case control	From 72 samples, the results showed that the age group that most suffered from cataracts was >50 years, namely 64 people (88.9%), and the gender was mostly female, namely 45 people (62.5%), and the most had a history of DMT2, namely 60 people (83.3%).The results of this study show that there is a relationship significant between history of diabetes mellitus with cataract incidence at Panti Rahayu Yakkum Hospital, Purwodadi in 2020, 67 times higher risk of suffering from cataracts in respondents who have a history of DM, compared patients who do not have a history of DM.
19	AD Paramita's children, et al.	*Characteristics of Cataract Patients Who Underwent*	The purpose of this study was to determine the characteristics of cataract	The study population was all patients who underwent cataract	This research is a descriptive-quantitative	Of the 317 patients, 172 (54.26%) were male, 301 (94.95%) had senile cataract, 141 (44.48%) had

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

NO	Authors	Title	Objective study	Subject	Method	Results
		Cataract Surgery in HL Manambai Abdulkadir Hospital Sumbawa	patients undergoing cataract surgery at HL Manambai Abdulkadir Sumbawa Regional Hospital based on cataract type, gender, age, comorbidities, initial visual acuity, and surgical method.	surgery at HL Manambai Abdulkadir Hospital, Sumbawa from April 2023 to September 2023.	study with a cross-sectional design.	bilateral cases, 210 (66.25%) had initial visual acuity <3/60, 43 (13.56%) had diabetes mellitus. 278 (88.54%) underwent phacoemulsification surgery, with 303 (95.58%) experiencing improvement in visual acuity.
20	Muhammad Shaifullah, et al	The Relationship between Diabetes Mellitus and Senile Cataracts	This study aims to analyze the relationship between diabetes mellitus and the incidence of senile cataracts.	The sample in this study included patients with eye disorders or diseases. Both patients with a diagnosis of cataracts who were the case group and non-cataract patients who were the control group who were treated at the SMEC Samarinda Eye Clinic in the period from January to December 2021 and met the research sample criteria. The number of samples was 334 people consisting of 167 case samples and 167 control samples.	The research was conducted using an analytical observational method using a case-control study approach with individual matching.	The results of this study show that women suffer the most from DM with cataracts, namely 86 people (51.5%) compared to men 81 people (48.5%), the most common age is 51-60 years, as many as 85 people (50.9%), then the location of the cataractunilateral 160 people (95.8%), Diabetes mellitus is related to the occurrence of senile cataracts where people with diabetes mellitus are 3.150 times more at risk of suffering from senile cataracts than people without diabetes mellitus.

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

Twenty articles were analyzed using a synthesis table to see the variables studied by each study regarding the characteristics of cataract patients with diabetes mellitus. Of the 20 articles discussing the characteristics of cataract patients with diabetes mellitus, 20 articles mentioned the age most often affected by cataracts with diabetes mellitus, namely adults to the elderly with an age range of 40 - 80 years (journals 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,18, 19, 20). Of the 14 articles mentioned that cataracts suffering from diabetes mellitus occur more in women (journals 1, 2, 3, 4, 6, 7, 9, 10, 11, 12, 13, 15, 16, 18, 20) when compared to men with 5 articles (journals 5, 8, 14, 17, 19), while for the duration of suffering from diabetes mellitus in cataract patients based on years, 2 articles mentioned the duration of suffering from diabetes mellitus in cataract patients was ≥ 5 years (journals 4, 17) and >10 years 3 articles (journals 6, 7, 9). There are 3 articles mentioning the results of GDS/FDP examination (journals 1, 6, 14). Furthermore, 5 other articles also discuss the classification or morphology of cataracts (journals 2, 4, 8, 14, 17).

One of the strengths of some of these articles is thatis the use of nationally and internationally representative data with the latest edition and a large sample size sufficient to analyze the characteristics of cataract patients suffering from diabetes mellitus.

One limitation that needs to be considered is that it requires a relatively large or numerous research subjects, assuming that there are quite a lot of independent variables that influence it, it is less able to describe the disease development process accurately. The data sources available in literature studies may not be complete enough to answer all research questions. In addition, some articles use less population coverage. In the analysis of the characteristics of cataract patients suffering from diabetes mellitus in the article, it was limited to discussing age and gender and the duration of diabetes mellitus, but the researcher then looked for several other journals to discuss the classification or morphology of cataracts and the results of blood sugar examinations of patients. Thus, the author suggests future research with better methodology, larger sample sizes, and more variables. Further research is needed to combat and reduce the number of cataract patients suffering from diabetes mellitus and reduce risk factors.

Discussion

According to data from the Indonesian Ministry of Health, the most common causes of visual impairment worldwide are uncorrected refraction (48.99%), cataracts (25.81%) and Age-related Macular Degeneration (AMD, 41%), while the most common causes of blindness are cataracts (34.47%), uncorrected refractive disorders (20.26%) and glaucoma (8.30%).8 The Beaver Dam Eye Study and the Blue Mountain Eye Study state that patients with diabetes mellitus tend to have a 5 times higher risk of cataract formation.[9]

In the search for several articles in this literature also discussed that cataract patients who suffer from diabetes mellitus in adulthood and the elderly over 40 years. Cataracts are often experienced by women because women experience menopause at the age of 45 years which can cause reduced body metabolism and damage to body tissue. The decrease in estrogen hormone that occurs with age, especially during menopause, can increase the risk of cataracts in women, because estrogen hormone has mitogenic and antioxidant properties against lens epithelial cells which function to protect the lens from cataractogenesis.[9] In

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

women, there are certain risks associated with reproductive factors and reproductive history. Women with early menarche, irregular menstrual cycles, polycystic ovary syndrome (high androgen levels), and a history of gestational diabetes increase the risk of T2DM later in life. In addition, female patients are more compliant with treatment and more aware of their body condition, so more female patients come to the treatment center. 10 This is in line with research conducted by Jeong, Ihn Sook, et al. (2022) which found that the incidence of cataracts was 1.7 times higher in women than men in their study. [11] Another study also conducted by Junaid Khan, et al. (2023) found that based on gender, the prevalence of cataracts was relatively higher in women (25%) than in men (21%). [12] Cataracts occur due to a multifactorial process, namely intrinsic and extrinsic factors. Intrinsic factors consist of gender and age, while extrinsic factors include a history of diabetes mellitus, drug use, low nutritional intake, alcohol, smoking, sun exposure and forced trauma to the eyeball. [13] Cataracts are characterized by impaired vision (blurred or cloudy), progressive decrease in visual acuity, needing more light to see things clearly, glare, changes in color perception can occur with reduced intensity, lack of contrast or yellowish distortion. [14]

Here are some cases of cataracts in the elderly according to data from the National Eye Institute that occur in various countries in the world. In the United States, around 24.4 million cases of cataracts occur in the elderly, in the UK around 2.5 million cases of cataracts occur in the elderly, then in India based on data from the Indian Ministry of Health, 15 million elderly people experience cataracts every year.[15] From research conducted by The Framingham Eye Study and the Health and Nutrition Examination Survey, it was stated that people with diabetes mellitus under the age of 65 years will be three to four times more likely to get cataracts, and twice as likely at age over sixty-five years compared to patients without diabetes mellitus.[5]

In the study of Alabdulwahhab et al., (2022) further explored the relationship between DM and cataract subtypes, in their study found that cortical cataracts were the most common subtype found, followed by posterior sub-capsular cataracts, while nuclear sclerosis was very rare, and this is consistent with most previous studies. Two studies reported different findings, namely nuclear sclerosis was identified as the most common subtype. Srinivasan et al. associated the higher incidence of nuclear sclerosis in their study with warmer climates and more exposure to sunlight, compared to other studies, however, in areas with hotter climates and much greater exposure to sunlight. Nuclear sclerosis is the most common type of cataract that occurs with age. Therefore, many elderly people experience it. Nuclear sclerosis cataracts are characterized by cloudiness, yellowing, and hardening in the center of the eye lens or nucleus. As age increases, the nucleus also becomes cloudy.[20]

10 years have a greater risk of developing diabetic cataracts. Therefore, it is quite important for DM patients to carry out health checks and prevention for DM patients in order to maintain their blood glucose levels to remain normal. In addition, it is also necessary to maintain eye health and consume a variety of foods that can be antioxidants such as fruits that have high vitamin C, vitamin E, selenium, and copper. A person will have a lower risk of cataracts if they have two or three types of antioxidants compared to people with lower antioxidants.16 Based on a study conducted by Indah Lestari, et al (2020) entitled "Diabetic

Jurnal Eduhealth
Volume 15 , Number 04, 2024, DOI 10.54209/eduhealth.v15i04
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

blood sugar levels with cataract types" the results were obtained with a history of diabetes mellitus> 5 years as many as 97 respondents (77.6%).17 Another study was also conducted by Yih-Chung Tham, et al (2020) it was found that the history of diabetes mellitus was ± 7.3 years.[18]

It is generally believed that hyperglycemia can stimulate risk factors to accelerate the development of diabetic complications, so the longer the duration of diabetes the patient has, the more progressive the occurrence of cataracts. With uncontrolled blood sugar for 5 years when suffering from T2DM, this will increase the risk of complications such as cataracts. This means that cloudiness in the eye lens will occur due to chronic hyperglycemia and can cause cataracts. Another study showed a two-fold increase in the risk of cataract diagnosis as the duration of diabetes also increased. Damage to various organs can be caused by chronic hyperglycemia. In the biochemical process, cell damage occurs as a side effect of hyperglycemia in the retinal nerve tissue, lens and blood vessels.[19]

In a study conducted by Wibisono, et al (2021) In patients who have suffered from DM for more than 10 years but do not suffer from cataracts because patients manage their blood sugar levels well, this causes the importance of blood sugar control for diabetics to avoid complications such as diabetic cataracts as early as possible. The recommended blood sugar level if the patient has a history of type 2 diabetes mellitus, namely GDP 80-130 mg/dL and GD2JPP <180 mg/dL. This is also proven by the research of Lazuardi and Haves (2022) which showed that the majority of respondents in their study had blood sugar levels <300 mg/dL. This can happen because there has been an awareness of DMT2 sufferers to be able to control their blood sugar levels due to the occurrence of long-term complications of DMT2 including cataracts.[19]

From the research conducted by Deepayan, et al (2023), in this study the classification of cataracts was grouped into 5 categories, namely posterior subcapsular, nuclear cataract, cortical cataract, mature cataract, and congenital traumatic. Based on the data obtained, it shows that the majority of cataract patients fall into the subcapsular posterior cataract category (43.4%).

CONCLUSION

Based on the results of identification and review in this literature review, it can be concluded that the characteristics of cataract patients suffering from diabetes mellitus are more common in women than men with an age range of 40 to 80 years, the duration of suffering from diabetes mellitus in most cataract patients is > 10 years, and the most common cataract morphology in diabetes mellitus is the posterior subcapsular type.

THANK-YOU NOTE

Gratitude to Allah SWT who has bestowed His grace and blessings upon the author. Then especially to the author's parents who have given encouragement, facilitated and accompanied the author's steps with moral and material support and prayers. Furthermore, to the supervisor and to the examiners who always direct and guide the author in compiling

this literature. And all related parties that I cannot mention one by one who have supported me so far.

REFERENCES

1. Putri, M. S., Kurniawan, M. I., Datu, H. H. dkk. (2024). Gambaran Visus Pasien Katarak Post Operatif di RS. Bhayangkara Tahun September 2019 – Januari 2022. Fakumi Medical Journal: Jurnal Mahasiswa Kedokteran.
2. Sudrajat, A., Al-Munawir, Supangat. (2021). Pengaruh Faktor Risiko Terjadinya Katarak Terhadap Katarak Senil Pada Petani di Wilayah Kerja Puskesmas Tempurejo Kabupaten Jember. Multidisciplinary Journal.
3. Firdaus, D. H., Imran, B. dkk. (2022). Klasifikasi Penyakit Katarak pada Mata menggunakan Metode Convolutional Neural Network (CNN) Berbasis Web. Jurnal Kecerdasan Buatan dan Teknologi Informasi (JKBTI).
4. Damayanti, A. K., Christina, Y. (2021). Hubungan Umur dan Jenis Kelamin dengan Angka Kejadian Katarak Senilis di RS Camatha Sahidya. Zona Kedokteran.
5. Widjaksana, I. G., Witari, N. P., Sunariasih, N. N. (2023). Gambaran Pasien Katarak dengan Riwayat Diabetes Melitus di Rumah Sakit Mata Bali Mandara. e-Journal AMJ (Aesculapius Medical Journal).
6. Febriza, A. N. (2020). The Relations Between Diabetes Mellitus Type 2 on The Incidence Cataract in Balai Kesehatan Mata Makassar in 2016. Magna Medica Berkala Ilmiah Kedokteran dan Kesehatan.
7. Ameliany, M. V., Ermawati, S. (2022). Pengaruh Kararak Senilis terhadap Aktivitas Sehari-hari. Continuing Medical Education.
8. Norsela, Faisal, M. A., Asnawati. (2023). Hubungan Diabetes Mellitus dengan Katarak pada Pasien di Poliklinik Mata RSUD Ulin Banjarmasin Periode 2021. Homeostasis.
9. Puspitasari, A. Y., Akib, M. N., Maharani, R. N. dkk. (2024). Prevalensi Kejadian Katarak dengan Diabetes Mellitus di RS Ibnu Sina Makassar Tahun 2020-2022. Fakumi Medical Journal: Jurnal Mahasiswa Kedokteran.
10. Purbaningsih, W. et al. (2021). Characteristics of Patients with Type 2 Diabetes Mellitus in Al-Ihsan Regional General Hospital. Global Medical and Health Communication.
11. Sook, J. I., Joo, L. E., Sung, K. M. et al. (2022). Incidence and Predictors of Cataract among People with Type 2 Diabetes Mellitus: Using Secondary Data Analysis from the Ansan Cohort of the Korean Genome and Epidemiology Study. Korean Society of Nursing Science
12. Khan, J., Shaw, S. (2023). Risk of cataract and glaucoma among older persons with diabetes in India: a cross-sectional study based on LASI, Wave-1. Scientific Reports.
13. Karunika, A. R., Resanindya, V. dkk. (2022). Gambaran Faktor Risiko Penderita Katarak di Puskesmas Kecematan Kebayoran Baru. Nusantara: Jurnal Ilmu Pengetahuan Sosial.
14. Transari, R. R., Neneng., Syamsi, N. (2024). Katarak Senilis Imatur : Laporan Kasus Immature Arentic Cataract: A Case Report. Jurnal Medical Profession (MedPro).
15. Royani, A., Kusumajaya, H., Arjuna. (2024). Faktor-Faktor yang Berhubungan demgam Kejadian Katarak pada Lansia di Poli Mata. Jurnal Penelitian Perawat Profesional.

16. Lazuardi, F. D., Ashan, H. (2022). Characteristics of Diabetic Cataract Patients at Siti Rahmah Padang Hospital, 2018-2019. Science Midwifery.
17. Lestari, I., Fifiyahpuahsari. (2020). Levels of Diabetes Blood Sugar with Type of Cataract. International Journal of Nursing and Midwifery Science (IJNMS).
18. Tham, Y., Liu, L., Rim, T. H. et al. (2020). Association of Cataract Surgery With Risk of Diabetic Retinopathy. Among Asian Participants in the Singapore Epidemiology of Eye Diseases Study. JAMA Network Open.
19. Novia, Wahyuni, I., Wironegoro. R. (2023). Hubungan Derajat Katarak dan Durasi Diabetes Melitus Tipe 2 di Instalasi Rawat Jalan Mata RSUD DR. Soetomo Surabaya. Jurnal Ners.
20. Alabdulwahhab, K. M. (2022). Senile Cataract in Patients with Diabetes with and Without Diabetic Retinopathy: A Community-Based Comparative Study. Journal of Epidemiology and Global Health.
21. Amaliah An, Febriza A. The Relations Between Diabetes Mellitus Type 2 on the Incidence Cataract in Balai Kesehatan Mata Makassar in 2016. MAGNA MEDICA Ilmu Kedokteran dan Kesehatan. 2019;6(1):99.
22. Gil JY, Min KH, Kim W, Kim JH, Han JM, Lee KE. Factors Associated with Lower Risk of Cataract in Type 2 Diabetics: National Health Insurance Claims Data Study. Drug Targets Ther. 2023;2(1):56–61.
23. Paramita AAD, Wibowo AA, Warnerin EBP. Characteristics of Cataract Patients who Underwent Cataract Surgery in H. L. Manambai Abdulkadir hospital Sumbawa. Int J Res Med Sci. 2024;12(3):658–62.
24. Trusda SAD, Purbaningsih W, Budiman B, Fitriadi SSN. Characteristics of Patients with Type 2 Diabetes Mellitus in Al-Ihsan Regional General Hospital. Glob Med Heal Commun. 2021;9(2):150–7.
25. Rashid T, Altaf SS, Rasool S, Iliyas R, Rashid S, Majid S, et al. Impact of Clinico-Biochemical Variations on the Etiopathogenesis of Cataract: a Case-Control Study. J Circ Biomarkers. 2023;12(7):1–11.
26. Maswa UK, Martaningsih WR, Novitasari A. Hubungan Antara Riwayat Diabetes Melitus Dengan Kejadian Katarak Dan Miopia Di Rs Panti Rahayu "Yakkum" Purwodadi. Med Kartika J Kedokt dan Kesehat. 2024;7(Volume 7 No 2):188–97.
27. Shaifullah M, Fatmawati NK, Ismail S. The Relationship between Diabetes Mellitus with Senile Cataracts. J Kesehat Pasak Bumi Kalimantan. 2024;6(2):215.
28. Fernandez-Martinez A, Lobatón-Vicente G, Vargas-Fernández R, Bendezu-Quispe G. Association between Diabetes and Cataracts in the Peruvian Population: Analysis of a National Survey. Rev Bras Oftalmol. 2023;82:1–7.