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The Characteristics of Eye Diseases at Merpati Eye Clinic Dr Kariadi Hospital Semarang in 2020-2022

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ABSTRACT

Background: The COVID -19 pandemic that has occurred since 2020 has changed and affected all aspects of life. In health services, the pandemic has limited patients from coming to health facilities. Recording of ophthalmology cases in health facilities has an important role in providing information about eye health problems that often occur in the community to identify what are the main challenges faced in the field of eye care
Objective:. This study aims to identify the characteristics of eye diseases at the Merpati Eye Polyclinic Dr Kariadi Hospital Semarang in 2020-2022.
Methods: This study was a retrospective descriptive study. The clinical characteristic data (gender, age, diagnosis, and Clinic) are retrieved from the medical records of patients suffering from eye diseases who underwent treatment at the Merpati Eye Clinic, Dr. Kariadi Hospital Semarang and was diagnosed in 2020-2022. The data obtained were processed and analyzed using the google sheets program
Results: There were 2961 newly diagnosed patients with the 10 most diagnosed diseases are Refractive disorders (12,87%), Cataracts (11,21%), Glaucoma (10,40%), Diabetic Retinopathy (6,75%), Pseudophakia (5,30%), Papile Atrophy (5,10%), Retinal Vein Occlusion (4,22%), Corneal Ulcer (3,92%), Retinal Detachment (3,71%) and Uveitis (3,51%). Based on age category, the most patients were 51-60 years old (22,29%). Based on gender category, female gender (50,35%) is more than male (49,65%).
Conclusion: Of all patients, the 10 most diagnosed diseases were Refractive Disorders, Cataracts, Glaucoma, Diabetic Retinopathy, Pseudophakia, Papillary Atrophy, Retinal Vein Occlusion, Corneal Ulcers, Retinal detachment and Uveitis.

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1. Introduction

In March 11th 2020, World Health Organization (WHO) has declared COVID-19 a pandemic. The COVID -19 pandemic has changed and affected all aspects of life, including health services.[1] Restrictive measures as a prevention to suppress the spread have been carried out by the government through the establishment of large-scale social restrictions (pembatasan sosial berskala besar/PSBB) locally, regionally and nationally. In Regulation of the Minister of Health Number 9 of 2020 regarding PSBB guidelines, one of which is an appeal to the public not to travel to health facilities unless emergencies.[2] This has resulted in a decrease in the number of patients visiting health facilities, including the ophthalmology department. Several outpatient visits are not necessary immediately and elective surgical procedures are ultimately delayed especially in older patients and those with comorbidities.[3] Meanwhile, eye disease is still one of the main health problems in Indonesia, ranging from mild to severe eye disorders. Delay or postponement in eye procedures of some cases can cause significant and rapid visual impairment which can lead to irreparable blindness. Loss of visual function or blindness is the peak of the most severe visual impairment. Visual impairment can affect the quality of life and socio-economic status in society [4, 5]

Based on the WHO report (2020), it is known that the most common cause of visual impairment worldwide is uncorrected refractive disorders (48.99%), followed by cataracts (25.81%) and ge related Macular Degeneration (AMD, 4.1%). While the most common causes of blindness are cataracts (34.47%), uncorrected refractive disorders (20.26%), and glaucoma (8.30%).4 Meanwhile, according to the Vision Loss Expert Group study of the Global Burden of Disease Lancet Global Health (2020), the main cause of global blindness in those aged 50 years and over is cataracts (15.2 million cases), followed by glaucoma (3, 6 million cases), refractive errors (2.3

million cases), age-related macular degeneration (1.8 million cases) and diabetic retinopathy (0.86 million cases). While the main causes of moderate and severe visual impairment are uncorrected refractive errors (86.1 million cases) and cataracts (78.8 million cases).[6] The prevalence of blindness in Indonesia is 3.0%. Approximately 85% of blindness affects patients aged over 50 years with the main cause of blindness and the largest visual impairment is cataract which is not operated on with a proportion of 77.7%.[7] According to the survey results reported by Rif'Ati et al. (2021) using the Rapid Assessment of Avoidable Blindness (RAAB) which was conducted in 15 provinces in Indonesia, the blind rate in Central Java reached 2.7% with the main cause of cataracts being 73, 8%.[5,8]

Recording of eye cases in health facilities has an important role, especially during the Covid-19 pandemic, which can provide information about common eye health problems in the community. Thus, it can be identified what are the main challenges faced in the field of eye care. This study aims to identify characteristics of eye disease in the Merpati Eye Clinic at Dr. Kariadi Hospital Semarang in 2020-2022.

2. Methods

This research was descriptive research with a retrospective approach. This research used quantitative methods. The data taken was secondary data from the medical records of patients who visit for treatment at the Merpati eye clinic at Dr. Kariadi Hospital Semarang. The subjects of research were taken using the total sampling method, which involved all of the patients who came for treatment. The obtained data was the data of patients who came for treatment at the eye clinic at Dr. Kariadi Hospital and was diagnosed with an eye disorder/disease in the period of May 2020-June 2022. The exclusion criteria for this study were incomplete medical record. The variables of this study were demographic and clinical characteristics which included gender, age, diagnosis, and clinical subdivisions. The ophthalmology outpatient installation consists of several clinics, namely: Glaucoma (GL), Infection Immunology (IIM), Lens Refractive Surgery (LBR), Neuro-ophthalmology (NO), Pediatric Ophthalmology and Strabismus (POS), Refraction (REF), Reconstruction, Oculoplastic Oncology (ROO), Vitreoretinal (VR).

The data obtained were grouped based on the main diagnosis, tabulated and analyzed using the Google Sheets program. From the tabulation, the ten most common diagnoses were selected in the overall data and data for each sub-division. The mean age and sex distribution of the top ten diagnoses from the overall data and data for each clinic were calculated.

3. Results

The results showed that in the Merpati eye clinic at Dr. Kariadi Hospital in the period 2020-2022, there were 2961 patient visits with eye disease and had complete medical record data. The most common diseases are taken and grouped based on clinical subdivisions. Most diseases are counted in each clinic and in general.

Data were stratified and analyzed overall and per clinic. Age characteristics were grouped into 7 groups. Data for the top 10 most common diseases are types of disease while sub-types of disease are in the data for each clinic.

Table 1. Characteristics of the subject

Variable	N	Percentage
Gender		
Male	1470	49.65%
Female	1491	50.35%
Age (Years)		
< 10	483	16.31%
11 - 20	253	8.54%
21 - 30	254	8.58%
31 - 40	313	10.57%
41 - 50	494	16.68%
51 - 60	660	22.29%
> 60	504	17.02%

Table 2. Distribution of case in each sub-division

Clinics	Age (years)							Gender				N
	≤10	11-20	21-30	31-40	41-50	51-60	>60	Male n (%)		Female n (%)		
Glaucoma (GL)	2	29	24	26	44	119	83	151	(46.18%)	176	(53.82%)	327

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Infection Immunology (IIM)	17	38	64	66	68	61	74	233	(60.05%)	155	(39.95%)	388
Lens Refractive Surgery (LBR)	0	11	9	7	26	68	73	106	(54.64%)	88	(45.36%)	194
Neuro-ophthamology (NO)	7	44	44	41	85	65	45	155	(46.83%)	176	(53.17%)	331
Pediatric Ophthalmology and Strabismus (POS)	425	35	13	6	5	4	1	242	(49.49%)	247	(50.51%)	489
Refraction (REF)	13	52	55	61	84	127	78	227	(48.30%)	243	(51.70%)	470
Reconstruction, Oculoplastic Oncology (ROO)	11	19	14	24	27	21	26	56	(39.44%)	86	(60.56%)	142
Vitreoretinal (VR)	8	25	31	82	155	195	124	300	(48.39%)	320	(51.61%)	620

Table 3. **Data of most common diagnosis in Merpati eye clinic**

No.	Diagnosis	N	Percentage (%)	Mean of age (years)	Gender			
					Male		Female	
					(n)	(%)	(n)	(%)
1	Refraction disorders	381	12.87%	37.26	166	43.57%	215	56.43%
2	Cataract	332	11.21%	47.60	175	52.71%	157	47.29%
3	Glaucoma	308	10.40%	47.85	148	48.05%	160	51.95%
4	Diabetic Retinopathy	200	6.75%	52.81	77	38.50%	123	61.50%
5	Pseudophakia	157	5.30%	55.21	74	47.13%	83	52.87%
6	Papillary atrophy	152	5.13%	43.28	82	53.95%	70	46.05%
7	Retinal Vein Occlusion	125	4.22%	16.63	61	48.80%	64	51.20%
8	Cornal ulcer	116	3.92%	48.72	90	77.59%	26	22.41%
9	Retinal Detachment	110	3.71%	45.11	64	58.18%	46	41.82%
10	Uveitis	104	3.51%	38.86	54	51.92%	50	48.08%
11	Strabismus	94	3.17%	18.72	44	46.81%	50	53.19%

Table 4. **Most common disease in each sub-division**

Sub-division clinic	Diagnosis	N	Percentage (%)	Mean of age (years)	Gender			
					Male		Female	
					(n)	(%)	(n)	(%)
Glaucoma (GL)	Primary Angle Closure Glaucoma	74	22.63%	56.58	31	41.89%	43	58.11%
	Cataract	48	14.68%	55.85	22	45.83%	26	54.17%
	Primary Open Angle Glaucoma	45	13.76%	53.31	24	53.33%	21	46.67%
	Absolute Glaucoma	34	10.40%	58.85	15	44.12%	19	55.88%
	Secondary Glaucoma	33	10.09%	46.24	22	66.67%	11	33.33%
	Pseudophakia	30	9.17%	54.77	16	53.33%	14	46.67%
	Primary Angle Closure	18	5.50%	57.44	3	16.67%	15	83.33%
	Juvenile Open Angle Glaucoma	17	5.20%	21.94	10	58.82%	7	41.18%
	Ocular Hypertension	12	3.67%	39.75	6	50.00%	6	50.00%
	Primary Angle Closure Suspect	11	3.36%	57.73	3	27.27%	8	72.73%
Infection Immunology (IIM)	Corneal ulcer with Hypopyon	34	8.76%	48.76	29	85.29%	5	14.71%
	Cataract	29	7.47%	49.79	12	41.38%	17	58.62%

	Leukoma	27	6.96%	35.63	12	44.44%	15	55.56%
	Dry Eye	25	6.44%	56.32	9	36.00%	16	64.00%
	Keratitis	25	6.44%	40.32	14	56.00%	11	44.00%
	Perforated Corneal Ulcer	25	6.44%	51.08	22	88.00%	3	12.00%
	Posterior Uveitis	24	6.19%	35.29	15	62.50%	9	37.50%
	Conjunctivitis	19	4.90%	32.79	11	57.89%	8	42.11%
	Endophthalmitis	17	4.38%	56.24	11	64.71%	6	35.29%
	Glaucoma	16	4.12%	43.63	8	50.00%	8	50.00%
Lens Refractive Surgery (LBR)	Pseudophakia	62	31.96%	60.23	29	46.77%	33	53.23%
	Immature Senile Cataract	43	22.16%	58.42	25	58.14%	18	41.86%
	Posterior Capsule Opacification	42	21.65%	65.03	17	40.48%	25	59.52%
	Glaucoma	21	10.82%	56.52	12	57.14%	9	42.86%
	Complicated cataract	17	8.76%	43.71	14	82.35%	3	17.65%
	Mature Senile Cataract	13	6.70%	60.54	7	53.85%	6	46.15%
	Diabetic Retinopathy	11	5.67%	54.73	5	45.45%	6	54.55%
	Diabetic cataract	10	5.15%	55.00	5	50.00%	5	50.00%
	Retinal Detachment	8	4.12%	53.88	6	75.00%	2	25.00%
	Decentralization of IOL	6	3.09%	65.03	2	33.33%	4	66.67%
Neuro-ophthamology (NO)	Papillary atrophy	121	36.56%	44.71	69	57.02%	52	42.98%
	Papillary oedema	47	14.20%	38.13	15	31.91%	32	68.09%
	Non-Arteritic Anterior Ischemic Optic Neuropathy	36	10.88%	54.14	18	50.00%	18	50.00%
	Optic neuritis	22	6.65%	25.41	7	31.82%	15	68.18%
	Cranial Nerve Palsy N III	21	6.34%	42.76	9	42.86%	12	57.14%
	Cranial Nerve Palsy N VI	18	5.44%	37.17	9	50.00%	9	50.00%
	Strabismus	17	5.14%	37.12	9	52.94%	8	47.06%
	Visual field defects	13	3.93%	49.77	9	69.23%	4	30.77
	Compressive Optic Neuropathy	11	3.32%	48.55	5	45.45%	6	54.55%
	Neuritis Retrobulbar	9	2.72%	35.11	4	44.44%	5	55.56%
Pediatric ophthalmology dan strabismus (POS)	Immature Retinal Vessels	79	16.16%	0.09	43	54.43%	36	45.57%
	Exotropia	48	9.82%	15.26	20	41.67%	28	58.33%
	Esotropia	34	6.95%	12.12	19	55.88%	15	44.12%
	Compound Astigmatism Myopia	32	6.54%	7.84	12	37.50%	20	62.50%
	Cortical Visual Impairment	28	5.73%	0.96	17	60.71%	11	39.29%
	Myopia	23	4.70%	9.12	10	43.48%	13	56.52%
	Retinopathy of Prematurity	23	4.70%	0.69	10	43.48%	13	56.52%
	Congenital Cataract	21	4.29%	2.64	13	61.90%	8	38.10%
	Amblyopia	19	3.89%	8.41	11	57.89%	8	42.11%
	Nystagmus	18	3.68%	4.63	10	55.56%	8	44.44%
Refraction (REF)	Astigmatism	131	27.87%	42.42	62	47.33%	69	52.67%
	Myopia	104	22.13%	38.81	44	42.31%	60	57.69%
	Compound Astigmatism Myopia	78	16.60%	37.96	36	46.15%	42	53.85%
	Hypermetropia	43	9.15%	50.04	22	51.16%	21	48.84%
	Cataract	25	5.32%	49.20	13	52.00%	12	48.00%
	Compound Astigmatism Hypermetropia	23	4.89%	50.30	12	52.17%	11	47.83%
	Mixed astigmatism	23	4.89%	53.26	13	56.52%	10	43.38%
	Glaucoma	19	4.04%	41.47	8	42.11%	11	57.89%

	Pseudophakia	15	3.19%	56.93	6	40.00%	9	60.00%
	Simple Astigmatism Myopia	13	2.77%	37.31	7	53.85%	6	46.15%
Reconstruction, Oculoplastic, Oncology (ROO)	Proptosis	41	28.87%	41.63	7	17.07%	34	82.93%
	Palpebral Mass	18	12.68%	42.00	5	27.78%	13	72.22%
	Papillary Atrophy	9	6.34%	26.20	3	33.33%	6	66.67%
	Ptosis	8	5.63%	26.20	5	62.50%	3	37.50%
	Entropion	6	4.23%	65.83	2	33.33%	4	66.67%
	Corneal Erosion	4	2.82%	40.25	2	50.00%	2	50.00%
	Grave's Ophthalmopathy	4	2.82%	33.50	1	25.00%	3	75.00%
	Retrobulbar Mass	4	2.82%	37.00	1	25.00%	3	75.00%
	Conjunctival Mass	3	2.11%	46.33	2	66.77%	1	33.33%
	Meningioma	3	2.11%	53.67	0	0.00%	3	100.00%
Vitreoretinal (VR)	Proliferative Diabetic Retinopathy	104	16.77%	50.81	33	31.73%	71	68.27%
	Vitreous Hemorrhage	65	10.48%	53.02	24	36.92%	41	63.08%
	Non Proliferative Diabetic Retinopathy	57	9.19%	54.37	24	42.11%	33	57.89%
	Rhegmatogenous Retinal Detachment	36	5.81%	45.69	23	63.89%	13	36.11%
	Tractional Retinal Detachment	28	4.52%	50.50	14	50.00%	14	50.00%
	Diabetic Macular Edema	23	3.71%	54.61	10	43.48%	13	56.52%
	Age-related Macular Degeneration	19	3.06%	61.95	10	52.63%	9	47.37%
	Central Retinal Vein Occlusion	19	3.06%	52.74	4	21.05%	15	78.95%
	Central Serous Chorioretinopathy	18	2.90%	43.56	16	88.89%	2	11.11%
	Degenerative Myopia	18	2.90%	48.06	8	44.44%	10	55.56%

4. Discussions

Based on age category, the most patients were aged 51-60 years (22.29%) followed by patients aged > 60 years (17.02%). Visual impairment increases with age, especially in several eye diseases such as glaucoma, cataracts, Age-Related Macular Degeneration (ARMD), Diabetic Retinopathy (DR).[9,10] As in the data of this study according to table 3 and table 4, the average age of glaucoma sufferers was 47.85 years, cataracts are 47.60 years, ARMD in vitreoretinal clinic was 61.95, and DR was 52.81. According to the data and information center of the Indonesian Ministry of Health (2018), the largest proportion of visual impairment and blindness occurs at the age of 50 years and over, namely 86% of people with blindness, 80% of people with moderate to severe visual impairment and 74% of people with mild visual impairment.5 From data of 15 provinces in Indonesia, the prevalence of blindness in people aged 50 years and over reaches 3.0%..5,8 Based on the gender category, this study found that there were more females (50.35%) than males (49.65%). This result was in accordance with data from the Ministry of Health regarding the Global Situation of Visual Impairment (2018) that 55% of people with visual impairments are women..[5]

The data above shows that the 10 most common diseases in the Merpati eye clinic Dr. Kariadi Hospital are Refractive Disorders (12.87%), Cataracts (11.21%), Glaucoma (10.40%), Diabetic Retinopathy (6.75%), Pseudophakia (5.30%), Papillary Atrophy (5.10%), Retinal Vein Occlusion (4.22%), Corneal Ulcer (3.92%), Retinal Ablation (3.71%) and Uveitis (3.51%).

According to the World Health Organization (2020), refractive disorders are the main cause of visual impairment.4 In this study, refractive disorders was the most common disease diagnosed in patients. As in the research at Masohi Hospital Maluku (2021) refractive disorders were the most cases found in 2019 and 2020.[11] Female (56.43%) were found to have more refractive errors than male (43.57%). These results were in accordance with research conducted at the eye clinic of Manado Hospital (2016) that women experience more refractive disorders. The average age of refractive disorder patients was the productive age, which was 37.26 years. The most common type of refractive disorders that can be seen from the Refraction subdivision clinic is Astigmatism in 131

patients (27.87%). The most common type of astigmatism was compound astigmatism myopia, with 78 patients (16.60%). This result was similar with a systematic review study conducted by taking global data (2018) that astigmatism was the most common refractive error in children and adults followed by hyperopia and myopia. [12]

Cataracts, which are the main cause of blindness in both Indonesia and Central Java, were the second most common disease in the Merpati eye clinic at Dr. Kariadi Hospital in 2020-2022 following refractive disorders, with 332 patients (11.21%). The most common cause of cataracts is due to aging with an increased risk of cataracts starting at the age of 40 years.[13] This was similar with the results of this study that the average age of cataract patients is 47.60 years. Cataracts caused by aging are called senile cataracts. In the clinical data of the LBR subdivision, the most common type of cataract found was immature senile cataract (22.16%). Indah Salsabila's research in NTB (2019) also explained that senile cataracts are the most common cataracts encountered with a higher frequency of male patients than female.[14] As in this study, there were more cataract patients in men (52.71%) than women (47.29%). However, this is different from the research conducted by Dwijayanti (2018), conducted at the Cicendo Eye Hospital National Eye Center (PMN RSM) which showed that the highest number of ophthalmology patients with blindness was found in female patients..[15] This also contradicts the hypothesis and studies regarding the role of estrogen in cataracts, that women have a higher prevalence of lens opacities due to decreased estrogen during menopause where estrogen has anti-oxidative properties and oxidative stress which is considered to be related to cataract formation..[16,17] Apart from glaucoma and cataracts, Diabetic Retinopathy (DR), which is a visual disorder with a risk factor for increasing age, is also one of the 10 most common eye diseases found, with 200 patients (6.75%). Proliferative Diabetic Retinopathy was the most common type of DR, with 104 patients (16.77%).

Glaucoma is the second most common cause of blindness after cataracts in people over 50 years old. In this study, glaucoma was the third most common disease found in patients, namely 308 patients (10.40%). Based on clinical data from the GL subdivision, primary angle closure glaucoma (PACG) was the most common type of glaucoma. However, this result was different from systematic review studies regarding the prevalence of glaucoma in Asia in which primary open angle glaucoma (POAG) is more common in Asia.[1819] PACG is a disorder associated with closure of the anterior chamber angle and is known to have a greater predisposition to bilateral blindness, which can be a major burden to family and society. Women are at a higher risk for PACG.[20,21] This result is in accordance with the data in this study that there were more female patients (58.11%) than male patients (41.89%) at PACG. Zhang N's research (2021) explained that age was the main risk factor for all types of glaucoma, because its prevalence increases with age. Aging is associated with higher intraocular pressure, thinner central corneal thickness, and higher mean ocular perfusion pressure. [21] From the data table above, the average age of PACG patients was 56.58 years.

The data in table 4 shows that the most common diseases in each sub-division clinic were PACG in the GL sub-division clinic (22.63%), Corneal ulcer with hypopyon in the IIM sub-division clinic (8.76%), Pseudophakia in the LBR sub-division clinic (31.96%), Papillary atrophy in the NO subdivision clinic (36.56%), Immature Retinal Vessels in the POS subdivision clinic (16.16%), Astigmatism in the REF subdivision clinic (27.87%), Proptosis at the TTR sub-division clinic (28.87%), and Proliferative Diabetic Retinopathy at the VR sub-division clinic (16.77%).

5. Conclusion

The 10 most diagnosed diseases were refractive disorders, cataracts, glaucoma with the most common types being PACG, diabetic retinopathy, pseudophakia, papillary atrophy, retinal vein occlusion, corneal ulcers, and uveitis. The results of this study are expected to be information for further and deeper research, especially on diseases with the most diagnoses to improve eye care at Dr. Kariadi General Hospital, Semarang

Ethical Approval

This research has received ethical approval from the Health Research Ethics Committee, Faculty of Medicine, Diponegoro University Dr. Kariadi Hospital Semarang with EC number No. 1270/EC/KEPK-RSDK/2022.

Conflicts of Interest

There is no conflict interest in this research

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Author Contributions

Conceptualization, FLR, RP, ZR, and RR; methodology, AW; software, RR; validation,

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