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Original Research Article

The characteristics of dry eye syndrome patients in Wangaya Regional Hospital from April 2023 to April 2024

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ABSTRACT

Background: Dry eye syndrome (DES) is a term used to describe a condition of the front of the eye that occurs in response to damage to the natural layer of tears that lines the front of the eye, called the tear film. Dry eye syndrome affects a person's quality of life, especially when reading, watching, driving, and when using laptops or similar gadgets. Dry eye syndrome is one of the diseases that has the most frequent morbidity of ocular surface disease. The purpose of this study is to identify the characteristics of patients with dry eye syndrome at Wangaya Regional General Hospital, Denpasar on April 2023-April 2024 based on age, gender, occupation, medical history, medication history, and lifestyle.
Methods: This is a quantitative study using purposive sampling technique to determine the participants. The data source in this study uses secondary data sources originating from medical records of dry eye syndrome patients who were treated at Wangaya Regional Hospital, Denpasar, Bali on April 2023-April 2024. This study enrolled 92 dry eye syndrome patients.
Results: Of the 92 patients, 64 (69,6%) were ≥40 years old, 59 (64,2%) were female, 37 (40,2%) were private sector workers, 40 (43,5%) has history of hypertensions, 59 (64,1%) has no history of smoking or drinking alcohol.
Conclusions: Most of dry eye syndrome patients were ≥40 years old, and most were female. Commonly the patient has history of hypertensions and has history of hypertensions medication. Most of the patients has no history of smoking or drinking alcohol.

Keywords: Dry eye syndrome, Characteristics, Quantitative study

INTRODUCTION

Dry eye syndrome is a complex condition that affects both the tear film and the ocular surface. It is characterized by symptoms such as discomfort, visual disturbances, and instability of the tear film, which can lead to damage to the eye's surface. This condition is also marked by higher osmolarity of the tears and inflammation of the ocular surface. Dry eye is the most prevalent eye disorder encountered in routine clinical practice.[1] The prevalence of dry eye syndrome in Asian populations is higher than in other ethnicities. There are only a few reports on the prevalence of dry eye in Asia, especially from Southeast Asia.[2] In the 21st century, many behaviours have developed including smoking and the rapid spread of technology such as the use of smartphones and computers. In addition, the average age of the population is increasing, so are chronic diseases and drug intake. These factors may be associated with the increasing percentage of dry eye syndrome worldwide.[3] Therefore, the objective of this study is to explore the characteristics of patients with dry eye syndrome at Wangaya regional hospital on April 2023 – April 2024.

METHODS

This study was a descriptive, cross-sectional study conducted at Wangaya Regional Hospital, Denpasar, Bali,

Indonesia, from April 2023 to April 2024. The study used secondary data obtained from the medical records of patients diagnosed with dry eye syndrome during the study period. The inclusion criteria are all patient diagnosed with dry eye syndrome at Wangaya Regional Hospital from April 2023 to April 2024 which has complete medical record data. Cases with incomplete or missing data were excluded from the analysis. The data were processed in univariate analysis. Samples were taken using purposive sampling technique, where all cases which met the inclusion criteria will be included in the research. Data were collected retrospectively from medical records. The variables in this study included age, gender, occupation, history of comorbid diseases, medication history, and lifestyle factors. No intervention was performed on the patients, as the study was purely observational and data-based. This study was approved by the Ethics Committee of Wangaya Regional Hospital, Denpasar, Bali, Indonesia (Ethical Clearance: 113/XI.1 1/KEP/RSW/2024 Date: 12 November 2024). Patients confidentiality were maintained, and data were anonymized prior to analysis. Data were analyzed using univariate analysis to describe the distribution of variables. Descriptive statistics such as frequencies, and percentages were used where appropriate.

RESULTS

During April 2023 – April 2024, there were 92 patients diagnosed with dry eye syndrome at the Wangaya Regional Hospital. In age category, it is categorized into two categories, with the most patient presented with age ≥ 40 years old with 64 cases (69.6%), followed by age <40 years old with 28 cases (30.4%). We also found that there were more female patients than male, namely 59 females (64.2%), while 33 are male (35.8%). Based on the patient's occupation, private sector worker was found to be more common occupation of patient diagnosed with dry eye syndrome, about 37 patients (40.2%), followed by civil servant as many as 21 patients (22.8%), merchant as many as 19 patients (20.7%), and lastly unemployed with 15 patients (16.3%). A total of 65 cases of dry eye syndrome patients has comorbid disease history consisted of 40 hypertension cases (43.5%) and 25 diabetes cases (27.2%), the other 27 cases (29.3%) has no comorbid disease history. 112 cases (35.33%) in the right eye and 76 cases (20.19%) in the left eye.

Table 1: Dry eye syndrome patient distribution based on gender.

Gender	N	Percentage
Male	33	35.8
Female	59	64.2
Jumlah	92	100

Based on their medication history, 37 patients (40.2%) has history of consuming antihypertension medication, 25 patients (27.2%) has history of consuming antidiabetic medication, and 30 patients (32.6%) has no history of taking routine medication. And lastly, on lifestyle category, 59 patients (64.1%) has no history of smoking nor consuming alcohol, 26 patients (28.3%) has history of smoking, and 7 patients (7.6%) has history of consuming alcohol.

Table 2: Dry eye syndrome patient distribution based on age.

Age (years)	N	Percentage
<40	28	30.4
≥40	64	69.6
Total	92	100

Table 3: Dry eye syndrome patient distribution based on occupation.

Occupation	N	Percentage
Unemployed	15	16.3
Private sector worker	37	40.2
Civil servant	21	22.8
Merchant	19	20.7
Total	92	100

Table 4: Dry eye syndrome patient distribution based on comorbid disease history.

Comorbid disease history	N	Percentage
No comorbid disease history	27	29.3
Diabetes	25	27.2
Hypertension	40	43.5
Total	92	100

Table 5: Dry eye syndrome patient distribution based on treatment history.

Treatment history	N	Percentage
No treatment	30	32.6
Antihypertension medication	37	40.2
Anti-diabetes medication	25	27.2
Total	92	100

Table 6: Dry eye syndrome patient distribution based on lifestyle.

Lifestyle	N	Percentage
Smoking	26	28.3
Alcohol	7	7.6
Never participate in smoking or alcohol consumption	59	64.1
Total	92	100

DISCUSSION

Dry eye syndrome, sometimes called tear duct dysfunction, is a source of frustration for both doctors and patients. It can be progressive and has major consequences

for patients' vision and quality of life, yet it remains underappreciated, misdiagnosed, and undertreated. Approximately 20 million people in the United States (344 million people worldwide) suffer from dry eye syndrome, and that number is set to grow in the coming years in both young and old adults, making it critical for doctors to find the best way to treat this condition.[4]

Dry eye syndrome according to the International Dry Eye Workshops (DEWS) is a multifactorial disease of the tears and ocular surface, with clinical symptoms of discomfort, visual disturbances, and tear film instability that has the potential to damage the surface layer of the eye. This condition is accompanied by increased osmolarity of the tear curtain and inflammation of the surface layer of the eye. Dry eye is the most common eye disease found in daily practice.[5] In Indonesia, the prevalence of dry eye syndrome case is around 27.5%, with a sample size of 1058 with an age range of ≥21 years. The incidence of dry eye syndrome has also increased in recent years. Its prevalence varies depending on ethnicity, environment, lifestyle habits, and the use of different diagnostic criteria. Previous studies have shown that the prevalence of dry eye syndrome in Asian populations is higher than in other ethnicities. There are only a few reports on the prevalence of dry eye in Asia, especially those from Southeast Asia.[6] Dry eye is more common in women than in men (due to the effects of female hormones on the lacrimal and meibomian glands and the ocular surface) and its prevalence increases with age. Studies have shown that female gender is a risk factor for dry eye, with prevalence ranging from 12% to 22%.[5] Generally, the diagnosis of dry eye syndrome requires a patient history and slit lamp examination, with additional tests if necessary.[7] Patients with dry eye symptoms often have co-morbidities, so it is important to address the underlying cause. The use of tear replacement as a primary treatment is generally unsuccessful if the underlying cause has not been treated. Clinicians should educate patients about the causes and chronicity of dry eye. Realistic expectations for treatment goals should be determined and discussed with the patient.

The results of the study showed that patients who experienced dry eye syndrome based on age were mostly aged ≥40 years (69.6%). This study is in line with research conducted by Inayah, which stated that as many as 23 people (79%) experienced dry eye syndrome at the age of ≥40 years.[8]

Increasing age causes the accumulation of reactive oxygen species (ROS) in the body to increase and reduce antioxidant substances in the body which will cause cell damage. The eye organ experiences decreased function, especially in the lacrimal glands and meibomian glands, so that there will be a decrease in tear wetness. The increasing age of a person will increase the risk of developing dry eye syndrome. The increased risk of dry eye syndrome in the elderly can be caused by changes in the lacrimal glands of the eye, namely if there is a disturbance in the glands, the tear layer will become unstable, causing tear deficiency.[8]

The results of the study showed that patients who experienced dry eye syndrome based on gender were mostly women, as many as 59 people (64.2%). Dry eye syndrome is more common in women than in men, although the difference becomes significant with age. Several studies have noted that the prevalence of dry eye in women (3.2 million) is higher than in men (1.6 million) over the age of 50. Large epidemiological studies have shown that there is indeed a difference in dry eye symptoms between men and women, with women more likely to experience dry eye signs and report dry eye symptoms than men. Female gender is a significant risk factor for the development of dry eye syndrome.[9]

Significant differences in sex-specific risk factors between men and women suggest that the underlying pathophysiological mechanisms of dry eye disease are partly due to differences in endocrine function. Hormones in this system include androgens, estrogens, progestins, hypothalamic-pituitary hormones, glucocorticoids, insulin, insulin-like growth factor 1 (IGF-1), and thyroid hormones. Sex-related differences in biological processes, molecular functions, and cellular components of the meibomian glands may be due to the effects of androgens, not estrogens and progesterone. Compared with androgens, estrogens and progesterone play a minor role in sex-related differences in gene expression and sexual dimorphism of the lacrimal gland.[10]

However, there are also several studies stating that dry eye syndrome in women may occur due to hormones influenced by low estrogen in women which causes a decrease in tear secretion. Estrogen is generally known to cause a decrease in lipid production and the size of the meibomian glands, thus allowing dry eye symptoms to occur.[11]

The results of the study showed that patients who experienced dry eye syndrome were mostly in private sector jobs, namely 37 people (40.2%). This study is in line with research conducted by Nugroho, which stated that patients who experienced dry eye syndrome were more likely to be in private sector workers, namely (56.3%).[12]

According to several studies, around 60% of private or office workers suffer from eye diseases, especially dry eyes. Because 70% of working time is spent in front of screen (Mobile Phone, Laptop, Computer). Because they are very concentrated for a long time, people who often work in front of the gadget screen experience a decrease in blinking frequency (normal frequency 12-14 times per minute). This causes the tear layer to be unstable or damaged, causing dry eyes. In addition, private workers are also accustomed to sitting in air-conditioned rooms which can cause dry eyes. Air conditioning (AC) is a room cooling device that can control the temperature of the air in the room and provide a comfortable effect on the body. The air released through the AC contains only a little water so that the air in the air-conditioned room tends to have lower humidity than normal. Air conditioning has a

dehumidifier that makes the air in the cold room very dry so that tears evaporate faster. The use of air conditioning is now commonplace for Indonesian citizens. Starting from homes to office buildings already have air conditioning facilities. The use of air conditioning in the room for so long will make the air in the room drier because the air conditioning only regulates the room temperature without regulating the humidity of the room. This can cause dry eye syndrome due to poor room air quality.[13]

The results of the study showed that patients who experienced dry eye syndrome were more in patients who had a history of hypertension, which was 40 people (43.5%). This study is in line with research conducted by Thang et al, which stated that dry eye syndrome occurs more in patients who have a history of hypertension (41.7%).[14]

Long-term hypertension will accelerate the occurrence of blood vessel sclerosis and cause changes in vascularization. Blood vessel sclerosis occurs due to fibrosis of the conjunctiva and lacrimal glands. On histological examination, fibrosis of the conjunctiva and lacrimal glands is found to be associated with degranulation mast cells. The occurrence of fibrosis of the conjunctiva and lacrimal glands will lead to a state of tear deficiency which causes further damage to the surface of the eye. Sclerosis due to changes in vascularization that occur does not provide specific symptoms in the eyes, but complaints experienced by patients with hypertension include eye pain, decreased vision or blurred vision, this is in accordance with the signs and symptoms of dry eye syndrome.[15]

The results of the study showed that patients who experienced dry eye syndrome were more likely to have a history of antihypertensive treatment, namely 37 people (40.2%). This study is in line with research conducted by Pamungkas et al, which stated that as many as 25 people (52.1%) who consumed antihypertensive drugs experienced dry eye syndrome. Several studies have stated that the use of antihypertensive drugs can cause dry eye syndrome. The types of antihypertensive drugs that have been studied are beta blockers and diuretics, but there is no data on the angiotensin-converting enzyme (ACE) inhibitors and calcium channel blockers (CCB) groups. However, a study conducted by Oviani stated that the use of antihypertensive drugs, especially the CCB group, namely amlodipine, can cause dry eye syndrome.[16]

Antihypertensive drugs can directly cause inflammation of the lacrimal glands. During inflammation, the glands will release pro-inflammatory cytokines and other mediators. Antihypertensives will also indirectly interfere with the transmission of impulses. This disruption of nerve impulse transmission is caused by an increase in cytokines produced by the inflamed lacrimal glands, which can interfere with the attachment of Ach to muscarinic receptors, so that impulses cannot be transmitted, then there is a disruption of the lacrimal glands to the secretion of tear secretions, tear production decreases from normal so that the eyes will become dry.[16]

The results of the study showed that patients who experienced dry eye syndrome were more in patients who did not smoke and did not consume alcohol (64.1%). This study is not in line with the study conducted by Songkares, which stated that out of 110 smoker samples, 52.7% experienced dry eye syndrome.[17]

There is a theory that smoking can reduce the density of goblet cells, inflammation occurs, the number of goblet cells decreases because goblet cells are susceptible to swelling. Swollen goblet cells are easily damaged so they cannot produce mucin to protect the corneal and conjunctival epithelium. Nicotine in cigarettes can stimulate macrophages that can change extracellular matrix proteins, will accelerate the apoptosis process, which increases hyperosmolarity that has occurred due to excessive evaporation. Carbon monoxide inhaled from cigarette smoke can reduce the blood's ability to carry oxygen to the capillaries of the eye, especially the lacrimal glands which can cause decreased lacrimal function to produce tears. The inflammation that occurs can stimulate the corneal and conjunctival nerves so that patients feel symptoms of dry eye syndrome.[18]

Limitations

As a descriptive study, this research is limited in its ability to establish causal relationships between variables, and findings may not be generalizable beyond the study population. Furthermore, because the study focuses on a specific population and setting, the results may not be applicable to other groups or healthcare environments.

CONCLUSION

The distribution of the proportion of dry eye syndrome at Wangaya Regional General Hospital in the period April 2023 - April 2024 most of them are aged ≥40, female, working as private workers, had hypertension and has history of taking antihypertensive drugs, with majority of the patients has never participate in smoking or consuming alcohol. This study is still limited to presenting descriptive data. Further research is needed to find the relationship between patient characteristics and the occurrence of dry eye syndrome incidents.

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