Prevalence and Comparison of Cardiovascular Disease Risk Factors Among cataract and Non-Cataract Patients: Non-Experimental Descriptive Research

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Abstract

Problem: oxidative stress has been implicated in the progression of major health problems by inactivating metabolic enzymes and damaging important cellular components, oxidizing the nucleic acids leading to cardiovascular diseases, eye disorders, joint and neurological diseases, atherosclerosis, lung and kidney disorders, liver and pancreatic diseases, cancer, aging, disease of the reproductive system including infertility, etc. Oxidative damage to proteins in the human lens is believed to be an important Etiology of age-related cataracts. Because free radical-mediated oxidative damage to lipoproteins may accelerate atherosclerosis, the development of cataracts might be a marker for such damage and therefore it is associated with future risk of cardiovascular disease. **Approach:** A quantitative descriptive approach was used. The non-experimental descriptive research design was adopted. A purposive sampling technique was adopted to select 100 patients with Cataracts and non-cataracts. Interview techniques were used for data collection. Assessment of CVD was done by administering a structured questionnaire. Data were analyzed using descriptive and inferential statistics. **Findings:** This study shows that highly statistically significant cardiovascular disease risk factors like BMI (0.03*), Waist circumference (0.05*), dietary pattern (0.001**), COVID-19 (0.03*), history of diabetes mellitus (0.04*), obesity (0.02*) and thyroid disorder (0.05*) among cataract patient than the non-cataract patient. This study's findings showed that cardiovascular disease prevalence is 58% with a confidence interval of 95%. **Conclusion:** The study revealed that there is an association of cardiovascular risk factors with cataract patients. It also showed more prevalence of cardiovascular disease.

Key Words: Cataract, cardiovascular disease, non-cataract, risk factors.

Introduction

Background

Accordance to the WHO, the primary contributory factor for death all over the world is the Conditions of the vascular system[8]. In 2019, cardiovascular disorders contributed to 32% of all deaths globally, estimated to have killed 17.9 million people. In 85% of these deaths, heart attacks and strokes were the cause. Most CVD mortality happens in nations with low and medium incomes. In 2019 saw, Before the age of 70, 17 million people died prematurely brought on by diseases that are not infectious, and 38% of those fatalities were related to CVDs[5]. Taking behavioral risk factors into consideration including smoking, eating poorly and obesity, being inactive, and using alcohol problematically, the majority of cardiovascular illnesses may be avoided[13]. In India, the prevalence of cardiovascular disease has increased over the past 20 years, and as a

result, 1 in 4 fatalities are now attributable to it, making it the country's top cause of mortality and morbidity[3]. It is estimated that 800,000 people worldwide die from heart disease, stroke, and vascular disease all fall under the umbrella term of "cardiovascular disease"[1]. By modifying one's way of life to reduce or manage risk factors, CVD can be stopped or postponed. By adjusting important risk parameters, approximately thirty-four percent of heart disease fatalities might be avoided. Elevated danger of passing away from heart illness may also be associated with cataracts, a common eye ailment that frequently develops with aging.

The relationship between cataracts and a higher chance of cardiovascular death may be related to oxidative stress, crystalline, or depression. Research has demonstrated that DNA damage brought on by oxidative stress leads to the growth of cataracts and encourages atherogenesis[2,11]. The degradation of crystallin that occurs in cataracts may indicate a more general problem that contributes to greater vascular mortality. Crystallin are important lens constituent and is also involved in controlling responses to stresses like inflammation and ischaemia[2]. Major health issues have been linked to the development of oxidative stress which inactivates the metabolic enzymes and damages important cellular components, oxidizing the nucleic acids, leading to cardiovascular diseases, eye disorders, joint disorders, neurological diseases, atherosclerosis, lung and kidney disorders, liver and pancreatic diseases, cancer, aging, disease of the reproductive system including the male and female infertility, etc. Oxidative damage to proteins in the human lens is believed to be important in the Etiology of age-related cataracts. Because free radical-mediated oxidative damage to lipoproteins may accelerate atherosclerosis, the development of cataracts might be a marker for such damage and therefore might be associated with future risk of cardiovascular disease[14].

Even after having cataract surgery, it has been demonstrated that patients with cataracts are more likely than those without the illness to have depression, and those who already experience depression are more likely to acquire cardiovascular disease[12,4]. The retina vasculature, or configuration of blood vessels located behind the retina, is intricately heart health-related. This implies that conditions affecting the eyes might have a direct impact on heart and blood vessel health. Retinal arteries and veins are meant to be around two to three times bigger than each other in size. Therefore, if the vein is much larger and dilated than the artery, it may be a sign of high blood pressure or other cardiovascular risk factors[13]. Also, this study shows that highly statistically significant cardiovascular disease risk factors like BMI (0.03*), Waist circumference (0.05*), dietary pattern (0.001**), COVID-19 (0.03*), history of diabetes mellitus (0.04*), obesity (0.02*) and thyroid disorder (0.05*) among cataract patient than the non-cataract patient and there is no any association between the selected demographic variable as well as the risk of developing cardiovascular disease in people with and without cataracts.

Material and method

The research was carried out only after gaining approval from the Institutional Human Ethical Committee at Chettinad Academic of Research and Education. Additionally, authorization was received in the words of the Medical Surgical Department, clearance was granted using the UG committee, and Each person's informed consent was obtained. The privacy of the subjects' data was maintained throughout the investigation. A quantitative descriptive research approach to achieve the study's aims. For the current investigation, a non-experimental descriptive design was selected. The research was done at Chettinad Hospital and Research Institute, situated in Kelambakkam, Chengalpattu district, which is an 1180-bed hospital and holds accreditation from the National Accreditation Board for Hospitals and Healthcare Providers. The medical center comprises 16 distinct outpatient departments, out of which Medical OPD and Ophthalmic OPD were chosen as the settings for conducting the research. The intended sample for the current research includes patients diagnosed with cataracts. The following are the study's inclusion criteria: Patients the age of 40 years or older, Patients who are fluent in English and Tamil languages, and Patients who have given their consent and are willing to take part in the research. The following are the data collection's exclusion criteria: People who were participants in the pilot research in the past, Patients who have undergone long-term steroid therapy, and Patients diagnosed with any cardiovascular disease. The research instrument was assessed by 5 professionals from various fields to verify content authenticity fields including two Medical-Surgical Nursing, Ophthalmologists, cardiologists, and Statisticians. The tool's

clarity, relevance, completeness, and appropriateness of material were to be evaluated by these experts. Based on their feedback, necessary modifications were made to the tool, and the interview program only contained questions with a perfect score. This helped to establish the content validity of the tool. The planned interview process used in the study was developed based on a comprehensive review of relevant literature, including studies, journals, and books, as well as input from experts in the field. The objective of the study was also taken into consideration during the creation of the tool. The data collection tool utilized in this investigation were split into two categories.

Section I- It consists of demographic information such as gender, age, family structure, marital status, religion, level of education, employment, family income, family history of cardiovascular disease.

Section II- It consists of a set created to evaluate the risk factors for cardiovascular disease, consisting of multiple-choice questions. These inquiries centered on a range of risk factors including physical attributes, inherited qualities, food patterns, and way of life decisions.

Data collection procedure

The data was collected at the medical and ophthalmic outpatient department in Chettinad Hospital for a period of 28.11.2022 to 06.01.2023. Formal written consent was obtained and the objective of the study was explained hospital medical officer to get his cooperation during the study. Oral consent was obtained from 100 samples that were selected based on the purposive sampling technique. On 28.11.2022 I took all the patients who were attending the ophthalmic outpatient department and medical outpatient department with a history of cardiovascular disease to screen for the prevalence of CVD. From the next day onwards, for comparisons I have taken all samples with no history of cardiovascular disease, among them 50 samples were selected from the ophthalmic outpatient department with cataracts, and 50 samples were selected from the medical outpatient department with non-cataract all attained inclusion criteria. The demographic profile of each subject was obtained by using a structured interview schedule. All the samples were interviewed with a structured questionnaire. The patients were informed of the investigation's objectives and the privacy of whatever information was exchanged was guaranteed. Each patient was surveyed independently during the data collection, which took place in the individual OPDs. Each sample data-gathering procedure took around 30 to 45 minutes. The investigator interviewed the patients and recorded their appropriate answers. Patients who needed more information about the questions or answers had the questions rephrased and repeated. At last, the pamphlet was distributed to all the participants which contained information on the prevention of cardiovascular disease.

In this study, data analysis using SPSS version 26. Analyzed included categorical data provided as percentiles and data that was continuously reported as the mean along with the standard deviation. The data have been examined and associated using the chi-square test. Indicators were deemed as statistically significant at a significance probability value of 0.05.

Result

Sample proportionate distribution based on demographic variables

According to the presented statistics, 42% of patients with cataracts are jobless, and 44% of patients without cataracts are employed in the private sector. Additionally, 78% of patients without cataracts and 82% of cataract patients are married. Patients with cataract diagnoses make up 46% of joint families whereas patients without cataract diagnoses make up 72% of nuclear families. Additionally, 96% of patients with cataracts are not vegetarians, while 78% of patients without cataracts are not vegetarians (figure 1). Additionally, 54% of patients with cataract diagnoses report having a history of cataracts, whereas 42% of patients without cataract diagnoses report having no such history.

Prevalence of cardiovascular disease risk factors among patients visiting the outpatient department

The figure indicates that among the total population (374), patients responded Yes with cardiovascular disease is 218 (58%) Prevalence Proportion of percentage. The mean difference (56.09 – 60.02) a percentage of the proportion of diagnosed with cardiovascular disease is 95% with a Confidence interval. (Figure:2)

Comparison of cardiovascular disease risk factors among cataract and non-cataract patient

According to this study, (Table 1) indicates that 42% of cataract patients and 24% of patients without cataracts had a BMI of 25 to 29.9 and above. 44% of patients with cataracts and 24% of patients without cataracts have waist circumferences between 95 and 102 cm. Consequently, numerous physical factors differ between patients with cataracts and those who don't. WHO classifies people between 25 to 29.9 as pre-obese and overweight, which increases their chance of developing comorbid conditions. This study discovered that patients with cataracts had higher BMIs and waist circumferences than those without cataracts.

(Table 2) shows that there was significance in the hereditary variables of a family history of diabetes and a family history of obesity (p=0.04 and p=0.02, respectively). This demonstrates that, in contrast to a family history of hypertension, other variables, such as a family history of diabetes and obesity, are the main risk factors for cardiovascular disease in individuals.

(Table 3) shows that eating fast food often and using palm crude oil for cooking had an impact (p=0.04; p=0.001). Additionally, consuming fatty snacks was significant (p=0.04). This demonstrates that between cataracts as well as non-cataract patients, consuming fast food often, preparing food using palm oil, and consuming fatty snacks are the main dietary indicators of risk underlying heart disease.

(Table 4) reveals that having previous episodes of thyroid disease and a background of covid-19 were significant (p=0.05) (p=0.03). Also, significant (p=0.04) were significant of deep veins thrombosis and varicose veins histories. This shows that factors related to illness history of thyroid disorder, history of COVID-19, and history of deep vein thrombosis and varicose veins are the major risk factors of cardiovascular disease among cataract and non-cataract patients.

(Table 5) revealed the significance of drinking alcohol and smoking was significant (p=0.007, p=0.01). Additionally, there was significance in the practice of tobacco use and labor with any chemicals (p=0.01, p=0.03). This demonstrates that within cataracts including non-cataract individuals, variables connected to a lifestyle's activity of drinking alcohol, inhaling tobacco smoke, in addition occupations handling any chemicals are among the greatest risks of heart disease.

Discussion

Shraddha et.al., 2020, according to data broken down by nation, noncommunicable diseases are believed to be the cause of 53% of all deaths in India, with cardiovascular diseases making up a significant 24% of those fatalities. Furthermore, Sreeni et.al., (2018), conducted research on the risk factors for cardiovascular disease in In India in 2016, it is thought that traditional Risk elements including overweight or obese dyslipidemia, insulin resistance, and hypertension are linked to a higher prevalence of coronary artery disease (CAD) in Indians. Compared to 15.2% and 6.9%, respectively, in 1990, CVD caused 28.1% of all fatalities and 14.1% based on all disability-adjusted lifespans. According to research, Kerala, Punjab, and Tamil Nadu are the countries with the biggest rates of CVD.

In this study, the prevalence of cardiovascular disease is 58% with a Confidence interval of 95%.

Clinicalstudies support the association between cataracts and cardiovascular diseases. All CVD risk factors were significantly more prevalent in cataract patients in univariate analysis. Multivariate logistic regression analysis revealed a significant association of the following with cataract genesis: diabetes, CAD, HTN, PVD, smoking, IHD, CRF, hyperlipidemia, and Ashkenazi origin.

According to the current study, patients with cataracts had higher BMIs and waist circumferences than those without cataracts.38% of cataract patients and 38% of non-cataract patients regularly consume fast food, and 24% of cataract patients and 30% of non-cataract patients consistently use palm oil in their cooking. Oily or Combination snacks tend to be eaten by 22% of non-cataract patients and 44% of cataract patients. The researcher discovered that 12% of cataract patients and 2% of non-cataract patients had a history of thyroid problems throughout the data-gathering process. COVID-19 affects 20% of cataract patients and 6% of patients who don't have cataracts. Deep vein thrombosis and varicose veins are present in 4% and 16%, respectively, of the participant's patients without cataracts. Regarding lifestyle, the researcher discovered that 42% of cataract individuals and 22% of non-cataract patients smoke regularly. The results indicate that 14%

of cataract patients and 2% of non-cataract patients work with chemical compounds, whereas 18% of cataract patients and 4% of non-cataract patients use cigarettes regularly.

Conclusion

According to the study findings risk factors of cardiovascular disease affect 58% of patients. Both cataract individuals and those without cataracts had a significant (0.02) ancestral record of obesity. The habit of eating fast food among cataract & non-cataract patients is significant (0.01). When cataracts, as well as non-cataract patients, prepare with palm oil, there is significance (0.01). The frequent use of greasy snacks among cataracts and non-cataract patients is significant (0.01). The age group of those who suffer from cataracts between 51 and 60 years old had a significant (0.01) blood pressure history. The indicator of body mass of non-cataract patients between the ages of 41 and 50 is significant (0.002). The waist circumference among patients who are between the ages of 41 and 50 without cataracts is significant (0.01). Having diabetes in the family and being overweight in the past are cataract patients are significant (0.002). Fast food consumption and a history of hypertension are significant (0.001) in cataract patients. Exercise habits and a history of hypertension are significant (0.05) among cataract patients. Waist circumference, history of high blood pressure, and diabetic issues in relatives are significant (0.5) among cataract patients. elevated blood pressure in the past and a person's body mass index among patients without cataracts are significant (0.05). The practice of eating fatty snacks and a history of hypertension is significant (0.01) among non-cataract patients. The study also claims that there is a significant difference in the amount of risk associated with dietary habits and lifestyle to demographic characteristics including age, educational position, family type, and dietary pattern among cataract and noncataract patients. This demonstrates that dietary habits and way life practices have a significant role in the dangerous components of cardiovascular disease in both cataract patients and patients without cataracts.

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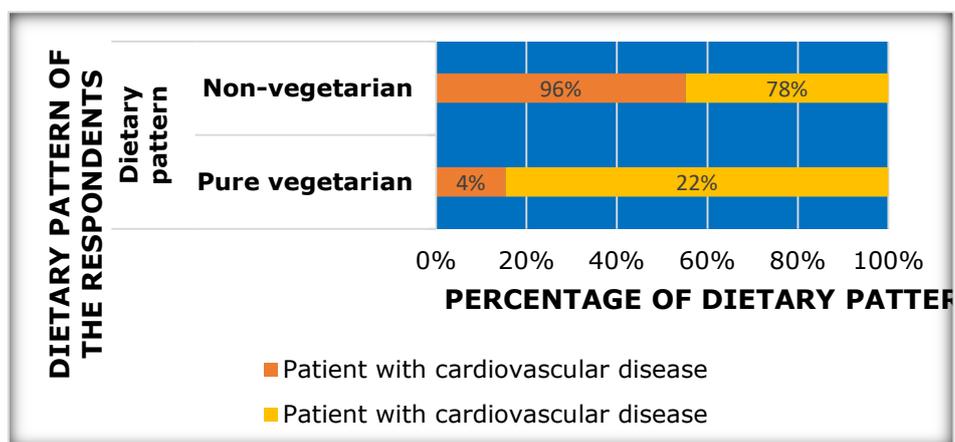
Figure:

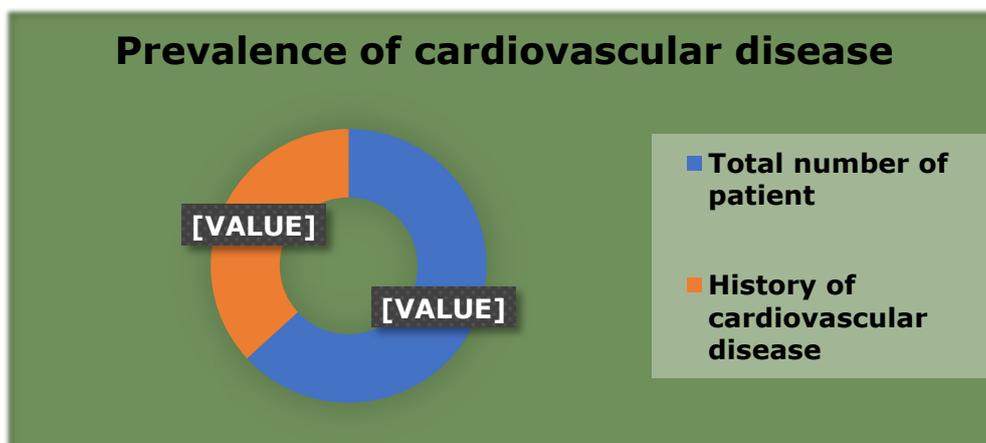*Figure 1 : Dietary pattern of the respondents*

Figure 2: Prevalence of cardiovascular disease

Table 1: Factors related to physical Parameters

Risk factor		Cataract		Non-cataract		χ2	P value
		N	%	N	%		
Body Mass Index	<18.5	3	9%	6	12%	8.70 DF=3	0.03*
	18.5-24.9	19	38%	30	60%		
	25-29.9	21	42%	12	24%		
	>30	7	14%	2	4%		
Waist Circumference	<94 cm	17	34%	21	42%	7.50 DF=3	0.05*
	95-102 cm	22	44%	12	24%		
	102-110 cm	11	22%	13	26%		
	>111 cm	0	0%	4	8%		

The following notations apply: * - p0.05, * - p0.001 Level of Significant**

Table 2: Factors related to hereditary

Factors related to hereditary		Cataract		Non-cataract		χ2	P value
		N	%	N	%		
Family history of hypertension	No	21	42%	26	52%	1.004 DF=1	0.31
	Yes	29	58%	24	48%		
Family history of diabetes	No	41	82%	32	64%	4.11 DF=1	0.04*
	Yes	9	18%	18	36%		
Family history of obesity	No	45	90%	50	100%	5.26 DF=1	0.02*
	Yes	5	10%	0	0%		

The following notations apply: * - p0.05, * - p0.001 Level of Significant**

Table 3: Factors related to Dietary pattern

Factors related to Dietary pattern		Cataract		Noncataract		χ2	P value
		N	%	N	%		
Habit of taking fast/junk food	Never	10	20%	7	14%	7.95 DF=3	0.04*
	Rarely	21	42%	17	34%		
	Most often	19	38%	19	38%		
	Always	0	0%	7	14%		
Using palm oil for cooking	Never	2	4%	3	6%	17.66 DF=3	0.001**
	Rarely	14	28%	28	56%		
	Most often	22	44%	4	8%		
	Always	12	24%	15	30%		
Using ghee with food	Never	20	40%	20	40%	0.70 DF=3	0.87
	Rarely	13	26%	16	32%		
	Most often	13	26%	10	20%		
	Always	4	8%	4	8%		
Eating oily snacks	Never	17	34%	18	36%	8.26 DF=3	0.04*
	Rarely	22	44%	11	22%		
	Most often	10	20%	15	30%		
	Always	1	2%	6	12%		
Taking tinned food	Never	4	8%	4	8%	1.75 DF=3	0.62
	Rarely	25	50%	24	48%		
	Most often	16	32%	20	40%		
	Always	5	10%	2	4%		

The following notations apply: * - p0.05, * - p0.001 Level of Significant**

Table 4: Factors related to illness

Factors related to illness		Cataract		Non-cataract		χ2	P value
		N	%	N	%		
History of Thyroid disorder	No	44	88%	49	98%	3.84 DF=1	**0.05***
	Yes	6	12%	1	2%		
Undergone any cardiac surgeries	No	47	94%	50	100%	3.09 DF=1	0.07
	Yes	3	6%	0	0%		
History of any angina	No	44	88%	48	96%	2.17 DF=1	0.14
	Yes	6	12%	2	4%		
Have you ever been affected by COVID–19	No	40	80%	47	94%	4.33 DF=1	**0.03***
	Yes	10	20%	3	6%		
History of deep vein thrombosis and varicose vein	No	42	84%	48	96%	4.00 DF=1	**0.04***
	Yes	8	16%	2	4%		

The following notations apply: * - p0.05, *** - p0.001 Level of Significant

Table 5:Factors related to lifestyle

Factors related to lifestyle		Cataract		Non-cataract		χ2	P value
		N	%	N	%		
Consuming alcohols Smoking	Never	23	46%	35	70%	11.99 DF=3	**0.007****
	Rarely	15	30%	3	6%		
	Most often	4	8%	7	14%		
	Always	8	16%	5	10%		
Smoking	Never	17	34%	26	52%	9.93 DF=3	**0.01***
	Rarely	21	42%	11	22%		
	Most often	9	18%	4	8%		
	Always	3	6%	9	18%		
Tobacco chewing	Never	38	76%	48	96%	8.61 DF=2	**0.01***
	Rarely	9	18%	2	4%		
	Most often	3	6%	0	0%		
	Always	0	0%	0	0%		
Habit of fasting	Never	30	60%	26	52%	1.11 DF=3	0.77
	Rarely	12	24%	16	32%		
	Most often	5	10%	4	8%		
	Always	3	6%	4	8%		
Work with chemicals, cleaners, paints etc.	Never	42	84%	46	92%	8.68 DF=3	**0.03***
	Rarely	7	14%	1	2%		
	Most often	1	2%	0	0%		
	Always	42	84%	3	6%		

The following notations apply: * - p0.05, *** - p0.001 Level of Significant