The Anthrometric Characteristics and Types of Cataract in Erbil City

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Abstract

Background and objectives: Cataract is the most leading cause of decrease visual acuity and blindness in the world. The aim of this study is to find out the association of the anthropometric characteristic and types of cataract among the studied population**Methods:** A cross sectional study conducted among 200 middle aged patients attending ophthalmology consultation clinic at Rizgary and Hawler teaching hospital in Erbil city and diagnosed by ophthalmologist to have cataract, from the 1st of June 2017 to the 30th of November 2017. The questionnaire was completed through direct interview.**Results:**The proportion of the posterior sub-capsular type among females (55.9%) was significantly higher than the proportion (29.9%) among males (p = 0.003). A significant association (p < 0.001) was detected between abdominal obesity and types of cataract. The proportion of the posterior sub-capsular was 58.7% among those with abdominal obesity compared with 16.5% among those with no abdominal obesity. Regarding obesity, categorized by body mass index, it was found that the proportion of the posterior sub-capsular type increase with the increase of body mass index, while the proportion of cortical type decrease with the increase in body mass index (p = 0.005). **Conclusions:** posterior sub capsular cataract, found to be the more evident type and significantly associated with the abdominal obesity and the increase of BMI while the cortical type found to decrease with the increase in BMI.

Keywords: Anthropometric characteristic; Types of cataract; Rizgary and Hawler teaching hospital; Erbil city.

Introduction

Cataract is the most leading cause of blindness worldwide today, characterized by lens opacity and visual impairement[1]. According to the 2010 Global Burden of Disease Study[2] and other worldwide meta-analyses[3-5] four million individuals worldwide were blind and 191 million individuals were visually impaired, meanwhile cataract found to be the leading cause of blindness. The three foremost components by which eye lens is harmed, prompting cataract: oxidation push, osmotic inclinations and glycosylation. Morphologically Cataract is classified into three main types, cortical, nuclear, and posterior subcapsular cataract. Nuclear cataracts form in the middle of the lens and cause the nucleus, or the center, to become yellow or brown. Cortical cataracts are wedge-shaped and form around the edges of the nucleus. Posterior capsular cataracts form faster than the other two types and affect the back of the lens[6].

Aging, environmental, and genetic factors[7-9] could play a role in cataract formation, beside other factors; diabetes, steroid utilization and smoking. Obesity may impact the physiological changes leading to cataract too[10]. A few investigations have proposed the positive relationship amongst cataract and BMI[11-12], yet debates exist[13]. However, obesity is an expanding problem worldwide it is worth to look whether overweight/ obesity is a free hazard factor for nuclear, cortical, and posterior subcapsular cataract (PSC). Clinically, it is vital to comprehend if overweight/ obesity is related to a particular subtype of cataract in light of the fact that the pathophysiology, treatment, and effects on visual working of the three subtypes of cataract have a tendency to be different[14].

This study was conducted to assess the association of anthropometric characteristics with different types of cataract among a sample of middle aged patient in Erbil city. Specific objectives were to identify the socio-demographic characteristics of patients with cataract, to determine the association of the anthropometric measurements (BMI and waist circumference) with cataracts and its types, to determine the association of different factors (age, gender, sun exposure, obesity) with cataract and its type.

Patients & Methods

A Cross-sectional study was conducted at the ophthalmology consultation clinic of Rizgary and Hawler teaching hospital in Erbil city. A convenience sample of 200 middle aged patients attending ophthalmology consultation clinic and diagnosed to have a cataract. The diagnosis of cataract and its types (nuclear, cortical, posterior subcapsular, and mixed) were ascertained by the ophthalmologist using slit lamp examination, accordingly eligible study population was defined. Both newly and previously diagnosed patients were involved. Patients aged 40-65 years old were included in this study, male to female ratio (1:0.86) or (107: 93), while patients with other comorbid diseases of eye (e.g. Glaucoma, Retinal detachment, Uveitis… etc.), patients with traumatic cataract, and patients having diabetes were excluded from this study. Data collection was done by one to two visits per week were achieved to the ophthalmology consultation clinics of Rizgary and Hawler teaching hospital in Erbil city; at each visit 8-10 patients were recruited. The data were collected through direct interview with every participant and lasts for about 10 minutes. All participants were assessed for their weight and

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height being completed by the researcher using the same scale. Height was measured, without shoes, in centimeters using a wall-mounted measuring tape, and weight was measured, with indoor clothes, in kilograms using a digital scale, both in standing position. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared[15]. BMI classified into: (Normal < 25 Kg/m2), (Overweight 25-29.9 Kg/m2), and (Obesity ≥ 30 Kg/m2) according to AACE/ACE Guidelines[16]. Waist circumference (WC) was measured by placing a measuring tape in a horizontal plane around the abdomen at the level of the iliac crest, accordingly patients were classified to have abdominal obesity if WC > 88 cm in female and > 102 cm in male[17]. Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 22). Chi square test and Fisher's exact test were used to compare between proportions. Analysis Of Variance (ANOVA) was used to compare three means. A post hoc test (LSD) was used to compare each two groups. A p value of ≤ 0.05 was considered statistically significant.

Results

Two hundred patients affected with cataract were included in the study. Their mean age + SD were 60.2 + 5.8 years, ranging from 40 to 65 years. The median was 63 years. The mean age of diagnosis + SD was 59.5 + 5.9 years, ranging from 40 to 65 years. The median was 62 years.

Table 1 and Table 2 show that 42% of the patients had posterior sub-capsular type of cataract, 24.5% had the mixed type, 22.5% had the nuclear type, and 11% had the cortical type. No significant association was detected between age and types of cataract (p = 0.137). The proportion of the posterior sub-capsular type among females (55.9%) was significantly higher than the proportion (29.9%) among males (p = 0.003). No significant association was detected between the degree of sun exposure and the types of cataract (p = 0.140), while significant association (p < 0.001) was detected between abdominal obesity and types of cataract. The proportion of the posterior sub-capsular was 58.7% among those with abdominal obesity compared with 16.5% among those with no abdominal obesity. Regarding obesity, categorized by BMI, it was found that the proportion of the posterior sub-capsular type increase with the increase of BMI, while the proportion of cortical type decrease with the increase of BMI (p = 0.005).

Table (1): Types of cataract by age and gender.

Variables	Types of cataract								P value
	Nuclear		Cortical		Posterior sub-capsular		Mixed		
	No.	%	No.	%	No.	%	No.	%	
Age									
40- <45	2	(66.7)	1	(33.3)	0	(0.0)	0	(0.0)	0.137*
45-49	5	(45.5)	0	(0.0)	6	(54.5)	0	(0.0)	
50-54	4	(21.1)	3	(15.8)	8	(42.1)	4	(21.1)	
55-59	5	(14.7)	6	(17.6)	14	(41.2)	9	(26.5)	
60- 65	29	(21.8)	12	(9.0)	56	(42.1)	36	(27.1)	
Gender									
Male	29	(27.1)	14	(13.1)	32	(29.9)	32	(29.9)	0.003
Female	16	(17.2)	8	(8.6)	52	(55.9)	17	(18.3)	

*By Fisher's exact test.

Table (2): Types of cataract by different factors.

Variables	Nuclear		Cortical		Posterior sub-capsular		Mixed		P- value
	No.	%	No.	%	No.	%	No.	%	
Exposure to sun									
None	27	(18.9)	17	(11.9)	63	(44.1)	36	(25.5)	0.140
< 20h/week	4	(28.6)	3	(21.4)	7	(50.0)	0	(0.0)	
20-30 h/week	7	(29.2)	1	(4.2)	9	(37.5)	7	(29.2)	
>30 h/week	7	(36.8)	1	(5.3)	5	(26.3)	6	(31.6)	
Abdominal obesity									
No	25	(31.6)	18	(22.8)	13	(16.5)	23	(29.1)	<0.001
Yes	20	(16.5)	4	(3.3)	71	(58.7)	26	(21.5)	
BMI categories									
Normal	28	(33.7)	13	(15.7)	23	(27.7)	19	(22.9)	0.005
Over-wt.	8	(13.8)	6	(10.3)	29	(50.0)	15	(25.9)	
Obese	9	(15.3)	3	(5.1)	32	(54.2)	15	(25.4)	
Total	45	(22.5)	22	(11.0)	84	(42.0)	49	(24.5)	

Table 3 and Table 4 show no significant association between type of cataract and age (p = 0.155), hours of sun exposure (p = 0.152), and age of diagnosis (p = 0.162). The highest means of both BMI (28.8 Kg/m2) and waist circumference (101.60 cm) were in the posterior sub-capsular type with statistically significant association (p value of 0.002 and < 0.001) respectively.

Table (3): Means of numerical variables by type of cataract.

Variables	Type of cataract	N	Mean	SD	p-value (ANOVA)	LSD groups	p (LSD)
Age (years)	A)Nuclear	45	59.40	7.04	.155	A X B	.570
	B)Cortical	22	58.55	6.24		A X C	.407
	C)Posterior subcapsular	84	60.29	5.55		A X D	.075
	D)Mixed	49	61.53	4.50		B X C	.210
	Total	200	60.20	5.81		B X D	.045
						C X D	.232
Sun Exposure (hr/Week)	A)Nuclear	45	10.18	14.72	.152	A X B	.075
	B)Cortical	22	4.27	10.91		A X C	.045
	C)Posterior subcapsular	84	5.45	10.98		A X D	.385
	D)Mixed	49	7.90	14.02		B X C	.698
	Total	200	6.99	12.75		B X D	.266
						C X D	.284

Table (4): Means of numerical variables by type of cataract.

Variables	Type of cataract	N	Mean	SD	p value (ANOVA)	LSD groups	p (LSD)
Age of diagnosis (years)	A)Nuclear	45	58.89	7.27	.163	A X B	.383
	B)Cortical	22	57.55	6.23		A X C	.583
	C)Posterior subcapsular	84	59.49	5.72		A X D	.123
	D)Mixed	49	60.78	4.52		B X C	.171
	Total	200	59.46	5.93		B X D	.034
						C X D	.226
BMI (kg/m2)	A)Nuclear	45	25.5660	4.05	.002	A X B	.863
	B)Cortical	22	25.3323	4.43		A X C	.001
	C)Posterior subcapsular	84	28.8562	5.86		A X D	.148
	D)Mixed	49	27.1233	5.24		B X C	.005
	Total	200	27.3037	5.36		B X D	.181
						C X D	.065
Waist circumference (cm)	A)Nuclear	45	94.69	10.61	< 0.001	A X B	.038
	B)Cortical	22	88.45	14.48		A X C	.001
	C)Posterior subcapsular	84	101.60	11.19		A X D	.309
	D)Mixed	49	97.10	11.17		B X C	.000
	Total	200	97.50	12.14		B X D	.004
						C X D	.030

Discussion

Regarding the demographic characteristics the percentage of males(56.5%)   diagnosed to have cataract were slightly more than that of female (43.5%), while in a study conducted in Korea 2015[18], both males and females found to be equally affected. On the other hand the mean age + SD of the studied sample (60.2 + 5.8 years) found to be consistent with a study conducted in Korea 2014[19]. The majority of patients in this study were more than 60 years old at the time of diagnosing cataract, a result similar to a study done in Columbia, Missouri, USA5. Though aging are among the main risk factor for developing cataract, no significant association had been revealed in this study between increasing age and cataract, this result could be rendered to the selection criteria adopted in this study so as to include those of middle aged patients only, being intended to explore the effect of other characteristics rather than aging which is mostly found to be evident   after the age of 65 years[20].

In the present study posterior subcapsular cataract found to be the most frequently evident type (42%). On the other hand the diagnosis of nuclear type found to be nearly twice that of cortical type (22.5% and 11%, respectively), such finding was also reflected in previous studies conducted in Taiwan[21], China[22], and Myanmar[23] which reported a higher prevalence of the nuclear type than that of the cortical type.

The prevalence of abdominal obesity in this study was 61%, while general obesity categorized by BMI was only %30. Whether obesity either general or abdominal could be linked to the different types of cataract was determined in this study and accordingly a significant association (p < 0.001) had been detected between abdominal obesity and different types of cataract in different manners. On one hand, the proportion of the posterior sub-capsular was 58.7% among those with abdominal obesity compared with 16.5% among those with normal abdominal circumference, on the other hand, the proportion of the posterior sub-capsular type found to be increased with the increase of general obesity categorized by BMI, while the proportion of cortical type decrease with the increase of BMI (p = 0.005). These results were somewhat consistant   with the fourth Korea National Health and Nutrition Examination Survey 2009 that found a significant association between body fatness and cataract, meanwhile it revealed an increase in cataract with lower BMI[18]. Another study conducted in Korea[19], also regarded metabolic syndrome, which includes abdominal obesity as an   independent risk factor for cataract. Yet a study done on middle aged (40-64 years) adults in Korea in 2015[18], showed that the prevalence of cataracts was significantly higher in both the generally obese groups (29.0% vs. 23.0%) and the abdominally obese group (35.0% vs. 21.0%) compared with their non-obese counterparts (both P < 0.001) among middle-aged women. Thus, there is still some discrepancy between different studies about the association between

different types of cataract and general obesity, whether they linked to increase or decrease in BMI, while the association of abdominal obesity with an increased risk of cataract and its different types disclosed to be more evident. Regarding the history of sun exposure, which is also known to be one of the risk factors of cataract, more than two thirds of the studied sample (%71) had reported no such exposure which could be explained by their demographic characteristics, being mostly; 60-65 years aged, retired, and unemployed or housewife's, thus could rendered their outdoor activities to be restricted as far as the exhibited lifestyle of such category of peoples living in urban areas in our country.

The impact of obesity ,whether categorized as general or abdominal ,on the development of cataract and it`s different types as far as being encountered in this study and other studies[18, 19, 24] necessitate an in width approach in evaluating such health problems so as to be managed effectively and efficiently, taking into consideration the possible primary prevention measures that could be under-taken for further improvement in the outlook of the optimum health status of aging population.

Conclusions

Among the three types of cataract, posterior sub capsular, found to be the more evident type and significantly associated with the abdominal obesity and the increase of BMI while the cortical type found to decrease with the increase in BMI.

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