Ethnicity is a risk factor for PCR in phacoemulsification surgery

Hamza A S Abdou [1] , Abdul-Jabbar Ghauri [2`]

1. University Hospitals of Leicester 2. Birmingham and Midlands Eye Center

Introduction and Background :

A literature review highlights the correlation between ethnicity and intraoperative surgical complications in different specialties. Ethnic minority communities are reported to experience higher rates of complications. These disparities can be attributed to various factors, including socioeconomic status, cultural barriers, implicit biases, inadequate access to healthcare resources and anatomic variations in different ethnicities.

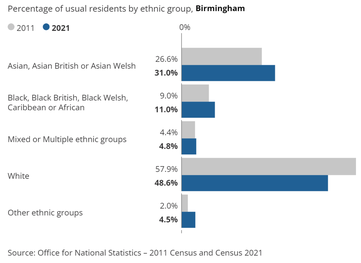
Correlation between cataract complications , specifically posterior capsule rupture (PCR) , and ethnicity has not been widely studied in the literature.

Objectives and venue

The aim of the study to determine if there is a correlation between the rate of posterior capsule rupture (PCR) during phacoemulsification surgery and patients' ethnicity

Venue : Birmingham and midlands Eye Centre (BMEC) and Sandwell General Hospital (SGH)

Birmingham, UK is a metropolitan multiethnic city with a large population exceeding one million. The City provides an access to a large diverse pool of various patients' ethnicities, which gives an excellent opportunity to study any correlation between ethnicity and specific diseases, or complications.



Source: Office for National Statistics – 2011 Census and Census 2021

Materials and Methods

We undertook a retrospective review of all phacoemulsification surgeries that took place at BMEC and SGH between 2012 and 2021. We exported the data retrospectively from Medisoft software to include all adult patients over 16, who had phacoemulsification surgery between January 2012 and January 2021. Descriptive statistics of the patients' characteristics was done using frequencies and relative frequencies (percentage) for categorical variables while mean and standard deviation were used for numeric variables. The difference between patients who had PC rupture and the others was tested using Chi-square test for categorical variables and independent t-test for numeric variables. The association between different risk factors and the occurrence of PC rupture was studied using multiple logistic regression. SPSS software version 26 was used for the statistical analysis and P-value < 0.05 was considered significant.

		OR	P-value	95% C.I.for OR	
				Lower	Upper
Age at operation		1.01	0.057	1.00	1.01
Gender	Male (REF)				
	Female	0.81	0.009	0.69	0.95
Ethnicity	White (REF)				
	African/carribian/black	1.41	0.01	1.09	1.83
	Bangladesh/India/Pakistan	1.19	0.089	0.97	1.45
	Chinese/other asian	0.94	0.831	0.53	1.66
	mixed	1.51	0.108	0.91	2.49
	other/unknown/non specified	0.66	0.013	0.48	0.92
DM	No DM (REF)				
	yes	1.38	0.001	1.15	1.66
	unknown	1.25	0.147	0.92	1.69
Surgeon Grade	Consultant (REF)				
	Associate specialist	2.76	<0.001	1.69	4.52
	Staff Grade	1.84	0.003	1.18	2.84
	Fellow	1.94	<0.001	1.56	2.40
	Specialist Registrar	1.63	<0.001	1.35	1.98
Diabetic retinopathy		1.15	0.279	0.89	1.49
Glaucoma		0.79	0.061	0.62	1.01
Brunescent / white cataract		1.86	<0.001	1.43	2.41
No view of fundus; Vitreous opacification		1.52	<0.001	1.06	2.19
Pseudoexfoliation		1.97	<0.001	1.15	3.38
Pupil Size	Large (REF)				
	Small	0.77	0.066	0.59	1.02
	Medium	0.76	0.055	0.58	1.01
Axial length	<26 mm (REF)				
	≥ 26 mm	1.28	0.181	0.89	1.83

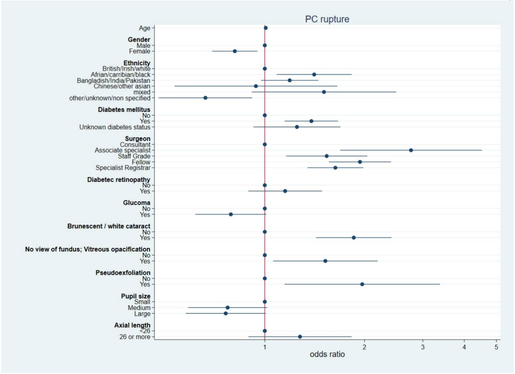
Multiple logistic regression for the association between PC rupture and different risk factors

Results

A total of **30266** eyes were included in this study . The association between different risk factors and the occurrence of PC rupture was studied using multiple logistic regression to control for other variables. The variables that showed a significant association with the occurrence of PC rupture are Gender, Ethnicity, DM status, Surgeon grade, and the presence of Brunescent / white cataract, No view of fundus; Vitreous opacification, or pseudoexfoliation.

African/Caribbean/black Ethnicity is associated with a higher probability of occurrence of PC rupture as compared to the white Ethnicity (OR=1.41, 95%CI: 1.08, 1.83). The odds of occurrence of PC rupture in African/Caribbean/black patients is 1.41 times the odds of occurrence of PC rupture in white patients, p-value =0.01.

The figure below shows the odds of occurrence of PCR in relation to different risk factors including ethnicity according to our study:



Discussion

In today's healthcare landscape, disparities in the quality and outcomes of medical care have become a growing concern. One significant aspect of these disparities is the impact of ethnicity on surgical complications. Ethnic minority groups often face unique challenges in accessing healthcare services, which can contribute to disparities in surgical outcomes. This study aims to explore the existing literature on ethnicity's correlation with PCR rates in cataract surgery and highlights our findings in the context of the literature findings. The literature search reveals a scarcity of available evidence. Notably, a retrospective study conducted by Chan et al.[6] demonstrated that ethnic diversity within Singapore did not exert any discernible influence on the PCR rate [6]. Further analysis of the findings from this study elucidates that although Singapore boasts a multi-ethnic population, it notably lacks representation from some ethnic groups such as Africans or Afro-Caribbeans.

Our study highlights a statistically significant correlation between a particular ethnicity and the rate of PCR. To the authors' knowledge, this finding has not been studied or established previously within a similar diverse sample of population.



Conclusion

African/Afro-Caribbean ethnicity carries a statistically significant higher risk of posterior capsule rupture during phacoemulsification surgery. Further research is needed to study this correlation.

To tackle healthcare disparities, a holistic approach involving healthcare providers, policymakers, and society at large is necessary. The focus should be on enhancing accessibility to healthcare, improving the cultural competence of healthcare professionals, fostering diversity in the medical workforce, and addressing implicit biases. Moreover, it is essential to conduct further research to gain a deeper understanding of the root causes behind these disparities and develop specific interventions to alleviate them.

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