

# Psychosocioeconomic Determinants of Complicated and Uncomplicated Mature Cataracts in Hong Kong

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## Abstract

**Objective:** Blindness caused by mature cataract is reversible with timely cataract extraction surgery, however neglecting it could complicate with phacomorphic glaucoma. This study aims to investigate the psych socioeconomic determinants of phacomorphic glaucoma complicated and uncomplicated mature cataracts in Hong Kong.

**Participants and Methods:** Retrospective review of cataract surgery records from 2013 - 2018 in a tertiary public emergency hospital's ophthalmology unit in Hong Kong was done to identify phacomorphic glaucoma and uncomplicated mature cataract patients as case and control respectively. Data on demographics, psychiatric diseases, social and economic factors were extracted and analyzed.

**Results:** 36 cases and 39 controls were included, with similar age ( $p = 0.73$ ) and sex ( $p = 0.99$ ). Presence of psychiatric diseases ( $p = 0.02$ ) and absence of spouse ( $p = 0.008$ ) were associated with phacomorphic glaucoma in univariate logistic regression analysis. Intention to private healthcare service usage ( $p = 0.002$ ,  $p = 0.006$ ) and living out of public rental housing ( $p = 0.002$ ,  $p = 0.004$ ) were associated with phacomorphic glaucoma in both the univariate and multivariate logistic regression analysis.

**Conclusion:** Attention to screening of mature cataract before complication of phacomorphic glaucoma occurs should target the single elderly households, psychiatric patients, and the non-public housing population.

**Keywords:** Socio economic factors, Psychiatry, Blindness, Cataract, Glaucoma

**Abbreviations:** IOL: Implantation of Intraocular Lens, ECCE: Extracapsular Cataract Extraction, eHRSS: Electronic Health Record Sharing System, OAH: Old Age Home, CSSA: Comprehensive Social Security Assistance

## Background:

Progressing with age, the natural lens of the eye would lose transparency and thicken, progressing from immature to mature cataract. Mature cataract is defined by significant opaque lens that prevent visualization of the posterior lens capsule, yet in time cataract surgery could reverse blindness by such [1]. Mature cataract does not only decrease visual acuity and cause blindness, but also complicate with

phacomorphic glaucoma. "Phacomorphic" implies the disease is cataract lens related, and "glaucoma" is an irreversible optic neuropathy comes with visual field defect [2]. Phacomorphic glaucoma usually presents with acute onset of eye pain, and is often associated with headache, nausea or vomiting; thus, calling for an emergency department attendance. For patients with mature cataracts, lens extraction surgery with implantation of intraocular lens



(IOL) is the definitive treatment to restore vision [3,4]. In modern countries, mature cataracts usually happen on self-neglecting, socially isolated or low socioeconomic class of patients. This study aims to investigate the psychosocioeconomic determinants of complicated (phacomorphic glaucoma) and uncomplicated mature cataracts in Hong Kong.

### Methods:

Patients were screened from the cataract operation records of a tertiary public emergency hospital's ophthalmology unit via the electronic system with the ICD-9 diagnosis code of 365.59 (phacomorphic glaucoma) and 366.17 (mature cataract). Cataract surgery cases in the 5 years of 2013 - 2018 were retrospectively reviewed. Exclusion criteria was patients who were too ill or fragile to be operated for their mature cataracts. Phacomorphic glaucoma patients who underwent any kinds of cataract extraction surgery were all included. Uncomplicated mature cataract patients with visual acuity down to hand movement or below, who underwent extracapsular cataract extraction (ECCE) in the same period, were included as the control group. Data on patients' demographics were extracted from the admission nursing summary. Medical history of psychiatric disease, smoking

status, and active follow-up in other specialties before first seen by ophthalmologist were recorded. Details of psychiatric diseases were reviewed. Social factors including presence of spouse, type of housing; and economic factors of self-payment of IOL, eligibility to free public healthcare service, and intention to private healthcare usage were retrieved. Intention to private healthcare usage was measured according to patient's registration to the electronic health record sharing system (eHRSS), which was a voluntary scheme started in 2009, that allowed free passage of patients' electronic record between the public and private doctors whom they were under care [5]. Statistical analyses by T-test, Chi-square test, univariate and multivariate logistic regression analysis were done by SPSS version 25. (IBM, Armonk, NY, USA)

### Results:

A total of 75 patients were identified, with 36 phacomorphic glaucoma patients and 39 uncomplicated mature cataract patients. 100% data were available for all items from the admission nursing summary. Age ( $p = 0.73$ ) and sex ( $p = 0.99$ ) were not significantly different, but female was uniformly more dominant in our study over both groups. Prevalence of each parameter was listed out in **Table 1**.

**Table 1: Characteristics of patients.**

	Phacomorphic glaucoma	Mature cataract	p-value
Age range	53 - 92	49 - 90	
Mean age (+/- SD)	73.3 +/- 9.5	72.4 +/- 11.3	0.729 (t-test)
Male: female	1: 1.77	1: 1.79	0.985 (chi-sq)
Presence of spouse	22.2%	56.4%	0.007* (chi-sq)
Smoker	11.1%	25.6%	0.107 (chi-sq)
Psychiatric diseases	33.3%	10.3%	0.015* (chi-sq)
Public rental housing (flat/ OAH †)	22.2%	61.5%	0.001* (chi-sq)
Active follow-up in public hospitals	80.6%	87.1%	0.434 (chi-sq)
Self-payment of intraocular lens	77.8%	59.0%	0.081 (chi-sq)
eHRSS ‡ registration	41.7%	12.8%	0.005* (chi-sq)

Significant p-values were highlighted with \*

† OAH = Old Age Home, ‡ eHRSS = electronic health record sharing system

Psychiatric diseases suffered by these patients were most commonly dementia (8.0%), followed by depression (6.6%). Other minor psychiatric disease entities were listed out in

**Table 2.** Because of the rarity of each particular psychiatric illness, subgroup analysis was not possible.

**Table 2: Details of psychiatric diseases of recruited subjects.**

	Phacomorphic glaucoma	Mature cataract
<b>Dementia</b>	5	1
<b>Depression</b>	4	1
<b>Others</b>	Schizophrenia x 1 Obsessive compulsive disorder x 1 Generalized anxiety disorder x 1	Panic disorder x 1 Mental retardation x 1
<b>Total</b>	12	4

Upon univariate logistic regression analysis, presence of psychiatric disease ( $p = 0.02$ ) and eHRSS registration ( $p = 0.002$ ) were associated with phacomorphic glaucoma. In

contrast, presence of spouse ( $p = 0.008$ ), and living in public rental housing/ old age home (OAH) ( $p = 0.002$ ) were associated with mature cataract only. (**Table 3**)

**Table 3: Univariate logistic regression analysis.**

	B	S.E.	Wald	p-value	Exp(B)	95% CI	
						lower	upper
<b>Age</b>	0.008	0.022	0.123	0.725	1.008	0.965	1.053
<b>Sex</b>	0.009	0.481	0.000	0.985	1.009	0.393	2.593
<b>Presence of spouse</b>	-1.417	0.538	6.936	0.008*	0.242	0.084	0.696
<b>Smoker</b>	-0.877	0.655	1.795	0.180	0.416	0.115	1.501
<b>Psychiatric diseases</b>	1.476	0.635	5.398	0.020*	4.375	1.260	15.196
<b>Public rental housing (flat/ OAH †)</b>	-1.658	0.546	9.239	0.002*	0.190	0.065	0.555
<b>Active follow-up in public hospitals</b>	-0.679	0.649	1.098	0.295	0.507	0.142	1.807
<b>Self-payment of intraocular lens</b>	1.117	0.599	3.478	0.062	3.055	0.945	9.877
<b>eHRSS ‡ registration</b>	1.894	0.609	9.681	0.002*	6.643	2.015	21.896

Significant p-values were highlighted with \*

† OAH = Old Age Home, eHRSS ‡ = electronic health record sharing system

In multivariate logistic regression analysis, presence of spouse and psychiatric diseases became not associated, while eHRSS registration ( $p = 0.006$ ) and public rental housing/ OAH ( $p = 0.004$ ) remain significant. (**Table 4**)

## Discussions:

Phacomorphic glaucoma usually presents as acute intraocular pressure rise that gives the symptoms of eye redness, blurring of vision, eye pain, headache, and nausea [6]. Thus, our study setting over an emergency hospital-based ophthalmology unit was the suitable places for capturing these cases. As the name implies, phacomorphic glaucoma is caused by the diseased lens, which becomes thicker and bulkier with age and cataract progression [7]. Before the acute attack, the mature cataract usually would have a significant impact on the patient's vision [8]. This study helps to identify the associated factors

on those vision-neglecting patients, thus guiding future healthcare resources allocation or directions of screening program.

Spouse was chosen as the social factor because children don't often live with their elderly parents in the nuclear family structure in Hong Kong. Public rental housing/ OAH were covered by the government's safety net, but with asset and income limits subject to approval. In contrast, patients under the comprehensive social security assistance (CSSA) scheme, and civil servants were entitled for free public healthcare service, together with free IOL during cataract surgery.

Going through the economic determinant of diseases, employment status and personal income were commonly mentioned, [9, 10] yet not applicable to our study as the diseased subjects were on average over 70 years old, of post-retirement age in Hong Kong. In terms of social factor, [11]



education level was not included in our analysis due to the non-structured educational system dated many decades back in the past, and possible bias from recalling difficulties by the

elderly. Therefore, only relevant determinants were included in this study for better reflection of the patients' socioeconomic status.

**Table 4: Multivariate logistic regression analysis.**

	B	S.E.	Wald	p-value	Exp(B)	95% CI	
						lower	upper
Age	-0.022	0.032	0.462	0.497	0.978	0.919	1.042
Sex	0.178	0.718	0.062	0.804	1.195	0.293	4.877
Presence of spouse	-1.016	0.801	1.608	0.205	0.362	0.075	1.741
Psychiatric diseases	1.717	0.963	3.183	0.074	5.570	0.844	36.758
Public rental housing (flat/ OAH †)	-2.311	0.802	8.299	0.004*	0.099	0.021	0.478
eHRSS ‡ registration	2.019	0.729	7.674	0.006*	7.533	1.805	31.433

Significant p-values were highlighted with \*

† OAH = Old Age Home, ‡ eHRSS = electronic health record sharing system

Our study showed that age and gender were not associated with the awareness of mature cataract, despite more female underwent cataract surgery in our hospital. This could be explained by the longer life-expectancy of female in Hong Kong [12]. Out of expectation, free healthcare service and active follow-up in public hospitals were not associated, whereas intention to private healthcare usage was associated with phacomorphic glaucoma. These findings suggested that patient's initiative to seek relevant subspecialty consultation was far more important than their financial consideration, which may be specific to eye diseases only [13]. The importance of getting motivation to seeking medical advice for illness was further evidenced by the positive impact of having a spouse, [14] and negative outcome in psychiatric disease group, whom they were prone to self-neglect [15, 16]. Interestingly, only housing factor and intention to private healthcare usage were associated, but oppositely, in the multivariate logistic regression analysis. The retrieval process of eHRSS data was retrospectively done in 2019 without knowing their exact year of eHRSS registration, thus putting an intrinsic bias, but also a new angle, in interpretation of the result. The association with phacomorphic glaucoma could be a reflection of increased self-health awareness after the disease episode, or intention to private healthcare usage after having cataract operation in the public hospital. In addition, the aforementioned bias was supplemented by the item of "Active follow-up in other specialties before first seen by

ophthalmologist", which unluckily was not associated in any analysis.

Less public rental housing/ OAH patients presented with phacomorphic glaucoma could be explained by the good community support in public housing estate or OAH on one hand, while this group of patients should have better awareness of social welfare coverage in Hong Kong throughout their application process. With the knowledge on the association of psych socioeconomic determinants of complicated mature cataract in Hong Kong, we understand more on the ophthalmology service gap in the community. Other than community medicine practitioner, geriatricians, psychiatrist could also help to do one step further as a holistic care for their patients.

### Conclusions:

Psych socioeconomic determinants of complicated mature cataract were identified. The direction of future community screening or caring programs for mature cataract should target those single elderly households, psychiatric patients and the non-public rental housing/ OAH population.

SCLA is contributed to (1) concept or design, (2) acquisition of data, (3) analysis or interpretation of data, (4) drafting of the manuscript, and (5) critical revision for important intellectual content. CKLK is contributed to (5) critical revision for important intellectual content.

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.



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