• Investigation •

Predictive factors of visual outcome of Malaysian cataract patients: a retrospective study

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Abstract

• AIM: To explore the associations between various characteristics of Malaysian cataract patients and their management, and their post-operative visual outcomes, to inform relevant bodies to reduce cataract-related blindness.

• METHODS: We conducted a descriptive secondary data analysis of cataract surgery patients in Melaka Hospital, from 2007 to 2014 using the National Eye Database (NED). Patient-related factors (demographic features, systemic and ocular comorbidities) and management-related factors (surgical duration, type of surgery, type of lens) were analysed for their association with visual outcome (acuity).

• RESULTS: Most patients were Malays (48.23%) and Chinese (38.55%) aged 60-79y (range 0-100y). Hypertension (58.61%) and diabetes (44.89%) were major systemic comorbidities. Glaucoma (6.71%) and diabetic retinopathy (10.12%) were the main ocular comorbidities. Other comorbidities were age-related macular degeneration, pterygium, corneal opacities, macula diseases, vitreous haemorrhage, retinal detachment and pseudoexfoliation (0.70%-1.60%). Preoperatively 7150 (55.03%) eyes presented with poor vision. Uncomplicated phacoemulsification performed quickly with foldable lenses gave good results.

• CONCLUSION: Primary care physicians should initiate early detection to prevent late presentation of cataracts causing poor vision and should discuss the risks and benefits of cataract surgery while emphasizing the role of pre-existing comorbidities which may affect the visual outcomes. For good results, phacoemulsification should be done within 30min, without complications, using foldable posterior chamber intraocular lens.

• KEYWORDS: cataract; presenting features; predictors; visual outcome

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INTRODUCTION

The Malaysian National Eye Survey reported that cataracts were the leading cause of blindness (39%) and poor vision (36%) in Malaysia[1]. The decision to undergo cataract surgery should be facilitated by an informed, evidence-based, preoperative discussion between doctor and patient, addressing the various reasons to undergo or avoid surgery. Estimates of visual prognosis should aid in decision-making, and patients should be counseled on the risks and outcomes, should complications arise. Differences in visual outcome should be explained, as realistic patient expectations may reduce the risk of medicolegal litigation too[2].

As cataracts are most commonly due to aging, patients present with a number of age-related ocular and systemic diseases which pose challenges in patient management. For example, diabetics are suspected to have an increased risk of *Streptococcus*-related post-operative endophthalmitis[3]. Systemic hypertension too has been associated with intraoperative complications such as suprachoroidal haemorrhage, although recent evidence questions this[4]. Despite universal healthcare provision in Malaysia, poor attendance at regular health screening results in undiagnosed cases of diabetes and hypertension. A community-based study at a French National Eye Centre suggested that up to 14% of presenting patients may have undiagnosed diabetes mellitus (DM)[5]. Often, deranged parameters are discovered only at the pre-operative assessment, and control of these can require hospitalisation and month-long delays in treatment. This negates the main benefits of day-care surgery, like cost-reduction and same-day discharge. Ideally, blood pressure and blood sugar levels should be controlled through early detection and treatment by the primary care doctor (family physician or general practitioner) prior to an ophthalmology referral.

Another issue is the number of late-presenters. Malaysian patients still present with cataracts causing poor visual acuities bilaterally. These patients often have mature/hypermature cataracts and require urgent surgical treatment, resulting in postponement of treatment for patients who are already waitlisted. This phenomenon can also be prevented by early detection and referral.

This study aims to assess the factors determining the visual outcome of cataract surgery, and discuss how these can inform an evidence-based pre-operative discussion between doctor and patient, to provide better patient education, ensure realistic patient expectations, and avoid unnecessary surgeries in high-risk patients.

SUBJECTS AND METHODS

We conducted an 8-year (2007-2014) retrospective analysis of secondary data using the National Eye Database (NED) of Melaka Hospital of patients who underwent cataract surgeries in Melaka Hospital. Approval was granted by Medical Research Ethics Committee of Malaysia. Melaka Hospital is an 806-bed government-funded specialist public hospital serving as a referral centre for Melaka State, the northern parts of Johor State and the Tampin District of Negeri Sembilan State[6].

We studied the relationship between patients' demographic features (*e.g.* age groups, ethnicities *etc.*), procedural features and complications; and their final outcome (visual acuity). We classified the patients by age groups into less than 40y, 41-60y, 61-80y and above 80y. Ethnicity was classified as Malay, Chinese and Indian which comprised of the 3 main races of the country. Others included Eurasian, Portuguese, Sri Lankan and foreign nationals such as Nepalese, Vietnamese, Myanmar, Cambodians, Bangladeshis and Indonesians. We classified visual acuity as 'good' (logMAR 0.0 to 0.3), 'impaired' (logMAR 0.50 to 0.80) or 'poor' [logMAR 1.00, hand movement (HM), light perception (LP) and no light perception (NLP)]. Visual outcome was recorded as the best corrected visual acuity, based on refractions performed by hospital-based optometrists, recorded at 12wk postoperatively.

We noted the cataract aetiology as either primary (congenital/developmental/senile) or secondary (drug-induced/traumatic/surgical). Chronic multi-system diseases were grouped as 'systemic comorbidities'. Diseases with chronic local effects limited to the eyeball and orbit were grouped as 'ocular comorbidities'. We also noted management-related factors and their association with the final visual outcome. We recorded the types of cataract surgeries and duration, and analyzed to determine their associations with visual outcomes. Whether cataract surgery was done alone or in combination with other ocular surgeries was also studied for its effect on visual outcome. The cumulative prevalence of intra-operative complications and post-operative complications were recorded and their associations with visual outcome were studied. We looked at associations of types of intraocular lenses (IOLs) and outcomes.

Odds ratios (OR), confidence interval and *P* values were calculated for each of the 3 visual acuity classes, compared to the rest of the patient population. Data analysis was performed using Epi-info 7 (freeware).

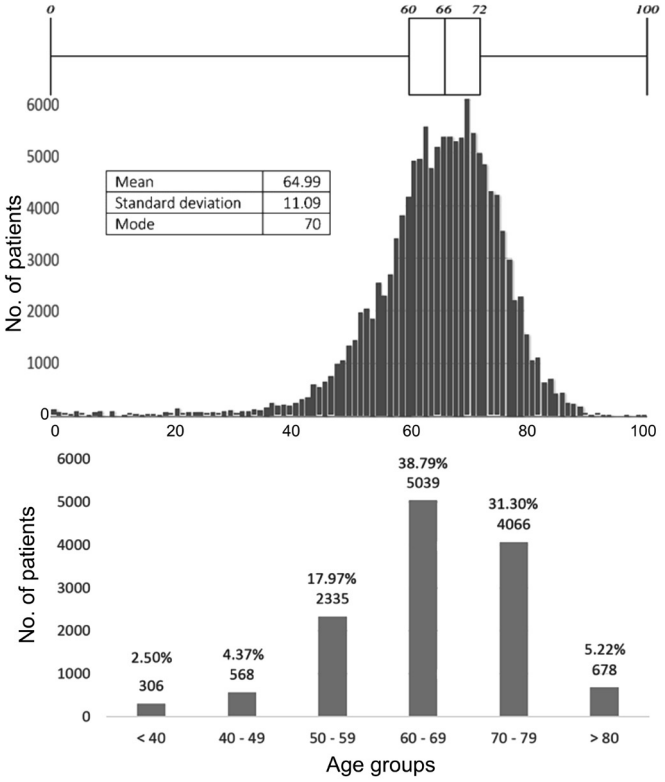

Figure 1 Age distribution of cataract surgery patients at Melaka Hospital, 2007-2014.

RESULTS

Some data were missing from the database and hence, we analysed only available data in various sections of the results. Figure 1 shows the age distribution of patients who underwent cataract surgery at Melaka Hospital from 2007-2014. As shown, cataracts can occur at any age, but tend to be among the elderly, normally distributed around a mean of 65 with a standard deviation of 11.09. The box-plot illustrates a median of 66, with an equally distributed interquartile range of 12 (60 to 72). The age-grouped bar chart eliminates tails: over 70% of patients are aged between 61 and 80. Table 1 shows that those aged less than 40y and over 80y were at greater risk of a poor visual outcome, with OR of 3.74 and 1.51 respectively.

Figure 2 displays the gender and ethnic distribution of cataract surgery patients seen in Melaka Hospital, 2007-2014. There were 6111 male patients (47%) and 6881 female patients (53%). The majority of patients were Malays (47.79%), with 38.20% of patients being Chinese and another 12.37% were Indians. Other races all comprised less than 1% of the total population. Table 1 shows that Malays were at an increased risk for a poor visual outcome while Chinese and Indians had a better chance of a good visual outcome.

As shown in Figure 3, the majority of patients had poor vision preoperatively (*n*=7150, 55.03%), while 4213 (32.43%) had impaired vision, and relatively few had good vision (*n*=1629, 12.54%) as would be expected. The majority (98.6%) of cataracts were primary in origin, with only 1.4% being due to secondary causes. As shown in Figure 4, the majority of secondary cataracts were due to trauma (*n*=101, 0.8%), with

Table 1 Association between visual outcome and various patient-related factors and procedure-related factors

Visual outcome	Total	%	Good visual outcome			Impaired visual outcome			Poor visual outcome		
			OR	95%CI	*P*	OR	95%CI	*P*	OR	95%CI	*P*
Age grouping (a)											
<40	325	2.50	0.34	(026-0.43)	<0.01	1.71	(1.28-2.27)	<0.01	3.74	(1.79-5.00)	<0.01
41-60	2884	22.20	1.06	(0.96-1.17)	0.27	0.78	(0.69-0.88)	<0.01	1.32	(1.13-1.53)	<0.01
61-80	9105	70.08	1.36	(1.25-1.49)	<0.01	0.90	(0.1-1.00)	0.04	0.58	(0.50-0.66)	<0.01
>80	678	5.22	0.45	(0.38-0.53)	<0.01	2.25	(1.87-2.71)	<0.01	1.51	(1.15-1.97)	<0.01
Race											
Malay	6209	47.79	0.89	(0.82-0.97)	<0.01	0.98	(0.89-1.09)	0.73	1.37	(1.20-1.57)	<0.01
Chinese	4963	38.20	1.10	(1.01-1.20)	0.03	1.01	(0.91-1.12)	0.88	0.77	(0.67-0.89)	<0.01
Indian	1608	12.37	1.07	(0.94-1.23)	0.28	1.00	(0.86-1.16)	0.99	0.83	(0.67-1.03)	0.08
Other	93	0.72	0.78	(0.48-1.29)	0.30	1.35	(0.76-1.36)	0.27	1.06	(0.45-2.38)	0.89
Missing data	119	0.92									
Ocular comorbidity	4391	35.86									
Pterygium on the cornea	183	1.49	1.10	(0.76-1.59)	0.61	1.14	(0.76-1.71)	0.49	0.54	(0.24-1.13)	0.08
Corneal opacity	88	0.72	0.42	(0.27-0.66)	<0.01	1.80	(1.08-3.00)	0.02	2.45	(1.34-4.40)	<0.01
Glaucoma	882	6.71	0.62	(0.53-0.72)	<0.01	1.34	(1.12-1.61)	<0.01	1.82	(1.46-2.27)	<0.01
Chronic uveitis	40	0.33	0.28	(0.53-0.72)	<0.01	3.25	(1.63-6.42)	<0.01	2.09	(0.79-5.22)	0.09
Pseudoexfoliation	136	1.11	0.76	(0.52-1.12)	0.15	1.16	(0.72-1.84)	0.52	1.47	(0.82-2.59)	0.16
Phacomorphic lens	24	0.20	0.26	(0.11-0.61)	<0.01	0.77	(0.18-2.71)	0.67	8.51	(3.51-20.41)	<0.01
Phacolytic lens	14	0.11	0.17	(0.05-0.55)	<0.01	1.47	(0.33-5.66)	0.55	8.91	(2.74-28.25)	<0.01
Subluxated/dislocated lens	37	0.30	0.23	(0.12-0.46)	<0.01	1.74	(0.76-3.85)	0.15	5.73	(2.71-11.93)	<0.01
Amblyopia	34	0.28	0.31	(0.15-0.63)	<0.01	3.35	(1.59-7.01)	<0.01	1.58	(0.47-4.7)	0.39
Previous eye trauma	15	0.12	0.46	(0.15-1.45)	0.13	1.35	(0.30-5.11)	0.64	2.96	(0.62-10.23)	0.10
NPDR	690	5.64	0.57	(0.49-0.68)	<0.01	1.33	(1.09-1.63)	<0.01	2.12	(1.68-2.66)	<0.01
PDR	549	4.48	0.34	(0.28-0.40)	<0.01	2.13	(1.75-2.60)	<0.01	2.94	(2.33-3.70)	<0.01
Maculopathy	165	1.35	0.26	(0.19-0.35)	<0.01	2.59	(1.84-3.65)	<0.01	3.38	(2.28-5.00)	<0.01
Vitreous haemorrhage	88	0.72	0.08	(0.04-0.13)	<0.01	2.03	(1.23-3.33)	<0.01	13.54	(8.68-21.11)	<0.01
ARMD	202	1.65	0.52	(0.39-0.71)	<0.01	1.74	(1.24-2.44)	<0.01	1.69	(1.08-2.62)	0.02
Other macular disease	97	0.79	0.22	(0.14-0.34)	<0.01	2.94	(1.89-4.56)	<0.01	3.52	(2.12-5.82)	<0.01
Retinal detachment	91	0.74	0.07	(0.04-0.12)	<0.01	1.62	(0.96-2.71)	0.05	17.38	(11.17-27.07)	<0.01
Other ocular comorbidity	368	3.01	0.57	(0.46-0.71)	<0.01	1.39	(1.07-1.82)	0.01	2.00	(1.46-2.72)	<0.01
Systemic comorbidity	9330	76.2									
Hypertension	7176	58.61	1.07	(0.98-1.16)	0.13	0.99	(0.90-1.10)	0.86	0.86	(0.76-0.99)	0.03
Diabetes mellitus	5496	44.89	0.83	(0.76-0.90)	<0.01	1.17	(1.06-1.30)	<0.01	1.20	(1.05-1.37)	0.01
Ischaemic heart disease	1291	10.54	1.07	(0.93-1.23)	0.37	0.97	(0.83-1.15)	0.74	0.90	(0.71-1.13)	0.33
Renal failure	289	2.36	0.42	(0.33-0.54)	<0.01	1.92	(1.46-2.53)	<0.01	2.24	(1.59-3.13)	0.00
Cerebrovascular accident	93	0.76	0.58	(0.37-0.91)	0.01	1.68	(1.01-2.77)	0.03	1.43	(0.69-2.85)	0.29
COPD/asthma	429	3.50	1.29	(1.00-1.66)	0.04	0.82	(0.61-1.10)	0.17	0.76	(0.49-1.15)	0.17
Other systemic comorbidity	1553	12.68	1.08	(0.95-1.23)	0.21	0.98	(0.85-1.14)	0.81	0.84	(0.68-1.04)	0.10
Previous ocular surgery	457	3.52	0.42	(0.34-0.51)	<0.01	1.52	(1.19-1.94)	<0.01	3.06	(2.37-3.96)	<0.01
Duration of surgery (min)											
<30	8837	68.02	2.13	(1.95-2.32)	<0.01	0.55	(0.50-0.61)	<0.01	0.46	(0.40-0.53)	<0.01
31-60	3179	24.47	0.64	(0.58-0.71)	<0.01	1.51	(1.36-1.68)	<0.01	1.40	(1.21-62)	<0.01
>60	921	7.09	0.34	(0.29-0.39)	<0.01	1.95	(1.65-2.30)	<0.01	3.28	(172-3.96)	<0.01
Combined surgery	617	4.75	0.36	(0.31-0.43)	<0.01	1.52	(1.23-1.87)	<0.01	3.85	(3.11-4.76)	<0.01
Type of surgery											
Phacoemulsification	10497	80.80	2.53	(2.29-2.80)	<0.01	0.45	(0.40-0.51)	<0.01	0.46	(0.40-0.53)	<0.01
ECCE	2000	15.39	0.47	(0.42-0.52)	<0.01	2.11	(1.87-2.38)	<0.01	1.56	(1.32-1.85)	<0.01
PHACO converted to ECCE	185	1.42	0.51	(0.37-0.71)	<0.01	1.74	1.20-2.52)	<0.01	1.79	(1.10-2.86)	<0.01
Lens aspiration	161	1.24	0.36	(0.25-0.50)	<0.01	1.58	(1.04-2.41)	0.02	3.69	(2.42-5.60)	<0.01
ICCE	78	0.60	0.14	(0.08-0.23)	<0.01	2.28	(1.32-3.90)	<0.01	7.89	(4.75-13.07)	<0.01
Missing data	71	0.53									

Table 1 Association between visual outcome and various patient-related factors and procedure-related factors (Continued)

Visual outcome	Total	%	Good visual outcome			Impaired visual outcome			Poor visual outcome		
			OR	95%CI	*P*	OR	95%CI	*P*	OR	95%CI	*P*
IOL site											
Posterior chamber IOL	12429	95.67	3.87	(0.93-5.11)	<0.01	0.30	(0.22-0.40)	<0.01	0.43	(0.29-0.64)	<0.01
Anterior chamber IOL	170	1.31	0.26	(0.19-0.36)	<0.01	3.39	(2.42-4.73)	<0.01	2.29	(1.44-3.62)	<0.01
Scleral-fixated IOL	55	0.43	0.21	(0.12-0.38)	<0.01	3.96	(2.17-7.19)	<0.01	2.46	(1.07-5.47)	0.03
Missing data	338	2.60									
IOL type											
Foldable	10622	81.76	2.18	(1.96-2.43)	<0.01	0.49	(0.44-0.56)	<0.01	0.55	(0.47-0.65)	<0.01
Non-foldable	2067	15.90	0.47	(0.42-0.52)	<0.01	2.03	(1.80-2.29)	<0.01	1.69	(1.43-2.00)	<0.01
Missing data	303	2.34									
Intra-operative complications	947	7.29	0.38	(0.33-0.43)	<0.01	2.04	(1.74-2.40)	<0.01	2.58	(2.12-3.14)	<0.01
Postop. complications	389	2.99	0.42	(0.32-0.55)	<0.01	1.65	(1.21-2.25)	<0.01	2.74	(1.94-3.85)	<0.01

OR: Odds ratio; CI: Confidence interval; ECCE: Extra-capsular cataract extraction; ICCE: Intra-capsular cataract extraction; IOL: Intraocular lens; PDR: Proliferative diabetic retinopathy; NPDR: Non-proliferative diabetic retinopathy; COPD: Chronic obstructive pulmonary disease; PHACO: Phacoemulsification; ARMD: Age-related macular degeneration.

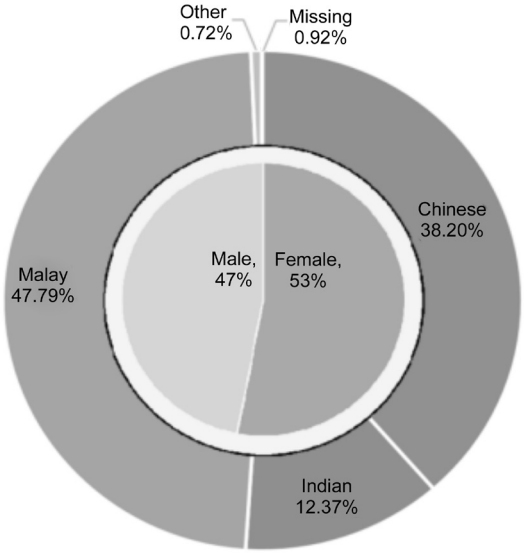

Figure 2 Gender and ethnic distribution of cataract surgery patients at Melaka Hospital, 2007-2014.

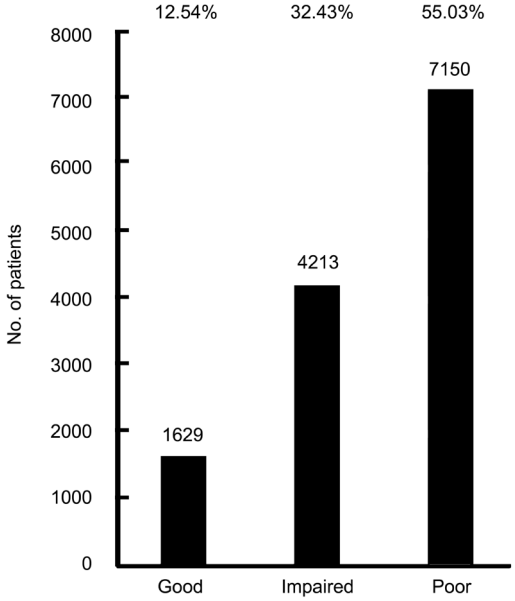

Figure 3 Preoperative visual acuity of cataract surgery patients at Melaka Hospital, 2007-2014.

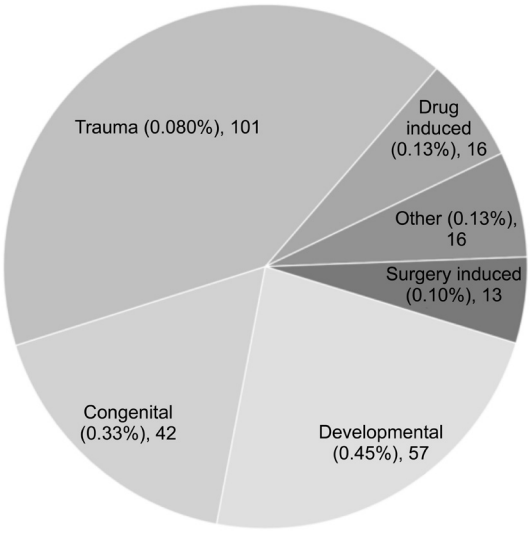

Figure 4 Aetiology of secondary cataract among cataract surgery patients at Melaka Hospital, 2007-2014.

16 drug induced, 13 surgically induced, and another 16 due to other (unspecified) secondary causes.

As many as 35.86% (*n*=4391) of our patients had at least one ocular comorbidity (Table 1). The most frequent ocular comorbidities were glaucoma (*n*=882, 6.71%), non-proliferative diabetic retinopathy (NPDR; *n*=690, 5.64%) and proliferative diabetic retinopathy (PDR; *n*=549, 4.48%). Patients with these diseases all had a greater likelihood of a poorer visual outcome. Less common ocular morbidities included age-related macular degeneration (ARMD, *n*=202, 1.65%), corneal pterygium (*n*=183, 1.49%), maculopathy (*n*=165, 1.35%) and pseudoexfoliation (*n*=136, 1.11%).

One or more systemic comorbidities were seen in 76.2% (9330) of our patients, the most frequent of which were hypertension (*n*=7176, 58.61%), and DM (*n*=5496, 44.89%). There were also 1553 cases of other unspecified comorbidities (12.68%), 1291 patients with ischemic heart disease (10.54%),

429 patients with chronic obstructive pulmonary disease/ asthma (3.50%), 289 cases of renal failure (2.36%), and 93 patients had suffered a previous cerebrovascular accident (0.76%). Hypertension (P=0.03) and diabetes (P=0.01) affected visual outcomes.

Trends in surgical duration suggested that shorter surgeries (less than 30min) were 2.13 times more likely to be associated with a 'good' visual outcome (P<0.01), compared to an OR of 0.64 and 0.34 for surgeries that lasted 31-60min and >60min, respectively. Conversely, surgeries that lasted >60min were 3.28 times more likely to result in a 'poor' visual outcome (P<0.01).

Combined surgeries were associated with a significantly higher chance of a poor outcome (OR: 0.36, P<0.01). Overall, phacoemulsification was significantly associated with a 'good' visual outcome (OR: 2.53, P<0.01), while other methods were shown to lower the chances of a 'good' visual outcome. The chance of a 'poor' visual outcome was high after an intra-capsular cataract extraction (ICCE) (OR: 7.89) and lens aspiration (OR: 3.69).

The type of the IOL was also found to significantly affect the visual outcome. A posterior chamber intraocular lens (PCIOL) was more strongly associated with a 'good' visual outcome (OR: 3.87) than an antenior chamber intraocular lens (ACIOL) (OR: 0.26) or a scleral-fixed IOL (OR: 0.21), which were associated with a greater likelihood of a 'poor' visual outcome (OR: 2.29 and 2.46, respectively). Foldable lenses increased the likelihood of a 'good' visual outcome (OR: 2.18), while non-foldable lenses predisposed to a 'poor' visual outcome (OR: 1.69). Both intra-operative and post-operative complications were associated with a greater risk of a 'poor' visual outcome (OR: 2.58 and 2.74, respectively).

DISCUSSION

We found that the demographic makeup of our patients comprised of Malays (47.79%), Chinese (38.20%), and Indians (12.37%), which roughly represented the ethnic distribution of the Melakan population. Gender distribution was fairly equal between males (47%) and females (53%). Chinese generally had better outcomes than Malays. Extremes of age were associated with lower chances of good outcomes, a finding which is corroborated by Schein *et al*[7].

Preoperatively as many as 7150 (55.03%) eyes had poor vision of 6/60 and worse. In a Malaysian district hospital study, Thevi *et al*[8] found that cataract (248, 22.9%) was the most common eye disease, accounting for severe visual impairment in 11 out of 12 patients. Reddy *et al*[9] found that cataract (385, 32.9%) was the most common eye disease in urban population in Malaysia.

The majority of patients had primary cataracts (98.6%). Paediatric patients presented with congenital cataract in 42 cases (0.33%) and developmental cataract in 57 (0.45%). This group should undergo surgery as soon as possible to prevent amblyopia (lazy eye). Doctors should be alert to examine the eyes of newborn and younger aged individuals to look for the red reflex and in its absence, to refer early for intervention. Due to screening procedures with a hand held ophthalmoscope for red reflex examination in Swedish Maternity Wards, congenital cataracts are referred earlier in Swedish children compared to Danish children[10]. Age at cataract extraction significantly affects the visual outcome in paediatric cataracts. Health workers and school teachers could be trained to use Snellen charts to test children's vision, as in Nepal[11]. Drug induced cataracts were also reported; Steroids are known to cause cataracts and patients should be informed of this possible complication to enable early reporting and secondary prevention. In the USA, recent approvals have made intranasal steroids available over-the-counter (OTC), raising concern that genetically sensitive individuals may develop lens opacities[12]. Phacomorphic (0.20%) and phacolytic (0.11%) lenses were also seen in our patients. Although access for ocular treatment is available, patients still present at a very late stage for cataract surgery. For patients with such advanced cataracts, lens-induced glaucoma is a very pressing problem, as a recent study reported that 2.4% of 12 004 cataract patients experienced it at presentation[13]. Vision in such patients is very poor; a Malaysian study found that 84.2% of 38 eyes with lens-induced glaucoma presented with only hand movement vision[14]. Screening measures must be instituted to prevent this. Glaucoma, NPDR and PDR were the commonest ocular comorbidities at presentation, and were also associated with poorer outcomes.

Cataract surgery has been found to successfully reduce medications required for glaucoma management[15]. Toric IOLs reduced astigmatism and improved vision among glaucoma patients undergoing cataract surgery[16]. Ophthalmologists and family doctors should discuss this benefit for patients with cataract and glaucoma who are unsure about the benefits of cataract surgery. We found that ocular comorbidities and previous ocular surgeries reduced the likelihood of obtaining good visual outcomes.

With dense cataracts, comorbidities in the posterior segment (*e.g.* ARMD, vitreous haemorrhage, retinal detachment and maculopathy and macular disease) are sometimes invisible, and not all can be diagnosed with B-scan ultrasonography. Patients must be told about the existence of such comorbidities and the guarded prognosis or the need for further intervention should they be present. Lai *et al*[17] found that ARMD and vitreous loss were associated with lower chance of visual improvement among elderly. Jammal *et al*[18] found that ARMD and diabetic maculopathy were the most common causes of reduced visual acuity following phacoemulsification in obscured fundus view. Analysis from the National Cataract Swedish Register found

that ocular comorbidity was related to no benefit outcome after cataract surgery[19].

In Malaysia, diabetic eye disease is the commonest cause of visual loss in the adult working age group[20]. In a study in University Malaya Medical Center, 29.2% of type 2 diabetic patients presented with diabetic retinopathy findings on the first visit[21]. Higher risks of complications, such as worsening of diabetic retinopathy and macula oedema following cataract surgery, are seen among diabetics[22]. Smalling and others found that diabetics with advanced age on insulin had decreased postoperative visual acuity and visual functions which affected the quality of life[23]. The use of intravitreal triamcinolone or bevacizumab at the time of cataract surgery was found to benefit patients with pre-existing macular edema or moderate-to-severe NPDR[24]. A cochrane[25] review however, found low quality evidence for the efficacy and safety of anti-vascular endothelial growth factor (VEGF) agents when used to treat PDR over and above current standard treatments. Early detection and treatment options for such cases should be discussed by the physician and ophthalmologist.

A variety of systemic comorbidities were present during presentation for cataract surgeries, the most common of which were hypertension and diabetes. A Meta-analysis found that the risk of cataracts in hypertensive populations was significantly higher among cohort studies[26]. Physicians treating these systemic disorders should perform routine ocular examinations to detect cataracts and refer suspected cases to prevent mature cataracts. Hypertension and tamsulosin therapy have been significantly associated with intraoperative floppy iris syndrome[27]. The treating physician should mention these conditions in the referral so that the operating surgeon will be aware of the difficulties that may arise due to floppy iris. Cerebrovascular accidents present with a variety of field defects which may be the only presenting symptom[28]. Patients should be informed prior to cataract surgery about the possibility of persistent visual field defects, so as not to expect full recovery post-operatively. Renal failure patients should be prescribed relevant drugs with caution, and dialysis should be scheduled appropriately around surgery. William *et al*[29] described a patient with diabetes, renal failure and recent cataract surgery who developed severe intraocular hypertension during dialysis. Nephrologists and staff in dialysis centres should be aware of this.

Duration of surgeries affected the visual outcomes in our study. Surgeries completed within 30min produced better outcomes compared to longer duration surgeries. Complex surgeries take a longer time to do, and this could be a possible explanation about poorer outcomes in longer duration surgeries. However, Thanigasalam *et al*[30] found that the duration of surgery did not affect the visual outcomes. Combination surgeries were associated with poorer outcomes. This could be due to either the pre-existing comorbidities which were already a factor for poorer outcomes or due to further complications developing. Combination surgeries in our center are filtering surgeries or glaucoma drainage device surgeries or vitreoretinal surgeries which are done along with cataract surgeries. In a study of combined and sequential surgeries of phacoemulsification and vitrectomy in PDR, there was a higher incidence of fibrinous exudation in the combined surgery group[31]. Several other studies found no difference between combination and sequential surgeries for cataract and vitrectomies[32]. Kim *et al*[33] found good outcomes following combined cataract and retinal detachments surgeries in macula on cases. Tzu *et al*[34] noted good outcomes in combination surgeries of simultaneous cataract extraction with trabeculectomy or glaucoma drainage device surgery. Similar to other studies, we too found that phacoemulsification gave the best visual outcomes compared to other techniques[35].

Foldable PCIOLs were associated with a higher chance of good outcomes than other lenses. However, some studies[36-37] challenge this finding. In our setup, when posterior capsular support is inadequate, ACIOLs and scleral-fixated IOLs are used. We found that ACIOLs had better outcomes than scleral-fixated IOL, as have other studies[38]. However, a study[39] by the American Academy of Ophthalmology found no difference in outcome between these two lenses. Intraoperative and postoperative complications were associated with poorer outcomes - a finding corroborated by Yuan *et al*[40]. However, in a study of 1632 cases, Thanigasalam *et al*[30] concluded that intraoperative complications did not affect visual outcomes.

In conclusion, primary care physicians have a role to screen and detect patients for cataract to prevent the late presentation causing blindness. They should adequately control the systemic disorders as comorbidities affect outcomes. Community screening measures and public health education should ensure that patients present earlier, to prevent blindness and facilitate timely surgery. Patients who request less expensive options should be counseled on the benefits of phacoemulsification over other surgical techniques, and the advantages of a foldable IOL. Meticulous care should be taken to avoid operative complications. However, should these occur, surgeons should preferably use an ACIOL rather than a scleral-fixated IOL.

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