The Malaysian Cataract Surgery Registry: Profile of Patients Presenting for Cataract Surgery

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Purpose: To investigate the change in the profile of patients who had cataract surgery at Ministry of Health (MOH) hospitals in Malaysia.

Design: Secondary analysis on Malaysian Cataract Surgery Registry data.

Methods: The Malaysian Cataract Surgery Registry, a MOH-initiated registry, collects data on patients who had cataract surgery at the 36 MOH ophthalmology departments including demography, causes of cataract, systemic and ocular comorbidity, preoperative visual acuity (VA), operative details, and postoperative outcomes. This article reviews data on patient profiles from 2002 to 2004 and 2007 to 2011.

Results: The coverage of cataract surgery was 91.5% (171,482/185,388). Mean patient age was 64.5 years, and 51.6% were women. A high proportion of patients had hypertension (48.9%), diabetes mellitus (37.1%), and diabetic retinopathy (10.7%). Most had senile cataract (93.4%) and one third had second eye surgery. Most patients (82.0%) had preoperative unaided VA of worse than 6/12. Eyes presenting with unaided VA of worse than 3/60 decreased from 62.6% in 2002 to 47.7% in 2011, whereas those with 6/18 to 3/60 increased from 35.2% to 48.5% (P < 0.001). Patients who had extracapsular cataract extraction had worse preoperative VA than those who had phacoemulsification (81.3% vs 40% had vision worse than 3/60).

Conclusions: The obvious change in patient profiles was the decreasing number of eyes presenting with worse than 3/60 vision. Compared with developed countries, patients who had cataract surgery at MOH hospitals in Malaysia were younger and had higher associations with diabetes mellitus and diabetic retinopathy.

Key Words: patient profile, cataract surgery, cataract surgery registry


Cataract surgery is the main and most cost-effective medical intervention for reducing the burden of blindness. The number of cataract surgeries done per million people per year, that is, the cataract surgery rate, is an indicator to measure the standard of eye care services in a country and its efforts to eradicate avoidable blindness. The World Health Organization has set a minimum rate required to combat cataract blindness at 3000 surgeries per million people per year. Developed countries such as the United States, Australia, and Sweden have exceeded the recommendation (ie, between 7000 and 11,000 surgeries per million people). On the other hand, developing countries with limited resources but a higher burden of cataract blindness have lower rates. The cataract surgery rate in each country is affected by the availability of health care resources and is also determined by the level of preoperative visual acuity (VA) at the time of cataract surgery.

Besides a rising cataract surgery rate in developed countries, there is an increasing trend toward cataract surgery in people with VA better than 6/12, as shown in the Beaver Dam Eye Study and Melbourne Visual Impairment Project. The National Cataract Surgery Registry in Sweden has shown that surgery in people with preoperative VA of 6/12 or better has increased from 56% in 1992 to 78% in 2009. These observations on changes in the indications for cataract surgery are crucial information for health care policy makers and providers. When patients who come for cataract surgery no longer demand rehabilitation from visual impairment but better visual function, cataract surgeons then need to advance their surgical skills toward cataract refractive surgery and not mere lens extraction. They also need to communicate better with patients to achieve the visual needs and outcomes that matter most to them. Because VA is no longer the main indicator for cataract surgery, surgeons need to employ relevant visual disability questionnaires to create a priority list of patients requiring cataract surgery. Health care providers will need to reallocate resources to purchase equipment with the latest technology and have the manpower to cope with increasing demands for cataract surgery.

The available information on changes in the levels of preoperative VA mainly comes from developed countries with reimbursement schemes and public demands for health care that are very different from developing countries. There is not much information regarding this in developing countries where cataract is still the main cause of blindness and where health care resources are much more scarce.

Malaysia is a developing country with an upper middle income economy. It has a population of 29.1 million, 5.1% of whom are older than age 64, with a male to female ratio of 1.06. Cataract is the major cause of blindness (39.0%). In 2011, cataract surgery services in Malaysia were provided by 36 Ministry of Health (MOH) hospitals, 3 university hospitals, 59 private hospitals with eye care services, and 128 standalone private eye clinics. There were 382 ophthalmologists in the country in 2011; 218 (57%) served in the public sector and 164 (43%) in the private sector, with a ratio of 1 ophthalmologist to 76,078 people.

The MOH established a cataract surgery registry in 2002 to collect information on patient profiles, operative details, and outcomes of cataract surgeries performed at MOH hospitals. Data on trends in various aspects of cataract surgery and variance in performance among hospitals have provided essential information for planning and evaluating eye care services. This article presents the change in the profile of patients who had cataract surgery at the 36 MOH ophthalmology departments in Malaysia, in 8 accumulated years (2002–2004 and 2007–2011).

MATERIALS AND METHODS

The Malaysian Cataract Surgery Registry (CSR) is part of the MOH Web-based National Eye Database. The objectives...
of CSR are to study the profile of patients who have cataract surgery, to evaluate trends in cataract surgeons’ practice patterns, and to monitor the occurrence of intraoperative and postoperative complications and operative outcomes in terms of VA, refraction, and postoperative complications. The method of data collection for the cataract surgery registry has been published elsewhere.\textsuperscript{13} In brief, there are 3 data collection forms. The precoding form is filled in when patients come for preoperative assessment. It includes demographic, systemic and ocular comorbidities, causes of cataract, preoperative VA, and plane refractive error. The operative form is completed immediately after surgery and contains details of the surgery, anesthesia, and intraoperative complications. The 12-week postoperative outcome forms contain postoperative vision, refraction, and complications such as infectious endophthalmitis.

From 2002 to 2004, completed hard copy forms from each participating center were sent to the registry coordinating center at Clinical Research Centre, MOH. Designated staff then entered the data into standalone computers. Data were later compiled for analysis. The CSR was suspended from 2005 to 2006 in preparation for a Web-based registry which was established in 2007 and is hosted at www.acrm.org.my/ned. Since 2007, information from medical records was keyed in directly to the online system in centers with good Internet connectivity. In centers with inadequate Internet connectivity or lack of computers, hard copy forms were used and later entered by designated staff into the Web-based registry.

As it is a MOH initiative, all MOH ophthalmology departments participate in the CSR. Ethical approval was obtained from the Medical Research and Ethics Committee, Ministry of Health Malaysia. Data quality was attempted by having designated trained staff check operating lists and surgical record books at the operating theaters to ensure all cataract surgeries performed were entered into the CSR. Data completeness on important variables was assured by having must-fill items in the Web-based registry system. Internal consistency for age and sex was done by autochecking with identity card number, as Malaysian identity card numbers contain birth dates and the last digit indicates men with an odd number and women with an even number. To avoid duplication, there was an automatic pop-up message if the same identity card for an eye which had been operated on was reentered. To ensure data accuracy, there was a range check on continuous variables such as planned refractive power. Data cleaning was done with a duplication check and a review of the proportion of missing data for each variable before statistical analysis was done. A statistical report is published every year and is available at http://www.crc.gov.my/reports/.

Statistical analysis was performed using Stata Statistical Software.\textsuperscript{14} Continuous variables were presented as mean ± SD for normally distributed data. Categorical data were presented as frequency and percentage. \(\chi^2\) test was performed to determine the association between the categorical variable and the year of surgery, whereas Kruskal-Wallis test was used to assess the difference in median age between the years.

The CSR was supported by the MOH with a special registry grant. The Medical Research and Ethics Committee of the MOH approved the registry protocol and allowed the placement of public notices at ophthalmology clinics as a means to notify patients to replace the need to request individual informed consent.

RESULTS

Coverage

Census data from the 36 MOH ophthalmology departments show that 185,388 cataract surgeries were performed from 2002 to 2004 and 2007 to 2011, whereas 171,482 (92.5%) cataract surgeries were registered with the CSR. The CSR coverage ranged from the lowest at 83.6% in 2007 to the highest at 95.4% in 2010 and 2011 (Fig. 1).

Demography, Systemic Comorbidity, and Second Eye Surgery

Mean patient age ± SD was 64.5 ± 12.3 years, and female patients were older (65.1 ± 13.1 years for women, 63.8 ± 11.4 years for men, \(P < 0.001\)). There was a significant increase in mean age over the years, from 63 years in 2002 to 65 years in 2011 (\(P < 0.001\)) (Fig. 2). The most common age group at the time of cataract surgery was from 65 to 74 years (Fig. 3). There were more female patients (51.6%, \(P < 0.001\)). The proportion of patients with systemic comorbidity increased from 56.8% in 2002 to 72.0% in 2011. The most common were hypertension (35.4% in 2002 to 56.3% in 2011, overall 48.9%) and diabetes mellitus (DM) (28.9% in 2002 to 41.7% in 2011, overall 37.1%). The proportion of patients who had second eye surgery increased slightly from 30% to 33% (Fig. 2).

Cause of Cataract and Ocular Comorbidity

Most patients had age-related cataract (92.4%, 160,132/171,482). Ocular trauma was the most common secondary cause (1.7%, 2908/171,482). The proportion of patients with any type of ocular comorbidity increased from 28.8% in 2002 to 41.7% in 2011 (overall 37.4%). The more common ocular diseases were diabetic retinopathy (overall 10.7%; increased from 8.0% in 2002 to 11.4% in 2011), glaucoma (overall 6.5%; increased from 6.2% to 6.5%), and age-related macular degeneration (AMD) (overall 1.5%; increased from 1.1% to 1.6%). Pterygium involving the cornea (2.7% in 2002, 1.3% in 2011) and lens-related complications such as phacolytic or phacomorphic glaucoma (1.3% in 2002, 0.6% in 2011) have declined over the years (Fig. 4).

Preoperative Visual Acuity

Preoperative unaided VA was recorded in 98.6% (169,004/171,482) of the patients. Refraction was not done on patients with poor red reflex due to dense cataract and thus only 21.5% (36,854/171,482) had refracted VA. Approximately 82% of the patients presented with preoperative unaided VA of worse than 6/12. Cataract patients who presented with unaided VA of 2/60 to no light perception decreased remarkably from 62.6% in 2002 to 47.7% in 2011, whereas patients with unaided VA of 6/18 to 3/60 increased markedly from 35.2% in 2002 to 48.5% in 2011 (\(P < 0.001\)) (Fig. 5). A small proportion of patients had visual acuity between 6/5 and 6/12, and there was not much change over the years (2.2% in 2002 to 3.8% in 2011 for unaided
VA, 22.1% in 2002 to 21.6% in 2011 for refracted VA) (Fig. 5). The status of preoperative VA differed with the type of surgery. About half of the patients (55.7%) who had phacoemulsification (phaco) had 6/18 to 3/60 unaided VA, and 40.0% had worse than 3/60 vision. There was a slight increase in phaco patients with VA of better than 6/12 over the years, from 4.2% in 2002 to 4.5% in 2011. Among patients who had extracapsular cataract surgery (ECCE), most (81.3%) had unaided VA of 2/60 to no light perception, and the proportion increased from 79.0% in 2002 to 84.0% in 2011 (Fig. 6).

**DISCUSSION**

The main finding noted in the profile of patients who had cataract surgeries at MOH hospitals was the decreasing proportion of patients with dense cataract, that is, with preoperative VA of worse than 3/60. Patients operated on were relatively younger and had higher associations with DM and diabetic retinopathy as compared with data presented from developed countries.

**Demographic Features**

Patients in the Malaysian CSR were younger (mean age of 64.5 years) than patients seen in the Swedish National Cataract Surgery Register (74.9 years), the United Kingdom Cataract Surgery Survey (76.3 years), and the Auckland Cataract Study (74.9 years). The earlier onset of cataract among Malaysians is most likely associated with the high prevalence of DM in Malaysia at 22.6%. Additionally, 37.1% of patients in the Malaysian CSR had DM. Diabetes mellitus is a significant independent risk factor for posterior subcapsular cataract. Living in a tropical country with unavoidable exposure to ultraviolet light may contribute to the formation of cataract as ultraviolet light is 1 of the risk factors for cortical cataract.

With a longer life expectancy and thus a greater likelihood of age-related cataract, more women had cataract surgery (51.6% in the Malaysian CSR, 61.0% in the Swedish National CSR, 65.0% in the United Kingdom Cataract Surgery Survey.
and 62.0% in the Auckland Cataract Study). In the Swedish National CSR, the proportion of women was more pronounced for second eye surgery, but decreased from 66% in 1992 to 61% in 2009, concurrent with the decreasing mean age at operation.

Systemic and Ocular Comorbidities

A higher proportion of patients (65%) reported in the Malaysian CSR had 1 or more systemic comorbidities as compared with those reported in the United Kingdom Cataract Surgery Survey (57.0%). The high percentage of hypertension and DM among Malaysian CSR patients was in concordance with a high population prevalence of hypertension (32.7%) and DM (22.6%).

Patients reported in the Malaysian CSR had a higher association with ocular comorbidities (37.4%) as compared with the United Kingdom (30.4 per 1000) and Auckland (26%) studies. With a high population prevalence of DM, diabetic retinopathy (10.7%) was more common among Malaysian CSR patients as compared with the United Kingdom (34 per 1000) and Auckland (7.6%) studies. The Malaysian CSR data showed a lower percentage of glaucoma, at 6.5% as compared with the United Kingdom (112 per 1000) and Auckland (9.2%) studies and a lower proportion of AMD (1.6%) as compared with the United Kingdom (169 per 1000) and Auckland (5.1%) studies. These observations can be explained by the younger age among Malaysian patients, which thus have a lower association with age-related ocular diseases such as glaucoma and AMD.

Second Eye Surgery

Surgery for the fellow eye is advantageous as having binocular vision improves visual function and quality of life. Only one third of patients in the Malaysian CSR had second eye surgery, although it was an increasing trend, from 30.0% in 2002 to 33.0% in 2011. The Swedish National Cataract Surgery Register data showed a higher and marked increase in second eye surgery from 28.5% in 1992 to 36.8% in 2000 and 40.4% in 2009. In the United Kingdom Cataract Surgery Survey in 1997, 35.0% of patients had second eye cataract extractions. Barriers to second eye surgery in Malaysia, such as financial constraints or patient perception of second eye surgery, need to be explored and strategies to increase second eye surgery should be implemented.

Preoperative Visual Acuity

Most cataract surgeries (82%) in the Malaysian CSR were done on eyes with preoperative unaided VA of 6/12 or worse, and 60% had worse than 3/60 vision. This is in contrast with data from developed countries where less than one third of eyes operated on had VA of 6/60 or worse (Swedish National CSR 31%, United Kingdom 20%, and Auckland 24%). This shows that Malaysia still has a significant backlog of people blinded by cataract. As there is difficulty in obtaining reliable data for cataract surgeries done by private ophthalmologists in Malaysia, we cannot calculate the cataract surgery rate. But based on Hugh Taylor’s estimation from the Melbourne Visual Impairment Project that operating at preoperative VA of 6/60 would yield a rate of 1300 surgeries per million people per year, Malaysia still has a low cataract surgery rate.

However, during the years studied, there was a trend in the reduction of patients with preoperative VA of worse than 3/60 and an increase in patients with VA of 6/18 to 3/60. A similar trend was observed in the Swedish National CSR where the proportion of people whose preoperative VA was worse than 6/60 declined over 20 years. The trend observed in the Malaysian CSR reflects a reduction in cataract surgery in patients who are cataract blind and an increase in those who have cataract visual
impairment. On the other hand, health care demands in developed countries such as the United States, Australia, and Sweden have shown an increasing trend for cataract surgery in people with VA better than 6/12, indicating very early or no cataract.

The Malaysian CSR also showed a significant difference in preoperative VA among patients who had phaco (55.7% had unaided VA of 6/18 to 3/60, 40% had worse than 3/60) as compared with patients who had ECCE (more than 81.3% had VA worse than 3/60). This shows that cataract surgeons in MOH facilities performed phaco for cataract which were less dense and performed ECCE on denser cataract.

The Malaysian CSR showed that there is still a backlog of patients with cataract visual impairment, and there is a need to increase the number of cataract surgeries. To eliminate cataract blindness and achieve the cataract surgery rate of at least 3000 per million people per year proposed by the World Health Organization, the Malaysia MOH has implemented various strategies to increase the number of cataract surgeries in both rural and urban areas. Eye care personnel travel to rural areas in designated mobile buses equipped with eye examination facilities to detect patients with operable cataract. Cataract surgery is then performed at the nearest district hospital by visiting ophthalmologists. This case the burden on MOH hospitals with ophthalmology departments and does not require patients to travel. Additionally, optometrists are placed at health clinics without ophthalmologists to screen for visually impaired cataract and refer patients with visual impairment. To address the cataract backlog in urban areas and the congestion at MOH hospitals, the creation of a 1-stop cataract surgery center in a densely populated area in Kuala Lumpur was initiated by the MOH and a not-for-profit organization called the Federal Territory Islamic Religious Council. Patients with operable cataract detected by primary care physicians including private general practitioners can be referred to that center. Outpatient cataract surgery is done by MOH ophthalmologists. The Federal Territory Islamic Religious Council covers the initial and operational costs of the facility. The MOH also has intraocular lens banks supported by corporate agencies to provide free intraocular lenses to people in financial need. All these efforts aim to eventually increase the cataract surgery rate and reduce cataract backlog.

Currently, preoperative VA is used as the main indicator for cataract surgery. However, other visual complaints such as glare and loss of contrast sensitivity need to be considered when making a decision about cataract surgery. The challenge for adding these indicators are the time and equipment needed to obtain objective measurement. Most hospitals in Malaysia still use the first-in first-out system for scheduling cataract surgery. This approach does not give priority to patients with greater visual impairment. A study using clinical measures and questionnaires to place patients in a more objective priority ranking. Such questions targeting visual impairment. The MOH also has intraocular lens banks supported by corporate agencies to provide free intraocular lenses to people in financial need. All these efforts aim to eventually increase the cataract surgery rate and reduce cataract backlog.

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The secret of getting ahead is getting started.
— Mark Twain


