

Evaluating rate of cataract surgery through smart partnership between Ministry of Health, Malaysia and Federal Territory Islamic Religious Council

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Research article

Keywords: MAIWP, Hospital Selayang, Cataract, Cataract surgical rate, Age adjusted rate, National Blue Ocean Strategy

Posted Date: January 27th, 2020

DOI: <https://doi.org/10.21203/rs.2.21875/v1>

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Abstract

Background

Cataract is the leading cause of blindness in developing countries including Malaysia. Federal Territory Islamic Religious Council (MAIWP) and Ministry of Health, Malaysia (MOH) have established a cataract day care centre called Pusat Pembedahan Katarak, MAIWP- Hospital Selayang (MAIWP- Selayang Hospital Cataract Surgery Centre) to offer a day care cataract surgery with the aim reduce the waiting list among patients plan for cataract operation at the MOH referral hospital in Klang Valley. This smart partnership enables more patients to undergo cataract surgery with a lesser waiting period irrespective of their religious belief. Objective This paper aims to estimate the cataract surgery rate (CSR) of Pusat Pembedahan Katarak, MAIWP- Hospital Selayang (Cataract Operation Centre) from 2013 to 2016 and descriptive assessments of the patients who received eye treatments in the centre.

Methods

All cataract patients who underwent for operations in Selayang Hospital were requested to complete the "Registration Form," that consist of the these information namely name, sex, age, home address, cataract classification, detailed ophthalmological exam information (such as naked eyesight, optometry, tonometry, etc.), cataract surgeon, surgical management, intraocular lens (IOL) implantation or not, operation cost origin, operation outcome (mainly 1st–3rd postoperative day corrected visual acuity (VA), etc. Cataract surgery data are entered into the local Eye Clinic Management System (ECMS) which synchronises with National Eye Database (NED) at regular intervals.

Results

Cataract surgery rate for 2013 was about 27 and increased to 37.3 in 2014. However, it was declined to 25 in 2015 before bouncing back to 36 in year of 2016. Female patients who received eye treatment at Pusat Pembedahan Katarak, MAIWP- Hospital Selayang was higher (53.7%) as compared to male patients (46.3%). Mean duration of cataract surgery from 2013 to 2016 was 21.25 ± 11.071 minutes.

Conclusions

Increased in cataract surgery rate for MAIWP-HS through smart partnership for day care cataract surgery proved that easy accessibility is possible to achieve the short and long-term strategies for the reduction and prevention of blindness in Malaysia.

Introduction

In line with Universal Eye Health, A Global Action Plan 2014–2019 was endorsed in May 2013 by the Sixty-sixth session of the World Health Assembly emphasized on updated approach on the health systems and integration of eye care into the general health system¹. The development and implementation of a locally appropriate plan will support to improve the quality and quantity of both the

clinical and non-clinical aspects of care in order to address local barriers². In monitoring progress of the Global Action Plan, key indicators are number of eye care professionals per million population, the cataract surgical rate and cataract surgical coverage¹.

About 80% of blindness can be avoided through prevention or treatment with interventions. Cataract is the leading cause of blindness and have affected 18 million people. About 90% of cataract blindness occurs in low- and middle-income countries (LMICs) and account for 51% of total blindness cases³. There are a variety of causes that can lead to blindness. The prevalence of blindness and low vision in any country depends on the socioeconomic status, availability of medical and health care facilities and literacy of the population.

In Malaysia, the most common causes of blindness and low vision are cataract, refractive errors, glaucoma, diabetic retinopathy, and retinopathy of prematurity⁴. A National Eye survey done by University of Malaya Medical Centre which represent urban population in Kuala Lumpur Federal Territory in 2014⁵ and Klang Valley in 2008 indicated prevalence of cataract 32.9%, glaucoma as 23.4% and diabetic retinopathy as 9.6%⁶.

Type of cataract

Cataract is an age-related condition in which the lens inside the eye becomes opaque, blurring vision⁶. Cataracts are named for their location in the lens. Basically, there are three types of cataracts namely subcapsular cataract, nuclear cataract and cortical cataract. Subcapsular cataract is a condition described as when the opacity occurs at the back of the lens. Patients with diabetes mellitus or taking high doses of steroid medications have higher risk of developing a subcapsular cataract. Nuclear cataract is a condition where the opacity is located in the centre of the lens. The nucleus tends to darken, changing from clear to yellow and sometimes brown. Nuclear cataracts usually are associated with aging. Lastly, a cortical cataract is identified by the present of white, wedge-like opacities in the periphery which later converge to the centre of the lens. This type of cataract occurs in the lens cortex, which is the part of the lens that surrounds the central nucleus⁷.

Cataract surgery is the only effective way to treat visually impaired cataract and most commonly performed ocular procedures in the world. This surgical technique has evolved from manual cataract extraction to phacoemulsification by using ultrasonic technique and laser-assisted cataract surgery which brings more precise incision, lesser complication, and better visual outcome. On the other hand, it also demands more skill, longer learning curves, and higher cost⁸. This facilities for cataract surgery are mostly available in public and private hospitals in Malaysia.

Smart Partnership

Federal Territory Islamic Religious Council or officially called Majlis Agama Islam Wilayah Persekutuan (MAIWP) was established on 1 February 1974 under Prime Minister Department simultaneously with the establishment of the Federal Territory of Kuala Lumpur, Malaysia. Its establishment is to take care of

Islamic affairs in the Federal Territory of Kuala Lumpur which was previously placed under the Selangor state government. MAIWP was subsequently responsible for managing the affairs of Muslims in Labuan and Putrajaya after they were announced as Federal Territories on 16 April 1984 and 1 February 2001 respectively.

One of the MAIWP's strategies is to strengthen the welfare efforts and increase the MAIWP's assets through investment and other halal ventures for the benefit of the people. Pusat Pembedahan Katarak, MAIWP- Hospital Selayang is a dedicated centre for cataract surgery and the only successful centre in Southeast Asia that established from a strategic cooperation between MAIWP and MOH through Selayang Hospital under the smart partnership within government agencies with the aim to help underprivileged patients to get the medical attention and treatment. This partnership is a unique and dynamic national strategy platform which brings together ministries, agencies, all levels of government and the private sector on a voluntary basis. The design and selection of this partnership initiatives are based on two key principles namely delivering high income through economic growth and integrated development and enhancing the level of public well-being through greater security as well as social inclusion to close the social distance between various groups in society for example, rural vs. urban, young vs old or men vs women⁹.

Thus, MAIWP has distributed almost RM10 million tithing monies to renovate their building premises into a surgical centre equipped with sophisticated and up-to-date surgical equipment. Meanwhile, MOH through Selayang Hospital has provided specialists to provide medical services and cataract surgery¹⁰.

The Selayang Hospital, which has become a cataract patients' reference, received a high number of patients to undergo surgery. Lack of space and equipment cause cataract patients to wait up to a year before surgery can be conducted.

This centre has two fully functioning operating theatres and includes all other cataract care pathways under one roof. It opens for clinic and surgery sessions daily from Monday to Friday. The objective of the cooperation is to maximise the output with high quality and good outcome surgery among all the scheduled surgical cases which are low risks or less complicated cases and performed by fully certified surgeons. The centre has started operation on January 16, 2013. With the establishment of the Pusat Pembedahan Katarak, MAIWP- Hospital Selayang, the waiting period for cataract patients to undergo surgery is accelerated to only 2 weeks from 16 weeks previously.

Material And Method

A total of 2,266 patients had undergone cataract surgery at Pusat Pembedahan Katarak, MAIWP- Hospital Selayang from 2013 to 2016. All the patients' information was retrieved from the registration book. Data from all cataract patients were recorded on a standardized data registration form, which included the following items: name, sex, age, home address, cataract classification, detailed ophthalmological exam information (such as naked eyesight, optometry, tonometry, etc.), cataract

surgeon, surgical management, intraocular lens (IOL) implantation or not, operation cost origin, operation outcome (mainly 1st–3rd postoperative day corrected visual acuity (VA), etc. All cataract patients were requested to complete the registration form with the help of medical or nursing assistant. The information from the registration forms were transferred to the local Eye Clinic Management System (ECMS) which synchronises with NED database at regular intervals. NED is a database supported by MOH. It is an eye health information system containing a clinical database consisting of six patient registries and a monthly ophthalmology service census. The patient registries are Cataract Surgery Registry, Diabetic Eye Registry, Contact Lens-Related Corneal Ulcer Surveillance, Glaucoma Registry, Retinoblastoma Registry, and Age-Related Macular Degeneration Registry.

Definition

This paper used WHO definition on blindness, low vision, and visual impairment. Blindness was defined as presenting visual acuity of less than 3/60 or inability to count fingers at a distance of 3 metres in the better eye using available means of correction (with spectacles when available). Low vision was defined as presenting visual acuity of less than 6/18 but equal to or greater than 3/60 in the better eye using available means of correction (with spectacles when available). Visual impairment was defined as presenting visual acuity of less than 6/18 in the better eye using available means of correction (with spectacles when available). Refraction was not performed to determine the best corrected vision.

Cataract was defined as the presence of lens opacity giving a grey or white appearance to the pupil when examined with an oblique light in a shaded or darkened area. Refractive errors were defined as visual impairment which improved to 6/18 or better with a pinhole, with no evidence of cataract by torchlight examination. Retinal diseases were defined as retinal abnormalities caused by dystrophy, degeneration, or acquired metabolic causes such as diabetes mellitus. Glaucoma was defined as the presence of the horizontal cup-disc ratio of 0.4 or more along with an intraocular pressure of more than 22 mm Hg. Corneal diseases were defined as loss of normal corneal transparency due to whatever causes involving the central cornea.

The cataract surgery rate (CSR), which is defined as the number of cataract surgeries per million people per year, is a critical index used to show that cataract blindness is being eliminated.

Results

In tandem with MOH strategy to address cataract blindness issue in the country, 1576 patients had undergone cataract surgery in 2013 and increased to 2255 in 2014. However, the number decreased to 1543 in 2015 and slightly higher from 2013 to 2266 in 2016. Mean age for cataract patients in 2013 to 2016 was 64.57 ± 8.436 years old. Of which more than 70% of the patients aged 60 and above went for cataract surgery for each year. Those who aged below 45 years old, cumulatively only about 1% went for cataract surgery in 2013 to 2016. Overall mean duration of cataract surgery taken each patient from 2013 to 2016 was 21.25 ± 11.071 minutes.

Table 1: Basic characteristics of the patients registered for cataract surgery in MAIWP - HS for 2013 to 2016

		year				Total
		2013	2014	2015	2016	
Pre-clerking done at	Hospital Klang	0	0	5	0	5
	Hospital Selayang	25	106	9	295	435
	Hospital Serdang	48	46	17	0	111
	Hospital Sungai Buloh	4	0	0	0	4
	MAIWP - Hospital Selayang	1499	2103	1512	1971	7085
Operative done at	MAIWP - Hospital Selayang	1576	2255	1543	2266	7640
age group	0-4	0	1	0	0	1
	15-19	2	0	0	0	2
	20-24	2	1	0	1	4
	25-29	1	0	0	3	4
	30-34	0	4	1	2	7
	35-39	5	4	8	9	26
	40-44	18	31	16	18	83
	45-49	48	68	50	62	228
	50-54	120	155	110	157	542
	55-59	204	329	232	270	1035
	60-64	322	448	314	533	1617
	65-69	349	529	388	597	1863
	70-74	324	437	260	370	1391
	75-79	142	213	155	199	709
	80-84	35	30	9	43	117
85 and above	4	5	0	2	11	
gender	Male	719	1073	718	1030	3540
	Female	857	1182	825	1236	4100
Ethnic Group, Other specify	Malay	613	984	684	940	3221

Table 1: Basic characteristics of the patients registered for cataract surgery in MAIWP - HS for 2013 to 2016

	Chinese	705	843	602	884	3034
	Indian	225	378	204	371	1178
	Others	33	50	53	71	207
Surgery On	First eye	891	1272	912	1391	4466
	Second eye	608	846	599	829	2882
	not available	77	137	32	46	292

In term of gender, more than 50% of the patients were female as compared to male in all 4 years in this study. Patients were seen as day care basis and majority of 95% went for phacoemulsification which is the safest method of cataract extraction. In total from 2013 to 2016, about 42.2% of the patients received treatment were Malay, 39.7% were Chinese, Indian was about 15.4% and balance of 2.7% were from other minority races. Almost 100% of the patient went for IOL implantation instead of other type of choices.

Table 2: Analysis of Cataract Surgeries in Selangor 2013–2016

Year	No CS	Population in Selangor (Million)	CSR	Surgical Method (%)			Snellen visual acuity	
				ECCE	Phaco	Others	≥ 0.05 (%)	≥ 0.3 (%)
2013	1576	5.904	26.69	4.2	95.0	0.8	99.6	75.6
2014	2255	6.051	37.27	2.5	97.0	0.5	99.7	80.0
2015	1543	6.178	24.98	1.6	98.1	0.3	99.6	84.6
2016	2266	6.291	36.02	1.1	98.2	0.7	99.6	81.6

Abbreviations used: No. CS the number of cataract surgeries, Phaco phacoemulsification surgeries, ECCE extracapsular cataract extraction surgeries, A% percentage of patients with 1st–3rd postoperative day corrected Snellen visual acuity (VA) ≥ 0.05 ; B%, percentage of patients with 1st–3rd postoperative day corrected Snellen VA ≥ 0.3 .

Cataract surgery rate for 2013 when first started the partnership was 26.69 and increased drastically by nearly 40% to 37.27 in 2014. However, it was down by almost 33% to 24.98 in 2015 before bouncing back to 36.02 in 2016 (Table 2). The percentage of phacoemulsification surgeries performed in Selangor increased from 95% to almost 100%, indicating that the gap in surgical methods among patients. From 2013 to 2016, the IOL implantation rate was greater than 98%, and more than 75% of patients had a 1st–3rd postoperative day corrected VA ≥ 0.3 .

Discussions

CSR is a critical index used to show that cataract blindness is being eliminated; the rate is higher in well-developed countries, while it is still very low in some parts of Africa and Asia¹¹.

Increment in cataract surgery rate from 2013 to 2014 for MAIWP-HS indicated a progress and the availability of eye health care in Malaysia although CSR is still very low in some parts of Africa and Asia. As stated in study done by Lee MY et al ¹² this trend is a result of investment in increasing surgical capacity in the government hospitals and change in practice pattern among ophthalmologists. However, in 2015, there was a declined about 33% before back on track in 2016 due to construction on hospital infrastructures for upgrading purposes.

Almost 100% of the patients in MAIWP-HS preferred IOL since the used of IOLs has become almost universal. According to Yorston D ¹³ the benefits of IOL safety was proven through randomised clinical trials and the cost of high-quality IOL has fallen as they are manufactured in India, Nepal, and Eritrea.

Although the use of intraocular lenses may be associated with slightly increased costs, this is more than outweighed by the improved outcome of surgery, the opportunity for earlier intervention, and the resulting increase in the number of operations.

The amount of cataract surgery in a community is influenced by a few factors including the age structure of the population, indications and thresholds for the surgery, access to surgical services, and the financial systems for paying and incentivising surgeons¹⁴.

Similar scenario to the Australia population was found where majority of the patients went for cataract surgery were those aged 60 and above years old as compared to those aged 40 and below years old¹⁵.

Increase in age is significantly associated with increasing prevalence of cataract in developing countries and it is a cumulative effect of the complex interaction of exposure many factors over time that contribute to the development of cataract¹⁶.

Our results also showed that female patients constituted more than 50% of all operated patients each year and aged adjusted for gender of cataract surgery (per 100,000 inhabitants) has been significantly higher for females than for males for all age groups between 60 and 79 years old. Differences in gender may be because of a higher prevalence of cataract in female subjects¹⁷. Observations in some part of China also showed that female had a significantly higher prevalence of visual impairment¹⁸. Female subjects have According to Resnikoff et al ¹⁹, women are more likely to have a visual impairment compared to men in every region of the world. Apart from that Olofsson, et al ²⁰ found that female subjects who went for cataract surgery also visit the healthcare provider for other reasons more often than male subjects. This may also contribute to the higher rate of surgery for female subjects.

Cataract surgery has evolved from intracapsular cataract extraction (ICCE) to extracapsular cataract extraction (ECCE) and today the preferred choice by most ophthalmologists is phacoemulsification (Phaco) that uses modern technology. Furthermore, study done by Thevi, Reddy and Shantakumar⁵ in Pahang, Malaysia concluded that visual outcome was significantly better in Phaco as compared to ECCE procedure ($p = 0.001$) and recommended that Phaco equipments should be supplied in the district hospitals with adequate facilities for performing intraocular surgery. The results also showed that hospital performs estimated average of 2,000 cataract surgeries annually. Phacoemulsification is the routine surgery of choice at this hospital.

Moreover, 98% of the surgery in Swedish National Cataract Register in 2000¹⁷ and 99.5% of cataract and refractive surgery in The European Registry of Quality Outcome chose this type of surgery²¹. Not only that few surveys such as New Zealand surveys which involved almost 100% of the respondents that conducted in 2007²², survey on American Society of Cataract and Refractive Surgeons members in 2003²⁴, 94% of Japanese ophthalmologists in 1999²⁵ and 92% among ophthalmologists who responded to a nationwide survey in Singapore also preferred phacoemulsification as type of surgery²⁵.

According to Yorston²⁶, important factors such as cost of surgery and IOL, lack of awareness, poor service, and long distances from surgical centres were the barriers of cataract surgery in developing countries.

Growing rate of cataract surgeries in private hospitals in recent years should also be consider and not be overlooked. Similar conditions such as outcome and cost, reasons why more cataract patients prefer to have surgery in private settings and problems arise, that eye doctors in public hospitals should ponder²⁷.

Previous studies also showed that important risk factors associated with cataract including income and educational level²⁸, smoking²⁹, diabetes³⁰, sunlight exposure^{31,32}, body mass index³³, drug intake^{33,34}, oestrogen replacement therapy³⁵ and alcohol³⁶.

Conclusions

Increased in cataract surgery rate in 2013 to 2014 for MAIWP-HS as reference centre for day care cataract surgery is a start and is going to help decision makers to achieve the short and long-term strategies for the reduction and prevention of blindness in Malaysia as well as the framework of the global initiative "Vision 2020 – the right to sight". Further cohort studies with more controls will be needed in order to prove the effectiveness of government policies.

List Of Abbreviations

CSR Cataract Surgery Rate

ECCE Extracapsular Cataract Extraction

ECMS Eye Clinic Management System

ICCE Intracapsular Cataract Extraction

IOL Intraocular Lens

LMIC Low- and Middle-Income Countries

MAIWP Federal Territory Islamic Religious Council

MOH Ministry of Health

VA Visual Acuity

Declarations

Ethics approval and consent to participate

This study was registered with National Medical Research Registry (NMRR) with the registration number NMRR -19-3151-51710. This study was approved by Malaysia Medical Research and Ethics Committee (MREC). This study was conducted using operational budget and no primary data was collected thus no consent to participate required.

Consent for publication

Not Applicable

Availability of data and materials

The data belongs to Ministry of Health, Malaysia and available upon request

Competing interests

The authors declare that they have no competing interests

Funding

This study was conducted using operational budget by Ministry of Health, Malaysia

Authors' contributions

NFN, RAA, EH, MAS and ZK collected and contributed the data. NAM performed the analysis and major contributor in writing the manuscript. All other authors read and approved the manuscript.

Acknowledgements

We thank the Director General of Health, Ministry of Health, Malaysia for permission to publish this report. We express our gratitude to Deputy Director General of Health (Research and Technical) for his continuous support. We also thank Federal Territory Islamic Religious Council for their contribution to making the centre a success.

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