ORIGINAL ARTICLE

The Kuala Pilah cluster cataract study: Accessible eye care reduces cataract blindness

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ABSTRACT

Objective: The Ministry of Health introduced the cluster hospital project in Kuala Pilah district in 2016 to allow sharing of resources between the hospitals in the same vicinity. The aim of this study is to compare the demographic profile, prevalence of cataract blindness and low vision among patients who presented for cataract surgery before and after the programme.

Methodology: This is a retrospective cohort study of patients who underwent cataract surgery in Kuala Pilah Cluster Hospitals between 2010 and 2017. A total of 2539 records of patients were reviewed. Patients were assigned into two groups: Group 1 (2010-2012)- before the programme (2010-2012) and Group 2 (2015-2017) after the introduction of the programme.

Results: There was a significant increase in number of cataract cases in the district hospital after the cluster initiative. The mean age of patients undergoing cataract surgery was similar in both groups. The common comorbidities were hypertension (Group 1=57.3%; Group 2=70.8%) and diabetes mellitus (Group 1=40.6%; Group 2=51.1%). In 2010-2012, most of the patients were one eye blind (34.4%), whereas in 2015-2017 majority of patients presented with vision better than 6/18 (43.5%). The proportion of patients with cataract blindness reduced from 6% in 2010-2012 to 4.3% in 2015-2017 (p<0.01).

Conclusion: There is a significant decrease in percentage of patients with cataract blindness and low vision after the introduction of Kuala Pilah Cluster Hospital Program. We believe that that cluster hospital system is effective in improving accessibility to eye care and therefore increases the cataract detection rate.

KEY WORDS:
Cataract, Low vision, Cluster hospital, Blindness

INTRODUCTION

The National Eye Survey 2014 has identified cataract as the commonest cause of blindness and vision problem in Malaysia. The survey found that 216,000 Malaysians have become blind while 272,000 Malaysians have become visually impaired after delaying cataract surgery.[1]

The Vision 2020 global initiative by the World Health Organization (WHO) advocates that focusing on major diseases for which proven cost effective interventions are available allows us to achieve the goal of eliminating avoidable blindness.[2] The major action plan to achieve this goal includes providing universal access to comprehensive eye care services. We view the cluster hospital project by the Ministry of Health (MOH) Malaysia as an excellent venture to improve access to eye care in our local population.

The Hospital Cluster concept was first introduced under the MOH Strategic Plan 2016-2020.[3] The Cluster Hospital Concept by the MOH is defined as the grouping of hospitals by the same geographical location within a state where the hospitals are aligned in terms of patient flow and services. Specialist hospitals are paired with smaller district hospitals to achieve universal access to quality healthcare. Hospital resources, facilities, manpower and equipment are shared within the cluster hospitals.

The Kuala Pilah Cluster Project was first implemented in 2016. It involved Hospital Kuala Pilah as the lead hospital and the Hospital Jempol and Hospital Tampin as the district hospitals, coming together to serve as a single entity in providing medical services and treatment to the public. We hypothesised that initiation of cluster hospital system in Kuala Pilah will increase cataract blindness detection rate in the local population. In this study we aimed to analyse the demographic data of patients who presented for cataract surgery before and after the initiation Kuala Pilah Cluster Hospital Project. We also intended to evaluate the prevalence of cataract blindness and low vision in these group of patients.

MATERIALS AND METHODS

This is a retrospective cohort study of patients who underwent cataract surgery in Kuala Pilah Cluster Hospitals between 2010 and 2017. This study was approved by the institutional review board and adhered to the tenets of the Declaration of Helsinki. Data were taken from the Malaysian Cataract Surgery Registry (CSR) which is part of the MOH Web-based National Eye Database. The data for this study was obtained from the pre-clerking forms which were filled in during pre-operative assessment of patients. The data included information on demography, systemic and ocular comorbidities, preoperative Snellen Visual Acuity (VA), and

This article was accepted: 16 April 2019
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Table I: Comparison of systemic comorbidity in cataract patients in 2010-2012 and 2015-2017

Systemic Comorbidities	Percentage (%)	
	2010-2012	2015-2017
Hypertension	57.3	70.8
Diabetes Mellitus	40.6	51.1
Ischaemic Heart Disease	11.2	9.2
Asthma/ Chronic Obstructive Airway Disease (COAD)	6.3	5.4
Renal Failure	2.6	3.2
Cerebrovascular Accident (CVA)	1.2	1.4

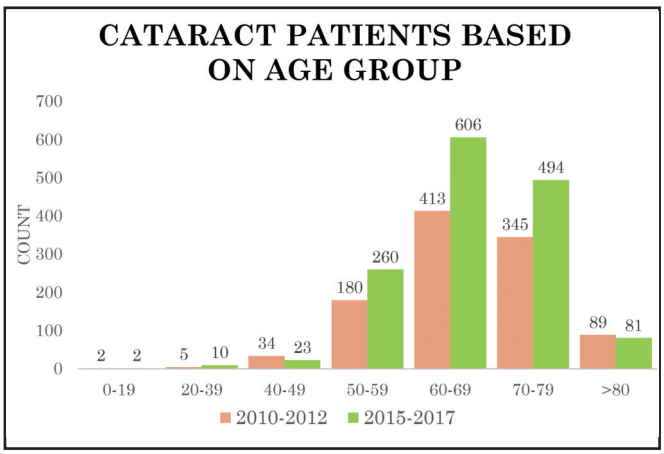

Fig. 1: Age group of patients undergoing cataract surgery.

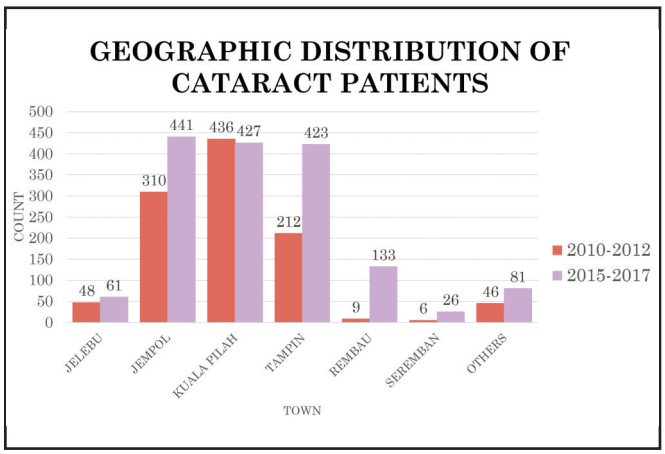

Fig. 2: Geographic distribution of cataract patients over the years.

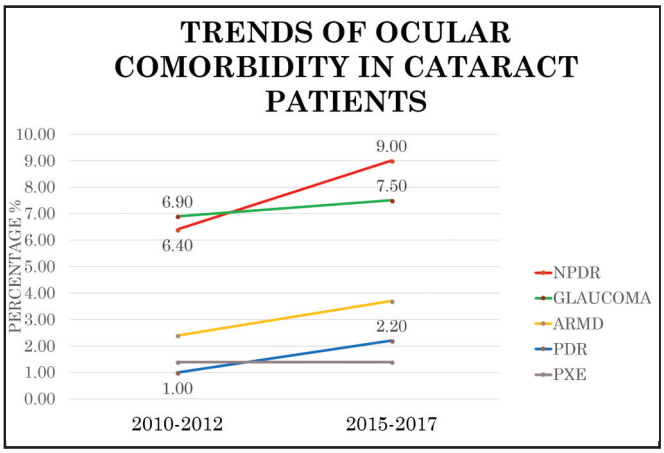

Fig. 3: Trends of ocular comorbidity in cataract patients over the year 2010-2012 and 2015-2017.

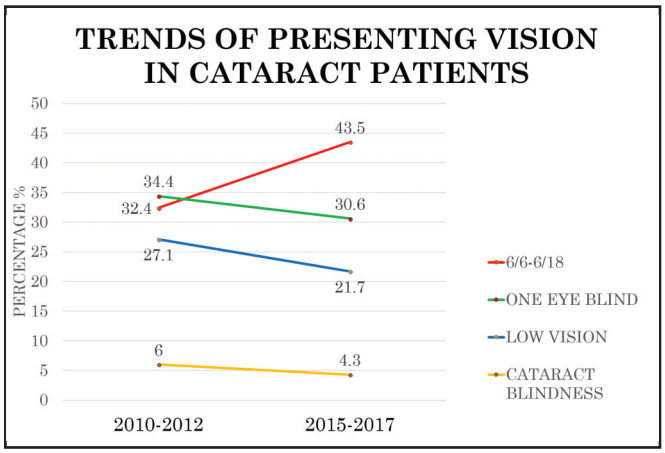

Fig. 4: Trends of ocular comorbidity in cataract patients over the year 2010-2012 and 2015-2017.

refractive error. Total of 2539 patients who underwent cataract surgery in Kuala Pilah Cluster Hospitals were included in this study. Patients were assigned into two groups: Group 1 consists of patients prior to the introduction of cluster program (2010-2012) and Group 2 after the implementation of the hospital cluster program (2015- 2017). All statistical tests were performed using the IBM SPSS for Windows statistical software package (version 24.0; SPSS Inc., Chicago, Illinois, USA). Categorical variables are presented as numbers and percentages, and chi square test was used to compare clinical characteristics among the groups. Independent-samples t test and Mann-Whitney U test was used for the analysis of continuous variables when appropriate for comparisons between groups.

RESULTS

There was an increase in number of cataract surgeries performed throughout the years. In 2010-2012, a total of 1,062 cataract surgeries performed, while in the year 2015-2017 the number increased to 1,472.

Demography

The most common age group undergoing cataract surgery was from 60 to 69 years old with a similar mean age of patients in both groups; 66.8 years in 2010-2012 and 66.7 years in 2015-2017 (Figure 1). Majority of patients consisted of Malays (63.5%; 61.8%) followed by Chinese (24.0%; 24.9%) and Indians (12.1%; 12.9%) in Groups 1 and 2 respectively. There was no statistical significance in gender distribution in both groups (p=0.290). However, we noticed that more females are coming forward for cataract surgery after implementation of the hospital cluster; 505 in Group 1 and 728 in Group 2, where the male to female ratio reduced from 1.11 to 1.02.

Figure II illustrates the geographical comparison of the number of cataract patients in both groups. The highest number of cataract surgery patients in Group 1 were from Kuala Pilah (40.1%), followed by Jempol and Tampin. After the introduction of the cluster programme, the overall percentage of cataract patients from Kuala Pilah reduced to 29%. Meanwhile, there was a significant increase in number of cases in both Tampin (19.9% to 28.7%) and Jempol (29% to 36%) (p<0.001) in the year 2015-2017. It was also noted that number of patients from Rembau, (a nearby district to Tampin), surged from 9 to 188 after the cluster initiation.

Systemic and Ocular Comorbidities

Table III shows the percentage of patients with systemic comorbidities in both groups. The most common were hypertension (57.3% in Group 1; 70.8% in Group 2) and diabetes mellitus (40.6% in Group 1; 51.1% in Group 2). The common ocular comorbidities were non-proliferative diabetic retinopathy (NPDR), which increased from 6.4% to 9.0%, followed by glaucoma, which increased from 6.9% to 7.5% and proliferative diabetic retinopathy (PDR), which increased from 1.0% to 2.2% comparing groups 1 and 2. The increase in number of patients with NPDR and PDR over the years were statistically significant (p=0.014; 0.028 respectively).

Presenting Vision

In 2010-2012 many of the cataract patients had a Snellen visual acuity of worse than 3/60 in one eye (34.4%). In 2015-2017, the majority of patients presented with a Snellen visual acuity of better than 6/18 (43.5%). The number of patients with cataract blindness (with bilateral Snellen visual acuity worse than 3/60) reduced from 6% to 4.3% (p = 0.0001) comparing before and after implementation of the hospital cluster program (Figure 3).

DISCUSSION

Cluster hospital system is a high impact initiative that has been identified under Healthcare Transformation Programme in 2013. The cluster initiative aims to provide accessible specialist service 'close to home' by forming an integrated network of hospitals within the same geographical location. To our knowledge, our study is the first one to report the effectiveness of cluster hospital programme in reducing the burden of a specialist hospital and delivering accessible eyecare to the rural community.

From 2015- 2017, there was a significant increase in number of cataract surgeries for patients from Jempol and Tampin. Prior to the Cluster Project, the ophthalmology service was only provided in Kuala Pilah Hospital. Residents from Tampin and Jempol were required to travel an average of 50km for cataract surgery. Since the introduction of the Kuala Pilah Hospital Cluster Program in 2016, eye care became more accessible to the residents in Tampin and Jempol therefore contributing to the increase in patient numbers from these areas. It was interesting to note the rise in the number of cataract patients from adjacent districts like Rembau and Seremban after the cluster initiative. This shows that upgrading a non-specialist district hospital to accommodate day-care facility for cataract surgery is well received by patients, and it can even help to decongest adjacent tertiary hospital like Hospital Seremban.

The mean age of patients was similar in both groups; 66.8 years and 66.7 years. A similar trend was also observed in the Malaysian Cataract Surgery Registry (CSR) where the mean age was 64.5 years.[4] It is worthwhile to note that in the western countries, mean age of the cataract patients are much older; such as in Sweden (76.1 years),[5] Auckland (74.9years)[6] and United Kingdom (76.3 years).[7]

The most common systemic comorbidities are hypertension and diabetes mellitus which is comparable with the Malaysian CSR.[4] This is in line with the global epidemic of rise in non-communicable diseases.[8] Among the ocular comorbidities, non-proliferative diabetic retinopathy is the highest with a total percentage of 7.9%. There is also a significant rise in percentage of patients with diabetic retinopathy over the years; from 6.4% to 9.0% for NPDR and 1.0% to 2.2% for PDR. This corresponds with the National Health and Morbidity Survey (NHMS) where there is an increase in diabetes prevalence from 15.2% in 2011[8] to 17.5% in 2015[10]. The rising trend in diabetic retinopathy could also be due to increased detection rate owing to the effective screening system in the district clinics.

The noticeable change from Kuala Pilah Hospital Cluster Project was a decreasing trend in patients presenting with VA worse than 3/60 and cataract blindness and an increase in cataract patients presenting earlier with the VA 6/12-6/18. A

similar trend was also shown in the Malaysian CSR with a reduction of patients with preoperative VA of worse than 3/60 and an increase in patients with VA of 6/18 to 3/60 over the year 2002-2011.[4] Several studies worldwide have acknowledged the fact that distance from hospital and transportation cost is an important barrier for cataract surgery.[11-13] Thus, providing cataract surgery service in district hospital closer to the rural community is an effective way of breaking this barrier. This study has shown that implementation of the Cluster Hospital Program in Kuala Pilah enables earlier cataract detection and intervention.

According to the National Eye Survey 2014, there is still an accumulation of patients with cataract visual impairment, and therefore the need to increase the number of cataract surgeries.[1] The Hospital Cluster concept is one of the initiatives set by the Malaysia MOH to extend the provision of ophthalmology services to rural areas. This reduces the burden and congestion in specialist hospitals as cataract surgeries can be done in district hospitals. Moreover, it also decreases the travel burden on patients which in turn encourages more patients to come forward to get treatment. Based on the Kuala Pilah Cluster Cataract Study, there is a decrease in cataract blindness rate in patients presenting for cataract surgery after the introduction of the Cluster Hospital Program. Thus, we conclude that the cluster system is effective in increasing cataract detection and therefore aid in reducing cataract blindness in this vicinity.

ACKNOWLEDGMENT

We would like to thank the Director General of Health Malaysia for his permission to publish this article.

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