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Meeting the need for childhood cataract surgical services in Madagascar

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ABSTRACT

Background: Cataract has emerged as the most important cause of blindness in children worldwide, and has been one of the priorities of VISION 2020, the global initiative to eliminate avoidable blindness by 2020. More than 2500 children are estimated to be blind from cataract in Madagascar. The aim of this study was to investigate the burden and causes of pediatric cataract in a busy eye clinic in Madagascar and measure service delivery. **Materials and Methods:** This was a retrospective case series of all children aged 15 and below, receiving cataract surgery at the busiest eye clinic in Southern Madagascar. Data on all children operated on at the eye clinic between September 1999 and July 2009 were retrieved from theatre logs and patient charts. **Results:** One hundred and fourteen eyes of 86 children were operated on during the study period, with congenital cataract being the diagnosis in 53.5% of the children. For the catchment area of 5.8 million inhabitants 2.7% of incident cases of non-traumatic pediatric cataracts had surgery, with a mean CCSR per year for the entire catchment area of 1.1/million population. **Conclusions:** The Southern part of Madagascar is underserved for pediatric cataract surgical services, hence the need for a childhood blindness program.

Key words: Africa, childhood cataract, childhood cataract surgical rate, Madagascar

INTRODUCTION

Approximately 1.4 million children are blind worldwide.[1] Using estimates from Tanzania,[2] we believe that more than 2500 children are currently living with blindness from non-traumatic cataract in Madagascar. Although there is no Child Eye Health Tertiary Facility (CEHTF) in the country, as recommended by the World Health Organization,[3] routine data from busy eye clinics with a strong community presence suggest that cataract could be a major cause of avoidable blindness among Malagasy children.

In this study, we sought to understand the burden and causes of pediatric cataract as seen in one of the busiest eye clinics in Madagascar.

MATERIALS AND METHODS

This was a retrospective case series of all children aged 15 and below, receiving cataract surgery at a busy eye clinic in Southern Madagascar during the period between September 1999 and July 2009.

From January 1999 to December 2009, the hospital performed a total of 9076 cataract surgeries. In 2009 alone, 1925 cataract surgeries were performed, accounting for 26.5% of the estimated 7226 performed by 20 eye clinics in Madagascar in 2009.

Though not fully equipped to handle pediatric cases, the clinic is the sole provider of cataract surgical services to children in a catchment area of 5.8 million inhabitants, accounting for 29% of the total population of Madagascar.

A list of all children receiving cataract surgery during the study period was obtained from the theater logs and the respective patient charts were retrieved. The following data were extracted from the charts: file number, age, sex, type of cataract, cause of trauma for traumatic cataracts, affected eye(s) as well as region of residence of patient.

Data entry was done using Microsoft excel and analysis using Intercooled STATA version 9.0. Student t-test and Pearson's Chi-square were used to test associations as appropriate.

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RESULTS

One hundred and fourteen eyes of 86 children were operated on during the 10-year period. Cataract was respectively bilateral and unilateral in 29 (33.7%) and 57 (66.3) of the children. The male to female ratio was 3:2. The age distribution by sex is summarized in Table 1 below.

As shown in Table 2, congenital cataracts were the most common diagnosis, followed by traumatic cataract. The cause of traumatic cataract was only documented for three children. This was a piece of stick (2 children) and a compass (1 child). Traumatic cataract was observed in 14 (26.9%) of male and 8 (23.5%) of female subjects, respectively ($P = 0.72$).

The surgical procedure was standard extra-capsular cataract extraction and sutureless cataract surgery in 55 (64.7%) and 30 (35.3%) of children, respectively. Seventy (81.4%) of all children received an intra-ocular lens. There was no gender difference with regard to IOL insertion ($P = 0.85$). Anterior vitrectomy was not performed to reduce risk of posterior capsule opacification.

Eighty four out of 86 children came from the catchment area of the hospital, one from a region outside the catchment area and another one from a region that was not specified in the case notes.

Table 3 shows the coverage for non-traumatic cataract for our catchment area. Between 1999 and 2009 between 0 and 10% of the estimated cumulative incident cases of congenital and developmental cataracts were operated on in each of the seven regions that comprise the catchment area of the eye clinic. For the entire catchment area of 5.8 million inhabitants, this translates to only 2.7% of incident cases having surgery. During the same period, the average Childhood Cataract Surgical Rate (CCSR), i.e. the number of cataract surgeries in children per million population per year, ranged from 0 for most regions to 4.0/million for Haute Matsiatra region. The mean CCSR per year for the entire catchment area was 1.1/million population.

Table 1: Demographic data

Sex	Number	Mean age (Years)	SD (Years)
Male	52	8.6	4.3
Female	34	7.9	4.5
Total	86	8.3	4.4

DISCUSSION

One hundred and fourteen eyes of 86 children were operated on in this retrospective study.

Overall, congenital cataracts accounted for 59.7% of the children, followed by traumatic cataract with 19.3% and developmental cataract with 8.8%. No significant gender difference was observed in these three groups.

More male children were operated on, with a male to female ratio of 3:2. This is similar to observations in other sub-Saharan African countries where two-thirds of pediatric cataract operations are done on boys.[2-5] As observed in Kenya, the disparity observed in our study is likely to be due to gender roles in the

Table 2: Diagnosis by number of children affected

Diagnosis	Male		Female		Total	
	Number	%	Number	%	Number	%
Congenital cataract	27	51.9	19	58.9	46	53.5
Developmental cataract	3	5.8	4	11.8	7	8.1
Traumatic cataract	14	26.9	8	23.5	22	25.6
Uveitis	4	7.7	1	2.9	5	5.8
Not specified	4	7.7	2	5.9	6	7.0
Total	52	100	34	100	86	100

Table 3: Congenital and developmental cataract surgical coverage in the catchment area 1999–2009

Region	Population of region (2009)	Children operated 1999–2009	Congenital and developmental cataracts operated on 1999–2009	Estimated cumulative incident congenital and developmental cataract cases	Mean estimate annual CCSR 1999–2009
Haute Matsiatra	1,283,489	63	51	510	4.0
Ihorombe	215,109	10	4	90	0
Anosy	618,722	5	2	250	0
Atsimo Atsinanana	706,266	1	1	280	0
Vatovavy Fitovinany	1,248,017	3	3	500	0
Androy	541,865	1	1	220	0
Atsimo Andrefana	1,157,971	1	0	460	0
Total	5,771,439	84	62	2,310	1.1

community.[4] Male genetic predisposition to congenital and developmental cataract is also unlikely, given that a recent study conducted in Denmark revealed no male genetic predisposition.[6]

During the period under review, only 10% of incident congenital and developmental cataracts in Haute Matsiatra region, where the eye clinic studied is based, received surgery (mean CCSR of 4.0). This figure is lower than those in two regions in Tanzania with well-established childhood blindness programs. In the latter, the CSSRs were 39.8 and 29.2, respectively.[2] For all seven regions constituting the hospital's catchment area, 2.7% of incident congenital and developmental cataract cases during the study period were operated on, with a mean CCSR of 1.1, a best case scenario if the figures were to be extrapolated to the entire country. This figure does not compare favorably with an overall CCSR of 9 in Tanzania.[2] Though we do not have estimates for the incidence of traumatic cataracts, these figures alone suggest that this part of Madagascar is underserved with pediatric cataract surgical services. Possible reasons for these low figures are lack of awareness that children can also have cataract and that it should be treated early. Long distances and high cost of public transportation in an indigent community may also play a part as has been observed in Tanzania.[7]

The fee of cataract surgery in 2010 was 70,000 Ariary (US$35) and 120,000 Ariary (US$60) for unilateral and bilateral cataract surgeries, respectively. However, the hospital had a policy, thanks to yearly grants from an international Non-Governmental Development Organization (NGDO), to waive surgical fees for patients, who were considered too poor to pay. So cost for surgery is unlikely to have been a major barrier. In 2008, the hospital had estimated that indirect cost (food, transportation to hospital, accommodation for caretaker etc.) averaged US$57 per episode and were therefore a significant barrier to uptake of cataract surgical services among adults (internal project communications).

Contrary to published data, there was no significant gender difference with regard to the proportion of traumatic cataracts ($P = 0.72$). This may be due to the small sample size.

In summary, only 53 children with non-traumatic cataract were operated on during the 10-year period under review. Using a conservative estimate of 30 incident cases of non-traumatic pediatric cataracts per year,[2] then alone in 2009, there should have been at least 170 children operated on for non-traumatic cataract in the catchment area, just to take care of incident cases.

It should be recalled that our study eye clinic did not have a childhood blindness program during the period under review. Evidence from East Africa suggests that such a program, which includes elements of early detection, counseling services, reimbursement of transportation, free cataract surgery as well as refractive and low vision services can effectively deal with cataract as a cause of childhood blindness.[2]

This study thus underscores the need for a childhood blindness program in our study area, which would also include training in recommended pediatric cataract surgery techniques and provision of adequate equipment.

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