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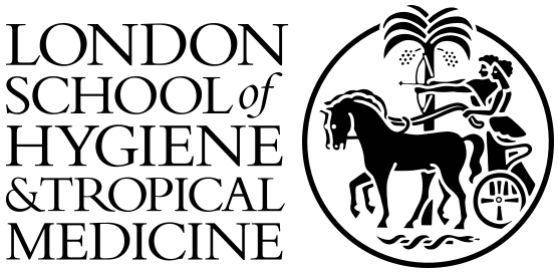

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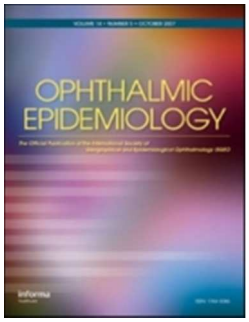

Trends in Cataract Surgical Rate and Resource Utilization in Egypt

Journal:	*Ophthalmic Epidemiology*
Manuscript ID	NOPE-2017-0090
Manuscript Type:	Original Research
Date Submitted by the Author:	24-Apr-2017
Complete List of Authors:	Elbeih, Islam; National Eye Centre Bascaran, Covadonga; London school of Hygiene and Tropical Medicine, International Centre for Eye Health Blanchet, Karl; London School of Hygiene and Tropical Medicine Foster, Allen; London School of Hygiene and Tropical Medicine
Keywords:	Cataract, Cataract Surgical Rate, Egypt, Resouce Utilization, Service Provision

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Trends in Cataract Surgical Rate and Resource Utilization in Egypt

Islam Elbieh[1]

Covadonga Bascaran[2]

Karl Blanchet[2]

Allen Foster[2]

[1] *National Eye Centre, Cairo, Egypt*

[2] *London School of Hygiene & Tropical Medicine, Keppel Street, WC1E 7HT, London*

Islam Elbeih islamelbeih@gmail.com

Covadonga Bascaran Covadonga.Bascaran@lshtm.ac.uk

Karl Blanchet Karl.Blanchet@lshtm.ac.uk

Allen Foster Allen.Foster@lshtm.ac.uk

Financial support: this research was funded by the Kirkpatrick Scholarship, awarded to the first author by the London School of Hygiene and Tropical Medicine.

None of the following authors has any proprietary interests or conflicts of interest related to this submission

This submission has not been published anywhere previously and is not simultaneously being considered for any other publication.

Corresponding author details:

Islam Elbieh

islamelbeih@gmail.com

National Eye Centre, Cairo, Egypt

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Abstract

Purpose:

To evaluate cataract services in Egypt and assess resources and practices in public and private sector.

Methods:

The study was conducted between June and August 2015. All facilities in the country providing cataract services were contacted to obtain information on surgeries performed in 2014. Hospitals performing eye surgery in Quena, Sharkia, and Fayoum regions were visited and a questionnaire on resources for cataract surgery was completed.

Results:

Cataract surgery was offered in the public sector by 64 government and 16 university teaching hospitals and in the private sector by 101 hospitals. In 2014, the national CSR was 3,674 varying in governorates from 7,579 in Ismailia to 402 in Suez. The private sector performed 70% of cataract surgeries.

Analysis of 3 regions showed an 11.7% increase in cataract output between 2010 and 2014. The average number of cataract surgeries per unit in 2014 was 2,272 in private, 1,633 in university and 824 in government hospitals. Private hospitals had 60% of human resources for eye care. Phacoemulsification was the surgical technique in 85.6% of private, 72.1% of university and 41% of government hospitals.

Reasons explaining the differences in output between public and private sectors were the lack of trainers, supervisors and incentives.

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Conclusion:

The private sector provides most of the cataract services in Egypt, resulting in inadequate services for the poor. There is a 15 fold variation in CSR between the best and least served regions. The public sector could increase cataract output by improving training, supervision and incentives.

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Background

Cataract is the main cause of blindness worldwide affecting an estimated 20 million people.[1] As such, it is a priority of the WHO Global Action Plan 2014-19, (GAP) for Universal Eye Health. Cataract Surgical Rate (CSR) and Cataract Surgical Coverage (CSC) are two key indicators to monitor the progress of the GAP towards reducing the prevalence of vision impairment.[2]

Egypt is classified as a low / middle income country (LMIC) by the World Bank.[3] In 2014, the percentage of GDP spent on Health was 5 %, less than other neighboring countries such as Sudan (7.2%), Morocco (6.4%), Tunisia (7%).[4] The out-of-pocket (OOP) expenditure as a percentage of total health expenditure (THE) was 60% in 2010 compared with 7% in Morocco, 35% in Tunisia, and 15% in Algeria.[4, 5] The high OOP indicates inadequate financial protection for poor people and the presence of financial barriers to access health services.[6]

The CSR is defined as the number of cataract surgeries performed per million population per year. [7],[8] In Egypt, the national CSR was estimated to be 692 in 2005, less than Sudan (932), Tunisia (1329), and Libyan Arab Jamahiriya (1887) in the same year.[9]

As a national policy, cataract surgical services are provided for free in public hospitals for all patients eligible for National Health Insurance and Social Insurance.[10]

The aim of this study in Egypt was to ~~evaluate the coverage of cataract services over time and by region,~~ and to assess the availability of key resources and practices in both public and private sectors of cataract service delivery.

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Methods and Analysis

The study was conducted between June and August 2015. All facilities in the country providing cataract surgical services were included and contacted by phone by the research team to obtain information on cataract surgeries performed in 2014.

All hospitals performing eye surgery in three regions representing different geographical areas (Quena, Sharkia, and Fayoum) were visited and a detailed questionnaire of the availability and utilization of resources for cataract surgery was completed by the research team.

All private and public facilities in the country providing cataract surgical services were included in the CSR calculation for 2014.

Quantitative data were entered using MS Excel® and analyzed by using STATA 11®. The CSR was calculated using population projections for 2014 from the Ministry of Health based on the latest census (2006).[9]

Qualitative data from the interviews was extracted from written notes and major themes were identified. Twelve eye care managers were interviewed, 5 from government, 2 from university and 5 from private hospitals.

Ethical approval was obtained from The National Eye Health office in the Ministry of Health in Egypt and the London School of Hygiene & Tropical Medicine.

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Results

National and Regional Cataract Data

Cataract surgery is offered by 80 public hospitals - 64 government, 16 university hospitals - and 101 private sector hospitals.

The response rate for the nationwide questionnaire was 90.6% (164 of 181 hospitals) with 100% government (64) and university (16) hospitals responding and 83.2% of private sector hospitals (84 of 101). The distribution of the hospitals by sector and governorate is shown in (Figure 1).

In 2014, a total of 317,181 cataract operations were reported to have been performed in Egypt of which 70.5% were in the private sector, 17.4% in government hospitals and 12.2% in university hospitals.

The National CSR was 3,674 per million population varying from 7,579 in Ismailia governorate to 402 in Suez. The Regional CSR is presented in Table 1 and Figure 2.

Analysis of Cataract Services in three Regions (2010-2014)

Cataract output

Data from 23 eye care facilities in three regions (Sharkia (11), Fayoum (8) and Quena (4) were analyzed. There was an 11.7% increase in the cataract output from 2010 (32,533) to 2014 (36,364) despite a decrease in 2011 (29,338). The CSR shows a decline of more than 10% in all 3 Regions in 2011 (Figure 3).

The average number of cataract surgeries per unit in 2014 was 2,272 in private hospitals, 1,633 in university hospitals and 824 in government hospitals. Of the 43,752 cataract operations performed in the 3 regions in 2014 57.4% were on men.

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Resources for Cataract Services

Approximately 60% of the total human resources for eye care were working in private hospitals, 23% in the government hospitals, and 17% in university hospitals. The distribution of eye care workers by cadre in the three sectors is shown in Table 2. Fayoum had 28 ophthalmologists/million pop compared with Sharkia 26 and Quena 13. The average working day in private hospitals was 6.8 hours compared with 4.0 in university and 3.8 in government facilities.

Private and university hospitals were better equipped with operating theatre equipment than government hospitals. (Table 3).

Cataract Surgery Practices

Phacoemulsification was the surgical technique in 85.6% of private, 72.1% of university and 41% of government hospitals. Extra Capsular Cataract Extraction (ECCE) was the most common technique in government hospitals (59%). The relatively low number of phacoemulsification cases in the government hospitals was due to either the absence of functioning phacoemulsification machines or absence of trained surgeons. Small Incision Cataract Surgery (SICS) was not practiced in any of the visited hospitals.

The private hospitals had the shortest average surgical time per case (approx. 8 mins) and turnaround time (16 minutes/case), compared with approx. 28mins and 37mins in government hospitals. (Figure 4)

Surgeons and Managers perspectives on cataract services

Ophthalmologists (n=22) from government and university hospitals were interviewed regarding provision of cataract services. The two main reasons given

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for the differences in output and practices between public and private sectors were the lack of trainers and supervision (15 of 22) and the lack of incentives (12 of 22). Lack of equipment was reported as the main reason for the lower number of phacoemulsification cases in the government and university hospitals.

Most managers in government and university hospitals were not satisfied with the quantity and quality of the cataract services. Lack of government financial and technical support were the major challenges mentioned. They also expressed the need to improve the training programmes and update the hospital's equipment. On the other hand, most managers in the private hospitals were satisfied with the cataract services provided.

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Discussion

There are an estimated 2,400 ophthalmologists in Egypt, 30 per million population.[11] This is higher than other Middle East countries and the VISION2020 recommendations.[12]

The CSR in 2014 in Egypt is estimated to be 3,674 per million population. This includes cataract surgeries performed in both public and private sectors. The study included 90.6% of all providers of cataract surgery, ~~and most of the remaining centers are small or non-functioning units and therefore unlikely to significantly affect the CSR calculation.~~ The previous CSR estimate for Egypt was 692 in 2005 giving a 4-5 times increase in CSR over the last 9 years.[13] Although this would suggest a significant progress, the 2005 number may be underestimated as the methodology used in 2005 is not explicit about whether both sectors were included. Our survey showed that, in 2014, the private sector was responsible for over 70% of the cataract surgeries in Egypt.

There were marked differences in CSR between regions, ranging from 402 in Suez to 7,579 in Ismailia. In low and middle income countries, most eye hospitals and ophthalmologists offering cataract surgery are based in urban areas.[13] Similarly, in our study, regions with large cities and a higher proportion of urban population, like Cairo, Giza, Ismailia, and Alexandria, showed higher CSR figures.

The target CSR of a given population is determined by the incidence of operable cataract, which is mainly influenced by the age structure of the population and the threshold of visual impairment used for performing cataract surgery.[8] The target CSR for Egypt is likely to increase due a progressively ageing population

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and the lowering of the visual acuity threshold used as the indication of cataract surgery.

When analyzing three Regions over five years, there was an overall increase in cataract output of 14.6% from 2009 to 2014; however, there was a considerable decrease of the CSR in 2011, particularly in the private sector. This sharp decline is probably due to the uprising and revolution in Egypt in 2011 and the accompanying economic instability and political unrest.

VISION 2020 and the WHO Global Action Plan for Universal Eye Health promote the development and equitable distribution of human resources to achieve the optimum outcome in eye care delivery.[2,14] In all three Regions analysed, the private sector was more productive, better equipped and the staff had greater work satisfaction. Phacoemulsification surgery is ubiquitous in the private sector but not in the government sector. Egypt is transitioning from ECCE to phaco without adopting SICS. This is the same pattern that high income countries have followed.[15] In Egypt phaco outside the private sector is still not widespread, due to the cost of equipment and consumables. Conversely, in other middle-income countries SICS is now the routine technique. It is superior to ECCE in results and matches those of phaco at a lower cost.[16] Re-training surgeons from ECCE to SICS could be faster and less costly than training them to do phaco, and it would mean that patients outside the private sector would be offered a technique with comparable results, however whether this is acceptable to the profession has to be considered. The alternative is a considerable investment to supply public sector hospitals with the training, equipment and consumables to perform routinme phacoemulsification cataract surgery.

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Gender inequity in access to cataract surgery has been shown in low-income settings, with a higher cataract surgical coverage for males than for females.[17, 18]. In our study in the three regions evaluated females accounted for 43% of cataract surgeries. In general women in LMICs are poorer and have less access to health services than men. [19] In our study this was confirmed by the fact that gender inequity was more marked in the private sector.

Conclusion

In conclusion, determining CSR has given a better understanding of the geographic distribution of cataract services in Egypt. Civil unrest had an impact on provision of cataract services.

Relying on the private sector to provide the majority of cataract services may result in inadequate services for the poor if they cannot afford the cost of the surgery. Further research should focus on the quality of cataract surgical outcomes and interventions that can improve the utilization and productivity of resources available for cataract services.

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Table 1: CSR in Egypt by governorate in 2014

Region	Cataract	Population (mills)	CSR 2014
Ismailia	8928	1.178	7579
Cairo	65097	9.278	7016
Alexandria	29074	4.812	6042
Giza	38999	7.585	5142
Portsaid	3406	0.666	5114
Luxour	5584	1.147	4868
Dakahlia	26041	5.949	4377
Aswan	6170	1.431	4312
Sharkia*	26746	6.485	4124
Gharbia	17416	4.751	3666
Damietta	4702	1.33	3535
Fayoum*	9126	3.17	2879
Menofya	11229	3.941	2849
Menya	13919	5.156	2700
Quena*	7879	3.045	2588
Assyuit	9430	4.245	2221
Banisuef	6118	2.856	2142
Kfrelshikh	5560	3.172	1753
Qualiopia	8159	5.106	1598
Behira	8004	5.804	1379
Sohag	5344	4.603	1161
Suez	250	0.622	402
Total	**317,181**	**86.342**	**3,674**

*Three Regions evaluated in depth

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Table 2: Distribution of Human Resources by Cadre in 3 Regions

Cadre	**Government Hospital N=5**		**University Hospitals N=2**		**Private Hospitals (N=16)**	
	No.	**No./unit**	No.	**No./unit**	No.	**No./unit**
Total Ophthalmologists	69	**13.8**	56	**28.0**	168	**10.5**
Ophthalmologists doing cataract operations	45	**9.0**	55	**27.5**	126	**7.9**
Anesthesiologists	7	**1.4**	5	**2.5**	22	**1.4**
Operating Theatre nurses	23	**4.6**	17	**8.5**	54	**3.4**
General nurses	54	**10.8**	24	**12.0**	107	**6.7**
Administrative staff	82	**16.4**	54	**27.0**	258	**16.1**
Maintenance Technicians	4	**0.8**	2	**1.0**	20	**1.2**

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Table 3: Distribution of equipment by type of eye care unit

Equipment	Number / govern. unit	Number / university unit	Number / private unit
Number of beds	6.6	10.0	4.9
Clinic Equipment			
Slit lamp	3.0	5.7	2.7
Tonometer	1.4	2.0	2.0
Direct Ophthalmoscope	2.2	3.5	2.0
Indirect Ophthalmoscope	1.6	3.5	2.0
Trial lens set	3.0	4.5	2.6
Auto refractor	1.4	2.5	1.6
A scan	0.8	1.0	1.1
Keratometer	0.8	1.0	1.1
Operating Theater Equipment			
Operating Theatre	2.2	5.5	2.7
Operating Microscope	2.0	4.0	3.0
Operating table	2.4	5.5	3.0
Cataract surgical set	4.8	13.0	9.1
Phaco machine	0.8	3.0	2.4
Vitrectomy machine	0.4	2.0	1.4

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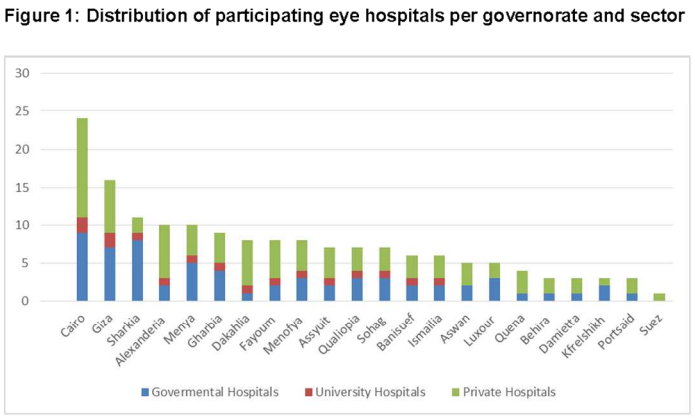

Figure 1: Distribution of participating eye hospitals per governorate and sector

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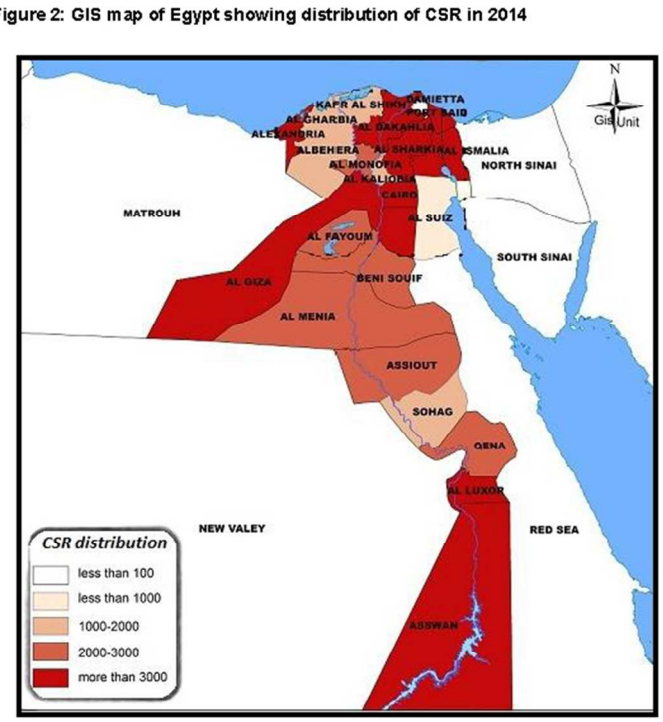

Figure 2: GIS map of Egypt showing distribution of CSR in 2014

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Figure 3: CSR in the Three Regions 2010-2014

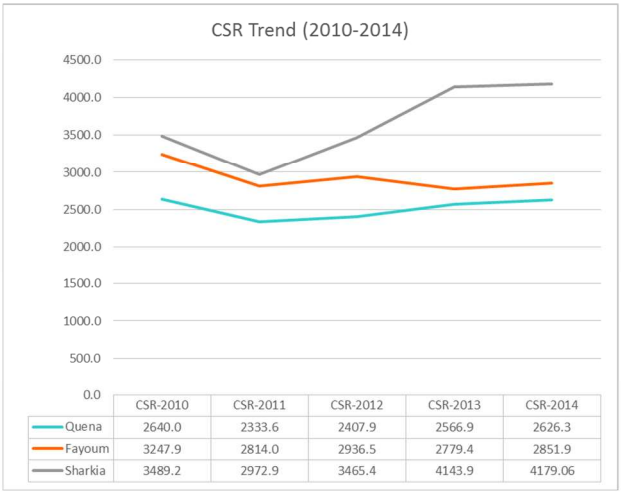

Figure 3: CSR in three regions 2010-2014

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Figure 4: Turnaround time and Cataract surgical time in the government, university, and private hospitals.

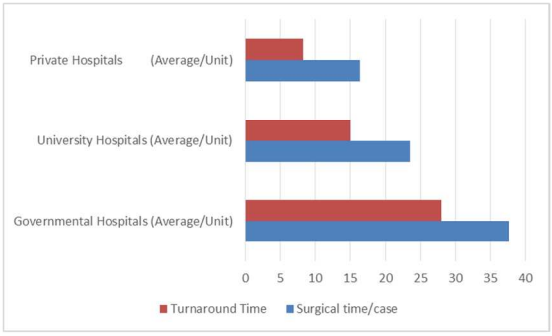

Figure 4: Turnaround time and Cataract surgical rate in the government, university and private hospitals

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