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Features of the Quality of Life of Patients with Cateract before and After Surgical Treatment

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ABSTRACT

Cataract is a major eye disease in Bangladesh as well as many countries in the world. Each and every year many patients suffer from cateract. Age-related cataract is a major cause of blindness and visual morbidity worldwide. It is therefore important to establish the optimal technique of lens removal in cataract surgery. In Bangladesh, eye care services are provided in hospital based clinical services, which are usually based in urban areas, usually without outreach facilities, surgical eye camps and, more recently, comprehensive eye care, which links activities in the community with primary eye care and tertiary services. Surgical eye camps have been popular because the services are usually provided free. However, the present study has conducted to compare outcomes of phacoemulsification [Phaco] with manual small incision cataract surgery (MSICS) for age-related cataract, to assess intraoperative and postoperative complications related to these 2 types of cataract surgery and to compare the financial cost between two types of cataract surgery. The study was survey type. The study was conducted in the area of Dhaka city. The study was conducted at National Institute of Ophthalmology Hospital Dhaka. Data were collected from primary and secondary sources. Primary data were collected from the patients of the study and secondary data were collected from books, research reports, journals, internet, websites etc. Purposive sampling method was used for the study. One hundred respondents of Manual Small Incision Cataract Surgery were selected and 100 respondents of Phacoemulsification were selected. So, total 200 respondents were selected for the study. Questionnaire and request letters were used for data collection. Data were collected by face to face interview with the patients.From the study it can be concluded that Phacoemulcification is better than MSICS. In case of Phacoemulcification visual acuity is more, less complications occur during operation and after operation in Phacoemulcification but more complications occur during operation and after operation in MSICS, few pain occur in Phacoemulcification but much pain occur in MSICS, less time is required in Phacoemulcification but more time is required in MSICS, patients had to stay few days in hospital after operation in Phacoemulcification but patients had to stay more days in hospital after operation. In Phacoemulcification cost is more but cost is less in MSICS. Regarding complications less in Phaco than MSICS. For cataract treatment, latest cataract operation technology is practicing in Bangladesh. In this process latest technology is used for better result. Conventional treatment of cataract operation is time consuming and less effective. As a result, treatment failure is reported. In an attempt to fulfill the need for a reliable and quick treatment cataract operation was proposed.

Key words: *Cateract, Patients, Surgical Treatment, Phacoemulsification (Phaco), Small Incision Cataract Surgery (SICS), Manual Small Incision Cataract Surgery (MSICS), Cataract Surgery, Complications, Post operative Complications*

INTRODUCTION

Cataract is a major cause of curable blindness in the world. Cataract extraction is the most frequently performed surgical procedure in patients above 60 years of age. An estimated 670 million people, worldwide, are visually impaired - 39 million of which, are blind and 269 million have low vision. Cataract one of the most common eye diseases and leading cause of blindness worldwide, accounts for 50% of the global burden of blindness, representing more than 20 million people worldwide6. Subsequently cataract presents a significant public health challenge and is responsible for a visual acuity of 6/60 or worse in more than 100 million eyes. In most developing countries, blindness is associated with considerable economic and social implications which impacts on the current difficulties of vulnerable populations who reside in under-served areas. An estimated 90% of people who are affected with cataracts reside in developing countries, which have limited capacity, infrastructure and technology to care for the visually impaired. Moreover, these areas have limited eye care capabilities to cope with the high demand for cataract surgery. Thus, these

countries exhibit the largest backlog of cataract surgeries, most of which are intumescent, mature and hyper-mature lenses (white cataracts).

Eye care services in Bangladesh are provided by the government, local and international non-governmental organizations (NGO), and charitable organizations. The NGO sector has important funding, collaborative, and logistical roles with Bangladesh service providers. The 500 trained, qualified ophthalmologists of Bangladesh work in either the government or the private sector. Most are concentrated in the urban centers and few are trained in extracapsular cataract extraction and intraocular lens surgery. Eye camps (with principally intracapsular cataract surgery) used to be the main approach of the non-governmental organizations; however, more recently modular eye care programmes have been developed. These cataract outcomes in Bangladesh can be compared with the outcomes of cataract surgery in two other population based studies in the Indian subcontinent, Nepal and Rajasthan. It is interesting that the presenting visual outcomes in Bangladesh and Nepal are similar, whereas the proportion of poor outcome is greater in Rajasthan, which may be attributable to the smaller proportion of intraocular lens surgeries, presumably due to a predominance of eye camp surgeries in Rajasthan.

Cataracts are treatable through cataract surgery, the most common procedure performed in ophthalmology and supplemented with a pair of spectacles. Near normal vision can be restored through the surgical removal of the opacified lens, facilitated by the implantation of an intraocular lens (IOL). To overcome the burden of cataract blindness, there must be sufficient surgical coverage and good surgical outcomes viz. safety, early visual rehabilitation and postoperative emmetropia. In the 20th century Intracapsular Cataract Extraction (ICCE) was the main form of lens removal but this technique had numerous disadvantages when the patient used aphakic spectacles for optical correction, such as image magnification, restricted visual fields, poor co-ordination and physical discomfort. The method that was preferred in the 1980s was extracapsular cataract extraction ECCE. Phacoemulsification (Phaco) has emerged, in recent years, as the most popular procedure to treat cataracts in patients in the developing world. The reasons for this popularity is that Phaco is safe and gives better visual outcomes, such as early visual rehabilitation and emmetropia. However, several studies have shown that despite Phaco surgery being popular in developing countries, it is not suitable for developing countries that have a significant backlog of patients requiring surgery, as the technique is associated with high costs, including the cost of the Phaco machine, maintenance and upgrades of the machine and facilities, staff wages and the cost of consumables. Therefore the Phaco technique is often unaffordable to disadvantages individuals and communities.

Driven by the need for more cost effective options, an increasing trend in developing countries is the use of manual sutureless Small Incision Cataract Surgery (SICS), which some have claimed is comparable to Phaco in terms of obtaining excellent visual outcomes, is faster, less costly and has fewer complications. Furthermore, the higher cost of the Phaco machine and the disposable items needed for its functioning and its demand for more advanced surgical training, have to some degree, limited the use of this technique in most developing countries. It is therefore critical that SICS be evaluated as an alternative for developing countries such as in South Africa, and other African countries. But Phaco may be applicable to the people of developed countries and the people are willing to spend more money for treatment like Bangladesh. The present report evaluates these two techniques, Phaco and SICS using some questionnaire surveys.

OBJECTIVES OF THE STUDY

1. To compare outcomes of phacoemulsification [Phaco] with manual small incision cataract surgery (MSICS) for age-related cataract.
2. To assess intraoperative and postoperative complications related to these 2 types of cataract surgery.
3. To compare the financial cost between two types of cataract surgery.

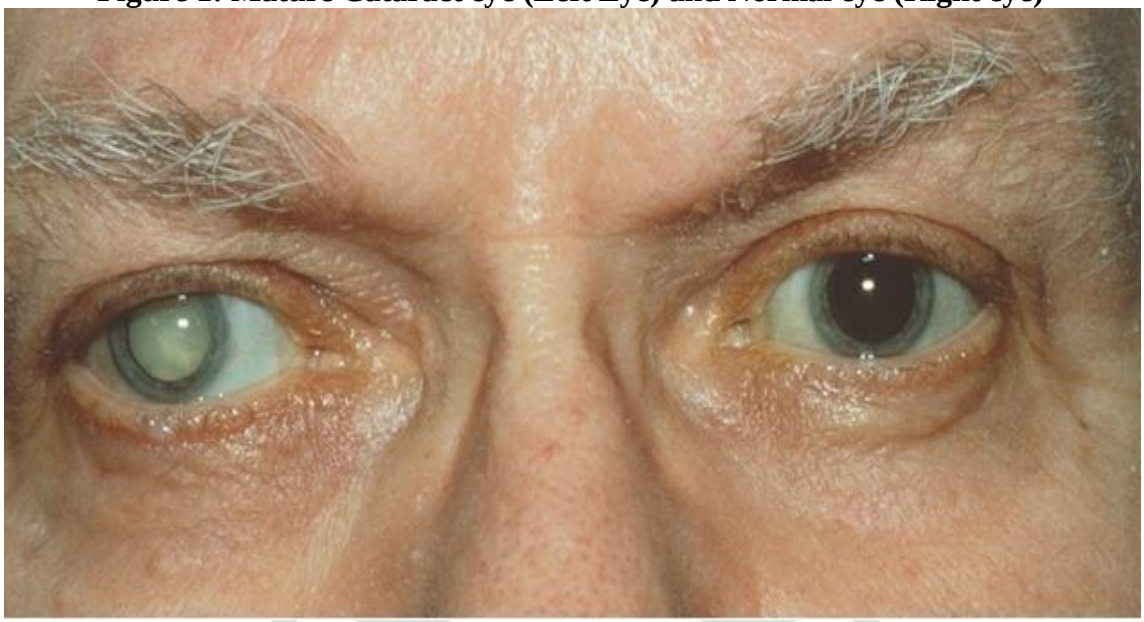
DEFINITION OF KEY TERMS

1. Cataract: Common eye disease, involves clouding of the eye lens. Cause of half of all blindness and one-third or all visual impairment worldwide. Cataract Leads to vision loss if untreated. It can occur in one eye or both eyes. It is not contagious.

2. Symptoms of Cataract: Blurry vision, difficulty seeing in dim light, seeing halos around lights, faded colors, discomfort in bright lights.

3. Predominant cause: Predominant cause aging; by the age of 80, half of all Americans had cataracts. Trauma, radiation exposure, eye surgery complications etc. Can be present from birth for some patients.

Figure 1: Mature Cataract eye (Left Eye) and Normal eye (Right eye)



4. Prognosis: Develop slowly over time. Do not disturb eyesight initially. Gradually interfere with vision, causing difficulty in driving, reading, recognizing faces.

5. Risk factors: Diabetes, tobacco, alcohol, directs sun exposure. Increases risk of falling and onset of depression.

6. Cataract Surgery: Cataract surgery is the removal of the natural lens of the eye (also called "crystalline lens") that has developed pacification, which is referred to as a cataract. Metabolic changes of the crystalline lens fibers over time lead to the development of the cataract and loss of transparency, causing impairment or loss of vision. Many patients' first symptoms are strong glare from lights and small light sources at night, along with reduced acuity at low light levels. During cataract surgery, a patient's cloudy natural cataract lens is removed and replaced with a synthetic lens to restore the lens's transparency. Cataract Surgery is simple, safe, fast surgery method.

7. Phacoemulsification (Phaco): The phacoemulsification procedure was first performed on the human eye by Charles Kelman in 1967. This was the beginning of Phaco to address problems associated with healing, inflammation, suture related problems and astigmatism. Phaco is a technique employed for the removal of cataracts using machine and micro-surgical instruments. The Phaco technique usually involves making a temporal 3.0 mm scleral tunnel incision and a separate clear corneal stab for the second instrument. A trypan blue-assisted, continuous curvilinear capsulorhexis is then created followed by hydro-dissection just below the anterior capsule rim. Phaco is usually performed using a phacoemulsification system in combination with a phaco-chop method. The tip of the instrument is introduced into the eye through the incision. The tip generates localized, high frequency waves that break up the cataract in small fragments/ pieces. These fragments/pieces are sucked out through the tip. After cleaning the opaque cataract, a thin shell is left behind and the capsular bag is filled with hydroxypropy. This procedure is followed by a lens implant into the capsular bag. The lens could be either folded or nonfoldable. If a folded lens is implanted, the 3 mm incision that was made does not need to be enlarged and a stitch is not required because the wound is self-sealing and watertight. However, the incision must be enlarged to 5.0 to 5.5 mm, when a fixed lens is inserted and a stitch is required.

8. Small Incision Cataract Surgery (SICS): SICS was developed in the United States and Israel and made popular in India, with the large proportion of surgeries undertaken. In this technique, extracapsular extraction is performed. The nucleus is prolapsed and removed through a 6 mm scleral tunnel and aspirates the remaining cortex. Venkatesh et al. (2010) report that a 6.5-7.0 mm superior frown-shaped sclero-corneal tunnel was constructed. Thereafter, a trypan blue-assisted capsulorhexis is created and the nucleus is prolapsed from the capsular bag with a Sinskey hook or by hydrodissection injection, followed by extraction using an irrigating vectis. A single-piece rigid IOL (poly methyl methacrylate) with a 6.0 mm optic is then

implanted in the capsular bag and the anterior chamber pressurized. The tunnel is self-sealing and the wound does not need sutures in most cases.

METHODOLOGY OF THE STUDY

The approach and strategy used to pursue a research depends upon the nature of the problem to be studied and research question to be answered. Previous studies in this field are mainly done as research evaluation conducted by the Results for development studies. To compare outcomes of phacoemulsification [Phaco] with manual small incision cataract surgery (MSICS) for age-related cataract at National Institute of Ophthalmology and Hospital, Dhaka, to assess intraoperative and postoperative complications related to these 2 types of cataract surgery at National Institute of Ophthalmology and Hospital, Dhaka.

And to compare the financial cost between two types of cataract surgery. In this regard industrial credit, credit risk management, non performing loans are given main focus. So the qualitative approach has been attempted to meet the objectives of the research. A combination of questionnaire survey, in-depth interview, expert opinion and case studies are used to collect first hand data and content analysis technique is applied to validate it. The purpose of using of different methods is that it minimizes the risk of biasness in the study and thus works as a reliable tool.

1. Research Method: Cresswell (2009) mentions three main approaches for conducting scientific research namely qualitative, quantitative and mixed approach. The study aims to describe the events and respondents perception scientifically. The researcher solely relies on the views of respondents of demand side and supply side as well as experts on this very topic under study. Quantitative approach suits the best to meet the objective of the study. Besides, some questionnaire survey using questionnaire was conducted to make efficient use of time. The research methodology of the study was explanatory in nature. In this research, both primary and secondary data were collected. Most of the data used in the present study have been collected from a recent survey on the different research reports. This survey was conducted in National Institute of Ophthalmology Hospital Dhaka, Bangladesh.

2. Study area: The study was conducted in the area of Dhaka city. The study was conducted at National Institute of Ophthalmology Hospital Dhaka.

3. Research Design: The choice of an appropriate research design is essential for a scientific study since it gives a framework of what the researcher will do from setting the research question to the operational implications of the data analysis. A research design is 'the arrangements of conditions form collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure' (Selltiz 1965 cited in Aminuzzaman 1991, p.53). To compare outcomes of phacoemulsification [Phaco] with manual small incision cataract surgery (MSICS) for age-related cataract at National Institute of Ophthalmology and Hospital, Dhaka, to assess intraoperative and postoperative complications related to these 2 types of cataract surgery at National Institute of Ophthalmology and Hospital, Dhaka. And to compare the financial cost between two types of cataract surgery. Hence descriptive and analytical research designs have been chosen. Because descriptive research design helps to describe the current practices and events while analytical research design enables to establish relationship between variables (Aminuzzaman 1991). Here the research design was survey type.

4. Source of Data: For this research two types of data are used-

1) Primary Sources
2) Secondary Sources

5. Primary Sources: Primary information was collected by the researcher / investigator himself through field operations. For having a sound conception of the secondary source was very helpful but this research had special attention on the data and information has been collected from primary sources. The most important data and information have been collected directly from the respondent's. Patient's satisfaction, surgery outcomes, average surgery duration, reported pain level, post-operative recovery time, costs through the structured questionnaire. In addition to this the observations during the field visit have been incorporated in this research.

6. Secondary Sources: To conduct this research, secondary data were also collected from various sources including authentic writings, books, thesis, articles, documents etc. of eminent authors, journals, statistical reviews, academic papers, government documents, newspapers, magazines, souvenirs, published and unpublished research works, internet homepages etc. relevant to the main theme of the study.

7. Survey Method: The study was survey type. Survey Method involves a systematic and comprehensive study of a specific community with a view to the analysis of social problem and presentation of recommendations for its solution. In this research, the tools used for the survey were questionnaire survey, interview schedule and observation.

8. Sampling Method: Basically, the study used purposive sampling method so as to get the best information to achieve the objectives of the study. This method gave flexibility to the researcher to pick up only people who are likely to have the required information and be willing to share it. Moreover, the sampling method helped to ensure representation of different variation of service providers as well as service seekers. In other words, heterogeneity in the composition of sample of service seekers and providers (age, sex, senior-junior officials, education, and profession) were attempted to maintain as possible. The present study involved Patient's satisfaction, surgery outcomes, average surgery duration, reported pain level, post-operative recovery time, costs were selected for interview. That means total number of respondents were 200. Each subject was approached individually to ensure the quality of data.

9. Sample size: One hundred respondents of Manual Small Incision Cataract Surgery were selected and 100 respondents of Phacoemulsification were selected. So, total 200 respondents were selected for the study.

10. Tools for data collection: Questionnaire and request letters were used for data collection.

11. Questionnaire: Questionnaire was the structured set of questions which were given to the respondent either directly by hand or by courier service, by post, or by mail. It can be described as a document that contains a set of questions, to which the answers are to be provided by the respondent. In this survey the questionnaire has been developed. It was both open and close ended with an aim of having the in-depth information of the target respondents. The questionnaire developed for the respondents of the study area. It is a straightforward question and answer method, but rather tried to collect data through informal discussion of several time by creating a report with the respondents so that the unhesitant could share with me.

12. In-depth Interview: Besides, gathering information from the respondents of 200 through structured questionnaire, in-depth interview technique had also been used to collect those kinds of information that could not be asked directly, such as Patient's satisfaction, surgery outcomes, average surgery duration, reported pain level, post-operative recovery time, costs their views/opinions about cataract surgery.

13. Distribution of Study Population: Study population has been selected from institutions side. The numbers of respondents were from National Institute of Ophthalmology Hospital Dhaka.

14. Data Collection Technique: A brief description of the data collection techniques used in the study is detailed here. Data were collected by face to face interview with the respondents.

15. Questionnaire Survey: For unique and exploratory research new information are required. Questionnaire survey is the easiest and most widely used instrument for data collection in this regard. This method allows the researcher to come in direct contact with the respondents, to observe their attitude during answering time and to analyze the issue under study in ordinary setting. Thesis Supervisor provided precious suggestions and corrections to make the questionnaire precise enough to meet the objectives of the study without exaggeration. Besides, comments and advice from other faculties and fellow participants during chapter defense had great support to frame up the questionnaire. The researcher went locally and had direct interaction with the respondents. The purpose and objectives of the study were explained to the respondents as simply as possible allocating sufficient time so that they swallow up the idea and can come back with spontaneous thoughts. Thus questionnaires were filled up to avoid unwarranted biasness.

16. Data Processing and Analysis: In qualitative study the researcher has the freedom to marshal gathered data to meet the desired objectives of the study (Creswell 2009). Partial data of questionnaire survey were processed using simple mathematics. The rest of the data were explained carefully to meet the aim of the

study and research question and also attempted to establish relation among the variables. Some important and strong statements were referred in the analysis part to add value to the findings. Endeavor was made firstly to unleash the potential of how recent Doctors do cataract surgery to mitigate the pains and cost of the patients. To compare outcomes of phacoemulsification [Phaco] with manual small incision cataract surgery (MSICS) for age-related cataract at National Institute of Ophthalmology and Hospital, Dhaka, to assess intraoperative and postoperative complications related to these 2 types of cataract surgery at National Institute of Ophthalmology and Hospital, Dhaka. And to compare the financial cost between two types of cataract surgery. Secondly to detect the challenges, prospects and finally to put some light on to overcome the barriers. Computer Program Microsoft Excel was used for data analysis.

17. Data Validation: Validity refers to trustworthiness which is done through cross checking the data collected from one source to that of others. If themes are established based on converging several sources of data or perspectives from participants, then this process can be claimed as adding to the validity of the study (Creswell 2009, p.191). In this study data were triangulated during survey and interview and latter justified with secondary data.

RESULTS AND DISCUSSION

Table 1: Sex of the respondent

Sex	Percent
Male	62.5%
Female	37.5%
Total	100.0%

From the result it was found that 62.5% respondents were male and 37.5 and respondents were female.

Table 2: Age of the respondents

Age group	Percent
40-49 Years	8.8%
50-59 Years	36.2%
60-69 Years	37.5%
70-79 Years	13.8%
80 Years and Above	3.8%
Total	100.0%

From the result it was found that age group 60-69 years were 37.5% which was maximum and age group 80 years and above was 3.8% which was minimum. On the other hand 8.8% respondents were age group 40-49 Years, 36.2% respondents were age group 50-59 Years and 13.8% respondents were age group 70-79 Years.

Table 3: Profession of the Respondents

Name of Profession	Percent
Business	11.0%
Engineer	5.0%
Private Service	10.0%
Govt. Service	12.0%
House wife	19.0%
Rickshaw Puller	3.0%
Farmer	27.5%
Teaching	12.5%
Total	100.0%

The result revealed that 27.5% respondents were farmers which were maximum and 3.0% respondents were Rickshaw Puller which was minimum. On the other hand 11.0% respondents were businessmen, 5% respondents were Engineer, 10.0% respondents were Private Service holders, 12.0% respondents were Govt. Service holders, 19.0% respondents were House wife, 12.5% respondents were teacher.

Table 4: Visual acuity

Vision	Phacoemulcification		MSICS	
	Before Operation	After Operation	Before Operation	After Operation
6/6		90%		82%
6/12	41%	5%	38%	8%
6/18	59%	5%	62%	10%
Total	100%	100%	100%	100%

The result revealed that in 90% respondents get 6/6 visual acuity in Phacoemulcification but 42% respondents get 6/6 visual acuity in MSICS. in case of Phacoemulcification 5% respondents get 6/12 visual acuity but in case of MSICS 38% respondents get 6/12 visual acuity and 5% respondents get 6/18 visual acuity in case of Phacoemulcification and 20% respondents get 6/18 visual acuity in case of MSICS.

Table 5: Intra-Operative Complications

Complications	Phacoemulcification	MSICS
No complication	95%	70%
Hyphema	2%	12%
Posterior lens capsule tear	2%	11%
Vitrious loss	1%	7%
Total	100%	100%

From the result it was found that 95% respondents replied that no complication occur in Phacoemulcification but 70% respondents replied that no complication occur in MSICS, 2% respondents

replied that Hyphema occur in Phacoemulcification but 12% respondents replied that Hyphema occur in MSICS, 2% respondents replied that Posterior lens capsule tear occur in Phacoemulcification but 12% respondents replied that Posterior lens capsule tear occur in MSICS and 1 % respondents replied that Vitrious loss occur in Phacoemulcification and 7% respondents replied that Vitrious loss occur in MSICS.

Table 6: Post operative Complications

Complications	Phacoemulcification	MSICS
No complication	94%	68%
Corneal edema	2%	17%
Hyphema	3%	10%
Anterior uveitis	1%	5%
Total	100%	100%

From the result it was found that 94% respondents replied that no complication occur in Phacoemulcification but 68% respondents replied that no complication occur in MSICS, 2% respondents replied that Corneal edema occur in Phacoemulcification but 17% respondents replied that Corneal edema occur in MSICS, 3% respondents replied that Hyphema in Phacoemulcification but 10% respondents replied that Hyphema occur in MSICS and 1 % respondents replied that Anterior uveitis in Phacoemulcification and 5% respondents replied that Anterior uveitis occur in MSICS.

Table 7: Time required for completing operation

Time	Phacoemulcification	MSICS
15 minutes	46%	
20 minutes	54%	
35 minutes		17%
40 minuets		33%
45 minutes		50%
Total	100%	100%

From the result it was found that 46% respondents replied that 15 minutes required completing Phacoemulcification operation but 54%respondents replied that 20 minutes required completing Phacoemulcification operation. In case of MSICs operation 17% respondents replied that they required 35 minutes to complete their operation, 33% respondents replied that they required 40 minutes to complete their operation and 50% respondents replied that they required 45 minutes to complete their operation.

Table 8: Staying time in Hospital after operation

Days required	Phacoemulcification	MSICS
2 days	57%	
3 days	43%	
5 days		13%
6 days		44%
7 days		43%
Total	100%	100%

From the result it was found that in Phacoemulcification operation 57% respondents replied that they stayed 2 days in Hospital after operation but 43%respondents replied that they stayed 3 days in Hospital after operation. In case of MSICs operation 13% respondents replied that they stayed 5 days in Hospital after operation, 44% respondents replied that they stayed 5 days in Hospital after operation and 43% respondents replied that they stayed 5 days in Hospital after operation.

Table 9: Cost comparison (in taka)

Complications	Phacoemulcification	MSICS
Anesthetics	100	500
Viscoelastics and other materials	120	240
Disposables	1500	1000
Intraocular lens	2500	1000

Total	4220	2740

From the result it was revealed that cost requirement is more in case of Phacoemulcification in comparison to MSICS.

CONCLUSION AND RECOMMENDATIONS

In developing countries with limited health resources and large populations, such as Bangladesh, cataract extraction should comprise of the following features: cheap and affordable, early rehabilitation to avoid economic loss, near emmetropic visual status postoperatively, minimal complications, minimal wound suturing (Malik *et al*., 2002), faster with increased surgical coverage and safe and effective. Phaco has all the above features except an increase in surgical coverage, but all these merits are available with SICS in settings where it has been widely used. Phaco is costly with its preand post-operative medicines, anesthetic agents, viscoelastic materials, disposables, instrumentation and IOLs. It also has a steep learning curve which is also costly as illustrated above. The advantage that SICS has over Phaco is that it is faster and cost-effective especially for advanced white cataracts. Capital, maintenance and per-case disposable costs that are associated with Phaco are avoided with SICS. In a developing country, the importance of surgical speed and efficiency are crucial as there is a shortage of human resources for eye surgeries (ophthalmic surgeons). It is crucial, therefore, to institute a surgical technique that is capable of serving the majority of those disadvantaged in developing countries. In order to cut the costs associated with Phaco and increase efficiency, the alternative is SICS given the relatively similar post-surgical outcomes.

It should be noted that the above recommendations emanating from the meta-analysis are in contrast to that of Cook et al. (2011). Although these authors are aware that scleral tunnel extracapsular surgery has been recommended as an alternative in middle and low income countries, they advocate a transition to Phaco. They did find that uncorrected and corrected VA to be better in Phaco and less astigmatism in Phaco treated patients at 8 weeks which may have been the basis for their conclusion. However, their study was based on a non-expertise design which may be a limitation as compared to the prospective randomized, expertise designs of the comparative studies on Phaco vs. SICS. They however draw their conclusions from their experience in cataract programs via the Christian Blind Mission's (CBM). As Cook (2011) stated in his presentation: "The transition to phacoemulsification cataract surgery is a logical transition that is taking place within CBM supported programmes" where ophthalmologist are "keen to do phacoemulsification", "numbers justify added capital expense, "a proportion of eyes are suitable for phacoemulsification", "addition costs for instruments and consumables can be accommodated in the project budget and "where training of ophthalmologists could be prioritized for the transition (2011)." The study by Venkatesh et al. (2005: 1083) indicates clearly that high quality; high volume SICS "can be attained in a high volume setting" using "standardized protocols, standardized training of surgeons and paramedical personnel, and an overall organizational structure that supports high volume patient flow".

From the study it can be concluded that Phacoemulcification is better than MSICS. In case of Phacoemulcification visual acuity is more, less complications occur during operation and after operation in Phacoemulcification but more complications occur during operation and after operation in MSICS, few pain occur in Phacoemulcification but much pain occur in MSICS, less time is required in Phacoemulcification but more time is required in MSICS, patients had to stay few days in hospital after operation in Phacoemulcification but patients had to stay more days in hospital after operation. In Phacoemulcification cost is more but cost is less in MSICS. Regarding complications less in Phaco than MSICS.

REFERENCES

1. Ahmad I, Wahab A, Sajjad S, and Untoo R.A. Visual Rehabilitation Following Manual Small Incision Cataract Surgery. *JK Science*.2005; 7 (3) July-September 2005.
2. Albert DM, Edwards DD. (1996). Ophthalmology before Hippocrates, In: The History of Allen D and Vasavada A. Cataract and surgery for cataract. *BMJ*. 2006; 333(7559):128-132. 19. Jha KN and Brig DP. Manual Small Incision Cataract Surgery: Experience at a Military Hospital, *MJAFI*. 2006; 62(3):212-215.
3. Ament C. S., Henderson B.A., (2011). Optimizing resident education in cataract surgery. Curr. Opin. Ophthalmol. 22, 64-67.
4. Andersen Ry S. (1997). The eye and its diseases in Ancient Egypt. Acta Ophthalmol Scand 1997; 75:338-344.
5. Aruta A, Marenco M, Marinozzi S. (2009). History of cataract surgery. Med Secoli, 21(1):403-428.

6. Ascaso FJ, Bosch J. (2010). Uveitic secondary glaucoma: influence in James Joyce's (1882- 1941) last works. J Med Biog, 18(1):57-60.
7. Ascaso FJ, Lizana J, Cristóbal JA. (2009). Cataract surgery in ancient Egypt. J Cataract Refract Surg, 35(3):607-608.
8. Astbury, N. (2009). Converting from ECCE to SICS. *Community Eye Health Journal*, 22 (69):6-7.
9. Bernscherer G. (2001). Selection from the history of cataract surgery from 2640 B.C. to 1750 A.D. Orv Hetil, 142(30):1623-1625.
10. Bieganowski L. (2003). Ophthalmology in the ancient river cultures. Was cataract surgery
11. Birinci H., Kuruoglu S., Oge I., Oge F., Acar E., (1999). Effect of intraocular lens and anterior capsule opening type on posterior capsule opacification. J. Cataract Refract. Surg. 25, 1140-1146.
12. Bourne RR, Minassian DC, Dart JK, Rosen P, Kaushal S, Wingate N. Effect of cataract surgery on the corneal endothelium: modern phacoemulsification compared with extracapsular cataract surgery. *Ophthalmology*. 2004; 111:679–85.
13. De Oliveira DF, Lira RPC, Lupinacci APC, Paccola M, and Arieta CEL, Cataract Surgery Complications as a Cause of Visual Impairment in a Population Aged 50 and Over. *Cad. Saude Publica*, Rio de Jeneiro. 2008; 24(10): 2440-2444.
14. Dewey S., Beiko G., Braga-Mele R., Nixon D.R., Raviv T., Rosenthal K., ASCRS Cataract Clinical Committee, Instrumentation and IOLs Subcommittee, 2014. Microincisions in cataract surgery. J. Cataract Refract. Surg. 40, 1549-1557. Division of Gryphon Editions, New York.
15. Floyd RP. (1994). History of cataract surgery. In: Principles and practice of Ophthalmology. Vol. I, Albert DM, Jakobiec FA. pp. 606-608. W.B. Saunders Company. Philadelphia.
16. George R, Rupauliha P, Sripriya AV, Rajesh PS, Vahan PV, Praveen S. Comparison of Endothelial Cell Loss and Surgically Induced Astigmatism following Conventional Extracapsular Cataract Surgery, Manual Small Incision Surgery and Phacoemulsification.
17. Gogate P**,** Deshpande M, and Nirmalan PK. Why Do Phacoemulsification? Manual Small-Incision Cataract Surgery Is Almost as Effective, but Less Expensive, *Ophthalmology*. 2007; 114: 965-968.
18. Gogate P, Deshpande M, Wormald R, Deshpande R, and Kulkarni S. Extra capsular cataract surgery compared with manual small incision cataract surgery in community eye setting in western India: a randomized control trial. *Br.J Ophthalmology*. 2003; 87(6): 667-672.
19. Gogate P, Kulkarni S, Krishnaiah S, Deshpande R, Joshi S, Palimkar A, et al. Safety and efficacy of phacoemulsification compared with manual small incision cataract surgery by a randomized control trial: Six weeks results. *Ophthalmology*. 2005; 112:869–74.
20. Gogate P. Comparison of various techniques for cataract surgery, their efficacy, safety and cost. *Oman Journal of Ophthalmology*. 2010; 3(3):105-106.
21. Gogate PM, Kulkarni SR, Krishnaiah S, Deshpande RD, Joshi SA, Palimkar A, and Deshpande MD. Safety and Efficacy of Phacoemulsification with Manual Small-Incision Cataract Surgery by a Randomized Controlled Clinical Trial. *Ophthalmology*. 2005; 112(5): 869-874.
22. Guzek JP and Ching A. Small incision manual extracapsular cataract surgery in Ghana, West Africa. *J Cataract Refract Surgery*. 2003; 29(1): 57-64.
23. Hashimoto C., Kurosaka D., Uetsuki Y., (2001). Teaching continuous curvilinear capsulorhexis using a postmortem pig eye with simulated cataract. J. Cataract Refract. Surg. 27, 814-816.
24. Hazra S., Palui H., Vemuganti G.K., (2012). Comparison of design of intraocular lens versus the material for PCO prevention. Int. J. Ophthalmol. 5, 59-63.
25. Henderson B.A., Grimes K.J., Fintelmann R.E., Oetting T.A., (2009). Stepwise approach to establishing an ophthalmology wet laboratory. J. Cataract Refract. Surg. 35, 1121-1128.
26. Hennig A, Singh S, Winter I and Yorston D. Can phaco be a cost-effective solution to cataract blindness? Costs and outcomes in Nepal. *Eye*. 2010; 24 (6): 1104.
27. Hennig A. Sutureless Non-phaco Cataract Surgery: A Solution to Reduce Worldwide Cataract Blindness? *Community Eye Health*. 2003;16 (48): 49-51.
28. Hepsen IF, Cekic O, Bay Ramlar H, Totan Y. Small incision extra capsular cataract surgery with manual phacotrisection. *J Cataract Refract Surgery*. 2000; 26(7): 1048-51.
29. Karimurio J, Sheila M, Gichangi M, Adala H, Huguet P. Rapid assessment of cataract surgical services in Embu district, Kenya. East African Journal of Ophthalmology. 2007.
30. Komolafe OO, Ashaye AO, Ajayi BGK and Bekibele CO. Visual Impairment from Age-Related Cataract among an Indigenous African Population. *Eye*. 2010; 24: 53-58.