

RELIABILITY OF “OBJECTIVE STRUCTURED ASSESSMENT OF CATARACT SURGICAL SKILL (OSACSS)”

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ABSTRACT

Objective: To estimate the reliability of Objective Structured Assessment of Cataract Surgical Skill (OSACSS)

Study Design: Co-relational reliability.

Place and Duration of Study: Department of Ophthalmology, Lahore General Hospital (LGH) 1st Nov 2015 to 30th Jan 2016.

Material and Methods: Eleven operations performed by trainees and surgeons were recorded. Three raters/observers (including one very experienced, one having comparatively less experience and one novice) observed the recordings and rated on the Objective Structured Assessment of Cataract Surgical Skill (OSACSS) checklist. The same checklist was filled three weeks later by each observer. Inter and intra rater reliability was assessed.

Results: Inter rater reliability (Cronbach's Alpha) was 0.681 (Questionable) in the first test and 0.878 (Good) in the retest. Intrarater reliability (Cronbach's Alpha) was 0.918 (Excellent) for the rater A, 0.844 (Good) for rater B and 0.662 (Questionable) for rater C.

Conclusion: Objective Structured Assessment of Cataract Surgical Skill (OSACSS) had excellent intra rater reliability in experienced hands and intra rater reliability decreases as the experience of the observer/rater decreases. Inter rater reliability increased in the retest indicating more experience of the observers/raters would make the instrument more reliable.

Keywords: Objective structured assessment of cataract surgical skill (OSACSS), Reliability.

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INTRODUCTION

Surgical skills are integral part of surgical training and practice. There is growing public awareness regarding quality of clinical procedures and surgical care being given to the patients. Previously assessment was largely subjective i.e. it was left to the discretion of the examiner. Now it is being standardized¹ i.e. it has pre established measures or standards and thus has more reliability. Deficiencies in training can only be detected if assessment is objective. Workplace based assessment (WpBA) is gaining popularity as assessment is carried out on performances which are done at actual work place. WpBA include mini-clinical evaluation exercises, direct observation of procedural skills, objective structured assessment of technical skills, mini-PAT (mini-peer assessment tool) and case

based discussion. Objective structured clinical examination (OSCE) has gained popularity in clinical assessment. Objective structured assessment is also now being used in procedural skills² but is not yet a routine as far as surgical procedures are concerned. Availability of valid, reliable and acceptable instruments for assessment of each type of clinical and surgical procedure especially the commonly performed ones, would make discrimination between competent and incompetent trainees easy. For assessing the operative skills of general surgical trainees Objective Structured Assessment of Technical Skill (OSATS) was developed^{3,4}. Policy makers in the diploma awarding institutions like College of Physicians and Surgeons Pakistan (having Faculties of Surgery and surgical allied specialties e.g. ophthalmology, gynaecology etc.) and universities awarding Masters in Surgery (MS) etc would also like to adopt instruments to gauge the surgical skills of the trainees/candidates appearing in final summative

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examination who are given the license to operate independently.

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required to clear at various levels of training. One of OSATS (Surgical Skills SS4) is concerned only with performance of cataract surgery. Objective assessment of skills in intraocular

Appendix-A: Objective Structured Assessment of Phacoemulsification Skill (OSAPS).

	Not Performed	Poorly Performed		Performed with some errors / hesitation		Performed well with Non hesitation
Draping: Surgical field clear of lashes	0	1	2	3	4	5
Incision and paracentesis: Formation and technique	0	1	2	3	4	5
Viscoelastic: Appropriate use and safe insertion	0	1	2	3	4	5
Capsulorrhexis: Commencement of flap	0	1	2	3	4	5
Capsulorrhexis: Formation and circular completion	0	1	2	3	4	5
Hydrodissection: Visible fluid wave & free nuclear rotation	0	1	2	3	4	5
Phacoemulsification probe and second instrument: Insertion into eye	0	1	2	3	4	5
Phacoemulsification probe and second instrument: Effective use and stability within the eye	0	1	2	3	4	5
Nucleus: Sculpting/ primary chop	0	1	2	3	4	5
Nucleus: Rotation & manipulation	0	1	2	3	4	5
Nucleus: Cracking / chopping with safe phacoemulsification of segments	0	1	2	3	4	5
Irrigation and aspiration technique with adequate removal of cortex	0	1	2	3	4	5
Lens insertion, rotation & final position of intraocular lens	0	1	2	3	4	5
Wound closure (suturing, hydration, & checking security)	0	1	2	3	4	5
Global indices wound neutrality, minimizing eye rolling and corneal distortion.	0	1	2	3	4	5
Eye positioned centrally within microscope view	0	1	2	3	4	5
Conjunctival and corneal tissue handling	0	1	2	3	4	5
Capsule: Protection of anterior and posterior capsules	0	1	2	3	4	5
Iris protection	0	1	2	3	4	5
Overall speed and fluidity of procedure	0	1	2	3	4	5

(FRCOphth), London, UK guidance for trainees undergoing ophthalmic specialist training includes yearly handbooks regarding (WpBA). It has a complete list of OSATS⁵ which trainees are

surgery (based on a software and computer database) has also been described^{6,7}.

OSATS developed for the assessment of cataract operation skills have been called

Objective Structured Assessment of Cataract Surgical Skill (OSACSS)⁸.

Cataract surgery is the most commonly performed in the world and phacoemulsification is the latest method of cataract surgery.

This study has been done to calculate reliability of OSACSS.

MATERIAL AND METHODS

It was co-relational reliability study. Institutional review board permission was sought

used (appendix A). Available trainees /surgeons (having variable experience in Phaco surgery) of LGH were assessed.

Delimitations Consisted

Trainees/surgeons of only LGH were studied to avoid any difficulties because of change in set up.

Patients who can create any difficulty e.g. those having head nodding, hard of hearing or having difficulty in understanding were excluded. Similarly all the eyes which could cause any potential problem e.g. hard cataracts,

Table-I: A,B, C are three raters and 1 is first time scoring and 2 is scoring after 2-3 weeks. 11 Cataract operations were done by surgeons having different experiences.

Op	A1	B1	C1	A2	B2	C2
1	56	24	56	52	46	61
2	30	21	43	40	35	41
3	53	74	53	59	63	62
4	45	18	30	46	33	43
5	59	51	50	61	66	56
6	54	68	58	57	56	52
7	59	71	58	55	65	56
8	58	51	54	59	63	56
9	62	54	58	59	50	54
10	57	59	53	59	56	60
11	53	51	19	51	53	50

Table-II: Inter-rater reliability of three observers rating trainees performing surgery in first test.

	Mean	Std. Deviation	N
Rater A	53.27	8.92	11
Rater B	49.27	19.94	11
Rater C	48.36	12.82	11
Inter-rater correlation (ICC)	.416	95% Confidence Interval	
		.042	.764
Cronbach's Alpha in first test (n of items = 3)	0.681		

before starting the study. Eleven operations were recorded. Ophthalmic surgeons/trainees of Lahore General Hospital (LGH) performed Phaco surgery. Camera on operating microscope was utilized for recording the cataract surgery and video recording was saved on CDs. Sampling strategy was non probability convenience sampling for quantitative data of OSAPS. For evaluation of phaco, OSACSS checklist⁸ has been

subluxated cataracts, were also excluded.

Data collection instrument was OSAPS (attached Appendix A). It was used to record the assessment of ophthalmic surgeons/trainees. It has a 14 task specific components checklist regarding phaco surgery and 6 global scores, each rated on a 5 point Likert scale with scores ranging from 0 (poor performance) to 5 (excellent performance). Construct validity of rating scale

has been ensured by a pair of experts. Maximum possible score is 100.

Three assessors filled the OSAPS independently without consulting each other for each recorded operation. A is eye surgeon having experience of more than 10 years of phaco surgery and has done more than 3000 phaco operations. B has done 1000 phaco operations and C has done less than 50 phaco operations independently. Assessors assessed recorded procedures initially (In table-I: marked as 1) and then again after three weeks (marked as 2). Data of OSAPS was statistically analyzed in SPSS

- Data will be kept by the principal researcher/first author for five years and then it would be destroyed.
- During data collection, data was kept confidential and not disclosed to anyone outside the project.

RESULTS

Eleven Cataract operations were done by trainees/surgeons having different experiences. Table-I shows the scores given by the three assessors. A, B, C are three raters and 1 is first time scoring and 2 is scoring after 3 weeks. Inter

Table-III: Inter-rater reliability of three observers rating trainees performing surgery in retest.

	Mean	Std. Deviation	N
Rater A	54.36	6.56	11
Rater B	53.27	11.46	11
Rater C	53.73	6.86	11
Inter-rater correlation (ICC)	.707	95% Confidence Interval	
		.396	.900
Cronbach's Alpha in first retest (n of items = 3)	0.878		

Table-IV: Intrarater reliability of rater A.

	Mean	Std. Deviation	N
Rater A Test	53.27	8.92	11
Rater A Retest	54.36	6.56	11
Intera-rater correlation (ICC)	.848	95% Confidence Interval	
		.531	.957
Cronbach's Alpha test-retest (n of items = 2)	.918		

version 20 to evaluate reliability of the instrument.

Ethical Issues Addressed Included

- Eye specialists/trainees who have done at least 20 phaco operations independently performed surgery.
- Informed written consent of the patients and operating doctors was taken prior to the surgery.
- Written permission was taken from the LGH institutional review board.
- Anonymity of trainees / surgeons was maintained and their identity was not disclosed to assessors.

rater reliability (Cronbach's Alpha) was (table-II) 0.681 (Questionable) in the first test and (table-III) 0.878 (Good) in the retest. Intrarater reliability between first assessment and second assessment (Cronbach's Alpha) was 0.918 (Excellent) for the rater A (table-IV), 0.844 (Good) for rater B (table-V) and 0.662 (Questionable) for rater C (table-VI).

DISCUSSION

Objective structured assessment tools have been employed in the modern cataract surgery procedure called Phacoemulsification (phaco)⁹ and strabismus surgery¹⁰. The evaluation tools have been used for the components of cataract operation (e.g. continuous curvilinear capsulorrhexis- CCC)¹¹. Phaco surgery on virtual

reality simulators has been observed to verify construct validity of OSACSS¹².

Regarding OSATS, trainees appreciate the positive aspects of e.g. feedback etc and have concerns regarding their negative aspects like being time consuming and stressful¹³ etc.

Three main categories included in assessment of technical and surgical skills are

All tools should have content validity, inter-rater reliability and construct validity. Data on feasibility, acceptability, and educational impact is also required. In most studies however these were not evaluated using an accepted scientific method.

In the present study the inter rater reliability in the first assessment was not good but it improved in the retest. It may be because this was

Table-V: Intrarater reliability of rater B.

	Mean	SD	N
Rater B Test	49.27	19.94	11
Rater B Retest	53.27	11.46	11
Intera-rater correlation (ICC)	.730	95% Confidence Interval	
		.266	
Cronbach's Alpha test-retest (n of items = 2)	.844		

Table-VI: Intrarater reliability of rater C.

	Mean	SD	N
Rater C Test	48.36	12.82	11
Rater C Retest	53.73	6.86	11
Intera-rater correlation (ICC)	.494	95% Confidence Interval	
		-.114	
Cronbach's Alpha test-retest (n of items = 2)	.662		.833

Table-VII: Intrarater reliability interpretation of cronbach's alpha.

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

global assessment scales evaluating generic skills, task-specific assessing procedure-specific skills, and combinations of tools evaluating both generic and task-specific skills^{14,15}.

Routine use of such instruments also makes trainees aware of the detailed steps of the operations. This makes not only the feedback structured and predictable but also the trainees can have a self analysis¹⁶ whether they have achieved the required competence or not.

the first time observers were engaged in such type of study. Perhaps more training of the observers/raters before starting the study would have improved the results even in the first assessment as happened in the retest.

Intrarater reliability decreased with the decreasing experience of the observer. It means that with experience reliability is more. Perhaps adding more information to the checklist would make it self explanatory and then even the novice would also be able to make a reliable assessment.

Further studies are thus required to make the instrument more reliable in the in experienced hands. Interest was also found to be variable among the raters. One cataract operation takes about 15 minutes in the experienced hands and may take 45 minutes when a beginner is doing the surgery. Assessment and reassessment takes several hours and thus a lot of motivation is required to observe the procedures closely. It indicates that if OSACSS is introduced in any assessment, observers should be experienced and their reliability should be checked on constant basis to detect lack of interest at any time.

Various limitations of the study have been recognized. Firstly assessors did not have an identical point of view regarding different steps of operation. Though cataract of moderate difficulty was selected for all participants, it was not possible to provide identical cases as far as cataract density is concerned. Even patients differed as some were difficult to operate and others were easy to handle. After reviewing the videos a few points were appreciated. It was noted that junior colleagues were at a disadvantage in some aspects. They received blunt knife (sometimes blades are autoclaved and reused for lack of resources) which influenced the incision making. Similarly juniors may get junior operation assistants that affect their overall performance. Pupil was not fully dilated in their cases. All the above mentioned factors require a decision whether bad performance should be attributed to the surgeon or not. Thus different decisions may have decreased the inter rater reliability. All of these factors can be eliminated by educating the observers before the study which was not done in the present study.

CONCLUSION

Objective Structured Assessment of Cataract Surgical Skill (OSACSS) had excellent intra rater reliability in experienced hands and intra rater reliability decreases as the experience of the

observer/rater decreases. Inter rater reliability increased in the retest indicating more experience of the observers/raters would make the instrument more reliable.

AUTHORS CONTRIBUTION

Both authors are fully involved in data acquisition, analysis and article writing.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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