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ORIGINAL RESEARCH

Ophthalmologists' Perspectives on Immediate Sequential Bilateral Cataract Surgery (ISBCS): Attitudes, Practices, and Barriers in a Rapidly Growing Arab Economy

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Purpose: To our knowledge, there is very little research on "Immediate Sequential Bilateral Cataract Surgery" (ISBCS) among ophthalmologists in the Arab countries. This study aimed to assess the attitudes, practices, and barriers related to ISBCS among board-certified ophthalmologists in a fast-growing Arab economy.

Methods: A cross-sectional study was conducted using a validated electronic questionnaire distributed to ophthalmologists practicing cataract and intraocular lens (IOL) surgery in Saudi Arabia. The survey was open from September 22 to October 21, 2024. The questionnaire included 25 specific questions divided into four domains: benefits and importance, controlling factors, surgeons' perspectives and selectivity, and reasons for adopting or rejecting ISBCS. Responses were collected via email, WhatsApp, and LinkedIn and analyzed based on the questionnaire planned structure. Descriptive statistics were used for analysis.

Results: A total of 95 ophthalmologists participated, 73 (76.8%) male and 22 (23.2%) female. The majority (60%) had been practicing for more than 10 years, and 69.5% worked in government hospitals. The ISBCS was actively practiced by 17.9%, while 76.8% had never performed ISBCS, and 5.3% had previously practiced but discontinued. The main benefits of ISBCS reported included fewer hospital visits, faster visual rehabilitation, and reduced costs. The primary barriers were concerns about bilateral endophthalmitis, medico-legal risks, and refractive surprises. Some non-practicing ophthalmologists expressed willingness to adopt ISBCS under specific conditions, such as cases requiring general anesthesia or congenital cataracts.

Conclusion: ISBCS remains underutilized among ophthalmologists in Saudi Arabia due to safety concerns and institutional policies. However, many practitioners recognize its potential benefits and may consider its adoption under specific conditions. Further research is needed to evaluate clinical outcomes, patient perspectives, patient satisfaction, opportunity cost, and cost-effectiveness to facilitate broader acceptance of ISBCS in this region.

Keywords: cataract surgery, ISBCS, ophthalmologists' attitude, Saudi Arabia

Introduction

The common practice for patients with bilateral cataracts is to undergo cataract surgery in each eye on different days. This approach is referred to as "Delayed Sequential Bilateral Cataract Surgery" (DSBCS). Alternatively, there is another approach where both eyes can be operated on the same day but as two separate procedures. This method is referred to as Immediate sequential bilateral cataract surgery (ISBCS).[1]

Several studies have explored ophthalmologists' views and practices on ISBCS.[2–4] In the Netherlands, 27.3% of surveyed ophthalmologists performed ISBCS, higher than the 13.9% reported in the UK but lower than the 67.2% found in a broader European survey.[2–4] In 2009, 10% of the European Society of Cataract and Refractive Surgeons (ESCRS) members who responded to the survey reported that they were performing ISBCS.[5] Finland leads in ISBCS adoption,

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with 40–60% of cataract patients undergoing the procedure, while Spain's Canary Islands perform ISBCS for 80% of cases, supported by government approval confirming its safety and effectiveness.[6,7]

According to a Dutch survey, 47.6% of the ophthalmologists were willing to perform ISBCS in the future, citing benefits such as fewer hospital visits, reduced anisometropia, consistent postoperative medication schedules, and the availability of separate tools for each eye. However, concerns about endophthalmitis, legal risks, and unexpected refractive outcomes were key barriers to the procedure's surgical uptake.[4] The UK survey found that ophthalmologists mainly offered ISBCS to save time for patients and clinics, with better visual outcomes as the second key factor. However, 31.4% refused to perform ISBCS, citing concerns about complications such as endophthalmitis and cystoid macular edema, risks of incorrect IOL power, and potential legal issues.[3]

The European survey identified several key factors that ophthalmologists consider when contemplating ISBCS.[2] These factors include the requirement for the surgeon and scrub nurse to scrub, re-gown, and re-glove before performing the surgery on the second eye. Additionally, it is important that the patient and their eyes do not have any additional risk factors for endophthalmitis, and the operating facilities should have a good track record in terms of infection control. On the other hand, the survey also highlighted the main reasons why some ophthalmologists choose not to perform ISBCS. These rejection reasons include the perceived risk of endophthalmitis, concerns about potential medico-legal issues if something goes wrong during the procedure, and the risk of incorrect calculation of intraocular lens power.[2]

Today, ISBCS is commonly performed and increasingly accepted in countries like Australia, Austria, Canada, China, Finland, the UK, Iran, Israel, Japan, Turkey, South Africa, Spain, Sweden, Poland, and, to a lesser degree, the United States.[8] As the global interest in ISBCS grows, it is crucial to understand ophthalmologists' views on its benefits—like improved efficiency and patient convenience—and challenges, such as clinical risks and legal concerns. These insights can guide future strategies for better cataract care.

Cataracts are the leading cause of visual impairment in older adults in Saudi Arabia, with an estimated prevalence of approximately 25% among individuals aged 60 and above.[9] Furthermore, the COVID-19 pandemic caused a marked decline in cataract surgical volume, with a tertiary referral center in Riyadh reporting an over 45% drop in monthly cataract operations compared to pre-pandemic levels, leading to a substantial backlog of cases.[10] This accumulated backlog compromises timely access to care and amplifies the need for more efficient surgical models such as ISBCS.

To our knowledge, there is very little specific research on ISBCS among ophthalmologists in the Arab countries, and our study may be the first to explore this topic in the region. While insights from studies in other parts of the world can be helpful, this research aims to measure the level of support for ISBCS among participants and identify the barriers to its implementation, such as safety concerns, logistical challenges, or cultural factors. In addition to clinical and institutional barriers, the medico-legal environment in Saudi Arabia plays a key role in limiting ISBCS adoption. Currently, there are no national regulations or official guidelines addressing ISBCS. Malpractice cases, including those involving eye surgery complications, fall under the jurisdiction of the Medical Violation Committee within the Ministry of Health and are adjudicated according to Sharia-based legal principles.[11] Without defined legal protections for bilateral procedures, ophthalmologists may face personal liability in the event of adverse outcomes, which contributes to widespread hesitancy despite the procedure's global safety profile. By doing so, we aim to provide valuable information that can help optimize cataract management and improve patient care in this region.

Methods

The current study adopts a cross-sectional design, utilizing a validated electronic questionnaire which was distributed to board-certified practicing ophthalmologists in Saudi Arabia. The questionnaire comprised 25 specific questions assessing the practice of ISBCS among certified eye surgeons. (Appendix 1) To ensure a structured assessment, the questionnaire was categorized into four main domains: benefits and importance, controlling factors, surgeons' perspectives and selectivity, and assessing the main reasons for adopting or rejecting ISBCS.

Demographic and clinical indicators were incorporated into the questionnaire to comprehensively analyze the attitudes, beliefs, and barriers toward ISBCS and correlate them with surgeons' characteristics. The survey was designed, packaged, and disseminated as a web-based questionnaire using Google Forms. Invitations were sent to ophthalmologists

via email, WhatsApp, and LinkedIn to maximize participation. The snowball technique encouraged invitees to share the survey with colleagues during ophthalmology gatherings.

The survey remained open for one month, from September 22 to October 21, 2024, with meticulous follow-up on sample size and data quality. During this period, approximately three reminder and follow-up messages were sent at regular intervals to ensure adequate participation. Data were collected, cleaned, managed, and coded before analysis. Ethical approval was obtained from the King Khalid Eye Specialist Hospital Institutional Review Board (IRB) and Research Ethics Committee under protocol #RP-24048. A written informed consent was obtained from all respondents to participate in this study.

The inclusion criteria required participants to be board-certified ophthalmologists practicing cataract and IOL surgery in Saudi Arabia. Exclusion criteria included ophthalmology residents, fellows under training, and ophthalmologists practicing outside Saudi Arabia. The sample size was calculated using a 95% confidence interval (CI), an effect size of 0.5, an α error of 0.05, a power of 80%, and a two-tailed test. Based on these parameters and the cross-sectional study design, 84 participants were required to ensure statistical precision and reliable evidence *(G*Power software V. 3.1.9.7, Heinrich-Heine-Universität Düsseldorf, Germany)*. All data management was done in statistical analysis using Microsoft Excel 365 *(Microsoft Corporation, Redmond, Washington, USA)*, while the statistical analysis was done using SPSS version 28.0 *(IBM Inc., Chicago, Illinois, USA)*.

Results

A total of 95 respondents completed the questionnaire, of whom 73 (76.8%) were male and 22 (23.2%) were female. In terms of years of experience, the majority of respondents had been practicing for more than 10 years (57; 60%), followed by those with 5–10 years of experience (24; 25.3%), while 14 (14.7%) had been practicing for 1–5 years. Regarding the workplace setting, the majority were practicing in government hospitals (66; 69.5%), while 29 (30.5%) were working in the private sector.

In terms of the ISBCS practitioners' characteristics, there were no statistically significant association between gender and ISBCS practicing. However, the length of experience seems to be significantly associated with such practice, as having more experience years is affecting the potentiality of performing ISBCS (p=0.013). Moreover, the workplace was not highly affecting the decision of practicing ISBCS whether it is governmental or private facility (Table 1).

Concerning the practice of ISBCS, 17 (17.9%) were actively practicing the procedure (Group A), 73 (76.8%) were not practicing ISBCS (Group B), and 5 (5.3%) had previously practiced ISBCS but had since stopped (Group C). Among those currently performing ISBCS, 14 (82.4%) had been practicing for more than 5 years, one (5.9%) for 2–5 years, and two (11.8%) for 1–2 years. Furthermore, 15 (88.2%) of this group performed ISBCS in 1–20% of their cataract cases, while only 2 (11.8%) performed it in 21–40% of cases.

According to the questionnaire, Group "A" highlighted and graded the key factors influencing their decision to perform ISBCS, as detailed in (Table 2). Additional reasons included anesthesia-related factors, early recovery, rapid

Table 1 Characteristics of ISBCS Practitioners

Characteristics	Category	ISBCS Practice, No. (%)			p-value
		Yes	No	I Used to, but Stopped	
Gender	Male	10 (13.7)	59 (80.8)	4 (5.5)	0.151
	Female	7 (31.8)	14 (63.6)	1 (4.5)	
Length of experience (years)	[1–5]	0 (0.0)	13 (92.9)	1 (7.1)	0.013*
	[5–10]	1 (4.2)	23 (95.8)	0 (0.0)	
	[> 10]	16 (28.1)	37 (64.9)	4 (7)	
Workplace	Governmental Hospital	10 (15.2)	53 (80.3)	3 (4.5)	0.482
	Private eye care facility	7 (24.1)	20 (69)	2 (6.9)	

Note: *Statistically significant (P<0.05).

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Table 2 Factors to Consider When Practicing Immediate Sequential Bilateral Cataract Surgery, Reported by "Group A" Respondents

Question	Not Important	Quite Important	Important	Very Important
More cost effective for healthcare system	7 (41.2)	2 (11.8)	5 (29.4)	3 (17.6)
Better visual outcome for patients	5 (29.4)	3 (17.6)	6 (35.3)	3 (17.6)
Reduced hospital visits for patients, saving their time	3 (17.6)	2 (11.8)	5 (29.4)	7 (41.2)
Patient request	5 (29.4)	6 (35.3)	5 (29.4)	1 (5.9)
Patient advantage	1 (5.9)	4 (23.5)	10 (58.8)	2 (11.8)
Saves more time in clinics and theatre	4 (25)	3 (18.8)	6 (37.5)	3 (18.8)

visual adaptation, lower cost for patients, preference in cases requiring general anesthesia, unstable cases, patient conditions that do not allow for a second surgery, and a preference among female teachers (each reported by 1 (1.1%) of respondents). Furthermore, this group identified important prerequisites for performing ISBCS, as outlined in (Table 3). Within Group "A", 10 (58.8%) stated that ISBCS would be applicable in 1–25% of eligible cases, while 3 (17.6%) estimated its use in 26–50% of cases, 2 (11.8%) in 51–75%, and 2 (11.8%) in 76–100% of cases.

Among Group "B" respondents who were not practicing ISBCS, several specific conditions were identified where they might consider performing the procedure, including senile cataract cases under general anesthesia (12; 12.6%), patients at high risk for general anesthesia (11; 11.6%), congenital cases (10; 10.5%), phakic IOL implantation (10; 10.5%), and refractive lens exchange (7; 7.4%). This group categorized the importance of various reasons for not considering ISBCS, as detailed in (Table 4). Additional concerns included allergy to intraocular medications/solutions, type of anesthesia, patient cooperation issues, recovery concerns, capsular rent, toxic anterior segment syndrome (TASS),

Table 3 Important Pre-Requisites for Same-Day Bilateral Cataract Surgery

Question	Not Important	Quite Important	Important	Very Important
The patient and his or her eyes have no additional risk for developing endophthalmitis	1 (5.9)	3 (17.6)	6 (35.3)	7 (41.2)
Exclusion of high-risk eyes	0 (0.0)	5 (29.4)	6 (35.3)	6 (35.3)
Surgeon has a track record	5 (29.4)	5 (29.4)	4 (23.5)	3 (17.6)
Operating facilities have good infection record	0 (0.0)	1 (5.9)	3 (17.6)	13 (76.5)
The surgeon and scrub nurse rescrub, re-gown, and re-glove before second-eye surgery	0 (0.0)	0 (0.0)	2 (11.8)	15 (88.2)
Second surgeon and second scrub nurse scrub for second-eye surgery	8 (47.1)	1 (5.9)	2 (11.8)	6 (35.3)
Instruments for each operation having gone through different sterilization cycles	1 (5.9)	2 (11.8)	3 (17.6)	11 (64.7)
Medicine, solutions, and cannula came from different manufacturers or have different batch numbers	10 (58.8)	2 (11.8)	2 (11.8)	3 (17.6)

Table 4 Importance of Different Reasons for Not Doing Same Day Sequential Bilateral Cataract Surgery

Question	Not Important	Quite Important	Important	Very Important
No evidence of effectiveness	17 (23.6)	14 (19.4)	24 (33.3)	17 (23.6)
Potential decrease in financial reimbursement for Hospital/Surgeon	26 (36.1)	14 (19.4)	24 (33.3)	8 (11.1)
Risk of Endophthalmitis	1 (1.4)	0 (0.0)	12 (16.4)	60 (82.2)
Risk of Cystoid macular edema	23 (31.5)	15 (20.5)	14 (19.2)	21 (28.8)
Risk of Retinal detachment	24 (32.9)	16 (21.9)	15 (20.5)	18 (24.7)
Risk of Wrong IOL power calculation	13 (17.8)	13 (17.8)	24 (32.9)	23 (31.5)
Risk of Other complications (Please specify)	14 (19.2)	7 (9.6)	29 (39.7)	23 (31.5)
Familiarity with single eye surgery	42 (57.5)	9 (12.3)	0 (0.0)	22 (30.1)
Medico-legal issues should same-day bilateral cataract surgery goes wrong	21 (28.8)	6 (8.2)	0 (0.0)	46 (63.0)
I have not been trained to do same day bilateral surgery	56 (76.7)	7 (9.6)	0 (0.0)	10 (13.7)
Insufficient facilities or support staff	59 (80.8)	7 (9.6)	0 (0.0)	7 (9.6)
Other reason(s)				

Table 5 Factors That Would Influence the Decision to Consider Bilateral Same-Day Cataract Surgery

Factor	No. (%)
I would not consider bilateral same-day cataract surgery	25 (26.3)
Improved availability of Intra-cameral cefuroxime	10 (10.5)
Ability to use specific purpose pre-packed right and left eye instrument packs	16 (16.8)
Trained nursing staff available	13 (13.7)
Training for surgeon	8 (8.4)
Improved evidence of effectiveness and safety	39 (41.1)
Hospital approval	33 (34.7)
Medico-legal / indemnity insurance approval	43 (45.3)
Specialist society / College approval	18 (18.9)
Others	3 (3.2)

prolonged operative time, risk of endophthalmitis, potential for doubled complications, fear of vision loss, pseudophakic bullous keratopathy (PBK), the need to assess outcomes from the first eye before proceeding, sterile uveitis, uveitis-glaucoma-hyphema (UGH) syndrome, scleritis, and encountering TASS (each reported by 1 (1.1%) of respondents).

Furthermore, Group "B" identified factors that would influence their decision to consider ISBCS, as presented in (Table 5). Additional considerations included patients traveling long distances (1; 1.1%), those unable to undergo multiple general anesthesia surgeries (2; 2.1%), and medically or mentally unstable patients (1; 1.1%). Among Group "C", those who had previously performed ISBCS but had stopped, the main reasons cited included hospital policy restrictions (2; 2.1%), a personal preference to maintain a minimum 48-hour interval between procedures (1; 1.1%), and a case-by-case approach where ISBCS was reserved for the most eligible patients (1; 1.1%).

Discussion

This study provides valuable insights into the attitudes, practices, and barriers surrounding immediate sequential bilateral cataract surgery (ISBCS) among board-certified ophthalmologists in Saudi Arabia. The findings highlight a relatively low adoption rate of ISBCS, with only 17.9% of respondents currently practicing the procedure, while the majority (76.8%) were not performing ISBCS, and a smaller proportion (5.3%) had previously performed ISBCS but discontinued it. These figures reflect global variations in ISBCS uptake, as seen in prior studies, where adoption rates ranged from 13.9% in the UK to 27.3% in the Netherlands and 67.2% in European surveys.[2–4]

When comparing our findings to other countries, it is evident that the uptake of ISBCS in Saudi Arabia is considerably lower than in nations such as Finland or Singapore,[4,12] where national policies actively endorse the procedure. In contrast, the Saudi healthcare system lacks explicit national guidelines or institutional protocols supporting ISBCS, which creates ambiguity around its implementation. Additionally, there are no formal medico-legal frameworks or indemnity protections in place specifically addressing ISBCS, making surgeons more vulnerable to litigation in the event of bilateral complications. This legal uncertainty, combined with the conservative regulatory environment in many Saudi institutions, acts as a major deterrent.

Unlike previous surveys conducted in Europe and the UK,[2,3] which primarily assessed overall attitudes and adoption rates, our study employed a more detailed and structured questionnaire divided into specific domains: perceived benefits, controlling factors, surgeon selectivity, and reasons for adopting or rejecting ISBCS. Additionally, we distinguished among current practitioners, non-practitioners, and those who had discontinued the practice, enabling a more nuanced understanding of the spectrum of attitudes. This multidimensional approach provides novel insight into the conditional acceptance of ISBCS in a region with limited published data on the topic and highlights potential drivers for its future implementation in similar healthcare systems.

Among our respondents, no significant associations were found between ISBCS practice and demographic or workplace characteristics. However, years of experience appeared to show a potential trend: ophthalmologists with longer clinical experience were more likely to practice ISBCS. This may reflect increased confidence and a deeper

understanding of the procedure's potential benefits over time. Our findings align with those reported by You et al[13] supporting the notion that with increased experience, surgeons may become more inclined to adopt ISBCS. Most surgeons performed ISBCS in less than 20% of their cataract patients, suggesting that it is reserved for carefully selected cases, likely those with bilateral visually significant cataracts, good general health, and minimal risk factors for complications.[14] This cautious approach aligns with previous studies that emphasize the importance of strict patient selection criteria, infection control measures, and surgical expertise in ensuring safe ISBCS outcomes.[1,15]

The perceived benefits of ISBCS reported by practitioners included fewer hospital visits, rapid visual rehabilitation, lower cost for patients, reduced anisometropia, and improved surgical efficiency. These findings are consistent with previous research demonstrating that ISBCS leads to faster postoperative recovery, reduced dependence on caregivers, and greater patient satisfaction compared to delayed sequential bilateral cataract surgery (DSBCS).[1,15,16] Health economic studies have also highlighted the cost-effectiveness of ISBCS, as it minimizes hospital resources and patient-related expenses, making it particularly beneficial in high-volume surgical centers.[17,18]

Despite these advantages, concerns about postoperative complications remain the primary barrier to ISBCS adoption, particularly the risk of bilateral endophthalmitis, cystoid macular edema (CME), and incorrect intraocular lens (IOL) power selection. These concerns were echoed by ophthalmologists in the UK and Dutch surveys, where the fear of bilateral complications and medico-legal risks was a significant deterrent.[3,4] However, evidence suggests that the risk of bilateral endophthalmitis is exceedingly low when strict infection control protocols are followed such as separate sterilization of instruments, use of intracameral antibiotics, and rescrubbing between surgeries.[15] A 13-year study on ISBCS adoption found that the rate of bilateral endophthalmitis remained at 0%, reinforcing the importance of adherence to best practices.[14] In another study, the authors analyzed Medicare data from 2011 to 2019 to compare trends and outcomes between ISBCS and DSBCS in the US Out of 1,944,979 patients, only 4014 (0.2%) had ISBCS, while the vast majority (1,940,965 [99.8%]) had DSBCS. Patients with higher comorbidity scores were more likely to receive ISBCS, while those with conditions like glaucoma or macular issues tended to have DSBCS. The compared rates of endophthalmitis and CME within six weeks follow-up showed no significant differences between the two groups.[19]

Interestingly, a substantial proportion of non-practicing ophthalmologists (Group B) indicated that they might consider ISBCS under specific conditions, such as cases requiring general anesthesia, high-risk anesthesia patients, congenital cataracts, phakic intraocular lens implantation, and refractive lens exchange. This suggests a willingness to adopt ISBCS selectively, particularly when reducing surgical exposure or anesthesia-related risks is critical. A similar trend was observed in a Medicare data analysis (2011–2019), which reported comparable safety outcomes between ISBCS and DSBCS, reinforcing the feasibility of ISBCS in appropriately selected patients.[19]

Among those who had previously performed ISBCS but stopped (Group C), the most cited reasons included hospital policy restrictions, a preference for a 48-hour interval between surgeries, and selective case eligibility. Institutional policies continue to play a major role in ISBCS adoption, as many healthcare systems still follow traditional DSBCS protocols despite growing evidence supporting ISBCS safety and efficacy.[15,17] Different cultures and decision-making policies often lead to varying conclusions, even with the same evidence. This applies to ISBCS and antibiotic choices for endophthalmitis prevention. A 2017 Cochrane review of five studies (101,005 adults, 132 endophthalmitis cases) found strong evidence that cefuroxime injections reduce endophthalmitis rates.[20] Nevertheless, the 2021 ASCRS survey showed that only 66% of surgeons used intracameral antibiotics, highlighting how culture and policy shape medical practices despite clear evidence.[21]

While this study provides important insights, some limitations must be acknowledged. The sample size (95 respondents) may not fully represent the perspectives of all ophthalmologists in Saudi Arabia. A web-based survey may introduce selection bias, favoring those more engaged with digital platforms. Additionally, self-reported responses may not always align with actual clinical practice. In conclusion, this study sheds light on how ophthalmologists in Saudi Arabia view ISBCS, their current practices, and the challenges they face. While only a small number of surgeons currently perform ISBCS, many recognize its advantages and are willing to consider it under specific conditions. Although our study did not assess clinical outcomes, existing literature suggests that ISBCS may offer comparable safety to DSBCS when performed under strict protocols, indicating its potential as a viable option in selected cases.

The main barriers remain concerns over bilateral complications, medico-legal risks, and institutional policies. As ISBCS gains global recognition as a safe and cost-effective alternative to DSBCS, more work is needed to address concerns, develop standardized protocols, and assess its outcomes in the Saudi healthcare system as well as establishing a monitoring and evaluation mechanism. Additionally, more local research and training are needed to strengthen the evidence for ISBCS, helping ophthalmologists make well-informed decisions by weighing its pros and cons.

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