ABSTRACT.

The need for cataract surgery is expected to rise dramatically in the future due to the increasing proportion of elderly citizens and increasing demands for optimum visual function. The aim of this study was to provide an evidence-based recommendation for the indication of cataract surgery based on which group of patients are most likely to benefit from surgery. A systematic literature search was performed in the MEDLINE, CINAHL, EMBASE and COCHRANE LIBRARY databases. Studies evaluating the outcome after cataract surgery according to preoperative visual acuity and visual complaints were included in a meta-analysis. We identified eight observational studies comparing outcome after cataract surgery in patients with poor (<20/40) and fair (>20/40) preoperative visual acuity. We could not find any studies that compared outcome after cataract surgery in patients with few or many preoperative visual complaints. A meta-analysis showed that the outcome of cataract surgery, evaluated as objective and subjective visual improvement, was independent on preoperative visual acuity. There is a lack of scientific evidence to guide the clinician in deciding which patients are most likely to benefit from surgery. To overcome this shortage of evidence, many systems have been developed internationally to prioritize patients on waiting lists for cataract surgery, but the Swedish NIKE (Nationell Indikationsmodell för Katarakt Ekstraktion) is the only system where an association to the preoperative scoring of a patient has been related to outcome of cataract surgery. We advise that clinicians are inspired by the NIKE system when they decide which patients to operate to ensure that surgery is only offered to patients who are expected to benefit from cataract surgery.

Key words: cataract – evidence – indication – visual acuity

Introduction

Cataract is a clouding of the lens of the eye interfering with visual function. Globally, cataract is the leading cause of blindness and impaired visual acuity (Resnikoff et al. 2004). Cataract surgery is one of the most commonly performed elective surgical procedures performed in westernized countries. Indications for cataract surgery are changing with more patients being operated at younger ages and better visual acuities (Behndig et al. 2011; Kessel et al. 2011; Lundstrom et al. 2015). The annual number of surgeries increases (Solborg et al. 2015) and is expected to double within the next two decades (Tuulonen et al. 2009; Kessel 2011). This probably reflects increasing demands for optimum visual function in patients as well as improved outcomes and safer procedures lowering the physician’s barrier for indication. A Finnish study showed that a surprisingly large proportion of patients with preoperative visual acuity 0.8 or better and in whom visual acuity could be improved by glasses still chose to have cataract surgery (Falck et al. 2012).

Cataract is diagnosed clinically at the slit lamp. Objective measurements may assist the clinician in the diagnosis. Most objective systems measure the degree of light scattering, for example the dynamic light scattering method.
prior to vitreoretinal or glaucoma surgery. There may be other indication on which patients with age-related provide evidence-based recommenda- tion to operate? The aim of this study was to determine which patient will benefit from cataract surgery. Then, how do we know who to operate and when to operate? The aim of this study was to provide evidence-based recommendation on which patients with age-related cataract are most likely to benefit from surgery. There may be other indications for cataract surgery, for example prior to vitreo-retinal or glaucoma surgery, improved monitoring of retinal disease, myopinization, phacomorphic or phaco- lytic glaucoma, but the present systematic review is focused on the bulk majority of patients who are operated to improve visual function. The study was initiated by an initiative by the Danish Medicines and Health Authorities to provide evidence-based national Danish guidelines for cataract surgery.

Methods

The systematic review and resulting meta-analysis were performed based on the principles described in the Grades of Recommendation, Assessment, Develop- ment and Evaluation (GRADE) system (Guyatt et al. 2011f). We first defined the topic of the systematic review using the PICO approach (Guyatt et al. 2011a). In short, PICO stands for Patient (P), Intervention (I), Comparison (C) and Outcome (O). For this specific review and meta-analysis, we formulated two specific questions: (1) Will the patient with age-related cataract and poor preoperative visual acuity (20/40 or lower) (P) benefit (O) more from cataract surgery (I) than the patient with fair preoperative visual acuity (better than 20/40) (C)? (2) Will the patient with fair preoperative visual acuity (≥20/40) and subjective cataract-related complaints (P) benefit more (O) from cataract surgery (I) than the patient with poor preoperative visual acuity (<20/40) but few or no subjective cataract-related complaints (C)?

For both questions, benefit was defined as an improvement in objective visual acuity (2 Snellen lines or greater or a doubling of the visual angle or improvement as defined by the included studies) or subjective visual function assessed by validated questionnaires. Harms of surgery, defined as peri- or postoperative complications as reported by included studies, were also considered as important outcomes. The preoperative visual acuity grouping of fair (>20/40) versus poor (<20/40) was chosen because 20/40 vision is the legal requirement for upholding a driver licence in Denmark.

A systematic literature search was conducted in August 2014 in the EMBASE, MEDLINE, CINAHL and COCHRANE LIBRARY databases using the search term (indication) AND ((cataract surgery) OR cataract extraction). The search was limited to references published in the English or Scandinavian languages. Studies that compared the outcome after cataract surgery in patients with poor and fair preoperative visual acuity, either alone or in combination with preoperative subjective visual acuity, were included in the meta-analysis. Studies that did not report the outcome after cataract surgery in relation to preoperative visual function were excluded from the meta-analysis. Both randomized controlled trials and non-randomized studies were considered for inclusion.

The quality of the included studies was evaluated using the Cochrane risk of bias tool (Higgins & Green 2011) in the REVIEW MANAGER 5 Software (Review Manager (RevMan) 2012). In short, the Cochrane risk of bias tool assesses the risk of bias associated with the selection of patients (randomization or patient allocation and concealment of allocation), study performance (blinding of patients and personnel), detection of outcomes (blinding of outcome assessment), attrition of data (such as missing patients or dropouts), reporting of study findings (selective outcome reporting) or other types of bias related to the study design that could affect the internal validity. This part of the systematic review was performed independently by two reviewers (LK and JA). Disagreement was resolved through discussion and consensus.

The quality of the evidence for each prespecified outcome was evaluated across the included studies using the GRADE system in the GRADE PROFILER Software (GRADE profiler 2011). Each outcome was analysed for study limitations that could affect the outcome (risk of bias, e.g. lack of allocation concealment or lack of blinding of patients or outcome assessors, incomplete accounting of patients and outcome, selective outcome reporting or other limitations) (Guyatt et al. 2011g), inconsistency (different results between studies) (Guyatt et al. 2011d), indirect- ness (e.g. use of surrogate measures) (Guyatt et al. 2011c), imprecision (large confidence intervals or the lack of statistical strength) (Guyatt et al. 2011b) and risk of publication bias (e.g. lack of reporting of negative findings).
| Study id | Methods | Participants | Interventions | Outcomes | Notes |
|----------|---------|--------------|---------------|----------|-------|
| Davis 2012 (Davis et al. 2012) | Prospective cohort study | Patients listed for cataract surgery | Cataract surgery | Mean (SD) change in VF-14 score (both eye surgery) was 4.2 (10.3) in Group 1 (n = 27) and 11.5 (12.0) in Group 2 (n = 24) | The authors have no competing interests |
| Douthwaite 2007 (Douthwaite et al. 2007) | Non-randomized, interventional study | Patients with age-related cataract waiting for cataract surgery | Cataract surgery | Postoperative VA (logMAR)^3: Group A1: –0.02 (0.07) Group A2: –0.03 (0.08) | Funding: not reported |
| Garcia-Gutierrez 2014 (Garcia-Gutierrez et al. 2014) | Non-randomized, prospective cohort study | Patients with age-related cataract | Cataract surgery | Subjective satisfaction (very satisfied + satisfied): Group 1: 3180/3501 Group 2: 632/674 | Funding: public and private funds. No conflict of interests reported |
| Kanthan 2011 (Kanthan et al. 2011) | Population based cohort study | Persons aged 49 + living in the Blue Mountains area, Australia | Cataract surgery | Postop VA ≤39 at 5 yrs: Group 1: 5/28 Group 2: 5/93 | Funding: the Australian National Health and Medical Research Council |
| Lundström 1999 (Lundstrom et al. 1999) | Database study | Patients with cataract | Cataract surgery | Subjective improvement/benefit after cataract surgery: Group 1: 538/604 Group 2: 1219/1329 | Funding: National Board of Health and Welfare Sweden |
| Lundström 2013 (Lundstrom et al. 2013) | Database study | Patients with age-related cataract undergoing cataract surgery | All patients had cataract surgery | Objective improvement in VA: Group 1: 11284/113709 Group 2: 249572/254359 | No financial or proprietary interests declared |
| Rosen 2005 (Rosen et al. 2005) | Non-randomized interventional study | Patients scheduled for cataract surgery | Cataract surgery | VF-14 at 4 months, mean (SD): Group 1: 94.82 (5.36) Group 2: 94.59 (8.81) | No conflict of interests reported |
Visual acuity after cataract surgery

We identified four observational studies that compared the visual acuity after cataract surgery in patients with poor or fair preoperative visual acuity (Saw et al. 2002; Douthwaite et al. 2007; Kanthan et al. 2011; Lundstrom et al. 2013). The studies reported the gain in visual acuity in three different ways: as the mean value in the two compared groups, as the number of patients with an improvement in visual acuity or as the number of patients with postoperative visual acuity 20/40 or less. None of the studies reported gain in visual acuity as our prespecified outcome of a doubling of the visual angle.

Mean visual acuity after cataract surgery in patients with fair versus poor preoperative visual acuity

Visual acuity outcome was compared in patients with fair (logMAR: 0.31 (0.09) mean (SD), corresponding to 20/40) and poor (logMAR 0.85 (0.47), mean (SD), corresponding to 20/125 to 20/160) preoperative visual acuity (Douthwaite et al. 2007). Included patients had cataract but no other significant ocular comorbidities. The time from cataract surgery to follow-up visit was not reported. Mean postoperative visual acuity was −0.02 logMAR (−20/20) in patients with fair preoperative visual acuity, and it was −0.03 logMAR (−20/20) in patients with poor preoperative visual acuity. There was no difference in visual acuity after surgery in the patients with poor or fair preoperative visual acuity (see Fig. 1).

Number of patients with postoperative visual acuity 20/40 or less in patients with fair versus poor preoperative visual acuity

Visual acuity outcome was reported in one study as the number of patients with a visual acuity of ≤39 ETDRS letters read (≤20/40 or less) 5 years after cataract surgery in patients with preoperative visual acuity of ≤39 ETDRS letters read (poor visual acuity, corresponding to <20/40 or ≥40 ETDRS letters read (fair visual acuity, corresponding to ≥20/40) (Kanthan et al. 2011). In the group of patients with poor preoperative visual acuity, 17.9% had a postoperative visual acuity 5 years after surgery of ≤39 ETDRS

Table 1.

| Study id | Methods | Participants | Interventions | Outcomes |
|----------|---------|--------------|---------------|----------|
| Saw 2002 (Saw et al. 2002) | Non-randomized, observational study | Patients with age-related cataract fellow to or phacoemulsification (71.3%) versus femtosecond laser (28.7%), Group 1: 175/234 patients were 65 yrs or younger | Outcomes are reported in rates (numbers affected/whole group) unless otherwise stated. SD: standard deviation. Post-op: postoperatively. Pre-op: preoperative. VA: visual acuity. VF-14: visual function. | (Continued) |

Table 1. (Continued)

| Study id | Notes | Funding: Singapore National EyeCenter |
|----------|-------|--------------------------------------|

(Guyatt et al. 2011e). According to the GRADE system, evidence based on randomized controlled trials start as high-quality evidence and non-randomized studies start as low-quality evidence, but the quality of the evidence for each of the prespecified outcomes can be downgraded based on the assessment of each of the limitations mentioned above. The quality of evidence can also be upgraded if the effect is very strong or the data point towards a dose–response effect.

Continuous data were analysed according to differences in mean treatment effects and their standard deviations. Dichotomous outcome data were analysed by calculating risk ratios. The REVIEW MANAGER 5 Software (Review Manager (RevMan) 2012) was used for estimation of overall treatment effects. Random-effects models were used to calculate pooled estimates of effects.

Results

A systematic literature search yielded 778 hits. Of those, 67 references were considered to be of potential interest and these references were obtained in full text and read thoroughly. We identified eight observational studies that compared the outcome after cataract surgery in patients with poor and fair preoperative visual acuity (Lundstrom et al. 1999, 2013; Saw et al. 2002; Rosen et al. 2005; Douthwaite et al. 2007; Kanthan et al. 2011; Davis et al. 2012; Garcia-Gutierrez et al. 2014). The characteristics of included studies are presented in Table 1, and the risk of bias assessment for the included studies is presented in Table 2. We did not identify any studies that compared the outcome of cataract surgery in patients with poor preoperative visual acuity and few subjective complaints to patients with fair preoperative visual acuity and many subjective complaints or any other combination of preoperative visual acuity and visual complaints. We did not identify any randomized trials evaluating the effect of cataract surgery based on preoperative visual characteristics. The literature search revealed furthermore 59 studies that did not fulfill the criteria for inclusion, and hence, those studies were excluded. A list of excluded studies and reasons for exclusion is provided in Table S1.
The table presents the risk of bias evaluation for the included studies according to the Cochrane handbook definitions (Higgins & Green 2011). Risk of bias assessment includes selection bias (random sequence generation and allocation concealment), performance bias (blinding of participants and personnel), detection bias (blinding of outcome assessment), attrition bias (incomplete outcome data), reporting bias (selective reporting) and other bias. Risk of bias was graded as high, unclear or low.

| Study ID          | Risk of bias assessment | Random sequence generation | Allocation concealment | Blindness of participants and personnel | Binding of outcomes | Incomplete outcome data | Selective reporting | Other bias |
|-------------------|-------------------------|----------------------------|------------------------|----------------------------------------|--------------------|------------------------|--------------------|------------|
| Davis 2012        | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Douthwaite 2007   | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Kahan 2011        | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Lundstrom 1999    | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Lundstrom 2013    | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Rosen 2005        | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Saw 2002          | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Saw 2006          | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Rosen 2014        | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Lundstrom 2013    | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Lundstrom 2019    | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Lundstrom 2015    | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
| Rosen 2005        | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | High risk (Unblinded study) | High risk (Not randomized) | High risk (Not randomized) | High risk (Not randomized) | Low risk (Not likely) |
letters compared to 5.1% in the group with fair preoperative visual acuity. The difference between the groups was statistically significant (see Fig. 2). The main reported cause of poor postoperative visual acuity was age-related macular degeneration.

**Improvement in visual acuity**

Three of the included studies reported the number of patients who had an improved visual acuity after cataract surgery (Saw et al. 2002; Kanthan et al. 2011; Lundstrom et al. 2013). None of the studies provided a definition of 'improved visual acuity'. Fair preoperative visual acuity was defined as ≥40 ETDRS letters read in one study (Kanthan et al. 2011), ≥0.63 Snellen in one study (Lundstrom et al. 2013) and >0.5 Snellen in one study (Saw et al. 2002). Correspondingly, poor preoperative visual acuity was defined as ≤39 ETDRS letters read in one study (Kanthan et al. 2011) and ≤0.5 in two studies (Saw et al. 2002; Lundstrom et al. 2013). Follow-up time after cataract surgery was 5 years in one study (Kanthan et al. 2011), <2 months in one study (Lundstrom et al. 2013) and 3 months in one study (Saw et al. 2002). In total, 98.1% of patients with fair preoperative visual acuity had an improvement in visual acuity after cataract surgery versus 98.8% of patients with poor preoperative visual acuity. The difference was not statistically significant (see Fig. 3).

**Subjective visual outcome after cataract surgery**

We identified four studies that compared the subjective visual outcome after cataract surgery in patients with poor or fair preoperative visual acuity (Lundstrom et al. 1999; Rosen et al. 2005; Davis et al. 2012; Garcia-Gutierrez et al. 2014). The studies reported subjective visual function in different ways. Two studies asked patients to rate the outcome after cataract surgery (Lundstrom et al. 1999; Garcia-Gutierrez et al. 2014), and two studies evaluated the subjective visual function using the Visual Function (VF-14) questionnaire (Rosen et al. 2005; Davis et al. 2012).

**Subjective visual outcome based on patient ratings**

Two studies asked patients to rate the subjective visual outcome after cataract surgery. One study asked patients whether they were 'Very satisfied', 'Satisfied' or 'Not satisfied' (Garcia-Gutierrez et al. 2014). One study evaluated whether the patients had 'Very good benefit' or 'Not very good benefit' from cataract surgery based on the Catquest questionnaire preoperative and postoperative scores (Lundstrom et al. 1999). Poor preoperative visual acuity was defined as ≤0.4 (20/50) and fair acuity as ≥0.5 (20/40) in both studies (Lundstrom et al. 1999; Garcia-Gutierrez et al. 2014). There was no difference in the rating of subjective visual outcome after cataract surgery between patients with poor or fair preoperative visual acuity (see Fig. 4).

**Subjective visual outcome based on VF-14 questionnaire**

One study evaluated subjective visual function at 7 weeks after cataract surgery using the Visual Function (VF-14) questionnaire (Davis et al. 2012), and another study evaluated subjective visual function at 4 months using the VF-14 questionnaire (Rosen et al. 2005). Fair preoperative visual acuity was defined as ≥20/40 in both studies. Overall, there was no difference in the postoperative VF-14 score between patients with fair or poor preoperative visual acuity (see Fig. 5).

**Quality of the evidence**

Quality of the evidence was evaluated using the GRADE approach (Table 3). The quality of evidence ranged from low to very low. According to the GRADE system, observational studies start as low-quality evidence. The level of evidence was further downgraded for two outcomes (the number of patients who experienced an improved postoperative visual acuity and the number of patients who experienced a subjective improvement in postoperative visual acuity).
Discussion

Whereas it is usually not difficult for the clinician to decide if a patient has cataract, it can be challenging to decide whether or not to offer surgery to the patient in question. The present study was carried out after an initiative by the Danish Health and Medicines Authorities to provide evidence-based recommendations on the indication for surgery for age-related cataract. The aim was to determine which preoperative characteristics best predict the visual gain, both subjective and objective, after cataract surgery in order to ensure that cataract surgery is offered to the patients who are most likely to benefit from surgery. The aim was not to set a barrier to reduce the number of surgeries performed. We decided to compare the outcome in patients with poor versus fair preoperative visual acuity, and found that preoperative visual acuity was a poor predictor for postoperative visual function. This finding is perhaps not surprising as postoperative visual function depends more on the status of the eye and the surgical procedure rather than the preoperative visual acuity, as it is influenced by factors such as age, degree of cataract, surgical technique, and postoperative care. Therefore, it is important to identify other factors that may influence the outcome of cataract surgery.

![Fig. 3. Number of patients who had an improved visual acuity (VA) after cataract surgery. CI, confidence interval; M-H, Mantel–Haenszel.](image)

![Fig. 4. Number of patients who reported an improvement in subjective visual function after cataract surgery. CI, confidence interval; M-H, Mantel–Haenszel; VA, visual acuity.](image)

![Fig. 5. Subjective visual function measured using the visual function questionnaire (VF-14). CI, confidence interval. IV, inverse variance; SD, standard deviation; VA, visual acuity.](image)
of the retina and optic nerve than on the degree of the cataract that is removed. Nonetheless, preoperative visual acuity is often used as the primary indicator for cataract surgery (Baun et al. 2001; Falck et al. 2008; Helsedirektoratet 2009). Although preoperative visual acuity is not a good predictor of the outcome of cataract surgery, it is efficient in regulating the number of required surgeries. A Spanish study showed that when the barrier was 20/40, the needed surgical volume was 69 000 cataract surgeries per million inhabitants over the age of 50 years versus 51 000 cataract surgeries per million inhabitants over the age of 50 years when setting the barrier at 20/50 (Comas et al. 2008).

Another reason that preoperative visual acuity is a poor predictor of visual gain after cataract surgery may be that preoperative visual acuity is routinely measured monocularly whereas the patient functions binocularly. Patient-perceived visual difficulties might thus be more closely related to the difference in visual function between the eyes than the visual function of each eye evaluated separately. Patients with bilateral cataract have better outcome after bilateral surgery.

Table 3. Quality of evidence and summary of findings.

| Outcomes                                         | No of Participants (studies) | Quality of the evidence (GRADE) | Relative effect (95% CI) | Anticipated absolute effects |
|--------------------------------------------------|-----------------------------|---------------------------------|--------------------------|-----------------------------|
| Objective visual outcome after cataract surgery  |                             |                                 |                          |                             |
| Postoperative BCDVA (logMAR)                      | 46 (1 study)                | ⊕⊕⊕⊕                            | Low                      |                             |
| Number of patients with post-op VA ≤0.5          | 121 (1 study)               | ⊕⊕⊕⊕                            | RR 0.3 (0.09 to 0.97)    | 179 per 1000                |
| Number of patients who improved in VA            | 368 644 (3 studies)         | ⊕⊕⊕⊕                            | RR 0.85 (0.64 to 1.13)   | 988 per 1000                |
| Subjective visual outcome after cataract surgery |                             |                                 |                          |                             |
| Number of patients with subjective improvement   | 6108 (2 studies)            | ⊕⊕⊕⊕                            | RR 1 (0.94 to 1.06)      | 915 per 1000                |
| Mean VF-14 score                                 | 198 (1 study)               | ⊕⊕⊕⊕                            | Low                      |                             |
| Change in VF-14 score                            | 51 (1 study)                | ⊕⊕⊕⊕                            | Low                      |                             |

BCDVA, best corrected distance visual acuity; CI, Confidence interval; logMAR, logarithm to the minimal angle of resolution (lower values indicate a better visual acuity); pre-op, preoperative; post-op, postoperative; RR, Risk ratio; VA, visual acuity; VF-14, visual function questionnaire (ranges from 0 = blind to 100 = perfect visual function).

GRADE Working Group grades of evidence.

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

† Inconsistent results between studies.
Although the majority of patients perceive an improvement in visual function after cataract surgery, nearly 1/10 of patients perceive increased difficulties 6 months after surgery (Lundström et al. 2002). Poor postoperative visual acuity is an important cause of dissatisfaction with cataract surgery (Monestam & Wachtmeister 1999). Older patients and patients with ocular comorbidities are less likely to have a good clinical outcome than younger and eye-healthy patients, and patients with good preoperative self-assessed visual function are less likely to have a good patient-reported outcome (Mollazadegan & Lundström 2015). Ocular comorbidity and anisometropia account for the majority of patients with impaired visual function after cataract surgery, but problems with the fellow eye, few preoperative subjective symptoms and postoperative complications are also important causes for non-benefit of cataract surgery (Lundstrom et al. 2000). Patients with ocular comorbidity have worse visual outcomes than those without ocular comorbidities because of the lower potential for visual function (Lundstrom et al. 2001a, 2013), but even patients with fundus pathology may have a favourable visual outcome (Chatziralli et al. 2011; Ostri 2014). Patients with good self-assessed preoperative visual function are more likely to have a poor patient-related outcome (Mollazadegan & Lundström 2015), and patients with good preoperative visual function have less possibility of improvement (Espallargues & Alonso 1998).

Conclusion and recommendations

Cataract surgery is the most commonly performed elective surgical procedure in many westernized countries, and yet we have very little scientific data to help the clinician to decide when to offer cataract surgery to an individual patient. Preoperative visual acuity provides a poor indication of the outcome after cataract surgery, but it can be quite efficient in setting a barrier for the number patients eligible for cataract surgery. We performed the present systematic review after an initiative by the Danish Health and Medicines Authority to establish evidence-based national guidelines for the indication for cataract surgery. We found that the Swedish NIKE system (Lundstrom et al. 2006) was the only system with a documented association between preoperative grading and outcome after cataract surgery. Hence, we advise that the NIKE system is implemented in Denmark to ensure that cataract surgery is offered to patients who are likely to benefit from surgery.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Table S1. Characteristics of excluded studies.