

**A systematic review
of the effectiveness, compliance,
and critical factors for implemenation of
safety checklists in surgery**

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Purpose of this systematic review

Determine the effectiveness, compliance, and critical factors for the successful initiation and implementation of checklists or protocols in surgical theaters.

Burden of „Surgery“

- 234 Million major operations performed worldwide
- Studies from industrialized countries:
 - Permanent Disability or mortality rates: 0.4 – 0.8%
 - Complications are common: 3 – 16 %
- Minimum of at least 1 million patients die after surgery
- 7 million patients are injured by surgical complications
- Approximately 50% of surgical adverse events can be considered preventable



Foto: <http://cdn2.vol.at/2011/01/Die-Operationssaale-im-LKH-Feldkirch-sind-stark-bea.jpg>

Checklists or protocols

Common tool for preventing human errors in complex and high intensity areas of work

Checklists summarize 4 of the most important aspects of safety:

1. Correct identification of the patient and surgical site/site
2. Safe anesthesia and airway or respiratory function,
3. Prevention of infection
4. Successful teamwork

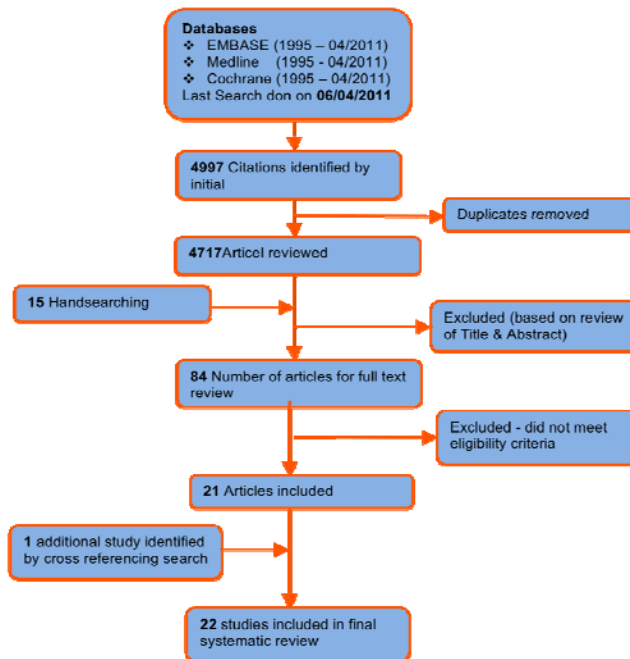


Foto: http://diepresse.com/images/uploads/1/2/c/745772/flugzeugcrash_sibirien_launchy-view-133337568890420120402185147.jpg

Questions of the review

1. What is the effectiveness of checklists or protocols in terms of complications and mortality?
2. What is the compliance with checklists (frequency and completeness)?
3. Which factors influence the compliance and effectiveness of checklists or protocols?

Methode I: Consort diagram for search strategy



Checklists



World Health Organization

SURGICAL SAFETY CHECKLIST (FIRST EDITION)

Before induction of anaesthesia >>>>>>>> Before skin incision >>>>>>>>>>>>>>> Before patient leaves operating room

SIGN IN	TIME OUT	SIGN OUT
<input type="checkbox"/> PATIENT HAS CONFIRMED • IDENTITY • SITE • PROCEDURE • CONSENT <input type="checkbox"/> SITE MARKED/NOT APPLICABLE <input type="checkbox"/> ANAESTHESIA SAFETY CHECK COMPLETED <input type="checkbox"/> PULSE OXIMETER ON PATIENT AND FUNCTIONING DOES PATIENT HAVE A: KNOWN ALLERGY? <input type="checkbox"/> NO <input type="checkbox"/> YES DIFFICULT AIRWAY/ASPIRATION RISK? <input type="checkbox"/> NO <input type="checkbox"/> YES, AND EQUIPMENT/ASSISTANCE AVAILABLE RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)? <input type="checkbox"/> NO <input type="checkbox"/> YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED	<input type="checkbox"/> CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE <input type="checkbox"/> SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM • PATIENT • SITE • PROCEDURE ANTICIPATED CRITICAL EVENTS <input type="checkbox"/> SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS? <input type="checkbox"/> ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS? <input type="checkbox"/> NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS? HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES? <input type="checkbox"/> YES <input type="checkbox"/> NOT APPLICABLE IS ESSENTIAL IMAGING DISPLAYED? <input type="checkbox"/> YES <input type="checkbox"/> NOT APPLICABLE	NURSE VERBALLY CONFIRMS WITH THE TEAM: <input type="checkbox"/> THE NAME OF THE PROCEDURE RECORDED <input type="checkbox"/> THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE) <input type="checkbox"/> HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME) <input type="checkbox"/> WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED <input type="checkbox"/> SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADAPTIONS AND MODIFICATIONS TO THE LOCAL PRACTICE ARE ENCOURAGED.

Method II:

- Data relating to effectiveness, compliance and critical factors or attitudes were extracted from the studies.
- A random effects meta-analysis of effectiveness data was conducted, if two or more studies reported a specified outcome.
- Quality assessments were performed for all studies by two independent investigators using the system by Nagpal et al..
- The agreement of the quality assessments was measured with Cohen's kappa coefficient.

Results

Effectiveness

13 articles reported data on effectiveness:

- Mortality: RR = 0.57 [95% CI 0.42 - 0.76]
- Any complications: RR = 0.63 [95% CI 0.58 - 0.67]
- Surgical site infection: RR = 0.62 [95% CI 0.53 - 0.72]
- Unplanned return to the operating room: RR = 0.76 [95% CI 0.56 - 1.02]
- Pneumonia: RR = 0.87 [95% CI 0.67 - 1.13]

Compliance

15 studies evaluated the compliance with checklist or protocols:

- Overall compliance rate: 12 - 100% (mean 75%)
- Compliance rate for Time Out: 70 - 100% (mean 91%)

Factors influencing compliance and effectiveness

5 studies quantitatively or qualitatively assessed critical factors or attitudes for a successful implementation of a checklist

- For a highly effective implementation it is important that “whys” and “hows” of checklist usage are communicated

Fazit und Recommendations

- Effective tool for decreasing the burden of morbidity and mortality
- Compliance of surgical staff with using the checklist was good overall
- For implementation:
 - Acceptance of the hospital staff and the adaption to the specific context are important
 - For a highly effective implementation the following points are important: Clearly communicated “why” and “how” the checklist should be used
 - The success was much higher when checklists were introduced in a consultative way by a multidisciplinary team instead of being mandated by a single surgical staff member
- Further research: organizational and cultural factors influencing the success of the implementation of safety checklists in surgery is necessary.
- The decision which of the checklists to introduce depends on the resources and processes of the organization

**Vielen Dank AND merci beaucoup AND
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