Evidence based decisions in nursing and their effect on quality of care
Versloot, M.N.

Citation for published version (APA):
Summary
SUMMARY

Improving quality of care is important for patients and healthcare professionals. Unfortunately there is a chasm between present-day and desired quality of healthcare. Closing this quality chasm is advocated.

Evidence Based Medicine is a tool to improve quality of healthcare by maintaining professional knowledge and fostering lifelong learning. Not only doctors but also nurses have increasingly adopted this paradigm in their decision making regarding patient care. This has led to the more general term Evidence Based Practice (EBP). EBP promotes the integration of new research knowledge into practice and fosters continuous quality improvement (CQI).

This thesis contributes to the body of knowledge of nursing practices, the promotion of evidence-based decision making, and efforts to overcome the challenges in the implementation process. For each decision investigated, its effect on the quality of care is measured.

Part 1: Evidence-based decisions in nursing

Novel practices

Overcrowding of Emergency Departments (EDs) means accurate triage systems are necessary in order to avoid delays in critical patient care. In the Netherlands, a guideline on triage was released in 2004, in which triage was defined as a dynamic decision process to prioritize the urgency need of patients entering the ED. Despite evidence of validity and reliability for the Emergency Severity Index (ESI) and a lack of research evidence for the Manchester Triage System (MTS), the latter was promoted as the preferred triage system in the Netherlands. To make an evidence-based decision about whether the MTS or the ESI should be implemented at our ED, the validity and inter- and intra-observer agreements for both triage systems were investigated.

Chapter 2 deals with a prospective observational comparative study, in which the amount of undertriage is compared: it looks at the validity of two structured triage systems (MTS and ESI) and the local informally structured triage system (ISS) in use, and their relation to resource use, hospital admission, and length of stay (LOS) in a large patient group. Triage ratings in 421 patients treated by ED physicians were compared with a reference standard. Undertriage occurred in 20%, 11% and 8% in the ESI, MTS and ISS, respectively. In all 900 patients triaged, the urgency levels across all three systems were associated with a significant increase in resource use, hospitalization rate, and LOS. Although the ESI showed the highest percentage of undertriage and the ISS the lowest, it does seem preferable to use a verifiable, formally structured triage system. In Chapter 3 inter and intra-observer agreement of the MTS and the ESI is compared, using paper-based clinical scenarios. A group of nurses who were familiar with the triage systems and another group who had
just trained in them judged the same scenarios. Interobserver unweighted kappas were 0.76 (95% CI 0.68 to 0.83) for MTS and 0.46 (95% CI 0.37 to 0.55) for ESI. Intra-observer unweighted kappas were 0.84 (95% CI 0.73 to 0.94) for MTS and 0.65 (95% CI 0.59 to 0.72) for ESI. These results showed that the MTS had a higher inter and intra-observer agreement than the ESI. Both studies are helpful, as they underpin with evidence clinical decisions about which triage tool to use (as well as the decision made in our ED) and build up the body of knowledge regarding the validity and agreement of triage tools.

The second example of a novel procedure was the introduction of a smoking cessation strategy in cardiovascular outpatients. Systematic reviews show that different smoking cessation programs, for example nicotine replacement therapy (NRT), are effective in different settings and patient populations. Specifically, the Minimal Intervention Strategy (MIS) is propagated by the Dutch expertise center on tobacco control (STIVORO). The MIS is a structured behavioral smoking cessation program and was adapted for cardiology inpatients (C-MIS); nurses are largely responsible for the intervention. This C-MIS was marginally effective in inpatients, but its effectiveness in the cardiovascular outpatient setting was unknown. Therefore, Chapter 4 addresses the effectiveness of this nurse-led intervention, in addition to NRT, to support smoking cessation in cardiovascular outpatients. Results from this randomized clinical trial showed that self-reported abstinence was 17% in the NRT group and 21% in the NRT + C-MIS group (AR 4%; 95% CI -6 to 14%). The MIS intervention was found ineffective and should not be implemented. This study was helpful in the decision process about whether or not to implement the C-MIS in daily nursing practice in cardiovascular outpatient clinics.

Routine clinical procedures
Studies fueled by uncertainty about the effectiveness of certain procedures in routine clinical care are presented in the next two chapters. Worldwide, several governmental institutions have developed guidelines for the timely identification of acutely ill medical patients, and recommend the use of early warning scores (EWS) or related systems. The consequences of these guidelines’ implementation are a substantial increase in measurements of vital signs, with doubtful clinical relevance. Therefore a systematic review is conducted, as described in Chapter 5, and the clinical relevance of routinely measured vital signs in medical and surgical hospitalized patients to detect mortality, septic or circulatory shock, ICU admission, bleeding, re-surgery or infection is determined. Vital signs included body temperature, heart rate, blood pressure, oxygen saturation and respiratory rate. A total of 14 studies were included in this systematic review: one prospective accuracy study and 13 observational studies. Although some discriminative likelihood ratios were found, the accompanying predictive values were low to moderate. There is scarce evidence available on the clinical relevance of routine vital-sign measurements. Hence, no evidence-based recommendation could be distilled from the current literature. There is a need for further prospective diagnostic accuracy and prognostic research on single or combination routine
vital-sign measurement to support daily routine and clinical decision making, and to avoid unnecessary practices.

Another widely used routine is the use of silver sulfadiazine (SSD) in patients with burn wounds. Many health care providers believe that SSD prevents wound infection and promotes wound healing. Other silver-containing dressings have also become popular, despite the absence of robust evidence for their effectiveness. Hence, a systematic review (Chapter 6) is conducted to establish the effect of silver-containing dressings and topical agents for the prevention of wound infection and the promotion of wound healing in uninfected wounds. A total of 26 studies were included, 20 of which concerned patients with burns. Heterogeneity of treatments and outcomes precluded meta-analyses. This systematic review shows that there is insufficient evidence to establish whether silver-containing dressings or topical agents promote wound healing or prevent wound infection. However, some evidence pleads against the use of SSD for this purpose.

The results of both studies illustrate that, for some routine clinical practices, surprisingly little evidence is available to support clinical decision making.

Part 2: Effect of evidence-based decisions on the quality of care

Influence of evidence-based decisions on patient care
Based on the results described in chapters 2 and 3, the MTS was implemented at our hospital’s ED. Implementation of an accurate triage system could positively influence the waiting time of critically ill patients and thereby the quality of care for these patients. Waiting times at EDs are also correlated with patient satisfaction. Yet waiting times and patient satisfaction have not been studied for the MTS. Chapter 7 deals with a prospective observational before–after study, in which the influence of the implementation of MTS on waiting times, LOS and patient satisfaction was determined in two consecutive patient series (n=1808). Waiting times did not decrease after implementation of the MTS, but were better distributed over urgency levels. In the After Implementation group, patient satisfaction was significantly lower on provision of information and opportunity to explain their problems, but waiting time and the feeling that their problem had been sorted out scored better. No significant differences were found between triaged and non-triaged patients. The better distribution over urgency levels justifies the decision to use the MTS. Still, implementing MTS on its own is not sufficient to improve the efficiency and quality of EDs.

Smoking cessation is an important factor in reducing cardiovascular mortality, but considerable effort is needed to successfully persuade patients to quit smoking. Treatment effects are mostly presented as the number needed to treat (NNT), but this does not reflect the total effort necessary to identify all patients who could or should potentially be treated. To determine the usefulness, relevance and efficiency of screening programs, the number needed to screen (NNS) may be a useful measure. Based on the prospectively sampled
cohort data for the study described in Chapter 4, we studied in **Chapter 8** the efficiency of the C-MIS and determined the NNT and NNS in relation to the number of deaths prevented over a five-year period. Subgroup analysis was performed for patients attending the clinics for first or routine follow-up attendees. The NNS was 687 (minimum (min)–maximum (max): 141–∞) in the cardiology clinic, and 574 (min–max: 134–∞) in the vascular surgery clinic. With the C-MIS for first-time and routine follow-up attendees, only six (min–max: 0–36) and zero (min–max: 0–25) deaths, respectively, could be prevented. In terms of the effectiveness of the C-MIS in addition to NRT, there is some benefit for first-time attendees but no benefit for routine follow-up attendees in preventing death.

**Chapters 7 and 8** exemplify the consequences of the new knowledge gained in chapters 2-4 for different stakeholders in clinical practice.

**Implementation challenges to change routine care**

The last two chapters describe two challenges for the implementation of changes in routine care. Despite a large body of knowledge available on effective implementation strategies of evidence-based guidelines into clinical and nursing practice, the ‘magic bullet’ does not exist. Multifaceted implementation strategies have been proposed to implement guidelines. In the review described in Chapter 5, fourteen studies were included: 13 observational studies and one prospective accuracy study. The last was performed by our own study group and assessed the diagnostic accuracy of routine postoperative body temperature measurements (BTM). By using a multifaceted implementation strategy, unnecessary BTM on surgical wards were abolished. Although short-term guideline adherence rates were high (91%), regression to old habits remains a common human flaw. Therefore the first challenge, i.e. long-term adherence, is described in **Chapter 9**, in which a mixed-methods analysis was used to determine if adherence was persistent over time and which facilitators and barriers contributed to adherence over time. Patient records were examined to see whether the recorded BTM complied with the guideline recommendation. Overall adherence rate was found to be 50%. Facilitators were belief in the advantages of the guideline and staff support. Barriers were the controversial nature of the guideline, the lack of self-efficacy among nurses and doctors regarding clinical judgment to identify an infection without the use of BTM, and a lack of management and staff doctor support. Therefore the conclusion was that to ensure long-term adherence, guidance is needed on every ward and indicators should be developed to monitor the required changes. Moreover, guidelines and their recommendations should be an integral part of the initial training period, standard education, and knowledge transfer of both nurses and physicians.

The second challenge is dealing with one of the barriers to adherence, i.e. awareness of the available evidence. It is impossible for doctors and nurses to keep abreast of all newly published research evidence. Therefore, available evidence is increasingly aggregated into systematic reviews (SR) and clinical guidelines. Despite active dissemination of the results of SRs and guidelines, 30–50% of patients receive care that is not in accordance with available
evidence. Based on the results of Chapter 6, **Chapter 10** describes a cross-sectional study investigating the awareness and use of evidence of 262 wound-care stakeholders (doctors, nurses, buyers, pharmacologists and manufacturers) in their choice of wound dressings. Doctors preferred conventional antiseptics (e.g., iodine), while specialized nurses and manufactures favoured popular products (e.g., silver). Most stakeholders considered silver-containing products to be evidence-based antiseptics, which contradicts scientific results. Nurses and manufacturers in particular were unaware of, or never used, the Cochrane Library. The results show that available high-quality evidence in wound care is not internalized equally by the various stakeholders, as is required to ensure evidence-based decision-making. As specialized nurses performed best in this regard, it appears that they can be most helpful in closing this quality chasm.

To solve clinical problems and to promote knowledge circulation, interdisciplinary collaboration in continuous quality improvement, EBP, and research should be seen as three complementary key tools in bridging the chasm between actual and desired quality of care.