Measuring Patients' Experiences in the Accident and Emergency Department

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Measuring Patients' Experiences in the Accident and Emergency Department

Het meten van patiëntenervaringen op de Spoedeisende Hulpafdeling

(met een samenvatting in het Nederlands)

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Chapter 1

General introduction

Patient-centredness

Since 1990 patient-centredness of care has been introduced in healthcare in order to better address the preferences of patients.[1] The American policy report 'Crossing the quality chasm' by the Institute of Medicine (IoM),[2] describes the problem of not being patient centred and the possibilities of the patient's perspective for healthcare system reform. The OiM states: "Healthcare harms patients too frequently and routinely fails to deliver its potential benefits. Between the delivery of healthcare and the optimal delivery of healthcare lies a chasm. Increasing patient centeredness is one (out of six) specific aim(s) to improve healthcare delivery. The IoM sets out ten rules to help to achieve the redesign of the system towards being more patients centered. The second of these rules is 'Care is customized according to patient needs and values'. Patients should be involved to succeed this rule.".

In 2000 the English National Health Service was imposed by the government to acknowledge the importance of patients' views. The program, entitled: 'The NHS Plan; a plan for investment, a plan for reform', was announced. The National Patient Survey Programme, a programme of annual surveys in NHS hospitals was set out in the NHS plan.[3]

In the Netherlands, in 2006, the Ministry of Health emphasized the need for a more prominent position of patients in the healthcare system in order to improve the quality of care.[4] In particular, standardized choice-information based on the experiences of patients was needed. The Dutch Center of Consumer Experience in Health Care was set up for the development, certification and implementation of measuring patients' experiences according to standardized guidelines. Since January 2013, the tasks of the Center of Consumer Experience in Health Care have been incorporated in the Quality Institute.

After the introduction of the concept of 'patient-centredness', the concept 'patient perspective' and how it can be measured is considered.

Patient perspective

The patient perspective helps to assess patient-centredness of healthcare and is embedded in a variety of measurements. Well-known are Patient Reported Experience Measures (PREMs), which focus on those quality of care aspects that are important according to patients, such as being treated with dignity. Patient-Reported Outcomes Measures (PROMs) describe whether services provide improved patients' health and sense of well-being.[5] PROMs are achieving a prominent position as are clinical outcome measures, such as mortality rate. PREMs, PROMs and clinical outcome measurements are potential indicators of the quality of care.[6]

To obtain the patient's perspective qualitative and quantitative research methodologies are used. In qualitative research, methods such as in-depth interviews, patient focus group discussions, and mystery guests are used to determine the patient's perspective.[7] The merit of this type of research is the detailed knowledge it provides. The disadvantages are that these methodologies are often time consuming and expensive processes (collecting, processing, and analysing the data). It is often applied prior to quantitative research methods and is meaningful to enhance the interpretation of quantitative research. Quantitative research to obtain the patient's perspective is often undertaken through patient surveys. Surveys can be administered in a variety of modes (mail/written, phone, face-to-face, internet). Generally, they offer the opportunity to include a larger number of respondents and quantitative data offer multiple analytic opportunities. Furthermore, questionnaires are applicable in various research designs such as pre-post evaluation designs or descriptive studies.

Measurements from the patient's perspective provide interesting information for several stakeholders in healthcare such as choice information for (other) patients, benchmark information for healthcare insurance companies, (operational) control information for healthcare professionals, comparative information for the Healthcare Inspectorate, and decision information for the Ministry of Health.

Experiences versus satisfaction

At first, the concept 'patient satisfaction' was used to evaluate care processes. Over time the relevance of studying patient satisfaction is increasingly being questioned because of conceptual and methodological problems. Satisfaction is based on two components: expectations (or 'needs') and experiences. Expectations are related to personal preferences, which make quality of care difficult to measure. Also, the definition of patient satisfaction described in various publications differs widely, where central elements such as personal evaluation, multi-dimensional concepts and subjective standard are used.[8] Subsequently, designing service improvements based upon measures of 'satisfaction' is difficult. To date, measures of 'experiences' are more preferred because these have shown to be more objective and to yield more detailed information for quality improvement.[9]

The American Consumer Assessment of Healthcare Providers and Systems (CAHPS) questionnaires, and the English questionnaires used in the National survey programme ask consumers and patients to report on and evaluate their experiences with healthcare. The Dutch questionnaires, which asks consumers and patients to report on and evaluate their experiences with healthcare performances, are known as the Consumer Quality Indices (CQIs).

The Dutch Consumer Quality Index

The Dutch Consumer Quality Index (CQI) combines the strengths of two comparable measures, the American CAHPS questionnaire and the Dutch Quality Of care Through the patients' Eyes (QUOTE).[8;10] The CQI provides important information for several parties. For instance, healthcare professionals are informed about two interesting aspects of healthcare performance. First, it displays improvement points for internal use, and second, it allows quality of care to be benchmarked between different care providers, which might be a stimulus to improve patient's perception of their service. In addition, it displays information about the best practices, which is also of interest of the Inspectorate of Healthcare. Another informed party is the Ministry of Health, which is interested in information for policy making processes.

The 'CQI hip knee' was one of the first developed CQIs (2007).[11] Currently, over forty CQIs for a variety of community services (CQI long-term care; CQI hospital care), care settings (CQI cancer care; CQI palliative care) and condition-specific patient groups (CQI cataract; CQI rheumatoid arthritis) have been developed or are under development.[12] This number will growth in the coming years. Different patient groups turned out to have different priorities, which stressed the need for specific questionnaires.[13] The development of a new CQI is an elaborate process. A questionnaire should meet at least two standards before it is applicable on a large scale. First, the validity (face and content) determines whether the questionnaire measures what it intends to measure. Second, the reliability determines whether the measure demonstrates the same or similar results in repeated comparable measures.[14] For CQIs, another important criterion is the discriminative capacity of the questionnaire to assess differences in quality of care among healthcare providers.[15] The development process has been prescribed in a manual, and it is guided and controlled by a scientific advisory board of the former Dutch Center of Consumer Experience in Health Care (incorporated in the Quality Institute as of January 1st, 2013).

Before the Dutch government acknowledged the importance of measuring patients' experiences in healthcare, the English NHS already ran the National Survey Programme. Within the Programme 'the Accident and Emergency department questionnaire', was used to measure patients' experiences in the A&E. The A&E survey was performed among hospital trusts in 2003, 2004/05, 2008, and 2012. This English example of measuring and assessing patients' experiences in the A&E inspired the development of a questionnaire measuring patients' experiences in the A&E that complies with Dutch guidelines. The assessment of patients' experiences and the development of the CQI A&E are central in this thesis. Following the development and testing, the CQI A&E will become publicly available this year (2013), thereby extending the set of CQIs for emergency services. This set currently exists of two CQIs for general practitioners (office hours and out-of-hours), a CQ-index for maternity services, and the CQIs for ambulance services and dispatch centres, which are under development.

The Accident and Emergency Department

In the Netherlands, about one hundred hospitals have an Accident and Emergency (A&E) department. Annually, more than two million people attend A&Es. The Dutch healthcare system assigned general practitioners as gatekeepers and patients are expected to consult a general practitioner (GP) before being referred to A&E departments in hospitals. However, the number of self-referrals is growing.[16] Ambulance services transport patients directly to the A&E, after referral by GP or without referral.[17;18] Also, medical specialists refer patients to an A&E if patients are worried about their condition or treatment after consultation.

In emergency medicine patients are often in distress whilst attending A&Es. Providing care designed around the patient is essential to avoid an unnecessarily traumatic impact besides the already existing physical and/or mental complaints.[19] Therefore, knowing what is of importance to patients and consequently whether it is received, should be measured. Whether factors such as age, gender, health status, or acuity, are related to patients' experiences needs to be explored to customize healthcare delivery.

Quality indicators for the Accident and Emergency Department

A quality indicator, as defined by Harteloh and Casparie[20] is a measurable aspect of care with a signalling function about the quality of care. Emergency medicine is a fairly new medical specialty. The international organisation for emergency medicine aims to propose a set of indicators to assess quality of emergency care across countries. The set should contain indicators to assess whether emergency care is safe, effective, patient-centred, timely, efficient and equitable.[21]

Donabedian divides indicators into structure, process and outcome indicators.[22] Structure and process indicators are related to organisational conditions and care processes such as guidelines and protocols for healthcare professionals. A broad range of outcome indicators exist such as clinical outcomes (mortality rate), economic outcomes (cost-effectiveness ratio), PROMs (i.e. pain, quality of life, health status), and PREMs (patients' experiences). Together, outcomes determine the quality of care of services.

The Department of Health in England introduced quality indicators for the A&E in April 2011. Here, one of the indicators is service experience by patients. The rationale behind this indicator is to include a qualitative understanding and description of service experience, and not be restricted to reporting quantitative measures of patient satisfaction from questionnaires. Other indicators are: 1. Unplanned re-attendance rate to the A&E within 7 days of the original attendance; 2. Total time spent in the A&E; 3. The number of patients who leave the A&E before a proper and thorough clinical assessment has been undertaken (left without being seen rate); 4. The time from arrival in the A&E to full initial assessment for cases arriving by ambulance; 5. The time between A&E arrival and the time when the patient is seen by a 'decision making clinician'; 6. Identification of three high risk presentations that should be reviewed by a consultant prior to A&E discharge (consultant sign-off).[23;24] Service experience by patients has already been measured as part of the National Survey Programme in 2003, 2004/05, 2008 and 2012.[25,26]

In the Netherlands, a complete and standardized set of quality indicators to evaluate emergency care in the A&E is lacking. The Netherlands Society of Emergency Physicians attempted to fill in this gap and introduced six indicators from a professional point of view i.e. adverse event reporting, awareness of child abuse, anticoagulant treatment (Ascal) in Acute Coronary Syndrome, pain treatment in non-traumatic abdominal pain, time to antibiotics in septic patients, and triage. Additionally, the Ministry of Health appointed a task force in 2009 to assess and categorize the quality of A&E departments. The report included a set of recommended quality standards, which were implemented from 2010.[27]

The standards relate specifically to the quality management system, the availability and competence of medical staff, and the time within which any necessary airway management interventions, including facemask ventilation or tracheal intubation, were operational. The Healthcare Inspectorate assesses compliance with the quality standards as part of its regular supervisory procedures.[28]

The on-going development of quality indicators contribute to the professionalism of emergency medicine as a medical specialty, which has been recognized as an area of special interest by the Medical Specialist Registration Committee (MSRC) in 2009.[29] A variety of structure, process and outcome indicators from different perspectives should be used to determine the quality of care. Measuring patients' experiences is useful in order to achieve standardization and professionalism in (inter-)national emergency care.

Comparison between countries

Emergency medicine may benefit from international comparison of patients' experiences. Increased migration of patients and professionals requires transparency of healthcare performance across countries.[30] Therefore, international initiatives of measuring patients' experiences in multiple countries should be extended. The Organization for Economic Cooperation and Development (OECD) emphasizes the importance of national and international surveys of patient experiences, and actively promotes cross-country comparative surveys using standardized instruments.[31] The OECD states that the need for patient reported outcome measurement will take a prominent position in healthcare over the next decade, because healthcare systems around the world are still struggling with the seemingly intractable problems of high costs and suboptimal quality, and are looking for new answers. Also, the European Partnership for Supervisory Organisations in Health Services and Social Care (EPSO) has been a powerful driver for undertaking cross-European research, to take advantage of the access to international expertise about safety, effectiveness and patient experience.[32]

Objectives

The work presented in this thesis explores the standardized measurement of patients' experiences in the Accident and Emergency department.
The three objectives are:

- To assess the quality of emergency care in the A&E by measuring patients' experiences, using the English A&E department questionnaire.
- To develop a questionnaire that measures patients' experiences in the A&E and adheres to Dutch Consumer Quality Index (CQI) guidelines.
- To explore patients' priorities, and patients' experiences of emergency care in the A&E in the Netherlands, using the newly developed Dutch CQI A&E questionnaire.

Outline

Chapter 1 introduced the topic of this thesis. In part 1 (chapters 2 and 3), the English A&E department questionnaire is studied to assess the quality of emergency care by measuring patients' experiences. Meaningful and reliable quality domains are constructed. Subsequently, patients' experiences in England and the Netherlands are surveyed, and the usefulness of comparing the quality of emergency care as experienced by patients across countries is determined.

Part 2 (chapters 4 and 5), describes the development process and the first evaluation of the Consumer Quality Index for the A&E (CQI A&E). The CQI format is the Dutch standard for measuring patients' experiences in healthcare. After the development of the questionnaire, the internal consistency, validity, and discriminative capacity of the CQI A&E is evaluated in 21 Dutch A&Es.

Part 3 (chapters 6 and 7), explores whether patient and care characteristics are related to what patients find important in emergency care (e.g. patients' priorities) (chapter 6) and looks into detail which patients experience problematic waiting times (chapter 7).
In chapter 8, the general discussion of this thesis, the policy implications, practice management implications, and scientific implications are discussed to anticipate to future developments.

Figure 1 Outline of the thesis: objectives and chapters

Assessing	Developing	Exploring
Chapter 2 Determing meaningful and reliable quality domains of the A&E department questionnaire.	**Chapter 4** The development and first use of the CQI A&E in the Netherlands.	**Chapter 6** Prioritizing emergency care aspects, and exploring relations between patients' priorities and patients' characteristics.
Chapter 3 Comparing patients' experiences in the Netherlands and England, and determing the usefulness of patients' experiences for across countries comparison of the quality of emergency care.	**Chapter 5** Determing the discriminative capacity of the CQI A&E.	**Chapter 7** Exploring factors related to problematic experiences with waiting time.

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Chapter 2

The Accident and Emergency department questionnaire

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The Accident and Emergency department questionnaire: a new measure for patients' experiences in the Accident and Emergency department

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Abstract

Background: The NHS National Patient Survey Programme systematically gathers patients' experiences about the care they have recently received. Prioritising quality improvement activities in the Accident and Emergency (A&E) department requires that survey outcomes are meaningful and reliable. We aimed to determine which method of obtaining summary scores for the A&E department questionnaire optimally combined good interpretability with robust psychometric characteristics.

Methods: A&E department questionnaire data from 151 hospital trusts were analysed, covering 49,646 patients. Three methods of grouping and summarizing items of the questionnaire were compared: 1. Principal Components Analysis; 2. Department of Health dimensions; 3. Sections according to the patient's journey through the A&E department. The patient-level reliability of summary scores was determined by Cronbach's alpha coefficients (threshold: $\alpha>0.70$), construct validity by Pearson's correlation coefficients, and the discriminative capacity by intra-class correlation coefficients and reliability of A&E-level mean scores.

Results: The Principal Components Analysis provided the best score reliability on six clear and interpretable composites: 1. Waiting time; 2. Doctors and nurses; 3. Your care and treatment; 4. Hygiene; 5. Information before discharge; 6. Overall. The discriminative power of the concepts was comparable for the three methods, with intra-class correlation coefficients between 0.010 and 0.061. A&E sample sizes were adequate in order to obtain good to excellent reliability of A&E-level mean scores.

Conclusions: The A&E department questionnaire is a valid and reliable questionnaire to assess patients' experiences with the A&E. The discriminative power of six summary scores offers a reliable comparison of healthcare performance between A&Es, in order to increase patient-centredness, and quality of care.

Background

Listening to patients' views is essential to providing a patient-centred health service. Many studies have underlined the fundamental importance of patient-established criteria for effective quality assessment. The importance of patients' views and experiences as an essential component of evaluation and improvement in healthcare has been emphasized both in studies and policy.[1-6]

Surveys are an important way to find out what patients have experienced in Accident and Emergency departments (A&Es).[7] The information provided by patients can be used to encourage and to prioritise local quality improvement activities. To increase the value and usefulness of this information, a meaningful and interpretable measure should be available. Specifically, these measures should avoid simply focussing on broad, vague concepts such as 'satisfaction' but should instead ask people to report events that occurred during their care and treatment.[8;9] Ideally, A&Es and other stakeholders in emergency medicine are provided with a measure which is applicable for benchmarks and to assess service improvements, both national and international. To enable these comparisons the measure needs to be consistent and rigorous.

In England, understanding what patients think about their care and treatment is an important part of the Care Quality Commission's (CQC) duty to assess and report on the quality and safety of services provided by the National Health Service (NHS). One of the ways in which CQC exercise this duty is via a national NHS patient survey programme that systematically gathers the views of patients about the care they have recently received.[10] All surveys in the NHS National Patient Survey Programme follow a similar methodology, provide comprehensive documentation, and report results consistently.[11]

The Accident and Emergency department questionnaire (A&E department questionnaire) was developed to assess patient experiences in the accident and emergency department. The questionnaire was cognitively tested with English speaking patients and was found to be construct valid.[12]

The effect of the findings of survey data largely depends on the presentation of the outcomes for their users such as government, commissioners, regulators, policymakers and patients. Summary scores help get an overview of performance and enable identification of the broad areas of strength and weakness. Data reduction, a process whereby items are grouped and summarized, enables more robust comparisons due to enhanced reliability. For the A&E department questionnaire, three different methods of grouping are relevant. Firstly, factor analysis, which is the most common statistical approach to grouping items in surveys. Factor analysis identifies which items are statistically related and refer jointly to an underlying domain (or factor).[13] The items can thus be reduced to the smallest possible number of concepts that still explain the largest possible part of the variance. The concepts provide an evidence based, patient-focussed outcome measure.[14; 15]

Secondly, the Department of Health constructed five ‘domains’ that are conceptually and thematically similar for all patient experience surveys in the National Patient Survey Programme. Each core questionnaire typically contains around 50-100 experience questions. A subset of these questions has been chosen to represent findings against each of five patient experience dimensions: ‘access and waiting’, ‘safe, high quality, coordinated care’, ‘better information, more choice’, ‘building better relationships’ and ‘clean, comfortable, friendly place to be’. It is possible to use these domains to compare organisations that participate in the same survey. National results have been published in key finding reports and have been used extensively for system level performance management.[16-19]

A third way to represent the outcomes is according to the patient’s journey through the Accident and Emergency department. The A&E department questionnaire is categorised in sections according to the patient’s journey from arrival until departure of the A&E department. For health care providers, reporting patients’ experiences in the sequence of the patient’s journey may be the most interpretable way of summarizing a survey.[20]

The three approaches described above each have their own benefits, but up to now little has been done to objectively compare their strengths in relation to the A&E survey. As the A&E survey is due to be repeated nationally in 2012 – having previously been run in 2004 and 2008 – it is timely to look at the domains emerging from these approaches. To enhance the main goal of the A&E survey, which is overall improvement of quality of care, evidence based outcome measures are preferable. Therefore, to assess the validity and reliability of the questionnaire, psychometric properties need to be tested. The aim of this study was to determine which method of obtaining summary scores for the A&E department questionnaire optimally combined good interpretability and was the most robust in terms of its psychometric characteristics.

Methods

Study design

A secondary analysis of data from a cross-sectional survey of A&E department attendees was performed.

Setting and participants

The A&E survey of the National Survey Programme was run in 2008 in 151 hospital trusts in England. For each eligible hospital trust, a systematic sample without replacement of 850 patients out of a one-month sample of A&E attendees was selected. Trusts were able to select one of three months, January or February or March 2008, in case any particular month was ‘atypical’ – for example in case of large scale local emergencies that may have placed unusual burden on the service. Annual emergency department attendances ranged from 11,058 to 306,689 patients. Patients were not eligible for the survey if they were under the age of 16, had attended a Minor Injuries Unit or Walk-in Centre, had been admitted to hospital via Medical or Surgical Admissions Units (and therefore had not visited the emergency department) or had a planned attendance at an outpatient clinic run within the emergency department. The paper questionnaire and covering letter were sent by postal mail up to three months after the A&E attendance. Up to two reminders were sent to non-respondents at two-weekly intervals. The recipients could return the questionnaire in a postage paid envelope.

Questionnaire

The A&E department questionnaire consisted of 50 questions divided into 11 different sections: arrival at the emergency department; waiting; doctors and nurses; your care and treatment; tests; pain; hospital environment and facilities; leaving the emergency department; overall; about you; any other comments. This structure was designed to correspond to the usual sequence of a visit to an A&E department, with the aim to make the questionnaire appear logical ordered: this is desirable as it may yield increased response rates.[21] The protocol for the original survey was reviewed and given a favourable ethical opinion by the North West Research Ethics Committee of the National Health Service.

Data screening and pre-analysis

Data from the survey was first analysed to identify item response rates and distributions. Questionnaire items were excluded from further analysis where they had an item non-response of >10% of expected responses (taking into account 'skip to' questions). Questions with high missing data are likely to be more relevant in some NHS trusts than in others, and rates of missing data typically vary between trusts. Therefore, items remained in the questionnaire but were not used for this summary measure. Questions with a high average will have very low base sizes for some trusts, which would make their use in summary measures aimed at all trusts problematic. Also, questions were excluded where they had an extreme skew of >90% of responses in the same category (i.e. a ceiling or floor effect). The ceiling effect limits its usefulness for comparisons, but if a trust is an outlier on that question then they should know about and act on. Where items had a negative wording, their scales were reversed to ensure comparability in the analysis. For each item, the response categories were scored from 0 to 100 with intermediate options at equal intervals.

Construction of composites

Composite item sets were readily available for the latter two of the three approaches outlined above, but analysis was undertaken to identify a set of items based on the factor analysis approach. Multiple analyses were performed using Principal Components Analysis (PCA). In case an item loaded on more than one factor, the factor with the highest loading was used. In a subsequent step, factor loadings were obtained (threshold: factor loading >0.30) for the factor composites. Internal consistency was calculated; if Cronbach's alpha for internal consistency (α) increased if an item was left out of the factor, the item was dropped. The factor structure in the final PCA fulfilled the statistical criteria. Nevertheless, to improve the clarity and interpretation of the factors, we decided to break down a large factor that covered multiple quality aspects into three factors, each measuring a single quality aspect.

Summary scores were calculated as the means of the experience scores for the items contributing to the composite after PCA, Department of Health dimension and questionnaire section. The concepts and items of the three different methods to reduce the data are presented in **Table 1**. Cronbach's alpha was calculated to estimate the internal consistency of the three concepts. Coefficients above 0.70 were regarded as reliable.[22] Construct validity was studied by calculating Pearson's correlation coefficients between the concept scores (**Table 2**). Pearson's correlation coefficient expresses the similarities of underlying constructs of the concepts. A correlation above 0.70 indicated that both concepts partially measured the same construct.

Additionally, the variance per A&E department and the intra-class correlation coefficient (ICC) were calculated. The variance describes the variability of the A&Es, whilst the ICC expresses the discriminative power of the concepts. The discriminative power is a general assessment of differences between healthcare providers; the variance attributable to providers can be tested for significance. The magnitude of the variance between providers may then be expressed as a proportion of the total variance on a scale from 0-1.[23]

Next, the calculations were repeated after adjusting the data for age (8 categories) and gender of the respondents,[24] and again after creating a more homogenous sample. The effect of heterogeneity of the A&Es was investigated with a more homogenous sample, which was constructed by deleting from the original sample all trusts characterized as multiservice, specialized or 'unknown'. Decreases of variances and related statistical measures imply that differences between trusts are partially caused by their characteristics.

Finally, A&E-level reliability, which express the proportion of variation in A&E-level mean scores attributable to true variation between A&Es, was estimated using generalizability theory.[25,26] The essence of generalizability theory is the recognition that in any measurement situation there are multiple sources of error variance, due, for instance, to random sampling. The theory contains two stages. In the first stage, called G-study, the variances

are used to create G-coefficients, each an extension of the classical reliability coefficient. The G-coefficients look at the proportion of total variance due to the object of measurement. In the final step the variances derived from the G-study are used to set the sample sizes needed to obtain a reliability of 0.7, 0.8 or 0.9. This is called a D-study.
All analyses were performed using the statistical software SPSS 19.0 and R 2.10.1.

Results

Participants
Questionnaires were sent to 128,383 patients and completed questionnaires were received from 49,646 respondents. This represented an adjusted response rate of 40% when undelivered questionnaires, ineligible patients, and deceased patients had been accounted for. Adjusted response rates varied between trusts from 26% to 52%. The mean age of the respondents was 54 years and 45% were male. For gender and age the differences between respondents and non-respondents were small but significant ($p<0.001$), as expected given the sample size.

Psychometric properties
Missing values ranged from 0.3% for the question ‘Was it possible to find a convenient place to park in the hospital car park?’ to 3.6% for ‘Do you think the hospital staff did everything they could to help you control your pain?’. The most skewed question was ‘While you were in the Emergency Department, did you feel bothered or threatened by other patients?’; 90.3% answered ‘no’, and the question was therefore not included in further analyses.
PCA identified four factors that accounted for 50.7% of explained variance. A first factor with twelve items and 31.8% of the variance, a second factor with five items and 7.4% of the variance, a third factor with three items and 6.3% of the variance and a fourth factor with two items and 5.3% of the variance. The content of the PCA factors showed similarities with the questionnaire sections. The first factor contained most items of the sections ‘doctors and nurses’ and ‘your care and treatment’ and all items of the ‘overall’ section: it was divided into three parts according to these sections to enhance interpretability. The second factor contained the same items as the section ‘leaving the emergency department’. Three out of four items of the section ‘waiting’ formed the third factor. The last factor contained two out of three items of the ‘hospital environment and facilities’ section.
Table 1 shows the concepts after reducing data in three different ways. Cronbach’s alpha coefficient described the internal consistency of each subscale. Overall, the highest Cronbach’s alpha coefficients were those of the six composites after PCA, with coefficients ranging from 0.634 to 0.877; only the ‘waiting time’ subscale had a value below

0.7. One question – Q17 – was added after PCA to the ‘your care and treatment’ subscale to improve internal consistency. Three out of five alpha coefficients of the national survey dimensions ‘access and waiting’, ‘safe, high quality, coordinated care’ and ‘better information, more choice’ were below the threshold of α=0.7. The alpha coefficients of the other two domains were α=0.701 and α=0.805. For the sections based on the patient‘s journey, the alpha coefficients of the sections ‘waiting’ and ‘hospital environment and facilities’ were below α=0.7. The other five coefficients ranged between α=0.729 and α=0.841.

Pearson’s correlation coefficients and unbiased, corrected correlations are presented in **Table 2**. Of interest were the correlations above the threshold of 0.7, which indicates an overlap between the concepts. The correlations of the concepts ‘doctors and nurses’, ‘your care and treatment’ and ‘overall’ were above this threshold (composites after PCA and sections). Thus these concepts partly measure the same aspect of healthcare performance in the A&E (and were originally included in a single factor in the PCA). The second and third dimensions show correlations above the threshold of 0.7 after corrections.

The ICC of a concept is the ability of that concept to point out differences in healthcare performance between A&Es. ICCs ranged from 0.010-0.061 for the composites after PCA. In other words, a small part of the total variability in experience of healthcare measured by these composites was attributable to performance differences between A&Es, namely 1.0-6.1%. ICCs of the DH dimensions were 0.011-0.049 (1.1-4.9%), and those of the sections of the questionnaire were 0.010-0.056 (1.0-5.6%). Adjustment for age (8 categories) and gender caused a minimal reduction in ICCs (minus 0 to 0.002). The ICCs calculated for the more homogenous sample of A&Es were influenced minimally as well (minus 0 to 0.003). Patients’ characteristics or trust characteristics made a very small difference to the variability between A&Es. **Table 3** shows the estimates of the concepts including mean experience score and the standard deviation; the variance between A&Es, and the ICC. Furthermore, the reliability (G-coefficient) of the mean value given the actual sample size of the A&Es was presented, and used to set the sample sizes needed to obtain reliability of 0.7, 0.8 or 0.9. Composites with a high A&E-level reliability (>0.9) may have good value as measures of comparative performance at the sample size available. For a reliability of 0.7 most required sample sizes appeared to be rather small.

Table 1 Concepts of A&E department questionnaire after data reduction (quality aspect, questions, and internal consistency)

		Quality aspect	Questions	α
Composite*	1	Waiting time	Q7 Q8 Q10	0.63
	2	Doctors and nurses	Q11 Q12 Q13 Q14 Q15	0.88
	3	Your care and treatment	Q17 Q18 Q19 Q21 Q27	0.78
	4	Hygiene	Q28 Q29	0.82
	5	Information before discharge	Q33 Q34 Q35 Q36 Q37	0.80
	6	Overall	Q38 Q39 Q40	0.83
Dimension**	1	Access and waiting	Q7 Q8 Q10	0.63
	2	Safe, high quality, coordinated care	Q15 Q20 Q36	0.55
	3	Better information, more choice	Q17 Q21 Q33 Q34	0.64
	4	Building better relationships	Q11 Q12 Q13 Q14 Q16	0.81
	5	Clean, comfortable, friendly place to be	Q18 Q27 Q28 Q39	0.70
Section***	1	Waiting time	Q7 Q8 Q9 Q10	0.53
	2	Doctors and nurses	Q11 Q12 Q13 Q14 Q15 Q16	0.84
	3	Your care and treatment	Q17 Q18 Q19 Q20 Q21	0.73
	4	Tests	Q23	N/A
	5	Pain	Q26 Q27	0.74
	6	Hospital environment and facilities	Q28 Q29 Q30	0.64
	7	Leaving the Emergency Department	Q33 Q34 Q35 Q36 Q37	0.80
	8	Overall	Q38 Q39 Q40	0.83

**Composite after Principal Components Analysis*
*** Department of Health dimension*
**** Section of the questionnaire*
α=Cronbach's alpha coefficient a measure for internal consistency
N/A=Not Applicable

Table 2 Correlation coefficients and Cronbach's alpha coefficients

		Quality aspect	1	2	3	4
Composite	1	Waiting time	**0.634**	0.424	0.499	0.419
	2	Doctors and nurses	0.316	**0.877**	0.905	0.434
	3	Your care and treatment	0.351	0.749	**0.781**	0.526
	4	Hygiene	0.301	0.367	0.420	**0.815**
	5	Information before discharge	0.244	0.567	0.581	0.318
	6	Overall	0.409	0.721	0.734	0.476
Dimension	1	Access and waiting	**0.634**	0.520	0.415	0.431
	2	Safe, high quality, coordinated care	0.308	**0.554**	0.991	0.946
	3	Better information, more choice	0.265	0.591	**0.642**	0.946
	4	Building better relationships	0.301	0.632	0.680	**0.805**
	5	Clean, comfortable, friendly place to be	0.362	0.528	0.476	0.524
Section	1	Waiting	**0.528**	0.518	0.579	N/A
	2	Doctors and nurses	0.345	**0.841**	0.955	N/A
	3	Your care and treatment	0.359	0.748	**0.729**	N/A
	4	Tests	0.220	0.511	0.496	**N/A**
	5	Pain	0.372	0.524	0.541	0.362
	6	Hospital environment and facilities	0.326	0.355	0.403	0.235
	7	Leaving the Emergency Department	0.310	0.556	0.540	0.442
	8	Overall	0.424	0.722	0.713	0.427

Pearson's (observed) correlation coefficients below the diagonal
Cronbach's alpha reliability coefficients on the diagonal in bold
Unattenuated (corrected) correlations above the diagonal
N/A=Not Applicable

Table 2, continued. Correlation coefficients and Cronbach's alpha coefficients

		Quality aspect	**5**	**6**	**7**	**8**
Composite	1	Waiting time	0.343	0.566		
	2	Doctors and nurses	0.677	0.848		
	3	Your care and treatment	0.735	0.914		
	4	Hygiene	0.394	0.580		
	5	Information before discharge	**0.800**	0.709		
	6	Overall	0.570	**0.825**		
Dimension	1	Access and waiting	0.543			
	2	Safe, high quality, coordinated care	0.847			
	3	Better information, more choice	0.710			
	4	Building better relationships	0.698			
	5	Clean, comfortable, friendly place to be	**0.701**			
Section	1	Waiting	0.594	0.562	0.642	0.642
	2	Doctors and nurses	0.663	0.485	0.867	0.867
	3	Your care and treatment	0.735	0.591	0.919	0.919
	4	Tests	N/A	N/A	N/A	N/A
	5	Pain	**0.743**	0.484	0.774	0.774
	6	Hospital environment and facilities	0.333	**0.637**	0.633	0.633
	7	Leaving the Emergency Department	0.483	0.279	**0.709**	0.709
	8	Overall	0.606	0.459	0.825	**0.825**

Table 3 Statistical measures of the concepts

	Quality aspect	Experience score (mean)	Variance per A&E	ICC	ICC *
Composite	1 Waiting time	66.8	22.214	0.049	0.048
	2 Doctors and nurses	81.6	5.618	0.010	0.010
	3 Your care and treatment	80.9	8.974	0.018	0.018
	4 Hygiene	74.4	34.032	0.061	0.059
	5 Information before discharge	59.3	15.768	0.013	0.013
	6 Overall	81.7	11.601	0.022	0.020
Dimension	1 Access and waiting	66.8	22.214	0.049	0.048
	2 Safe, high quality, coordinated care	81.8	7.862	0.013	0.012
	3 Better information, more choice	80.0	9.242	0.014	0.013
	4 Building better relationships	82.6	5.370	0.011	0.011
	5 Clean, comfortable, friendly place to be	80.2	14.849	0.037	0.036
Section	1 Waiting	62.1	19.787	0.037	0.037
	2 Doctors and nurses	82.9	5.509	0.012	0.012
	3 Your care and treatment	83.3	7.503	0.018	0.018
	4 Tests	74.7	13.309	0.010	0.011
	5 Pain	71.0	25.462	0.021	0.019
	6 Hospital environment and facilities	83.8	16.924	0.056	0.054
	7 Leaving the Emergency Department	59.3	15.768	0.013	0.013
	8 Overall	81.7	11.601	0.022	0.020

** ICC adjusted for the age and gender of the patients*
*** ICC of homogenous sample*
**** The G-coefficient indicates the reliability of the measurement at an A&E given the actual sample size*

Table 3, continued. Statistical measures of the concepts

	Quality aspect	ICC **	Mean valid response per A&E	Reliability (G-coeffi-ciënt)***	No. of respondents needed for reliability		
					0.7	0.8	0.9
Composite	1 Waiting time	0.046	314	0.94	46	78	176
	2 Doctors and nurses	0.009	321	0.76	237	406	913
	3 Your care and treatment	0.018	318	0.85	128	219	492
	4 Hygiene	0.058	169	0.92	36	61	138
	5 Information before discharge	0.012	128	0.63	174	298	670
	6 Overall	0.020	323	0.88	106	182	409
Dimension	1 Access and waiting	0.046	314	0.94	46	78	176
	2 Safe, high quality, coordinated care	0.013	319	0.81	173	297	668
	3 Better information, more choice	0.014	300	0.80	170	292	657
	4 Building better relationships	0.010	320	0.78	206	353	795
	5 Clean, comfortable, friendly place to be	0.035	317	0.92	60	104	233
Section	1 Waiting	0.034	317	0.93	60	103	231
	2 Doctors and nurses	0.011	322	0.79	194	333	749
	3 Your care and treatment	0.018	322	0.86	125	213	480
	4 Tests	0.011	192	0.67	222	380	855
	5 Pain	0.020	185	0.80	110	188	424
	6 Hospital environment and facilities	0.053	311	0.95	39	67	151
	7 Leaving the Emergency Department	0.012	128	0.63	174	298	670
	8 Overall	0.020	323	0.88	106	182	409

Discussion

In general, data reduction has the aim to enhance clarity and comprehensibility of survey data. The focus of this study was to determine a meaningful and reliable presentation of the outcomes of the A&E survey for their users. We studied three data reduction methods for the A&E department questionnaire. First, principal components analysis resulted in six composites, which covered 23 items of the questionnaire. Second, the five dimensions of the national patient experience programme covered 19 items. Last, the patient's journey and questionnaire sections resulted in nine sections, which covered 32 items.

In this study, the PCA exhibited better internal consistency than the other two methods. The content and interpretability of all composites were clear. Variances and ICCs, and therefore the discriminative power of the concepts, were comparable for the three methods. Sample sizes were adequate in order to obtain good to excellent reliability of the A&E-level mean scores. The DH dimensions showed lower reliability and interpretability compared to the other methods.

Inevitably, data reduction causes a loss of content of the questionnaire. The patient's journey and questionnaire sections might give the broadest representation of the content of the questionnaire. Nevertheless, we advise to represent the outcomes of the A&E department questionnaire according to the more reliable six composites after PCA, although the number of items in the composites is lower and some content is lost. Increased reliability (by definition) gives better discrimination between objects of measurement; unreliable measures attenuate relationships and will give less precise estimates of performance.

We decided to break down the 'original' first factor of the PCA into three separate composites. In our opinion a composite that measures a single aspect of care is more useful for quality improvement and benchmarking than a larger composite that measures multiple aspects of care, even though the latter might satisfy the statistical criteria. The three composites are easier to interpret, more informative and more specific than the 'original' factor. The 'original' factor and items were similar to the items of the three sections 'doctors and nurses', 'your care and treatment' and 'overall', which appeared to be reliable and followed a logical sequence, which enhances interpretation of outcomes. We are aware that there was no mathematical reason for breaking down the factor.

Pearson's correlation coefficients of the five Department of Health domains were below the threshold of 0.70 before correcting the correlations for random error of the reliability estimates. Afterwards the DH dimensions were above the 0.7 threshold and higher than the other correlations. The raw Pearson's correlation can be regarded as a lower bound estimate and the 'true' correlation may be greater. Hence, the 'true' correlation would be somewhere between the raw and adjusted coefficients. The correlations of the 'doctors and nurses', 'your care and treatment' and 'overall' concepts of the other two approaches were above the 0.7 threshold. This implies that these sections partially measure a similar underlying construct of the care provided at the A&E, which was expected for the 'overall' concept. The high correlation between 'doctors and nurses' and 'your care and treatment' was supported by PCA, in which these composites originally formed one factor, together with the 'overall' composite.

ICCs of all concepts after data reduction were good compared to other survey data. In other studies on patient experiences the mean ICC was 0.01 for unadjusted data.[23] Adjusting the data for age and gender of the patients did not affect the variance or ICC in our study; the largest decrease of the ICC was 0.002. In the present study the lowest ICC was 0.01, whilst the highest was 0.061 for the composite 'hygiene' after PCA. Thus, patients' reported experiences can measure differences in healthcare performance between A&E departments. However, interpretation of these numbers showed that only 1-6% of the total score variance was attributable to the difference between providers, suggesting that individual variation outweighs variation between trusts.

A&E reliability of the mean scores expressed the proportion of variation at the A&E-level attributable to true variation between A&Es. The A&E-level reliability of the concepts was good, and for several concepts excellent, which would support their potential for comparative performance assessment. The reliability of the 'information before discharge' composite was below the threshold of 0.7. The minimum number of respondents required for all PCA domains to have good reliability at the A&E level is 237. Nevertheless, concepts that show high internal consistency but that are less capable of distinguishing small differences - in other words, those with high reliability but low ICC - should be used with caution. Large sample sizes may be needed to compare organisational performance against these concepts, and larger sample sizes increase the cost of postal surveys. **Table 3** shows the reliability and required sample sizes for each concepts, obtained using generalizability theory; the same methodology was applied by Lyratzopolous et al. using a different terminology.[27]

The first main strength of this study was the large database of 49,646 respondents distributed over 151 national acute services trusts. The questionnaire provides the government, commissioners, policy makers and patients with a measure to benchmark best practice and to assess service improvement. Secondly, the A&E survey is part of the national survey programme of 2012. Whether healthcare performances in the A&E, and quality of care as experienced by patients, have been changed over the last four years can be explored, adding value to the programme. Thirdly, this study contributes to the international interest in patient-centred care. Future research should establish the possibility of using this measure for international comparisons of quality of emergency care.

Limitations

We found some small but significant differences between respondents and non-respondents in age and sex. This was likely due to the large sample size and therefore statistical power and not a reflection of meaningful differences between these populations. Patient's symptoms could have evoked recall bias (i.e. due to loss of consciousness). However, the questionnaire was tested via cognitive interviews before use and was found to work well.

We found several similarities between the data reducing methods. First, the ranges of Cronbach's alpha coefficients, variances, ICCs and A&E-level reliability estimates between the three concepts were small. Second, the composite after PCA 'information before discharge' and the section 'leaving the ED' were similar. The different numbers of composites, dimensions and sections made a comparison between the three methods somewhat arbitrary. The overall composite could justifiably be removed since it showed high correlations to two other domains. Only one out of three items of the 'overall' composite will be maintained in the A&E survey in 2012.

Data reduction causes loss of content, and consequently the summary scores did not represent all aspects of patients' journeys through the A&E. From a clinical point of view, it might be preferable to evaluate the quality of care from arrival until departure of the A&E using individual items in addition to the summary scores; this could be particularly useful for locally initiated work aiming to report at sub-organisational level. However, for organisation level use it might also be a logical step to create a shortened version of the A&E department questionnaire based on the six reliable composites. A shorter survey would decrease patient burden, and might improve response. Previous research has shown mixed evidence on questionnaire length and response rate.[28, 29]

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Chapter 3

Quality of care in the Accident and Emergency department in England and the Netherlands as experienced by patients

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A comparison of the quality of care in Accident and Emergency departments in England and the Netherlands as experienced by patients

Submitted

Abstract

Objective: Measuring patients' experiences to determine healthcare performance and quality of care from a patient perspective can provide valuable evidence for international improvements of the quality of care. We compared patients' experiences in the Accident & Emergency department (A&E) in England and the Netherlands, and discussed the usefulness of this comparison.

Design: Cross-sectional surveys

Setting: 134 A&Es in England and 9 A&Es in the Netherlands

Participants: Patients attending A&Es aged 16 years and older.

Main outcome measure: Patients' experiences represented with six domain scores aggregated on the country level or on the A&E level.

Results: In England, 43,892 completed questionnaires were received (40%). In the Netherlands, 1,865 completed questionnaires were received (42%). Summary scores for three out of six domains were significantly higher for patients in the Netherlands: 'waiting time' (mean scores of 73.8 (NL) versus 67.2 (UK)), 'doctors and nurses' (mean scores of 85.7 (NL) versus 80.6 (UK)) and 'your care and treatment' (mean scores of 82.6 (NL) and 80.2 (UK)). The variance among the English A&Es was larger than the variance among the Dutch A&Es. The best and worst practices on five domains were English A&Es.

Conclusions: The mean quality of care in the A&E appeared to be better in the Netherlands on three domains. Yet the best practices were English A&Es. The within-country differences between A&Es were much larger than differences between countries. Healthcare performance in the A&E can be compared between countries by surveying patients' experiences, and there is much to learn across A&Es both within and among countries.

Introduction

Recently, the importance of taking a patient perspective has been given greater prominence in emergency medicine.[1] Assessing patients' experiences is increasingly acknowledged as an integral part of evaluating healthcare.[2] Measuring their experiences with healthcare performance in different countries may add valuable input to the discussion about preferable models for the organisation of emergency medicine. The Organization for Economic Cooperation and Development (OECD) emphasizes the importance of national and international surveys of patient experiences, and actively promotes cross-country comparative surveys using standardized instruments.[3] Disease-specific questionnaires for diabetes and cancer patients have already been developed and applied cross-country, anticipating the migration of patients and professionals.[4] The OECD believes the need for patient-reported outcome measurement will take a prominent position in healthcare over the next decade, because healthcare systems around the world are still struggling with the seemingly intractable problems of high costs and suboptimal quality, and are looking for new answers. In addition, the European Partnership for Supervisory Organisations in Health Services and Social Care (EPSO) has been a powerful driver for undertaking cross-European research, to take advantage of the access to international expertise about safety, effectiveness and patient experience.[5] The Commonwealth Fund already used the benefits of cross-cultural comparisons of patients' experiences to explore possibilities of reducing the national healthcare costs in the United States.[6]

One of the healthcare areas that may benefit from international comparison of patients' experiences is emergency medicine. Organisation of, and access to, emergency medicine differs among countries. Whether healthcare performance in emergency medicine as experienced by patients differs between countries, and whether cross-country comparisons can be meaningful for optimization of the organisation of emergency medicine should be researched. We explore this topic by comparing patients' experiences with emergency care in the Accident and Emergency departments (A&Es) in England and the Netherlands.

In England, understanding what patients think about their care and treatment is an important part of the Care Quality Commission's duty to assess and report on the quality and safety of services provided by the National Health Service (NHS). The NHS has a national patient experience survey programme that systematically gathers patients' views of the care they have recently received.[7] Improving patient experience is a key aim of the NHS. Although NHS trusts' participation in the programme is voluntary, it is universal. By asking for, monitoring, and acting upon patient feedback, organisations are able to make improvements in the areas that patients say matter most to them. Within the survey programme, adults using A&E services were surveyed in 2004, 2008 and 2012. The survey was undertaken with the Accident and Emergency department questionnaire, which measures patients' experiences in the A&Es of NHS trusts. The questionnaire seeks to measure patients' experiences rather than their satisfaction. Satisfaction is based on two components: expectations (or 'needs') and experiences. Expectations are related to personal preferences, which make quality of care difficult to measure. Therefore, it is preferable to measure experiences, which have shown to be more objective and to yield more detailed information for quality improvement.[8]

In the Netherlands, the Ministry of Healthcare, Welfare and Sport promotes the measurement of patients' experiences for healthcare evaluations. Since 2006 several questionnaires for a variety of community services, care settings and condition-specific patients' groups have been developed.[9] Healthcare organisations participate voluntarily in the majority of surveys. Until recently a questionnaire for the A&E was lacking. Therefore, the A&E department questionnaire used in the English National Patient Survey Programme[10] was translated into Dutch and surveys were undertaken in A&Es in the Netherlands, in 2009 and 2010.

The aim of this study is to explore and compare the quality of care in A&Es in England and the Netherlands from the patient's perspective, and to discuss the usefulness of comparing the quality of care as experienced by patients between countries.

Methods

Study design

Cross-sectional surveys were conducted in England and the Netherlands.

Data collection

In this study we used data from the A&E survey of the National Patient Experiences Survey Programme in England run in 2008.[11] For each hospital trust, a random selection of 850 adult A&E attendees out of a one-month sample, with known postal address (and excluding known deaths) were selected, using a computer-generated numbers table. Trusts were able to select one of three months, January or February or March 2008, in case any particular month was 'atypical' – for example in case of large scale local emergencies that may have placed an unusual burden on the service. Participation in the survey was voluntary and funded locally; all 134 eligible trusts took part. Annual patients' numbers attending A&E ranged from 11,058 to 306,689. Patients were not eligible if they were under the age of 16 years, had attended a Minor Injuries Unit or Walk-in Centre, had been admitted to hospital via Medical or Surgical Admissions Units (and therefore had not visited the A&E) or had a planned attendance at an outpatient clinic run within the A&E.

In the Netherlands an announcement of the study was made in an online national medical newsletter. Nine hospitals were interested in the study and confirmed their participation. Annual A&E patients' numbers attending A&E ranged from 13,500 to 50,000. These are medium to large sized hospitals, varying in terms of bed numbers, patient throughput, geographical area (urban or rural) and teaching or non-teaching status. Overall quality of the participating hospitals ranged from best through worst on a national rank-order of hospital quality.[12] For the data collection a sample of patients who attended the A&E was compiled in April 2009 (two hospitals) and September 2010 (seven hospitals). In the 2009 samples, all patients who went to the A&E in one week were included. In the 2010 samples, 600-800 patients per A&E were randomly selected out of all patients attending in three subsequent weeks. Patients were not eligible under the age of 16 years, if their postal address was unknown or if the hospital had reported their death. In England, the paper questionnaire and covering letter were sent by post up to three months after the A&E attendance. Up to two reminders were sent to non-respondents at 2-weekly intervals. The recipients could return the questionnaire in a pre-paid envelope or complete the survey by telephone or in a different language if they requested. In the Netherlands, the patients received the questionnaire and an information letter within one month of their attendance. Up to three reminders were sent to non-respondents: after 1, 4, and 6 weeks. The questionnaire could be returned in a postage paid return envelope.

Questionnaire

The A&E department questionnaire used in the 2008 survey in England was based on the questionnaire used for the national emergency department survey conducted in 2003. Stakeholders were consulted and focus groups were conducted with patients to test the face validity of the questionnaire.[13] The questionnaire was translated into Dutch by two independent researchers, according to the cross cultural adaptation process.[14] Differences in the translations were discussed and translations were adapted by consensus. The questionnaire was translated back to English by a native speaker. Variations between the original questionnaire and the forward-backward translated questionnaire were resolved with the developer. The core questionnaire consisted of fifty questions divided into eleven different sections: arrival at the emergency department; waiting; doctors and nurses; your care and treatment; tests; pain; hospital environment and facilities; leaving the emergency department; overall; about you; any other comments. These sections were introduced in an order that parallels the typical sequence of use of an A&E.

The English study protocol was approved by the North West Research Ethics Committee of the National Health Service and the Dutch protocol by Medical Ethical Committee of the University Medical Center Utrecht.

Data Analysis

Descriptive statistics were used to summarize the English and Dutch sample characteristics of the respondents, such as age, gender, referral, and hospital admission after discharge from the A&E. Previous research[10] indicated that patients' experiences measured by the A&E department questionnaire could be represented with six domain scores (each with internal consistency according to the Cronbach's alpha coefficient (α) 1. Waiting time (α=0.634); 2. Doctors and nurses (α=0.877); 3. Your care and treatment (α=0.781); 4. Hygiene (α=0.815); 5. Information before discharge (α=0.800); 6. Overall (α=0.825). To calculate the domain scores, the response categories of the questions that constitute the domain were recoded into 0 to 100 with intermediary options at equal intervals.

The data set was aggregated from A&E unit to national level to compute the domain scores that comprise the overall mean of the experience scores for each item contributing to the domains. Linear mixed effect models were used to examine the associations between countries and patients' experiences.[15] These models are appropriate to analyse the hierarchical structure of the data (patients within A&Es). A domain score was the dependent variable, and a random intercept per A&E was included in the model. Significant differences between countries for each of the six domain scores was determined using likelihood ratio tests. Differences with a $p<0.01$ were considered significant. Adjusted mean scores were calculated to assess differences due to healthcare performances between countries while controlling for potential confounding of the patient characteristics age, sex, referral, and admission after discharge.[16] The question 'What was the main reason that you went to the emergency department for?' was used to assess the categories of the variable 'referral'. Referral was used as a proxy for differences between healthcare systems. The question 'What happened at the end of your visit to the emergency department?' was used to determine the three discharge categories: 1. admission to the same hospital; 2. discharged to home or stayed with a friend or relative; 3. somewhere else, transferred to a different hospital or to a nursing home or stayed somewhere else. The question was used as a proxy for the severity of the patient's health problem.

To enhance the interpretation of the differences between countries' mean domain scores, effect sizes were calculated using the method proposed by Hedges for estimating δT.[17] An effect size expresses the differences between the means in standard deviation units and is an indicator for the practical relevance. The widely used threshold values for small, medium and large effect sizes are respectively 0.2, 0.5, and 0.8.[18]

Finally, to determine the variability of A&Es within countries the variance among A&Es was determined. Linear mixed effect models provide data to calculate the intra-class correlation coefficient (ICC), a general assessment of differences among A&Es.[19] ICCs were used to calculate the mean score of all A&Es and the 95% comparative confidence intervals (CI) of individual A&Es, adjusted for sex, age, admission after discharge, and referral.

Data were analysed with R 2.10.120;21 and SPSS 19.0.

Results

Participants

In England, questionnaires were sent to 113,955 patients and completed questionnaires were received from 43,892 respondents. This represented an adjusted response rate of 40% when undelivered questionnaires, ineligible patients, and deceased patients have been accounted for. The mean age of the respondents was 53.5 years and 45% were male. In the Netherlands, questionnaires were sent to 4,464 patients and completed questionnaires were received from 1,865 respondents. This represented an adjusted response rate of 42% when undelivered questionnaires, ineligible patients, and deceased patients have been accounted for. The mean age of the Dutch respondents was 54.4 years and 49% were male. In the Dutch sample, most respondents (46%) were referred by a healthcare professional. English' respondents were mostly referred by ambulance (29%), self-referred (28%), or healthcare professional (26%) (**Table 1**).

Table 1 Respondent characteristics

		NL		UK	
		%	N	%	N
Age	Years (mean (SD))	54.4 (19.9)	1861	53.5 (20.6)	43872
	Missing		4		20
Gender	Male	49.0	891	44.9	19716
	Female	51.0	927	55.1	24170
	Missing		47		6
Referral	Healthcare professional	49.1	837	26.2	10056
	Ambulance	19.1	326	28.8	11051
	Self-referral	20.1	343	28.2	10790
	Somebody else (friend, relative, colleague)	11.6	198	16.8	6427
	Missing		161		5568
Admission from A&E	Admitted to the same hospital	34.0	612	27.8	11939
	Discharged to home	63.6	1146	68.9	29640
	Somewhere else	2.4	43	3.3	1436
	Missing		64		877

** ICC adjusted for the age and gender of the patients ** ICC of homogenous sample*
**** The G-coefficient indicates the reliability of the measurement at an A&E given the actual sample size*

Aggregated domain scores (range 0 to 100) for patients in the Netherlands were higher (**Table 2**). Significant differences between the countries were observed for the domains ‘waiting time’ (mean scores of 73.8 (NL) versus 67.2 (UK)), ‘doctors and nurses’ (mean scores of 85.7 (NL) versus 80.6 (UK)) and ‘your care and treatment’ (mean scores of 82.6 (NL) and 80.2 (UK)). The mean scores for ‘hygiene’, and for ‘overall’ were also higher for Dutch patients but differences were not significant between the two countries. The mean score for ‘information before discharge’ was slightly but non-significantly higher for the English patients (59.4 (UK) versus 58.9 (NL)). The largest effect size was computed for the domain ‘waiting time’, which was 0.3. All other effect sizes were smaller than 0.3. No effect was found for the domain ‘ information before discharge’.

Table 2 Patients' experiences domain scores

	Experience domain scores (mean (s.e.))		**Effect size**
	NL	**UK**	
Waiting time*	73.8 (1.6)	67.2 (0.4)	0.31
Doctors and nurses*	85.7 (1.0)	80.6 (0.3)	0.22
Your care and treatment*	82.6 (1.1)	80.2 (0.3)	0.11
Hygiene	76.6 (2.0)	74.1 (0.6)	0.11
Information before discharge	58.9 (2.1)	59.4 (1.2)	0.02
Overall	83.6 (1.1)	81.4 (0.3)	0.10

** Domain scores were significantly different between the two countries (likelihood ratio test; p<0.01)*
Domain score models were adjusted for age, sex, referral, and admission after discharge
Threshold values for small, medium and large effect sizes are 0.2, 0.5, and 0.8

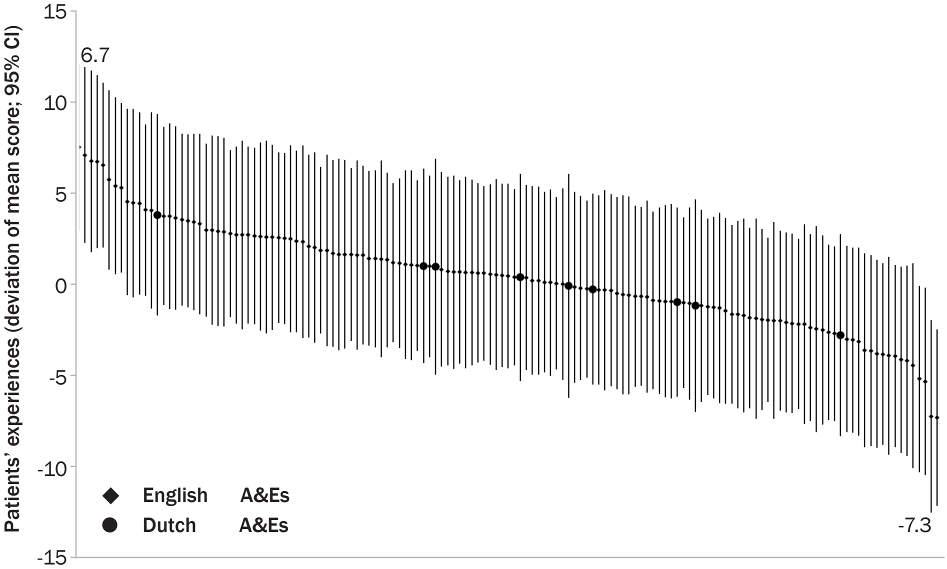
Table 3 shows the lower limit and the upper limit of the deviation of the mean domain score within both countries. The variance among the English A&Es was larger than the variance among the Dutch A&Es. The best and worst practices on five domains were English A&Es. On the domain 'doctors and nurses' the best practice was a Dutch A&E. We plotted deviations from the means, and corresponding 95% confidence intervals of the domains with the largest effect size 'waiting time' and the domain with the smallest effect size 'information before discharge' to visualize the variance among A&Es within both countries, see caterpillar plots **Figure 1** and **Figure 2**.

Table 3 Variance of patients' experiences domain scores

	Deviation of mean experience domain scores			
	NL		**UK**	
	Lower limit	**Upper limit**	**Lower limit**	**Upper limit**
Waiting time	-0.3	8.9	-14.1	9.8
Doctors and nurses	0.8	5.4	-7.7	4.5
Your care and treatment	-0.9	4.2	-8.8	5.4
Hygiene	-1.6	7.5	-11.8	10.5
Information before discharge	-3.0	3.2	-7.3	6.7
Overall	-2.9	4.2	-6.7	5.0

Domain score models were adjusted for age, sex, referral, and admission after discharge

Figure 1 Waiting time



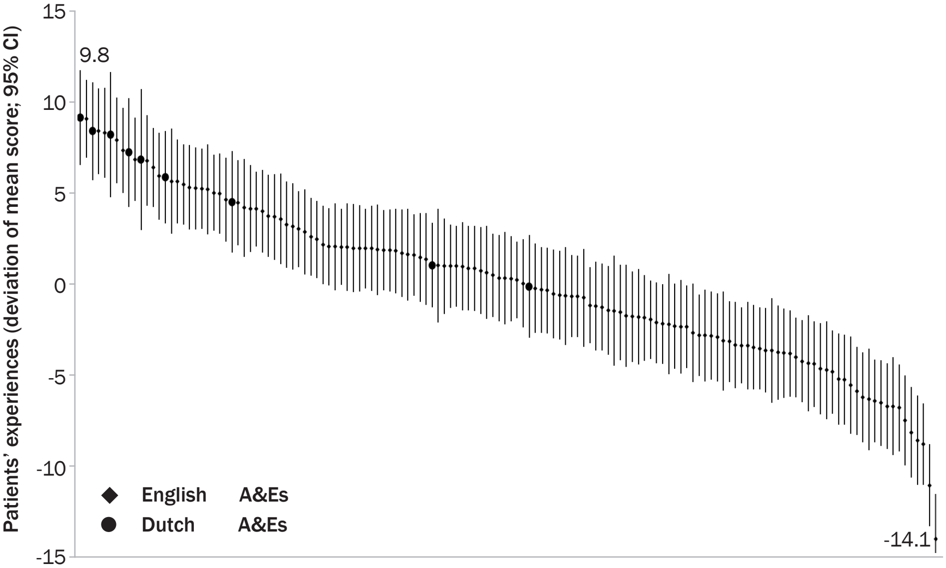
The figure displays patients' experiences on the domain waiting time of each A&E. The vertical axis plots the deviation of the mean score, and the corresponding 95% confidence interval. In the upper left corner the highest deviation of the mean score is presented (6.7). In the lower right corner the lowest deviation of the mean score is displayed (-7.3). The large black dots are estimates of Dutch A&Es. The smaller black diamonds are estimates of English A&Es.

Discussion

This is the first study to compare quality aspects of healthcare performance, as experienced by patients in the A&E, between England and the Netherlands. The Dutch patients had significantly more positive experiences on the domains 'waiting time', 'doctors and nurses', and 'your care and treatment'. However, effect sizes were small. This suggests that in daily practice, healthcare performance as experienced by patients does not differ substantially between these countries. The largest effect size was calculated for waiting time (i.e. small effect). In general, the differences between countries were smaller than the within-country differences between A&Es.

Despite the higher mean scores in the Netherlands, at the A&E level the English A&Es performed better. Best practices on five out of six domains were English A&Es. None of the best practice English A&Es performed consistently better on all domains nor did a Dutch A&E. There seems to be more room for improvement in the Netherlands than the mean scores on national level suggested. The best performing A&Es in the Netherlands in this study have not achieved the care standards of the best English A&Es. It seems that

Figure 2 Information before discharge



The figure displays patients' experiences on the domain information before discharge of each A&E. The vertical axis plots the deviation of the mean score, and the corresponding 95% confidence interval. In the upper left corner the highest deviation of the mean score is presented (9.8). In the lower right corner the lowest deviation of the mean score is displayed (-14.1). The large black dots are estimates of Dutch A&Es. The smaller black diamonds are estimates of English A&Es.

in both countries the quality of emergency care in most A&Es can be improved considerably. We suggest that much can be learned from the high performing English A&Es. The Dutch and English A&Es should describe and analyse the work processes of these best performing A&Es, taking into account cultural and regional differences, as these may affect healthcare performance.

Across-country comparison of patients' experiences extends our knowledge and can be meaningful for optimization of the organisation of emergency medicine. The OECD and EPSO must continue their leading role in developing policy for international comparisons of care. The next questions in this line of research are how learning from these surveys is disseminated, who identifies best performers and how learning from best performers can be organised.

The healthcare systems in the two countries differ. In England, a patient with an acute health problem can visit a variety of in office-hours and out-of-hours services. In primary care a single phone call to NHS Direct provides a one-stop gateway to out-of-hours healthcare, passing on calls, where necessary, to the appropriate general practitioner (GP) co-operative or deputising service. Intermediate care services, such as walk-in clinics, are available in some places and more severe patients can be treated at A&Es in hospitals.[7] Generally, in England patients can be either self-referred or referred by general practitioners, by ambulance services or by referral from NHS. In the Netherlands, general practitioners are positioned as gatekeepers; patients know they should consult a GP before referral to A&Es in hospitals. In the Dutch sample, 46% of the respondents were referred by a healthcare professional, for English' respondents this percentage was 26%. We used the variable referral as a proxy to adjust for system differences in our models. This suggests that the A&E survey measures patients' experiences with care processes in the A&E instead of differences caused by different pre-hospital pathways for the Dutch and UK emergency care systems.

The largest difference between the countries was found for the domain 'waiting time'. A previous study showed the importance of waiting time on patients' experiences.[22] One review of patient satisfaction in the A&E suggested three points of interest for improvement projects: 1. improvement of interpersonal, attitudinal and communication skills in staff; 2. provision of more information and explanation; 3. reduction of the perceived waiting time.[23] In the current study, patients in the Netherlands and England were also critical about the information provided before discharge and about waiting times. Overall, these were the lowest domain scores. However, in contrast to the review, in both countries patients were positive about doctors and nurses and improvement of interpersonal, attitudinal and communication skills does not seem a priority.

The comparison of patients' experiences was based on two different samples. Therefore, some limitations have to be considered. The first and major limitation is the difference of the sample sizes and number of respondents. The English data were derived from a national survey in 2008, whereas the Dutch convenience sample consisted of the respondents of nine hospitals in the Netherlands, surveyed in 2009 and 2010. In addition, the selection of hospitals varied. All eligible trusts in England participated (no selection bias) versus a voluntary sample of the A&Es in the Netherlands. Selection bias could have occurred in two ways. An overestimation of the quality of care is possible if mainly well-performing A&Es, which were confident about their performance, volunteered for participation. In contrast, hospitals that were aware of a lack in their performance could have applied for this study, for example to measure their 'awareness'. We think that the potential influence of self-selection in the Netherlands on representativeness for all A&Es is limited: the hospitals vary in terms of area, size, teaching or non-teaching. Furthermore, according to a nation-wide rank-order of the overall quality of hospital care, these nine hospitals vary widely in overall quality of care.[12]

A second limitation is the difference in study protocols between the two countries. In England, the hospitals could select one of three months; subsequently 850 patients were randomly selected. Patients received a questionnaire at home within three months after their A&E attendance, and up to two reminders were sent. Patient selection in the

Netherlands varied in time and length of the measurement period and the number of patients. All patients received a questionnaire at home within the first month after their visit, and up to three reminders were sent. The expected positive effects of a shorter time period between A&E visit and receiving the questionnaire, and an extra reminder on the response rate appeared to be small. Despite the difference in study protocol, we assume that both patient samples were random, and therefore representative for the total population.

Thirdly, patient characteristics were different between the two countries. Case-mix adjustment for age, gender and admission after discharge was applied in analyses to make a fairer comparison, but other differences in patient characteristics may account for the differences among A&Es and countries.[16]

We acknowledge that these methodological limitations may influence the findings of this study. However, the main finding of between- and within-country differences in patient experiences in A&Es should not be discarded because of these limitations. This study attributes to the international research about quality of care, and specifically patients' experiences. We suggest that in future studies the above mentioned methodological pitfalls should be avoided or reduced, but should not become a barrier for international comparisons.

Conclusions

In the two countries, the Netherlands and England, patients were positive about doctors and nurses, their care and treatment and the overall quality of care they had received. Patients were more critical about waiting time, hygiene and information before discharge. The mean quality of care in the A&E appeared to be better in the Netherlands on three domains. Yet the best practices were English A&Es. Healthcare performance in the A&E can be compared between countries by surveying patients' experiences, and there is much to learn across A&Es (in)dependent of country.

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Chapter 4

The development and first use of the Consumer Quality Index for the Accident and Emergency department

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The Consumer Quality Index (CQ-index) in an Accident and Emergency department: development and first evaluation

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Abstract

Background: Assessment of patients' views are essential to provide a patient-centred health service and to evaluating quality of care. As no standardized and validated system for measuring patients' experiences in Accident and Emergency (A&E) departments existed, we have developed the Consumer Quality index for the Accident and Emergency department (CQI A&E).

Methods: Qualitative research has been undertaken to determine the content validity of the CQI A&E. In order to assess psychometric characteristics an 84-item questionnaire was sent to 653 patients who had attended a large A&E in the Netherlands. Also, fifty importance questions were added to determine relevance of the questions and for future calculations of improvement scores. Exploratory factor analysis was applied to detect the domains of the questionnaire.

Results: Survey data of 304 (47%) patients were used for the analysis. The first exploratory factor analysis resulted in three domains based on thirteen items: 'Attitude of the healthcare professionals', 'Environment and impression of the A&E' and 'Respect for and explanation to the patient'. The first two had an acceptable internal consistency. The second analysis, included 24 items grouped into five domains: 'Attitude of the healthcare professionals', 'Information and explanation', 'Environment of the A&E', 'Leaving the A&E' and 'General information and rapidity of care'. All factors were internal consistent. According to the patients, the three most important aspects in healthcare performance in the A&E were: trust in the competence of the healthcare professionals, hygiene in the A&E and patients' health care expectations. In general, the highest improvement scores concerned patient information.

Conclusions: The Consumer Quality index for the Accident and Emergency department measures patients' experiences of A&E healthcare performance. Preliminary psychometric characteristics are sufficient to justify further research into reliability and validity.

Background

Healthcare services have shown an increasing interest in the quality of care they provide.[1] After clinical outcome evaluations, evaluations based on the patient's perspective have become more prominent since the introduction of patient-centred care.[2] International organisations such as the Organization for Economic Cooperation and Development (OECD) and the World Health Organization (WHO), have emphasized the importance of the patient's perspective in the evaluation of healthcare delivery. National and cross-national comparisons of patients' experiences are important for identifying areas in need of improvement.[3] Patients' experiences provide information on which healthcare professionals, patients, and health-insurance companies may base their decisions. Furthermore, it enables the government and the Health Care Inspectorate to monitor the quality of healthcare. Finally, the standardized measurement of patients' experiences enables evaluations of research projects.

It is preferable to measure patients' experiences rather than their satisfaction, as they have shown to be more objective and to yield more detailed information for quality improvement.[4] One theory is that satisfaction is a multi-dimensional concept, partly based on expectations and personal preferences. This complicates the objective measurement of the quality of care. When a product fails to match expectations, the quality will be judged as unsatisfactory.[5]

In the Netherlands, the Consumer Quality Index (CQ-index), a standardized method for developing surveys and measuring healthcare quality from the patient's perspective, was introduced in 2006 in order to promote patient-centred care. In order to obtain reliable and valid questionnaires, the development process has been prescribed in a manual and it is guided and controlled by a scientific advisory board. The content validity is ascertained during a qualitative phase which includes a literature search, interviews with experts, and patient focus groups. After this phase a pilot study on the CQ-index should be performed to determine internal consistency. The CQ-index is characterised by combining patients' experiences with the relative importance of each experience item resulting in a list of priorities for improvement of quality of care. Several CQ-indices for a variety of community services, care settings and condition-specific patients' groups have been developed, such as the rheumatoid arthritic questionnaire, the cataract questionnaire, the hip and knee questionnaire, and breast-cancer questionnaire.[2;6;7] Different patient groups turned out to have different priorities, which stressed the need for specific questionnaires.[8] In emergency medicine, two CQ-indices for general practitioners (office hours and out-of-hours), and a CQ-index for maternity services are available. The CQ-indices for ambulance services and dispatch centres are under development. This study completes the set of questionnaires for emergency services with the development of the CQ-index for the Accident and Emergency department.

In the Netherlands, general practitioners (GPs) are positioned as gatekeepers, also in the case of emergency care. Emergency care by GPs is provided from local GP-practices during working hours, and out-of-hours in regional GP-cooperatives.[9] Patients need to consult their GP for referral to A&Es in hospitals. However, the number of self-referrals to A&Es is growing.[10] Patients transported by ambulance in need of emergency care are brought directly to the A&E.[11;12] A&Es are often the place where patients form their first impression of a hospital and a positive experience may influence decisions about future visits and personal patient recommendations.[13] Measuring the quality of care in the A&E as experienced by patients may provide valuable information, for instance for identifying areas in need of improvement.

The goal of this study is to develop and pilot test a CQ-index for the A&E department (CQI A&E). This questionnaire aims to measure healthcare performance in the A&E as experienced by the patient.

Methods

Qualitative and constructive phase

The prescribed CQ-index guidelines were applied during the development of the CQI A&E.[14;15] The first phase of the development is a qualitative phase. The aim of this phase is to detect all relevant quality aspects of healthcare performance in the A&E. We carried out a literature search in Pubmed, including a search for existing questionnaires, and

Box 1 Three development phases of the CQI A&E

1. Qualitative phase → Aim:
The detection of quality aspects of healthcare performance in the A&E
- Literature search
- Expert interviews
- Patient focus group discussions

2. Constructive phase → Aim:
The construction of relevant, unambiguous, understandable and useful questions
- Cognitive interviews with patients
- Importance study

3. Psychometric phase → Aim:
The assessment of the psychometric properties of CQI A&E
- Pilot test

interviews with three experts, in order to compose a topic list for focus group discussions with patients about healthcare performance in the A&E. For the focus groups, a consecutive sample of 177 patients treated in the A&E at the University Medical Center Utrecht, aged 18 and older, with known postal address and phone number, were sent an invitation by postal mail to participate, in the first week after their A&E attendance. In a subsequent step, all patients were called and invited a second time to participate in a patient focus group. Seventeen patients confirmed their participation. Two researchers acted as moderators during the focus group discussions. After the focus groups the first draft questionnaire was defined. This draft was sent to ten patients. Within one week, cognitive interviews were performed by telephone in order to ensure that the questions were relevant, unambiguous, understandable and useful to patients, and whether patients had experienced any problems during self-completion of the paper questionnaire. Unclear questions in the CQI A&E were rephrased. Afterwards the CQI A&E consisted of 84 questions divided into nine categories: General; Before arrival in the A&E; Reception desk A&E; Health professionals in the A&E; Pain; Examination and treatment; Leaving the A&E; General A&E; About you. 52 questions out of the total of 84 questions were constructed as so called ‘experience questions’. The other questions included ‘skip or go to’ items, opinion questions and demographic questions.

Importance study

An importance study was undertaken to determine the relative importance of the items in the questionnaire to patients visiting the A&E. Firstly, importance scores were used to decide whether a question should be retained or deleted prior to the factor analysis. Secondly, importance scores are necessary for calculating improvement scores. For each experience question a corresponding importance question was formulated. For example: ‘Was the signposting to the A&E of the hospital a problem?’ with the corresponding importance question ‘How important is the signposting to the A&E of the hospital to you?’. This resulted in a temporary set of fifty extra importance questions in the CQI A&E. Importance questions of two experience questions were unclearly phrased or difficult to understand, and therefore left out of the importance study.

Psychometric phase

The questionnaire was pilot tested in the psychometric phase to assess the psychometric properties. The three phases are presented in **Box 1**.

Patients

For the pilot test all 653 patients who visited the A&E of a large urban hospital in the course of one week in January 2010, were included. The hospital was centrally located in the Netherlands. 38,000 patients visit the A&E annually. The A&E treats patients in need of urgent care, except for multiple trauma patients, who are referred to specialized trauma centres. Patients who attended to the A&E with a known postal address and no reported death were eligible.

The paper questionnaire and covering letter were sent by postal mail within one week after the visit to the A&E. Up to three reminders were sent to non-respondents: after 1, 4 and 6 weeks. The recipients were able to return the questionnaire in a postage paid envelope. The study protocol was approved by the Medical Ethical Committee of the University Medical Center, Utrecht.

Data analysis

The hospital registration system provided data on gender, age, referral to A&E (ambulance, general practitioner, self-referred, other), day and time of the visit, triage code, symptoms of which the patients complained (abdominal pain, traumatic injuries, shortness of breath, collapse, chest pain, arrhythmia, malaise/fever, stroke, infection, intoxication, other). The respondents' gender and age profile was compared to the total sample and to non-respondents using a Chi square or t-test, in order to assess whether it was representative. Questionnaires which had been filled in by someone other than the respondent and questionnaires with more than fifty percent of the answers missing, including skip (or 'go to') instructions after the questions, were not used for analysis.

Data quality and exploratory factor analysis

The data set was first analysed in order to identify item response rates and frequency distributions. Questionnaire items were excluded from further analysis if they had an item non-response of >10% of expected responses or extreme skew of >90% of responses in the same category (i.e. a ceiling or floor effect). Spearman's correlation coefficient was calculated to check for correlations between items ($r>0.70$). Where items had a negative wording, their scales were reversed to ensure comparability in the analysis. Exploratory Factor Analysis (EFA) was used to group the experience questions. In the first EFA only the thirteen experience items with a 4-point Likert scale were included. EFA was performed with oblique rotation.[16] In EFA several criteria need to be fulfilled. The Kaiser-Meyer-Olkin Measure of Adequacy (KMO) is a measure of sampling adequacy (threshold: KMO>0.60). Bartlett's test of sphericity is used to test the null hypothesis that the variables in the population correlation matrix are uncorrelated (threshold: $p<0.05$). The Eigenvalue represents the amount of the total variance explained by the factor (threshold: Eigenvalue>1, also known as the Kaiser criterion). A variety of analyses were performed, whereby options like 'fixed number of factors yes or no' and 'replace missing values by mean yes or no' were tested. The domains in the final EFA fulfilled the statistical criteria, explained the highest percentage of variance and had a clear interpretation. In a subsequent step, factor loadings were obtained (threshold: factor load >0.30). We calculated a measure of internal consistency, Cronbach's alpha (α), in order to estimate the reliability of the reported factors. Cronbach's alpha coefficients above 0.70 were considered reliable. In this stage of development alpha coefficients between 0.60-0.70 were provisionally accepted. The α of the total factor should not increase by deleting one of the items. Item-total correlation (ITC) had to be higher than 0.40. When following the CQI guidelines, the majority of experience questions were omitted when constructing domains. Therefore, a second EFA was performed, including all 52 experience questions, with response categories on 2-, 3-, and 4-point Likert scales. This was done to prevent loss of content, thereby ignoring one criterion of the CQI guidelines.

Experience scores, importance scores and improvement scores

The experience scores and importance scores were calculated as means of response categories (i.e. no/a big problem/never/not important=1, sometimes/of some importance=2, a bit of a problem=2.5, a great deal/important=3, yes/not a problem/always/extremely important=4). A domain score was computed as the mean of the experience scores of items contributing to the domain.[17] Quality improvement scores were calculated by multiplying the importance scores with the percentages of the negative response categories 'never', 'sometimes', 'big problem' or 'no' on the corresponding experience questions. The improvement scores were an estimate for the potential improvement of quality of care and are useful for internal monitoring, whereas domain scores are more relevant for external monitors. Scores above 0.5 may potentially improve quality of care (range: 0-4). All analyses were performed using the statistical software SPSS 17.0.

Results

Qualitative and constructive phase

A review of the literature was conducted, using the PubMed database. A search with Mesh major headings 'Emergency Service, hospital' AND 'Consumer satisfaction' resulted in 364 hits. All abstracts from 1993 until August 2010 were reviewed for quality dimensions and aspects of care in the A&E. In 53 articles quality aspects were described. The two most frequently used questionnaires were the Consumer Emergency Care Satisfaction Scale (CECSS) and the Emergency Department Patient Satisfaction Survey (EDPSS). Together with the most discussed topics in interviews with experts a topic-list was composed, which was used in patient focus groups discussions. Quality aspects for A&E healthcare delivery were: patient history, accessibility, empathy and attitude of healthcare professionals, autonomy, cooperation, waiting time, competence, triage, treatment, communication, information, pain management, discharge management, re-admittance, privacy, environment, global rating, safety, diagnostic tests, rapidity, refreshments, and accompaniment. The quality aspects were used to formulate the questions and compile the draft questionnaire. After cognitive interviews, the questionnaire was adjusted and questions were added or rephrased where necessary. Substantial adjustments were: The question 'At what time did you visit the A&E?' was added to the questionnaire; the question 'Was the accessibility of the A&E a problem? was rephrased to 'Was the travelling time to the A&E of the hospital a problem?; the question 'Did you have to wait a second time after your first contact with a healthcare professional?' was rephrased to 'Was your health problem first briefly assessed by a nurse and did you then have to wait again in the waiting room?'; the question 'What score would you give the healthcare professionals?' was deleted; the question 'Did you get the care you expected from the A&E?' was added. Full detailed information of the qualitative and constructive phase were reported and approved by the scientific advisory board of the CQI A&E.[18]

Importance study

Fifty importance questions were used to calculate the most important aspects in healthcare performance in the A&E according to patients. The five most important aspects were: 1. trust in the competence of healthcare professionals (3.66); 2. hygiene in the A&E (3.65); 3. patients' healthcare expectations (3.65); 4. patients' healthcare needs (3.64); 5. being taken seriously by healthcare professionals (3.63) (**Table 4**). The five least important items were: 1. information on the order in which patients were treated (2.54); 2. availability of refreshments (2.53); 3. information on an admission letter for the general practitioner (2.50); 4. pleasant atmosphere in the waiting room (2.57); and 5. having to tell the same story about the health problem (2.61). Importance scores ranged from 0 to 4.

Psychometric phase

Patients

368 out of 653 patients (56%) returned the questionnaire. Two uncompleted questionnaires were excluded, as were 52 questionnaires which had been filled in by someone other than the patient, for instance by the representatives of patients aged 0-11 years. The dataset for the analysis contained 304 questionnaires (47%). Patients' characteristics are presented in **Table 1**. No differences between respondents and non-respondents were found for gender, age, referral, day and time of the visit or symptoms. A significant difference was found for the triage code (p=0.01). Respondents were triaged in more urgent categories than non-respondents. 34% of the respondents were admitted to a

hospital ward after their visit to the A&E.

Data quality

The item ‘access to results of previous visit’ and the item ‘pain control by healthcare professionals’ had a non-response >10%. Extremely skewed items (>90%) were the items ‘signposting to the A&E’, ‘travelling time’, ‘signage in the hospital’ and ‘talking about patients in the presence of the patient’. The five items were left out of the factor analyses. None of the importance items had a remarkably lower score than the average score, or was extremely skewed. Spearman correlations coefficients were calculated; none of the correlation coefficients of experience questions or importance questions were above the 0.70 threshold.

First factor analysis and internal consistency

The first EFA, based on thirteen items, showed a 3-factor solution with an explained variance of 56%, covering all items (KMO 0.883, Bartlett’s test p<0.001, N=298). The first domain measured the quality aspect ‘attitude of healthcare professionals’, the second domain ‘environment and impression of the A&E’ and the third domain ‘respect for and explanation to the patient’ (**Table 2**). Cronbach’s alpha coefficient of the first domain was 0.85. The alpha coefficient of the second domain was 0.60, and the alpha coefficient of the third domain was 0.42. The item-total correlations of the third factor were below 0.40. The internal consistency did not increase by taking an item out of this third domain.

Second factor analysis and internal consistency

The second analysis was performed on 52 items. Reliability analysis showed that the questionnaire contained four domains with Cronbach’s alpha coefficients above 0.70, and one domain with an alpha coefficient of 0.67. The five domains had an explained variance of 51%. Like the first analysis, this second analysis fulfilled the predefined criteria; Eigenvalue>1 and KMO=0.837. However, Bartlett’s test of sphericity was not significant (p=1.00; N=298). Domains, items and Cronbach’s alpha coefficients are presented in **Table 3**. All item-total correlations were above 0.40, with the exception of the item ‘consistency of provided information’. The Cronbach’s alpha coefficient of the domain remained the same if the item was left out. The five domains covered 24 items.

Quality Improvement

For every item the experience score and quality improvement score were computed. Within the top 20 of most important quality aspects, four aspects stood out as far as their improvement potential was concerned: 1. ‘information on side-effects of the medication’; 2. ‘information by healthcare professionals on danger signals to watch out for after leaving the A&E'; 3. 'information by healthcare professionals on readmission in case of health problems'; and 4. 'availability of parking space near the A&E' (**Table 4**). Three out of four items were dealing with information needs at the end of the A&E visit, and belonged to the fourteen items with the highest improvement scores, i.e. a quality improvement score >1; range 0-4 (**Table 5**).

Table 1 Characteristics of the study sample

	Respondents		Non-respondents	
	%	N	%	N
Age (mean (SD))	51.4 (21.6)	304	49.3 (24.2)	291
Gender				
Male	52.3	159	49.1	143
Female	47.7	145	50.9	148
Day and time of attendance				
Weekday 8:00 – 17:00	54.6	166	50.9	148
Weekend day 8:00 – 17:00	18.1	55	18.2	53
Out of hours 17:00 – 0:00	18.8	57	19.6	57
Out of hours 0:00 – 8:00	8.6	26	11.3	33
Referral				
Ambulance	18.4	56	24.1	70
General Practitioner	38.2	116	27.1	79
Self-referred	34.5	105	35.7	104
Other	8.9	27	13.1	38
Triage code*				
Red	0	0	0	0
Orange	23.2	66	16.4	43
Yellow	39.1	111	37.0	97
Green	37.7	107	45.8	120
Blue	0	0	0.8	2
Missing		20		27
Symptoms				
Abdominal pain	10.6	30	9.4	26
Traumatic injuries	35.9	102	40.6	112
Shortness of breath	8.8	25	8.0	22
Collapse	4.9	14	2.5	7
Chest pain	9.9	28	9.1	25
Arrhythmia	5.6	16	1.1	3
Malaise/fever	6.3	18	6.9	19
Stroke	0.7	2	2.2	6
Infection	2.5	7	2.2	6
Intoxication	1.1	2	2.2	6
Other	13.7	39	15.9	44
Missing		20		15
After A&E				
Admitted to hospital	34.3	101	N/A	N/A
Discharged to home	62.3	184	N/A	N/A
Other	3.4	10	N/A	N/A
Missing		9		

** $p<0.05$ significant difference between respondents and non-respondents* *N/A=Not Applicable*

Table 2 Domains, items, and internal consistency of the first factor analysis

Quality aspect	Loading	ITC	α if item deleted
Attitude of the healthcare professionals (α=0.85; n=278)			
Politeness of healthcare professionals	0.70	0.58	0.84
Listening to patients by healthcare professionals	0.82	0.74	0.81
The healthcare professionals take time for their patients	0.69	0.64	0.83
Being taken seriously by healthcare professionals	0.88	0.78	0.81
Consistency of the provided information by healthcare professionals	0.57	0.42	0.85
Cooperation between healthcare professionals	0.54	0.52	0.85
Trust in the competence of healthcare professionals	0.82	0.73	0.85
Environment and impression of the ED (α=0.60; n=289)			
Hygiene in the A&E	0.82	0.44	0.44
Calm/peaceful A&E	0.69	0.39	0.55
Feeling safe in the A&E	0.69	0.43	0.51
Respect for and explanation to the patient (α=0.42; n=281)			
Privacy in the treatment room	0.82	0.23	0.38
Involvement in treatment decisions	0.41	0.25	0.42
Clarity of explanations of the health problem to the patient	0.58	0.34	0.20

ITC=Item-total correlation
α=Cronbach's alpha coefficient

Table 3 Domains, items, and internal consistency of the second factor analysis

Quality aspect	Loading	ITC	α if item deleted
Attitude of healthcare professionals (α =0.88; n=165)			
Patients' healthcare needs	0.53	0.62	0.86
Politeness of healthcare professionals	0.71	0.67	0.87
Listening to patients by healthcare professionals	0.78	0.77	0.85
Healthcare professionals take time for their patients	0.71	0.65	0.86
Being taken seriously by healthcare professionals	0.87	0.82	0.85
Consistency of the provided information by healthcare professionals	0.52	0.37	0.88
Cooperation between healthcare professionals	0.48	0.53	0.88
Trust in the competence of healthcare professionals	0.77	0.75	0.85
Feeling safe in the A&E	0.57	0.56	0.87
Information and explanation (α=0.83; n=41)			
Information on treatment	0.67	0.67	0.78
Clarity of explanations of results of examinations	0.49	0.67	0.79
Clarity of explanations (general)	0.65	0.71	0.77
Explanation about how to make an appointment in the policlinic	0.61	0.54	0.82
Information towards attendants	0.56	0.59	0.81
Environment of the A&E (α=0.67; n=159)			
Pleasant atmosphere in waiting room	0.69	0.51	N/A
Refreshments	0.72	0.51	N/A
Leaving the A&E (α=0.75; n=38)			
Explanation about new medication	0.66	0.41	0.77
Information on side-effects of the medication	0.71	0.66	0.63
Information on resumption of daily activities	0.51	0.50	0.72
Information on danger signals to watch out for after leaving the A&E	0.67	0.64	0.64
General information and rapidity of care (α=0.71; n=53)			
Information on the rapidity of the treatment based on acuity of the health problem	0.57	0.52	0.63
Information on the order of treatment	0.69	0.50	0.64
Pain control	0.60	0.50	0.64
Rapidity of the treatment	0.41	0.46	0.67

ITC=Item-total correlation
N/A=Not Applicable due to one remaining item after deletion
α=Cronbach's alpha coefficient

Table 4 Top 20 Importance scores (I) with corresponding quality improvement scores (Q), and corresponding experience scores (E)

	Quality aspect	I	Q	E
1	Trust in competence of healthcare professionals	3.66	0.20	3.70
2	Hygiene in the A&E	3.65	0.30	3.42
3	Patients' healthcare expectations	3.65	0.23	3.56
4	Patients' health care needs	3.64	0.32	3.58
5	Being taken seriously by healthcare professionals	3.63	0.10	3.81
6	Being taken seriously by the reception staff member at the reception desk	3.57	0.10	3.85
7	Cooperation between healthcare professionals	3.57	0.21	3.59
8	Consistency of the provided information	3.57	0.10	3.84
9	Clarity of explanations of results of examinations	3.55	0.52	3.40
10	Rapidity of the treatment	3.54	0.59	3.33
11	Listening to patients by healthcare professionals	3.53	0.12	3.77
12	Availability of a parking space near the A&E	3.52	**1.05**	2.75
13	Information by the healthcare professionals on danger signals to watch out for after leaving the A&E	3.51	**1.58**	2.66
14	Clarity of explanations of the health problem	3.48	0.36	3.53
15	Feeling safe in the A&E	3.47	0.11	3.73
16	Assessment by the acuity of the patients' problem	3.46	0.81	3.65
17	Finding the A&E in the hospital	3.46	0.28	3.88
18	Information by healthcare professionals on readmission in case of health problems	3.44	**1.13**	3.02
19	Explanation of the aim of new medication	3.41	0.53	3.40
20	Information on side-effects of the medication	3.39	**2.40**	1.92

I=importance score (range: 1-4), Q=quality improvement score (range: 0-4) E=experience score (range: 1-4)
Quality improvement scores in bold are above one

Table 5 Items with quality improvement scores >1 (Q) with corresponding importance scores (I), and corresponding experience scores (E)

	Quality aspect	I	Q	E
1	Information on side-effects of the medication	3.39	2.40	1.92
2	Information on the rapidity of the provided care	3.28	2.20	2.01
3	Information by healthcare professionals on the admission letter for the GP	2.50	2.11	1.47
4	The GP is informed by healthcare professionals	2.85	2.10	1.80
5	Information on the order of treatment	2.54	2.07	1.53
6	Involvement in treatment decisions	3.12	1.76	2.38
7	Healthcare professionals help to control the pain	3.12	1.75	2.27
8	Information by healthcare professionals on danger signals to watch out for after leaving the A&E	3.51	1.58	2.66
9	Information by the reception staff member on procedures in the A&E	3.07	1.51	2.50
10	Information by healthcare professional on resumption of daily activities	3.30	1.35	2.65
11	Pleasant atmosphere in waiting room	2.55	1.31	2.49
12	Information by healthcare professional on readmission in case of health problems	3.44	1.13	3.02
13	Healthcare professionals ask to consent to treatment	3.08	1.10	2.76
14	Availability of a parking space near the A&E	3.52	1.05	2.75

I=importance score (range: 1-4); Q=quality improvement score (range: 0-4); E=experience score (range: 1-4)

Discussion

This study aimed to construct and test a questionnaire to measure patients' experiences with the Accident and Emergency department, according to the guidelines of the Consumer Quality index.[15] This first version of the Consumer Quality index for the accident and emergency department (CQI A&E) consisted of 84 questions. 52 questions were phrased as 'experience questions'. The response rate (47%) of the pilot test was comparable to other postal surveys involving A&E patients.[14;19] However, disease-specific CQ-indices showed better response rates (68%-84%).[2;6;7;20;21] To determine the construct of the questionnaire, two exploratory factor analyses were performed. The first analysis was performed including thirteen items. Three domains were constituted ('attitude of healthcare professionals', 'environment and impression of the A&E', 'respect for and explanation to the patient'). A second analysis comprising all 52 experience questions was performed with the aim of including more questions on experiences deemed important by patients. Five domains 'attitude of healthcare professionals', 'information and explanation', 'environment of the A&E', 'leaving the A&E', and 'general information and rapidity of care' were constructed, covering 24 items. Two out of three domains in the first EFA were internally consistent, whereas all domains in the second EFA were internally consistent. Internal consistency of domains increases by increasing the number of respondents. Despite of lower response numbers in the domains of the second EFA, the internal consistency exceeded the internal consistency of the first EFA. The percentage of explained variance of the five domains decreased five percent compared to the explained variance of the three domains of the first analysis.

Two main goals for CQI-data can be distinguished. The first goal is to compare quality of care between healthcare providers. A strict (following the CQI-guidelines), statistically correct EFA was performed in order to generate the information needed for making a valid comparison between A&Es. Researchers, the Health Care Inspectorate, health-insurance companies, hospital boards and the Ministry of Health are the intended users of these outcomes. However, the main customer in healthcare is the patient. Therefore, the second goal is to acquire the information needed for quality improvement within a healthcare institution. To this end, an alternative EFA was performed. To include more content of the questionnaire in the domains, more questions were added. We think this information may help A&E managers and others to start evaluating quality improvement projects. Both goals represent a different way of constructing domains in questionnaires. Following all criteria in the CQI guidelines, domains are constructed using the perspective of a reflective measurement model.[22;23] Only items with a 4-point Likert scale were included. Items that did not fit into any domain, and domains that did not fulfill the statistical criteria, were omitted.[24] The qualitative phase was carried out in order to detect all aspects related to healthcare performance in the A&E. Each aspect is a unique part of the provided care and together they form the construct 'quality of care'. To end up with a few statistically related items neglects the broad range of the aspects. Therefore, a formative measurement model may be better suited to construct domains in experience questionnaires. The latter theory concerns the construction of domains based on content and not solely on strict statistical criteria. In the second analysis, we did not try to construct domains solely from a formative perspective, but we tried to include as many experience questions as possible, while still achieving internally consistent and interpretable domains. We included all domains that came up in the second EFA, thereby doubling the content of the questionnaire included in internally consistent domains. Although we only relaxed one of the criteria of CQI-guidelines, we think that these domains are better suited for quality improvement and that they are also suited for benchmarking. The improvement scores provide concrete tailor-made information, which can be helpful for management and staff.

In accordance with most CQ-indices, the domains on communication, information, attitude of healthcare providers (often within the communication domain) and the environment of the health service, are part of the CQI A&E. Domains regarding accessibility and leaving the organisation are also often found.[6;7;20;25] There are a lot of similarities to other CQI instruments, whereas the similarities with satisfaction questionnaires are few. The A&E satisfaction questionnaire Quality Patient Perspective discussed patient participation.[19] The Swedish A&E Patient Satisfaction Survey revealed three factors: caring, teaching and clinical competence.[26]

The most important aspects in healthcare performance in the A&E from the patient's perspective dealt with competence of professionals, hygiene and expectations. It has to be determined whether these importance scores are valid across study populations.

In an English importance study, with sixteen participants who had visited the A&E the most important aspect was confidence and trust in the doctors and nurses. Secondly, 'being treated with respect and dignity', and thirdly 'explanation about condition and treatment' were important items. Interestingly, waiting time did not feature in the top 20 of most important aspects in our study. As regards the top three of least important aspects, our study corresponds with the English study on aspects such as refreshments in the waiting room and not being asked details about the patient's condition or illness too often. However, in the English study the number of respondents was limited, and inclusion criteria broader.

The study has same limitations. Firstly, we used the pilot study dataset of respondents of only one hospital. In the next phase of the development, the stability of the domain structure will be assessed in a dataset of twenty A&Es, and therefore the presented domains are preliminary outcomes. The discriminative capacity of the CQI A&E will be assessed in that phase as well. Secondly, in this study a consecutive sample was used for the psychometric analysis. All patients who had visited the A&E within an average week were included. The gender and age profile of the respondents was representative for the A&E population of the research hospital. Respondents and non-respondents were comparable as regards age, gender, day or time of attendance and symptoms. Therefore, it is unlikely that the low response rate has affected the outcomes. A significant difference between both groups was found for the triage code. The least severely injured patients (blue triage code) were underrepresented within the respondents group. These patients are often discharged without experiencing all aspects of healthcare performance and perhaps did not think of themselves as a 'true' A&E patient. This might have introduced selection bias among respondents.

The study protocol had advantages such as sending the questionnaires to the patient's home, instead of administering them in person in the A&E, which prevents selection bias caused by healthcare professionals. Also, all patients received the questionnaire within one week after their A&E visit, which limits the recall bias. However, patients' symptoms might have evoked recall bias.

Conclusions

The Consumer Quality index for the Accident and Emergency department measures patients' experiences of A&E healthcare performance. Preliminary psychometric characteristics of the CQI A&E are good, but further research on reliability and validity is needed. Depending on the viewpoint, exploratory factor analysis results in two or five internally consistent domains. The five-domain structure seems preferable, as this includes more content of the questionnaire while maintaining internal consistency. Furthermore, the improvement scores of each item provide information that makes it possible to identify aspects that require consideration in order to increase quality of care. The preliminary outcomes and the discriminative capacity have to be confirmed in future research by means of the CQI A&E.

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Chapter 5

Internal consistency, validity, and discriminative capacity of the Consumer Quality Index for the Accident and Emergency department

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The Consumer Quality Index (CQ-index) in an Accident and Emergency department; internal consistency, validity, and discriminative capacity

Revision submitted

Abstract

Background: Patients' experiences are an indicator of healthcare performance in the Accident and Emergency department (A&E). The Consumer Quality Index for the Accident and Emergency department (CQI A&E), a questionnaire to assess the quality of care as experienced by patients, was investigated. The internal consistency, construct validity and discriminative capacity of the questionnaire were examined.

Methods: In the Netherlands, twenty-one A&Es participated in a cross-sectional survey, covering 4883 patients. The questionnaire consisted of 78 questions. Principal Components Analysis determined underlying domains. Internal consistency was determined by Cronbach's alpha coefficients, construct validity by Pearson's correlation coefficients, and the discriminative capacity by intra-class correlation coefficients and reliability of A&E-level mean scores (G-coefficient).

Results: Seven quality domains emerged from the Principal Components Analysis: information before treatment; timeliness; attitude of healthcare professionals; professionalism of received care; information during treatment; environment and facilities; and discharge management. Domains were internally consistent (range: 0.67-0.84). Five domains and the 'global quality rating' had the capacity to discriminate among A&Es (significant intra-class correlation coefficient). Four domains and the 'global quality rating' were close to or above the threshold for reliably demonstrating differences among A&Es. The patient experiences score on the domain timeliness showed the largest range between the worst and best performing A&E.

Conclusions: The CQI A&E is a validated survey to measure healthcare performance in the A&E from patients' perspective. Five domains regarding quality of care aspects, and the 'global quality rating' had the capacity to discriminate among A&Es.

Introduction

Evidence suggests that quality of care varies across Accident and Emergency (A&E) departments in the Netherlands.[1] A recent report indicated that not all A&Es meet national standards as defined by the Healthcare Inspectorate. These standards measure healthcare performance from the professional point of view. Measurement of the patient's perspective of the quality of care has not yet been included in these standards despite the fact that patients' experiences are an important indicator of healthcare performance.[2,3] The merit of evaluating healthcare performance from the patient perspective in the A&E has been acknowledged.[4] Identifying, and responding to patients needs improves the quality of emergency care. For instance, patients with a positive experience have a reduced tendency to seek further options for treatment, show more compliance with guidelines, and report less problems.[5,6] Besides, acting upon evaluations from the patient's perspective balances improvements of clinical care from the professional's perspective. Therefore, a standardized and validated tool to measure patient experiences is needed.

In the USA, Canada and European countries such as England and most Scandinavian countries a national survey programme for measuring patient experiences is performed.[7,8] Inspired by the American Consumer Assessment of Health care Providers and Systems (CAHPS) and the Dutch QUality Of care Through the patients' Eyes (QUOTE), a family of surveys to measure patients' experiences, known as the Consumer Quality Indices (CQIs), were introduced in the Netherlands.[9,10] CQIs are available for many community services, care settings and condition-specific patients' groups.[11] The questionnaires aim to measure healthcare performance as experienced by patients. Strengths of the methodology are standardized analysis and reports of outcomes to provide performance information for several parties such as individual consumers, patient/consumer organisations, health insurers, healthcare providers, the Healthcare Inspectorate, and the Ministry of Health.[12]

Recently the Consumer Quality Index for the Accident and Emergency department (CQI A&E) was developed and psychometrically tested in a pilot study. Exploratory factor analysis determined five domains with sufficient reliability to be provisionally accepted.[13] These preliminary results need to be confirmed and validated. The purpose of this study was to test the internal consistency, the validity and the discriminative capacity of the CQI A&E in a multi-centre study design. The following three aspects of the discriminative capacity were explored: 1. detection of significant differences among healthcare providers; 2. feasibility of sample sizes to obtain reliability; 3. meaningfulness of differences for users.[14] Moreover, the need for case-mix adjustment was investigated.[15, 16]

Methods

Data collection

To recruit A&Es for this study an announcement of the study was made in an online national medical newsletter at the end of 2009. Following the CQI guidelines, we aimed at including twenty A&Es. Twenty-one of the hundred A&E departments in the Netherlands decided to participate. Annual A&E patients' numbers ranged from 8,000 to 50,000, representing small, medium and large A&Es in the Netherlands. The A&Es varied in terms of patient throughput, geographical area (urban or rural regions), trauma centre or non-trauma centre, and teaching or non-teaching status. In the samples, 600-800 patients per A&E were randomly selected out of all patients attending the A&Es during three subsequent weeks. Patients with a known postal address and no reported death were eligible.

The 78-item CQI A&E was sent by postal mail within one month of A&E attendance. Up to three reminders were sent to non-respondents after 1, 4, and 6 weeks. The recipients could return the questionnaire in a postage paid envelope. Descriptive data of the patients were provided by the hospital registration systems. The study protocol was approved by the Medical Ethical Committee of the University Medical Center Utrecht.

CQI A&E questionnaire

The conceptual basis and the design of the CQI A&E, developed according to the CQI guidelines, were described in a technical report, and accorded by the CQI scientific advisory board.[13,17] The development and first use have been described in detail in a previous paper.[18] In summary, the content validity was ascertained by a literature review, in depth interviews with A&E experts and patient focus groups, resulting in a draft questionnaire. The draft questionnaire was cognitively tested on A&E patients, and adapted where necessary. Subsequently, a pilot test was performed to assess the psychometric validation of the CQI A&E. The Principal Components Analysis (PCA) to locate underlying domains revealed a distinct five-factor solution. Preliminary internally consistent domains were: 1. attitude of the healthcare professionals; 2. information and explanation; 3. environment of the A&E; 4. leaving the A&E; 5. rapidity of care. The content of the CQI A&E, and examples of questions are presented in **Box 1**.

Data Analysis

Descriptive statistics were used to summarize the characteristics of the respondents, such as gender, age, and triage code. A&Es prioritized patients to treatment by one of two triage systems: the Manchester Triage System (MTS) or the Emergency Severity Index (ESI). Both systems use five categories.[19] Patients of corresponding urgency categories were combined for analysis. Excluded from analyses were questionnaires filled in by

Box 1 Content of the CQI A&E

Categories:

1. General (3 items)
2. Before arrival in the A&E (11 items)
3. Reception desk A&E (4 items)
4. Health professionals in the A&E (8 items)
5. Pain (3 items)
6. Examination and treatment (16 items)
7. Leaving the A&E (11 items)
8. General A&E (11 items)
9. About you (11 items)

45 experience questions; for instance:
Was the signposting to the A&E of the hospital a problem?
☐ A big problem
☐ A small problem
☐ No problem

Was the reception staff member polite to you?
☐ No, not at all
☐ A bit
☐ A great deal
☐ Yes, completely

respondents aged eleven and younger, answered by someone else other than the respondent, or with more than fifty percent missing answers.

Internal consistency

A PCA was undertaken to optimize the 5-factor solution out of the pilot study. Firstly, data were analysed to identify item response rates and frequency distributions. Questionnaire items were excluded from further analysis where they had an item non-response of >10%, extreme skew of >90% of responses in the same category (i.e. a ceiling or floor effect) or item-correlation, determined by Spearman's correlation coefficient, above 0.70. Secondly, several criteria needed to be fulfilled in the PCA: (i) the Kaiser-Meyer-Olkin Measure of Adequacy (KMO), a measure of sampling adequacy (threshold: KMO>0.60), (ii) Bartlett's test of sphericity to test the null hypothesis that variables in the population correlation matrix were uncorrelated (threshold: p<0.05), and (iii) the Eigenvalue represented the amount of the total variance explained by the factor (threshold: Eigenvalue > 1, also known as the Kaiser criterion). The PCA was performed with oblique rotation.[20] In subsequent steps, factor loading (threshold: factor load>0.30) and Cronbach's alpha coefficient (α), a measure of internal consistency to estimate the reliability of the reported factors, were calculated. Cronbach's alpha coefficients above 0.70 were considered reliable. The alpha of the total factor should not increase by deleting one of the items. Item-total correlation (ITC) had to be higher than 0.40. Inter-factor correlations were calculated to estimate the overlap among domains (threshold: r>0.70). After the PCA, the interpretability of the domains for daily practice was evaluated. To enhance interpretability, domains with multiple and dissimilar quality aspects could be broken up into smaller domains, while safeguarding the reliability of the domains.

Domain scores

Patients responded to items on ordinal 2, 3, or 4-point Likert scales. For the computation of a domain score, response categories of items that constituted to the domain were recoded from 1 to 4, summed up and divided by the number of items that constituted the domain (i.e. no/big problem/never=1, sometimes=2, bit of a problem=2.5, usually=3, yes/not a problem/always=4).[21] Items with negative wording were reversed to ensure comparability in the analysis.

Case-mix adjustment

The need for case-mix adjustment was investigated using linear mixed effect models. Mixed effect models account for the hierarchical structure of the data: patients within A&Es. The models decomposed variance into that attributable to A&Es and that attributable to other sources, such as individual differences. The methodology has been described and examined in various studies.[14,22] For each domain score a separate (empty) model was analysed, with the domain score as dependent variable, and a random intercept for each A&E department. Patient characteristics such as gender, age, and triage code as reported in the hospital registry systems, and characteristics such as health status, education and ethnicity as determined out of questions in the questionnaire were added as fixed effects. Only those variables that significantly ($p<0.05$) contributed to the (full) model were retained in the final model. In addition, a separate model with the global quality rating of the healthcare performance as dependant variable was analysed. Significance was determined by likelihood ratio tests ($p<0.05$).

The impact of case-mix adjustment on the total variance was assessed by calculating the proportional change in variance (PCV). The proportional change in variance is an estimate to assess the amount of variance in the empty model (V_0) attributable to differences in patient characteristics (case-mix). The PCV was calculated according to Merlo et al (V_0 – variance final model/ V_0).[23] Total variance is comprised of three components: variance among A&Es; variance due to patient characteristics; and remaining variance within A&Es (or residual variance).

Discriminative capacity

The discriminative capacity follows three criteria. Firstly, the intra-class correlation coefficient (ICC) was calculated. The ICC expresses the discriminative power of the domains. The discriminative power is a general assessment of differences among healthcare providers; the variance attributable to providers can be tested for significance. The magnitude of the variance among providers may then be expressed as a proportion of the total variance on a scale from 0-1.[14] Next, the calculations were repeated after adjusting the data for age (eight categories), gender, and health status of the respondents (five categories). Low, average, and high performing A&Es were determined by the mean score of all A&Es and the 95% comparative confidence intervals (CI) of individual A&Es.[24] An overlap of the CI with the mean domain score implied an average performing A&E. CIs without an overlap with the mean score were low or high performers. Mean scores and CIs were plotted in caterpillar plots (see **Figure 1**).

Secondly, the A&E-level reliability, given the current sample sizes, was calculated. The reliability expresses the proportion of variation in A&E-level mean scores attributable to true variation among A&Es, and was estimated using generalizability theory.[25,26] The essence of generalizability theory is the recognition that in any measurement situation there are multiple sources of error variance, due, for instance, to random sampling. The theory contains two stages. In the first stage, called G-study, the variances are used to create G-coefficients, extensions of classical reliability coefficients. G-coefficients look at the proportion of total variance due to the object of measurement. In the final step the variances derived from the G-study are used to set the sample sizes to obtain a reliability of 0.7, 0.8 and 0.9. This is called a D-study. The D-study is the third criteria of the discriminative capacity, to determine whether differences among A&Es were detectable with a feasible sample size.

All analyses were performed using the statistical software SPSS 19.0 and R 2.10.1.

Results

In total 4883 (40%) patients responded. The number of respondents per hospital varied from 173 to 302. The mean age of the respondents was 52.8 (SD 20.5) years, and 49 percent was male. Non-respondents were younger (mean age 45.6 years) and more likely to be male (54%) (**Table 1**).

Two-third of the respondents rated their health status as good, very good or excellent. Respondents were equally divided over three educational levels; the vast majority was born in the Netherlands (89%). The triage code prioritized patients to treatment by the severity of the patients' symptoms. Most patients were triaged in the yellow (40%) or green (42%) category, and according to the triage systems had to be treated within one or two hours, respectively.

Domains

The PCA resulted in a five-factor solution comprising 26 items (explained variance=51%; KMO 0.934; Bartlett's test $p<0.001$; N=4883). Domains were largely comparable to prior analysis in the pilot study. The first domain 'attitude of healthcare professionals' comprised nine items, related to multiple quality aspects. Therefore, this domain was broken up into three domains to enhance interpretability and feasibility. The three domains were labelled: 1. attitude of healthcare professionals; 2. timeliness; 3. professionalism of received care. Each new domain measures one care aspect. For the face validity and the reliability we decided to move Q31 ‘received care as quickly as desired’ out of the domain ‘information before treatment’ into ‘timeliness’, and Q61 ‘feeling safe in the A&E’ was moved from the domain ‘attitude of healthcare professionals’ into the domain ‘environment and facilities’. Additionally, four extra items (Q18, Q24, Q64, and Q57) enhanced the reliability of the newly constituted seven domains. The domains were labelled: 1. information before treatment (α=0.667); 2. timeliness (α=0.834); 3. attitude of healthcare professionals (α=0.839); 4. professionalism of received care (α=0.714); 5. information during treatment (α=0.764); 6. environment and facilities (α=0.723); and 7. discharge management (α=0.788). Item-total correlations were above 0.40 for all items and the reliability of the domains did not increase if an item was deleted out of the domain (**Table 2**).

Correlations between domains are presented in **Table 3**. Of interest were correlations exceeding the threshold of 0.7, which indicate an overlap between domains. The third (‘attitude of healthcare professionals’) and the fourth (‘professionalism of received care’) domains partly measured the same aspect of healthcare performance in the A&E (r= 0.722).

Case-mix adjustment

Age, gender, and health status were statistically significant predictors in linear mixed effect models for all domains and the global quality rating. In other words, it is necessary to adjust patient experience scores for age, gender, and health status to make a fairer comparison among A&Es. Educational level, country of birth, and triage code were significant predictors for some (not all) domains and therefore not added to the adjusted models. The effect of case-mix adjustment as estimated by the PCV were comparable for the seven domains (range: 3.1-5.8% of the total variance), and slightly higher for the global quality rating: 6.9%.

ICCs were slightly higher in empty models (range: 0.0063 to 0.0354) than ICCs in adjusted models (range: 0.0038 to 0.0327). The effect of adjustment was the largest for the domain ´attitude of healthcare professionals´ and the smallest for the domain ´discharge management´. Experiences regarding interpersonal relations with professionals appeared to be more influenced by patients’ characteristics than for instance discharge management. Overall, patient characteristics explained only a very small part of the total variance in their experiences.

Discriminative capacity

Five domains regarding quality of care aspects and the ‘global quality rating’ had the capacity to discriminate among A&Es. The domains ‘information before treatment’ and ´discharge management’ did not demonstrate a discriminative capacity among

A&Es (no significant ICCs) (**Table 4**). The reliability (G-coefficient) of the mean value of patients' experience scores given actual sample sizes of A&Es (**Table 4**) was used to set the sample sizes to obtain a reliability of 0.7, 0.8 or 0.9. We found that two domains, 'timeliness' and 'environment and facilities', and the 'global quality rating' were reliable (G-coefficient>0.7) for the given numbers of respondents. Sample sizes of the two domains 'attitude of healthcare professionals' and 'professionalism of received care' were close to the reliability threshold, with G-coefficients of respectively 0.62 and 0.67. Sample sizes of respectively 335 and 226 were required to obtain reliability of 0.7. Sample sizes of three domains were insufficient for reliable measurements of differences among A&Es. The domain 'information during treatment' had an average response number of 228, whereas a sample size of 488 respondents was required for a more reliable estimate. For the domain 'information before treatment' and the domain 'discharge management' respectively, 301 and 473 were required to obtain sufficient reliability.

Table 5 shows numbers of low, average, and high performing A&Es, and means of patients experience scores. Scores on the domains 'information before treatment' and 'discharge management' were the lowest experience scores. High scores were found for 'attitude of healthcare professionals', 'professionalism of received care' and 'information provided during treatment'. A&E scores were plotted in caterpillar plots. **Figure 1** shows patient experience scores on the timeliness domain.

Table 1 Patient characteristics

	Respondents		Non-respondents	
	N	%	N	%
Age (mean and SD)*	52.8	20.5	44.6	23.1
Gender*				
Male	2392	49.0	4023	54.1
Female	2491	51.0	3418	45.9
Triage code*				
Red	18	0.5	48	1.0
Orange	497	14.4	605	12.0
Yellow	1389	40.2	1749	34.7
Green	1453	42.0	2423	48.0
Blue	99	2.9	219	4.3
Missing	1427			2397
Health status				
Excellent	547	11.4	N/A	N/A
Very well	828	17.2		
Well	1887	39.3		
Moderate	1242	25.8		
Poor	302	6.3		
Missing	77			
Educational level				
Low	1196	27.3	N/A	N/A
Medium	1640	37.5		
High	1540	31.5		
Missing	507			
Country of birth				
Dutch	4238	89.3	N/A	N/A
Non-Dutch	506	10.7		
Missing	139			

** Significant difference between respondents and non-respondents (p<0.05)*
N/A=Not Applicable. Health status, educational level and country of birth were obtained out of completed questionnaires

Table 2 Domains with accompanying items

Quality aspect		ITC	α if item deleted
Information before treatment (α=0.667; n=1301)			
Q18	Patient's healthcare expectations	0.45	0.61
Q21	Information on the rapidity of the treatment based on acuteness of the health problem	0.51	0.53
Q22	Information on the order of the treatment	0.48	0.57
Timeliness (α=0.834; n=1960)			
Q24	Total waiting time before treatment	0.68	0.78
Q31	Received care as quickly as desired	0.69	0.78
Q32	Patient's healthcare needs	0.62	0.81
Q64	Total time spent in the A&E	0.67	0.78
Attitude of healthcare professionals (α=0.839; n=4728)			
Q38	Healthcare professionals listened attentively to patients	0.75	0.74
Q39	Healthcare professionals took time for patients	0.68	0.82
Q40	Taken seriously by healthcare professionals	0.72	0.78
Professionalism of received care (α=0.714; n=3883)			
Q43	Cooperation among healthcare professionals	0.57	N/A
Q44	Trust in the competence of healthcare professionals	0.57	N/A
Information during treatment (α=0.764; n=2720)			
Q33	Information on treatment	0.57	0.71
Q35	Clarity of explanation of results of examinations	0.59	0.70
Q41	Clarity of explanation of health problem	0.66	0.66
Q62	Information towards attendants	0.46	0.76
Environment and facilities (α=0.723; n=2499)			
Q57	Pleasant atmosphere in the waiting room	0.57	0.64
Q58	Availability of refreshments	0.42	0.73
Q59	Hygiene in the A&E	0.53	0.66
Q60	Quiet environment	0.51	0.67
Q61	Felt safe in the A&E	0.49	0.69
Discharge management (α=0.788; n=261)			
Q48	Explanation about new medication	0.49	0.77
Q49	Information on side-effects of the medication	0.56	0.76
Q50	Information on resumption of daily activities	0.69	0.70
Q51	Information on danger signs to watch out for after leaving the A&E	0.69	0.71
Q56	Explanation about how to make an appointment for outpatient care	0.46	0.78

α=Cronbach's alpha coefficient
ITC= Item-total correlation
N/A=Not Applicable

Table 3 Correlation coefficients of domains

	Quality aspect	1	2	3	4	5	6
1	Information before treatment						
2	Timeliness	0.379					
3	Attitude of healthcare professionals	0.339	0.595				
4	Professionalism of received care	0.346	0.589	0.724			
5	Information during treatment	0.382	0.501	0.657	0.611		
6	Environment and facilities	0.342	0.522	0.535	0.522	0.477	
7	Discharge management	0.387	0.374	0.475	0.467	0.579	0.373

Table 4 Linear mixed effect models for the domains of the CQI A&E

Quality aspect	Empty model			PCV (%)	Adjusted model[a]	
	Variance A&E	Variance patients	ICC		Variance A&E	Variance patients
Information before treatment (α=0.667)	0.0091	0.8149	0.0111	5.27	0.0053	0.7754
Timeliness (α=0.834)	0.0158	0.6175	**0.0249**	5.01	0.0133	0.5883
Attitude of healthcare professionals (α=0.839)	0.0032	0.3505	**0.0259**	4.07	0.0023	0.3370
Professionalism of received care (α=0.714)	0.0065	0.3651	**0.0116**	3.06	0.0036	0.3485
Information during treatment (α=0.764)	0.0029	0.4522	**0.0063**	3.56	0.0020	0.4369
Environment and facilities (α=0.723)	0.0128	0.3499	**0.0354**	4.64	0.0113	0.3347
Discharge management (α=0.788)	0.0034	0.7196	0.0047	4.91	0.0026	0.6848
Global quality rating	0.0510	26.927	**0.0186**	6.91	0.0445	25.095

α Cronbach's alpha coefficient
a Adjusted for age, gender and health
ICC, Intra class correlation coefficient; ICCs in bold are significant (p<0.05)
PCV, Proportional change of variance
** The G-coefficient indicates the reliability of the measurement at an A&E, given the actual sample size; G-coefficients in bold are above the threshold of 0.7*

Table 4, continued. Linear mixed effect models for the domains of the CQI A&E

	Adjusted model[a]	Mean valid response per A&E	Reliability (G-coefficient)***	No. of respondents needed for reliability		
Quality aspect	**ICC**			**0.7**	**0.8**	**0.9**
Information before treatment (α=0.667)	0.0067	79	0.38	301	516	1160
Timeliness (α =0.834)	**0.0221**	213	**0.82**	109	186	419
Attitude of healthcare professionals (α=0.839)	**0.0155**	230	0.62	335	574	1292
Professionalism of received care (α=0.714)	**0.0102**	185	0.67	226	387	870
Information during treatment (α=0.764)	**0.0046**	226	0.52	488	836	1882
Environment and facilities (α=0.723)	**0.0327**	227	**0.89**	68	117	263
Discharge management (α=0.788)	0.0038	69	0.25	473	811	1825
Global quality rating	**0.0174**	229	**0.80**	131	225	505

Table 5 A&E quality performance and patient experience domain scores

	Quality of care (numbers of A&Es)			Patients' experiences*			
Quality aspect	**Low**	**Average**	**High**	**Mean**	**Minimum**	**Maximum**	**Range**
Information before treatment	0	21	0	2.08	2.00	2.17	0.17
Timeliness	4	14	3	3.39	3.21	3.56	0.35
Attitude of healthcare professionals	1	18	2	3.59	3.52	3.66	0.14
Professionalism of received care	2	17	2	3.48	3.41	3.60	0.19
Information during treatment	0	20	1	3.47	3.43	3.55	0.12
Environment and facilities	6	11	4	3.31	3.19	3.53	0.34
Discharge management	0	21	0	3.02	3.02	3.02	0.00
Global quality rating	2	15	4	7.65	7.38	8.07	0.69

Numbers of low, average and high performing A&Es

** Patients' experiences domain scores adjusted for age, gender and health status.*

Figure 1 Patients' experience scores of the domain 'timeliness'

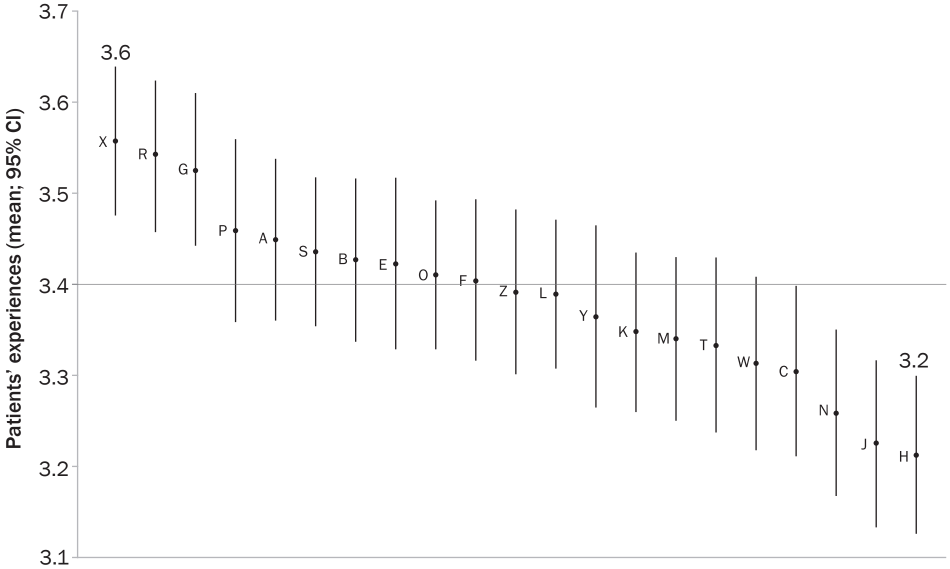

Figure 1 displays patients' experience scores of the domain 'timeliness'. Vertical lines represent ranges of experience scores of A&Es. The horizontal line in the middle of the figure represents the aggregated average patient experience score (3.4). A&Es performing significantly worse than average are plotted in the lower right corner (N, J, and H). A&Es performing significantly better than average are plotted in the upper left corner (G, R, and X).

Discussion

In this study, the construct validity of the CQI A&E was investigated. Furthermore, we studied the discriminative capacity of the CQI A&E. The questionnaire measured seven quality aspects of healthcare performance in the A&E, which were labelled: information before treatment; timeliness; attitude of healthcare professionals; professionalism of received care; information during treatment; environment and facilities; and discharge management.

The CQI A&E can be used for monitoring the quality of care in the A&E from the patients' perspective. As mentioned in the introduction, a national report introduced three standards from the professional perspective to assess quality of care. Standards relate specifically to the quality management system, the availability and competence of medical staff, and the time within which any necessary airway management interventions are implemented.[1] We propose adding the systematic measurement of patients' experiences as a standard to monitor and improve healthcare performance among and within A&Es. We follow Cameron, Schull and Cooke,[27] who mentioned patient-centredness, accessed by measuring patients' experiences, as a key element in a framework for quality measurement in the A&E.

The questionnaire provides information for several stakeholders in emergency medicine. Individual questions provide tailor-made information to pinpoint problems on a local level. Domain scores enhance clarity, comprehensibility and reliability of the data, and are more informative for surveillance and benchmarks among A&Es. Thus, measuring patients' experiences enhances transparency and enables benchmarks.

One large factor of the PCA was broken down into three separate domains. These three distinct domains seem easier to interpret and are, in our opinion, more informative and more specific than the 'original' domain with multiple quality aspects. This decision is beneficial for the face validity of the questionnaire. We accepted the domain 'information before treatment' although the Cronbach's alpha coefficient was below the threshold of 0.7.

In order to determine the discriminative capacity of the CQI A&E, several elements have to be discussed. Firstly, the PCV was calculated to clarify the effect of case-mix adjustment. Proportional variances ranged from 3% for professionalism of received care to 7% for global quality rating. Influences of patients' age, gender and health status were marginal. Therefore we deemed extending models with variables such as educational level, country of birth and triage code, which were not significant predictors for all models, unnecessary. This is consistent with previous findings that factors contributing to the variability in patient experiences were patient's age and health status, and hospital factors were of less importance.[16]

Secondly, ICCs expressed differences among A&Es. The ICCs of five domains were capable to demonstrate differences in healthcare performance among A&Es as experienced by patients. These differences showed that there is room for improvement on these domains, and A&Es can learn from best practices. The domain with the highest discriminative capacity was ‘environment and facilities’. A maximum of 3.3% of the total variance was attributable to the difference among A&Es. However, the largest part of the variance among A&Es remained statistically unexplained. ICCs and PCVs are in line with comparable studies.[14,23,28] Future study should elaborate on the relevance of the relatively small statistical differences for daily practice.

Thirdly, the reliability of the A&E level mean scores appeared to be sufficient for three domains with the given samples sizes. Low response rates for ‘information before treatment’ and ‘discharge management’ explain the poor reliability of both domains. In order to obtain a good reliability, sample sizes should be enhanced to 301 and 473 respondents, respectively; this would be difficult to accomplish for the discharge management domain due to a ‘skip to question’ link in the questionnaire, which precludes patients admitted to hospital wards (30%) completing several items. Another domain with limited reliability is the ‘information during treatment’ domain. Here, the problem is caused by the small difference in patient experience mean scores (range is 0.12). The value of increasing the sample size to 488 patients for the detection of such a small difference is questionable. Increasing the number of patients could benefit the discriminative capacity of the CQI A&E, and possibly reveal significant differences on more domains, but the consequence of higher costs to detect small differences should be considered.[29]

Two domains were unable to discriminate among A&Es. However, we argue that public reports should provide a complete overview of the quality of care. Therefore, we should reconsider the construct of the questionnaire to obtain discriminative domains. We estimate that increasing the number of respondents by adapting the skip questions to avoid elimination of patients to complete the items, which constituted the non-significant domains, will be sufficient.

Publications on benchmarks and patient-centred care in the A&E are limited. Chalder et al.[30] compared patient satisfaction at walk-in centres and A&Es. There was no evidence that walk-in centres co-located with A&Es had achieved the aim of increasing patient choice, preferences or satisfaction with received care. Recently Raleigh et al studied six domains of patients’ experiences across three service areas of trusts (outpatients, inpatients and A&Es) and reported three performance levels. 30 out of 142 trusts performed better on all domains, and 6 out of 142 performed worse on all domains. We found 1 out of 21 A&Es that performed better on all five discriminative domains and none that performed worse on all domains. The identification of a best practice A&E, which potentially would be a role model for other A&Es, might have a general positive effect on quality of care. However, sustained improvements tend to be achieved combined by for instance government targets, coupled with incentives and penalties.[31,32]

Two main limitations of the study were response bias and selection bias. Respondents were somewhat older and more likely to be female. To control for response bias, case-mix adjustment for age, gender and health status was applied on the domain scores. The discriminative capacity was not affected by this adjustment. Also, respondents were more often assigned to the orange and yellow triage categories compared to the non-respondents, who were more often triaged in the green and blue (i.e. less urgent) categories. Not responding could be influenced by many factors related or unrelated to the quality of care, such as language differences or unconsciousness of patients (recall bias). The direction and magnitude of impact of such factors (and potentially others) is not known, and could potentially influence the survey results and therefore also their generalizability. Secondly, we were able to include the required number of A&Es in our study. Participation of A&Es was voluntary and selection bias could have occurred. However, we think this influence is minimal, as A&Es varied in terms of patient volume, geographical area urban or rural regions, trauma centre or non-trauma centre, and teaching or non-teaching status, reflecting the full variation present in Dutch A&Es.

Conclusions

The CQI A&E is a validated survey to measure healthcare performance in the A&E from patients' perspective. Five domains regarding quality of care aspects, and the 'global quality rating' had the capacity to discriminate among A&Es, and to identify best practices as experienced by patients. The global quality rating and four domains showed good reliability given actual sample sizes.

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Chapter 6

Patients' priorities in the Accident and Emergency department

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Patients' priorities are stable across Accident and Emergency department
patient populations

Submitted

Abstract

Background: Knowing what care aspects patients rate as important, and acting upon their priorities increases patient-centredness of care in the Accident and Emergency department (A&E).

Objective: We prioritized healthcare aspects in A&E populations from the patient's perspective, and explored relationships between priorities and patients' characteristics.

Method: A cross-sectional priority study with patients aged 12 years and older of two A&Es was undertaken. A 43-items questionnaire was used to determine importance scores (range 1-4) of care items and domains.

Results: The 467 respondents gave the highest importance to the items 'hygiene'(3.65), 'seriousness of professionals'(3.61), and 'patients received the needed care'(3.61). Overall, differences between mean importance scores of the two A&Es were small, despite differences between A&E populations. Ordinal logistic regression models for the importance items showed an inconsistency among related patient's characteristics. The multivariate models of importance domains showed more stability.

Conclusions: Overall, care aspects in the A&E are highly valued by patients; importance scores were high. Patients' priorities across different A&E populations were stable. Only a small part of the variance of importance scores was related to patients' characteristics. Measuring patients' priorities in various A&E populations does not seem necessary.

Background

Knowing what care aspects patients rate as important, and acting upon their priorities increases patient-centredness of care in the Accident and Emergency department (A&E). An important question is whether patients' priorities of the quality aspects of healthcare performance in the A&E vary for A&E populations. In case of instability and variability, systematic measurement of patients' priorities is needed to assure that provider's efforts to improve quality of care are focused on appropriate quality aspects.

A&E populations vary due to the localization of the A&E (urban or rural), facilities, services and surroundings of the A&E. For instance, the availability of trauma rooms for the treatment of multiple trauma patients, annual patients' numbers, (lack of) competition of nearby A&Es, and collaborations with general practitioners cooperatives. It has been acknowledged that the A&E population in an rural area is characterized by a relatively high self-referral rate. Self-referrals are more likely to be younger and injuries are less severe.[1]

To our knowledge no other research on the stability of patients' priorities across A&E populations has been performed. During the development of the Consumer Quality Index for the Accident and Emergency department (CQI A&E),[2] a questionnaire which measures patients' experiences in the A&E, a study on patients' priorities was performed. The two aims were: first, to prioritize healthcare aspects in two various A&E populations from the patient's perspective, and second, to explore the relationship between priorities and patients' characteristics.

Methods

Population

A cross-sectional survey was conducted in two A&Es in the Netherlands. The A&E populations were likely to be different. The first A&E was centrally located in the Netherlands and served patients from both the urban area and the surrounding rural area. The closest A&E is at a distance of twenty kilometers. 38.000 patients visit the (large) A&E, annually. We included 653 patients, who visited the A&E in the course of one week in January 2010. The second A&E was located in the center of the capital of the Netherlands with 25.000 patients visiting the (medium) A&E annually. There are five competing A&Es in the city of Amsterdam, the closest at a distance of four kilometers. We randomly selected 800 out of all patients who had visited the A&E during three subsequent weeks in September 2011. Both participating A&Es provide 24/7 hours service to patients in need of urgent care, except for multiple trauma patients, who are referred to specialized trauma centers. Patients who attended the A&E with a known postal address (and excluding known deaths) were eligible. The paper-questionnaire and a covering letter were sent by postal mail within the first week after patients were included. Up to three reminders were sent to non-respondents, after 1 week, 4 weeks and 6 weeks. The questionnaire could be returned in a postage paid return envelope.

Questionnaire

Fifty importance questions were added to the preliminary Consumer Quality Index for the Accident and Emergency department (CQI A&E). The CQI A&E measures patients' experiences with the healthcare performance in the A&E. The preliminary version of the CQI A&E consisted of 54 so-called 'experience questions'. Related to experience questions, 'importance questions' were formulated to determine the importance of items according to A&E patients. For instance, the experience question: 'Did the healthcare professionals listen attentively to you?', was rephrased in the following importance question: 'Was it important to you that healthcare professionals listen attentively to you?'. Response formats of the importance items were: 1. Not important; 2. Of some importance; 3. Important; 4. Very important. Four importance questions were unclear, incomprehensible or impossible to compose and therefore left out of the priority study, resulting in the 50 importance questions. The second survey was performed with the final (shortened) CQI A&E. The questionnaire consisted of 43 experience questions and 43 matching importance questions.[2] As a consequence of the shortening of the questionnaire, the total number of importance questions differed between surveys. Analysis was performed without the eight inconsistent importance questions between both questionnaires.

The study protocol was approved by the Medical Research Ethics Committee of the University Medical Center, Utrecht.

Data Analysis

Respondents who were aged twelve years or older, and who had completed the questionnaire by themselves were included in the analysis. Descriptive statistics were used to summarize sample characteristics of patients of the two A&Es such as age, gender, referral, triage code, and time of attendance to the A&E. These variables were retrieved from the hospital registration systems. The A&Es used two different triage systems to initially assess the severity of the patients, who attend to the A&E: the Emergency Severity Index,[3] and the Manchester Triage System.[4] Both systems assign patients in five categories according to the severity of their health problem. In our analysis we did not distinguish between both systems, and grouped the categories red/1, orange/2, yellow/3, green/4, and blue/5. In this manuscript we will use the color-codes without the numbers. Self-reported health status at time of completion of the questionnaire and educational level were assessed by questions in the CQI A&E. None of the respondents were triaged in the red category. The single respondent who was triaged in the blue triage category was excluded, therefore the triage code was entered in the analysis as an ordinal variable with three response categories (orange, yellow, and green).

First, to determine the importance of a quality aspect, the mean importance score was calculated. The response categories of an importance question coded from 1 to 4 were added up and divided by the number of respondents.

Second, importance domain scores were calculated according to previously defined patients' experience domain scores.[5] The seven internally consistent experience domains are: 1. Information before treatment; 2. Timeliness; 3. Attitude of healthcare professional; 4. Professionalism of healthcare professionals; 5. Information during treatment; 6. Environment and facilities; and 7. Discharge management. Corresponding importance domains were constructed out of related importance questions, covering 26 out of 43 items. The item 'total time spend in the A&E' in the experience domain 'timeliness' did not have a corresponding importance question. The domain score was calculated without the missing question. A domain score was computed as the mean of importance scores of items contributing to the domain.

Third, ordinal logistic regression analysis was used to determine the factors related to the importance scores. Importance questions were used in the models as dependent variables. Analyses were performed with one importance question at a time (univariate analysis of variance), because the number of cases restricted the analyses of full models (multivariate analysis of variance). Age and self-reported health status were added to the model as covariates (continuous variables). Gender, level of education, triage code, referral and time of attendance (daytime/evening/night) were added to the models as factors (nominal or ordinal variables).

Finally, linear regression was performed to assess which factors were significantly related to the importance domain scores (dependent variables). For the variables gender, educational level, triage code, referral and time of attendance, dummy variables were created. Age and health status were entered as continuous variables. Full linear regression models were analyzed to determine the factors related to the importance domain scores. All statistical analyses were performed using the software SPSS 20.0.

Results

Respondents

Respondent's characteristics are presented in **Table 1**. The mean age of the respondents was 51 years and 49% were men. Most respondents reported to be in good, very good or excellent health at the moment of completing the questionnaire. About a quarter of the respondents had a lower educational level. The general practitioner referred 36% of the patients, and 43% was self-referred. Patients were almost equally divided over the orange, yellow, and green triage categories. 63% of the patients attended the A&E at day-time.

The respondents of the two A&Es were significantly different for triage code and referral. The respondents of the first A&E were more often referred by the general practitioner, whereas more than half of the respondents of the second A&E were self-referrals. Consequently, more respondents of the second A&E were triaged in the green category (67% versus 22%).

Mean score single importance items

Importance scores were calculated for all items. The top 20 mean importance scores of all patients, and for the two A&E populations are presented in **Table 2**. The items 'hygiene in the A&E', 'seriousness of healthcare professionals', 'patients received the needed care', 'trust in the healthcare professionals', and 'patients received the expected care', had the highest importance scores. All mean scores in the top 20 were above 3, reflecting patients considered these aspects as important to very important.

Overall, differences between the mean importance scores of the two A&Es were small. The largest difference between the A&Es was found for the importance given to the item 'Was it important to you that you could find a parking place near the A&E?'(A&E_1=3.53; A&E_2=3.18). The rank-order of the most important items was slightly different between both A&Es.

Factors related to the single importance items

Ordinal logistic regression models for the importance items showed an inconsistency among the related variables. Numbers in brackets behind the variables are total numbers of significant associations of the variable with importance items: health status (21); gender (21); age (19); education (13); triage code (9); A&E (6); referral (5); and time of attendance (3). Health status, gender, and age were the strongest predictors for the importance given to items. None of the variables were associated with one of the following importance questions 'Was it important to you that the reception desk staff gave you information on what to expect during your visit to the A&E?', 'Was it important to you that the waiting time before you started treatment in the treatment room was not a problem?', and 'Was it important to you that you received the help you needed?'.

Factors related to the importance domains

Linear regression models for the seven importance domains are presented in **Table 3**. The models showed the associations of age and gender in respectively three and two importance domains. With an increase of age more importance was given to the domains 'information before treatment' and 'professionalism of healthcare professionals'. Women gave more importance to the domains 'attitude of healthcare professionals', 'professionalism of healthcare professionals', and 'information during treatment' compared to men. Lower educated respondents gave more importance to the domain 'information before treatment'. Respondents triaged in the orange category gave less importance to the domain 'timeliness'. The percentage of explained variance of the models was small, 4.0–8.9%. If all factors were added to the models the mean importance scores of three domains did not change significantly. These domains are: 1. 'Attitude of healthcare professionals'; 2. 'Professionalism of healthcare professionals'; 3. 'Environment and facilities'.

Table 1 Respondent characteristics

		Respondents		
	N	Total N=467	A&E_1 N=294	A&E_2 N=173
Age (mean (SD))	467	50.6 (21.2)	51.0 (21.1)	49.8 (21.4)
Gender		%	%	%
Men	230	49.3	51.4	45.7
Women	237	50.7	48.6	54.3
Missing	0			
Self-rated health status at follow up				
Excellent	56	12.2	11.3	13.6
Very good	89	19.3	19.9	18.3
Good	187	40.7	41.2	39.6
Fair	104	22.6	22.0	23.7
Poor	24	5.2	5.5	4.7
Missing	7			
Education				
Low	117	27.1	28.2	25.0
Medium	161	37.3	37.1	37.5
High	154	35.6	34.6	37.5
Missing	35			
Triage code*				
Orange	107	31.1	38.8	1.4
Yellow	128	37.2	38.8	31.4
Green	108	31.4	22.3	67.1
Missing	124			
Referral*				
Ambulance	78	17.7	19.0	15.6
General Practitioner	159	36.1	42.5	26.0
Self-referred	191	43.3	38.4	50.9
Other	13	2.9	0.0	7.5
Missing	26			
Time of attendance				
Daytime 8:00 – 17:00	293	62.7	64.6	59.5
Evening 17:00 – 0:00	135	28.9	26.5	32.9
Night 0:00 – 8:00	39	8.4	8.8	7.5
Missing	0			

** Significant difference between A&E populations ($p<0.05$)*

Table 2 Top 20 of most important quality aspects in the A&E

Was it important to you that…	**Importance score** **All** **Mean**	 **Rank-order**	 **A&E_1** **Mean**	 **Rank-order**	 **A&E_2** **Mean**	 **Rank-order**	 **Δ A&E**
the A&E was hygienic?	3.65	1	3.63	3	3.67	1	-0.04
the healthcare professionals took you seriously?	3.61	2	3.62	4	3.58	4	0.04
you received the help you needed?	3.61	3	3.62	5	3.60	3	0.02
you trusted the expertise of the healthcare professionals in the A&E?	3.60	4	3.64	1	3.52	6	0.12
you received the help you had expected from the A&E?	3.59	5	3.57	7	3.63	2	-0.06
the reception desk staff treated you seriously?	3.59	6	3.64	2	3.51	7	0.13
if needed, you received help as quickly as you wanted?	3.54	7	3.52	11	3.56	5	-0.04
the healthcare professionals did not gave you contradictory information?	3.52	8	3.58	6	3.43	14	0.15
the healthcare professionals cooperate with each other?	3.52	9	3.57	8	3.44	12	0.13
the healthcare professional explained the results of the tests in an understandable manner?	3.51	10	3.53	9	3.48	8	0.05
the healthcare professionals listen attentively to you?	3.50	11	3.52	12	3.48	9	0.04
the healthcare professionals told you what danger signals to watch for after your departure of the A&E?	3.48	12	3.50	13	3.46	11	0.04
you could find the A&E in the hospital?	3.46	13	3.45	16	3.48	10	-0.03
the healthcare professionals explained your health problem in an understandable manner?	3.45	14	3.46	15	3.44	13	0.02
you felt safe during your stay in the A&E?	3.44	15	3.47	14	3.37	17	0.10
more serious patients were treated first?	3.43	16	3.45	17	3.41	15	0.04
you could find a parking place near the A&E?	3.40	17	3.53	10	3.18	20	0.35
the health professionals explained the aim of new medicines in an understandable manner?	3.39	18	3.40	19	3.39	16	0.01
the health professionals told you who to contact if you were worried after your departure from the A&E?	3.38	19	3.41	18	3.33	18	0.08
the health professionals told you of side-effects to which you had to pay attention for?	3.35	20	3.38	20	3.31	19	0.07

Δ A&E = differences between A&E_1 and A&E_2. Importance scores range 1-4

Table 3 Full regression models of importance domains

		Domain 1		**Domain 2**		**Domain 3**		**Domain 4**	
		B	**P-value**	**B**	**P-value**	**B**	**P-value**	**B**	**P-value**
Constant		2.435		3.270		3.168		3.429	
A&E	A&E_1 vs. A&E_2	0.018	0.10	-0.004	0.69	0.000	0.98	-0.011	0.20
Age		**0.004**	**0.04**	0.002	0.30	0.002	0.11	**0.003**	**0.01**
Health status		0.018	0.62	0.028	0.32	0.026	0.37	0.020	0.46
Gender	Men vs. women	0.052	0.45	0.017	0.77	**0.166**	**0.00**	**0.105**	**0.04**
Education	Medium vs. low	**0.171**	**0.04**	-0.019	0.79	0.025	0.71	-0.065	0.29
	Medium vs. high	0.118	0.14	0.076	0.27	0.079	0.21	0.070	0.24
Triage code	Green vs. orange	-0.152	0.12	**-0.202**	**0.02**	-0.049	0.52	-0.044	0.54
	Green vs. yellow	-0.099	0.25	-0.091	0.21	-0.047	0.49	0.040	0.53
Referral	GP vs. self-referral	-0.029	0.72	0.071	0.30	0.061	0.35	-0.006	0.93
	GP vs. ambulance	0.000	1.00	-0.054	0.54	0.068	0.41	-0.030	0.70
	GP vs. Other	-0.047	0.54	0.218	0.38	0.041	0.86	-0.135	0.53
Time of attendance	Daytime vs. night	0.078	0.71	0.030	0.78	-0.089	0.38	0.163	0.09
	Daytime vs. evening	0.152	0.05	0.008	0.90	0.076	0.22	0.040	0.48

Domain 1. information before discharge; domain 2. timeliness; domain 3. attitude of healthcare professionals; domain 4. professionalism of healthcare professionals; domain 5. information during treatment; domain 6. environment and facilities; domain 7. discharge management.
P-values in bold are significant (p<0.05)

Table 3, continued. Full regression models of importance domains

		Domain 5		Domain 6		Domain 7	
		B	P-value	B	P-value	B	P-value
Constant		3.099		2.887		2.931	
A&E	A&E_1 vs. A&E_2	-0.001	0.87	0.002	0.83	0.010	0.24
Age		0.002	0.07	0.001	0.38	0.002	0.23
Health status		0.043	0.11	0.012	0.70	0.037	0.20
Gender	Men vs. women	**0.118**	**0.02**	0.073	0.22	0.097	0.08
Education	Medium vs. low	0.110	0.08	0.106	0.15	0.085	0.21
	Medium vs. high	0.006	0.93	-0.057	0.41	-0.055	0.39
Triage code	Green vs. orange	-0.075	0.31	0.015	0.86	-0.067	0.39
	Green vs. yellow	-0.102	0.12	-0.009	0.91	-0.121	0.08
Referral	GP vs. self-referral	0.020	0.74	-0.002	0.97	-0.023	0.72
	GP vs. ambulance	0.088	0.26	0.039	0.66	0.075	0.36
	GP vs. Other	0.090	0.68	0.255	0.31	-0.120	0.61
Time of attendance	Daytime vs. night	-0.025	0.80	-0.058	0.60	0.057	0.58
	Daytime vs. evening	0.060	0.31	0.051	0.45	0.081	0.20

Domain 1: R^2=0.084; p<0.01
Domain 2: R^2=0.044; p=0.32
Domain 3: R^2=0.064; p=0.06
Domain 4: R^2=0.079; p=0.01
Domain 5: R^2=0.089; p<0.01
Domain 6: R^2=0.040; p=0.42
Domain 7: R^2=0.084; p<0.01

Discussion

The objective of this study was the assessment of patients' priorities of healthcare delivery in the A&E. We investigated the relationship between patients' characteristics and priorities. The most important quality of care aspects were, first, the hygiene in the A&E, second, patients had the feeling that the healthcare professionals took them seriously, and third, patients received care when help was needed. The mean importance scores of the two A&Es were comparable. Differences in the rank-order were small. The variability of factors related to the priorities in the univariate regression models of the single importance items was large, whereas the variability in the multivariate importance domains models was limited. Patients' characteristics age and gender were significant predictors in respectively two and three importance domains.

This study shows the stability of patients' priorities of emergency care in the A&E. In practice, to deliver patient-centred care, attention should be paid to helping patients accurately, and treating them seriously, in a hygienic A&E. Also, patients are burdened by systematically measuring the patient's perspective for the evaluation of healthcare delivery. To avoid a (further) decline of response rates, and introducing non-response, and inevitably selection bias, the objective of a survey should be carefully considered. Our findings about stable importance scores indicate that continuous or systematic measurements of patients' priorities are not necessary.

The significant differences between the triage code and type of referral between the two A&Es confirmed the assumed variability in patients' characteristics between both populations. Despite these differences patients' priorities remained constant. This in line with our previous study.[2] We reported the importance scores of one of the A&Es, and compared these to an English priority study. The findings suggested that the importance of quality aspects were comparable between England and the Netherlands. Also, our findings are in line with a research on more homogenous disease-specific patients groups.[6,7]

The largest difference between single importance items was found for the importance given to the availability of a parking place near the A&E. We related this to the current parking problem at the first A&E. This finding suggests that experiences affect the importance given to items. Probably a higher priority is given to items after a negative experience. This could also explain the finding that respondents triaged in the orange category gave less importance to the domain timeliness compared to patients triaged in the green category. It is likely that the more urgent (orange) patients had a shorter waiting time.

The factor 'health status' at follow-up was a relatively strong determinant for the individual importance items, but the associations disappeared in the full regression models of the importance domain scores. We calculated correlations of health status with age and gender to investigate whether effects found in the univariate models were taken over in the multivariate models by age and gender. However, correlations were weak, and could not explain the absence of relationships.

Cook's importance study[8] determined that patients expectations in the A&E, regarding staff communication with patients, wait times, the triage process and information management were related to the severity of patient's injuries. In our study we found only the importance domain 'timeliness' to be significantly related to the severity of the health problem. Triage code was used as a proxy for the severity of the health problem. Respondents triaged in the orange category gave less importance to the domain compared to patients triaged in the green category. No difference existed between the yellow and green triage categories. The influence of the severity of the health problem appears to be limited in priority setting, which is in contrast to Cook's importance study.

Another study, that solely focuses on nurse caring behavior in the A&E, found age, gender and educational level do be determinants for the importance of aspects of nurse caring behavior. No significant differences were found among subjects regarding to the residence or the way in which subjects perceived the seriousness of their illness.[9] In our study three domains were associated with age or gender. The importance given to the domain 'information before treatment' increased by age. Also, the importance given to the domain 'professionalism of healthcare professionals' increased by age and was more important for women. In addition, the domains 'attitude of healthcare professionals' and 'information during treatment' were rated more imported by women. Healthcare professionals should pay attention to these priorities during treatment, especially when the patient is an older woman.

Due to the dissemination of a Dutch-language questionnaire selection bias could have occurred. Patients with other ethnical backgrounds were underrepresented. The priorities of these patients group could be different, and could possibly effect patient-centredness of care. However, relationships between priorities and the various patient's characteristics in our study appeared to be stable though populations differed on those characteristics. Therefore, unstable priorities are not expected even when the variability among A&E populations is even larger than in our study sample. Whether patients' priorities remain stable in time should be further investigated.

Conclusions

Overall, care aspects in the A&E were highly valued by patients, importance scores were high. Patients' priorities across different A&E populations were stable. Only a small part of the variance of importance scores was related to the patients' characteristics age and gender, and none was related to care characteristics.

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Chapter 7

Waiting in the Accident and Emergency department

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Waiting in the Accident and Emergency department; exploring problematic experiences

Submitted

Abstract

Objective: To investigate the relationship between patients' perceived waiting times and patients' global quality ratings of the Accident and Emergency (A&E) department, and to explore which patients experience waiting times as problematic.

Methods: A cross-sectional survey was undertaken in twenty-one A&Es in the Netherlands. Eligible were A&E-patients aged 18 years and older, who were not transported with an ambulance. Analysis was done using univariate and multivariate logistic regression analysis.

Outcome measures: Patients global ratings of perceived waiting time categories, and related factors to problematic patients´ experiences with the perceived waiting time before treatment.

Results: 3483 patients were included in the analysis. 80% of the patients who had to wait 2-4 hours before treatment experienced problems with the perceived waiting time. Longer perceived waiting time was associated with a decrease in global quality rating and increased reports of problematic experiences. In a multivariate analysis a problematic waiting experience was significantly associated with pain (odds ratio (OR) 1.12; 95% CI 1.07-1.17), perceived acuity (emergency/urgent/non urgent ORs: 2.68; 95% CI 1.64-4.36/2.22; 95% CI 1.68-2.92/1.0), and information before treatment. The OR of uninformed versus patients who were completely informed about what to expect during their visit was 3.30 (95% CI 2.34-4.87). The OR of uninformed versus completely informed patients about how quickly they needed to be helped was 3.4 (95% CI 2.29-5.11).

Conclusions: Providing information before treatment, controlling perception of pain, and managing the perceived acuity reduced problematic experiences about the perceived waiting time, are likely to improve experienced quality of care in the A&E.

Introduction

One of the key indicators for the quality of emergency care is the patient's waiting time until definitive care.[1,2] Reducing waits can improve clinical outcome and is especially important for patients in need of emergency care.[3,4] However, waiting times are not only important in view of the clinical outcome but also because of the relationship with the patients ratings of the received care. Previous studies show that longer waiting times in specifically the Accident and Emergency Department (A&E) result in lower satisfaction scores about the A&E.[5,6] This is especially the case for the perceived waiting time.[7-9]
For improving the patients satisfaction about their A&E visit it is interesting to investigate which patients experience their perceived waiting times to be a problem because these patients are likely to rate their visit more negatively.[10] Insight into these patient groups may learn us that adjustments in the patient's flow or modifications in other care characteristics may result in more satisfied patients who give more positive overall evaluations of their A&E visit. Satisfied patients are more willing to return and to recommend the A&E to others.[11]
This multicenter study focuses on the perceived waiting times of A&E patients in the Netherlands. The aim of this study was to analyse the relationship between the perceived waiting times and patients ratings of the A&Es as well as to further explore which patients experience their waiting times as problematic. For this latter objective we explored the relation between experiences and patient characteristics, A&E characteristics and the degree to which information on the waiting times was given.

Methods

Study population and data collection

A cross-sectional survey was undertaken to obtain patients' experiences of healthcare performance in the A&E in the Netherlands using the Consumer Quality Index for the A&E (CQI A&E). The CQI A&E is a questionnaire with 78-items.[12] Twenty-one out of a hundred A&Es in the Netherlands participated. The A&Es varied in terms of patient throughput, geographical area (urban or rural areas), trauma centre or non-trauma centre, teaching or non-teaching hospital. Data were collected in April and September 2010. Variables such as the patients name, postal address, gender, age, triage code, and time of attendance were obtained from the hospital registration systems. For the surveys, 600-800 patients per A&E were randomly selected, using a computer-generated numbers table, out of all patients attending the A&Es during three subsequent weeks. Patients with a known postal address and no reported death were eligible. The paper questionnaire and covering letter were sent by postal mail. To minimize the recall bias and the influence of intervening healthcare contacts questionnaires were sent between two to four weeks after the A&E attendance. Up to three reminders were sent to non-respondents: after 1, 4, and 6 weeks. The recipients could return the questionnaire in a postage paid envelope. The study protocol was approved by the Medical Ethical Review Committee of the University Medical Center Utrecht.

Data analysis

Questionnaires of respondents aged 18 years and older, and who were not transported by ambulance were included in the analysis. **Table 1** shows an overview of the questionnaire items with corresponding response categories we used in the analyses in this study. The central question about the perceived length of the waiting time was divided into two: the waiting time until triage (wait_triage, question 1) and the waiting time after triage and before diagnostics or treatment started (wait_treatment, question 2). Some response categories of the questions 4, 5, and 6 were grouped in view of small numbers of respondents. For the question whether the total waiting time was experienced as problematic (question 3) the respondents of the categories 'a big problem' and 'a small problem' were grouped because these two groups showed the same results (data not shown). The amount of provided information was determined by the questions 7, 8 and 9. In the analyses they are used as the variables: information 1, information 2, and information 3. The last question (question 10) on the overall quality rating is the final outcome variable.

The data collection systems registered the triage code of patients to determine the severity of the health problem. All A&Es used either the Manchester Triage System or the Emergency Severity Index.[13-15] Both systems assign patients in five categories according to the severity of their health problem. In our analysis we did not distinguish between both systems, and grouped the categories red/1, orange/2, yellow/3, green/4, and blue/5. In this manuscript we will use the color codes without the numbers. The numbers of patients triaged in the red and blue categories were limited; therefore respondents of the red and orange categories, and respondents of the blue and green categories were grouped in the analysis. The time of attendance was categorized in three categories: day (8:00–17:00); evening (17:00–0:00); night (0:00–8:00). Annual patients' numbers were used as a proxy for the size of the A&Es. A&Es were categorized into small (<20,000 annual attendances), medium (20,000-30,000 annual attendances), and large (>30,000 annual attendances) A&Es.

First, for each category of the perceived waiting time, the global quality rating was estimated as the mean value of the respondents. The association between the perceived waiting time and the global quality rating was tested using ANOVA. Second, to determine which factors were related to experiencing a problematic waiting time, univariate logistic

Table 1 Variable names and questionnaire items plus response categories

	Variable	Question and response categories
1.	Wait_triage	'How long did you have to wait before you first spoke to a care provider?' a) 0-10 minutes; b) 11-30 minutes; c) 31-60 minutes; d) 1-2 hours; e) 2-4 hours; f) I don't know (anymore)'
2.	Wait_treatment	'How long did you have to wait this second time in the waiting room before your treatment started?' a) I was helped directly; b) 5-10 minutes; c) 11-30 minutes; d) 31-60 minutes; e) 1-2 hours; f) 2-4 hours; g) longer than 4 hours; h) I don't know (anymore)
3.	Problems with the total waiting time	'Was the total waiting time before you started treatment in the treatment room a problem?' a) a big problem; b) a small problem; c) no problem
4.	Perceived acuity	'According to you, how quickly should you have been seen?' a) not quickly (had no haste); b) urgent (aid necessary within some hours); c) emergency (aid necessary within half an hour); d) life- threatening (each second counts)'
5.	Pain	'Can you indicate on a scale of 0 to 10 how much pain you had on entry to the A&E?' 0 means no pain 10 means the most terrible pain conceivable
6.	Referral	'Who referred you to the A&E?' a) my general practitioner; b) the General Practitioner Cooperatives; c) I was brought by an ambulance; d) a specialist told me I had to go to the A&E; e) someone else (e.g. a friend, family member, colleague) decided I had to go to the A&E; f) I decided myself that I had to go to the A&E
7.	Information 1	'Did the reception staff give you information on what to expect during your visit to the A&E?' a) No, not at all; b) A bit; c) A great deal; d) Yes, completely
8.	Information 2	'Did the nurse tell you how quickly you needed to be helped with your health problem?' a) No, not at all; b) A bit; c) A great deal; d) Yes, completely
9.	Information 3	'Did the nurse tell you the order you and the other patients in the waiting room would be helped?' a) No, not at all; b) A bit; c) A great deal; d) Yes, completely
10.	Global quality rating	'What score would you give the A&E?' 0 means a very bad A&E 10 means an excellent A&E

regression analyses were performed. The problem/no problem group, with respect to their received waiting times was entered as dependent variable. Age, gender, perceived acuity, triage code, referral, pain, information 1, information 2, and information 3, A&E size and time of attendance were entered as independent variables.

Third, the variables, which were significant predictors in the univariate analyses were entered in a multivariate logistic regression analysis, using backward selection. Whether pain scores and self-perceived acuity were significantly related was tested using ANOVA. To study this interaction effect, the interaction term was added to the multivariate model. The results of the univariate and multivariate logistic regression analyses are reported as respectively crude and adjusted odds ratios (OR) with 95% confidence intervals.

All statistical analyses were performed using the statistical package SPSS version 20.0. P-values were based on two-sided tests with a cut-off level for statistical significance of 0.05.

Results

The eligible sample consisted of 9796 patients; 1163 questionnaires were uncompleted returned, 5159 responded (53%), 290 questionnaires were not self-completed or insufficiently completed and were excluded from analyses. Overall, 3483 (36%) completed questionnaires could be included in the analyses. The mean age of the respondents was 53.3 (SD 17.9) years, and 49% was male. Non-respondents were significantly younger (mean age 48.3 ± 21.8 years), and significantly more often men (51%).

Perceived waiting times and global quality rating

Table 2 shows the distributions of the first perceived waiting time before triage started, and the second perceived waiting time after triage until the treatment started. Almost half (44%) of the patients reported to be triaged within ten minutes. According to 7% of the patients they had to wait one hour or longer before they were triaged. After triage, more than half of the patients (60%) reported to have been treated within thirty minutes. One out of five patients (21%) had a second perceived waiting time of at least one hour before treatment started. The number of respondents was small; only 1383 (40%) patients reported that they had to wait a second time after they had spoken to a health professional for the first time.

Problems rating versus perceived waiting time

The global quality rating of the A&E was negatively associated with the perceived waiting time before triage as well as with the waiting time after triage and before treatment (see **Figure 1 and 2**). The mean global quality rating for the categories of the first waiting time ranged from 6.0 for the longest waiting time to 8.3 for the shortest waiting time. The global quality rating for the categories of the second waiting time had comparable ratings with a minimum mean value of 6.3 for the longest waiting time, and a maximum mean value of 8.3 for the shortest waiting time. The two waiting times were both significantly associated with global quality rating ($p<0.05$).

Problems with the perceived waiting times

Nineteen percent of the patients who were triaged within ten minutes after their arrival in the A&E had experienced a problem with the waiting time. This percentage increased to 80% of the patients who had to wait two to four hours before they were triaged. The same pattern was shown for the second waiting time.

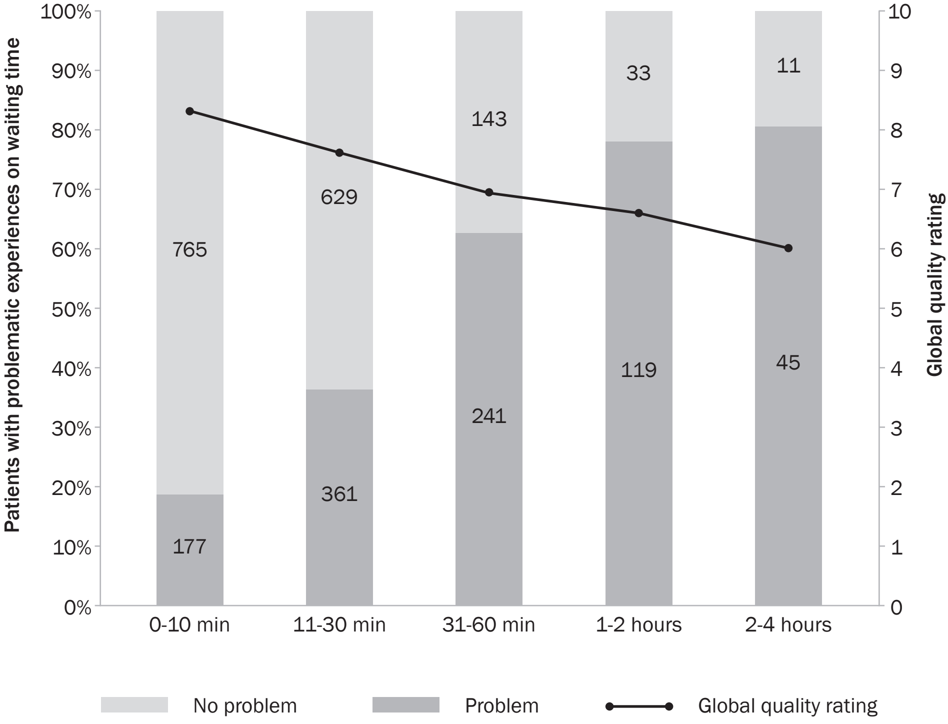
Factors influencing a problematic experience during the total waiting time before treatment

Table 3 shows the baseline characteristics of the patients who had experienced a problem with the total waiting time before treatment and of those who had experienced no problem. Patients who experienced a problem were younger (50 years) and more likely to be female (53%) compared to those who experienced no problem with their waiting time (54 years; 49% female). Gender was a significant predictor for the problem/no problem group (OR=1.22). The patients with a problematic waiting time reported to be in more pain before treatment than their counterparts who did not experience their waiting time as problematic (OR=1.15; pain score 5.7 versus 4.5). Furthermore, they considered their health problem more often as an emergency or life-threatening (15% versus 9%). Perceived acuity appeared to be a significant predictor for a problematic experienced waiting time with odds ratios of 2.36 for emergency or life-threatening perceived acuity, and 1.86 for urgent perceived acuity compared to the patients who rated their health problem not as urgent. The waiting time in large A&Es was more often problematic according to the patients, compared to the waiting times perceived by the patients treated in small A&E, with an odds ratio of 1.72.

Information provision was the strongest predictor for problems during the waiting time. Odds ratios of the patients who did not receive any information on the three information aspects were respectively 4.3 (information 1), 4.8 (information 2) and 3.9 (information 3) compared to those patients who were completely informed. Of the patients with a problematic experienced waiting time, only 12% were completely informed on what to expect during their stay in the A&E, 10% were completely informed on how quickly help was needed, and 7% was completely informed on the order of treatment in the waiting room. Respectively 32%, 30%, and 20% of their counterparts of patients who did not experience problems with their waiting times reported to have been fully informed. Triage code, time of attendance and the referral were not significantly related to a problematic experienced waiting time.

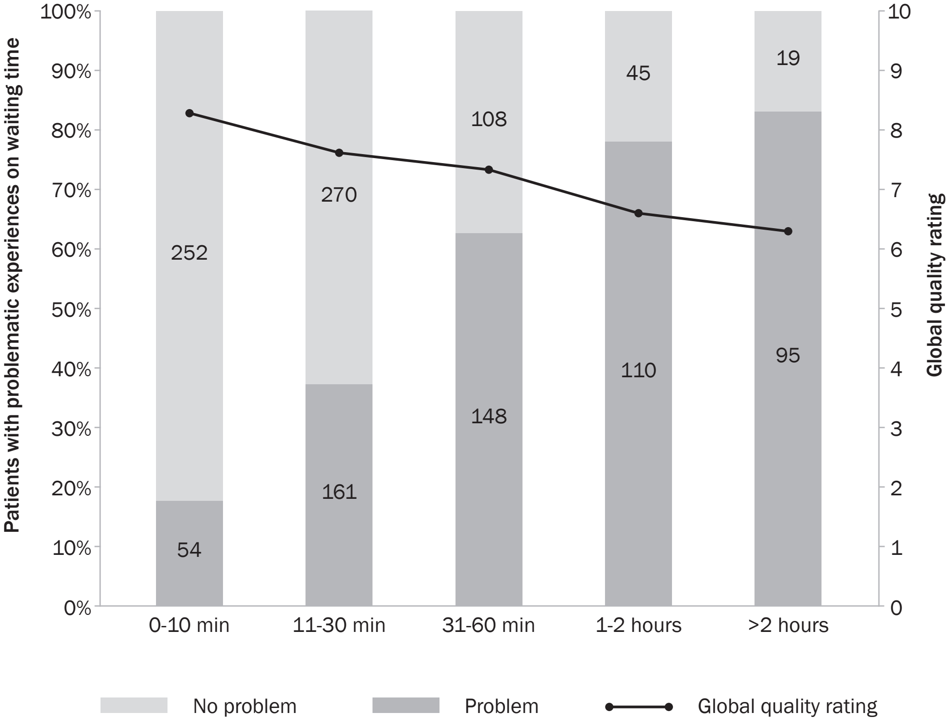
In the multivariate logistic regression analysis, the variables pain, perceived acuity, information 1 and information 2 were predictors for a problematic experienced waiting time. Again, information 1 and 2 were the strongest predictors (**Table 4**). Odds ratios for the patients, who were completely informed compared to those who were uninformed, were respectively 3.3 and 3.4. The mean pain scores for the three perceived acuity categories emergency or life-threatening/urgent/not urgent, were respectively 6.1/5.1/4.1, and significantly different ($p<0.01$). Adding the interaction term of perceived acuity and pain in the multivariate regression model did not increase the predictive value of the model.

Figure 1 Perceived waiting time before treatment



Patients are divided according to the five perceived waiting time categories on the horizontal axis. On the left vertical axis patients with problematic experiences on waiting time are presented in percentages; absolute numbers are shown in the bars of each waiting time category. On the right vertical axis the global quality rating is presented on a scale ranging from 0 to 10.

Figure 2 Perceived waiting time between triage and treatment



Patients are divided according to the five waiting time categories on the horizontal axis. On the left vertical axis patients with problematic experiences on waiting time are presented in percentages; absolute numbers are shown in the bars of each waiting time category. On the right vertical axis the global quality rating is presented on a scale ranging from 0 to 10.

Table 2 Frequency distribution of the two perceived waiting times

	1st waiting time		2nd waiting time	
	N	%	N	%
0 – 10 minutes	1371	44.4	356	26.4
11 – 30 minutes	1099	35.6	452	33.6
31 – 60 minutes	400	12.9	263	19.5
1 – 2 hours	158	5.1	159	11.8
More than 2 hours	62	2.0	119	8.8
Missings	72		34	

1st waiting time = waiting time before triage
2nd waiting time = waiting time between triage and treatment
Missings are reported without the respondents of the two A&Es that did not use a triage system, and without the respondents, who did not wait a second time.

Table 3 Odds ratios and 95% confidence intervals (CI) of related factors among patients who experienced no problems with the waiting time and patients who experienced problems with the waiting time

	Total waiting time before treatment				
	No problem		Problem ‡		Odds ratio (95% CI)
	%	N	%	N	
Age (mean (SD))	53.7 (17.4)	1758	49.9 (18.1)	1034	0.99 (0.98-0.99)*
Pain (mean (SD))	4.5 (3.1)	1726	5.7 (3.0)	1013	1.15 (1.12-1.18)*
Gender					
Female	48.5	852	53.4	552	1.22 (1.04-1.42)*
Male	51.5	906	46.6	482	1.00 (reference)
Perceived acuity					
Emergency/life-threatening	9.0	156	14.8	151	2.36 (1.83-3.04)*
Urgent	36.8	635	47.5	484	1.86 (1.57-2.20)*
Not urgent	54.2	936	37.7	384	1.00 (reference)
Referral					
General practitioner	42.7	734	39.1	398	0.86 (0.71-1.03)
Self-referral	30.1	518	31.9	325	0.99(0.81-1.21)
Other	27.2	467	29.0	296	1.00 (reference)
Information 1 (reception: expectations)					
No, not at all	25.2	321	41.4	343	4.29 (3.29-5.60)*
A bit	19.3	245	26.8	222	3.63 (2.73-4.83)*
A great deal	24.0	305	19.7	163	2.14 (1.60-2.86)*
Yes, completely	31.5	401	12.1	100	1.00 (reference)

** The odds ratio is significantly different from the reference group. ‡No problem with the waiting time is the reference group. L=large A&E; M=medium A&E; S=small A&E. Information 1 'Did the reception staff give you information on what to expect during your visit to the A&E?; Information 2 'Did the nurse tell you how quickly you needed to be helped with your health problem?; Information 3 'Did the nurse tell you the order you and the other patients in the waiting room would be helped?'*

Table 3, continued. Odds ratios and 95% confidence intervals (CI) of related factors among patients who experienced no problems with the waiting time and patients who experienced problems with the waiting time

	Total waiting time before treatment				
	No problem		Problem ‡		Odds ratio (95% CI)
	%	N	%	N	
Information 2 (nurse: urgency)					
No, not at all	29.0	220	44.6	283	4.81 (3.45-6.71)*
A bit	18.6	141	25.2	160	4.24 (2.95-6.09)*
A great deal	22.3	169	20.5	130	2.88 (2.00-4.14)*
Yes, completely	30.1	228	9.6	61	1.00 (reference)
Information 3 (nurse: order)					
No, not at all	59.4	438	76.0	475	3.85 (2.67-5.55)*
A bit	9.4	69	9.0	56	2.89 (1.76-4.71)*
A great deal	11.0	81	8.3	52	2.28 (1.40-3.71)*
Yes, completely	20.2	149	6.7	42	1.00 (reference)
Triage code					
Red/orange	8.0	100	8.1	61	1.01 (0.72-1.42)
Yellow	37.7	472	37.5	284	1.00 (0.82-1.20)
Green/Blue	54.3	681	54.4	412	1.00 (reference)
Time of attendance					
Evening	29.6	516	32.4	337	1.13 (0.96-1.34)
Night	4.4	77	3.4	35	0.79 (0.52-1.19)
Day	66.0	1153	64.2	663	1.00 (reference)
Size A&E					
L (>30.000)	21.8	370	29.8	295	1.72 (1.37-2.17)*
M (20.000-30.000)	54.3	923	51.2	507	1.19 (0.97-1.45)
S (<20.000)	24.0	408	19.1	189	1.00 (reference)

Table 4 Adjusted odds ratios and 95% confidence intervals (CI) of related factors among patients who experienced no problems with the waiting time and patients who experienced problems with the waiting time in a multivariate model

	Total waiting time before treatment	
	Odds ratio (95% CI)	**P-value**
Pain	1.12 (1.07-1.17)	<0.01
Perceived acuity		
Emergency	2.68 (1.64-4.36)	<0.01
Urgent	2.22 (1.68-2.92)	<0.01
Not urgent	1.00 (reference)	<0.01
Information 1		
No, not at all	3.30 (2.34-4.87)	<0.01
A bit	2.95 (1.98-4.40)	<0.01
A great deal	1.87 (1.26-2.78)	<0.01
Yes, completely	1.00 (reference)	<0.01
Information 2		
No, not at all	3.42 (2.29-5.11)	<0.01
A bit	2.75 (1.79-4.22)	<0.01
A great deal	2.20 (1.44-3.35)	<0.01
Yes, completely	1.00 (reference)	<0.01

N=1033 ; Nagelkerke R^2= 0.224
No problem with the waiting time is the reference group. Information 1 ‘Did the reception staff give you information on what to expect during your visit to the A&E?; Information 2 ‘Did the nurse tell you how quickly you needed to be helped with your health problem?

Discussion

Our study confirms the relationship between perceived waiting time and patients' ratings of healthcare performance in the A&E. Patients' ratings decreased for longer perceived waiting times. In addition, this association was found for both the waiting time before triage as well as for the perceived waiting time between triage and treatment. In our study we further explored which patients experienced their waiting times as problematic. As far as we know this latter has not previously been studied. Uninformed patients, patients in pain, and patients with a highly self-perceived acuity experienced the waiting times as most problematic.

From a professional point of view the waiting time until triage as reported by the Dutch patients in our study is too long. Only less than half of the patients reported to be triaged within ten minutes. According to a Dutch guideline[16] patients should be triaged within five minutes after arrival in the A&E, because the most urgent patients need to be treated within ten minutes.

Overall, we found that one-third of the A&E-patients rated their perceived total waiting time to be a problem. The degree to which patients received information was the strongest predictor of experiencing problematic waiting times. Overall, only a quarter of the patients received information at arrival in the A&E regarding what to expect or were told by the triage nurse how quickly they needed to be helped with their health problem. Information provision about these two aspects seem important areas for improvement. Information about the order of treatment of patients in the waiting room seems less important because in the multivariate model this information aspect was not related to problematic experiences about the waiting time. In addition to the received information also pain and self-perceived acuity were strongly related to negative ratings about their waiting times. Pain and self-perceived acuity were also strongly related to each other. This is in line with previous research.[17] Clearly, patients in pain and patients with an urgent, emergent or life-threatening health problem want to be treated quickly. Pain ratings are part of both MTS and ESI triage systems. The higher the pain on a VAS score, the more urgent the triage code. However, we found in a previous study that, in the Netherlands, pain is not always measured and taken into account during triage.[18] Possibly patients in pain would have had a more urgent triage score and would have been treated more quickly if pain was taken into account. It would be interesting to know whether the patients in pain, who rated the total waiting times as problematic, received pain relief medication during triage. If so, these patients may become less negative about having to wait. In addition, patients with a highly self-perceived acuity are likely to be in distress. Possibly, information about their health condition and explanation by a health professional about the urgency of their health problem may lower the patient's distress and make them feel to be taken seriously resulting in less problems with the waiting times.

A future study should examine the univariate association we found between problematic experienced waiting time and size of the A&E. More patients in the waiting rooms of large A&Es may influence the perception of the waiting time. The negative effect of crowding and waiting time on patient satisfaction has previously been assessed and may occur more often in large A&Es.[19-21]

Limitations

There are some limitations in this study. First, we did not include a question on whether the patients were told how long they would have to wait. Previous studies proved that information on the expected length of wait increases the satisfaction with the A&E.[8,9,22-24] Clearly, it is important that the estimated waiting time is realistic and in line with the actual waiting time.

Second, we measured the perceived waiting time, which is not necessarily the same as the actual waiting time. Patients easily overestimate the passing of time and can have inaccurate perceptions of waiting time.[25]

Third, the perceived waiting time before treatment was measured by two questions. A similar pattern was found for both questions in relation to the global quality rating. In a future study, one question seems sufficient to determine the total perceived waiting time. This could avoid possible misinterpretation by the respondents, and overcome the problem of a low response rate for the second waiting time (wait_treatment). Overall, the response rate is in line with other surveys undertaken in the A&E.[26,27] As in all surveys responses are possible biased. Non-respondents were significantly more often men and younger patients, resulting in an overestimation of the odds ratio of gender and age in the univariate analysis. However, these effects disappeared in the multivariate analysis, because gender and age were not predicting variables in the model.

Conclusions

Longer perceived waiting time in the A&E was associated with a decrease in global quality rating and increased reports of problematic experiences. Less than half of the patients reported to have been triaged within ten minutes. Only a quarter of the patients received information at arrival in the A&E regarding what to expect, or were told how quickly they needed to be helped with their health problem.

Patients in pain, and patients who perceived their health problem as urgent, emergent or life-threatening experienced problematic waiting times. Moreover, patients who remained uninformed before the treatment started had more problems with the waiting time. Our study reveals that proactive management of patients' perceptions of waiting time, by providing specific information, and managing self-perceived acuity and pain are likely to positively affect patients' experience about the quality of care and should be a focus in A&E management.

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Chapter 8

General discussion

General discussion

The work presented in this thesis explored the standardized measurement of patients' experiences in the Accident and Emergency (A&E) department.
The three objectives were:

- To assess the quality of emergency care in the A&E by measuring patients' experiences, using the English A&E department questionnaire.
- To develop a questionnaire that measures patients' experiences in the A&E and adheres to Dutch Consumer Quality Index (CQI) guidelines.
- To explore patients' priorities, and patients' experiences of emergency care in the A&E in the Netherlands, using the newly developed Dutch CQI A&E questionnaire.

This final chapter provides a discussion on the main study results. Policy implications, practice management implications, and scientific implications are discussed.

Main findings

Two questionnaires were used to measure patients' experiences in the A&E. First, the English A&E department questionnaire used in the English National Survey Programme. This questionnaire was translated in Dutch for use in the Netherlands. The second questionnaire concerned the newly developed Consumer Quality Index for the A&E (CQI A&E). Both questionnaires showed to be valid and reliable questionnaires to assess patients' experiences with the A&E. Presenting survey data according to respectively, six and seven quality domains increases the usefulness of measuring patients' experiences. The discriminative power of these summary domain scores enables a reliable comparison of healthcare performance between A&Es from the patient's perspective.
Domains scores were constructed for both questionnaires on the basis of factor analyses. The six domains of the English A&E department questionnaire were: 1. Waiting time; 2. Nurses and doctors; 3. Your care and treatment; 4. Hygiene; 5. Information before discharge; and 6. Overall performance. The CQI A&E was developed in line with the Dutch family of CQIs, which measure patients' experiences in healthcare in the Netherlands. The seven domains of the CQI A&E were: 1. Information before treatment; 2.Timeliness; 3. Attitude of healthcare professionals; 4. Professionalism of received care; 5. Information during treatment; 6. Environment and facilities; and 7. Discharge management. The A&E department questionnaire consists of 50 items, while the CQI A&E is a 78 item-questionnaire.
In general, measures based on the English A&E department questionnaire in the Netherlands and England showed that the Dutch patients reported significantly better

mean scores on the three domains waiting time, doctors and nurses, and your care and treatment than the English patients. However, differences and effect sizes were small. Despite the fact that overall the Dutch A&Es had higher mean scores on three domains, plots of individual A&Es, caterpillar plots, showed that on all domains the best performing A&E concerned English A&Es. Both English and Dutch patients reported the most positive experiences on the domains about the overall performance (e.g. deal with main reason for visit, rating overall care), doctors and nurses (e.g. listening, confidence), your care and treatment (e.g. privacy, attention, involvement). More criticism was reported on the domains about waiting time (before/after triage), and hygiene. Patients' reported the worst experiences on the domain information before discharge.

A priority study among Dutch A&E patients was performed. With regard to patients' prioritization of different aspects of quality of the A&E care, hygiene in the A&E, whether professionals treat their patients seriously, and whether patients receive the care they need were indicated as the most important issues. It has not been studied before if prioritization of care aspects differs between populations - the development of a CQI requires only a single assessment of priorities. Patients' priorities across different Dutch A&E populations showed to be stable, and indifferent of patients' characteristics.

Waiting time was strongly related to the global quality rating of healthcare performance. Problematic experiences about the perceived waiting time can be reduced by information provision before treatment, controlling pain, and acting upon patients' perceived acuity. Consequently, the global quality rating can increase.

Policy implications

First, the policy implications of the availability of two valid questionnaires to assess patients' experiences in the A&E are discussed.

Since 2006 the Dutch government emphasizes the benefits of a market-oriented healthcare system. To enhance such market-orientation, the National Health Insurance Act was introduced in the same year. Health insurance companies should debate commissioning with care providers to reduce prices for their insured population. Insurance companies stimulate the use of indicators from the patient perspective as a counterpart to professional indicators, and to increase transparency of healthcare performance. A first evaluation in 2009 using patients' experiences concluded that more time was needed to sort out effects on the use of patients' experiences for comparative quality information.[1,2] Although some 70% of reimbursement is negotiated between care providers and insurance companies in 2013, insurance companies have not yet started to introduce market principles in A&E departments. Prices are fixed due to the principal of free accessibility of emergency care for everyone, and therefore not negotiable so far. However, health insurance companies are interested in performance indicators used in the A&E for evaluations of, and feedback on the previously agreements with care providers. Health Insurance Companies (Zorgverzekeraars Nederland) announced proposals for introducing commissioning principles in the A&E services within which the CQI A&E could play an important role.[3]

The Dutch Center of Consumer Experience in Health Care was set up for the development, certification and implementation of measuring patients' experiences according to standardized guidelines (2006). Since January 2013, the tasks of the Center of Consumer Experience in Health Care have been incorporated in the Quality Institute. The Quality Institute, which has been established by the government, has a central position in controlling and monitoring quality of care. The Quality Institute adopted CQIs as valid measurements and will continue promoting their use. This implies that care providers cannot neglect measurement of and acting upon patient experiences, as policy makers, health insurance companies and patient organisations will more and more require them to do so.

At the moment a hot topic in emergency care in the Netherlands is the reduction of the number of A&Es. The Raad voor de Volksgezondheid en Zorg (RVZ)[4], the Health Council of the Netherlands (Gezondheidsraad)[5], and the health insurance companies[3] advocate such a reduction: centralization of emergency care would provide higher quality of emergency care. Due to larger A&Es, which serve more patients, the number of experienced and available physicians could increase, guaranteeing 24 hours a day high quality of care. Whether patients' outcomes and experiences are affected due to this or other governmental decisions in the future must be monitored. In fact, such transitions should studied by measuring patient experiences to make sure that patient experiences are not compromised by concentration of A&E services. Especially in rural areas, timely access may be negatively influenced by concentration. The responsibility for monitoring quality of care lies heavily on insurance companies, government, and the Healthcare Inspectorate, while mass media play a role as watchful onlooker.

The questionnaire that was developed within this thesis, the CQI A&E, offers a measure to assess reliable benchmark information about healthcare performance in A&Es, and is applicable as a reference framework. The CQI A&E adds information to Patient Reported Outcome Measurements (PROMs) and clinical outcome measures such as mortality rates. At the forefront of major changes in the organisation of A&E care in the Netherlands, we recommend that all A&Es start using the CQI to document quality of care levels as of 2013.

In emergency medicine, patients' choice to attend to an A&E according to their preferences is limited. In emergency situations patients often visit the closest A&E in the vicinity. Therefore, it is unlikely that patients use performance information to select an A&E. Consequently, the quality of emergency care must be guaranteed. Patients are aware of the quality of emergency care and certainly have their demands. Listening to patients' voice, by measuring their experiences, can increase patient-centredness of emergency care.

In 2007, a World Health Organisation review[6] of emergency medical services in the EU reported substantial variation between countries in all aspects of emergency care. It should be studied whether the instruments used in this thesis are suitable for broader international use, or that they need to be adapted to provide relevant information for health policy on a European level.

Practice management implications

The survey data of the CQI A&E was used to inform professionals and managers of the participating A&Es in this study about the performance of their A&E. They received feedback reports with frequency tables and improvement scores, global quality ratings of the overall performance, and summary scores of quality domains. Improvement scores are obtained by multiplying importance of items with the percentage of negative scores on the respective items. Summary scores on the quality domains were calculated for all participating A&Es, providing benchmark information. The A&E with the highest overall mean patients' experience score on a quality domain was considered as the best practice. After having received feedback several initiatives were started to improve patients' experiences, such as checklists to ensure patients received information about their treatment and discharge information, or introducing a food/drink policy during intake. Emergency physicians were asked to register whether patients were allowed to eat or drink before treatment started, which enables an A&E clerk to act upon patients' requests for food or drinks without consulting a physician. In one A&E a follow-up measure was performed after one year, using the first findings as a baseline measurement. For those elements of care that were suboptimal at baseline, patients' experiences were increased at follow-up.

When acting upon the feedback report, staff mostly had an internal view and focussed on improvement scores rather than an external view using information on best practices on specific domains. The improvement scores of experience questions correspond with single aspects in the care process and are easy to interpret and recognizable, which make them useful as (operational) control information. Domain scores are composites of multiple items, which make them more reliable than single items,[7] and are preferably used for benchmarking, which requires reliable comparisons. The information provided by benchmark- and feedback reports is currently not optimally used. First, learning from others is not done enough. Staff reviewing on their performances should broaden their view, using the identification of best performers and how learning from best practices can be organized and implemented in their A&E. Second, acting upon the information should be structured according to existing principles from improvement science, such as the Model for Improvement.[8] This model is based on three fundamental questions: What are we trying to accomplish? How will we know that a change is an improvement? What changes can we make that will result in improvement? These three questions are combined with the Plan -Do - Study - Act (PDSA) cycle to form the basis of the model. This way, evidence about effectiveness and feasibility of implementing best practices can be accumulated and disseminated, which will help other organisations to decide about the most optimal way to improve their quality of care.

Improvement scores are more sensitive to organisational changes than (summary) domain scores. To detect whether organisational changes improve patients' experiences, repeated or routine outcome measurement (ROM) of patients' experiences increases their value for A&Es. Patient Reported Experience Measurements (PREMs) can be displayed as (online) dashboard information, and establish a strategic position of the A&E opposed to other A&Es, for instance to empower public image or to reassure people. PREMs are relatively easy to perform, and can be executed without scientific support, although this support is often needed to obtain robust, generalizable outcomes. The success of quality indicators such as PREMs depends among others on data registration, and data collection.[9] Ideally, to anchor PREMs in daily routines, patients would complete a digital questionnaire using a tablet computer at the end of their visit before being discharged. Patients' admitted to a hospital ward could complete the questionnaire before being discharged from the hospital. This would increase the response rate and reduce non-response bias. In addition, selection bias due to random sampling, and recall bias due to a lag in time before the patient receives a questionnaire are avoided. Further, to obtain representative results on-going measurements are stronger than once-only (special event) measurements. However, routine outcome measurement also requires investment in a system of retrieving and presenting results regularly and comprehensibly. Such systems are currently developed by several commercial providers of PREMs.

The effect of patient' feedback on quality improvement depends on the presentation of findings. Methods to enhance the implementation are: First, a better interpretation of differences between A&Es should stimulate learning from best practices. In this study differences among A&Es were small, which complicated the interpretation, but it is encouraging that there were no clear underachievers, which indicates that quality of emergency care does not substantially differ among A&Es. Second, customization of feedback information for intended users (patients, managers and professionals) will stimulate implementation. For instance, in this study no feedback information was provided about the number or content of complaints and positive comments in the questionnaires. Answers to the open-ended question 'any other comments' could be summarized and added to reports for staff. This can be done by using Pareto charts, which summarize qualitative data and are most useful to help focus on improvement efforts. A Pareto chart is the equivalent of a frequency plot for continuous data.[10] The downside of summarizing qualitative data is that it is resource intensive. Another aspect that requires attention is that using quantitative research methodologies of patients' experiences only neglects the heterogeneity of patient perspectives. A combination with qualitative research is a stronger approach to learn from patients. Combining survey experiences with other sources of patients' experiences on blogs, social networks, Twitter and hospital review sites, presenting an intriguing cloud of patient experience information, was recently presented.[11] The usefulness of diverse sources of patient experience information for earlier detection of poor quality of care, or in the future perhaps excellence of care could be explored.

New developments to extend current methodologies and measurements of patients' experiences should be encouraged. Patients' surveys are here to stay, but combinations with qualitative research methods are promising. To transform survey information into solutions for care improvements, brainstorm sessions, focus groups of patients and/or professionals or other type of creative, reflective meetings could be undertaken. In addition, whether there is correspondence between patients' experiences and other quality indicators, and whether some types of indicators are more useful for improvement than others, and how (and if!) patients' experiences should be weighted against other quality indicators are objectives of future study. The question remains whether the best practice from the patient perspective and the professional perspective should correspond, or that these perspectives are expected to differ. Previous research shows mixed evidence of positive correlations between different types of indicators.[12] In emergency care, topical pain and waiting times can be studied with a set of indicators from various perspectives. Finally, extending measurements could even provide feedback about the individual staff member.

Scientific implications

In the first part of the thesis, patients' experiences were measured using the A&E department questionnaire. Whether patients' experiences are able to detect differences in delivery of emergency care among A&Es is clarified. Six quality domain scores of the A&E department questionnaire were constructed by explorative factor analysis. Until now, feedback of the results of the A&E department questionnaire to English care providers was solely provided on item level, not on domains. The domains are in line with the most discussed topics of emergency care in previous research.[13,14] This suggests that these domains provide a complete overview of the quality of care in the A&E, and can be applied on a large scale. Furthermore, the domains are able to detect differences among

English A&Es, and they are useful for national and international comparison of quality of care. Although the within-country differences among A&Es were larger than differences between countries, there is much to learn across countries from patients' experiences. The organisation of emergency care varied between both healthcare systems in this study, which could undermine a fair comparison between countries. The referral, if any, to the A&Es is the most relevant and prominent difference in the organisation of emergency care between England and the Netherlands. The type of referral to the A&E was used as the best available proxy for differences in the system of preclinical healthcare to study the influence of these differences on patients' experiences about the provided care in the A&E. No relationship between referral type and experiences was found, indicating that patients' experiences at the A&E were marginally influenced by the healthcare system, and that the across country comparison of quality of care in the A&E as experienced by patients was valid. Yet, referral is a proxy that does not encompass all system differences, and therefore does not fully captures the sensitivity of patients' experiences to different healthcare systems.

One of the questions related to benchmarking is how much variation in scores is attributable to differences between care providers. To address this question, the variance per A&E department and the intra-class correlation coefficient (ICC) were calculated. The variance describes the variability of the A&Es, while the ICCs expressed the discriminative power of the quality domains, in other words the ability of the domains to point out differences in healthcare performance. ICCs of the A&E department questionnaire and the CQI were low. The range of the A&E department questionnaire was 0.010-0.061, and the range of the CQI A&E was 0.0038-0.0327. This means that respectively 1.0-6.1% and 0.4-3.3% of the variance was attributable to performance differences between A&Es. Adjustment for age and gender resulted in similar ICCs, as well as the ICCs of a more homogenous A&E sample. This in turn indicates that those patients' characteristics and care characteristics made a very small difference to the variability between A&Es. These findings suggests that individual variation out weights variation between A&Es. In addition the proportional variance was calculated to clarify the effect of case-mix adjustment. The proportional variance is an estimate to assess to amount of variance explained by patients' characteristics. Proportional change of variance ranged from 3% to 7%, confirming that the influence of patient's age, gender and health status was marginal and questioning the usual method of case-mix correction. The largest part of the variance remains statistically unexplained. This rather unsatisfying conclusion invites to explore the variance in future studies. Until then the most plausible explanation for the large individual variation is that attending A&E remains a unique experience.

Following the example of measuring patients' experiences in the A&E in England, the CQI A&E, a questionnaire modelled on the Dutch family of questionnaires to measure patients' experiences in healthcare, was developed (part 2 of this thesis). Following the

CQI guidelines, domains were constructed using the perspective of a reflective measurement model. In a reflective measurement model, structural relationships among latent, unobserved constructs are identified by statistically relating covariation between the latent constructs and the observed variables or indicators of these latent constructs.[15,16] Identifying these latent variables ('domains') is often done by principal components analysis or explorative factor analysis. This type of analysis has certain requirements for the data: each case should have complete data, and variables should have sufficient variation. As patient experience questionnaire data often suffer both from missing data and lack of variation, a substantial number of cases and variables are not included in the statistical analysis. Also, some variables are not included in a domain/do not belong to a latent variable, and therefore neglected when reporting/comparing/benchmarking using domains. These statistical requirements threaten the validity of the resulting domains. The first step in developing patient experience questionnaires is to perform a qualitative study to capture what patients think is important in the care they receive. This information is used to construct items for the questionnaire. Excluding both cases and items from being included in a domain on purely statistical grounds conflicts with the goal of capturing the whole patients' view on quality of care. Another approach to construct domains in questionnaires is a formative measurement model. The latter approach concerns the construction of domains based on content and not solely on strict statistical criteria. A set of activities make up an attribute, as opposed to a reflective measurement model where the attribute/latent variable defines which activities belong together. Well-known examples of formative models are the Apgar score (a method to assess the health of new-born children immediately after birth) and the human development index (a composite statistic of life expectancy, education, and income).[17] An example of the formative approach applied to patient experiences is the 'responsiveness' model of the WHO.[18] Responsiveness is defined as how well the health system meets the legitimate expectations of the population for the non-health enhancing aspects of the health system. It entails eight domains: Dignity, Autonomy, Confidentiality, Communication, Prompt attention, Social Support, Basic amenities, and Choice/Continuity. Although the formative approach may be more suitable for measuring patient experiences, one of the problems with this approach is the lack of empirical criteria to design and validate the questionnaire.[19] In this thesis, we explored the appropriateness of a mixed approach for constructing experience domains. The CQI A&E quality domains and the domains of the A&E department questionnaire were composed using Explorative Factor Analysis (reflective measurement model, but with less stringent criteria on excluding variables), mixed with a formative approach to assure that the domains optimally combine good interpretability, robustness, and were meaningful for their users. As an example: in the English A&E department questionnaire, the first domain that appeared in the factor analysis was split into three internally consistent domains that each had a distinct interpretation: ‘doctors and nurses’, ‘your care and treatment’ and ‘overall performance’. In the CQI A&E, the mixed approach resulted in more domains representing more items (and therefore relevant content) than the purely reflective measurement approach of the CQI guideline. Although our approach does perform better on representing the patients’ view on quality of care, it still does not represent the full view.

The responsiveness model of the WHO triggers another question: the questionnaires from both the English National Survey Programme and the Dutch Consumer Quality Index do neglect this internationally used and validated model. Both families of instruments use different ways of summarizing questionnaire data: the English A&E department questionnaire did not combine items at all (until the study in this thesis), while the Dutch CQI use a reflective measurement model, as outlined above. Both approaches imply that results are not comparable with results obtained by questionnaires that use the responsiveness model.

Our findings of the A&E department survey are not applicable to all patients across A&E, but only to unplanned patients of 16 years and over. Excluded were people who visited A&E departments for planned attendances at outpatient units such as fracture clinics, because their experiences and priorities are likely to be atypical compared with people who made unplanned attendances. This helps to compare results between organisations because it removes the rate of planned attendances as a source of variation, but covers the experiences of these patients. Official NHS data[20] states that in 2011/12 patients under 20 years old attributed to 27.1% of all admissions to A&E. Planned follow up in A&E accounted for 2.2%. In our analyses of the CQI A&E data we used the responses of people older than 17 years, who had completed the questionnaire by themselves. It is important to gather feedback from children, and young people using health services, but surveys designed for adults are often unsuitable for this age group. The Picker Institute Europe have designed and tested separate questionnaires for use with children and young-people under the age of 16, who who have visited emergency departments, but not yet applied within the National Survey Programme. Additionally, the feedback of those who accompany patients can provide valuable feedback. For instance spouses of patients who were unconscious, or parents or caretakers of children. The development of questionnaires for these groups should be continued.

Improving emergency services from a patient perspective means that a large number of items should be covered. Downside is that large questionnaires can affect propensity to respond. The mixed approach as described above meets these two issues. For continuous measurement a shorter ‘core’ questionnaire, covering items, which are part of a domain can be used. The remaining single items can be added to the questionnaire on request. The large ‘complete’ questionnaire could be used for annual measurements or for once-only (special event) measurements. Which items are suitable for inclusion in such a core questionnaire remains to be determined.

Summary scores were calculated to display patients' experiences on quality domains. Summary scores conceal extreme outcomes, which therefore partly remain unnoticed. To overcome this problem it is interesting to elaborate on analyses using a cut-of point instead of continuous analysis. A threshold for the rate of dissatisfied versus satisfied patients or a dichotomous variable for the worse performers (negative outliers) after an arbitrarily chosen cut-off point could be composed. Discrete outcomes may have more power to discriminate between A&Es, and to expose differences between A&Es. Additionally, extreme outcomes can be researched in case studies.

The quality domains of the A&E department questionnaire and the CQI A&E are meaningful for their users. The constructed quality domains address comparable topics, and the same pattern of highly valued domains and lower valued domains is shown. In addition, response rates of the questionnaires are comparable (40%-47%). For these reasons there is no preference for using one or the other questionnaire. Other considerations that play a role in choosing which instrument to use include which instrument was previously used, the availability of translations or the requirement to measure according to the standardized Dutch format. Topical length of questionnaires favours the use of the A&E department questionnaire, or the development of a core questionnaire as stated above.

The third part of the thesis focuses on outcomes and consequences of measuring patients' experiences. The content of the questionnaire ought to reflect patients' current priorities of healthcare aspects. Prior to follow-up measurements the content of the questionnaire could be updated, as is currently done in England. Unless major changes in the A&E care process have happened, repetition of some labour-intensive steps of the development process such as focus group interviews may be unnecessary. The results in this thesis show that patient priorities remain stable across populations and within a time-window of one and a half year. Once the organisation of emergency care has changed care processes in the A&E, the questionnaire must be adapted in line with changed prioritization of care aspects.

Conclusions

To increase patient-centredness, and standardize the quality of emergency care, patients' experiences should be welcomed as a new quality indicator in the A&E. Both, the A&E department questionnaire and the CQI A&E showed to be valid and reliable questionnaires to assess patients' experiences with the A&E. Differences among A&Es were exposed using the questionnaires. Reducing the waiting time, focussing on the hygiene, and providing information before discharge increases the quality of care as experienced by patients.

Key recommendations

- Start using the quality domains of the English A&E department questionnaire to increase transparency and to enable benchmarking between A&Es.
- Start using the CQI A&E in the Netherlands to document quality of care levels as of 2013.
- Elaborating on the usefulness of measuring patients' experiences in the A&E for health policy on a European level.
- Focussing on the implementation of measuring patients' experiences into daily practice, routine outcome measurements (ROM) and customization of feedback information.
- Reacting upon quality information should use a systematic approach such as the Model for Improvement (which includes the Plan-Do-Study-Act cycle)
- Combining patients' survey with qualitative research methodologies to learn from patients, and explore the usefulness for earlier detection of poor quality.
- Analyses of the relative weights of patients' experiences compared to other quality indicators of emergency care.
- Patients' experiences explained a small part of the variation in quality of care between A&Es, and were marginally influenced by patients' characteristics or care characteristics. Future study should explore A&E variation.
- A mixed approach including reflective and formative measurement models is recommended for reducing survey data to construct quality domains; reconsider the approach applied on CQ-indices; construct domains for surveys within the NHS survey programme.
- Start developing questionnaires to measure the experiences of children, youngsters, or relatives who attend the A&E.

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Chapter 9

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Summary

Since 1990 patient-centredness of care has been introduced in healthcare in order to better address the preferences of patients. The patient's perspective helps to assess patient-centredness of healthcare and is embedded in a variety of measurements. Well-known are Patient Reported Experience Measures (PREMs), which focus on those quality of care aspects that are important according to patients. PREMs are potential indicators of the quality of care, and are often obtained through patient surveys.

The Netherlands counts about one hundred Accident and Emergency (A&E) departments. Annually, more than two million people attend A&Es. A standardized set of quality indicators to assess the quality of emergency care is requested. The measurement of patients' experiences is a potential indicator to achieve standardization and professionalism in (inter-)national emergency care.

Before the Dutch government acknowledged the importance of measuring patients' experiences in healthcare (2006), the English National Health Service (NHS) already ran the National Survey Programme, a programme of annual patient surveys in NHS hospitals. Within the Programme 'the Accident and Emergency department questionnaire', was used to measure patients' experiences in the A&E. In the Netherlands a family of questionnaires, which ask consumers and patients to report on and evaluate their experiences with healthcare performances, is known as the Consumer Quality Indices (CQIs). Within this family of questionnaire a specific questionnaire for the A&E was lacking. Therefore the Consumer Quality Index for the Accident and Emergency department (CQI A&E) was developed.

The work presented in this thesis explores the standardized measurement of patients' experiences in the A&E. The three objectives are: first the assessment of the quality of emergency care by measuring patients' experiences, using the English A&E department questionnaire. Second, to develop a questionnaire that measures patients' experiences in the A&E and adheres to Dutch Consumer Quality Index (CQI) guidelines. Third, to explore patients' priorities, and patients' experiences of emergency care, using the newly developed CQI A&E.

Chapter 2 presents the analysis of 49,646 English patients' experiences about the emergency care they received in 151 A&Es to assess the quality of care. The patients' experiences were systematically gathered within the National Patient Survey Programme of the NHS. Prioritising quality improvement activities in the A&E requires that survey outcomes are meaningful and reliable. The aim of the study was to determine which method of obtaining summary scores (domains) for the A&E department questionnaire optimally combined good interpretability with robust psychometric characteristics. Three methods of grouping and summarizing items of the questionnaire were compared: 1. Principal Components Analysis; 2. Department of Health dimensions; 3. Sections according to the patient's journey through the A&E department. The patient-level reliability of summary scores was determined by Cronbach’s alpha coefficient (threshold: $\alpha > 0.70$). The construct validity by Pearson’s correlation coefficients, and the discriminative capacity by intra-class correlation coefficients and reliability of A&E-level mean scores. We found that the Principal Components Analysis provided the best score reliability on six clear and interpretable domains: 1. Waiting time; 2. Doctors and nurses; 3. Your care and treatment; 4. Hygiene; 5. Information before discharge; and 6. Overall experience. The discriminative power of the concepts was comparable for the three methods, with intra-class correlation coefficients between 0.010 and 0.061. A&E sample sizes were adequate in order to obtain good to excellent reliability of A&E-level mean scores. In conclusion, the A&E department questionnaire is a valid and reliable questionnaire to assess patients’ experiences with the A&E. The discriminative power of six summary scores offers a reliable comparison of healthcare performance between A&Es.

Chapter 3 describes the usefulness of patients’ experiences for an international comparison of healthcare performance in the A&E. The A&E department questionnaire was used to measure and compare patients’ experiences in English (n=134) and Dutch (n=9) A&Es. Patients attending A&Es aged 16 years and older were included. The six summary scores (chapter 2), which best represented patients’ experiences were aggregated on the country level and on the A&E level. In England, 43,892 (40%) completed questionnaires were received. In the Netherlands, 1,865 (42%) completed questionnaires were received. Summary scores of three out of six domains were significantly higher for patients in the Netherlands (range: 0-100): ‘waiting time’ (mean scores of 73.8 (NL) versus 67.2 (UK)), ‘doctors and nurses’ (mean scores of 85.7 (NL) versus 80.6 (UK)) and ‘your care and treatment‘ (mean scores of 82.6 (NL) versus 80.2 (UK)). The variance among the English A&Es was larger than the variance among the Dutch A&Es. The best and worst practices on five domains were English A&Es. Thus, although the mean quality of care in the A&E appeared to be better in the Netherlands on three domains, the best practices were English A&Es. The within-country differences between A&Es were much larger than differences between countries. Healthcare performance in the A&E can be compared between countries by surveying patients’ experiences, and there is much to learn across A&Es both within and among countries.

Chapter 4 describes the development of the Dutch Consumer Quality Index for the A&E department (CQI A&E). The CQI A&E was developed because no standardized and validated system for measuring patients’ experiences in the A&E in the Netherlands existed. A literature search, expert interviews, and qualitative research using patient focus groups, were undertaken to determine the content validity of the CQI A&E. In order to assess psychometric characteristics of the CQI A&E, the questionnaire was sent to 653 patients who had attended a large A&E in the Netherlands. The questionnaire consisted of 84 experience questions. Also, fifty importance questions were added to determine the relevance of the questions, and to calculate improvement scores. Principal Components Analysis was applied to detect the domains of the questionnaire. Survey data of 304 (47%) patients were used for the analysis. The first Principal Components Analysis resulted in three domains based on 13 items: ‘Attitude of the healthcare professionals’, ‘Environment and impression of the A&E’ and ‘Respect for and explanation to the patient’. The first two had an acceptable internal consistency. The second analysis, included 24 items grouped into five domains: ‘Attitude of the healthcare professionals’, ‘Information and explanation about treatment’, ‘Environment of the A&E’, ’Leaving the A&E’ and ‘General information and rapidity of care’. All domains were internal consistent. According to the patients, the three most important aspects in healthcare performance in the A&E were: trust in the competence of the healthcare professionals, hygiene in the A&E and patients’ health care expectations were met. In conclusion, the preliminary psychometric characteristics of the CQI A&E were sufficient to justify further research into reliability and validity.

Chapter 5 describes the study about the internal consistency, construct validity and discriminative capacity of the CQI A&E. Twenty-one Dutch A&Es participated in a cross-sectional survey, covering 4883 patients. The questionnaire consisted of 78 questions. Principal Components Analysis determined underlying domains. Internal consistency was determined by Cronbach’s alpha coefficients, construct validity by Pearson’s correlation coefficients, and the discriminative capacity by intra-class correlation coefficients and reliability of A&E-level mean scores (G-coefficient). Seven quality domains emerged from the Principal Components Analysis: 1. information before treatment; 2. timeliness; 3. attitude of healthcare professionals; 4. professionalism of healthcare professionals; 5. information during treatment; 6. environment and facilities; and 7. discharge management. Domains were internally consistent (range from $\alpha=0.67$ to $\alpha=0.84$). Five domains and the ‘global quality rating’ had the capacity to discriminate among A&Es (significant intra-class correlation coefficient). Four of those five domains and the global quality rating were close to or above the threshold for reliably demonstrating differences among A&Es given the current sample size. The patient experiences score on the domain timeliness showed the largest range between the worst and best performing A&E. In conclusion, the CQI A&E is a validated questionnaire to measure healthcare performance in the A&E from patients’ perspective. Five domains regarding quality of care aspects, and the global quality rating had the capacity to discriminate among A&Es.

Chapter 6 describes the study about patients' priorities of healthcare performance in the A&E. Knowing what care aspects patients rate as important, and acting upon their priorities increases patient-centredness of emergency care in A&E. Furthermore, the relationships between priorities and patients' characteristics were explored. A cross-sectional priority study with patients aged 12 years and older of two A&Es was undertaken. A 43-items questionnaire with response categories on 4-point Likert scales were used to determine importance scores (range 1-4) of items and domains. To calculate the importance score of an item the response categories were coded 1 to 4, added up and divided by the number of respondents. The importance domains were constituted according to the items that compose the related experience domains (chapter 5). The higher the score the more importance is given to the item or domain in the care process. A total of 467 respondents gave the highest importance to the items 'hygiene' (3.65), 'seriousness of professionals' (3.61), and 'patients received the needed care' (3.61). All importance scores within the top 20 of most important items were above 3.35. Overall, differences between mean importance scores of the two A&Es were small, despite differences in populations. Ordinal logistic regression models for the importance items showed a variability among related patient's characteristics. Health status was a relatively strong determinant for the individual importance items, but the associations disappeared in the multivariate models of importance domains. Age and gender were more consistent determinants. Both variables were related to various importance items. Also, age and gender were related to patients' priorities on respectively three and two importance domains. In conclusion, importance scores of healthcare aspects in the A&E were high. Patients' priorities across two different A&E populations showed to be stable. Assessing patients' priorities in specific A&E population does not seem necessary. Only a small part of the variance of importance scores was related to patients' characteristics.

Chapter 7 focuses on perceived waiting times of patients in the A&E. The first objective of the study was to investigate the relationship between perceived waiting times and patients global quality ratings of the A&E department. The second objective was to explore, which patients experience waiting times as problematic. The data of the cross-sectional survey performed among twenty-one A&Es in the Netherlands was used (Chapter 5). Eligible were A&E-patients older than 17 years, who were not transported by ambulance. Respondents' global quality ratings of perceived waiting time categories (0-10 minutes; 11-30 minutes; 31-60 minutes; 1-2 hours; more than 2 hours) were calculated. Respondents were divided according to their experiences with the perceived waiting time before treatment into a no problem or problem group. Logistic regression analyses were used to explore related factors to problematic experiences. 3483 (36%) patients were included in the analysis. 80% of the patients experienced problems after a perceived waiting time of 2-4 hours before treatment. Longer perceived waiting time was associated with a decrease in global quality ratings, and an increase of problematic experiences. In the multivariate analysis a problematic waiting experience was significantly associated with pain before treatment (odds ratio (OR) 1.12; 95% CI 1.07-1.17), perceived acuity (emergency/urgent/non urgent ORs: 2.68; 95% CI 1.64-4.36/2.22; 95% CI 1.68-2.92/1.0), and information before treatment. The OR of uninformed versus patients who were completely informed about what to expect during their visit was 3.30 (95% CI 2.34-4.87). The OR of uninformed versus completely informed patients about how quickly they needed to be helped was 3.4 (95% CI 2.29-5.11). In conclusion, providing information before treatment, controlling pain, and respond to the perceived acuity are likely to reduce problematic experiences about the perceived waiting time and, are likely to improve experienced quality of care in the A&E.

Chapter 8 presents the main findings of this thesis, discusses the policy, practical and scientific implications from different perspectives, and provides recommendations for future research on measuring patients' experiences in the A&E. This chapter ends with the main conclusion that to increase patient-centredness of care, and to standardize and improve the quality of emergency care, patients' experiences should be welcomed as a new quality indicator in the A&E. For this purpose the newly developed CQI A&E can be used.

Dutch summary

In 1990 is het begrip 'patiëntgerichtheid van zorgverlening' in de gezondheidszorg geïntroduceerd. Het doel van het introduceren van dit begrip is dat de zorgverlening beter aan de wensen van patiënten tegemoet gaat komen. Het patiëntenperspectief ondersteunt het beoordelen van de patiëntgerichtheid van de zorgverlening, waarvoor een verscheidenheid aan meetinstrumenten beschikbaar is. Veel gebruikt zijn de Patient Reported Outcome Measures (PROMs), die zich richten op die kwaliteitsaspecten van de zorg die belangrijk zijn voor patiënten. PROMs zijn potentiële indicatoren voor de kwaliteit van de zorgverlening en worden vaak gemeten aan de hand van vragenlijsten.

Nederland telt ongeveer honderd Spoedeisende Hulpafdelingen (SEH's). De gezamenlijke SEH's worden jaarlijks door meer dan twee miljoen mensen bezocht. Om de kwaliteit van de spoedeisende zorgverlening op de SEH te beoordelen is een gestandaardiseerde set van kwaliteitsindicatoren nodig. Het meten van de ervaringen van patiënten is één van de potentiële kwaliteitsindicatoren. Om standaardisatie en professionalisering van (inter-)nationale spoedeisende zorg te bewerkstelligen, dient de wijze van het meten te worden gestandaardiseerd.

Voordat de Nederlandse overheid het belang van het meten de ervaringen van patiënten in de gezondheidszorg erkende (2006), was in Engeland door de Engelse National Health Service (NHS) reeds een National Survey Programme opgezet, waarin jaarlijks vragenlijsten bij patiënten van NHS ziekenhuizen worden afgenomen. Binnen het programma wordt de Engelse 'Accident and Emergency department questionnaire' gebuikt om de ervaringen van patiënten op een SEH te meten.

De Nederlandse 'familie' van vragenlijsten, die de ervaringen van consumenten en patiënten over de zorgverlening rapporteren, is bekend als de Consumer Quality Index (CQI). Binnen deze familie van vragenlijsten ontbrak een specifieke vragenlijst voor de SEH. Dit was aanleiding om een Consumer Quality Index specifiek voor de Spoedeisende Hulpafdeling (CQI SEH) te ontwikkelen.

Het werk dat wordt beschreven in dit proefschrift onderzoekt de gestandaardiseerde meting van de ervaringen van patiënten op de Spoedeisende Hulpafdeling. De drie doelstellingen zijn: Ten eerste, de bruikbaarheid vaststellen van het meten van ervaringen van patienten voor het beoordelen van de kwaliteit van de spoedeisende zorgverlening op de SEH met behulp van de Engels 'A&E department questionnaire'. Ten tweede, om een vragenlijst te ontwikkelen waarmee de ervaringen van patiënten op een SEH worden gemeten en die tegelijkertijd voldoet aan de Nederlandse Consumer Quality Index (CQI) richtlijnen. De derde doelstelling is het verkennen van de prioriteiten en ervaringen van patiënten met de zorgverlening op de SEH met behulp van de nieuw ontwikkelde CQI SEH.

Hoofdstuk 2 geeft de bevindingen weer van een onderzoek naar de bruikbaarheid van het meten van patiëntenervaringen voor het bepalen van de kwaliteit van de spoedeisende zorgverlening. Voor het uitvoeren van het onderzoek werd gebruik gemaakt van een bestaand databestand, waarin de ervaringen van 49.646 Engelse patiënten uit 151 SEH's zijn opgenomen. De patiëntenervaringen werden systematisch gemeten binnen het Engelse National Patient Survey Programme van de NHS. Het prioriteren van activiteiten om de kwaliteit van zorg te verbeteren vereist dat de uitkomsten van het vragenlijstonderzoek betrouwbaar en betekenisvol zijn. De doelstelling van het onderzoek was het vaststellen van welke methode voor het verkrijgen van somscores (domeinen) van de 'A&E department questionnaire' een goede interpretatie met sterke psychometrische eigenschappen combineert. Drie methoden om de items te groeperen werden vergeleken: 1. Principal Components Analysis; 2. Algemene dimensies van de Engelse Department of Health; 3. Secties van de vragenlijst, die aansluiten bij het traject dat patiënten op de SEH doorlopen. De betrouwbaarheid van de somscores werd op patiëntniveau bepaald door Cronbach's alpha coëfficiënt (drempelwaarde: $\alpha > 0{,}70$). De constructvaliditeit werd bepaald door Pearson's correlatie coëfficiënt. Het onderscheidend vermogen van de domeinen werd vastgesteld aan de hand van de intra-klasse correlatie coëfficiënten en de betrouwbaarheid van de domeinen op het niveau van de SEH's. De Principal Components Analysis resulteerde in zes meest betrouwbare en duidelijk te interpreteren domeinen: 1. Wachttijden; 2. Dokters en verpleegkundigen; 3. Zorgverlening en behandeling; 4. Hygiëne; 5. Informatievoorziening voor ontslag; 6. Algemene ervaring. Het onderscheidend vermogen van de domeinen van de drie methoden was vergelijkbaar met intra-klasse correlatie coëfficiënten van 0,010 tot 0,061. Het aantal respondenten per SEH was voldoende voor een goede tot uitstekende betrouwbaarheid van de domeinen op het niveau van de SEH's. Concluderend, de 'A&E department questionnaire' is een valide en betrouwbare vragenlijst om de ervaringen van patiënten in de SEH te bepalen. Het onderscheidend vermogen van zes zorg gerelateerde somscores maakt een betrouwbare vergelijking tussen SEH's mogelijk.

Hoofdstuk 3 beschrijft de bruikbaarheid van patiëntenervaringen voor een internationale vergelijking van de zorgverlening op de SEH. Patiëntenervaringen werden gemeten met de 'A&E department questionnaire'. Uit het databestand met de ervaringen van de Engelse patiënten, werden de patiënten van 134 algemene SEH's geïncludeerd in de studie. Daarnaast werd de vragenlijst uitgezet onder Nederlandse patiënten van negen SEH's. Alle patiënten van 16 jaar en ouder die de SEH bezochten werden geïncludeerd. De zes somscores (domeinen) (hoofdstuk 2), die de patiëntenervaringen op de SEH zo goed mogelijk weergeven werden geaggregeerd naar SEH en land. In Engeland werden 43.892 (netto respons 40%) ingevulde vragenlijsten ontvangen; in Nederland waren dit 1.865 (netto respons 42%) ingevulde vragenlijsten. Somscores van drie van de zes domeinen waren significant hoger voor Nederlandse patiënten (de scores liggen tussen 0 en 100): ‘wachttijden’ (gemiddelde score van 73.8 (NL) versus 67.2 (UK)), ‘dokters en verpleegkundigen’ (gemiddelde score van 85.7 (NL) versus 80.6 (UK)) en ‘uw zorg en behandeling‘ (gemiddelde score van 82.6 (NL) versus 80.2 (UK)). De variantie onder de Engelse SEH’s was groter dan de variantie onder de Nederlandse SEH’s. De best en minst presterende SEH’s op alle domeinen waren Engelse SEH’s. Alhoewel de gemiddelde kwaliteit van de zorgverlening in de SEH beter lijkt te zijn in Nederland, blijken de best presterende SEH’s Engels te zijn. De verschillen tussen de SEH’s binnen een land waren veel groter dan de verschillen tussen de beide landen. De conclusie is dat het vergelijken van de zorgverlening op de SEH aan de hand van patiëntenervaringen een bruikbare strategie is. SEH’s kunnen van elkaar leren door zowel binnen een land als tussen landen naar de ervaringen van de patiënten te kijken.

Hoofdstuk 4 beschrijft de ontwikkeling van de Nederlandse Consumer Quality Index voor de Spoedeisende Hulpafdeling (CQI SEH). Aanleiding voor het ontwikkelen van de CQI SEH was het ontbreken van een gestandaardiseerd en gevalideerd meetinstrument voor het meten van patiëntenervaringen in de SEH in Nederland. Een literatuurstudie, interviews met experts en focusgroepsgesprekken met patiënten die een SEH hadden bezocht, maakten deel uit van de kwalitatieve fase, waardoor de inhoudsvaliditeit van de vragenlijst gewaarborgd werd. Voor het bepalen van de psychometrische eigenschappen van de CQI SEH werd de vragenlijst met 84 ervaringsvragen verstuurd naar 653 patiënten die een grote Nederlandse SEH hadden bezocht. Aan de vragenlijst werden 50 belangvragen toegevoegd. Aan de hand van de belangvragen werd de belangscore voor iedere vraag berekend, waardoor de relevantie van de vragen werd bepaald. Principal Components Analysis werd toegepast om de domeinen van de items in de vragenlijst te bepalen. De vragenlijsten van 304 patiënten (netto respons 47%) werden gebruikt in de analyses. De eerste analyse resulteerde in drie domeinen gebaseerd op dertien items: ‘Attitude van de zorgverleners’, ‘Omgeving en uitstraling van de SEH’ en ‘Respect en uitleg naar patiënten’. De betrouwbaarheid van de eerste twee domeinen was acceptabel. In de tweede analyse werden 24 items geïncludeerd in vijf domeinen: ‘Attitude van de zorgverleners’, ‘Informatie en uitleg over de behandeling’, ‘Omgeving van de SEH’, ‘Vertrek van de SEH’ en ‘Algemene informatie en snelheid van de hulpverlening’. Alle domeinen waren betrouwbaar (intern consistent). De belangrijkste aspecten van de zorgverlening waren volgens de patiënten: vertrouwen in de competenties van zorgverleners, hygiëne in de SEH en de zorgverlening voldeed aan de verwachtingen van de patiënt. Concluderend, de psychometrische eigenschappen van de CQI SEH zijn voorlopig voldoende om verder onderzoek naar de betrouwbaarheid en validiteit van de CQI SEH te rechtvaardigen.

Hoofdstuk 5 beschrijft het uitgebreidere onderzoek naar de betrouwbaarheid en validiteit van de CQI SEH (interne consistentie, construct validiteit en onderscheidend vermogen). Eenentwintig Nederlandse SEH's namen deel aan het cross-sectionele vragenlijstonderzoek met de CQI SEH. De analyses waren gebaseerd op 4883 patiënten. Principal Components Analysis werd gebruikt voor het bepalen van de onderliggende domeinen van de 78 items in de vragenlijst. De interne consistentie werd bepaald aan de hand van Cronbach's alpha coëfficiënt. De construct validiteit werd bepaald door de intra-klasse correlatie coëfficiënt. De G-coëfficiënt bepaalde de betrouwbaarheid van de somscores op SEH niveau. Principal Components Analysis leverde zeven domeinen op: 1. informatievoorziening voorafgaand aan de behandeling; 2. tijdigheid van de zorgverlening; 3. attitude van de zorgverleners; 4. professionaliteit van de geleverde zorg; 5. informatievoorziening tijdens de behandeling; 6. omgeving en faciliteiten; 7. ontslagmanagement. De domeinen waren intern consistent (spreiding van α=0.67 tot α=0.84). Vijf domeinen en het algemene waarderingscijfer voor de kwaliteit van de zorgverlening hadden de capaciteit om te onderscheiden tussen SEH's (significante intra-klasse correlatie coëfficiënten). Vier van deze vijf domeinen en het algemene waarderingscijfer zijn bijna of voldoende betrouwbaar om, gebaseerd op het aantal respondenten in deze studie, op SEH niveau verschillen aan te tonen. De verschillen tussen de best presterende en de minst presterende SEH's waren het grootst voor het domein 'tijdigheid van de zorgverlening'. Concluderend, de CQI SEH is een gevalideerde vragenlijst voor het meten van de zorgverlening in de SEH vanuit het patiëntenperspectief. De patiëntenervaringen van vijf domeinen en het algemene waarderingscijfer hadden de capaciteit om onderscheid aan te tonen op deze kwaliteitsaspecten van de zorgverlening tussen SEH's.

Hoofdstuk 6 beschrijft het onderzoek naar de prioriteiten van patiënten met betrekking tot de kwaliteitsaspecten van de zorgverlening in de SEH. Door te weten wat patiënten belangrijk vinden, door te onderzoeken welke prioriteiten patiënten stellen aan de zorgverlening op de SEH en om vervolgens te handelen en te verbeteren op basis van deze prioriteiten kan mogelijk de patiëntgerichtheid van de spoedeisende zorgverlening vergroten. Verder werd in deze studie gekeken naar de relatie tussen prioriteiten en karakteristieken van patiënten. Een zogenaamde belangstudie om de prioriteiten van kwaliteitsaspecten van de zorgverlening vast te stellen, werd uitgezet onder SEH patiënten van 12 jaar en ouder van twee SEH's. De vragenlijst bestond uit 43 belangvragen met antwoordcategorieën op een 4-puntsschaal. Aan de hand van de antwoorden werden de belangscores per item en per domein berekend (spreiding van 1 tot 4). De belangscores werden berekend door de antwoordcategorieën oplopend te coderen van één tot vier, op te tellen en vervolgens te delen door de som van het aantal respondenten. De somscores werden samengesteld overeenkomstig met de items in de domeinen van de patiëntenervaringen (hoofdstuk 5). Des te hoger de score des te hoger het belang van het kwaliteitsaspect in het zorgproces op de SEH. De 467 respondenten gaven de hoogste prioriteit aan de items ‘hygiëne’ (3,65), ‘de patiënt voelt zich serieus genomen door de zorgverlener’ (3,61) en ‘de patiënt krijgt de zorg die hij/zij nodig heeft’ (3,61). Alle belangscores binnen de top twintig van belangrijkste items, waren hoger dan 3,35. Over het algemeen waren de verschillen tussen de gemiddelde belangscores van de beide SEH’s klein ondanks verschillen tussen de onderzoekspopulaties. In de ordinale logistische regressie modellen blijkt een variabiliteit aan patiënten karakteristieken gerelateerd te zijn aan de belangvragen. Gezondheidsstatus was een relatief sterke voorspeller in de modellen van de individuele belangscores, echter verdwijnt deze relatie in de multivariate modellen voor de somscores. Leeftijd en geslacht bleken consistentere determinanten voor belangscores, beide determinanten zijn gerelateerd aan verschillende individuele belangvragen bovendien is leeftijd gerelateerd aan drie somscores en geslacht aan twee somscores. Concluderend, alle belangscores waren hoog, dit betekent dat de diverse kwaliteitsaspecten van de zorgverlening op de SEH belangrijk zijn voor de patienten. De prioriteiten van patiënten tussen twee verschillende SEH-populaties zijn stabiel. Het bepalen van de prioriteiten van patiënten binnen een specifieke SEH-populatie is onnodig, omdat slechts een klein deel van de variantie van de belangscores is te relateren aan de karakteristieken van patiënten.

Hoofdstuk 7 zoomt in op de ervaren wachttijd van patiënten op de SEH. De eerste doelstelling was het onderzoeken van de relatie tussen ervaren wachttijden en de algemene waardering van de kwaliteit van de zorgverlening op de SEH door patiënten. De tweede doelstelling was het bepalen van determinanten die gerelateerd zijn aan een problematisch ervaren wachttijd. De data van het cross-sectionele onderzoek onder eenentwintig Nederlandse SEH’s werd gebruikt (hoofdstuk 5). Alle patiënten ouder dan 17 jaar die niet per ambulance vervoerd waren naar de SEH werden geïncludeerd in de studie. Het algemene waarderingscijfer voor de kwaliteit van de zorgverlening op de SEH werd berekend voor de verschillende ervaren wachttijd categorieën (0-10 minuten; 11-30 minuten; 31-60 minuten; 1-2 uur; langer dan 2 uur). Vervolgens werden de respondenten ingedeeld in twee groepen. De indeling was afhankelijk van de ervaring met de wachttijd en bestond uit een ‘probleem’ groep die een probleem met de wachttijd ervaarde en een ‘geen probleem’ groep. Logistische regressie werd gebruikt om te bepalen welke determinanten gerelateerd zijn aan een problematische ervaring met de ervaren wachttijd. 3482 patiënten (netto respons van 36%) werden geïncludeerd in de analyses. 80% van de patiënten rapporteerden een probleem te hebben ervaren met een wachttijd langer dan twee uur voor de start van de behandeling. Een langere wachttijd was geassocieerd met een afname van het algemene waarderingscijfer voor de kwaliteit van de zorgverlening en een toename van problematische patiëntenervaringen. In de multivariate regressie modellen was een problematisch ervaren wachttijd geassocieerd met drie determinanten. Ten eerste de pijn voorafgaand aan de behandeling. Ten tweede rapporteerden mensen met een hoge ervaren urgentie (spoedeisend) bijna drie keer zo vaak een probleem met de wachttijd als mensen met niet-urgente zorgvragen en mensen met urgente zorgvragen ruim twee keer zo vaak. Ten derde rapporteerden de patiënten die niet geïnformeerd waren over wat zij konden verwachten tijdens hun verblijf op de SEH meer dan drie keer zo vaak problemen ten opzichte van de patiënten die compleet geïnformeerd waren. De patiënten die niet geïnformeerd waren over hoe snel de hulpverlening nodig was rapporteerden ook drie keer zo vaak problemen over de ervaren wachttijden ten op zicht van de patiënten die volledig geïnformeerd waren. Concluderend, het verstrekken van informatie voorafgaand aan de behandeling, het reguleren van pijn en het inspelen op de ervaren urgentie van de patiënten kunnen mogelijk de problematische ervaringen met de wachttijd reduceren. Hierdoor zal naar alle waarschijnlijkheid de ervaren kwaliteit van de zorgverlening op de SEH verbeteren.

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About the author

Nanne Bos

Nanne Bos was born on July 30, 1977 in Sneek, the Netherlands. After secondary school she started her training for theatre nurse in the Tjongerschans hospital in Heerenveen in 1996. In 1999 after graduating, she studied Human Movement Sciences (Sports) at the University of Groningen. She obtained her Master of Science degree in 2003. From 2003 until 2007 she worked as a theatre nurse and researcher in the Martini hospital Groningen. She was specifically interested in orthopaedics. In 2008 she moved to Utrecht to work as a researcher in emergency medicine at the Julius Center for Health Sciences and Primary Care a division of the University Medical Center, Utrecht. In 2009 she seized the opportunity to start a PhD project in emergency medicine in the same center, under supervision of professor A.J.P. Schrijvers, dr. L.M. Sturms, and dr. H.F. van Stel. During her PhD project she obtained her second Master of Science degree in Health Services Research (Public Health) at the Erasmus University in Rotterdam. Notably, she was involved in teaching medical students; therefore she obtained her teaching qualification.

The main objectives of the PhD project were to measure patients' experiences in the Accident and Emergency department, to assess the quality of emergency care, to develop a questionnaire for standardized measurement of patients' experiences, and to explore patients' priorities and patients' experiences of emergency care, which have resulted in the studies presented in this thesis. Currently she applies her knowlegde in the field of quality of care and the development of quality indicators as a project coordinator at Stichting Miletus.