

**Experiences, symptoms and signs in 3-11 year-old
children undergoing day surgery in the context
of the perioperative dialogue**

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ABSTRACT

Surgical interventions create real, imagined, or potential fear or anxiety in many children, thus highlighting a need for the health professionals who work with them to increasingly act as facilitators. The overall aim of the present thesis was to gain a deeper understanding of 3-11 year-old children's perioperative symptoms, signs, experiences and main concerns when attending hospital for day surgery and of how they manage this situation. *Paper I* explores bodily and verbal expressions of postoperative symptoms using a qualitative and descriptive methodology. Fourteen boys between 3-6 years of age were interviewed and observed. The participant observation method was the primary source of data and the domains and subdomains together showed how bodily and verbal expressions could be intertwined. For boys of this age, distinguishing pain, nausea and distress is difficult, and they also have different ways of communicating the 'correct' words in clarifying a symptom. *For paper II*, a grounded theory (GT) study was carried out based on data from 15 boys and 5 girls (aged 6-9 years) scheduled for day surgery. The aim was to explore what it means for children to attend hospital for day surgery. Data were collected using tape-recorded interviews, participant observations and pre- and postoperative drawings. The analysis showed that the main concern for children undergoing day surgery was that they were forced into an unpredictable and distressful situation. They perceived a "breaking away from daily routines" and were "facing an unknown reality". A conceptual model was generated, including a core category, "enduring inflicted hospital stress", which explains how the situation was handled. Initially, the children tried to "gain control" over the situation. However, during the perioperative period they experienced a "loss of control" and "cooperated despite fear and pain". Post-operatively they "breathed a sigh of relief" and tried to "regain normality in life" again.

Paper III presents a psychometric test of the Swedish version of the Child Drawing: Hospital Manual (CD:H), which intends to assess hospital anxiety in children. Drawings from 59 children (aged 5-11) undergoing day surgery were analyzed and compared to drawings from 71 school children (aged 5-11) in a comparison group. The results showed that the Swedish version of the CD:H has adequate construct validity (Parts A, C and total scale score), high inter-rater reliability and acceptable internal consistency reliability. In *paper IV*, the efficacy of the perioperative dialogue was investigated by analysing salivary cortisol in 5-11 year old children undergoing day surgery. Seventy-nine boys and 14 girls (n=93) scheduled for day surgery were randomly recruited into three groups with different types of perioperative care: Standard perioperative care (control group) (n=31), Standard perioperative care including pre-operative information (n=31), and the Perioperative Dialogue (PD) (n=31). Postoperatively, The PD group had significantly lower saliva cortisol concentrations than the other two groups and these levels continuously decreased during the day of surgery. Among the children who received analgesics, the PD group received significantly less morphine related to bodyweight. Irrespective of group, there was a positive correlation between morphine consumption and salivary cortisol concentration. In *paper V*, associations between objective measures of stress (cortisol concentration in saliva) and subjective assessment of hospital anxiety (children's drawings) are investigated. The sample included 93 children (79 boys and 14 girls) scheduled for elective day surgery requiring general anaesthesia. The results showed no significant associations between children's saliva cortisol concentration (stress) and their drawings (anxiety) in any of the parts of the CD:H or individual items. In conclusion, the studies contribute to a deeper understanding of how 3-11 year-old children undergoing day surgery experience and express their situation, symptoms and physiological stress in the context of the PD.

Keywords; anxiety, children, cortisol, day surgery, drawings, nursing, perioperative dialogue, stress, symptoms

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- II Wennström, B., Hallberg, L. R-M. & Bergh, I. (2008). Use of perioperative dialogues with children undergoing day surgery. *Journal of Advanced Nursing*, 62 (1), 96-106.
- III Wennström, B., Nasic, S., Hedelin, H. & Bergh, I. (2011). Evaluation of the Swedish version of the Child Drawing: Hospital Manual. *Journal of Advanced Nursing*, 67(5), 1118-1128.
- IV Wennström, B., Törnåge, C-J., Nasic, S., Hedelin, H. & Bergh, I. (2011). The perioperative dialogue reduces postoperative stress in children undergoing day surgery as confirmed by salivary cortisol. *Pediatric Anesthesia*, (21), 1058-1065.
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ABBREVIATIONS

ANOVA	Analysis of variance
ASA	The American Society of Anaesthesiologists
CD: H	Child Drawing: Hospital (Manual)
GT	Grounded Theory
HFD	Human Figure Drawing
HPA	Hypothalamic-Pituitary-Adrenal (axis)
IASP	International Association for the Study of Pain
PACU	Post-Anaesthesia Care Unit
PD	Perioperative dialogue
PONV	Postoperative Nausea and Vomiting
PPIA	Parental Presence during Induction of Anaesthesia
SNS	Sympathetic Nervous System
SPSS	Statistical Package for the Social Scientists
W-B scale	The Wong-Baker [FACES] Pain Rating Scale
WHO	World Health Organization

PREFACE

My interest in research began when I found that rectally administered diclofenac (Voltaren), in contrast to opioid (morphine), reduced vomiting in children after strabismus surgery. In a study I conducted in 2002, the incidence of Postoperative Nausea and Vomiting (PONV) was found to be such a dominant symptom that it could be disguised and expressed as pain, associated not only with a requirement for more analgesics but also with an inferior ability to cope with pain (Wennström & Reinfelt, 2002). Attempting to describe and discriminate postoperative symptoms in children is thus complicated. When children's pain and/or PONV are assessed in clinical practice, a great deal of attention is traditionally focused on the rated intensity. The findings of our above-mentioned study highlighted important issues regarding the nurses' assessment of children's postoperative symptoms, as well as the way the children expressed them. When health professionals use different types of rating scales in order to assess symptoms, giving the children enough time and relying on the way they express their difficulties is very important in the assessment process. In addition, the relationship between symptoms like pain, PONV and anxiety makes the assessment method especially important since discrimination between symptoms is necessary for adequate treatment. Listening to what the children have to say about themselves instead of what others say about them increases understanding of the unique child in the specific situation. The interactive research process in this thesis can be seen as providing the child with 'extra' preparation and support throughout the entire perioperative procedure. This also includes the idea that the researcher identifies and reflects on the preconceptions he or she brings to the study. According to Malterud (2001), preconceptions are not the same as bias, unless the researcher fails to acknowledge them.

My preconceptions are based on a nursing science perspective, encompassing knowledge, experience and a sense of duty and commitment accumulated over 25 years as a nurse anaesthetist; a professional pre-understanding (von Post & Eriksson, 1999). Throughout the studies, I have 'learnt' through the eyes of the children as well as through the eyes of my pre-understanding. Nevertheless, this can be 'defended' from an ethical standpoint because the acquired knowledge intends to give benefit to the child (Beauchamp & Childress, 2001) and depends on the interactional perspective which has guided this thesis. My intention was to describe the children's situation when attending hospital for surgery by regarding them as unique individuals in terms of their expectations, experiences, symptoms, comprehensions and way of managing this specific situation. In this way I have attempted to describe the world of the hospital from the child's perspective.

INTRODUCTION

There has been a significant shift in the delivery of care intended to surgically treat children, as exemplified by the short/day surgical program and the use of improved surgical techniques and anaesthetic agents. With the advancement of medicine and nursing care, as well as increased reliance on evidence-based perioperative guidelines, day surgery is becoming ever more prevalent. Today, most health care systems in developed countries employ day surgery for a number of operations on children in order to avoid the trauma of hospital admission and in-patient stay. A significant number of children undergo surgery. In Sweden, approximately 150 000 children (aged 0-18) undergo surgery each year, of whom 109 000 (73%) are registered for day surgery operations. In addition, the majority of children in day surgery consist of boys (64%), with diagnoses such as hydrocele, phimosis and undescended testis (Swedish National Patient Register at The National Board of Health and Welfare, 2009).

As far back as 1975, Visintainer and Wolfer argued that fears affect children in a perioperative context irrespective of day or in-patient procedures. Later on, other authors pointed out that children undergoing day surgery are significantly less upset than those who are admitted on the day before and at discharge the day after surgery (Campbell et al. 1988). Some years later it was stated that day surgery has greatly reduced the negative effects of the pediatric health care experience and provides many advantages, including less child and parent separations, faster return home, decreased nosocomial infections and reduced societal costs (Zuckerberg, 1994). At the same time, one must bear in mind that in day surgery, the nurse anaesthetist or anaesthesiologist may not have any contact with the child/parent before the day of admission, increasing the demands on 'short time' trusting accessibility and 'correct' pre- and postoperative communication with the children and their parents (Kain et al. 1996a; O'Conner-Von, 2000). Early reports have indicated that systematic preoperative teaching and emotional support was clearly related to increased cooperation in children aged 3-13. Upset behaviour and post-hospital adjustment problems decreased and less anxiety was reported (Visintainer & Wolfer, 1975; Williams, 1980). However, a review highlights that studies involving preoperative preparation for children in order to decrease anxiety are mainly published in journals of paediatrics, psychology and dentistry and, that it was only in the early 1990s that work in this context appeared in the anaesthetic literature (Watson & Visram, 2003). Dreger and Tremback (2006) argue that preoperative anxiety should be reviewed from the perspectives of various disciplines and professions for successful strategies to be identified and applied.

Today it appears that researchers from disciplines other than nursing contribute to the increasing body of knowledge and evidence for the application in practice of how to, for example, improve anaesthesiologist-patient communication (Hool & Smith, 2009). Other examples are researchers representing child psychology, child life specialists and medical disciplines who have directed research efforts towards examining the effects of preparation on children's stress reactions associated with the perioperative and hospital experience. This also includes instrument development aimed at assessing anxiety and alternative intervention models (Kain et al. 1998; Kennelly, 2000; Méndez et al. 2001; Kain et al. 2004). Further, it is recognised that hospital clowns,

who use communication and play with ailing children and children undergoing surgery, promote an atmosphere in which laughter and humour is appreciated (Vagnoli et al. 2005). This gives the child opportunity to find his/her life-force potential and ability to act creatively instead of passively allowing the various treatments to defeat him/her (Linge, 2008). Although researchers from other disciplines have contributed to increased understanding of children's need for preoperative preparation, one must consider that nurses have an ideal position and a unique perspective in not only contributing to the science but also in employing clinical nursing interventions to support children in dealing with these stressful experiences (Bar-Mor, 1997; LaMontagne, 2000; Lindberg & von Post, 2006; Justus et al. 2006). Lindberg and von Post (2006), for example, showed that continuity and supporting dialogues by the same nurse anaesthetist during the pre- intra- and postoperative procedures inspired confidence in children and helped them to manage their fear of anaesthesia. Obviously, there is an agreement that hospitalization, medical and perioperative procedures cause *some* degree of anxiety in *all* children and more *severe* anxiety in others. It therefore seems important that nursing research and practice focuses on how to evaluate the children's experiences, symptoms, comprehensions and management of these specific situations.

BACKGROUND

Medical and perioperative procedures in children

Over the years it has been well documented that medical and perioperative procedures can be emotionally devastating for children (e.g. Pearson, 1941; Corman et al. 1958; Vernon et al. 1965; Erickson, 1972; Thompson, 1985; Li & Lam, 2003; MacLaren et al. 2009). This may manifest itself as sullen and withdrawn behaviour, crying and regression (Visintainer & Wolfer, 1975) as well as anxiety, fear, sadness, loneliness, anger, distortion of body image and fear of loss of control over self and bodily functions (Barnes et al. 1990; Kain et al. 1996b). Surgical procedures generate increased levels of anxiety. Caumo et al. (2000) showed that children with increased preoperative anxiety also exhibited a higher risk of postoperative anxiety. Moreover, children with previously distressing surgical experiences had negative psychological reactions after surgery compared to children without these experiences (Margolis et al. 1998; Kain et al. 1996b). Later, researchers explored factors associated with children's preoperative anxiety (Wollin et al. 2003) as well as their desire to know what to expect preoperatively (Smith & Callery, 2005; Fortier et al. 2009) and what they do to manage fear related to hospitalisation and medical and perioperative procedures (Salmela et al. 2010). There is consensus among anaesthesiologists that preoperative preparation and postoperative support is beneficial for patients undergoing surgery (Macario et al. 1999a; 1999b). There is also an increasing awareness of the challenges and opportunities associated with preparing children and their parents adequately, including a need for clinical and best practice guidelines (O'Conner-Von, 2000), with an evidence-based care and evidence-based medicine as the ultimate goal within Swedish public healthcare (Swedish National Board of Health and Welfare, 2011).

Parents are key in helping to prepare and support their children during the perioperative procedure. Indirectly, this means that the quality of pre-admission, discharge information and support will impact on the child's experiences of care and ability to cope with the situation (Dreger & Tremback, 2006; Li et al. 2007). Health professionals address perioperative anxiety in children from various perspectives and anaesthesia care providers refer to the importance of reducing children's anxiety both for humanitarian reasons and for improving cooperation (Watson & Visram, 2003). The challenge that perioperative nurses often face is to provide procedures so that children can be better prepared in today's fast-paced operating rooms (Dreger & Tremback, 2006) thus making it more possible to avoid an uncaring situation. An important task in perioperative clinical practice, therefore, is to treat and explore effects of perioperative symptoms and outcomes that could influence children's experiences of their hospital stay.

Symptom, signs and experiences

The term psychological upset (a multidimensional phenomenon which includes behavioural, subjective and psychological components) or emotional distress has been frequently used in the literature. The terms describe 'expressions' from children, such

as crying, being restless, verbal protest and withdrawal during medical and perioperative procedures (Wolfer & Visintainer, 1975; Thompson, 1985; Li & Lam, 2003; Wright et al. 2007). Factors that influence these behaviours might be previous hospital experiences, cognitive abilities, verbal communication ability (Harbeck-Weber & Mckee, 1995; Margolis et al. 1998), as well as nurses' actual knowledge of symptoms such as pain, nausea/vomiting, fear and anxieties in children, and their assessment of these (Woodgate & Kristjanson, 1996).

The word 'experience' refers to the fact or state of having been affected by or having gained knowledge, skill or practice through direct observation or participation in events or in a particular activity (Merriam-Webster, 2011). A symptom refers to an experience of illness reflecting changes in the bio-psychological functioning, sensations or cognition of an individual. In contrast to a symptom, a sign refers to an objective indication of disease, detectable by the individual and/or by others (Harver & Mahler, 1990). Symptom experiences include an individual's perception of a symptom, evaluation of its meaning and response to it, and refer to whether an individual notices a change in the way he or she usually feels or behaves. People evaluate symptoms by making judgements about the severity, cause, treatability and the effects on their lives. Most notable is the necessity for professionals to be vigilant in acknowledging that symptoms are more than separate physiological or psychological states (Dodd et al. 2001b). For assessing symptoms and distress, researchers most often use tools that assess the occurrence (quantity) as well as perceived intensity of symptoms (Haberman, 1999). However, it is difficult to find words which adequately describe the nature of someone's symptoms. For example, the terms 'unbearable' or 'excruciating' may describe pain that would give similar numerical values on a Visual Analogue Scale (VAS), but these two words may imply something different about the patient's experience of it (Hain, 1997).

Kirmayer et al. (2004) highlight the term 'medically unexplained symptoms' as a social and clinical predicament rather than a specific disorder, arguing that it is not a replacement for the concept of somatoform disorder but a way of drawing attention to a situation in which the meaning of distress is contested. Probably, this also encircles states of mood such as fear or anxiety. Dodd et al. (2001a), argue that if two or more symptoms occur at the same time, they are likely to affect each other, e.g. pain is worse when fatigue or nausea occur at the same time. The intensity of a symptom such as pain may dominate or 'mask' other symptoms such as nausea. Dodd et al. also state that children's perceptions of symptoms become more complex when viewed in the context of multiple perceivers, i.e. the health professionals perceive the response of a child and/or a parent, interprets it and makes a management decision (Dodd et al. 2001b). Multiple postoperative symptoms in children might be viewed as symptom(s) of indescribable distress due to difficulties in communicating the 'correct' words to clarify symptoms. This automatically reduces the health professional's ability to make correct judgements and give adequate treatment since the child has difficulty in discriminating between different symptoms and relating their experiences to their actual causes. Thus, assessment of postoperative symptoms such as pain, Postoperative Nausea and Vomiting (PONV) and anxiety in paediatric patients is one of the biggest challenges facing health professionals at the Post-Anaesthesia Care Unit (PACU).

Pain

The International Association for the Study of Pain (IASP) defines pain as “An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (IASP, 1979). McCaffery (1979) declares that “pain is whatever the experiencing person says it is, existing whenever he says it does” (p.11). These definitions are based on self-report of pain and cannot be applied to any living organism that is incapable of self-report, including newborn or preverbal infants, young children and those with neurological or developmental conditions that impair cognition or communication (Anand & Craig, 1996). Behavioural expressions may therefore be considered as an early form of self-report. This is in line with Jacox (1979) who argues that recognizing the fact that a verbal report of pain is more reliable than any physiological indicator does not mean that a subjective report of pain is the only means of assessment. Fordyce (1976) point out that there are at least two reasons why pain is not simply what a patient says it is. Firstly, the patient’s knowledge and perception may limit the ability to interpret, discriminate and describe what is happening in his/her body. Secondly, in expressing pain as in expressing other human experience, verbal and non-verbal behaviour often differ, and there is no reason to believe that verbal behaviour is more valid or reliable than non-verbal. Fordyce continues arguing that “the discrepancy between what people say and what they do is not simply a question of honesty or candour” (p.12). For various reasons people may intentionally or unintentionally try to conceal or exaggerate the amount of pain they are feeling (Fordyce, 1976). For example, an adult patient may please the physician/nurse since they are in a mood of thankfulness or a child may fabricate things to avoid being forced to take medication.

Price, (2002) has presented an alternative definition of pain that explains how different strategies can be useful in the multidimensional context of a painful experience: “pain often occurs within a situation that is threatening, such as during physical trauma or disease. Part of the affective dimension of pain is the moment-by-moment unpleasantness of pain, which consists of emotional feelings that pertain to the present or short-term future, such as annoyance, fear, or distress” (p. 393). This definition of pain describes how the physical part of pain can only explain a small part of the individual’s total pain experience, for example, it could be enhanced by other symptoms such as anxiety and/or nausea.

Nausea and vomiting

Nausea and vomiting are defined as symptoms which can occur independently of each other but are usually closely connected (Birke, 1987; Kovac, 2007). Retching is the synchronous, rhythmic contraction of the abdominal, diaphragmatic and intercostal muscles that occurs with a closed mouth and glottis (Kovac, 2007) while nausea is the unpleasant feeling which induces a pronounced desire to vomit. Vomiting is defined as the uncontrollable, forceful elimination of stomach content (Birke, 1987; Kovac, 2007). This tells us that nausea and vomiting should be considered as two separate entities and assessed independently. Nausea is also often referred to as a ‘queasy sensation’ or a feeling of being ‘sick to the stomach’. Nevertheless, it is important to note that individual tendency towards nausea varies. Some people may suffer from long bouts

of nausea without vomiting whereas others will vomit frequently upon feeling the slightest nausea. Nausea may occur with or without vomiting, and vomiting can occur without nausea. For this reason, Birke maintains that hospital staff should always check if patients ordinarily find it easy or difficult to vomit.

A review made by Apfel et al. states that nausea is a subjective sensation which should be evaluated by the patient, not the observer. The feeling is best described as the desire to vomit, without the presence of expulsive muscular movements. When nausea becomes severe, the secretion of saliva is increased and is associated with vasomotor disturbances and sweating. The feature that distinguishes retching from vomiting is the production of even the smallest amount of stomach contents. When no stomach contents are expelled, the expulsive efforts should be classified as retching (Apfel et al, 2002). Retching and vomiting may be grouped together under the common term 'emetic episodes' (Korttila, 1992). However, one must bear in mind that it is difficult to assess pain as a cause of nausea (or vice versa) and these two symptoms are considered related to each other (Watcha & White, 1992) in children (Rose & Watcha, 1999) and in adults (Andersen & Krogh, 1976). These symptoms may also give rise to fear or anxiety in the individual as to their health and recovery.

Fear and anxiety

Although the terms "fear" and "anxiety" are often used interchangeably both in literature and in practice, there is a difference between them. Epstein (1972) concluded that fear is related to action, in particular to escape and avoidance. However, when the action is blocked or prevented, e.g. when the situation is uncontrollable, fear is turned into anxiety. In Epstein's view, fear is an avoidance motive and anxiety can be defined as unresolved fear, or alternatively, as a state of undirected arousal following the perception of threat. Barlow (1988) describes anxiety as a future-oriented negative affective state resulting from perceptions of threat characterized by perceived inability to predict, control, or obtain desired results in upcoming situations, e.g. difficulties in adopting adequate coping strategies. The presence of fear in regard to apprehension about the future is a defining characteristic of anxiety. Kubzansky et al. (1998) use the term 'anxiety' to refer to the full spectrum of experiences from the normal to the pathological, suggesting that the differences are matters of duration, intensity and meaning of the experience to the individual sufferer.

Bay and Algase (1999) made a clear distinction between fear and anxiety in their concept analysis; fear is defined as "the result of disruption from a perceived source that is identified as threatening, while anxiety arises in response to a vague, non-specific threat" (p.107). To further connect these definitions to the empirical literature the following definitions are offered. Fear is "a sufficiently potent, biologically driven, motivated state wherein a single salient threat guides behavior. It is a defensive response to perceived threat or the result of exposure to a single cue, presented in an environment reminiscent of the original fear experience" (p. 107). Anxiety is "a heightened sense of uneasiness to a potential threat, which is inconsistent with the expected event and results when there is a mismatch between the next likely event and the actual event". However, "the proximity, substance and intensity of the source of threat is critical in distinguishing these concepts because fear results when stimulus is perceived as

threatening and has potential for interfering with biological survival. Anxiety is a response to an unspecified threat that signals mismatch” (p. 107).

Stress

Stress has been defined in different ways: 1) as a stressor, i.e. environmental stress; 2) as the response to the stressor, i.e. feeling of tension and 3) as something which involves biochemical, physiological, behavioural, and psychological changes (Ogden, 1997). Schlotz et al. (2008) argue that there is a covariance between psychological and endocrine responses to stress. This tells us that it is reasonable to believe there is a connection between stress and anxiety. It has been claimed that the emergence of state anxiety is the first stress response (Boudarene et al. 2002). Up to a certain stress level, anxiety remains stable. Then, the nature of the stress response changes and takes a biological aspect. Increased cortisol concentrations in plasma and saliva (which is the secondary stress response) will be observed and gives evidence of an intensified and sustained stress response. Such a gradual phenomenon is particularly reported in elevated psychological distress which is associated with loss of control (Boudarene et al. 2002).

Although stress research has focused primarily on the negative aspects of stress, Ogden (1997) differentiates between stress that is harmful and damaging (distress) and stress that is positive and beneficial (eustress). This distinction is also evident in the division of the appraisal into (threat of) harm and challenge, the latter denoting the positive aspects of stress (Lazarus, & Folkman, 1984). Lazarus further states that an event is stressful when the individual perceives that the demand taxes or exceeds his/her resources (Lazarus, 1991). This perception may lead to negative emotions such as anxiety or fear, for example, being subjected to surgery probably increases anxiety or fear in a child. Thus, the brain acts very much on probability and predictability of stress. Predictability is used for both the true relationship between events and the subjective or learned (perceived) relationship. In addition, there are emotions attached to these expectancies. To a large extent, fear, anxiety and general well-being are all determined by what is probably going to happen. Fear and anxiety are often different in their time perspectives; fear is of a specified event in time and space, anxiety is uncertain for the time dimension as well. In addition, predictability, a sense of control, and feedback are all factors that permit the organism to reduce its levels of stress arousal (Eriksen & Ursin, 2006).

Assessment and measurement of symptoms

The distinction between assessment and measurement of pain is not always clearly drawn in the literature. In a review, Hain (1997) argues that “assessment” describes the clinical diagnosis and the estimation of the entire pain experience, while “measurement” describes the quantification of only one aspect. This is in accordance with McGuire (1992), who argues that assessment and measurement are two different processes. Another definition for assessment is: “the act of making a judgment about something” and for measurement: “the act or process of measuring something” (Merriam-Webster, 2011). The concept of ‘assessing’ is translated into Swedish as *uppskatta*, *bedöma* and *värdera*, while the concept ‘measuring’ is translated into *mäta*

(Nordstedts Dictionary, 1994). Pain assessment is obviously a broader concept than pain measurement and takes into account the many dimensions and the interplay between different aspects of the pain experience. Thus, when the concept 'assessment' is applied to pain, it describes the clinical diagnosis and estimation of the entire pain experience, whereas measurement describes the quantification of one aspect of many – which is labeled as pain only. In children, as in adults, pain is a multifactorial experience unique to the individual as well as to the circumstances of the pain experience.

Inadequate postoperative pain relief (Burokas, 1985; Hamers et al. 1998) and children's difficulties in discriminating multidimensional, postoperative symptoms such as pain, distress (Beyer et al. 1990) and PONV have been discussed earlier (Wennström & Reinfelt, 2002). In addition, IASP points out that children at any age may deny pain if the questioner is a stranger, if they believe that they are expected to be brave, if they are fearful, or if they anticipate receiving an injection for pain (IASP, 1995). To assess pain adequately, it is therefore necessary to measure as well as assess more than one dimension of the pain experience. Von Baeyer (2006) points out that there are many sources of bias and error in self-reports of pain. Ratings consequently need to be interpreted in the light of information from other sources such as observation of behaviour, knowledge of the circumstances of the pain and parents' reports. Several dimensions of acute pain in children should be considered when assessing pain in a holistic way, and should represent cognitive, physiological, sensory, behavioural, affective, socio-cultural and environmental factors (Morton, 1997). Morton asserts that the clinician or nurse must take these different factors into account to make 'correct' judgements of each particular child on each particular occasion in each particular medical environment according to a specific surgical procedure. This may be one explanation as to why researchers have been forced to develop many different instruments for both measuring and assessing pain experiences.

Faces (pain) scales and behavioural observations of pain

Faces (pain) scales have become the most popular approach to eliciting children's self-report of pain. Faces scales, unlike other self-report assessments, are preferred by children, parents and nurses when compared with other assessment tools, including VAS and word descriptor scales (Wong & Baker, 1988; Fogel-Keck & Gerkenmeyer, 1996; Chambers et al. 1999). Recently, a systematic review showed that one of the most widely used and best validated faces pain scales is the Wong-Baker [FACES] Pain Rating Scale (W-B-scale, see Figure 2, p. 38) (Hockenberry & Wilson, 2009), which is also preferred by the children themselves (Tomlinson et al. 2010). The faces scales are attractive, simple and quick to administer, but there may be several possible confounding factors in using them. One such factor might be that the faces equally express mood as pain, PONV and/or fear/anxiety. This is probably justifiable in many clinical situations. On the other hand, these symptoms may be the major contributing factors that influence the child's well-being. Another factor is that the instructions that typically accompany scales with a smiling face as the 'no pain' anchor describe the faces as 'happy', i.e. 'feeling happy' of being 'pain-free'. There is consequently a risk of 'false positive' assessment or measurement of a condition in a child who is not in pain (Chambers et al. 1998). Accordingly, if the child depicts his/her mood, s/he might mistakenly point to a face towards the middle of the scale (e.g. neutral mouth/

smile), meaning s/he is not happy, giving the impression pain is present when is not (Chambers et al. 1998).

Studies concerning behavioural observations have shown that children often lie immobile in bed when they are in pain (Taylor, 1983; Mills, 1989). Of course, this is not because they are comfortable, but because they are experiencing severe pain related to movement. Behavioural observations may therefore take into account the risk of underestimating pain intensity compared to self-reports and encourage health professionals to be aware of the patient with persistent pain (Beyer et al. 1990). In contrast, Berde et al. (2002) argue that behavioural scales may overrate pain in the setting of procedurally brief pain situations and probably assess fear or anxiety in addition to pain. These authors further discuss that such scales may be better described as “distress scales”, regarding distress as a combination of pain, fear or anxiety. Commonly, vocalization, facial expression, and body movements are associated with pain. However, inferring pain from behaviour is fraught with difficulties, because there are frequent discordances between pain behaviours and self-reports – the ‘gold standard’ for pain. The concordance between behaviour and self-report of pain is often best for brief, sharp pain, such as pain from a needle (Fradet et al. 1990). Further, Fradet and co-workers argue that in a procedural pain situation, there is no difference between anticipatory anxiety, pain self-report and pain behaviour. Accordingly, it is important to bear in mind that when pain caused by surgical interventions occurs, PONV is often one more symptom to deal with. Although there may be age-related trends in terms of pain responses, these variations are probably related to developmental differences rather than to age differences (McGrath, 1990; Rydelius, 2001). Generally, the younger the child is, the less certain one can be in ascertaining pain intensity. This is because the child will often find it difficult to separate cause of pain (why or what is hurting) from intensity of pain (how much it hurts). In this age group, assessment therefore does not always involve pain itself but the reactions to pain. Consequently, anyone caring for young children must learn to assess pain indirectly (Jylli, 2001).

Postoperative Nausea and Vomiting (PONV)

Postoperative vomiting remains a common complication of general anaesthesia and surgery (Tramèr, 2001a; 2001b) and occurs more frequently in children than in adults (Gan et al. 2003) with a peak incidence of 34-50% in school-aged children, compared to 20-30% in adults (Apfel et al. 2002; Gan et al. 2003). It is also a significant problem that PONV often results in suffering and prolonged postoperative recovery. A review of 10 772 children undergoing day surgery found that PONV was the fourth most common reason for unplanned hospital admission following pain, surgical complications and surgery late in the day (Awad et al. 2004). Another interesting aspect of PONV and pain is that surgical patients have reported that the fear of suffering PONV is worse than the fear of postoperative pain (Van Wijk & Smalhout, 1990). Although nausea, retching and vomiting are frequently interlinked, they may well occur on their own. It is therefore important that the different outcome variables, mainly nausea, vomiting and rescue treatment should be assessed independently (Apfel et al. 2002). Further, one may argue that nausea, the subjectively unpleasant sensation associated with the persistent urge to vomit, is a difficult phenomenon for the younger child to describe (Apfel et al. 2002), and the endpoint of most pediatric studies has been lim-

ited to retching and vomiting (Gan et al. 2003). In order to judge the incidence and severity of PONV in an “objective” way, a numerical rank score has been used, i.e., 0=no nausea and vomiting, 1=nausea but no vomiting, 2=one episode of vomiting, 3=two or >two episodes of vomiting (Wennström & Reinfelt, 2002). Postoperatively, a number of factors may affect PONV, e.g. type and duration of anaesthesia/surgery, age, sex, weight and ASA-status (Watcha & White, 1992; Junger et al. 2001). Accordingly, this might also include anxiety, its management, and nursing interventions.

Anxiety, fear and distress

There is great variation in the way children express and manage their hospital distress (Woodgate & Kristjanson, 1995; Woodgate et al. 2003). Moreover, it is obvious that nurses’ postoperative interpretation and treatment of children’s distress and symptoms differ (Woodgate & Kristjanson, 1996). To avoid unsatisfying situations for the involved parties, the ‘medical’ dialogue should be communicated in an age-appropriate manner, including truthful and simple, non-threatening terminology. This dialogue should include avoidance of emotionally charged and potentially confusing words (Jaaniste et al. 2007). Words or phrases that some children find helpful can be threatening or confusing to others. It therefore becomes necessary for health professionals to take into account their experiences of children’s varying descriptions of symptoms in a hospital context, and also to learn about them from the children themselves, making it possible to communicate about symptoms in a subjective and comprehensible way, i.e. using the child’s words.

Preparatory information gives positive effects, meaning increased control for the child and resulting in decreased anxiety over clinical outcomes (Edwinsson-Månsson et al. 1992; Prins, 1994). Consistent with this is the fact that if children master difficult situations, their self-esteem will increase (Linge, 2008). This highlights the importance of health professionals recognising their ethical responsibility in formulating the delivery of information to children in a way that assuages their fears and respects their cognitive comprehension. Thus gaining insight into how children perceive and experience their symptoms, one should become aware of how children understand and verbalize their feelings. Some children verbalize their fear or anxiety explicitly, whereas for others it is expressed behaviourally (Corman et al. 1958; Vernon et al. 1965), for example by looking scared, becoming agitated, trembling, not talking/playing or crying (Kain & Mayes, 2001).

Behavioural theory (Skinner, 2005) asserts that children who have a strong sense of fear when, for example, they have visited the dentist for the first time, might experience fear before every such visit in the future. This fear could progress and become a phobia, entailing total avoidance of further visits to the dentist. Furthermore, the first experience of fear can develop into some sort of generalised, conditioned reaction. This means not only situations directly related to the fear trigger the reaction but also situations that are reminiscent of the original trauma (Ollendick & King, 1991). In contrast, there are many children who have not been exposed to any traumatic experience at all but still develop fear of medical situations. Here one must search for other explanations, for example, the parents’ own fears, a friend’s ‘anxious’ narratives or shyness in the child (Melamed & Siegel, 1985).

Fear focuses on the things which threaten us (Aristoteles, 1993) and is more common in children than in adults but is given less space when the child grows older (Gullone et al. 2001). Reasons for the creation of fear change over time but one important reason for fear in children is illness. In connection with this, hospital care may present painful, unpleasant and incomprehensible experiences and meetings (Gullone et al. 2001; Young, 2005). Generally, the experience of illness and hospital care is influenced by the unique life situation that each person has, including thoughts, fantasies, earlier experiences and how the individual visualizes himself/herself and others (Toombs, 1992). For children, age and developmental stages form the bases for understanding these specific situations (Eiser, 1985). Even if fear might arise from a combination of reality and fantasy, the reaction should be understood as a necessary and adaptable aspect of human life (Gullone, 2000). Unfortunately, fear can sometimes have the upper hand and its prolongation may generate difficulties in the child's life which need to be resolved (Ollendick et al. 2002). Fear is associated with experiences related to threat of separation and rejection. Even in emotions of abandonment and loneliness, fear is involved as a diffuse experience of insecurity (Sonnby-Borgström, 2005).

In a child-focused perioperative education, Squires (1995) argues that in addition to children's medical experiences and the manifestations of their psychological upsets, health professionals must remember two key developmentally-based fears that overlay all life experiences for children. At the risk of overgeneralizing, Squires maintains that these fears can be categorized as fears that children have between the age of 2 -6 and above the age of 6 years: Firstly, the fear of abandonment and/or separation from their parents (or significant others). This can be a driving fear for children under the age of 6. The intensity of the abandonment or separation anxiety far outweighs the fear of many medical experiences. Secondly, the fear of pain and mutilation is often associated with children over 6 years of age. It is important to recognize that children of this age require clear and concrete explanations for any treatment or activity that may be painful, cause a change in appearance, or occur in the region of their "private parts" (Squires, 1995).

Anxiety in children's drawings

Several valid and reliable drawing tests are available to assess children's emotional status and/or anxiety in clinical practice and research (Clathworthy et al. 1999a, 1999b; Ryan-Wenger, 2001). Drawings are also used as projective techniques, based on the assumptions that they reflect a child's self-concept, attitudes and conflicts, and represent emotions or thoughts that children are unable or unwilling to verbalize (Ryan-Wenger, 1998). Pioneers in this field (Di Leo 1973; 1977, Koppitz 1968; 1984) have shown that the quality and the content of a drawing reveals the person's self-concept, anxiety, attitudes and conflicts. According to Koppitz (1968) there are three principles that underlie the analysis of children's human figure drawings (HFD): (1) how a child draws a figure, (2) which person the child draws and (3) what the child says about the HFD. In clinical practice, a drawing instrument could be helpful in gaining information about a child's mood/levels of distress. Several studies have used the drawing method in order to investigate the child's distress, history, psychological condition and needs when attending hospital for surgery (Lukash, 2002; Puura et al. 2005; Smith & Callery; 2005; Pelander et al. 2007). One of the important findings in the studies

mentioned above was that drawings seem to be helpful for clarifying children's needs in regard to certain physical/psychological issues that may provoke distress or anxiety in a hospital context.

Stress in children

The glucocorticoid hormone Cortisol is secreted in response to increased stress in an individual's environment and is considered to follow similar circadian rhythms in both children and adults, i.e. decreasing from early morning to late evening (11pm) (McCarthy et al. 2009). Salivary cortisol is a biological marker for determining stress levels, allowing an understanding of patients' stress and responses to stressful stimuli/events. Since it is an easy-to-collect marker of stress, its use has emerged in paediatric research over the years (Hanrahan et al. 2006; Törnbage & Alfvén, 2006; Rains et al. 2009). Stress response involves the interaction of two systems: the sympathetic nervous system (SNS) and the *hypothalamic-pituitary-adrenal* (HPA) axis. The SNS is associated with the release of norepinephrine and epinephrine, which rapidly activates a fight-or-flight response. The HPA axis is activated more slowly, causing a cascade of endocrine events (Carter & DeVries, 1999) with cortisol as the end product. There is an estimated lapse of 15 to 30 minutes between a stressful event and the production and release of increased plasma cortisol; an additional two-minute delay occurs before cortisol has increase also in saliva (Gunnar & White, 2001). The data obtained can contribute to understanding children's responses to stressful events and to determining effective interventions. Saliva cortisol concentrations more than 28 nmol/L in children have been said to indicate a high stress response (Gröschl et al. 2003). However, saliva cortisol concentrations obtained in the classroom (8-9am) from 298 healthy, age matched Swedish 6-15 year olds were found to be 'normal', and ranged from 1.8 to 95.9 nmol/L (median 8.8) (Törnbage & Alfvén, 2006). In addition, similar results have been found earlier in the same context and time-point with median/range values 8.8 (1.0-33.2 nmol/L) in 210 boys and 8.6. (1.5-53.9) in 176 girls (Törnbage, 2002). In summary, there were very few values above 30 nmol/L (less than 3 percent in this population of nearly seven hundred children) and this is in agreement with Gröschl et al. (2003).

Perspectives regarding child development and understanding

During the last 50 years, international research on children has seen radical changes. New insights gleaned from many empirical investigations have caused a paradigm shift built on fundamental understandings of children and how their cognitive development should be viewed. Sommer (2005) describes the 1960's social perspective of the child as a fundamentally incompetent human being who is exposed to risks and crises. During this period, society over-emphasized children's weaknesses and underestimated their abilities. Later on, this research paradigm developed a decisive new approach, describing the child as resilient and competent, and having different psychological abilities for coping. The main idea here is to avoid defining different stages of development or chronological years, or putting a 'value' on the children's background or growth. Sommer argues that the theory of different developmental stages could be useful in pedagogical work, but must incorporate a holistic view of the child's whole life situation and experiences. These statements highlight how chil-

dren may have different behaviours and ways of understanding in relation to familiar situations and ‘unknown’ procedures. Thus, our expectation that children will be able to cope is as relevant as our need to be aware that their response will vary with the environment to which they are exposed and the way they interpret it as individuals (Sommer, 2005).

Jean Piaget’s theories have dominated research on children’s cognitive development for the greater part of the last fifty years. Today, the literature shows that children’s development is more complex than mere cognitive development and is now also related to social and cultural factors and earlier experiences (Doverborg & Pramling-Samuelsson, 2003; Sommer, 2005). Childhood is thus a period of intensive changes which are explained by theories on cognitive development, thinking and language (Vygotsky, 1962; Piaget & Inhelder, 1969), psychosocial development (Erikson, 1997), development of holistic understanding of inner and outer experiences through play and fantasies (Winnicott, 1971), development of attachment and independence (Bowlby, 1969) and development of ‘self-narrative’ (Stern, 2000). All in all, most theories on children’s development agree that age is of importance in how children understand their existence. However, age boundaries are fuzzy-edged and more recent theories are less inclined to adopt strict categorisations in respect of age.

The age range 2-12 represents different periods in the Piagetian theory: preoperational (2-7) and concrete operational (8-12) stages. The literature describes the reasoning of preoperational children as being influenced by what they perceive or see; they believe that the way they see things or the way they want events to turn out corresponds to the way things are in reality. Piaget’s perspective suggests that most preoperational children cannot dissociate the dimensions of their pain because of their presumed difficulty in focusing on more than one dimension or point of view at a time. Within the concrete operational stage, children become able to adopt another person’s perspective and construct mental symbols of the real and imagined world (Piaget & Inhelder, 1969; Piaget, 2001) but are still unable to hypothesize about what “might happen” (Gedaly-Duff, 1991). Moving from one stage to another occurs over a period of time. For example, the concrete operational stage typically begins between 6-8 years of age. The different stages are further subdivided into a pre-conceptual period (2-4 years) and an intuitive period (5-7 years) and are sometimes called the transition periods. Children aged between 3-6 years focus on magical thinking and are less able to distinguish reality from fantasy. As children get older, their cognitive abilities mature and normally they become able to think rationally through “step by step” processes (Gedaly-Duff, 1991). Nevertheless, even if theories describing children’s fear are often associated with a view of the various developmental stages, the most fundamental concern for the health professional is to listen to each individual child rather than being preoccupied with imparting information to him/her. Moreover, professionals have to keep in mind that no ‘standard’ child exists in practice but that each one is an individual formed from his/her own individual experiences.

Interaction and communication between adults and children

The child’s individual experiences navigate learning and thinking within every specific situation (Pramling-Samuelsson & Asplund-Carlsson, 2003). These authors point out

that language is not just an expression of thinking, rather it should be used to determine how we think, talk and learn. For example, when a teacher wants to draw ideas from a group of children, the latter should be given the opportunity to express themselves both visually and verbally, as well as voice their reflections (Pramling-Samuelsson & Asplund-Carlsson, 2003). The dialogue/communication in pre-school/school is a natural and obvious part of the child's daily life in contrast to the 'unknown' world of the hospital, which often subjects the child to unfamiliar people, sometimes imparts incomprehensible information in an unfamiliar environment and sometimes insists on frightening medical investigations. A child's perception and thought processes may vary depending on earlier experiences (Doverborg & Pramling-Samuelsson, 2003; Sommer, 2005), age and maturity (Piaget, 1969; 2001). However, perspectives on children's learning have changed from a view of maturity towards a view encompassing more social and cultural experiences (Doverborg & Pramling-Samuelsson, 2003; Sommer, 2005). This means that when children are confronted with a new situation they can create understanding based on their past experience (Sommer, 2005). If pedagogic activities are devoid of a caring dimension, the pedagogue will be unable to meet and involve the thinking, sensuality and physical constitution of the child and consequently this perspective will be dismissed from being further developed (Johansson & Pramling-Samuelsson, 2001). If we consider the opposite, that health professionals in a caring context do not take pedagogic knowledge into account, this may result in 'uncaring'. In the interaction between pedagogy and the child, the presumption is to share different outlooks on life, even though the inter-subjectivity might be broken. In these meetings there is a possibility for mutual or disparate meanings. From this perspective, and although they do not have an adult conception or frame of experience, children have the same ability to experience meaning(s) (Johansson & Pramling-Samuelsson, 2001).

Child perspective or the child's perspective

Child perspective is a flexible concept that can be used in different ways (Pramling-Samuelsson & Asplund-Carlsson, 2003). If we increase our knowledge of how both children and adults think in terms of the child perspective versus the child's perspective, our ability to interpret each other may give better co-operation and results. There are two different ways in which these two entities may be viewed. The child perspective makes one interested in the child's world and what is best for him/her whereas the child's perspective means listening to what the child says and considering this. An example of taking the "child perspective" may be when an adult wants to do the 'best' for the child based on what the adult knows about the child. From the view of the "child's perspective", the child first has to react and then the adult can interpret this. In trying to clarify these ideas, the following questions may be raised: what do children mean when they are trying to ask for something or explain its meaning? How does thinking change while a child is learning? (Pramling-Samuelsson & Asplund-Carlsson, 2003). Interpreting and understanding a child's perspective and meeting and treating each child on the basis of his/her intention and lifeworld is a challenge. Adults are faced with the children's perspective of how they think and experience the reality they find themselves in and interpreting this is a question of having knowledge of and being sensitive to the expressions of the child and the context in which the child has a place (Johansson & Pramling Samuelsson, 2003).

Children do not have inferior ('worse') thinking than adults but they do think differently. Moreover, children of similar age can perceive and understand 'the same' in different ways. One can assume that this depends on their cognitive developmental stage, their own unique way of reasoning (illogical or logical thoughts), and their experiences of, and ways of coping with surrounding situations. To illustrate this, it is not until around the age of nine that children begin to state that pain is caused by disease, germs, malfunctioning body organs and psychosocial experiences such as missing school and/or being teased (Savendra et al, 1981; Abu-Saad, 1984; Gaffney & Dunne, 1987). For example, one study regarding postoperative pain showed that 5-7 year-old children attributed the cause of abdominal pain/illness to a situation that occurred close to their illness. The majority of children thought that food eaten close to their illness was the cause of their abdominal pain or surgery. Some children thought that the person who was involved or close to their illness was also the cause of it (Wiroonpanich & Strickland, 2004). This indicates that, depending on his/her stage of development, the child might misinterpret the meaning and understanding of perioperative procedures/hospital stay and symptom outcomes. To minimize misinterpretations and incomprehensible experiences of the perioperative procedures, health professionals should be aware of children's thoughts, as well as of their own usage of language, focusing on the child's experiences and development stage throughout the dialogue. For example, how do we explain and take into account age, degrees of illness and anxiety, time perspective and hospital stay to children suffering long-term illness? Or, how do we explain to a child undergoing day surgery that the operation is meaningful, even if the child does not experience symptoms of illness? We cannot under- or overestimate a child's ability to understand, but should give the child the opportunity and the time to express himself/herself. We should also give ourselves time and opportunity to focus on learning and creating understandable dialogues.

The perioperative dialogue (PD)

In Sweden, nurses working in perioperative care are Registered Nurses and academically trained as nurse anaesthetists or theatre nurses. Their responsibilities for anaesthetic and surgical procedures, including 'Perioperative care', are clearly laid down, for nurse anaesthetists (*Description of competence for Registered Nurse with Graduate Diploma in Specialist Nursing—Anaesthesia Care*, 2008, (under revision)). 'Peri' is a prefix, originally from Greek, referring to time in the sense of closest to and around (Hanks, 1979), i.e. the pre-, intra- and post-operative time the nurse anaesthetist/theatre nurse shares with the patient.

In 1978, the concept, 'perioperative nursing care' was introduced in the USA as an alternative to 'operating room nursing'. Initially, it was described as 'the perioperative role', but in 1985 the word 'role' was changed to 'practice' (McGarvey, et al. 2000). 'Perioperative nursing care' was described in Northern Europe much later in 1989 by Panelius and Varisto. Since healthcare is organized and administered differently in the various countries and the education and allocation of responsibility of perioperative nurses differs widely to that of the US, it was necessary to reformulate and adapt the American definition of perioperative care to fit local circumstances. In Sweden, for example, von Post (1999) defined 'perioperative nursing care' in her thesis as perioperative nursing care that includes continuity in the caring process, the perioperative

dialogue, encompasses perioperative nurses' pre- intra- and postoperative dialogue with their patients, as well as safe surgical and anaesthesia treatments and techniques, all in the service of health and life (von Post, 1999; Lindwall & von Post, 2009).

The word 'continuity' is described as a "being in a connected whole" and "an uninterrupted context". Synonyms for continuity include: unimpeded progress, connected sequence, complete belonging, togetherness, unity (Palmér, 1960). Continuity means experiencing a connected whole, independent of space and time. In her thesis, von Post describes continuity as an uninterrupted context in which patient and anaesthetist nurse or theatre nurse embody the connected whole via continuity and dialogue (von Post, 1999). Etymologically, the word 'dialogue' stems from the Greek 'dialogos' meaning 'through the meaning or word'. In modern language, the word 'dialogue' has come to mean a discussion of an important matter between two people. By virtue of Plato and in connection with the teaching methods of Socrates, the dialogue has come to be seen as a didactic discussion in which the subject is largely explored by the individual asking questions in order to come to a deeper and clearer insight. The objective of Socratic dialogue is to elucidate knowledge and insight the participants already have, even though they may not be aware of it (Palmér, 1960).

The PD encompasses the nursing and caring process and concerns nurse anaesthetists or theatre nurses' pre-intra- and postoperative dialogues with 'their' patients in connection with anaesthesia and surgery. This continuity ensures that the patient can be greeted by a familiar face throughout the entire perioperative procedure. The dialogue comprise the various parts of the caring process; an initial explanation to the patient, data analysis, planning, administering treatment and evaluation, all of which allow the patient to influence his/her own care. This means that a particular nurse is responsible for evaluating the entire caring process, including how perioperative nursing care is organised, planned and carried out (von Post, 1999; Lindwall & von Post, 2009). PD is based on a humanistic ontological view of nursing and caring, labeled caritative caring theory (Eriksson, 2002). Its ethos is embedded in the idea of one's duty to think and act in a sensitive manner (Lindwall et al. 2007). The basic idea behind the perioperative dialogue is influenced by Buber's (1988) philosophy of the dialogue based on the sphere of between, created, recreated and developed, in accordance with human interactions being "inter-human meetings".

The PD has been chosen as a complement to standard perioperative care (Figure 1, p. 27) in the studies herein referred to, the intention being to gain access to the children's thoughts, language and experiences and to achieve consistent support and continuity – a connected whole – throughout the perioperative procedure. By extension, a conscious and goal-oriented nursing care based on knowledge, experience and commitment will emerge, one which is developed by reflecting on theory and practice, providing guidelines for perioperative nurses and for the future of perioperative nursing care (Lindwall et al. 2007; Lindwall & von Post, 2009). The ongoing dialogue thus creates the conditions for a genuine meeting between the patient and the perioperative nurse, allowing the latter to create continuity in order to alleviate anxiety and fear that might arise from the administration of anaesthetics and/or surgery. Earlier researchers using the perioperative dialogue have shown how continuity and supporting dialogues by the same nurse anaesthetist during the pre- intra- and postoperative procedures

improved confidence in children and helped them to manage their fear of anaesthesia. Being able to work this way seems to impact positively on both children's (Lindberg & von Post; 2006) and adults' (Rudolfsson et al. 2003) confidence, well-being and recovery. Different steps of pre- intra- and postoperative procedure are carried out in order to support the children/parents during their hospital stay (exemplified in Figure 1).

Preoperative dialogue	Intraoperative dialogue	Postoperative dialogue	Outcome in clinical practice
<ul style="list-style-type: none"> • interpersonal interactions, trustful negotiations and mutual loyalties with the nurse anaesthetist in terms of 'what to do' within the perioperative procedures • listen to the child's questions, thoughts, language, needs, expectations and experiences • improve the child's control, confidence and trust • help the child to gain a sense of control to endure the unknown, often distressing, situation 	<ul style="list-style-type: none"> • an on-going dialogue with the <i>same</i> nurse anaesthetist • prepare for anaesthesia and surgery 	<ul style="list-style-type: none"> • the <i>same</i> nurse anaesthetist evaluates the child's experiences through the perioperative procedure • enable the child to reflect and evaluate his/her experiences at the hospital 	<ul style="list-style-type: none"> • the pre- intra and postoperative dialogues create conditions for consistent meetings, knowledge and continuity in evaluating children's nursing

Figure 1. Steps of 'the perioperative dialogue' with children going through day surgery, with the aim of creating continuity in children's nursing.

RATIONALE

The general rationale underpinning this thesis is the importance of describing and gaining a deeper understanding of how children experience their situation and express their symptoms when attending hospital for day surgery.

Hospitalization, treatment and examination are sometimes dramatic events for children. However, most visits proceed smoothly without major problems, although some procedures cause anxiety and/or fear in children. These frightening events could be viewed as included in a transition from what is familiar to the child, to the unfamiliar, unknown, and sometimes even daunting environment. Reducing experienced stress, anxiety and/or fear in children during medical and perioperative procedures is important for several reasons. Firstly, it is difficult to perform any procedure (e.g. conducting examinations or administering injections) if the child is scared and upset. Secondly, in the case of invasive procedures such as accessing a vein for an infusion (venipuncture), induction of anaesthesia, performing suture removing or surgical treatment in local anaesthesia, if the child is kicking and flailing (i.e. exhibiting distress-related behaviours) the risk of accidental injury to the child is increased. Thirdly, struggling with an upset child can increase the stress experienced by the parent(s) as well as the health professionals. To illustrate, Manne et al. (1990) state that health professionals who repeatedly conduct invasive procedures on children (e.g. in cancer treatment units) find that the stress involved in such procedures contributes to job dissatisfaction. Negative hospital experiences create negative expectations within the child towards health professionals and medical settings. By extension, this may affect future attitudes towards health care negatively. Anderson and Masur (1983) argue that distress in itself interferes with physical recovery from medical procedures. For example, Glaser et al. (1999) concluded that stress delays wound healing because psychological stress has measurable effects on pro-inflammatory cytokine production in the local wound environment.

Vague threats are found to be more upsetting than known and understood threats, and unexpected stress is found to be more upsetting than expected stress (Vernon et al. 1965; Edwinsson-Månsson et al. 1992; Fortier, 2009). In addition, anticipation of anaesthesia and surgery results in neuro-immuno-endocrinological changes, leading to the hypothesis that blocking the preoperative behavioural stress response can affect the overall perioperative physiological stress response (Kain et al. 1999). Studies have also shown that reduced preoperative stress can aid sleep and lessen the need for pain medication in children recovering from surgery (Kain et al. 2006; Nilsson et al. 2009).

Children are dependent on their parents (or significant others), not least when undergoing medical treatments and examination procedures. Health professionals in perioperative care must consequently do their utmost to prevent anxiety through consistent support, trust and comprehending dialogues with children *and* their parent(s) (Janniste et al. 2007; Blount et al. 2009). Thus, a mutual goal of 'successfully' building bridges between health professionals and children undergoing surgery and care is a challenge for nursing practice and research. Perioperative dialogues are assumed to facilitate health professionals' learning of how to better acquaint children and their

parents with unfamiliar situations. This includes learning and awareness of the unique child's thinking, language, developmental levels and reactions to stressful events. Appropriate psychological support in connection to surgery is thus important in reducing anxiety and stress in both children and their parents.

AIMS OF THE THESIS

The overall aim of the present thesis was to gain a deeper understanding of 3-11 year-old children's perioperative symptoms, signs, experiences and main concerns when attending hospital for day surgery and of how they manage these situations.

The specific aims were:

Paper I

To investigate how small boys between 3 and 6 years of age describe bodily and verbal expressions of postoperative symptoms.

Paper II

To explore what it means for children to attend hospital for day surgery.

Paper III

To test the psychometric properties of the Swedish version of the Child Drawing: Hospital Manual.

Paper IV

To evaluate the efficacy of 'the perioperative dialogue' by analysing salivary cortisol in 5-11 year-old children undergoing day surgery.

Paper V

To explore the association between objective measures of stress (i.e. cortisol in saliva) and subjective assessment of hospital anxiety (i.e. children's drawings) interpreted by the Swedish version of the CD:H Manual.

Perspective

From the viewpoint of nursing science, the aim was to describe, explain and understand the subjective and objective 'expressions' of children undergoing day surgery, and thereby gain a child's perspective on the experience. The research approach involves both qualitative and quantitative methodology, the former including descriptive (*paper I*) and theory-generating (*paper II*) attempts whereas the quantitative methodology involves comparisons between groups (*paper IV-V*) and psychometric evaluation of a measurement (*paper III*). The multi-method design (Morse, 2002) was applied to enhance the understanding of the situation for children undergoing perioperative procedures and day surgery.

METHODS

Designs

This thesis includes a descriptive qualitative study, a theory-generating study, a comparative study, a correlational study and a psychometric evaluation of an American instrument (assessing hospital anxiety) translated into Swedish. The entire research project is focused on children's experiences, symptoms and signs in connection to day surgery. In order to gain as broad an understanding as possible, both inductive and deductive methods were used; i.e. qualitative analyses were used in *papers I-II* and quantitative analyses in *papers III-V* (Table 1). The data was collected through interviews and drawings and by more 'objective' methods such as participant observation

Table 1. An overview of the aims, designs, data collections, samples and analysis

Paper	Aim	Design	Data collection	Sample	Analysis
I	To investigate how boys between 3 and 6 years of age describe bodily and verbal expressions of postoperative symptoms	Qualitative approach Descriptive study	Participant observations, pre-and postoperative semi-structured interviews	A sample of 14 boys aged 3-6 undergoing undescended testis surgery	Qualitative analysis
II	To explore what it means for children to attend hospital for day surgery	Theory-generating approach – grounded theory	Pre - and postoperative semi-structured interviews, Participant observations. Children's drawings	A sample of 20 children, 6-9 years of age undergoing day surgery	Constant comparative analysis in line with grounded theory methodology
III	To test the psychometric properties of the Swedish version of the Child Drawing: Hospital Manual (CD:H)	Translation of the CH:D manual into Swedish and psychometric testing (inter-rater reliability, construct validity and internal consistency reliability)	Drawings from children undergoing day surgery and drawings from school children	A sample of 59 children, 5-11 years old, undergoing day surgery and a sample of 71 school children, 5-11 years of age	Inter-rater reliability, internal consistency reliability and construct validity. Comparison of anxiety levels between groups
IV	To evaluate the efficacy of 'the perioperative dialogue' by analysing salivary cortisol, in 5-11 year- old children undergoing day surgery	Comparative study between Swedish and groups: 1) standard perioperative care (control group). 2) standard perioperative care including preoperative information 3) the perioperative dialogue	Pre-perioperative measurement of cortisol concentration in saliva, assessment of postoperative pain, use of morphine consumption and duration of hospital care at the PACU in three groups of children with differing nursing care conditions	A sample of 93 children, 5-11 year old children undergoing day surgery	Comparisons of stress (cortisol concentration levels), postoperative pain, morphine consumption and duration at PACU between the three groups
V	To explore the association between objective measures of stress (i.e. cortisol in saliva) and subjective assessment of hospital anxiety (i.e. children's drawings) interpreted by the Swedish version of the CD:H Manual	Correlational study	Cortisol concentration in saliva and drawings assessing hospital anxiety from children undergoing day surgery (interpreted in line with the Swedish version of the CD: H)	A sample of 93, 5-11 year-old children undergoing day surgery	Association between objective measures of stress (cortisol in saliva) and subjective assessment of hospital anxiety (child drawing) using the Swedish version of the CD:H

of bodily expressions, and saliva cortisol was measured as a biological stress indicator. Correlations between the variables and comparison between groups of children undergoing day surgery under different perioperative nursing conditions were made (i.e. perioperative dialogue, standard perioperative care with and without preoperative information). Associations between cortisol concentrations in saliva and levels of hospital anxiety as measured by the Swedish version of the Child Drawing: Hospital Manual (scorings of children's drawings) were investigated. The assumption of these studies was that a combination of qualitative and quantitative approaches would broaden the perspective and allow the child's point of view to be in focus. This would also facilitate a deeper understanding of the children's experiences, symptoms and signs during day surgery.

Settings

The studies were conducted at the outpatient surgery department, operating theatre, PACU and the children's day ward, Skaraborg Hospital, Sweden. Skaraborg Hospital serves a population of 2 050 children (aged 0-18) undergoing surgery each year, 1 670 (81%) of whom are treated within day surgery. In addition, 58% of these consist of boys (registered data from Fenix, 2009). The studies were performed over the period 2003-2010 and utilized empirical data collections from children aged 3-11, admitted for day surgery, A group of school children in the same community as the hospital was also included (*paper III*).

Participants

In total, 127 children scheduled for elective day surgery under general anaesthesia, were requested to participate. The causes for surgery were inguinal hernia, hydrocele, phimosis, undescended testis, proctoscopy, excision of naevus and strabismus. The children were consecutively called from the waiting list to the outpatient surgery department by the secretary in charge of patient recruitment and judged eligible for a surgical procedure by the surgeon.

In Paper I, 14 boys aged between 3-6 (mean age 46 months or 3.8 years) were interviewed and observed in order to describe their bodily and verbal expressions of postoperative symptoms.

In Paper II, 20 children (15 boys and 5 girls) aged between 6-9 (mean age 87 months or 7.3 years) were interviewed about their expectations and experiences in regard to the perioperative procedures. In addition, they were requested to make drawings of their expectations and experiences related to the hospital stay, before and after the surgery.

In paper III, The Child Drawing: Hospital Manual (CD:H) was translated into Swedish, psychometrically evaluated and used to assess hospital anxiety in 59 children aged 5-11 (50 boys and 9 girls) undergoing day surgery. A comparison group of healthy 5-11 year old children in school was used (n=71, 45 girls and 26 boys).

In Paper IV, 93 children aged between 5-11 (79 boys and 14 girls) were included in order to investigate their levels of hospital stress while undergoing day surgery – a comparison of effects between different perioperative nursing care conditions: *Group 1*) standard perioperative care, *Group 2*) standard perioperative care including preoperative information, and *Group 3*) the perioperative dialogue (PD). The mean age was 91 months (7.5 years).

In paper V, 93 children aged between 5-11 (79 boys and 14 girls) were included in order to investigate the association between objective measures of stress (cortisol in saliva) and subjective assessment of hospital anxiety (children's drawings). The mean age of the children was 91 months (7.5 years).

Papers III-V are based on the same sample of children, apart from the control group in *paper III*, which was excluded because the children in this group had not received any information preoperatively at the outpatient surgery department. Moreover, in *paper III*, the day surgery children were not equal in terms of age and gender when compared with the school children. To reduce this skewness we conducted a matching procedure that resulted in 35 pairs of children.

Inclusion criteria

The inclusion criteria for sampling informants for studies I-V were that the child (1) was between 3-11 years old (2) was scheduled for elective day surgery under general anaesthesia, and that (3) their general condition was classified as ASA I-II. The American Society of Anaesthesiologists (ASA) classifies patients with a number of grades according to their general condition (Owens et al. 1978) as follows:

Class I	normally healthy patient
Class II	patient with mild systemic disease
Class III	patient with severe systemic disease that is not incapacitating
Class IV	patient with an incapacitating systemic disease that is a constant threat to life
Class V	moribund patient who is not expected to survive for 24 hours with or without operation

Data collection and procedure

Papers I and II

Without any preconceived hypotheses and theories, qualitative methods guided the research process in order to explore and gain a deeper understanding of the children's expressions of postoperative symptoms, as well as their expectations and experiences when attending hospital for day surgery. *Paper I* included simultaneous data generation and a qualitative analysis was done, inspired by some of the steps included in guidelines for grounded theory (GT). In *paper II*, GT methodology described by Glaser and Strauss (1967) and Charmaz (2000; 2006) was chosen. Multiple methods

of data collection were employed in *papers I and II* including participant observations, tape-recorded semi-structured interviews, field-notes and in *paper II*, pre- and postoperative drawings. The different data collection methods were chosen according to the children's expressions of postoperative symptoms as well as their expectations and experiences of the perioperative procedure. In *paper I*, the participant observation method was the primary source of data to describe the bodily and verbal expression of symptoms postoperatively. In *paper II*, semi-structured interviews with children were conducted, with the aim of exploring what attending hospital for day surgery means to them, their main concerns and their management of the situation. The children also generated data through drawings from their hospital stay.

In both studies *I and II*, one 15-20 minute tape-recorded interview was held with each child to obtain information about their experiences of pain, nausea, mood, earlier and present hospital care. The interviews were carried out three times with each child: preoperatively at the outpatient surgery department, on the day of surgery and finally, postoperatively at the PACU. When a child had a scheduled postoperative visit to the surgeon (having undergone strabismus surgery), the interview was conducted at the clinic within two weeks of the operation. To achieve a description of the children's emotional status that reflected their own views, the W-B scale was used as a 'communicative bridge', as well as a tool to assess their mood. This was initiated by asking the child to point out the face that most resembled the way they felt: "Which one of these faces do you feel like right now?" When the child had pointed to the face he/she identified with, a follow-up question was asked: "How does that feel then?"

In *paper I*, the whole perioperative procedure took up to eight hours after surgery. Postoperatively, the children's bodily and verbal expressions were observed and documented continuously although the number of observations per child varied according to their condition. Pain was assessed continuously by using the W-B scale and the four first assessments were included in the analysis. PONV was assessed by measuring the degree of nausea and the frequency of vomiting and retching. The purpose of the semi-structured interview was to gain a deeper insight into how young children experience and report postoperative symptoms. The interview included the following question: "How do you feel right now?" Depending on the child's answer, relevant follow-up questions were asked, for example, "How much pain do you have?" and "What do you mean by saying I don't know how I feel?".

In *paper II*, preoperatively at the outpatient surgery department as well as on the day of surgery, the interviews with the children started with the question, "What was it like coming to the hospital today?" Depending on the child's answer, relevant follow-up questions were asked. The children were also requested to draw a picture of their expectations of their imminent hospital stay and to bring the pictures back on the day of surgery. In order to stimulate the children's thinking and actions related to their hospital stay, they were shown a picture book illustrating the perioperative procedure. Based on the content of the pictures in this book, I (as a nurse anaesthetist) described an electrocardiogram, intravenous catheter, oxygen mask, pulse oximeter, local anaesthetic ointment (EMLA), the W-B scale, and the reason for giving postoperative analgesics and/or anti-emetics.

Paper III

The CD:H Manual (Clathworthy et al. 1999b) was translated into Swedish in line with WHO guidelines, a routine procedure for the translation of foreign instruments (http://www.who.int/substance_abuse/research_tools/translation/en/index.html). The following stages were undergone: (1) The CD:H was independently translated into Swedish by three researchers (BW, LH and IB). (2) The three translations were compared to each other and differences between translations were discussed until a final version was agreed upon. (3) In order to confirm the meaning of the original CD:H, the final Swedish version was translated back into English by a bilingual and authorized translator and compared to the original version of the CD:H. (4) Finally, a Swedish version of the CD:H was agreed upon (appendix 1 and 2), employing a psychometric design, testing the Swedish version in terms of inter-rater reliability, construct validity and internal consistency reliability. Drawings done by children undergoing day surgery were collected by BW at the outpatient surgery department 1–5 weeks before the day of surgery. The children were called consecutively from the waiting list by the secretary and judged eligible for a surgical procedure by the surgeon in charge. Drawings done by a comparison group of healthy school children in class were collected by BW. The teacher was present in the classroom but not involved in the data collection of the drawings. All drawings were analysed and scored in line with the instructions for the CD:H by the same five individuals.

The drawing procedure according to the Swedish version of CD:H

The equipment needed to administer the CD:H manual consists of a blank 8½ x 11 inch sheet of white paper and a box of eight basic-coloured crayons (red, purple, blue, green, yellow, orange, black and brown). The child was given the sheet of paper and the box of crayons. The sheet of paper was placed in front of the child at an angle, in order to allow the direction of the drawing on the paper to be determined by the child alone. The box of crayons was opened, exposing all of the colours available. The child was instructed: “Please draw a picture of a person at the hospital. I will look after your picture when you are finished.” This was all the information the child was given. The drawing was collected when the child indicated verbally or by gesture that he/she was finished. No time limit was given for completion. All the children in the same sample completed their drawings in comparable time frames (5-10 minutes) and under the same circumstances.

Paper IV

This comparative study was aimed at investigating stress in 5-11 year old children during the perioperative period (including the preoperative visit at the outpatient surgery department). One-five weeks before the day of surgery at the outpatient surgery department, BW randomly assigned the children to either Group 1: Control group (standard perioperative care without preoperative information), Group 2: (intervention group 1) standard perioperative care including preoperative information and Group 3: (intervention group 2) the perioperative dialogue (including preoperative information).

Standard perioperative care

The standard procedures for children undergoing day surgery, i.e. surgeries for which the child is admitted and discharged from the hospital in a single day, are briefly described below. These surgeries, which often require general anaesthesia, presuppose that the child has been examined and remitted for an operation by a surgeon at the outpatient surgery department several weeks before the day of surgery. On this occasion, no anaesthesiologist or nurse anaesthetist is present to communicate with the child about the different perioperative and/or medical procedures. In Swedish public healthcare, standard perioperative care for day surgery of children involves the nurse anaesthetist (whoever is available) meeting the patient and carrying out the intraoperative care about 20-30 minutes before the induction of the anaesthesia. Postoperative care is given by another nurse. Parental presence during the induction of anaesthesia in children is almost standard routine in Swedish hospital policy.

The three study groups

Group 1: Standard perioperative care (control group) (n=31)

Preoperatively at the outpatient surgery department

Saliva cortisol was sampled but no preoperative information was given.

Preoperatively on the day of surgery

An available nurse anaesthetist at the PACU/day-care ward, gave preoperative information* to the child. Saliva cortisol was sampled after this 'communication session' as well as just before the induction of anaesthesia.

Postoperatively at the PACU

Saliva was sampled when the child expressed willingness to cooperate (30-90 minutes after arrival).

Group 2: Standard perioperative care including preoperative information (n=31)

Since several studies claim that preoperative information reduces anxiety in children undergoing surgery (Watson & Visram, 2003; Jaaniste et al. 2007; Fortier et al. 2009) one group included standard perioperative care plus preoperative information*.

Preoperatively at the outpatient surgery department

Preoperative information* was given at this early stage to allow the child adequate time to understand and reflect on 'what was going to happen' up to and on the day of surgery. Saliva was sampled after this 'communication session'.

Pre as well as postoperatively on the day of surgery

The child was cared for as in Group 1 (see standard perioperative care - control group).

Group 3: Perioperative dialogue, PD (n=31)

PD is a model (exemplified in Figure 1, p. 27) and a complement to standard perioperative nursing care: the patient meets the *same* nurse anaesthetist for a pre- and intraoperative dialogue in the operating department and after surgery. To give the child

both continuity, (i.e. a 'familiar face' with whom they meet up on the day of surgery) and adequate time to understand and reflect on 'what is going to happen' up to and on the day of surgery, the PD had already been conducted at the outpatient surgery department. The different steps of the procedure, including provision of preoperative information*, were conducted by BW.

Preoperatively at the outpatient surgery department

Preoperative information* was given and saliva sampled after this 'communication session'.

Preoperatively on the day of surgery at the PACU/day ward

The children met the same nurse anaesthetist (BW) and were once again informed about the perioperative procedures*. Saliva was sampled after this second 'communication session' as well as within the operation theatre just before the induction of anaesthesia.

Postoperatively at the PACU

Saliva was sampled (see standard perioperative care, control group).

Paper V

Saliva cortisol is an easy-to-collect marker of stress and has emerged in pediatric research to assess stress and responses to stressful stimuli. A correlational study design was chosen to investigate the association between objective measures of stress (cortisol in saliva) and subjective assessment of anxiety (children's drawings) using the Swedish version of the CD:H.

Preoperatively at the outpatient surgery department

One-five weeks before the day of surgery, BW assigned the children to the study. The W-B scale was used to assess the children's mood at that specific time, the assessment being initiated by asking the child to point out the face that resembled how he/she felt and by asking "Which one of these faces do you feel like right now?" and a follow-up question, "How does that feel then?" after the child had pointed to the face he/she identified with. Saliva for cortisol analysis was obtained after this 'communication' session. The children were then asked to draw a picture of a person at the hospital in order for an interpretation of the child's anxiety according to the Swedish CD:H Manual to be made.

Preoperatively on the day of surgery

The same procedures were undertaken at the PACU/day ward as at the outpatient surgery department.

*The children were informed verbally and by using a book with pictures illustrating the perioperative procedures: electrocardiogram, intravenous catheter, clothes, Lidocaine-Prilocaine Emulsion (EMLA), pulse oximeter etc. The child was also shown how to use the W-B scale and told why postoperative analgesics and anti-emetics might be given.

Measurements and instruments (I-V)

The Wong-Baker [FACES] Pain Rating Scale (W-B scale) (I-II, IV-V)

One of the most widely used and validated faces pain scales is considered to be the W-B scale, also preferred by children themselves (Tomlinson et al. 2010). The W-B scale was originally developed to assess postoperative pain in children of 3 years or older (Wong & Baker, 1988). In all studies in this thesis (except in study III) both at the outpatient surgery department and preoperatively the day of surgery, the W-B scale was used to achieve a description of the child's mood. Postoperatively it was used to assess pain. The six faces on the scale are scored from 0 to 5 and intend to correspond with the child's experiences of pain at that moment (Figure 2).



Figure 2. Wong-Baker [FACES] Pain Rating Scale. Reprinted with kind permission from Hockenberry, M.J. & Wilson, D. (2009). *Wong's Essentials of Pediatric Nursing* (ed. 8), St. Louis: Mosby. Copyright Mosby.

Saliva sampling (IV and V)

A repeated measurement design was used to monitor intra- and inter-individual differences of cortisol concentration in saliva. Samples were taken at the following times: *paper IV* 1) at the outpatient surgery department, 2) when attending hospital on the day of surgery, 3) before the induction of anaesthesia and 4) at the recovery at the PACU. In *paper V* 1) at the outpatient surgery department and 2) when attending hospital on the day of surgery. Cotton based neutral Salivette tubes (Sarstedt™ Landskrona, Sweden) were used. A swab was chewed and then placed in a sterile plastic tube. The Salivette tubes were then centrifuged at 1711G for 15 minutes at 20° C and then frozen at minus 80° C until assayed simultaneously. A commercial radioimmunoassay based technique for salivary cortisol was used (Spectria™ Cortisol I¹²⁵, Landskrona, Sweden).

The Swedish version of the CD:H manual (III)

The Child Drawing: Hospital Manual was translated into Swedish and used as a measurement tool in order to quantify anxiety based on scorings of children's drawings. The CD:H consists of three parts (Parts A, B and C). The inter-rater reliability for five independent scorers was high ($p < 0.001$) for all three parts (A-C), but somewhat lower for part C where intra-class correlations (i.e. correlations between raters) varied between 0.57 ($p < 0.01$) and 0.72 ($p < 0.001$). Cronbach's alpha was 0.77, indicating good internal consistency in Part A. Parts A and C, as well as the total scale score of the

CD:H showed an adequate construct validity and discriminated between a group of children undergoing day surgery and a comparison group of school children concerning level of anxiety.

Part A contains 14 items that are scored on a scale ranging from 1 (lowest level of anxiety) to 10 (highest level of anxiety) and concern the following characteristics in the drawing: position, action, length of person, width of person related to length, facial expression, eyes, size of person compared to environment, colour predominance, colour number used, use of paper, placement of paper, strokes quality, presence of hospital equipment, and developmental level. Maximum score for Part A is 140 points.

Part B contains 8 items of pathological indices such as omission or distortion of body parts (higher levels of anxiety). The first 3 items (if present) are given 5 points each (maximum 15 points). The remaining 5 items are given 10 points each (maximum 50 points). For example, omission of one body part results in 5 points and distortion of bodily figures result in 10 points. Maximum score for Part B is 65 points.

Part C is scored on a continuous scale (1-10). Identifiers are provided at certain points along the scale to anchor it. This is similar to most of the items in Part A, which have identifiers for some points but not all. The intention is to guide the scorer, not bind them. Part C is a "Gestalt" rating and an overall response of the child's anxiety as expressed in the drawing. Four choices are possible: "Coping" gives about 1-4 points; "light stress" gives about 5 points, "stressed" gives about 8 points and being "disturbed" gives 10 points. The total score of the CD:H can vary between 15 to 215 points. Scorings of ≤ 43 indicate very low anxiety level, 44-83 low anxiety level, 84-129 average anxiety level, while 130-167 indicate above-average and ≥ 168 very high anxiety levels.

Data analysis

Papers I and II

Grounded theory (GT), also referred to as the constant comparative method of analysis (Glaser & Strauss, 1967), has its theoretical roots mainly in symbolic interactionism. This social-psychological perspective involves the idea that meaning is derived from and modified through interactions with other people (Blumer, 1969). In a GT study, "all is data" according to Glaser (2001, p. 145). Glaser seems to assume a "real reality" and a neutral researcher in his description of an emerging GT, i.e. an objectivist grounded theory (Hallberg, 2006). Charmaz (2006) argues that researchers have to enter the world they are studying and "learn from the inside". Charmaz means that grounded theories are constructed by subjects and that the construction of a GT is influenced by on-going interactions between the people involved in the research process. Her perspective relies on the pragmatic philosophical tradition informed by symbolic interactionism, assuming a relativist ontology that implies that there are multiple realities rather than only one "real reality", i.e. constructivist GT. This means that objectivist and constructivist grounded theory relies on differing ontological and epistemological viewpoints. Exploring a research area where theories are sparse or

lacking or bringing a fresh perspective to a familiar field are strong motives for using GT. This infers that hypotheses and concepts not *only* emanate from empirical data but are constructed in an interactional process between data and researcher during the course of the research. Data in *paper I* in this thesis is based on participant observations, interviews, field notes and also (in *paper II*) children's drawings of their hospital stay. The interviews were tape-recorded and transcribed verbatim.

Paper I

Data, participant observations and interviews were collected and analysed in a simultaneous process, the emerging results guiding the direction of subsequent data collection. In GT, this procedure is called theoretical sampling and continues until saturation of the categories is met, i.e. when new data does not add new information, the data collection is terminated (Glaser & Strauss, 1967). The aim of theoretical sampling is thus not to increase the number of informants, rather it is to obtain as thick descriptions as possible of the emerging categories. The analysis in *paper I* started with open coding of the postoperative observations of bodily and verbal expressions of symptoms. These initial codes were labelled concretely and were continuously compared with each other so that similar incidents were given the same label. All expressions were grouped into domains, which later on formed several subdomains. The children's bodily expressions (e.g. vomiting, paleness and hyperventilation) were labelled in line with their verbal expressions (e.g. verbal: "I have pain", bodily: the child is vomiting). Memos were written throughout the study.

In the participant observations of the children's bodily and verbal expressions, the researchers focused on and analysed the data based on the initial interpretations of symptoms and symptom outcomes. Several questions were formulated to support this analysis process: "What does the child actually say?", "How does the child say it?", "How does the child look?" "What does this lead to?" Codes were formulated on the basis of the content in the data, which were different postoperative symptoms and their consequences. The concepts were then compared and grouped into domains according to similarities. The creation of domains and subdomains added to the understanding of the children's postoperative experiences. This was done by trying to map out events and incidents that reflected the researchers' interpretation of the children's expressions. Making comparisons between what the children said and what they did also meant that the groups were based on the implicit meaning in the data. However, the analysis neither included a systematic exploration of relationships between categories, nor an identification of a core category, and should therefore be seen as being inspired by guidelines for grounded theory.

Paper II

The research questions in *paper II* were: "What is the main problem for 6-9 year-old children undergoing day surgery in a context of perioperative dialogues?" and "What are they doing to manage this situation?" The fundamental principles of GT were applied, i.e. hierarchical analysis, open coding, constant comparisons, theoretical sampling, and theoretical coding. The primary aim was to generate concepts, hypotheses

or a theory grounded in empirical data. Initially, open coding was performed and substantive codes were identified in the data. Codes with similar meaning were clustered into higher order categories. Properties and dimensions of the categories were then identified and relations between categories were explored. Theoretical sampling was done late in the simultaneous process of collection and analysis of data, the emerging results subsequently directing which information was sought. Theoretical sampling continued until saturation of all categories was met. Accordingly, theoretical sampling aimed at saturating each category rather than increasing the study sample. Finally, a core category was identified and relationships between the core category and the other categories were ensured. Memo-writing, an important part of GT, took place throughout the entire data collection and analysis process.

The children's drawings were regarded as a valuable complement to the interviews and observations. Preoperatively (at the outpatient surgery department) the children were requested to draw a picture of their expectations of the planned hospital procedure and to bring the pictures back on the day of surgery. Preoperatively (on the day of surgery), when discussing the drawing with the children the questions asked were: "What do we see here?" "What did you feel when you drew this?" Postoperatively, children most often felt tired or 'not in the mood', so they did their drawings at home and returned them by post. A follow-up interview was conducted by telephone upon receiving the drawing by post. Before the telephone call, the child was sent a copy of the drawing to remind him/her what it was about. The drawing was discussed in this interview, starting with the questions: "What do we see here?" "What did you feel when you drew this?" "What were your experiences of being at the hospital?" "What was the worst/best thing you experienced during your hospital stay?"

Paper III

Frequencies and percentages were calculated for categorical variables, and means and standard deviations (SDs) for continuous variables. Descriptive statistics were used to characterize the sample. In an attempt to investigate the construct validity of the Swedish version of the CD:H, and as we were dealing with ordinal data, we compared item scores for the day surgery group and a group of school children by using a non-parametric test, the Mann-Whitney U-test (step 1). When comparing categorical variables, a chi-square test was used. If chi-square was inappropriate due to small subgroups, Fisher's exact test was used. Inter-rater reliability was assessed using intra-class correlation (ICC). Internal consistency reliability (Part A) was assessed using Cronbach's alpha reliability coefficient. The rationale for internal consistency is that the individual items or indicators of the scale would all be assessing different aspects of the same construct and thus be inter-correlated. To determine the different items, the subscale and total score importance in discriminating the two groups in regard to anxiety, a logistic regression model was applied in which the independent variables were the CD:H scores and the study group was the dependent variable (step 2). To adjust for different age and sex distributions between the groups, we included variables for age and sex in the model. The variables were first tested one at a time in a univariate model and those which turned out as statistically significant were included in a

multiple logistic regression model (step 3). To verify results with a stricter method in regard to differences in age and sex distribution, we also used conditional logistic regression with 35 pairs of children matched for sex and age (one child from the school group and one child from hospital group) with a tolerance of 12 months (step 4). The statistical analyses were performed using the Statistical Package for Social Scientists (SPSS, version 15.0). All tests were two-tailed and statistical significance was set at 5% level.

Paper IV

Descriptive statistics for salivary cortisol and for different covariates are presented. Statistical comparisons of saliva cortisol concentrations were made using non-parametric tests. For comparisons between the groups, Kruskal-Wallis, Chi-square and Mann-Whitney U-tests were used and for comparison within a group over time, Wilcoxon's test was used. To test for differences in trend over time between the groups, we used an ANOVA with repeated measurements module, where the logarithm of cortisol concentrations was used to reduce skewness of the data distribution. In this model, the difference in trend over time was tested by looking at the interaction between the group and time point for measurement (group×time point). When exploring the decreasing trends of cortisol, "attending day surgery" was used as the baseline level, and a stratified analysis was conducted to control for some types of surgeries. Spearman's correlation coefficients were presented when correlation analysis was used, the statistical analyses being performed with SPSS (version 18.0).

Paper V

Paper V was compiled in order to explore the association between psychological and physiological stress indicators. It is argued that there is a covariance between psychological and endocrine responses to stress (Schlotz et al. 2008), making it reasonable to believe that there is a connection between stress and anxiety. Salivary cortisol has emerged in pediatric research to evaluate stress (Hanrahan et al. 2006) and drawings interpreted by the CD:H manual have been claimed to assess anxiety in hospitalized children (Clathworthy et al. 1999b). The data obtained can contribute to our understanding of children's responses to stressful events and our ability to determine effective interventions. As the saliva concentration has a skewed distribution and items within the Swedish version of the CD:H are of the ordinal data level, we used Spearman's correlation coefficient to explore possible correlations between the saliva cortisol concentration and the CD:H score. The comparison of variables between assessments at the outpatient surgery department and on the day of surgery was conducted using a Wilcoxon signed rank test for related samples. To compare the distribution of the CD:H score with the corresponding distribution among school children (*paper III*) the calculated percentiles were based on the CD:H distribution for Swedish school children and used as boundaries for reference intervals (Figure 6). The statistical analyses were performed using the SPSS (version 18.0). All tests were two-tailed and statistical significance was set at the 5% level.

ETHICAL CONSIDERATIONS

There has been growing concern about the rights of young children involved in research projects. Not only regarding the protection of children but also regarding respectful ways of researching with them rather than on them. The approach of “listening to children’s thoughts and voices” therefore involved us in ethical considerations such as the ethical responsibility of healthcare providers to address children in a manner that they can comprehend cognitively. This is of paramount importance. According to Swedish law (SFS 2003: 460) children under the age of 15 should, as far as possible, be informed about the research project. Although the parents may have agreed to participate, it cannot be performed if the child <15 realises the personal implications, and refuses to participate. Obtaining a child’s agreement to participate in research projects should be carefully planned and implemented. Developmental limitations, the imbalance of power between children, parents and healthcare professionals and, in some cases, their compromised health status, can influence their willingness to participate. Researchers must consequently give the child an honest and understandable description of the research project, taking the child’s age into consideration.

Ethical considerations in the present studies concerned child and parent autonomy, obtaining written and oral informed consent from the parents, obtaining age-appropriate written (5-11 year olds signing with given name) and dialogued assent from the children, and the risk of causing emotional injury through data collection. Parents and children who decided to participate in the study were informed of their right to end their participation at any time and were guaranteed that this would not affect present and/or future treatment and care in any way. The school children’s parents were informed about the study both verbally and in written form at a parent–teacher meeting. At this meeting, consent for participation was also obtained. A dialogued assent from the children was obtained in the classroom on the same day as the drawings were made. Both parents and children were informed about their right to end their participation at any time without declaring any reason for termination. The project was approved by the Research Ethics Committee at Gothenburg University (Paper I: Ö- 452-02, Paper II: 359-05, Paper III, IV and V: 540-06).

RESULTS

The findings from the five studies in the thesis are based on a multi-method design, meaning that both qualitative studies (studies I-II) and quantitative studies (studies III-V) are included.

Bodily and verbal expressions of postoperative symptoms (Study I)

Paper I provided descriptions of how boys aged 3-6 bodily and verbally express and respond to postoperative symptoms up to eight hours after surgery. These domains and subdomains, are summarized in Table 2 and 3. For boys of this age, it seems to be difficult to distinguish between pain, nausea and distress and they also have different ways of expressing these symptoms. The boys also had difficulties in ‘putting’ words to which symptoms were the most troublesome to them. One important aspect (and perhaps the main purpose) of symptom assessment might be not only to identify specific symptoms but also to recognize degrees of distress in a particular child at a particular time. With a few exceptions, neither bodily nor verbal expressions were clearly related to pain or nausea. However, depictions of being stiff as a poker, with high muscular tonus and drawn-up legs tended to be related to pain, while tossing, turning and restlessness/fidgeting were related to both pain and nausea. The word ‘pain’ was more frequently used when the child had difficulties in describing the experienced symptoms. As an example, some children who expressed pain vomited

Table 2. Domains of Bodily Expressions of Postoperative Symptoms

Domain	Emetic problems	Skin	Breathing patterns	Facial expressions	Changing in activity pattern	Search for distraction	Interpersonal reactions
Subdomains	Vomiting Retching Nausea Increased salivation	Paleness Cold sweat Rosy Warm skin	Sighs Hyperventilation	Smiling Grimacing	Toss and turn Restlessness/fidgeting Drawn-up legs Stiff as a poker/ increasing tonus Relaxed Move without pain Indolent/Drowsy	Pulls at his willie Drinking	Cooperation Withdrawal Quiet Searching for contact Playful

Table 3. Domains of Verbal Expressions of Postoperative Symptoms

Domain	Pain	Discomfort	Emetic problems	Uncertainty	Searching for well-being	Nonverbal utterance	Physiological needs	Interpersonal reactions
Subdomains	Overall pain	Difficulties	Vomiting	Inability to describe the situation Lack of context	Escaping the situation	Crying	Drinking	Trust
	Demarcating the pain localization Separating the pain localization	Unpleasantness	Nausea	Visual fear	Searching for activity Searching for comfort	Screaming Grumbling Whimpering	Eating Urinating	Pride Withdrawal Quiet Playful

later on, whereas others just recovered and were content to sit on their parent's knee. Postoperatively, excessive begging for something to drink was a common need and seemed to be a way of coping with an indescribable overall feeling of discomfort. Frequently, this drinking resulted in vomiting. The children used the W-B scale in different ways when they estimated their postoperative pain. Some children were 'unable' to determine a score on the W-B scale. The description of the children's symptoms was presented in a context which included seeking a postoperative understanding of their bodily and verbal expressions, which often showed a disparity between observed behaviour and self-reports.

Enduring inflicted hospital distress (Study II)

Paper II generated a conceptual model showing that the main problem for children aged 6-9 undergoing day surgery is that they have not chosen the hospital stay themselves, rather they are "forced into an unpredictable and distressing situation which they have to endure" (Figure 3). The core category was labelled "*Enduring inflicted hospital distress*" and described how they managed their main concern. Preoperatively, the children did not know what to expect would happen to them at the hospital; actually, they were "*facing an unknown reality*" and their experience was that they were "*breaking away from daily routines*". Despite uncertainty and unknown conditions, they "*tried to gain control*" over the situation. During the perioperative period, they felt they were "*losing control*" but they adjusted to the demands and "*co-operated despite fear and pain*". Postoperatively, they were "*breathing a sigh of relief*" that the uncertain situation was over and made efforts to "*regain normality in life*".

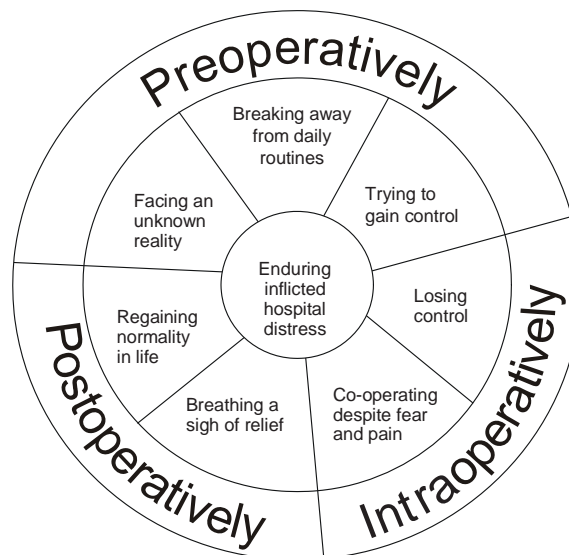


Figure 3. Enduring inflicted hospital distress

Psychometric testing of the Swedish version of the Child Drawing: Hospital Manual (CD:H) (Study III)

Paper III demonstrated that inter-rater reliability of the Swedish version of the CD:H was high, especially for Parts A and B and the total score ($p < 0.001$). The inter-rater reliability for Part C was somewhat lower but still significant and intra-class (i.e. between raters), correlations varying between 0.57 ($p < 0.01$) and 0.72 ($p < 0.001$). Cronbach's alpha was 0.77 considering internal consistency within Part A. Looking at the different subscales within the whole instrument, the strongest correlation was found between Part A and Part C, both among school children ($r = 0.64$, $p < 0.01$) and among day surgery children ($r = 0.76$, $p < 0.01$). Among day surgery children there was also a weak correlation between Part B and Part A ($r = 0.29$, $p < 0.05$) and between Part B and Part C ($r = 0.37$, $p < 0.01$).

In order to investigate construct validity of the CD:H, data from the day surgery children's group was compared to a group of school children (Table 4a, step 1). Between the groups, there were significant differences in the scorings of the following nine items of Part A: '*position person*', '*use of paper*', '*number of colours used*', '*strokes quality*', '*placement*', '*size of person in relation to environment*', '*eyes*', '*action*' and '*development level*'. None of the items included in Part B were considerably more often seen in drawings made by the children undergoing day surgery than in drawings made by school children. This means that there was no significant difference in Part B between the two groups (Table 4b).

The children in the day surgery group had a significantly higher score ($p < 0.01$) in Part C than the school children. Scorings for Part C show that more children in the day surgery group were 'stressed' (i.e. showed higher levels of anxiety) compared to the group of school children, although none of the children's drawings was given the highest score (which is 10 points and indicates 'disturbance' due to stress and anxiety). When summarizing the three sub-scales (Parts A, B and C) according to the suggested algorithm in Clathworthy et al. (1999a), the group of children undergoing day surgery had a significantly ($p < 0.001$) higher mean score of 86.3, with a 95% CI of 80.6-92.0 compared to the group of school children who had a mean of 72.2 with 95% CI (67.2-77.2). All in all, there were significant differences between children undergoing day surgery and school children in Parts A and C, as well as in the total score (the sum of Parts A, B and C) of the CD:H ($p < 0.001$). The discriminative ability of the Swedish version of the CD:H indicates that the Swedish version of the CD:H has adequate construct validity.

In order to explore each item's capacity to discriminate between the groups adjusted by age and sex, we looked at the proportion of the total variation explained by each item (R^2) and percentage correctly predicted by the item. The items that best discriminated between the groups were '*strokes quality*' ($R^2 = 0.41$), '*use of paper*' ($R^2 = 0.34$) and '*colour number used*' ($R^2 = 0.33$). '*Placement*', '*size of person*' and '*facial expression*' (step 2) had somewhat lower discrimination capacity. All six items that were statistically significant were then included with age and sex variables in a multiple logistic regression model (step 3). The following variables were still statistically significant: '*strokes quality*' ($p < 0.01$), '*facial expression*' ($p < 0.05$) and '*use of paper*'

($p < 0.05$) with $R^2 = 0.46$ for the whole regression model (correct percentage predicted = 84). To verify and further investigate these results, we conducted a conditional logistic regression including 35 pairs of children, matched by age and sex. The following items turned out to be statistically significant in a univariate model: ‘*strokes quality*’ ($p < 0.01$), ‘*use of paper*’ ($p < 0.05$), ‘*colour number used*’ ($p < 0.05$) and Part C

Table 4a (step 1). Distributions of scores* mean and standard deviation (SD) on separate items of Part A and C of the CD:H. Comparisons between day surgery children ($n=59$) and school children ($n=71$) using Mann-Whitney U-test

Part A (1-10 point scale) Number of children with score 1, 2, 3 etc.	1	2	3	4	5	6	7	8	9	10	Mean	SD	p-value
Position person													
Day surgery children	6	26	0	0	1	1	0	22	3	0	4.61	3.13	0.017
School children	10	8	1	0	11	2	1	22	13	3	6.00	3.05	
Action													
Day surgery children	1	1	4	3	18	3	9	15	3	2	6.19	2.00	0.049
School children	7	3	9	4	18	3	8	15	3	1	5.31	2.43	
Length of person													
Day surgery children	0	7	14	11	14	6	6	1	0	0	4.34	1.57	n.s
School children	3	12	26	6	9	0	1	8	6	0	4.21	2.37	
Width of person													
Day surgery children	16	3	3	2	4	6	23	2	0	0	4.61	2.64	n.s
School children	21	5	8	0	16	3	16	2	0	0	3.96	2.45	
Facial expression													
Day surgery children	16	3	8	2	14	1	0	3	2	10	4.61	3.26	n.s
School children	13	9	6	1	21	0	0	5	2	14	5.01	3.25	
Eyes													
Day surgery children	2	0	3	2	3	5	26	1	12	5	6.98	2.07	0.027
School children	10	4	10	2	6	1	20	2	5	11	5.68	3.07	
Size of person to environment													
Day surgery children	6	0	17	6	13	5	4	7	1	0	4.56	2.11	0.000
School children	22	2	23	7	12	2	0	3	0	0	3.08	1.84	
Colour predominance													
Day surgery children	2	0	9	0	4	6	4	1	6	27	7.54	2.90	n.s
School children	6	0	5	0	10	5	3	15	3	24	7.17	2.88	
Colour number used													
Day surgery children	1	2	0	0	11	12	12	1	13	7	6.97	2.11	0.000
School children	10	5	11	0	16	9	9	1	6	4	4.96	2.67	
Use of paper													
Day surgery children	11	3	4	0	9	5	2	15	3	7	5.68	3.11	0.000
School children	37	1	11	2	7	3	1	5	2	2	3.07	2.72	
Placement													
Day surgery children	18	1	6	4	13	3	2	12	0	0	4.19	2.64	0.000
School children	46	1	3	0	11	2	3	5	0	0	2.61	2.42	
Strokes quality													
Day surgery children	5	2	5	3	30	4	3	7	0	0	4.86	1.85	0.000
School children	14	18	12	8	17	2	0	0	0	0	3.03	1.55	
Presence of hospital equipment													
Day surgery children	27	0	16	5	4	3	2	1	1	0	2.78	2.06	n.s
School children	26	1	35	4	2	1	1	0	1	0	2.55	1.53	
Development level													
Day surgery children	0	1	43	11	2	1	1	0	0	0	3.36	0.80	0.046
School children	1	1	61	4	3	1	0	0	0	0	3.14	0.64	
Total score Part A													
Day surgery children											71.27	16.16	0.001
School children											59.77	16.86	
Part C (1-10 point scale)													
Day surgery children	7	5	8	2	17	7	3	10	0	0	4.69	2.25	0.005
School children	13	10	9	14	17	2	1	5	0	0	3.66	1.97	

*Three children by mistake included in table 2a *paper III* have been excluded. The mean values in the item “size of person to environment” were by mistake shifted between the two groups, this is now corrected.

($p < 0.05$). ‘*Facial expression*’ was not statistically significant according to this model. In a multiple conditional logistic regression model (step 4), the only item left as statistically significant was ‘*strokes quality*’ ($p < 0.01$). The other variables were no longer statistically significant, probably because of certain correlation between the items.

Approximately 98% of both groups of children had CD:H scores (according to the original CD:H scale, Clathworthy et al. 1999a) that indicated an ‘average’ level of anxiety or lower. ‘Low’ or ‘very low’ levels of anxiety were scored for 73% of the school children group compared to 44% of the day surgery group. According to the drawing scores, no-one in the day surgery group had a ‘very low’ or ‘very high’ level of anxiety. Among the children in the day surgery group, there was an accumulation of drawings scored at ‘average’ (84-129) level of anxiety (54%). Only drawings from one child from each group had scorings ‘above average’ level of anxiety.

Table 4b. Distribution and comparison of the two groups of children’s scorings on part B and the separate items in the CD:H

Part B	No (%)	Yes (%) (present)	P-value*
Omission of one body part			
Day surgery children	n=21 (36)	n=38 (64)	n.s
School children	n=32 (45)	n=39 (55)	
Exaggeration of a body part			
Day surgery children	n=58 (98)	n=1 (2)	n.s
School children	n=69 (97)	n=2 (3)	
De-emphasis of a body part			
Day surgery children	n=56 (95)	n=3 (5)	n.s
School children	n=71 (100)	n=0 (0)	
Distortion of body			
Day surgery children	n=58 (98)	n=1 (2)	n.s
School children	n=69 (97)	n=2 (3)	
Omission two/more body parts			
Day surgery children	n=26 (44)	n=33 (56)	n.s
School children	n=41 (58)	n=30 (42)	
Use of transparency			
Day surgery children	n=57 (97)	n=2 (3)	n.s
School children	n=70 (99)	n=1 (1)	
Use of mixed profile			
Day surgery children	n=59 (100)	n=0 (0)	n.s
School children	n=71 (100)	n=0 (0)	
Use of shading			
Day surgery children	n=55 (93)	n=4 (7)	n.s
School children	n=62 (87)	n=9 (13)	
Any item present within Part B			
Day surgery children	n=17 (29)	n=42 (71)	n.s
School children	n=23 (32)	n=48 (68)	

Chi-Square test and Fischer’s exact test

Physiological stress in children undergoing day surgery as confirmed by salivary cortisol (Study IV)

Paper IV shows that “the perioperative dialogue” (PD) reduces postoperative stress in the study group of 5-11 year olds undergoing day surgery, which is confirmed by salivary cortisol concentration. The PD group had significantly lower salivary cor-

tisol concentrations postoperatively than children who received standard care with ($p=0.006$) or without preoperative information ($p=0.003$). Moreover, it continuously decreased during the day of surgery, compared to the other two groups ($p<0.01$, Figure 4).

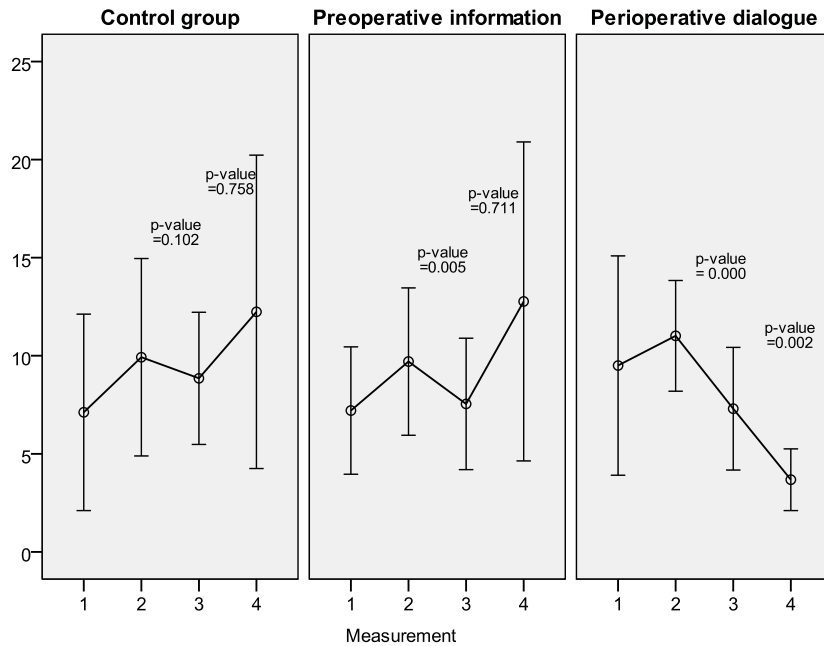


Figure 4. Salivary cortisol concentrations nmol/L (mean with 95% CI) at different measurement time points. 1= Outpatient surgery department, 2= Attending day surgery, 3= Before induction of anaesthesia, 4= Postoperative recovery

The cortisol concentration decreased from baseline (attending day surgery) to postoperative recovery in 96% (23 out of 24 children) in the PD-group compared to 72% (13 out of 18 children) in group 1 (standard perioperative care - control group) and 63% (12 out of 19 children) in group 2, which was the preoperative information group. There was a decrease of 75-100% from baseline level in 54% (13/24) of the children in the PD-group compared to 16% (3 out of 19 children) in the preoperative information group and 11% (2 out of 18 children) in the control group. The difference in trends for cortisol over time during the day of surgery was statistically significant between the groups (Figure 4, $p<0.01$) when the ANOVA for repeated measurements model was applied. The distribution of type of surgery was not equal between the groups, which is important to note since the median cortisol levels differed between types of surgery. The concentration of cortisol at recovery was 18 nmol/L with quartiles (13-26 nmol/L) within the “orchiopexy” group, and 4 nmol/L with quartiles (2-19 nmol/L) within the “herniorraphy” group. In a stratified analysis that reduced discrepancy between the groups with respect to type of surgery, the overall trend of decrease in cortisol concentration over time was still statistically significantly different ($p<0.05$) between the groups.

Of the 30 children in the standard perioperative care group (control group), 12 (40%) had a regional block compared to 11 (35%) out of 31 children in the preoperative information group and 6 (19%) out of 31 children in the PD group. There was a tendency for a proportion of blocks to be lower in the PD-group but this difference between the groups was not statistically significant (p -value=0.187). There were no statistically significant differences in pain score between the groups and the number of children who received analgesics. However, among the children who received analgesics, the PD group received significantly less morphine (p =0.014) related to bodyweight: the mean dose was 0.1mg/kg (n =9) in the control group versus 0.04 mg/kg (n =6) in the PD group. The duration of anaesthesia/surgery, duration of hospital care at the PACU and W-B scale scores did not differ between the groups. Irrespective of group, there was a positive correlation between the children's morphine consumption (related to body weight) and salivary cortisol concentrations (r =0.56, p =0.038). The W-B scale score was higher in the group that received morphine (median=3 versus 1, p =0.001). There were no differences between the groups with respect to age, time of point of sampling during the day or earlier experiences of hospital care. Three children had cortisol concentrations of >36.5 nmol/L (mean +2 SD) preoperatively (one from each group) on the day of surgery, indicating high stress levels.

Associations between preoperative stress (salivary cortisol concentration) and anxiety interpreted by the Swedish version of the CD:H Manual) (Study V)

Salivary cortisol concentration was higher (p -value<0.001) when measured on the day of surgery (median=8.0; quartiles 6.1-10.3) compared to at the outpatient surgery department (median=4.4; quartiles 3.3-6.7). An opposite trend was observed for anxiety, as assessed by CD:H. The total score showed a median value of 85 (quartiles 69-103) on the day of surgery whereas the median value was 76 (quartiles 66-97) at the outpatient surgery department, indicating a significantly decreased level of anxiety (p =0.048). The same was true for part C of the CD:H, showing a significant decrease (p =0.002) in anxiety between the day of surgery (median=5, quartiles=3-6) and at the outpatient surgery department (median=4 with quartiles 2-5). The frequency of children with a CD:H score of 5 or higher in part C at the outpatient surgery department was 56% (51 out of 91 children). This could be compared to the circumstances on the day of surgery, when 33% (28 out of 84 children) scored 5 or higher on the CD:H (p -value=0.001). The W-B scale scorings were the same on both occasions (Figure 5). There were no significant associations between saliva cortisol concentration and anxiety (children's drawings) as measured by the Swedish version of the CD:H in any of the parts or any of the single items in the instrument. The distribution of the total CD:H scores among children both at the outpatient surgery department and on the day of surgery were shifted to the right, i.e. increased CD:H values, representing a higher degree of anxiety as compared to the distribution among Swedish school children sampled in the classroom (*paper III*). The average total CD:H score was in concordance with the statistically significant lower (p -value<0.001) in school children (Figure 6).

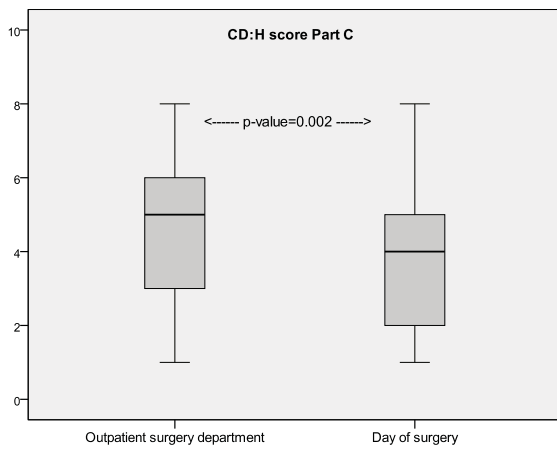
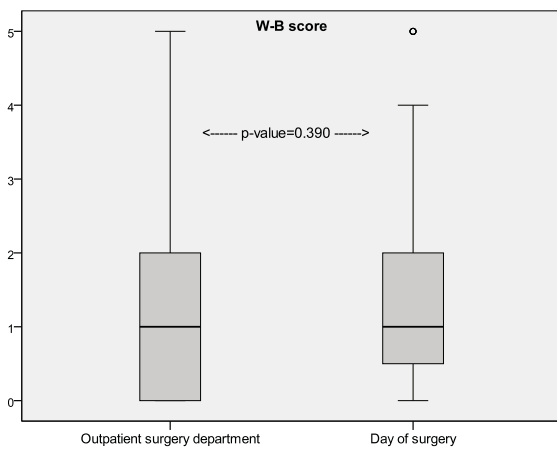
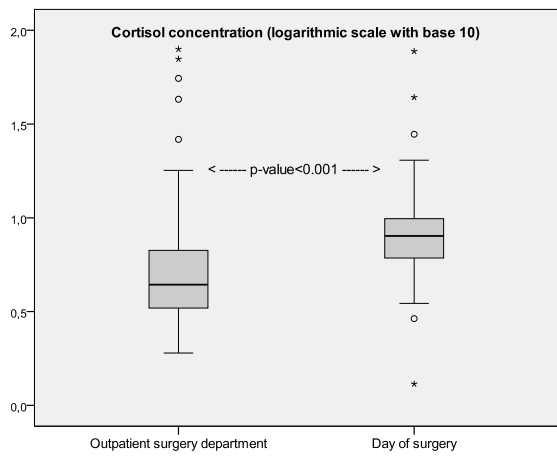


Figure 5. Comparison of saliva cortisol concentration, Wong-Baker pain rating score and Child Drawing Hospital score part C between the outpatient surgery department and preoperatively on the day of surgery.

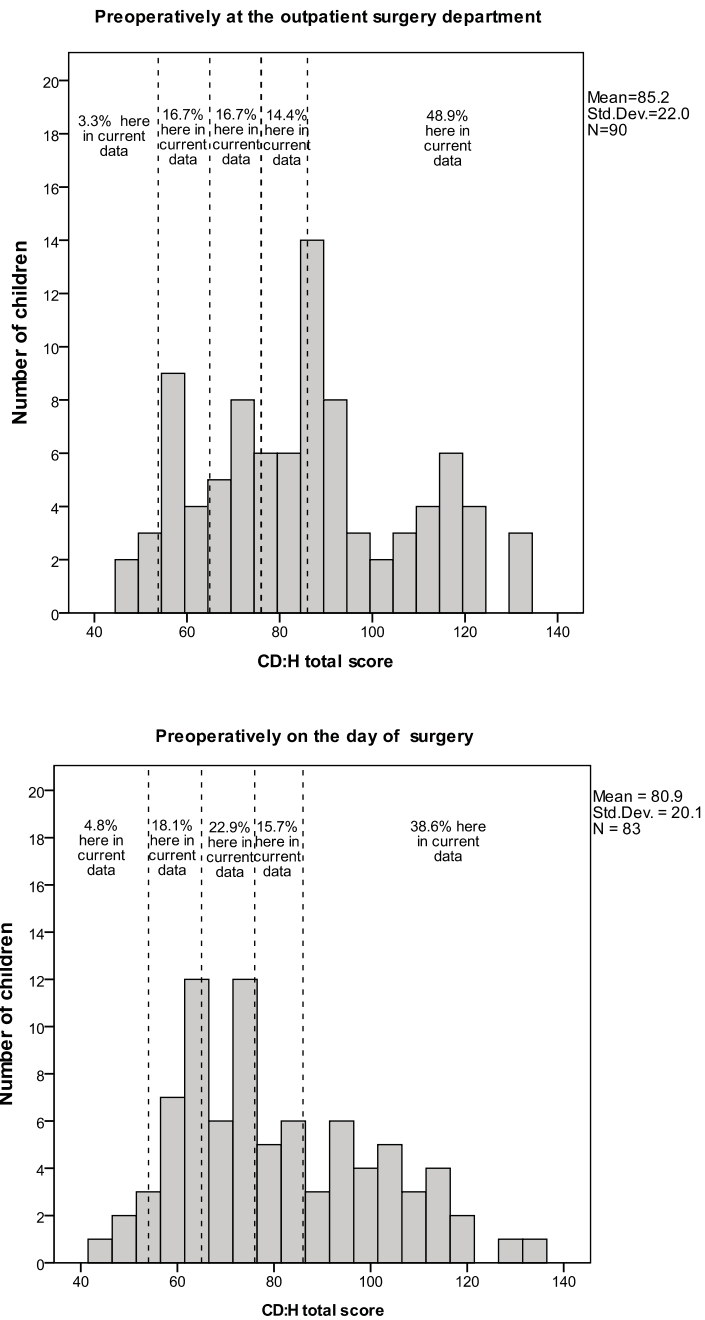


Figure 6. Distribution of total scores of the Swedish version of the CD: H Manual 1) at the outpatient surgery department and 2) when attending hospital on the day of surgery, related to reference intervals (the 20th, 40th, 60th and 80th percentiles¹) based on CD:H Manual distribution among school children as a Swedish reference population (paper III).

¹Percentiles (illustrated by vertical broken lines in the diagrams above) were based on the school children's CD:H distribution. This means that 20% of the school children belong to each of the five reference intervals.

SUMMARY

- Boys aged 3-6 have difficulties in distinguishing between postoperative symptoms like pain, nausea, and discomfort, and also express their symptoms in different ways (*I*).
- The findings show that the main problem for children undergoing day surgery is that they are forced into an unpredictable and distressful situation. A conceptual model was generated with the core category 'enduring inflicted hospital distress', explaining how the children manage this main concern (*II*).
- The Swedish version of the Child Drawing: Hospital Manual has high inter-rater reliability and good internal consistency reliability (*III*).
- The Swedish version of the Child Drawing: Hospital Manual discriminates between children undergoing day surgery and school children, indicating adequate construct validity (*III*).
- A group of children aged 5-11, who received continuity in care through the perioperative dialogue (PD), had significantly lower levels of salivary cortisol concentrations postoperatively than groups of children who received standard care with or without preoperative information. Apart from lower levels of stress, the PD group required significantly less morphine related to bodyweight than the other groups (*IV*).
- In order to reduce perioperative anxiety, the PD's different steps of continuity and on-going dialogues by the same nurse anaesthetist seem to be beneficial and may serve as a complement to standard perioperative nursing care in children undergoing day surgery (*IV*).
- The children did not appear to have an extensive preoperative stress and/or anxiety as measured by cortisol in saliva and child drawings. The reasons might be a trustworthy and/or well-functioning family-oriented, child-friendly care and/or that the Swedish version of the total CD:H Manual is not sensitive enough to detect the small differences in preoperative anxiety the children in the study experienced (*V*).

DISCUSSION

This thesis shows that even though children undergoing day surgery have to endure inflicted hospital distress and have difficulties in discriminating and expressing postoperative symptoms, continuity of care seems to reduce postoperative stress, as confirmed by salivary cortisol in saliva. This supports the idea that continuity and ongoing dialogues by the *same* nurse anaesthetist, in line with the perioperative dialogue (PD), is beneficial for children undergoing day surgery. Drawings done by children undergoing day surgery showed they had an increased level of anxiety (interpreted in line with the Swedish version of the CD:H manual) compared to drawings done by a group of school children. There were no significant associations between saliva cortisol concentration (stress) and children drawings (hospital anxiety), as interpreted by the Swedish version of the CD:H. This suggests that the drawings and saliva cortisol concentration reflect different parts of the conditions (stress, distress, anxiety or fear) emerging in the situation. Nevertheless, drawings seem to be a relatively friendly, inexpensive and easy method that might be useful as a ‘door-opener’ for a dialogue and/or play in an unknown, daunting situation between the clinician and the child in a perioperative context.

Postoperative symptoms in children

We found that boys aged 3-6 had difficulties in both expressing (i.e. finding words) and distinguishing between postoperative symptoms like pain, nausea, and discomfort, and that they also had different ways of expressing these symptoms (*paper I*). The findings from this study support earlier work that identifies pain behaviours such as restlessness, immobility and self-comforting actions in young children (Taylor 1983; Mills, 1989) as well as a lack of consistency between self-report measures and the behavioural observation scores (Beyer et al. 1990). When assessing postoperative symptoms in young children, the nurse should be aware of how children of this age combine their concrete experiences and different ways of thinking. That means that in clinical praxis, the nurse must actively draw the child’s story out (Carter, 2002) in order to identify postoperative symptoms. Tamm (2003) argues that in contrast to other fears, medical fears are often a confusion of pain or a fear of feeling pain. Pain affects fear and fear affects pain, making it impossible for the child to determine what he/she is really afraid of. For this reason, it is not that easy to distinguish these symptoms and/or feelings from each other (Tamm, 2003). This means that the assessment of pain, nausea or other symptoms not only depends on how the nurse interprets the children’s language or stories but also how he/she emphasizes it. Therefore, in young children, multiple postoperative symptoms sometimes may be viewed as ‘unidentified distresses’ or, as Kirmayer et al. (2004) argue, “medically unexplained symptoms” as a social and clinical predicament rather than a specific disorder – an important reflection before decisions of nursing and/or medical treatment. To achieve this kind of assessment, the nurse has to devote the time needed.

There is a general consensus that pain and nausea are two symptoms that are closely related to each other (Watcha & White, 1992). In our study (*paper I*), begging for something to drink was a common need among the 3-6 year old children postop-

eratively, although they described both nausea and pain. Frequently, this drinking resulted in vomiting. The excessive drinking may be a sign of 'swallowing the nauseous feeling in the throat' or just a strategy to be free of pain and emetic suffering. However, the need to drink may also be a sign of searching for well-being. A review reported factors that were associated with PONV in pediatric patients at PACU, and one increasing factor of vomiting was insisting on oral intake before discharge (Watcha, 2003), which may explain the frequency of children's vomiting (*paper I*). Another different view regarding PONV could be exemplified by Wollin et al. (2004) who interviewed 120 children aged 5-12 preoperatively concerning anxiety and fear. The answers were centred on the operation (anaesthetic/mask/gas/complications), the needles and postoperative pain, smell, staying overnight and fasting. Children may expect pain after surgery since it is usually associated with the idea of being 'cut up'. The experience of fear related to postoperative pain thus seems reasonable. Notably in the study of Wollin and co-workers, none of the children were worried about PONV. The loss of expected PONV may indicate that nausea is an unexpected, unknown condition to the children if they have not experienced it before, or if they have not been informed that it might affect them postoperatively. Interestingly, in a review article exploring patients' concerns about anaesthesia, it was found that even adult patients expected PONV with less concerns (Royston & Cox, 2003). Nonetheless, irrespective of whether the patient is an adult or a child, one can only speculate if this 'loss of concern' depends on insufficient information or less awareness of the risks of being affected by PONV.

Since we know that children need to know what is going to happen (Watson & Visram, 2003) one can reflect whether expecting PONV could reduce the anxiety it might otherwise provoke when it is unexpected or uncontrolled, e.g. "am I really sick now, and/or is it dangerous to feel like this?" However, as an aid to deciphering children's expressions of postoperative symptoms, the W-B scale can be used as a communication tool that enables to identify fear, anxiety or PONV rather than just rating the pain. It is important for health professionals to be sensitive in listening to and interpreting children's negative and positive emotions, aiming to bridge the gap between physiology and the individual bodily and verbal expressions and to interpret these 'linguistic combinations' as a whole. Thus, health professionals probably derive some advantage from understanding emotions in that they may read the child's expressions in relation to or in combination with his/her bodily, verbal and facial expressions to form a reliable interpretation.

However, in our study (*paper I*) many children were playful in the way they rated themselves on the W-B scale, both pre- and postoperatively. The playfulness preoperatively gave an opportunity to make a judgment of each unique initial position of mood, which undoubtedly differed from child to child. Similar assessment of mood when using faces pain scales pre-postoperatively has been discussed earlier (Robertson, 1993; Smith & Callery, 2005) and to avoid mistakes in judgment and treatment postoperatively, it would be of great help for health professionals to become aware of the specific child's initial position of preoperative well-being or mood assessed by, for example, the pain FACES scales. The children's responses raised research questions about the usefulness of the existing FACES pain scales, which tend to equate

the young children's expressions of distress with nausea, pain and anxiety (*paper I*) Even if a measuring instrument is validated and reliable in a research context for a whole group, at least 30 per cent still accounts for individual deviation (Bergh et al. 2001). For this reason, it is most important to focus on the ability of a measuring instrument to be trustworthy, not only in the group of children to be tested, but also for each individual child, combined with a deeper understanding of how children use their language when they are in distress. Thus, there are several aspects to consider in relation to pain scales and the use of these in young children postoperatively. Many such scales appear to be valid and reliable for assessing pain in children, but they obviously have limitations. Firstly, it seems too difficult or too dull for young children to use pain scales. Secondly, it simply takes too long for healthcare providers to explain their function to the children. Thirdly, when assessing pain in children, the pain scales might not be used alone. Jacox (1979) states that in the pain-assessing process, the nurse (in the absence of objective measuring instruments) depends partly on the message the patient can communicate and partly on how he/she personally perceives, interprets and responds to the content of this message.

Enduring inflicted hospital distress

“Enduring inflicted hospital distress” was a significant, dominant and ‘absorbing’ core concept grounded in the children’s statements and central in how they managed their stay at the hospital on the day of surgery (*paper II*). Being unable to imagine what is going to happen and how things will turn out while they are losing control over the situation, for example, that the dizziness that follow sedative premedication will affect their ability to walk, is a real concern for the children and one that health professionals should take into account when nursing them in a perioperative context. These findings strongly suggests that sedative premedication should not be given routinely but only after careful individual assessment. In line with Clathworthy et al. (1999a), the findings in this study showed that children preoperatively expressed that they “did not know” why they felt “well, OK or fine” and that they “did not know” what they were expecting of the hospital stay. Postoperatively many children were relieved because everything had been “fixed” and some also expressed positive thoughts about the value of being operated, which probably helped them to feel better. This evaluation sometimes included satisfaction with their own achievements and pride for having come through it.

Consequently, the child’s perspective of the perioperative procedure may mirror a mental state of processing thoughts such as “What is this?” “What’s happening?” “Why should I do it?” “When will I get well again?” “Can I play again when I get home?” The answer “I don’t know” in an unknown situation will therefore be self-explanatory, and is a natural way of describing something that the child has not experienced earlier. It is sometimes difficult for adults to articulate the actual state of their emotions, and this is obviously even more problematic for young children. Understanding their questions and thoughts (Rich, 1968) as a starting-point for co-operation, in line with suggestions by Doverborg and Pramling-Samuelsson (2003), might therefore be a key to achieving good nursing care in a perioperative context. This is also in line with Gedaly-Duff (1991) who argues that children in this age group are unable to imagine or hypothesize about what “might happen”. Considering this, the

following questions arise - how do we formulate comprehensible questions to a child? And how do we answer the child's questions? Doverborg and Pramling-Samuelsson assert that when a child is unable to express feelings or thoughts about something, it often depends on the fact that he/she has not had the ability to reflect on (or not been exposed to) the specific situation or that no-one has given the child the necessary time or support needed to reflect on it (Doverborg & Pramling-Samuelsson, 2003).

Children's way of thinking is not 'worse' than adults' but children think differently. Their capacity to understand situations may be greater than their ability to articulate their understanding (Monroe & Kraus, 1996). Children of similar ages also perceive and understand the same, but in different ways. For this reason, verbal interchange and behavioural observations do not always provide an adequate assessment of children's emotional status. Researchers (Doverborg & Pramling-Samuelsson, 2003; Sommer, 2005) state that entirety and parts in the child's learning and understanding give the ability to discern and create meaning in a situation, which further on provides a deeper understanding of what he/she experienced. This may explain how the children in this study both pre- and postoperatively tried to gain control over the situation by searching for a meaning in performing the surgery. In order to communicate and obtain 'more substantial' descriptions, the children were also requested to make drawings of expectations and experiences related to the hospital stay, before and after the surgery.

When comparing pre- and postoperative drawings, observations and interviews (*paper II*), it was obvious that although the child verbally expressed that everything was "fine" or "good", the drawings could depict self-portraits with sad mouths, tears rolling down the cheeks or threatening syringes. The child's body was often drawn very small in the operating bed, sometimes with the head shown and the rest of the body covered by a blanket, which, according to Clathworthy et al. (1999a; 1999b) may reflect increased anxiety. An additional interpretation could be that it shows how a child describes his/her body size compared to an adult. However, as a complement to children's verbal communication, the drawings offer a friendly and easy method of creating a non-threatening dialogue. This method might also help health professionals to take into account the child's mood, history and experiences of sickness/injury (Matsumori, 2005). Further, drawings require no 'right' answers and help to identify feelings and desires that the person may not be consciously aware of or able to express verbally (Lynn, 1986; Poster, 1989). Drawings are therefore a suitable method, especially with children who may give socially desirable responses or who answer "don't know" because they are unable to verbally express their feelings or expectations.

Pre- and perioperative stress and/or anxiety in children

The children aged 5-11 who received continuity of care through the perioperative dialogue (PD), exhibited significantly lower levels of salivary cortisol concentrations postoperatively than the groups of children who received standard care with ($p=0.006$) or without ($p=0.003$) preoperative information (*paper IV*). Moreover, the cortisol concentration continuously decreased during the day of surgery, in contrast with the other two groups (i.e. with and without preoperative information). This indicates that perioperative nursing (PD), including different steps of continuity and on-going dialogues by the same nurse anaesthetist, is beneficial for children undergoing day sur-

gery. Further, among the children who received analgesics postoperatively, the PD group received significantly less morphine related to bodyweight. There was a positive correlation between morphine consumption related to body weight and salivary cortisol concentration in all children irrespective of group (*paper IV*). This is in line with other authors who claim that perioperative anxiety in children may be associated with adverse outcomes, such as increased pain and negative changes in postoperative behaviour (Kotiniemi et al. 1997; Kain et al. 2006; Fortier et al. 2010). There was no difference in pain scores between the groups in the study, irrespective of whether they had received morphine or not. Nevertheless, the children in the PD group received less morphine. One explanation could be that the children in the PD group were better able to manage the situation and therefore demanded less analgesic. Similar findings have been identified when music was used as a complement postoperatively, i.e. with no differences in pain score but reduced morphine requirement and reduced distress, indicating faster recovery of well-being (Nilsson et al. 2009). It has been claimed that the emergence of state anxiety is the first stress response (Boudarene et al. 2002). Anxiety remains stable up to a certain stress level, after which the nature of the stress response changes and takes a biological aspect. Increased cortisol concentrations in plasma and saliva (which is the secondary stress response), will be observed and gives evidence of an intensified and sustained stress response. Such a gradual phenomenon is particularly reported in elevated psychological distress, which is associated with loss of control (Boudarene et al. 2002). Consequently, an alternative explanation as to why the PD group had lower cortisol concentrations postoperatively than the other groups could be that they never reached the 'plateau level' at which increased support and control was experienced.

Children with increased preoperative anxiety are more likely to be at risk of developing postoperative anxiety (Caumo et al. 2000), which may have long-term negative impact on their responses to future hospital care. For example, Keller (2001) argues that children have many fantasies of danger and an underdeveloped ability to reason and judge the division between fact and fiction. As a result, the line, which for most adults is distinct, may be blurred in the minds of children, and thus fears of mutilation during surgery may be a reality to them. Reducing children's perioperative anxiety is nonetheless important, not only for humanitarian reasons, for example pain reduction, (Fortier 2010) but also to facilitate cooperation with anaesthesia care providers (Watson & Visram, 2003). Consequently, in order for children to be able to deal with fear or anxiety prior to investigations and/or procedures, they also need to be confident and informed about what is going to happen (Watson & Visram 2003). Intervention strategies should therefore be initiated before admission to hospital, providing emotional support and allowing the child to get a sense of control while being exposed to the unknown stressor that hospital care most often presents (Edwinsson-Månsson, 1992; Zuckerberg, 1994; Fortier, 2009).

In a study of 143 children who had undergone elective day surgery, anxiety was assessed to determine the effectiveness of a preoperative preparation program which included information about the perioperative experience, and an orientation tour and medical play by child-life specialists. The results showed that preoperative preparation had a negative effect on younger children and was only beneficial to children

aged 6 years and older. Another finding was that children over 6 years of age were least anxious if they had been prepared at least 5-7 days before surgery, and that anxiety increased if they had only been prepared 1 day before. The study also showed that few children were offered the time needed for them to gain control or become acclimatized to the unknown stressful situation that hospital care most often presents. This might indicate that the children fail to establish coping skills and assimilate important information which could help them through stressful procedures (Kain et al. 1996a).

In *study IV*, the findings highlight the effects of the PD but fail to confirm the usefulness of preoperative information, at least in the way it was given in this study. Previous studies have shown contradictory results regarding this issue (Kain et al. 1998; Kain et al, 2007; Rice et al. 2008). Preparing a child for anaesthesia/surgery may appear to be a simple thing to do, i.e. tell the child what is going to happen. In reality, however, it is not. Today it is revealed that there are intricacies of preparation that have strong effects on the efficacy of doing so. *What* information/dialogue to provide, *when* and *how* to provide it and by *whom* are all key factors to consider (MacLaren & Kain, 2007). Accordingly, one can also reflect what influenced the saliva cortisol levels to decrease in the PD group children postoperatively compared to the other two groups. Is it the continuity of care, the on-going dialogues, an increased sense of control, the 'personal chemistry' between the child and the nurse anaesthetist, or is it due to all these components combined?

It is well known that parents and children prefer to stay together during medical procedures since this decreases the child's (Visintainer & Wolfer, 1975; Hannallah & Rosales, 1983) and the parents' anxiety (Bauchner et al. 1989; Kain et al. 2000). Nevertheless, randomized controlled trials indicate that routine parental presence during induction of anaesthesia (PPIA) is not always beneficial, demonstrating that only children over 4 years of age with a "calm" baseline personality or those with a parent with a "calm" baseline personality benefit from PPIA (Kain et al. 1996c). Concerning perioperative standard care routines in the Swedish public healthcare system, it is important to keep in mind that (with some exceptions) a formal policy of PPIA generally exists. This might be one explanation why the children in this thesis seem to manage the perioperative procedures rather 'well'. Another explanation might be that the present findings demonstrate that standard perioperative care in Swedish public healthcare for children is quite trustworthy and well-functioning for the child/family.

The evaluation of the Swedish version of the CD:H showed that the inter-rater reliability was high and that internal consistency reliability was good. The evaluation also showed that the CD:H discriminated levels of anxiety between a group of children undergoing day surgery and a comparison group of school children, thus indicating construct validity (*paper III*). When comparing the scorings from the two groups concerning Part A step 1, 9 items out of 14 discriminated significantly between the groups (Table 4a, p. 47), indicating that this part might be over-dimensioned. In step 2, six items discriminated significantly between the groups; '*strokes quality*', '*use of paper*', '*colour number used*', '*placement*', '*size of person*' and '*facial expression*'. In step 3, the items '*strokes quality*', '*use of paper*', and '*facial expression*' turned out to be statistically significant. In step 4, the only item left that statistically discriminated be-

tween two groups was '*strokes quality*'. Thus, in the first three steps several items still remained as statistically significant. The items being statistically significant univariately but not in a multiple model has probably a certain correlation with each other and might therefore be over-dimensioned for the CD:H.

Interestingly, some of the discriminating items found in our results (e.g. '*strokes quality*') seem to be in line with other authors in terms of drawing analysis. As early as 1953, Machover stated that 'The pressure, the firmness, and the solidity of the line used in drawing are considered more basically characteristic than some of the other formal features' (p.95) //...// 'The dim lines occur most frequently in the timid, self-effacing, and uncertain individual' (p.96). In addition, Di Leo argues that the secure child usually draws freely and uses the available space ('*use of paper*') on the paper with good, firm pressure and continuity of stroke. In contrast, the insecure child's drawing is small and restricted to a small area of the available space and the lines are lightly drawn and are often broken or wavering (Di Leo, 1977).

The primary weakness of the Swedish version of the CD:H seems to be the subjective component, Part C (gestalt of the picture). Part C had lower inter-rater reliability compared to Parts A and B. When scoring Part B, we emphasise that it is important to be aware of the development of drawing ability in children, otherwise inappropriate interpretations may result (Di Leo, 1983). The total score (Parts A+B+C) of the Swedish version of the CD:H significantly differentiated hospitalized children from school children based on level of anxiety. However, among the children in the day surgery group there seems to be an accumulation according to an average level (84-129, 54%). Moreover, none of the children in the day surgery group had a very high level of anxiety and that only one child 'expressed' a level of above average.

Interestingly, the drawings in our Swedish study tend (within the average levels in CD:H guidelines i.e. 84-129) to 'express' a lower level of hospital anxiety than earlier American studies using the CD:H, (Tiedeman & Clathworthy 1990; Clathworthy et al. 1999a). Nevertheless, both Swedish and American children from the above studies fell into the classification 'average level of anxiety' according to the guidelines (Clathworthy et al. 1999a). One must bear in mind, however that, the children in the above studies were admitted to hospital at least overnight, which might affect the drawings outcome in terms of anxiety scores. Further, our results do not necessarily show that Swedish children generally have lower levels of anxiety than American children, nor that these results are explained by cultural differences. It could be that children 'express' themselves differently in their drawings or that scores may differ due to differences in interpretation. This is a question for further investigation.

In clinical praxis, it is important that health care/paediatric professionals take into account knowledge of personality as it pertains to the growth and development of children's learning as well as the unique child's thinking, language and developmental abilities. In regard to this, the items in the present study that discriminated significantly according to the CD:H (Part A) could be assessed fairly objectively, such objectivity being important for scoring anxiety in the day surgery children's drawings (e.g. '*colour number used*' '*strokes quality*' '*use of paper*') and something that may

well reduce the risk of making inappropriate interpretations. Anxiety can hardly be assessed by a single test such as CD:H; rather one should also ask the child to assess their frame of mind with, for example, a FACES scale. This combination of assessments provides the clinician/researcher with valuable information about the child's emotional status at the specific moment. However, the number of items in the Swedish CD:H did not appear to differ sufficiently from each other to merit their inclusion as separate items. Eliminating superfluous items and making the tool more concise will therefore facilitate clinical utility.

The covariance between psychological and endocrine responses among the children (*paper V*) showed that salivary cortisol was higher (p-value <0.001) when measured preoperatively on the day of surgery than at the outpatient surgery department and that an opposite trend was observed for assessed anxiety (children's drawings) in the total CD:H score (p=0.048) and part C (p=0.002), with a lower level of anxiety being evident on the day of surgery. In addition, there were no associations between saliva cortisol concentration and the children's drawings (CD:H) in any of the parts or single items in the manual. This indicates rather convincingly that the two measurements/instruments reflect the conditions from different angles, irrespective of whether they are measuring stress, distress, anxiety or fear in this specific situation. Which is the most "true" and clinically relevant is difficult to say/know, but it seems reasonable to believe that stress levels increase when arriving in hospital on the day of surgery. Salivary cortisol concentration both at the outpatient surgery department and on the morning of the day of surgery (*paper V*) were virtually the same as in age matched, 6-15 year old Swedish children sampled in the classroom (8-9am) and were found to be 'normal' at 1.8-95.9 nmol/L (median 8.8) (Törnåge & Alfvén, 2006). In addition, similar results have been presented earlier in the same context and time-point with median/range values 8.8 (1.0-33.2 nmol/L) in 210 boys and 8.6 (1.5- 53.9) in 176 girls (Törnåge, 2002). For this reason, we also believe that the increase in salivary cortisol when attending hospital on the day of surgery compared to when visiting the outpatient surgery department is a 'normal' level of increased physiological stress.

The original CD:H instrument is considered to be a reliable, valid and sensitive instrument to assess anxiety in both non-hospitalized and hospitalized children, for whom mean scores of about 100 were observed (Clathworthy et al. 1999a, 1999b). These scores are far higher than that recorded for the day surgery children in our study (Figure 6, p. 52). The explanation for this discrepancy could be differences between the health care systems, in health professional education and/or upbringing of children, as well as cultural differences. However, in contrast to our study's findings, the CD:H Manual has shown to correlate well with, for example, behavioural and observational assessments of the child's pain and distress (Aminabadi et al. 2011). The "normal" levels of stress/anxiety in both the drawings and saliva cortisol concentrations (*paper V*) indicate that neither a visit to the outpatient department nor the thought of imminent surgery causes fear and/or anxiety at levels that are unmanageable for the child. This interpretation of our findings is supported by the fact that when the children were asked how they felt at that moment, they assessed themselves to be low (i.e. rather 'positive' mood) on the W-B scale on both occasions, giving a score of one (0-5). This suggests that Swedish children (at least those in our study) do not experience such

high levels of increased stress/anxiety in connection to preoperative procedures associated with day surgery. The reasons might be a trustworthy and/or well-functioning family-oriented, child-friendly care and/or that the Swedish version of the total CD:H Manual is not sensitive enough to detect the small differences in preoperative anxiety the children in the study experienced. Measuring stress and/or anxiety is thus a complex task and has motivated researchers to combine analysis of physiological stress responses (cortisol) and psychological behaviours, (i.e. observer- and self-reported anxiety) when evaluating methods of reducing pre-perioperative anxiety in children (Kain et al. 1996c; 1998).

Drawing may serve both as a way of relaxing and of reducing individual defensiveness and denial (Arrington, 2001). It is argued, for example, that shy and timid children with poor self-concepts draw large figures expressing the wish to be more powerful and noticeable, and a smile may mask the real message of drawing (Klepsch & Logie, 1982). Accordingly, (*paper V*) since the child experiences higher levels of stress on the day of surgery (as confirmed by cortisol concentrations in saliva) one can only reflect if the 'happier' drawing on the day of surgery is an unconscious or conscious reassurance strategy for the child in order to manage the situation better. To the best of our knowledge, there are no previous studies on salivary cortisol sampling in children undergoing day surgery conducted under similar circumstances and occasions as those in our study, and this makes it problematic to speculate further about the saliva cortisol results. However, drawings in conjunction with children's verbal/nonverbal communication and actions seem to be a relatively friendly, inexpensive and simple way of facilitating a dialogue and/or play in an unknown, daunting situation between the clinician and the child in a perioperative context.

The perioperative dialogue

"The perioperative dialogue" (PD) has been used as a complement to standard perioperative care (already applied preoperatively at the outpatient surgery department) and chosen as a model for this thesis as a means of gaining access to the children's thoughts, language and experiences and as a means of achieving continuity and support through the entire perioperative procedure. This allows the child both continuity, (i.e. a 'known face' with whom they meet up on the day of surgery) and adequate time to understand and reflect 'what is going to happen' until the day of surgery. Using the PD, researchers have pointed out how continuity and supporting dialogues by the *same* nurse anaesthetist during the pre- intra- and postoperative procedures inspires confidence in children and help them to manage their fear of anaesthesia (Lindberg & von Post, 2006). Asking questions and reflecting over the situation in a dialogue (rather than merely providing information) with the nurse anaesthetist might enable the child to gain a sense of control despite being exposed to the 'unknown'. As an aid to this process, the nurse anaesthetist should strive to 'read' the child and act accordingly in order to create trustful agreement and be a 'travelling companion' throughout the entire perioperative procedure.

It is well known that contact between the anaesthesiologist (or the nurse anaesthetist) and the child before the day of surgery positively affects the quality of the anaesthetic

induction and the overall experience of the perioperative procedure (Ahlgren, 1973; Visintainer & Wolfer, 1975; Zuckerberg, 1994) and highlights the importance of fulfilling the first step in psychologically preparing children for surgery, i.e. identifying children who are at high risk of developing pre-perioperative anxiety. Hospitalization for surgery obviously causes some degree of anxiety in all children but is more severe in others. It would therefore be an advantage if children with high stress or anxiety levels could be identified preoperatively, allowing individualized care to be given and preventive measures instituted. This might be facilitated through a preoperative outpatient unit for children where the nurse anesthetist or/and anesthesiologist meets the child/parents some days before surgery and finds out what specific needs the individual child has in this specific situation and moment. If a more severe anxiety is identified in this first step of the preoperative procedure, the PD is a possible complement to standard perioperative care. Such an approach will provide professional development for the operating theatre staff and would most likely increase the quality of care for children undergoing surgery.

METHODOLOGICAL CONSIDERATIONS

The use of multi-method design (Morse, 2002), as in this thesis, is assumed to give strength to scientific research. Morse argues that by using more than one method within a research program, we are able to obtain a more complete picture of human behaviour and experience. However, the aim of research, independent of method used, is to produce findings that can be applied beyond the study setting. Starting from the child's perspective, the present thesis has tried to describe the characteristics of children's experiences and expressions of symptoms such as pain, PONV and anxiety in connection to day surgery. The incidence of symptoms and symptom outcomes is also described. The children's experiences of the perioperative procedures were assessed subjectively (through interviews and drawings) as well as more objectively (participant observation of bodily expressions postoperatively). In addition, cortisol concentration in saliva was measured in order to obtain an objective measure of a biological stress indicator.

Strengths and weaknesses

Convenience sampling and the fact that all data were collected in one setting limit the ability to generalize the findings, although these could be transferable to children undergoing day surgery in Swedish public healthcare and also in other Scandinavian countries. Nevertheless, caution should be exercised in transferring or generalising the results into other settings with other cultures and/or healthcare systems. Since the majority of children undergoing day surgery in Swedish public healthcare are boys (64 %) (Swedish National Board of Health and Welfare, 2009) (with diagnosis such as phimosis, undescended testis and hydrocele) the study samples in the present thesis are neither equal in gender distribution nor strategically selected. At the same time, the samples held some qualities of heterogeneity according to age and type of surgery. Other variables such as earlier experiences of hospital care/surgery and willingness or inability to verbally describe the experienced situation are factors that may have influenced the findings. However, these conditions reflect a situation common in clinical practice. Although the children's age range in this thesis work is wide (3-11 years), paediatric research argues that chronological age may not be of very great importance (Price, 1994; Vessey, 2003). Despite this limitation, the studies highlight issues such as children's experiences, language, thoughts and expressions of loyalty that may not have been recognized using other methodologies and which, as yet, have only superficially been probed in the literature relevant for this field.

Qualitative methods (I-II)

One assumption in qualitative research is that data is generated in interaction between researcher and informant. In a GT study, codes and analytic categories are generated from empirical data rather than being deduced from hypotheses or established theories. Allowing the children to make comments and engage their reasoning gave the present studies access to rich and meaningful data. The dialogues between myself (BW) as a nurse anaesthetist/researcher and the child created an opportunity to listen and reflect on their thoughts and experiences and to mutually exchange thoughts that

deepened the understanding of what was said. This generates what in GT (Glaser & Strauss, 1967) is called ‘thick descriptions’ and optimal variations in emerging data. A weakness in this method is that children may fabricate things to please the interviewer (Peace, 1994). Charmaz (2006) argues that like other qualitative approaches, the GT invokes the term ‘saturation’ uncritically and that disagreements arise about its meaning. This is often a criticized concept in GT since researchers often proclaim saturation rather than prove that they have achieved it. Charmaz points out that saturation is not the same as repetition of the same events or stories. Rather, saturation shows how categories are ‘saturated’ when new data no longer gives new theoretical insights or reveals new properties of the existing categories. Authors have argued that the term ‘saturation’ could be somewhat ‘elastic’ (Dellve et al. 2002), which might indicate that you never know if additional interviews will give new information.

To secure the credibility of the findings, the data in the present thesis was collected through semi-structured tape-recorded interviews, participant observations, field-notes and pre- and postoperative drawings. The semi-structured interview guide was inspired by my pre-understanding of clinical procedures regarding a perioperative context, and new theoretical insight was gained through the two qualitative studies, ensuring the qualitative criterion of originality was met. The published studies in this thesis work give an understanding of how children express their symptoms postoperatively, providing a conceptual model that illuminates their main concern in connection to perioperative procedures and explains how they manage this situation. The combination of originality and credibility increases resonance, usefulness, and the subsequent value of the contribution (Charmaz, 2006). However, no analysis is neutral. The interpersonal interactions make the researcher a part of his/her observations (Hutchinsson, 1993) thus perhaps introducing a risk of weakness in scientific rigour.

The researcher’s interaction is described in terms of reflexivity and relationality, the former referring to the researcher being a part of rather than being separated from the data while the latter addresses power and trust in the relationship between the participant and the researcher (Hall & Callery, 2001). Improving rigour around these issues demands awareness of the consequences of creativity on theory development, also including the idea that if the researcher identifies and reflects on the preconceptions he or she brings into the study, this will not be the same as bias, unless the researcher fails to acknowledge them (Malterud, 2001).

Credibility or trustworthiness in GT studies means that the phenomena under study are validated on the basis of constant comparisons of the data throughout the entire process of data collection and analysis. According to Glaser (1992) the quality of a GT should be evaluated in terms of its fit, work, relevance and modifiability. This means that emerging categories must fit and explain the meaning of the data rather than be preconceived concepts forced on the data. As I understand this, the researcher has to hold back his/her preconceptions in an attitude which can be characterized as “disciplined restraint” (Hallberg, 2006). This means that each concept has to earn its way into the emerging theory or conceptual model. The theory, or conceptual model, has to work and be of relevance, i.e. it must explain the studied area. Finally, modifiability means that a GT, just like other theories, has to change when conditions are changing.

Quantitative methods (III-V)

Measurement of biological markers (IV-V)

A number of factors need to be addressed before incorporating measurements of salivary cortisol into pediatric research. Strategies for sample collection include: (1) standardizing the time for sample collection, including baseline samples (see sampling procedure, p. 38), (2) using consistent collection materials and methods, (3) controlling for certain drinks, foods, medications and diagnoses and (4) establishing procedures and protocols. Strategies for the laboratory analyses include: (1) selecting the appropriate assay and laboratory, (2) identifying units of measure and norms and (3) establishing quality controls (Hanrahan et al. 2006). Controlling for factors that might interfere with accurate measurements of cortisol in saliva was done in accordance with the recommendations above.

Assessment of children's drawings (III and V)

The Child Drawing:Hospital Manual (CD:H) was developed as a means of measuring emotional status. It is validated to measure anxiety in hospitalized children aged 5-11 (Clathworthy et al. 1999a) and includes 23 characteristic indicatives of anxiety, 16 of which appear on Koppitz' (1984) emotional indicators lists. The CD:H Manual's standardized instructions for the drawing procedure and equipment needed to administer the data collection of the drawings were followed (Clathworthy et al. 1999b) and all the children completed their drawings in comparable time frames (5-10 minutes) and under the same circumstances. It is worth bearing in mind that when a clinician/researcher requests a drawing from a child, the drawing may differ markedly from one the child produces spontaneously (Ryan-Wenger, 2001). It has been argued that children's drawings should be assessed over time, using more than one drawing, since repeated drawings can illuminate changes over time and may therefore serve as an outcome measure of an intervention (Di Leo, 1983; Ryan Wenger; 2001). The children did a drawing on two separate occasions (see data collection/*paper V*), showing that the anxiety levels, as assessed by the CD:H, decreased between the outpatient surgery department and the day of surgery. However, this was only significant in Part C and in the total CD:H score.

CONCLUSIONS AND CLINICAL IMPLICATIONS

This thesis (*paper I*) has provided descriptions of how boys aged 3-6 express and respond to postoperative symptoms up to 8 hours after day surgery. For boys of this age, it is difficult to distinguish between pain, nausea, and discomfort and they have different ways of expressing these symptoms. With a few exceptions, neither bodily nor verbal expressions were clearly related to pain or nausea. However, signs of being stiff as a poker, with high muscular tonus and drawn-up legs was often related to pain, whereas tossing and turning and restlessness/fidgeting were related to both pain and nausea. When assessing postoperative symptoms in young children, the nurse must therefore be aware of the difficulties that children of this age have to verbalize and distinguish their symptoms, as well as how they combine their concrete experiences and magical ways of thinking, for example, "I'm feeling well but my willie is in pain, it's crying". That means that the nurse in clinical praxis must actively 'draw out' the child's story to identify postoperative symptoms, devoting the time necessary to achieve this kind of assessment. As an aid in this 'drawing out' process, faces scales can be used as a communication tool that enables the dialogue to identify mood, rather than just rate pain.

Other findings show (*paper II*) that the main concern for 6-9 year olds undergoing day surgery (as described by themselves) is that they are put into an unknown, unpredictable and distressful situation which has to be endured. Nevertheless, perioperative dialogues with continuity of care (described in *paper II* and *IV*) seem to be beneficial to children undergoing day surgery, and I argue that the nurse anaesthetist can give the child support and a feeling of safety during their hospital stay through trustful negotiations and mutual loyalties. The value of being involved in a perioperative dialogue/s is that (1) the child, the parent(s) and the nurse perceive continuity – a familiar face to meet on the day of surgery (2) the child/parent(s) are offered sufficient time for a dialogue, which may increase the child's ability to endure distressful emotions as well as facilitate interpersonal trust and control during the perioperative procedures (Lindberg & von Post, 2006) and finally, as found in *paper IV*, (3) reduce the development of stress response postoperatively as confirmed by salivary cortisol.

For the child and their parent(s) this may probably prevent unnecessary concerns about further contact with healthcare and health professionals. Consistent with this is the fact that if children master difficult situations, their self-esteem will increase (Linge, 2008), implying that the ethical responsibility of health professionals to address children in a manner that they can comprehend cognitively is paramount. These are important reasons for implementing the PD in clinical praxis, especially for children with increased anxiety, as identified by the nurse anaesthetist and/or the anaesthesiologist at a preoperative outpatient unit some days to one week before the day of surgery. In addition, as a clinical outcome, the pre-, intra and postoperative dialogues create conditions for consistent meetings, knowledge and continuity in evaluating children's nursing. In *paper III* there was a translation of the original version of the CD:H manual and a psychometric evaluation of the Swedish version of the measurement tool. Evidence for adequate construct validity in Parts A and C (and total scale score), high inter-rater reliability and acceptable internal consistency reliability were

presented. About 98% of both the day surgery group and the school children had CD:H scores that indicated an 'average' level of anxiety or lower. 'Low' or 'very low' levels of anxiety were scored for 73% of the school children compared to 44% of the day surgery group. The number of items in the Swedish CD:H did not appear to differ sufficiently from one another to merit their inclusion as separate items. Eliminating superfluous items and making the tool more concise will therefore facilitate clinical utility.

The purpose of *paper V* was to explore the associations between physiological (cortisol in saliva) and psychological stress indicators (anxiety in children's drawings) interpreted by the Swedish version of the CD:H Manual. Salivary cortisol measurements at the outpatient surgery department and on the morning of the day of surgery were virtually the same as in Swedish, age-matched 6-15 year-olds sampled in the classroom (Törnåge, 2002; Törnåge & Alfvén, 2006). It is difficult to delineate if fear and/or anxiety is higher at the outpatient surgery department or on the morning before surgery. Our findings in this respect are contradictory, with salivary cortisol concentrations higher on the day of surgery than at the outpatient surgery department and a CD:H total score and Part C which were higher at the outpatient surgery department than on the day of surgery.

There were no associations between salivary cortisol concentration and the children's drawings (CD:H) in any of the parts or single items in the manual. This indicates rather convincingly that the two measurements/instruments reflect the condition from different angles, irrespective of whether they are measuring stress, distress, anxiety or fear. Which is the most "true" and clinically relevant is difficult to say, but it seems reasonable to believe that stress increases when arriving in hospital on the day of surgery. For this reason, we also believe that the increase in salivary cortisol when attending hospital on the day of surgery compared to when visiting the out surgery department is a "normal" expected level of increased physiological stress. Nevertheless, the 'normal' levels of stress/anxiety in both the child drawings and cortisol concentrations indicate that neither a visit to the outpatient department nor the thought of imminent surgery causes fear and/or anxiety at levels that are unmanageable for the child. This interpretation of our findings is supported by the fact that when the children were asked how they felt at that moment, they assessed themselves to be low (i.e. in a rather 'positive' mood) on the W-B scale on both occasions, giving a score of one, suggesting that Swedish children (at least those in our study) do not experience such high levels of increased stress/anxiety in connection to preoperative procedures associated with day surgery. However, drawings might be useful to health professionals in facilitating dialogue and/or play in children. This might also create opportunities for the child to be understood, which in turn might satisfy their need of "what to know".

This thesis contributes to a deeper understanding of how 3-11 year-old children undergoing day surgery experience and express their situation, symptoms and physiological stress in the context of the PD. Hospitalization for surgery obviously causes some degree of fear or anxiety in all children but is more severe in others. It would be an advantage if children with high stress or anxiety levels could be identified preopera-

tively, allowing individualized care to be given and preventive measures instituted. This might be facilitated through a preoperative outpatient unit for children where the nurse anesthetist or/and anesthesiologist meets the child/parents some days before surgery and finds out what specific needs the individual child has in this specific situation and moment. If a more severe anxiety is identified in this first step of the preoperative procedure, the PD is a possible complement to standard perioperative care. Such an approach will provide professional development for the operating theatre staff and would most likely increase the quality of care for children undergoing surgery.

FUTURE RESEARCH

Surgery is a particular area in which anxiety peaks during exposure to frightening but not painful stimuli (Blount et al. 2009) such as threatening medical equipment and environment when attending the operating room, unfamiliar faces with caps, mask placement at induction of anaesthesia, etc. Reducing perioperative stress is a goal for perioperative care. Pre-perioperative nursing and preparation is therefore by necessity the responsibility of the nurse anaesthetist or equivalent. In order to contribute to evidence-based knowledge on nursing for children undergoing day surgery these are all issues that need to be emphasized in nursing education and clinical praxis as well as in future research. Drawing conclusions from research findings is not the end of evidence-based nursing practice; it is crucial to ensure that the research findings can be used in clinical practice.

Paper IV in this thesis evaluates the efficacy of PD in a group of 5-11 year-olds scheduled for elective day surgery by analyzing their salivary cortisol levels in comparison with children who were given standard perioperative care with or without additional preoperative information. In the PD group, the child was accompanied by the same nurse pre-, intra- and postoperatively, with the purpose of creating continuity, a personal relationship, improving confidence and reducing anxiety and stress in the children. Minimizing the perioperative psychological threat to the children is of great interest for pediatric health professionals, and the PD approach seems to be family-oriented, child-friendly and effective. Future research should therefore focus on how to identify children who are at increased risk of developing pre-perioperative anxiety. To evaluate the usefulness of the PD in reducing pre-perioperative stress in children, the cortisol in saliva study design (*paper IV*) could be repeated by other nurse anaesthetists in a similar setting. Accordingly, future research is suggested to find the most appropriate content and form of instrument and approach to improve pre- intra- and postoperative programs in order to reduce anxiety in children undergoing day surgery.

SVENSK SAMMANFATTNING

Intentionen med denna avhandling är att få en djupare förståelse för upplevelser, symptom och fysiologisk stress hos barn som genomgår dagkirurgiska ingrepp samt hur de hanterar denna specifika situation – med andra ord ett försök att beskriva sjukhusvårlden utifrån barnets eget perspektiv och inom ramen för ”den perioperativa dialogen” (PD)* (Figur 1, sidan 27).

Att minimera pre-perioperativ stress och oro hos barn är en stor utmaning. PD är ett arbetssätt som använts i avhandlingen som ett komplement till sedvanlig perioperativ vård. Fördelarna med att bli omhändertagen enligt PD är att anestesijuksköterskan preoperativt (till exempel redan vid preoperativt besök på mottagning) kan förbereda barnet om det som ska hända. Detta gör att barnet ges möjlighet att reflektera omkring den förestående operationen samt att anestesijuksköterskan får en bättre chans att ingjuta trygghet samt ge det specifika stöd som barnet och familjen kan behöva.

Studie I är en kvalitativ studie där syftet var, att via intervjuer och deltagande observation, beskriva hur pojkar (n=14) mellan 3 - 6 år verbalt och kroppsligt reagerar och uttrycker postoperativa symtom. Pojkar i denna ålder visade sig ha svårt att särskilja smärta, illamående och oro och hade olika sätt att uttrycka dessa symtom. Detta bör sjuksköterskan vara medveten om samt att barn kan beskriva sina symtom på ett magiskt sätt, till exempel ”jag mår bra men min snopp gråter”. Sjuksköterskor bör ta ”den tid som behövs” för att lyssna på hur barnet beskriver sina symtom. Smärtskalor (med ansikten) (Figur 2, sidan 38) som ofta används för att värdera smärta på barn, kan även ses som ett verktyg i en dialog eller lek i syfte att identifiera barnets sinnesstämning snarare än att ’bara’ värdera graden av smärta.

Studie II är en kvalitativ studie av 20 barn (15 pojkar), 6-9 år gamla, som belyser barnens upplevelser av att genomgå dagkirurgi. Huvudproblemet för barnen visade sig vara att ”de tvingades in i en oförutsägbar och stressfylld situation”. De upplevde också att de ”uteslöts från sina dagliga rutiner” och ”mötte en okänd verklighet” samt att de var tvungna ”att uthärda en påtvingad stressituation. Initialt strävade barnen efter att ”skaffa sig kontroll” över situationen (till exempel genom att få information om vad som ska hända), för att sedan ”förlora kontrollen” (till exempel att bli yr av sedativ premedicinering) och de valde att ”samarbeta trots rädsla och smärta”. Postoperativt ”drogs en suck av lättnad av att allt var över” och barnen ”försökte att återgå till ett vanligt liv”. Viktigt är att sjuksköterskan/vårdpersonal har en kontinuerlig dialog med barnet (förälder) om vad som ska hända både före och efter operationen (eventuell smärta, illamående, svullet och/eller ”blodigt” operationsområde) samt att detta sker på barnets ’eget språk’. Sedativ premedicinering innan operation bör ej ges rutinmässigt utan efter en noggrann individuell bedömning.

Studie III värderar en till svenska översatt version av Child Drawing: Hospital Manual (CD:H), ett instrument som avser att mäta ångest/oro (sjukhusrädsla) hos barn (Clatworthy et al. 1999b). Teckningar från 59 barn, som skulle genomgå dagkirurgiskt ingrepp, analyserades och jämfördes med teckningar från 71 skolbarn i samma ålder

(5-11 år). Både barn som skulle genomgå dagkirurgi och barn i skolmiljö hade en CD:H poäng som indikerade en «genomsnittlig» eller låg nivå av oro/ångest. «Låg» eller «mycket låg» nivå fanns hos 73% av barnen i skolmiljö jämfört med 44% av barnen som skulle genomgå dagkirurgi. Till exempel, så var svagt penntryck, få antal färger samt litet utnyttjande av pappersarket korrelerade till oro/ångest (sjukhusrädsla). Den svenska versionen av CD:H visade sig ha en adekvat begreppsvaliditet, hög inter-bedömarreliabilitet samt acceptabel tillförlitlighet men innehåller skattningsdelar som verkar värdera samma sak, vilket innebär att vissa av dom är överflödiga och bör därför tas bort för att göra instrumentet mer kliniskt användbart.

Studie IV undersöker effekter av den perioperativa dialogen (PD) genom att analysera kortisolnivån i saliv hos 93 barn pre-perioperativt i samband med dagkirurgiska ingrepp och som omhändertogs på olika sätt. Barnen var mellan 5-11 år och fördelades slumpmässigt i tre grupper: Grupp 1: sedvanlig perioperativ omvårdnad (n=31), Grupp 2: sedvanlig perioperativ omvårdnad utökad med preoperativ information* (redan vid besök på mottagning) (n=31), Grupp 3: PD (inkluderar preoperativ information) (n=31). Grupp 3, som omhändertogs enligt PD-modellen, hade signifikant lägre nivåer av salivkortisol postoperativt jämfört med grupp 1 och 2. Av de barn som gavs smärtstillande medicinering postoperativt, fick barn i grupp 3 (PD-grupp) mindre morfin än de andra två grupperna. Resultatet kan tolkas som att oro/stress kan reduceras för barn vårdade enligt PD modellen.

I *studie V* undersöktes sambandet mellan en fysiologisk parameter (kortisol i saliv) och ångest/oro i barnets teckning (sjukhusrädsla) mätt med en svensk version av CD:H. Kortisolvärdet i saliv från barn som skulle genomgå dagkirurgi ökade från mottagningsbesöket till operationsdagen, men låg inom samma område som hos åldersmatchade, 6-15 år gamla barn i skolmiljö (Törnhage, 2002; Törnhage & Alfvén, 2006). Ökningen av kortisol i saliv på operationsdagen jämfört med värdet vid besöket på mottagningen tyder därför på en "normal" ökning av stressnivån. Barnens teckningar däremot visade ett lägre värde på ångest/oro på operationsdagen jämfört med mottagningsbesöket. Samband saknades således mellan salivkortisolkoncentration och teckningar. Detta tolkas som att kortisol i saliv och CD:H (sjukhusrädsla) mäter olika tillstånd, oavsett om det är stress, ångest eller oro. Resultaten i *studie V* kan vidare tolkas som att den svenska versionen av CD:H är inte tillräckligt känslig i detta sammanhang och med dessa unga deltagare, för att mäta små skillnader beträffande oro/ångest.

Sammanfattningsvis bidrar resultatet av denna avhandling till djupare förståelse hur 3-11 år gamla barn upplever sin situation när de genomgår dagkirurgi. En utveckling och förbättring av den perioperativa vården, med syfte att *identifiera* och *förebygga* oro/stress (sjukhusrädsla) kan starta med ett besök på en preoperativ mottagning för barn några dagar upp till en vecka före planerad operationsdag där PD kan erbjudas till barn med ett ökat omvårdnadsbehov. PD gör att barnet (föräldern) får kontinuitet i vårdandet då ett bekant ansikte möter upp på operationsdagen vilket även ökar möjligheten för barnet att känna tillit och ökad kontroll över situationen. Detta i sin tur har visat sig ge mindre stress postoperativt. Att kunna behärska svåra situationer

ökar chanserna till större självkänsla (Linge, 2008). Att behandla barn på ett sätt som de kognitivt kan förstå blir därför ett etiskt ansvar för hälso-och sjukvårdspersonal. Detta är viktiga skäl för att implementera PD i klinisk praxis, särskilt för barn med ett ökat omvårdnadsbehov och/eller starka rädslor. Ett sådant tillvägagångssätt, inkluderad en fortlöpande utvärdering av barn i den perioperativa vården, skapar även förutsättningar för kunskap och kompetensutveckling hos anesthesi/operationspersonal och torde med stor sannolikhet leda till ökad vårdkvalitet för barn som genomgår kirurgiska ingrepp.

Teckningar kan vara användbara som 'dörröppnare' för vårdpersonal i syfte att inleda och/eller underlätta en dialog/lek med barn som ska genomgå dagkirurgi. Teckningar kan också skapa möjligheter för barnet att bli förstått, vilket i sin tur kan tillgodose barnets behov av att förmedla vad han/hon vill veta eller förmedla. Slutligen, den svenska perioperativa vården tycks vara relativt välfungerande, förtroendeingivande och stödjande för barn och förälder.

*Den perioperativa dialogen; en modell som strävar efter kontinuitet genom en anesthesi- eller operationssjuksköterskas pre-, intra- och postoperativa dialoger med den patient hon/han skall vårda i samband med anesthesi och/eller kirurgiskt ingrepp och där syftet är att lindra patientens lidande och främja hälsa (von Post, 1999, Lindwall & von Post, 2009).

*Preoperativ information; Barnen blir informerade praktiskt och via bilder om vad som ska hända under vistelsen på sjukhuset; operationskläder, EKG, perifer venkateter, bedövningsplåster (EMLA), pulsoximeter, hur W-B skalan (smärtskalan) används samt att man kan få mediciner mot illamående och smärta postoperativt om det så skulle behövas.

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Have I told you lately that I love you
Have I told you there’s no one above you
Fill my heart with gladness
Take away my sadness
Ease my troubles, that’s what you do

- Van Morrison

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