SURGERY NURSES REDUCING ASEPTIC PRACTICE-RELATED STRESS

ABSTRACT

Aims and objectives. This paper aims to explore aseptic practice-related stress in surgery. The objectives are to define stress-related factors, and the means to reduce the stress.

Background. Occupational stress is related to personal characteristics; job satisfaction and physiological and psychological well-being. The stress symptoms are often classified as part of a negative mood. Nurses have expressed stress when deadening their conscience to external demands with co-workers, or internal working role-related demands. Surgery nurses expect fair division of work and compliance with rules. The hospital management, technology and the medical profession, instead of the needs of the patient are recognized as a danger in the development of surgery nurses' role.

Design. A qualitative stimulated-recall interview was performed in the surgery of the university hospital.

Methods. Thirty one operations were videotaped and 31 nurses interviewed during videotape stimulation. The 1306 text pages were transcripted and analyzed by a qualitative membership categorization device analysis.

Results. The analysis revealed aseptic practice-related stress which constructed a sixteen level category. The membership categorization identified connections between qualitatively attributed personnel and seven stress factors: working experience; time; equipment; person; patient; working morals, and power. Final analysis revealed nurses reducing aseptic practice-related stress by safe; peaceful; competent, and relative means.

Conclusions. The aseptic practice-related stress varied from positive motivating feelings to exhaustion. The stress was experienced by medical and nursing coworkers, and reduced by means which varied according to expertise and coworkers.

Relevance to clinical practice. This study showed needs for both the shared multiprofessional documentation of aseptic practice and better adherence to recommendations. Constructive means are useful when solving conflicts and replacing person-related aseptic practice with evidence-

based. They may support nurses' professional growth, reduce their stress and increase the surgical patient's safety.

Keywords: Aseptic practice, clinical research, nursing, occupational stress, surgery, operation, stimulated-recall interview.

INTRODUCTION

The stress that surgery team members experience is defined as one of the biggest challenges to be overcome to maintain collaboration and good patient care (Silén-Lipponen *et al.* 2002). Surgery nurses experienced the stress due to difficulties; uncertainty and changes when organizing work during emergency situations; in conflict situations due to insufficient flow of information (Silén-Lipponen *et al.* 2002); lack of time; and medical domination (McGarvey *et al.* 2004, Flint *et al.* 2006). They pointed out the importance of patient safety, fair division of work and compliance with rules when controlling the work-related stress in surgery (Silén-Lipponen *et al.* 2002, Flint *et al.* 2006).

Killen (2002) considered non-compliance with aseptic practice (AP) in surgery as a stressful moral dilemma reflecting a system-wide problem. AP is defined as a means to minimize wound contamination by ensuring the sterility of equipment and items in the sterile field during invasive procedures (AORN 1999). In international studies the compliance with infection control precautions is usually reported to remain suboptimal (Larson & Kretzer 1995, Pittet *et al.* 2000, Reilly *et al.* 2002, Flint *et al.* 2006) but Finnish nurses reported performance of AP as one of their strongest professional skills (Räisänen 2001, Tengvall 2010). To investigate the gap between the attitudes and compliance with AP some Finnish nurses have performed quality improvement projects. In the study surgery, AP has been developed in the contexts of: 1) preparation of the personnel and 2) preparation of the patient for the operation; 3) central services; 4) environmental services; 5)

aseptic behavior, and 6) aseptic technique during creation, maintenance and discharge of the sterile field.

BACKGROUND

In the findings of Stone *et al.* (2004) the occupational stress was found related to: personal characteristics; job satisfaction; physiological and psychological well-being. The stress symptoms were often classified as part of negative mood states, and people who were sensitive to punishment but not sensitive to rewards were more prone to stress (van der Linden *et al.* 2007). Nurses have reported stress when they had to deaden their conscience relating to external demands in order to be able to collaborate with coworkers, or internal demands in order to uphold identity as 'a good health care professional' (Silén-Lipponen *et al*. 2002, Juthberg *et al.* 2007). The hospital management, technology and the medical profession, instead of the needs of the patient and the principles of nursing were recognized as a danger in the development of independent surgery nurses' role (McGarvey *et al.* 2000) and professional performance of it (McGarvey *et al.* 2004, Flint *et al.* 2006).

Sørlie *et al.* (2005) found that nurses created self-demand in hectic and stressful care; worked alone; felt frustration due to time, organization and divided tasks, and responsibility for patients' well-being. In surgery, nurses had working hours and workload-related stress, and challenges were focused on physical patient care or on cognitive issues (Hjort Jacobsen *et al.* 2006). Long working hours was defined as a contributing factor for chronic fatigue syndrome among health care workers (Kara *et al.* 2008). On-call work as a stressor caused fatigue related errors, low mood, tension, frustration, depression and anxiety (Nicol & Botteril 2004). Flexibility allowed a surgery to be run with the smallest possible number of staff members and was more important than delivering 'good care' (McGarvey *et al.* 2004).

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When controlling their stress nurses were seeking assistance for physically diverse work from others (Sveinsdóttir *et al.* 2007) and they felt positive about team work (Silén-Lipponen *et al*. 1999 and 2002, Sørlie *et al.* 2005). Both physical and emotional resources were found to be important stress buffers (van den Tooren & de Jonge 2008). Support from peers was considered to be essential close to suffering patients in surgery (Torjuul *et al.* 2007). High decision authority; work predictability; support from supervisors; and skill discretion predicted significantly reduced numbers of absence days (Nielsen *et al*. 2004).

Stacciarini and Tróccolli (2003) found that constructive thinking and job satisfaction were inversely associated with occupational stress among nurses. Surgery nurses expressed empathy, flexibility, and caring to ensure positive experiences for patients. They used ethical conscience and clinical management to prevent or resolve conflicts, and constructive management techniques to direct attention away from budding conflicts (Chard 2000, Espin & Lingard 2001, Sigurðsson 2001, Riley & Manias 2002). Finnish surgery nurses perceived collegiality, ability to organize and anticipate work in open communication, and confidence in others' professional skills as demands of multiprofessional collaboration (Silén-Lipponen *et al.* 1999 and 2002).

Björn and Lindberg Boström (2008) found that nurses use the knowledge of a surgeon's personal ways to work and act when solving problems during an operation. Some nurses perceived looking after the surgeon as one of their responsibilities. They identified the nurses' choice "Keeping happy and not upsetting the surgeon" as a hostess role accomplished by talk and action (Timmons & Tanner 2005). Richardson-Tench (2008) criticized nurses for rejecting accountability for the patient by having a familiar relationship with surgeons and reducing the surgeon's stress by "social chit-chat". Silén-Lipponen *et al.* (2002) and Killen (2002) both reported surgery nurses being stressed due to the authority of surgeon. According to Killen (2002) it sometimes made it impossible for the nurses to follow the professional standards in AP. This led to suboptimal care; the surgeons continued the operation without proper consideration of potential complications. Both studies

reported that assertiveness was needed when the nurses solved working-morals related problems for the benefit of the patient.

This study aims to explore AP-related stress among surgery nurses. The objectives are to define stress-related factors, and the means to reduce the stress experienced by supervising circulating surgery nurses (SNs). The specific study questions:

1) How did the SNs define the AP related stress during breast operations?

2) What were the AP-related stress factors during breast operations?

3) How did the SNs reduce the AP-related stress during breast operations?

METHODS

Design

This qualitative study was performed as stimulated-recall interviews of SNs to describe and explain the social conditions under which AP as organizational work was and was not done effectively during surgery. As is typical for a qualitative method the focus of the study was clarified during the research procedure: during the interviews the performance of recommended AP showed to be a source of stress for SNs. This study answers questions about the how and why of organizational outcomes of AP-related stress and the means of reducing it. The study provides an inside standpoint to reveal possible unintended consequences of recently documented AP-policies and procedures in one surgery. It contrasts the outside perspective with the inside perspective when focusing on the details of surgery professionals' shared organizational knowledge; their everyday actions, and multiprofessional interaction in performance of AP (Miller *et al.* 2004).

With this approach it is not the interview which is good or bad, but the ability of the analysis to explicate the routine grounds of the work. The interviewer and the respondent together assign the meaning to the interiors and exteriors they discuss (Baker 2004). When the interviewees were considered as interiors it was crucial to understand their role and responsibilities. In the study

surgery, nurses worked in varying roles: as members of anesthesia teams; recovery room teams, or in two roles in surgical teams. Usually they changed teams weekly, or daily when needed to be flexible. In the surgery team, the nurses varied their roles so that in every other operation they worked as a 'scrub nurse' and in every other operation they 'circulated' and 'supervised' (SN). All the nurses in the study surgery were registered professionals. That is why they prefer to call themselves 'supervising nurses' rather than 'circulating nurses'. In SN's role, in addition to traditional circulating nurses' tasks, the criteria and evidence-based assessment; supervision; and documentation of AP were important parts of the work. In the study surgery, the SNs considered themselves as important and permanent members of the surgical team, not assistants.

Data collection

The data was collected from February to June 2003 in one surgery department of Helsinki University Central Hospital (HUCH). The stimulated-recall interview was offered to all 34 nurses in the study surgery during breast operations. Thirty one nurses participated, two refused, and one did not work as SN.

Thirty one operations were videotaped as 3,358 minutes of visual data. The recordings started when the nurses created the sterile areas and ended when they discharged them. The videotaped time per operation varied from 42 to 213 minutes (mean 108 minutes). The stimulated-recall interviews of SN were audiotape recorded one or two days after videotaping.

During the data generation the researcher performed all the data collection, transcription and analysis. Before the SNs were interviewed the videos were looked through and the performance of AP was assessed by a semi-structured form. In this form the criteria for AP were culturally validated and detailed from AORN (1999) recommended practices by the researcher and the personnel of the study surgery together. The videotaped operations 1) provided the interviewee with a stimulus of the original situation; 2) improved the reliability of the data collection; and 3)

constructed a context and situation for clinical education (Jokinen & Pelkonen1996, Peräkylä 2004). In the interviews the SNs analyzed the AP performed during the operation. The interviewer stimulated reflections by asking questions like: "Please, tell me what is important in AP in this situation?", "Why did you behave like you did?", "How did you feel? ", and "How did you manage with the stressful situations?" The interviewees performed as their own controls so the interviewer confirmed her assumptions and conclusions during the interviews. By this, the aim was to improve the reliability of the data collection, and to reach as objective an inside and outside perspective of AP as possible (Baker 2004, Peräkylä 2004). The interviewer, a health care educator, has coordinated the AP-related quality programs in HUCH surgeries since 1996 including an observational assessment with a laser particle counter.

All but two of 31 stimulated-recall interviews were technically possible to transcript. The data consisted of 1306 text pages in Ariel 11 font with single-line spacing. All interviews were transcripted verbatim. The pauses during interviews were identified by three periods (…). The feelings of interviewees were interpreted during the operation and recordings, and written in parenthesis (like: uncertain, frustrated, worry). The noises in surgery made the transcription challenging.

Ethical considerations

The acceptance for this study was given by heads of HUCH and the ethics board of HUCH district. Nurses were informed personally. They were keen to discuss the performance of AP so the atmosphere in the study surgery was open. Written permission to videotape the operations was received from all patients after verbal and literal information. The signed consent was saved within patient records. Patient anonymity on videotape was ensured according to the demands of the ethics board. All physicians were informed via e-mail and personally. The final acceptance for videotaping was ensured verbally in the beginning of every operation from the patient and all the team members.

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Analysis of the interview data

The interview text of seven SNs was analyzed during a primary analysis. After reading the text "a membership categorization device analysis of interview talks" introduced by Barker (2004) was applied. As a result of the holistic impression the AP was constantly present in the surgery. In their talk the SNs identified stress as, not necessarily a negative attribute of the AP, but as a meaningful and important factor in performance of AP. This guided us to follow Baker's advice to reveal both the hidden and visible AP-related stress. In the primary analysis it existed on eleven levels: desire, experience, need, discomfort, problem, worry, uncertainty, frustration, tension, pressure and fear. The primary membership categorization identified surgeons; patients; nurses of surgical wards and emergency room; and younger, senior and student nurse colleagues in surgery as stress-related "members" of breast operations. The analysis revealed that competence rather than working years was important in stress management. The AP-related stress was worked through to look at the categories and attributions connections that members produce to find the "courses of social action" in stressful situations. Time, equipment, person, patient, working experience, morals, and power were identified as the attributions of stressful AP situations. The cultural validation for the primary findings was done with the whole nursing personnel of the study surgery during an interactional presentation of the categorical results before the final analysis.

During the first phase of the final analysis, all 1306 pages of text were read carefully. In the text, the description of stress, the cause of stress and the means to reduce stress were usually close together. The analyzing units included them all (Table 1). In the second phase the reduced text was analyzed, including the analyzing units only by themes and contents. A document file was created for each of the eight themes; seven files on the attributions of stressful situations in AP: *working experience; time; equipment; person; patient; morals;* and *power*, and the eighth theme on *descriptions of means to reduce stress* in the AP. The expressions concerning stress were recorded within the descriptions in all eight thematic files. The primary descriptions were enriched

during the final analysis. In the *working experience* theme nurses brought into the discussion one more dimension *"the demands"* as experiences of external expectations. It was distinguished from *"the needs"* as an internal source of mainly positive stress to perform AP. In *the morals-related stress* theme some nurses felt "*guilty of*" AP mistakes and blamed themselves for surgical site infections. Experiences of "*disrelish" and "exhaustion*" were identified as descriptions of extreme stress (Figure 1). It existed, for example, in the *power*-theme when a nurse had to act against one's professional morals due to a coworker's extremely unconcerned AP. During the analysis a new theme, *physical stress*, was identified within the *patient-related stress* theme.

During the third phase the thematic files were reduced and coded as the content classes. In the *person*-theme some nurses made visible the profession specific assumption, that 'nurses perform better AP than surgeons'. During the stimulated-recall interview this assumption was not verified. Then SNs explained lapses in AP by personal and gender-related variations in AP. After this finding the meaning of collective assumptions as cultural attributes became more visible and more AP-related assumptions were identified in the study surgery (Table 2).

In the fourth phase 'the socially particular' AP- related stress was emphasized by defining the membership categories and the means to reduce the stress (Figures 2 and 3). The AP-related stress factors were classified according to surgery team membership with qualitative attributes like *"fussy nurse colleague"* or *"the whole surgery team"* (Baker 2004:164). Next the generic means to reduce the AP-related stress were identified among all themes and all membership categories. This was done in order to reach the abstraction level which made visible the culturally particular description of AP-related stress, and the means to reduce it during breast operations.

RESULTS

Of the nurses who participated in the study, 28 were female and three male. They were between their 20's and 60's and had working experience from two months up to more than 30 years in

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surgery. All nurses had at least first level registered nurse qualification and a range of other educational and clinical qualifications. As this was a qualitative study, statistical representativeness and generability were not sought.

AP-related stress

In the analysis of the SN's talk, the AP-related stress was categorized as sixteen levels from positive motivating feelings of desire up to extremely stressful situations with exhaustion, feelings of total mismatch of professional and personal demands within the team. The stressful situations in AP identified during the analysis were: *working experience, time, equipment, person, patient, morals* and *power* (Figure 2).

In the SN's experiences of AP-related stress it was possible to recognize competence and working experience related variation. A senior SN identified stress related to the *experience* of her coworker or herself:*" I recognize a kind of competency in behavior of younger colleagues. Say… working experience of two to four years… a kind of feeling of competence is present… and then it bursts like a bubble when you understand things… and when you understand you respect more and are more afraid… competence is not expertise."*. A young SN had a desire to perform AP in as talented way as her more experienced colleague. She felt the lack of experience as a threat:*"… in spinal-level AP there is a threat that everything is wrong… and in thinking like: 'there is only one way to do things'… Critical thinking is harder."*

A young nurse felt uncertainty due to the run of AP procedures. In situations when there was *time* available the pressure to work more was present in the experience of an expert SN*: "From time to time I have a feeling that when you have finished your own schedule, you will have a wonderful bonus operation."* A less experienced SN needed time for the current operation and said: *"All the time the surgery schedule is on my mind. We have to do it during the working day. I am stressed. In my opinion, you should do one operation and then concentrate on the other..."* *"The pressure to*

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make turnovers faster" was present when one SN tried *" to avoid extra hours after a working day."*

Equipment was quite often a source of AP-related stress. Nurses felt worry about breaking expensive equipment during operations, or they were stressed about choosing the correct instruments or equipment: *"He says: 'I am not operating with these things…' …and then we change everything."*

The SNs had deep personal feelings and adjusted their AP according to *the person* they were working with:*"I personally have a more critical attitude with surgeons´ AP. And besides this I have to agree, that those who you know to have ... a kind of... aseptic looseness... you pay more attention to... but with those you know, and who have worked long... and you know are responsible... you expect that they work properly... " "After working a day with (a certain surgeon) you are exhausted because you have to be extra sharp all the time… and despite it… even though you are sharp… you recognize those situations and comment on them… and it does not help at all... So it is depressing."*

The *patient*-related stress in AP was visible during operations, for example as a need to document the obesity of the patient as a potential risk for infection. A young nurse was worried about harming an old patient's thin skin or had problems with patients' anatomical variances. The poor pre-operative preparation of the patient caused nurses feelings of frustration and the restless patient in regional anesthesia discomfort. *Physical* work demands were described as heavy and causing discomfort:*"It is heavy to hold the hand of the patient, but you just have to do it!"*

Working-moral-related stress as an open or budding conflict between the surgeon and nurses was often present in the surgery. Some of the interviewees felt very deep accountability for the patient as their moral responsibility. One of the senior nurses described: *"… we are accountable for the patient... we have to think on behalf of the patient. Not for our own sake… Not for the sake of*

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power and willingness to order. Those things are clearer for us than for the surgeons."

A SN with some working experience had got stressful *power*-related feedback after her performance of AP:*"I think that in principal... the surgeon has the final word."* She also had fear of being excluded from the surgical team due to active AP feedback on the surgeon. Additionally, a beginner as a surgery nurse was:*"... afraid of making the surgeon angry."* The experiences of being in the focus of power-related decision making concerning AP was not always related to the experience of the interviewee, a senior SN had experiences of:*"Surgical field being a battle field."*

The membership categories connected to AP-related stress

The membership categorization identified "qualitatively attributed" surgeons; patients; younger, senior and foreign-trained nurses, and student nurse colleagues as stress-related members of a surgery team during an operation (Figure 2). Equipment-related stress was connected to a demanding surgeon, novice SN, and with SN´s own practice as AP specialist being compromised during instrument counts and environmental contamination control.

Members causing time-related stress were either 'faceless', like the rhythm of working, or had faces of a pressing surgeon or SN her/himself. The busy surgery schedule and overall pressure were often experienced as individual feelings of inability to meet the work demands. Working-experience related negative stress was present when an AP-expert worked with junior surgeons or nurses. The stress was felt as positive when an SN worked as an AP-specialist 'in a dream surgery team'. Person-related stress was present when a hot-tempered surgeon; fussy co-worker; either nurse or surgeon with limitations on taking feedback or following recommendations for AP participated in the team.

Physical stress was experienced due to heavy patients, existence of patients´ body fluids and surgical smoke as occupational risks. Long operations caused stress by static body positions and limitations in taking care of personal needs. Restless patients and the varying roles in a surgery

team caused stress. Working morals and power-related stress were experienced due to co-workers with whom SNs felt it difficult to follow AP-recommendations.

Means to reduce AP-related stress

The nurses used situation and person specific means to reduce AP-related stress. The chosen means also varied according to the experience of the SN. When stressed by AP-related factors, a competent SN said*: "You should be able to pick up those things which help you to work faster."* A more experienced nurse described her work: *"We always work in a hurry but we must try to work in the right manner and be reasonable…"* An expert nurse described means in stress reduction:*"A nurse has to be independent and, sometimes, quite headstrong to have the right to work properly*". A novice nurse solved the budding conflicts in his own way: *"It is better to use the asking-strategy... not to give open feedback ... a little bit like asking: What happened? Did you notice?"* He felt professional pride despite limited experience: *"This is a practical profession, so I should think about this with professional pride. So I am able to say after the operation: 'I have done this!' I'll do things with care, because this is meaningful for me."*

The generic means to reduce AP-related stress by safe; peaceful; competent, and relative nursing practice were categorized during the final analysis of all stress factors and the membership-related means to reduce stress. *Safe practice* included exact, anticipative and ensuring performance of AP during an operation. *Competent practice* was constructed of responsible, patient centered, collegial and a skilled means of reducing stress. *Peaceful practice* was facilitating and silent. *Relative practice* included both passive and active withdrawal, and person and situation specified means to reduce the stress. (Figure 3)

DISCUSSION

The goal of the study was objective and credible descriptions of a social world in surgery in the

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context of AP-related stress. The operations were video recorded to achieve accuracy and inclusiveness in data collection. The truthfulness of the analytical claims was tested by audio recording the stimulated-recall interviews (Peräkylä 2004). The question of "how much to record" was present in this study during the whole process. The relatively large amount of data made it possible to obtain variation in AP-related stress. For example, the expressions of the pilot analysis were enriched by rare cases in which the surgeon annulled to a great extent nurse's AP or a SN with long working experience was not able to get feedback concerning AP. Without these observations the social assumptions of AP, as well organized professional practice based on mutual confidence and acceptance among surgery teams, would be the main result of the study.

As Baker (2004) described, the data was generated, not only collected. The accounts of SNs' answers to the interview questions challenged the cultural assumptions and revealed the reality of AP and team membership in surgery. In this study the persistent cultural assumption concerning well-performed AP (Räisänen 2001, Tengvall 2010) was compromised. The membership widened beyond the traditional nurse – surgeon relationship. The rich mutual competence-related hierarchy of nurses became visible. The videotaped operations provided both the interviewer and the interviewee with stimuli of the original situation, improved the reliability of the data collection, and constructed a possibility to verify the interpretations which the interviewer made during the structured analysis of AP. The interpretations and both the verbal and visible reactions of the interviewees' were discussed during the interviews, transcripted and used during the whole analyzing process. In many cases, the interviewees broadly described the situation and justified their behavior. (Jokinen & Perälä 1996, Baker 2004, Peräkylä 2004).

The aim of the simultaneous classifications of all themes was the accurate and truthful content for each theme (Peräkylä 2004). In this study the interviewed SNs described power and working morals-related stress similarly to the nurses in the studies of Silén-Lipponen *et al.* (2002), (Killen (2002) and Flint *et al.* (2006). The accuracy and inclusiveness were difficult to reach between the

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power- and moral- themes. Among nurses, the power existed in interaction between experienced and novice nurses, and nurses and medical students. Sometimes the quality of power was more like professional protectionism to give the best possible clinical education for future colleagues, than the use of hierarchical power to make clinical decisions contrary to mutual previous agreements, as it was when the surgeon annulled nurses' AP. The performance of AP contrary to nurses' own professional values turned out to be consequences of coworker's, not only surgeons', extreme unconcern of AP. It led to experiences of professional exhaustion arising from the helplessness as a nurse to provide good nursing care.

In this, as in any other qualitative study, all the aspects of social organization were not described (Peräkylä 2004). For example, the effects of on-call work on the AP were not discussed deeply during the interviews. All the operations took place during morning shifts, but it may be possible that the previous on-call shifts affected the performance of AP. The nurses' experiences of AP-related stress was at the focus of this study, the results and the cultural assumptions showed that in the future it would also be important to study the surgeons' points of views more closely. Surgeons and nurses share these experiences in the sterile field and more careful participation of surgeons in AP is both an ethical and patient safety issue. The findings of Flin *et al.* (2006) challenged the cultural assumptions of SNs by showing that surgeons are concerned about patient safety as the nurses are.

A lot of time was used to transcript, analyze and translate this challenging data. This may be considered as a bias or as an advantage when reporting as ethically and methodologically demanding an issue as AP. The potential correlations between AP and surgical infections are difficult to prove and they are contaminated by several variables, like AP-related stress.

In the study surgery, the visible, hidden or relative factors for AP-related stress were defined via: time; equipment; person; patient; work experience; working-morals; power, and physical stress.

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Our findings get support from international literature. In Sigurdsson's study (2001) the meaning of being a perioperative nurse was defined as arising out of three patterns: money, power and forces of colonization. The regulation of space and time to maintain the integrity of the sterile field was earlier identified as a focus of clinical management in surgery (Riley & Manias 2002) and as a dominant catalyst for tension between surgeons' and nurses' in communication (Espin & Lingard 2001). In the study of Flint *et al.* (2006) surgery personnel were reported more likely to make more errors in tense or hostile situations. Due to patient safety it is important to improve the working atmosphere in surgeries.

The AP-related stress factors in this study were like the ones introduced in international literature: surgeons using power and 'personal' supplies (Timmons & Tanner 2005), and working-morals-related problems like the breaks in sterile technique (Killen 2002). In the study surgery, the presence of potential infectious diseases and hazards was a stress factor when working with a careless or fussy colleague. Nurses frequently referred to surgeons' bad tempers, shouting and tantrums (Silén-Lipponen *et al.* 1999*,* Timmons & Tanner 2005). They did not want to upset surgeons and used conversation in stress reduction. An interesting difference was found in the means of reducing the stress caused by instruments: SNs in the UK hide instruments for the surgeon (Timmons & Tanner 2005). Nurses in the study surgery hide instruments from the surgeon. The difference may be explained by levels of expertise and activity in work (Silén-Lipponen *et al.* 2002, Torjuul *et al.* 2007). In this study the expert nurses used their expert power, were cunning, but also turned a blind eye to the 'hopeless person'. Competent SNs did not want to disturb the surgeon's AP due to "the peace in the surgery". Novice nurses felt that they were 'not in a position to give feed-back to a surgeon or senior colleague'. In this study most SNs, like the nurses in the study of Killen (2002), wanted to keep the surgeon happy and argued for it by advocating the best interests of the patients. Some were assertive when needed, as in the studies of Silén-Lipponen *et al.* (2002) and Flint *et al.* (2006*), some withdrawal, as in the study of* (McGarvey *et al.* 2004).

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Nurses' reactions to coworkers' actions was introduced by a scale with a wide range of emotional responses to stress. Both surgeons and nurses awoke strong emotions. In the study surgery, the hierarchy between and within professions was present in the working-morals and power-related AP. As in international studies, some SNs reported it existing between surgeons and surgery nurses, some between junior and senior nurses (Silén-Lipponen *et al.* 2002, McGarvey *et al.* 2004, and Flint *et al.* 2006). It was found to lead to negative skill discretion in AP-performance. SNs did not always have freedom or authority to make judgments and to act as they saw fit. According to Nielsen *et al*. (2004) the lack of professional authority and support from superiors may lead to increased absence as a predicator of occupational stress.

A potentially increasing future stress factor was the lack of knowledge concerning the education and the clinical competencies of a foreign-educated nurse co-worker. The difference in clinical competencies, cultural sensitivity, and working morals are the concerns about foreign-educated nurses (Stone *et al.* 2004). The ability to trust all the colleagues was found necessary in AP also by Björn and Lindberg Boström (2008), Silén-Lipponen *et al.* (2004) and Flint *et al.* 2006. That is why it is important that surgery personnel can talk to one another; support each other, and agree with each other (Sørlie *et al.* 2005, Juthberg *et al.* 2007, Torjuul *et al.* 2007, and Flint *et al.* 2006).

The means to reduce AP-related stress were bipolar: the SNs balanced carefully between supplicant and rebel; between surgeon's perceptions and goals, and their own ones. The SNs were not necessarily obedient servants of surgeons. The choice of which means they used was often person and situation specific. Some nurses ensured professional survival in demanding situations or with demanding persons. They behaved like surgery nurses in the studies of McGarvey *et al.* (2004) and Björn and Lindberg Boström (2008) where the main concern of some nurses' was to be prepared for the operation. Timmons and Tanner (2005) defined the role of surgery nurses as that of a hostess and their means to reduce work related stress as

unprofessional. In this study some nurses, like nurses in studies of Silén-Lipponen *et al.* (1999), Chard (2000), Espin and Lingard (2001), Sigurðsson (2001), Riley and Manias (2002), and Bianchi (2008), practised ethically for the good of the patients. They expressed empathy, flexibility, and caring in teamwork, and ensured positive experiences for their patients. This constructive strategy may be useful when decreasing the stress of SNs. It may also increase the independence, and improve the role definition of the SNs in the context of AP (McGarvey *et al.* 2000, Flint *et al.* 2006).

The results of this study showed that despite competent Finnish surgery nurses efforts to advance good AP, there still are challenges to reducing the obstacles in order to reach 'Scandinavian equality' and increase the professional courage to advocate the patients' best interests in the surgery team. Some SNs valued both the technical expertise and the courage to exhibit their professional expertise under pressure. The findings showed that the surgery nurses are in a position where it is possible to construct professional expertise in AP by hard clinical work, use of evidence-based knowledge and development of clinical means to advance AP as a professional skill. As Finnish philosopher, Ilkka Niiniluoto (1993, 1996) stated, the technical norms bind only those who accept their value basis.

CONCLUSIONS

In this study AP-related stress was found to be an important part of surgery work. It was present as negative and positive experiences related to both medical and nursing coworkers. SNs reduced their AP-related stress by turning a blind eye, giving feed back or expressing clinical expertise in AP. The means they used varied according to the level of SN's expertise and were coworker and situation specific. That is why constructive means are recommended when solving conflicts and replacing person-related AP with evidence based one. This would support professional growth, reduce stress and by these, improve the surgical patient care.

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RELEVANCE TO CLINICAL PRACTICE

The results of this study supported the findings of Silén-Lipponen *et al.* (2002) and Flint *et al.* 2006 when pointing out the need to create evidence-based recommendations for AP in multiprofessional co-operation to secure the well-being of the all personnel in the surgeries. In the context of evaluative programs it is possible to increase the understanding of AP performed neither without harming the surgeon nor on the behalf of the nurses only, but of all patients, all personnel and the safe surgery environment. The findings support the need to decrease time-related stress in surgery to prevent the personnel from suffering chronic fatigue syndrome (Kara *et al.* 2008, Nicol & Botteril 2004). Also, it would be useful to study time-related stress more as a risk for patient safety (Flint *et al.* 2006).

The results of this study like the ones of Silén-Lipponen *et al.* (2002), Storch & Kenny (2007) and Flint *et al.* (2006) showed the need for joint education; supporting members of personnel in fulfilling their multiple commitments; recognition of the conflicts; planning actions to reduce conflicts; and learning to work in collaboration. All these would be useful and cost-effective ways to decrease the stress and stress-related absence in surgery (Nielsen *et al.* 2004). Learning from errors and near misses as exemplars of system vulnerabilities might possibly provide direction for developing improvement strategies for clinical AP (Jeffs *et al.* 2008). It also may increase the interest in surgery nursing as a professional career in the future. A shared multiprofessional agreement and documentation of AP is needed to increase the adherence to AP recommendations. Sound practices and ongoing education may be useful when improving and solving nurses' occupational infections; recruitment, and retention problems (Silén-Lipponen *et al.* 2002, Stone *et al.* 2004, van den Tooren & de Jonge 2008).

CONFLICT OF NTERESTS

There is no conflict of interests to declare.

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Study Design: T-KA

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Table 1 The themes of stressful aseptic practice (AP) situations and number of units of analyzes concerning AP-related stress and means to reduce the stress.

The themes of stressful AP situations	Pages of text/ number of units of analyzes
Working morals-related stress	93 / 353
Person-related stress	69 / 380
Working experience-related stress in general	63 / 208
- process of professional growth	5 / 62
- characteristics of competence levels	16 / 217
Equipment-related stress	40 / 193
Time-related stress	26 / 119
Power-related stress	36/ 130
Patient-related stress	10 / 29
Physical stress	2 / 15
The means to reduce the AP-related stress	95 / 396

Table 2 General aseptic practice (AP)-related assumptions as cultural attributes during breast surgery.

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- Surgical practice is based on the trust in proper AP of all co workers (explicit need).

- It is impossible to observe AP of co workers all the time (explicit experience).

- It is not possible to realize all AP recommendations literally in real life due to limited space in surgery (explicit experience).

- Senior surgeons perform old habits in AP instead of documented AP recommendations (explicit experience).

- Junior surgeons learn AP recommendations from surgery nurses (explicit experience).

- Novice nurses, junior surgeons, nursing and medical students need more supervision in AP than more experienced professionals (explicit need).

- The surgeon is an expert in surgery and surgery nurses in AP (explicit experience).

- Limited time resources are part of surgery work but not an excuse for breaks in AP (explicit experience).

- Surgery time is expensive (explicit experience).

- Saving costs is essential in surgery nursing (explicit experience).

- Preparing the next operation during the current one is an effective way to save surgery time (explicit need).

- Intact gloves are important part of infection control (implicit need).

- Use of hair, mouth and nose cover, and levels in the sterile field are not an important part of infection control (implicit experience).

- Novice nurses do not have full responsibility for AP in surgery (explicit experience).

- A novice nurse is not in a position to give feedback to a senior colleague (explicit experience).

- All members of surgery personnel are experts in AP (explicit experience).

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Surgery nurses reducing AP-related stress

Figure 1 The aseptic practice (AP)-related stress in the talk of surgery nurses.

Surgery nurses reducing AP-related stress

Membership by sources of AP-related stress (number of expressions)	
EQUIPMENT-RELATED STRESS (91) with a surgeon needing extra sterile-supplies with a surgeon needing personal sterile-supplies as a nurse having no training for new equipment as a nurse with sharp items at risk of injury as a nurse decreasing the risk of contamination with a novice supervising nurse with a surgeon expecting the right instruments as a nurse counting instruments as a nurse controlling environmental contamination	**TIME-RELATED STRESS (69)** with a surgeon being late with a waiting surgeon as a nurse practising in a busy situation (faceless member) with too lengthy operating lists (faceless member)
WORKING EXPERIENCE-RELATED STRESS (66) as a nurse when a young surgeon dares not ask for help as senior colleague of a novice nurse in surgery as a colleague of a nurse with a foreign education as a novice nurse in surgery as a team member in an expert team	**MORAL-RELATED STRESS (48)** with a surgeon not performing AP with a colleague having loose morals in AP as a nurse maintaining one's own professional know how as a surgery nurse in general
PERSON-RELATED STRESS (47) with a hot-tempered surgeon with a fussy co worker with a co-worker unreceptive to feedback with a co-worker disagreeing on AP-related principles with a senior surgeon not complying AP recommendations when working in different surgery nursing roles	**POWER-RELATED STRESS (42)** with a surgeon not performing AP with a senior nurse co-worker not performing AP as a legally responsible professional
PATIENT-RELATED STRESS (17) with a patient at risk due to breaks in AP with a patient having potential complications with a patient as a potential source of contamination with a restless regionally anesthetized patient	**PHYSICAL STRESS (15)** with a heavy patient as a nurse at risk of blood contamination as a nurse at risk due to surgical smoke as a nurse working in a long operations as a nurse using heavy personal protective equipment as a nurse working long in same static position as a nurse having insistent personal needs during an operation

Figure 2 Membership categories by sources of the aseptic practice (AP)-related stress during breast surgery.

Surgery nurses reducing AP-related stress

in-time practice practice in good order practice by exact working manners	**exact practice**	**Safe practice**
priorizing practice promoting practice preventive practice	**anticipative practice**	
protective practice controlling practice corrective practice	**ensuring practice**	
time taking practice peacefully practice slowing down practice conflict free practice constructive practice	**facilitating practice**	**Peaceful practice**
practice with quiet critics by silent service silent communication	**silent practice**	
reflective practice AP adherent practice	**skilled practice**	**Competent practice**
sharing practice respective practice	**collegial practice**	
accountable practice participative practice	**patient centered practice**	
practice with responsible documentation practice with pertinent feedback practice with critical responsibility practice with pertinent reasoning observative practice	**responsible practice**	
position specific active withdrawal passive withdrawal accountably withdrawal	**withdrawal practice**	**Relative practice**
situation specific practice person specific practice foxy practice	**specified practice**	

Figure 3 Categorization of generic means to reduce the AP-related stress during breast surgery.