

# Dyspnea Experience and Quality of Life

among Persons with Lung Cancer  
in Palliative Care

INGELA HENOCH

Institute of Health and Care Sciences  
Göteborg University



The Sahlgrenska Academy  
at GÖTEBORG UNIVERSITY

COPYRIGHT © Ingela Hensch

ISBN 978-91-628-7062-1

Printed in Sweden by Intellecta DocuSys AB, Västra Frölunda 2007

To my family with love

# TABLE OF CONTENTS

|                                                              |  |           |
|--------------------------------------------------------------|--|-----------|
| <b>ABSTRACT</b> .....                                        |  | <b>3</b>  |
| <b>ORIGINAL PAPERS</b> .....                                 |  | <b>4</b>  |
| <b>ABBREVIATIONS</b> .....                                   |  | <b>5</b>  |
| <b>1. INTRODUCTION</b> .....                                 |  | <b>6</b>  |
| <b>2. THEORETICAL FRAMEWORK</b> .....                        |  | <b>7</b>  |
| THE SYMPTOM MANAGEMENT MODEL .....                           |  | 7         |
| <b>Palliative care</b> .....                                 |  | <b>9</b>  |
| <b>Nursing science</b> .....                                 |  | <b>9</b>  |
| <b>Symptom experience</b> .....                              |  | <b>10</b> |
| <b>Symptom management strategies</b> .....                   |  | <b>10</b> |
| <b>Outcomes</b> .....                                        |  | <b>11</b> |
| <b>3. REVIEW OF RELATED LITERATURE</b> .....                 |  | <b>13</b> |
| PALLIATIVE CARE .....                                        |  | 13        |
| SYMPTOMS .....                                               |  | 14        |
| DYSPNEA.....                                                 |  | 15        |
| <b>Patophysiology</b> .....                                  |  | <b>15</b> |
| <b>Descriptors of dyspnea</b> .....                          |  | <b>16</b> |
| DYSPNEA EXPERIENCE.....                                      |  | 17        |
| <b>Perception of dyspnea</b> .....                           |  | <b>17</b> |
| <b>Evaluation of dyspnea</b> .....                           |  | <b>17</b> |
| <b>Response to dyspnea</b> .....                             |  | <b>19</b> |
| NURSING SCIENCE DOMAINS.....                                 |  | 19        |
| <b>Personal domain</b> .....                                 |  | <b>20</b> |
| <i>Demographic characteristics</i> .....                     |  | 20        |
| <i>Coping</i> .....                                          |  | 20        |
| <b>Environmental domain</b> .....                            |  | <b>21</b> |
| <i>Social support</i> .....                                  |  | 21        |
| <b>Disease/illness domain</b> .....                          |  | <b>22</b> |
| <i>The lung cancer disease</i> .....                         |  | 23        |
| <i>Symptoms in lung cancer</i> .....                         |  | 23        |
| <i>Performance status</i> .....                              |  | 24        |
| DYSPNEA MANAGEMENT STRATEGIES.....                           |  | 25        |
| <b>Non-pharmacological strategies</b> .....                  |  | <b>25</b> |
| <b>Self-care strategies</b> .....                            |  | <b>26</b> |
| OUTCOMES .....                                               |  | 26        |
| <b>Quality of life</b> .....                                 |  | <b>26</b> |
| <i>QoL and related factors</i> .....                         |  | 27        |
| RATIONALE.....                                               |  | 28        |
| <b>4. AIM</b> .....                                          |  | <b>30</b> |
| SPECIFIC AIMS.....                                           |  | 30        |
| RESEARCH QUESTIONS.....                                      |  | 31        |
| <b>5. METHODOLOGY</b> .....                                  |  | <b>32</b> |
| RESEARCH DESIGN.....                                         |  | 32        |
| SAMPLE .....                                                 |  | 35        |
| <b>Setting</b> .....                                         |  | <b>35</b> |
| <b>Sample size</b> .....                                     |  | <b>35</b> |
| <b>Patients</b> .....                                        |  | <b>35</b> |
| METHODS .....                                                |  | 38        |
| <b>Measurements (Papers I-III)</b> .....                     |  | <b>38</b> |
| <i>Visual analogue scale of dyspnea and discomfort</i> ..... |  | 38        |
| <i>Cancer Dyspnea Scale</i> .....                            |  | 38        |
| <i>EORTC QLQ-LC13</i> .....                                  |  | 39        |
| <i>Hospital Anxiety and Depression Scale</i> .....           |  | 39        |

|            |                                                                                                |           |
|------------|------------------------------------------------------------------------------------------------|-----------|
|            | <i>EORTC QLQ-C30</i> .....                                                                     | 39        |
|            | <i>Assessment of Quality of Life at the End of Life</i> .....                                  | 40        |
|            | <i>Social Support Survey</i> .....                                                             | 40        |
|            | <i>Sense of Coherence Scale</i> .....                                                          | 41        |
|            | <i>Performance status</i> .....                                                                | 41        |
|            | <b>Content analysis (Paper IV)</b> .....                                                       | <b>41</b> |
|            | <b>Procedure</b> .....                                                                         | <b>41</b> |
|            | <i>Papers I-III</i> .....                                                                      | 41        |
|            | <i>Statistical analysis</i> .....                                                              | 42        |
|            | <i>Paper IV</i> .....                                                                          | 44        |
|            | <i>Analysis of interview data</i> .....                                                        | 44        |
|            | <i>Validity and reliability in qualitative studies</i> .....                                   | 45        |
|            | ETHICS .....                                                                                   | 46        |
| <b>6.</b>  | <b>RESULTS</b> .....                                                                           | <b>47</b> |
|            | VALIDITY OF THE SWEDISH VERSION OF CANCER DYSPNEA SCALE (PAPER I) .....                        | 47        |
|            | DYSPNEA EXPERIENCE (PAPER II) .....                                                            | 47        |
|            | <b>Factors related to dyspnea</b> .....                                                        | <b>48</b> |
|            | <b>Predictors of dyspnea</b> .....                                                             | <b>48</b> |
|            | QUALITY OF LIFE EXPERIENCE (PAPER III).....                                                    | 48        |
|            | <b>Dyspnea, emotional functioning and QoL over time</b> .....                                  | <b>48</b> |
|            | <b>Factors related to QoL</b> .....                                                            | <b>49</b> |
|            | <b>Predictors of QoL over time</b> .....                                                       | <b>49</b> |
|            | <b>Additional measurements of predictors</b> .....                                             | <b>49</b> |
|            | PRECEDINGS, EXPRESSIONS, CONSEQUENCES AND MANAGEMENT STRATEGIES OF DYSPNEA<br>(PAPER IV) ..... | 50        |
|            | <b>Precedings of dyspnea</b> .....                                                             | <b>50</b> |
|            | <b>Expressions of dyspnea</b> .....                                                            | <b>50</b> |
|            | <b>Long-term consequences of dyspnea</b> .....                                                 | <b>50</b> |
|            | <b>Strategies to manage dyspnea</b> .....                                                      | <b>50</b> |
| <b>7.</b>  | <b>DISCUSSION</b> .....                                                                        | <b>51</b> |
|            | SYMPTOM MANAGEMENT MODEL .....                                                                 | 51        |
|            | SYMPTOM CLUSTERS .....                                                                         | 53        |
|            | DYSPNEA EXPERIENCE.....                                                                        | 53        |
|            | <b>Perception and evaluation of dyspnea among patients with lung cancer</b> .....              | <b>53</b> |
|            | <b>Response to dyspnea</b> .....                                                               | <b>55</b> |
|            | NURSING SCIENCE DOMAINS .....                                                                  | 56        |
|            | <b>Personal domain: Coping capacity</b> .....                                                  | <b>57</b> |
|            | DYSPNEA MANAGEMENT STRATEGIES.....                                                             | 58        |
|            | OUTCOMES .....                                                                                 | 59        |
| <b>8.</b>  | <b>METHODOLOGICAL CONSIDERATIONS</b> .....                                                     | <b>61</b> |
|            | SAMPLE SELECTION .....                                                                         | 61        |
|            | RESEARCH DESIGN.....                                                                           | 62        |
|            | STATISTICAL TESTS .....                                                                        | 62        |
| <b>9.</b>  | <b>CONCLUSIONS</b> .....                                                                       | <b>64</b> |
| <b>10.</b> | <b>IMPLICATIONS</b> .....                                                                      | <b>65</b> |
| <b>11.</b> | <b>RECOMMENDATIONS FOR FUTURE RESEARCH</b> .....                                               | <b>66</b> |
| <b>12.</b> | <b>POPULÄRVETENSKAPLIG SAMMANFATTNING</b> .....                                                | <b>67</b> |
| <b>13.</b> | <b>ACKNOWLEDGEMENTS</b> .....                                                                  | <b>70</b> |
| <b>14.</b> | <b>REFERENCES</b> .....                                                                        | <b>72</b> |

## PAPERS I-IV

## ABSTRACT

**Background:** Dyspnea, a subjective, multidimensional experience of breathing discomfort commonly occurring in patients with incurable lung cancer, influences all aspects of life in the suffering persons. To optimally enhance quality of life (QoL) and to identify persons most vulnerable to this symptom, it is important to investigate how to assess dyspnea, how other symptoms and coping are related to dyspnea, and what the consequences of dyspnea are, especially on QoL.

**Aim:** The aim of this thesis was to describe how patients with lung cancer experience dyspnea and QoL over time when treatment options with curative or life-prolonging intent are no longer feasible.

**Methods:** The thesis has as its point of departure the Symptom Management Model (SMM). A descriptive design was used, with three quantitative studies and one qualitative study. Participants in the quantitative studies were 105 consecutive patients diagnosed with lung cancer, approached in palliative phase of disease. In the qualitative study, 20 of the patients with dyspnea were included.

Dyspnea, other symptoms, QoL, social support and coping capacity were measured with various questionnaires at baseline (Papers I and II) and some were repeated at 3, 6, 9 and 12 months (Paper III). Medical data, including performance status, were obtained from medical records. Narrative interviews with questions about dyspnea experiences and management were conducted and analysed using qualitative content analysis (Paper IV).

**Results:** More than half of the patients experienced dyspnea. Different aspects of dyspnea correlated positively with anxiety, depression, fatigue, cough, performance status and negatively with coping capacity. Lower coping capacity predicted dyspnea. Dyspnea, depression and global QoL deteriorated over time. Performance status, anxiety, depression, different aspects of dyspnea, pain and the meaningfulness component of coping capacity correlated with global QoL. Depression predicted QoL at 4/5 assessment points. Other predictors over time were coping capacity, anxiety, performance status, pain and social support. The CDS-S was found valid and reliable concerning criterion-related validity, convergent validity and internal consistency. The CDS-S correlated with the psychological dimension, but the visual analogue scale of dyspnea (VAS-D) did not.

In the content analysis emerged four areas comprising categories and subcategories, which all are presented in a model that could be used to gain a better understanding of the dyspnea experience. "Precedings of dyspnea" included circumstances contributing to dyspnea. "Expressions of dyspnea" consisted of physical features and immediate reactions. "Long-term consequences of dyspnea" included a changing life style and existential reflections. "Strategies for managing dyspnea" included bodily, psychological and medical measures.

**Conclusions:** Dyspnea is complex experience and should preferably be measured in a comprehensive way. The CDS-S proved to be a valid and reliable instrument to measure the dyspnea experience in patients in a palliative setting, which was also confirmed by the results in the qualitative study. The CDS-S was also found to better capture the emotional component of dyspnea than VAS-D could. Dyspnea increased over time and QoL deteriorated significantly from baseline to 3, 6 and 9 months and correlated strongly with anxiety and depression. Patients with lower coping capacity experienced higher levels of dyspnea and lower QoL. The meaningfulness component of coping capacity correlated with dyspnea at baseline and QoL over time. Dyspnea, as measured by the CDS-S, did not predict QoL, but depression was a consistent predictor of QoL. The consequences of dyspnea were life changes including limitations and increased dependence; and existential reflections. The patients used bodily, psychological strategies to manage their dyspnea. The results from the thesis could be useful when designing interventions to support patients in clinical practice and in research to evaluate interventions.

**Keywords:** Cancer Dyspnea Scale, CDS; Consequences; Content analysis; Coping; Depression; Dyspnea; Existential; Experience; Lung cancer; Management strategies; Palliative care; Quality of life; Reliability; Social support; Symptoms; Symptom experience; Validity.

## ORIGINAL PAPERS

- I. Henoeh, I., Bergman, B. & Gaston-Johansson, F. (2006). Validation of a Swedish version of the Cancer Dyspnea Scale. *Journal of Pain and Symptom Management* 31(4), 353-61.
- II. Henoeh, I., Bergman, B., Gustafsson, M. Gaston-Johansson, F. & Danielson, E. Dyspnea experience in patients with lung cancer in palliative care (Submitted).
- III. Henoeh, I., Bergman, B., Gustafsson, M., Gaston-Johansson, F. & Danielson, E. The impact of symptoms, coping capacity and social support on quality of life experience over time in patients with lung cancer. *Journal of Pain and Symptom Management* (In press).
- IV. Henoeh, I., Bergman, B. & Danielson, E. Experience of dyspnea in patients with lung cancer: Precedings, expressions, consequences and management strategies (Submitted).

Articles I and III are reprinted with permission from U.S. Cancer Pain Relief Committee.

## ABBREVIATIONS

|                |                                                                |
|----------------|----------------------------------------------------------------|
| AQEL           | Assessment of Quality of life at the End of Life               |
| COPD           | Chronic Obstructive Pulmonary Disease                          |
| CDS            | Cancer Dyspnea Scale                                           |
| CDS-S          | Swedish version of Cancer Dyspnea Scale                        |
| EORTC          | The European Organization for Research and Treatment of Cancer |
| EORTC QLQ-C30  | The EORTC Quality of Life Questionnaire with 30 items          |
| EORTC QLQ-LC13 | The EORTC Lung Cancer module with 13 items                     |
| HADS           | Hospital Anxiety and Depression Scale                          |
| (MOS) SSS      | (Medical Outcomes Study) Social Support Survey                 |
| NSCLC          | Non-Small Cell Lung Cancer                                     |
| SOC            | Sense of Coherence                                             |
| SCLC           | Small Cell Lung Cancer                                         |
| SMM            | Symptom Management Model                                       |
| QoL            | Quality of Life                                                |
| VAS-D          | Visual Analogue Scale of Dyspnea                               |
| VAS-Dis        | Visual Analogue Scale of Discomfort (caused by dyspnea).       |

## 1. INTRODUCTION

Persons who are stricken by lung cancer suffer from an often incurable disease as well as from associated symptoms and deterioration of quality of life (QoL). In 2004, the incidence of lung cancer was slightly above 3000 cases, representing 6.3% of all cancer cases in Sweden (Socialstyrelsen 2005). The relative 5-years survival was 10% for men and 15% for women. With such limited survival, QoL issues becomes especially important, along with prevention and relief of suffering from symptoms and other physical, psychosocial and spiritual problems (WHO 2002). Patients with lung cancer suffer from several symptoms, such as fatigue, dyspnea, pain, cough, loss of appetite and haemoptysis (Lutz *et al.* 2001). Dyspnea is a multidimensional sensation (American Thoracic Society 1999) and patients with lung cancer that experience high dyspnea levels have also been shown to experience significantly lower QoL levels (Lavoie Smith *et al.* 2001). Moreover, if the reason for the dyspnea experience is incurable cancer, this will influence all aspects of life in the suffering persons, reflected by QoL, concerning the persons' sense of well-being concerning physical, psychological, social and spiritual dimensions (Ferrell 1996; Haas 1999). Personal, environmental and health-related factors, such as coping capacity (Fok, Chair & Lopez 2005), social support (Tang, Aaronson & Forbes 2004) and symptoms (Borglin *et al.* 2005) are important to QoL experience.

Therefore, to enhance QoL as much as possible in patients with lung cancer it is important to identify the experiences of the most vulnerable persons. This may be done by investigating how to assess dyspnea, what the consequences of dyspnea are and how the dyspnea experience is related to other symptoms, QoL, coping and support from significant others. To delineate the occurrences of symptoms, their significance to QoL and the influence of coping strategies and social support, prospective, quantitative, longitudinal research has been proposed as the most appropriate (King *et al.* 1997; Cooley 2000). To describe and analyze the dyspnea experience, both qualitative and quantitative methods have been used. Symptom relief and QoL are important issues in palliative care. Most QoL studies in patients with lung cancer have been conducted during the treatment period (Kaasa 1989; Bergman 1991; Montazeri, Gillis & McEwen 1998). In contrast, the studies included in this thesis were conducted in patients with lung cancer when curative or life-prolonging therapies were no longer options. To get a more comprehensive picture of the dyspnea experience, this thesis has its point of departure the Symptom Management Model (Larson *et al.* 1994; Dodd *et al.* 2001) (Figure 1).

## **2. THEORETICAL FRAMEWORK**

A structural order of contemporary nursing knowledge has been suggested by Fawcett (2005), with metaparadigm as the most abstract level and thereafter philosophies, conceptual models, theories and at the most concrete level, empirical indicators. The present thesis includes the metaparadigm of nursing: human beings, environment, health and nursing. The philosophy that has inspired this thesis is the reciprocal interaction world view (Fawcett 2005), which regards human beings as holistic inasmuch as the parts are viewed only in the context of the whole. Human beings are seen as active and in constant interaction with the environment. Reality is multidimensional, context dependent and relative, which leads to a pragmatic view of inquiry (Creswell 2003). The holistic view of human beings is congruent with the chosen definitions of palliative care (WHO 2002), of QoL (Ferrel 1996) and of dyspnea (American Thoracic Society 1999). A conceptual model has been defined as “a set of relatively abstract and general concepts that address the phenomena of central interest to a discipline, the propositions that broadly describe those concepts, and the propositions that state relatively abstract and general relations between two or more of the concepts” (Fawcett 2005, p. 16). To be able to incorporate the metaparadigm of nursing with the holistic world view included in the definitions of palliative care, QoL and dyspnea, the Symptom Management Model was chosen as conceptual model. Although this model might not totally fulfil the above stated demands of a conceptual model as some of the concepts included in the model are more concrete, it deals with the central interests of the nursing discipline, e.g. symptom experience, and the metaparadigmatic concepts human beings, health, environment and nursing.

### **THE SYMPTOM MANAGEMENT MODEL**

This section describes the Symptom Management Model (SMM) and its major components and their relations to one another. The components in the original model are symptom experience, symptom management strategies and outcomes (Figure 1). The adaptation of the model as well as the concepts in the studies included in this thesis, i.e. dyspnea, QoL, other symptoms related to dyspnea in patients with lung cancer, coping strategies and social support, are shown in Figure 2.

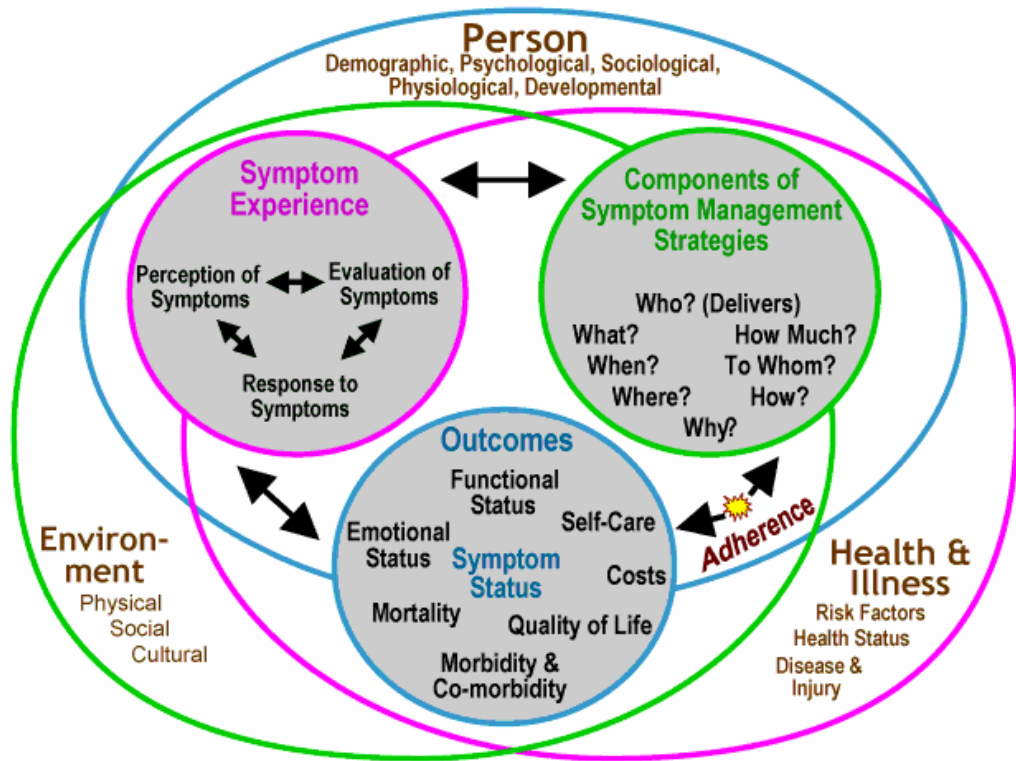


Figure 1. The Revised Symptom Management Model (Larson et al. 1994; Dodd et al. 2001; Research Centre for Symptom Management 2006).

The SMM focuses on the patient's own experience of the symptom (Larson et al. 1994; Dodd et al. 2001) and has been used in a variety of studies about symptoms (Gustafsson 1999; Dodd, Miaskowski & Paul 2001a; Larsen et al. 2004; Ahlberg et al. 2004) and to explicate barriers to effective symptom management (Jablonski & Wyatt 2005). The main components in the model are *symptom experience*, *components of symptom management strategies* and *symptom outcomes* (Dodd et al. 2001). The reason for elaborating the SMM was that it was considered that both medicine and nursing used too narrow scopes when dealing with symptoms (Larson et al. 1994). For medicine, the intention was to find causes of symptoms and to treat these. For nursing, the intention was mostly to help patients to cope with symptoms. These intentions were considered to be too restricted to fully help the patients to manage symptoms. Therefore, a biopsychosocial view of symptoms was adopted and it was considered that symptom experience, management strategies and outcomes were all important to be able to effectively manage symptoms.

Since the thesis was guided by the definitions of dyspnea, QoL and palliative care, which all comprise a holistic view of the suffering person, the SMM was adapted to focus mainly on the subjectivity of the individual's

experiences of symptoms and related factors. Adjustment of the model also made it possible to include the preconditions of the lung cancer disease.

### **Palliative care**

The WHO definition of palliative care (WHO 2002) concerns the QoL of patients with life-threatening illness, which is congruent with the SMM that places QoL as an outcome of symptom experience. The definition also stresses the relief of suffering concerning assessment and treatment of pain and other problems, physical, psychosocial and spiritual, which corresponds with the focus of symptom experience and management strategies in the SMM.

### **Nursing science**

The components of the SMM are influenced by the nursing science domains, which are the personal, the environmental and the health/illness domains (Figure 1). These domains have their origin in the metaparadigmatic concepts of nursing: human beings, environment, health and nursing (Fawcett 2005). Therefore, the SMM was considered useful to both nursing science and palliative care.

The personal domain includes the personal traits of the person, as demographic, psychological, sociological and physiological variables (Dodd *et al.* 2001). In the present thesis, the personal domain was represented by demographic variables as age and gender; as well as by self-rated coping capacity.

The environmental domain includes the physical, social, ethnic and cultural variables. In this thesis, the environmental domain was limited to the persons' rating of perceived availability of social support.

The health/illness domain comprises variables that are unique to the health or illness state (Dodd *et al.* 2001) and was in the present thesis adjusted to be able to highlight both objective and subjective variables. The differences between disease and illness have been described (Nordenfelt 1991; Tishelman, Taube & Sachs 1991). Disease concerns the biologic processes that cause the person to not be healthy and illness is the person's subjective experience of not being healthy. The health/illness domain in this thesis concerns both concepts related to the lung cancer disease, represented by type of lung cancer, presence of metastases, time since diagnosis and performance status as well as self-rated symptoms such as fatigue, cough and pain, relating to the patients' experience of illness. Therefore, this domain will henceforth be called disease/illness domain (Figure 2).

According to Fawcett (2005), nursing includes a mutual process between patients and nurses concerning assessment, labelling, planning, intervention and evaluation. These components of nursing are congruent to the main components of the SMM, namely symptom experience, symptom management strategies and outcomes.

### **Symptom experience**

The symptom experience consists of the perception, evaluation and response to symptoms. The main symptom included in the thesis was dyspnea (Figure 2).

*“Perception of symptoms* is a conscious, cognitive interpretation of information gathered by the senses in the context of a particular environment or situation” (Larson *et al.* 1994, p. 273) and refers to whether the person notices a change from his or her usual way of feeling or behaving (Dodd *et al.* 2001). The dyspnea perception in the thesis was represented by the occurrence of dyspnea.

*Evaluation of symptoms* characterizes the symptom experience and includes intensity, location, temporal nature, frequency, the associated pattern of disability and the threat posed by the symptom (Larson *et al.* 1994; Dodd *et al.* 2001). The evaluation of the symptoms is influenced by biopsychosocial factors. In order to capture the multidimensionality of the dyspnea experience, the following concepts were included to represent the evaluation of dyspnea: frequency, intensity, discomfort caused by dyspnea, dyspnea in relation to activity and the qualities of dyspnea. The latter of which, according to Lenz *et al.* (1994), reflects how patients describe the symptom.

The *response to symptoms* is physiological, psychological, sociocultural and behavioural, and is influenced by the biopsychosocial factors (Larson *et al.* 1994; Dodd *et al.* 2001). Behavioural responses, including verbal or social communication, are the objective expressions of a symptom. As the focus of the thesis was to describe the persons’ own experience relating to the dyspnea experience, the only responses studied were anxiety and depression.

### **Symptom management strategies**

Larson *et al.* (1994) stated that all troublesome symptoms need to be managed and symptom management should influence both the symptom experience and the outcomes. The goal of symptom management is to avert or delay a negative outcome through biomedical, professional and self-care strategies (Dodd *et al.* 2001). Interventions are targeted at one or more

components of symptom experience. The symptom management strategies included in the thesis were the patients' self-care strategies to manage dyspnea.

### **Outcomes**

Outcomes emerge from symptom management strategies and from symptom experience. The outcomes are symptom status as well as functional and emotional status, self-care ability, costs, QoL, morbidity or mortality, many of which are related to each other (Dodd *et al.* 2001). Since the focus of this thesis was to capture the persons' experience of dyspnea in palliative phase of the disease and because the main goal of palliative care is QoL, QoL was considered the most important outcome in the thesis.

To conclude, the SMM has been adapted to mainly focus on the persons' own experiences of aspects of dyspnea, some other symptoms and QoL, their ability to cope, their own perception of social support and to include some disease-specific variables.

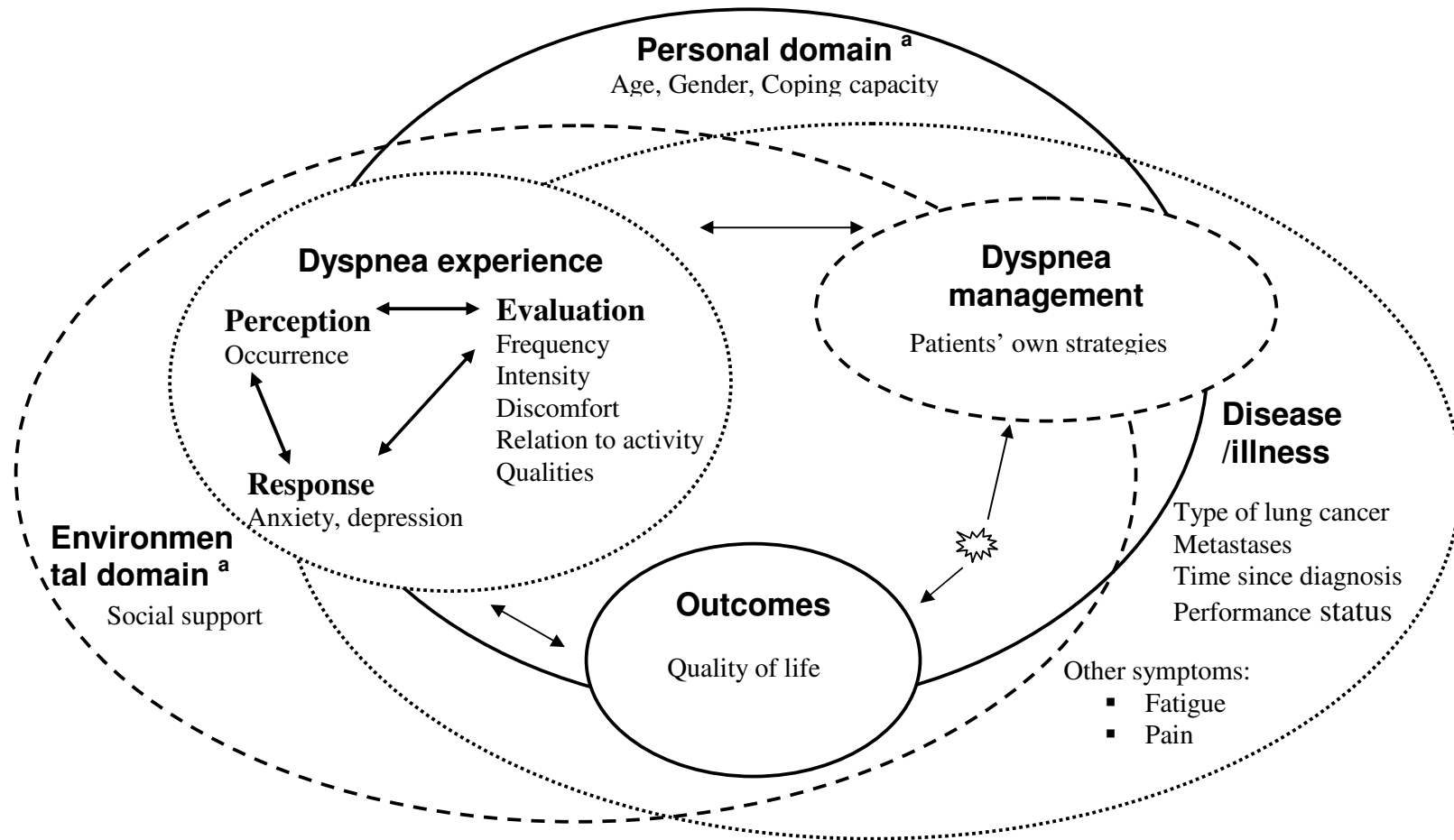


Figure 2. Dyspnea experience inserted in the adapted Symptom Management Model.<sup>a</sup> The nursing science domains are included as the personal, the environmental, the disease/ illness and nursing domains. Nursing is represented by dyspnea experience, dyspnea management strategies and outcomes in the model.

### 3. REVIEW OF RELATED LITERATURE

The main concept in this thesis is dyspnea experience and the following literature review concentrates on perception, evaluation and responses to dyspnea and factors assumed to influence the dyspnea experience as presented in the adapted Symptom Management Model (SMM). The literature review will first introduce palliative care followed by a description of symptom experience and then proceed with aspects of the dyspnea experience. Subsequently, the nursing science domains, i.e. the personal, environmental and disease/illness domains, will be delineated with special reference to factors from the domains that influence dyspnea. Thereafter, dyspnea management strategies will be described with focus on non-pharmacological and non-invasive strategies. And finally, outcomes, in the present thesis limited to QoL, will be described.

#### PALLIATIVE CARE

A growing interest in care of the dying patient evolved in the 1950s, stemming from a desire to improve the care for the dying, to meet the growing interest in euthanasia, dignity and meaning; to reverse the fatalistic attitude to the dying patient that "there is nothing more to do"; and finally to embrace a growing awareness of the interdependency of physical and mental health (Clark 2002). From this movement, called the thanatological movement, several models of dying have been elaborated, for example stage theory by Kübler-Ross, awareness trajectory model by Glaser and Strauss and coping/adaptation model by Weisman (Holritz Rasmussen 2000). In 1967, Cicely Saunders started St.Christopher's Hospice in London, which was the start of the modern hospice movement. Hospice was originally a resting place, situated along the pilgrim roads that took care of travelling, sick and dying pilgrims. The philosophy of the modern hospice movement includes an acceptance of death as a part of life, the significance of quality before quantity of life, and addresses the concept of total pain (Saunders 1979), with a focus on alleviation from physical, psychological, social and spiritual problems via an interdisciplinary approach. The Hospice philosophy has been adopted by palliative care, defined by the World Health Organization as:

Palliative care is an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and

treatment of pain and other problems, physical, psychosocial and spiritual. (WHO 2002 p. 84).

When a patient is stricken by a severe disease the initial aim of treatment will be to modify the disease; however, as the disease progresses the disease-modifying treatment declines and the main focus will be palliative care (WHO 2002). When the life-prolonging goal is impossible to reach, the main goal will be to enhance or at least maintain QoL. There are different goals possible to attain during the life-prolonging and palliative care periods, therefore it is reasonable to talk about an early and a late phase of palliative care, where the late period will be synonymous to hospice care, previously termed terminal care or simply end of life care (Hench 2002). One inclusion criterion for the patients in the studies in the present thesis was that treatments with curative or life-prolonging (i.e. disease-modifying treatment) intent were not meaningful. Therefore, the patients were considered to be in a phase where the focus of care was palliative, with symptom relief and maintenance of QoL as the main goals.

## SYMPTOMS

A symptom has been defined as “a subjective experience reflecting changes in the biopsychosocial functioning, sensations, or cognition of an individual” (Larson *et al.* 1994 p. 273). *Symptom experience* includes the occurrence of symptom and the distress caused by the symptom (McDaniel & Rhodes 1995). Symptom experience has also been described to include perception, evaluation of the meaning and response to a symptom (Dodd *et al.* 2001). In a concept analysis, symptom experience was described as frequency, intensity, distress and the meaning of symptom (Armstrong 2003). *Symptom occurrence* includes the frequency, severity and duration of the symptom (McDaniel & Rhodes 1995). *Symptom distress* includes the human response to occurrence, the degree of discomfort as a response to the symptom (McCorkle & Young 1978; McDaniel & Rhodes 1995). Rhodes *et al.* (2000) stated that symptom experience is an expression of the patient’s feelings about the total situation and includes both symptom occurrence and symptom distress as different entities that should be measured separately. In studies at the end of life, symptom distress remained in advanced cancer patients (Oi-Ling, Man-Wah & Kam-Hung 2005) and influenced QoL (McMillan & Small 2002). When applied to the SMM, symptom distress could be included in symptom evaluation (Dodd *et al.* 2001). Tishelman, Degner and Mueller (2000) reported in a pilot study

that there were discrepancies between the patients' ratings of the importance and intensity of symptoms. When the distress of symptoms in patients with lung cancer was compared with the intensity of symptoms and it was not the most intensive symptoms that were the most distressful (Tishelman *et al.* 2005). Dyspnea, pain and fatigue were the most distressing symptoms in this group of patients and fatigue was considered to have the highest intensity. Another way to discriminate between symptom severity and distress is to let the patients assess both severity and prioritization (Strömgren *et al.* 2006). After pain and physical function, dyspnea was prioritized highest by 175 patients with different sites of cancer.

The main focus of this thesis was the dyspnea experience, but other symptoms, such as anxiety, depression, fatigue, cough and pain, were included with the intention to describe their association to dyspnea.

## DYSPNEA

Dyspnea has been defined as a subjective, multidimensional experience of breathing discomfort influenced by physiological, psychological, social, and environmental factors, including secondary physiological and behavioural responses. It cannot be defined only by physical objective abnormalities (American Thoracic Society 1999; Ripamonti & Fusco 2002). The multidimensionality of dyspnea has also been expressed in models of dyspnea that include its physical perception, interpretation and physical, psychological and sociocultural consequences (Gift 1990; McCarley 1999), in a model for operationalizing dyspnea (McCord & Cronin-Stubbs 1992), as well as in an ecologic model of the dyspnea experience where individual and environmental factors are included (Steele & Shaver 1992).

### **Patophysiology**

The physiology of dyspnea is complex. There are three components in the patophysiology of dyspnea: the work of breathing component, the chemical component and the neuromechanical component (Thomas & von Gunten 2002). Breathing is controlled by the respiratory centre in the brainstem (Ripamonti & Bruera 1997), which receives information from receptors in the mechanoreceptors in the lung, airways and chest wall and from chemoreceptors in the brain or periphery. The work of breathing component in dyspnea includes the increased effort required for breathing against resistance or breathing with weakened muscles (Manning & Schwartzstein 1995; Thomas & von Gunten 2002; LeGrand 2002). The

chemical component especially concerns the medullary chemoreceptors that are sensitive to hypercapnia (Manning & Schwartzstein 1995). The neuromechanical dissociation refers to when there is a mismatch between what the brain desires for respiration and the sensory feedback it receives (Thomas & von Gunten 2002). Upper air-way and facial receptors may modify the sensation of dyspnea (Manning & Schwartzstein 1995). There are also receptors in the lungs and the chest wall that mediate the sense of dyspnea.

### **Descriptors of dyspnea**

Attempts have been made to distinguish between different descriptions of dyspnea that are assumed to refer to different types of dyspnea depending on the origin of the dyspnea experience (Scano, Stendardi & Grazzini 2005). Clusters of descriptors of dyspnea and connections to diagnoses were investigated in a study where patients with dyspnea due to various diagnoses were presented a list of descriptors (Simon *et al.* 1990). Fourteen clusters were found and three of them, namely gasping, effort and shallow, were associated with interstitial lung disease, i.e. sarcoidosis and idiopathic pulmonary fibrosis. Fifteen of the descriptors in the study by Simon *et al.* (1990) were subsequently used in a study in patients with asthma, COPD, chronic cardiorespiratory disease and lung cancer, classified by different manifestations, such as tumour mass, pleural effusion, collapse, metastases, pleural thickening and lymphangitis carcinomatosa (Wilcock *et al.* 2002). Cluster analysis was performed and connections with the diseases were examined. Ten clusters were found and the clusters out of breath and enough air were connected with all lung cancer manifestations, but these were also associated to most of the other diseases. Rapid/heavy was connected with pleural effusion, shallow with collapse, and work/effort with tumour mass and lymphangitis carcinomatosa. The clusters hunger and tight/constricted were connected with pleural thickening. In a study of patients with dyspnea due to different diagnoses, patients were asked for their own descriptions of breathlessness (Skevington *et al.* 1997). The descriptors were then presented to expert healthcare professionals who rated frequencies and connections of the descriptors to each other. A structure of the descriptors emerged with four classes, physical sensation, affective/evaluative, low energy and a fourth class which was divided in two subclasses, hyperventilation and speechless. In the study by Simon *et al.* (1990), none of the 48 included patients had lung cancer and in the study by Skevington *et al.* (1997), 15 of a total of 53 patients had cancer of different sites. In the study by Wilcock *et al.* (2002), there were 131 patients with lung cancer, but the descriptions they were presented and requested to choose

among were pre-determined and not elaborated among patients with lung cancer. Patients' with lung cancer own descriptions have been found to be "short of breath", "difficulty breathing", "hard to move air", "tired or fatigued" (Brown *et al.* 1986). Other descriptions included "not getting enough air" and "feelings of suffocating or tightness". There seems to be agreement that dyspnea concerns both physical and emotional experiences (Skevington *et al.* 1997; O'Driscoll *et al.* 1999) and that dyspnea could be described as being unable to get enough air (O'Driscoll *et al.* 1999; Wilcock *et al.* 2002), to gasp (Simon *et al.* 1990; Skevington *et al.* 1997; Wilcock *et al.* 2002), that breathing requires effort (Simon *et al.* 1990; Wilcock *et al.* 2002) and can be shallow (Simon *et al.* 1990; Wilcock *et al.* 2002). To date, it has not been possible to connect specific descriptors of dyspnea to the lung cancer disease.

## DYSPNEA EXPERIENCE

The following paragraphs will present literature regarding the dyspnea experience in the SMM described in Figure 2, where the dyspnea experience consists of the perception and evaluation of dyspnea, as well as the response to dyspnea. Since the experience of symptoms is subjective, patient self-report is the preferred method of measurement (Cooley 2000).

### **Perception of dyspnea**

Dodd *et al.* (2001) refer to perception of symptoms as the individual's observation of a change in usual feelings or behaviours. In this thesis, perception was included as occurrence. The occurrence of dyspnea varies between diagnoses, along illness trajectory and among settings (Ripamonti 1999).

### **Evaluation of dyspnea**

Evaluation of symptoms is a characterization of the symptom and includes several aspects such as, intensity, frequency and affective impact (Dodd *et al.* 2001) (Figure 2). Dyspnea has been described by patients with lung cancer as both physical and emotional sensations, such as feelings of being unable to get enough air, panic or impending death (O'Driscoll *et al.* 1999). Although the focus of the present thesis was the dyspnea experience and its components, the assessment of dyspnea also has to be acknowledged since it is one way to obtain knowledge of the patients' experience in research as well as in practice. This section outlines what ought to be measured and continues with examples of existing instruments.

A comprehensive assessment of dyspnea should include evaluation of the cognition, beliefs, and behaviours that reflects the patients' understanding of and responses to the disease (American Thoracic Society 1999), and antecedents, mediators, reactions and consequences (McCord & Cronin-Stubbs 1992). The antecedents are physiologic and psychogenic, such as anxiety. Mediators could be cultural background, environment, life experiences, including social support networks and psychological states. It has been recommended that a multidimensional instrument measuring different components of dyspnea should be used (McCord & Cronin-Stubbs 1992). In reviews of instruments measuring dyspnea/shortness of breath, no instrument was found that measures all dimensions of the symptoms (Mancini & Body 1999; Bausewein *et al.* 2006). To obtain a comprehensive description of dyspnea experience it is thus necessary to use several methods and instruments measuring different aspects of dyspnea.

There are several instruments to assess dyspnea and most of them concern intensity or severity. The most simple are the numerical, verbal or visual analogue scales (VAS) (Ahmedzai 1998). This graphic rating method was first described in 1921 (Hayes & Patterson 1921; MacDonald *et al.* 2005) and was first used to assess dyspnea in 1969 (Aitken 1969; MacDonald *et al.* 2005). VAS-D has been compared with Verbal Rating Scale of Dyspnea and found to strongly correlate (Dudgeon *et al.* 2001a). VAS-D has been recommended for daily assessment of dyspnea intensity (Mancini & Body 1999) or VAS in combination with other scales (Bausewein *et al.* 2006). A variant of numerical and verbal scale is the Borg scale using numbers anchored with corresponding text (Borg 1982; Kendrick, Baxi & Smith 2000). The Borg scale has also been used in advanced cancer patients (Chiu *et al.* 2004). Dyspnea has been measured in patients with lung cancer with QoL questionnaires. A scale elaborated to assess different symptoms and functions in cancer patients is the EORTC QLQ-30 (Aaronson *et al.* 1993), with a special module meant for patients with lung cancer (QLQ-LC13) that includes a dyspnea scale measuring dyspnea in relation to effort (Bergman *et al.* 1994). Dyspnea in patients with lung cancer has also been measured by Functional Assessment of Cancer Therapy with a supplement for lung cancer (Cella *et al.* 1995) and the Lung Cancer Symptom Scale (Hollen *et al.* 1993). The influence of dyspnea on daily life activities has been measured by the Shortness of Breath Questionnaire (Eakin *et al.* 1998). The Cancer Dyspnea Scale (CDS) assesses different parts of the physical dyspnea experience in cancer patients (Tanaka *et al.* 2000). It consists of twelve

items which could be grouped into three factors: a physical factor called sense of effort, a psychological factor called sense of anxiety and a factor reflecting the uncomfortable feeling at rest called sense of discomfort. This scale has not earlier been validated or used in a Swedish population.

### **Response to dyspnea**

According to Dodd *et al.* (2001), the response to symptoms concerns physiologic, psychological, sociocultural and behavioural responses to symptoms. The present thesis focuses on the patients' own experience of dyspnea and the physiologic, sociocultural and behavioural responses were considered to be responses not easily described by the patient, therefore, only psychological distress, in terms of anxiety and depression, was included as response to dyspnea perception and evaluation. Inclusion of these concepts was strengthened by the literature showing that symptoms that are likely to coexist together with dyspnea in patients with lung cancer are anxiety and depression (Lavoie Smith *et al.* 2001; Tanaka *et al.* 2002a). Patients with lung cancer were found to experience more anxiety and dyspnea than other groups of cancer patients (Heedman & Strang 2002). Anxiety and dyspnea were significantly correlated in patients with advanced cancer (Bruera *et al.* 2000) and in cancer patients at an outpatient clinic (Dudgeon, Lertzman & Askew 2001b). In a study of COPD patients, anxiety was seen as a sign of longstanding or acute respiratory failure and it was conjectured that anxiety might be an indicator of illness severity (Hill Bailey 2004). Findings from another study of patients with COPD indicated that patients could distinguish their dyspnea from the distress and anxiety associated with dyspnea (Carrieri-Kohlman *et al.* 1996a), such that distress and anxiety were considered as responses to dyspnea. In another study that divided the dyspnea experience into a sensory and an affective dimension, it was found that the affective dimension was more vulnerable to emotional influences (von Leupoldt *et al.* 2006). In the present thesis, anxiety and depression were regarded as responses, while distress as measured by discomfort was considered an evaluation.

### **NURSING SCIENCE DOMAINS**

The domains of nursing science i.e. person, environment and disease/illness, are contextual variables assumed to influence symptom experience, components of management strategies and outcomes (Dodd *et al.* 2001). These domains stem from the metaparadigm of nursing, where person refers to human beings that are participating in nursing; environment refers among others, to significant others; and health concerns human

processes of living and dying (Fawcett 2005). Similar contextual variables have also been used in medical models. Ripamonti and Bruera (1997) suggested a model where dyspnea is produced by chemical and mechanical receptors and the patient's perception is modulated by cultural background, environment, life experiences and psychological state.

### **Personal domain**

Although the personal domain concerns demographic, psychological, sociological and physiological variables (Dodd *et al.* 2001), only demographic characteristics and coping, with special reference to coping capacity, are included in the present thesis.

#### *Demographic characteristics*

Findings on the influence of gender on the dyspnea experience are inconsistent. In one study of patients with late stage lung cancer, men reported more severe dyspnea than women (Lavoie Smith *et al.* 2001), whereas in another study of patients with lung cancer women reported higher levels of dyspnea than did men (Tanaka *et al.* 2002a). Women with lung cancer were also found to report higher symptom distress (Degner & Sloan 1995; Cooley, Short & Moriarty 2002). Older patients with lung cancer experienced less distress than did younger patients (Degner & Sloan 1995).

#### *Coping*

Coping was defined by Lazarus and Folkman (1984 p. 141) as "constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person". Coping resources are social and personal characteristics people use when meeting stressful situations (Thoits 1995). Coping strategies are attempts of a behavioural and cognitive nature to manage demands which exceed the ability to adapt. Coping strategies can be directed at the demands (problem-focused) or directed to the emotional reactions to the demands (emotion-focused). Patients with lung cancer used a combination of emotion-focused and problem-focused coping strategies when meeting symptom distress and increased the number of strategies when symptom distress increased (Kuo & Ma 2002). Relationships were found between self-reported depressive coping and survival in patients with lung cancer (Faller & Schmidt 2004). Moreover, relationships have been found between coping, social support and QoL in patients with lung cancer diagnosed within the preceding six months (Downe-Wamboldt, Butler & Coulter 2006). The ability to manage meaning of illness was found to be the most important predictor of QoL.

Another perspective to coping focuses on the persons' resources to resist difficulties. Antonovsky (1979) found that people have different resources to face strain and named these resources Sense of Coherence (SOC). Sense of Coherence (p. 123) is "a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that one's internal and external environment are predictable and that there is a probability that things will work out as well as can reasonably be expected". This concept consists of the components comprehensibility, manageability and meaningfulness. Comprehensibility means that one perceives events in life as making cognitive sense, are ordered, structured and clear. Manageability reflects the extent to which the resources disposed by a person are perceived as adequate to meet demands in life. Meaningfulness means that at least some problems and demands in life are worth commitment and engagement. Persons with high SOC have been found to use more active problem-focused coping, to interpret a situation more positively and to be less likely to withdraw and give up (Pallant & Lae 2002). Although Antonovsky (1993) considered SOC, henceforth called coping capacity, a stable concept, later studies have demonstrated that it is amenable for interventions (Eriksson & Lindström 2005). Coping is a very large field of research, of which only a small portion has been outlined here.

### **Environmental domain**

The environment concerns physical, social and cultural variables (Dodd *et al.* 2001), but since the focus of this thesis was on the patients' own experience and their perceived environment, the environmental domain is here only represented by social support.

#### *Social support*

In nursing research and practice it is important to detect both the existence of social relations and their supportive qualities. Seeking social support is a basic strategy of coping (Lazarus 1992; Thoits 1995). In a concept analysis of social support, the attributes were determined to be emotional, instrumental, informational and appraisal support (Hinson Langford *et al.* 1997). Emotional support includes the provision of caring, empathy, love and trust. Instrumental support was defined as the provision of tangible goods or aid. Informational support is the information given during time of stress that assists in problem-solving. Appraisal support is information relevant to self-evaluation. Outcomes of social support were suggested to be personal competence, health maintenance behaviour, perceived control, positive affect, sense of stability, recognition of self-worth, decreased anxiety and depression, and increased psychological well-being (Hinson Langford *et al.* 1997). Other outcomes

were that the patients felt less negative emotions, felt protected, and maintained a sense of self-worth and identity (Hinds & Moyer 1997). Social support influences mental health (Finfgeld-Connett 2005) and relationships were found between QoL and social support in cancer patients (Kornblith *et al.* 2001; Parker *et al.* 2003) and in hospice patients with terminal illness (Tang *et al.* 2004). The relation between the coping style of patients with lung cancer and type of social support has also been examined for their impact on depressive symptoms (Walker, Zona & Fisher 2005). Social support was divided into directive, i.e. telling the receiver what to do, feel or chose, or non-directive, i.e. assisting and cooperating. Non-directive social support was associated with adaptive coping style. Directive social support and less adaptive coping style were positively related to depressive symptoms (Walker *et al.* 2005).

Hupcey (1998) claims social support presumes the existence of a personal relationship between provider and receiver. The receiver has a perceived need and the provider has a willingness to give the support. Krishnasamy (1996) includes healthcare professionals among those who can deliver social support. Patients undergoing radiotherapy received most support from family and friends and the support the patients expected and received from professionals was informational support (Hinds & Moyer 1997). Courtens *et al.* (1996) conducted a longitudinal study of newly diagnosed cancer patients' social network and social support. They found no relation between structural aspects of network, measured by size, density and composition of the network, and QoL, but emotional support was positively related to QoL (Courtens *et al.* 1996).

### **Disease/illness domain**

According to Dodd *et al.* (2001), the health and illness domain concerns factors unique to the health or illness state. In the present thesis this domain was called disease/illness domain since it concerns both the objective variables referring to the main health deficit among the patients, i.e. the lung cancer disease and its consequences, and the subjective experience of other symptoms. Disease concerns the biologic process that causes the person not to be healthy, and illness explicates the person's experience of not being healthy (Nordenfelt 1991; Tishelman *et al.* 1991). Therefore, the issues included in this domain were objective variables, i.e. not rated by the patients, such as performance status and presence of metastases; and other symptoms, comprising subjectively experienced variables.

### *The lung cancer disease*

Lung cancer currently is the leading cause of malignant deaths in the world. The incidence of lung cancer in Sweden was above 3000 cases in 2004 (Socialstyrelsen 2005). Lung cancer is decreasing among men, but increasing among women and the incidence was in 2004 higher in women than in men at ages below 54 years (Socialstyrelsen 2005).

The main cause of lung cancer is smoking. About 85-90% of patients with lung cancer are smokers or previous smokers (Haugen 2000). An important component may be inherited predisposition, as fewer than 20% of smokers develop lung cancer. The knowledge that lung cancer was mainly caused by smoking was suggested already in 1927 (Tylecote 1927; Boyle, Gandini & Gray 2000).

The most usual places for metastases are the lungs, CNS, bone, liver and adrenal gland. The relative 5 year survival in Sweden is about 10% for men and about 15% for women (Socialstyrelsen 2005). WHO developed a histological classification of lung cancer in 1967 with revisions in 1981 and 1999. The most frequently used classification is between tumours that are non-small cell lung cancer (NSCLC), comprising about 75-80% of all lung cancers, and small cell lung cancer (SCLC) (Shepherd & Carney 2000). Squamous cell carcinoma was earlier the most common type of lung cancer, but now adenocarcinoma is dominating. This is due in part to the fact that adenocarcinoma is more common among women and lung cancer has increased in women, and partly to the fact that the use of low nicotine cigarettes and filter cigarettes has increased (Johansson 2001). The tumour extent is classified according to TNM clinical classification concerning the primary tumour (T), regional lymph nodes (N) and distant metastases (M) (Travis *et al.* 1999).

### *Symptoms in lung cancer*

There are few symptoms in early stages, but at time of diagnosis more than 90% of patients with lung cancer experience symptoms. Common symptoms are dyspnea (Hollen *et al.* 1999; Lutz *et al.* 2001; Okuyama *et al.* 2001), fatigue (Lutz *et al.* 2001; Okuyama *et al.* 2001), pain (Hollen *et al.* 1999; Lutz *et al.* 2001), cough (Hollen *et al.* 1999; Lutz *et al.* 2001), loss of appetite (Hollen *et al.* 1999; Lutz *et al.* 2001) and haemoptysis (Hollen *et al.* 1999; Lutz *et al.* 2001). In patients with cancer at the end of life with a median survival of 43 days, fatigue, appetite loss and dyspnea were the most severe symptoms (Lundh Hagelin, Seiger & Fürst 2006). Dyspnea, pain and fatigue caused limitations to daily activities (Tanaka *et al.* 2002b). Dyspnea, although mostly mild, was found to interfere with

daily activities in patients with advanced lung cancer and interfered with both the physical domain and the psychological domain.

Symptoms occurring together with dyspnea were found to form a symptom cluster. A symptom cluster is when three or more symptoms are related to each other (Dodd *et al.* 2001a). In a concept analysis of symptom clusters the attributes were found to be relationships between the symptoms in a cluster; concurrence i.e. symptoms occurring together; underlying dimensions; stability; and common aetiology (Kim *et al.* 2005). The underlying dimensions, stability and common aetiology, were said to be tentative attributes, which might be changed when further research has established more knowledge. Chan, Richardson and Richardson (2005) considered breathlessness, fatigue and anxiety as a cluster of symptoms among patients with lung cancer. Since it was a small sample, this has to be further investigated.

#### *Performance status*

Performance status is a global assessment of a person's level of function and ability to perform self-care (Buccheri, Ferrigno & Tamburini 1996). Functional status and performance status has been used interchangeably. Garman and Cohen (2002) distinguish between performance status, functional status and QoL. Performance status is a method to assess the impact from cancer disease on patients' ability for activity, self-care and work (Garman & Cohen 2002). Performance status use to be assessed by Karnofsky's Scale of Performance Status (KPS), Eastern Cooperative Oncology Group Scale of Performance Status (ECOG PS) (Buccheri *et al.* 1996) or WHO Performance Status Scale (WHO 1979). It is considered a prognostic factor, a predictor of toxicity of treatment and an indicator of comorbidities (Buccheri *et al.* 1996) and is often used to determine whether patients with lung cancer will manage aggressive treatment or not (Ando *et al.* 2001). Functional status concerns patients' ability to perform specific tasks measured by standardized scales (Garman & Cohen 2002). In a concept analysis of functional status, the attributes found were: "1) activities people do in the normal courses of their lives to meet basic needs, fulfil usual roles and maintain their health and well-being. 2) the level of performance corresponds to its normal expectation in the individual nature, structure and conditions" (Wang 2004, p 459). The consequences of impaired functional status are difficulties in daily life. QoL assessments often concern function, physical condition, mental health and social interactions (Garman & Cohen 2002). When comparing QoL dimensions in a study of 231 hospice homecare patients and dividing dimensions into psychophysiologic well-being, functional well-being and social/spiritual well-being, the greatest decline

was found in functional well-being (McMillan & Weitzner 2000). Relations have been found between functional status and dyspnea (Sarna & Brecht 1997).

## DYSPNEA MANAGEMENT STRATEGIES

To adequately manage dyspnea in palliative care there is a need for an understanding of the pathophysiological causes of dyspnea (Ahmedzai 1998). The treatments for dyspnea are pharmacological (Coyne, Viswanathan & Smith 2002; Shimoyama & Shimoyama 2002; Kohara *et al.* 2003) and non-pharmacological (Ahmedzai 1998; Webb, Moody & Mason 2000). The effectiveness of oxygen has been investigated (Bruera *et al.* 1993; Booth *et al.* 1996; Bruera, *et al.* 2003) with contradictory results and it has been stated that oxygen therapy should be used only in hypoxic patients with specified partial pressure of oxygen cut-off points (Dudgeon 2001).

### **Non-pharmacological strategies**

Some non-pharmacological treatments are the use of fans (American Thoracic Society 1999; Dudgeon 2001; Booth *et al.* 2006), altered breathing pattern including pursed-lip breathing and diaphragmatic breathing (American Thoracic Society 1999; Gallo-Silver & Pollack 2000; Webb *et al.* 2000; Dudgeon 2001; Jantarakupt & Porock 2005), muscle relaxation techniques (Dudgeon 2001; Jantarakupt & Porock 2005; Webb *et al.* 2000), positioning (American Thoracic Society 1999; Webb *et al.* 2000; Dudgeon 2001; Jantarakupt & Porock 2005), education (American Thoracic Society 1999) and cognitive-behavioural approaches, such as anticipatory symptom relief with administration of symptomatic drugs; use of psychological support techniques with preventive intention and avoidance with minimizing efforts known to induce dyspnea (Bruera & Ripamonti 1998; American Thoracic Society 1999; Ripamonti 1999). Exercise significantly improved dyspnea and anxiety associated with dyspnea in 51 COPD patients who completed 12 supervised treadmill training sessions (Carrieri-Kohlman *et al.* 1996b). In a multicentre randomized controlled trial conducted in 100 lung cancer patients in UK, there were statistically significant differences in breathlessness at best, as well as in WHO performance scale, levels of depression and physical symptom distress after 8 weeks of nursing intervention (Bredin *et al.* 1999). The intervention was carried out by specialist nurses and consisted of a detailed assessment of dyspnea and alleviating factors: advice and support for patients and families, exploration of the meaning of breathlessness, the disease and the future, training in breathing and

relaxation techniques, support in the development of coping strategies, and early recognition of medical problems. Levels of breathlessness, functional capacity, activity levels and distress levels improved in patients with lung cancer after three sessions of non-pharmacological treatments including breathing retraining, relaxation techniques activity pacing and psychosocial support (Hately *et al.* 2003).

### **Self-care strategies**

Patients' own management strategies were to recognize and avoid activities that trigger breathlessness (Roberts, Thorne & Pearson 1993; O'Driscoll Corner & Baily 1999), as well as positioning and slowing down, pacing, resting, deep breathing, relaxing, accepting help and the use of fans (O'Driscoll *et al.* 1999). Management strategies have also been divided into immediate coping strategies and long term adaptive strategies (Brown *et al.* 1986). The immediate strategies were positioning, moving slower, use of inhaler, posture, medicines and pursed lip breathing. Long-term adaptive strategies concerned activities of daily living, general activities, other behaviours, social isolation and emotional strategies. Some of patients' selfcare strategies are congruent with strategies introduced by healthcare professionals. Therefore, patients' own strategies are important to delineate.

## **OUTCOMES**

### **Quality of life**

Quality of life (QoL) research concerns the persons' experience of living a good or a bad life, including the relationship between socio-economic living condition of a given society and the QoL of the persons in that society (Naess 1987). The WHO implicitly introduced the QoL concept into health care when health was defined as a state of physical, mental, and social well-being and not merely the absence of disease or infirmity (Cooley 1998). Haas (1999 p. 738) defines QoL as "a multidimensional evaluation of an individual's life circumstances in the context of the culture in which they live and the values that they hold". Haas (1999) further agrees with the dimensions and subjectivity that Ferrell (1996 p. 915) used when defining QoL as "a personal sense of well-being encompassing physical, psychological, social and spiritual dimension". One example of the multidimensionality of the QoL concept was that meaningfulness, mainly concerning relations to close ones, was important to QoL in patients with brain tumours (Strang & Strang 2001). In a concept analysis of QoL in persons with non-small cell lung cancer, the

attributes were found to be functional status, physical symptoms, emotional function and social function (Cooley 1998). This is congruent with some of the domains included in operational definitions of QoL: physical domain, intellectual/cognitive domain, psychological/emotional domain, social domain, socio-economic domain, spiritual domain, global domain, and opinion about healthcare professionals (Mast 1995; King *et al.* 1997; Smith, Avis & Assmann 1999; Sloan *et al.* 2002). Other important areas are somatic symptoms, social function including relationships, sexual function, occupational function and possibly financial state (Cella 1994; O'Boyle and Waldron 1997).

In a meta-analysis of how patients conceptualize QoL and if QoL could be distinguished from health status, it was found that patients considered health and QoL as different concepts; and that mental health contributed more to QoL and physical functioning was more important to health (Smith *et al.* 1999). In a health survey of a Finnish population, it was found that emotional well-being had the greatest contribution to global QoL (Heinonen *et al.* 2004). This is congruent with a study of Arnold *et al.* (2004) who found that psychological functioning contributed significantly to overall QoL in patients with different chronic disorders as well as in healthy persons. The most important issues concerning QoL in terminally ill cancer patients were physical and psychological condition, physical and cognitive functioning, relationships, outlook, physical environment and quality of palliative care (Cohen & Leis 2002). No QoL assessment tool was found to include all these domains. Health-related QoL (HRQoL) assessments are used with at least five aims: to assess treatment outcome, to qualify quantity of survival, to assess physical and psychological problems, to predict mortality or survival length and as an intervention to support information-giving (Sprangers 2002).

#### *QoL and related factors*

Deteriorated QoL was predicted by symptom distress in hospice patients (Moody & McMillan 2003) and by lung cancer diagnosis, low levels of hope and with low income in elderly patients newly diagnosed with cancer (Esbensen *et al.* 2004). Anxiety and depression contributed independently to various dimensions of QoL in cancer patients in palliative care (Smith, Gomm & Dickens 2003). In a population of hospice patients in US, pain intensity, spirituality and social support were significantly correlated with QoL (Tang *et al.* 2004). Patients with lung cancer who reported higher levels of dyspnea experienced lower levels of QoL (Lavoie Smith *et al.* 2001). QoL has been seen as a predictor of survival in terminal cancer patients (Tamburini *et al.* 1996; Montazeri *et al.* 2001). There exists no consensus in defining QoL, but there is agreement that it

is a multidimensional concept and should be evaluated by patients themselves (King *et al.* 1997; Cooley 1998). When measuring QoL by means of questionnaires it is important to know that the instruments measure in *relation to* someone, for example, the own group, oneself a year ago etc. (Naess 1987). Core domains included in the QoL concept are the physical, psychological, social, spiritual and global, and sometimes a socio-economic domain, and opinions about health care. Different authors have found different domains to be the most important.

## RATIONALE

Lung cancer is a severe disease with limited survival for the suffering persons. Therefore, QoL and symptom relief become important issues in the care of these patients. As QoL is an intended goal of palliative care, it is important to pay special attention to this concept in clinical practice as well as in research in patients at the end of life. QoL is a multidimensional concept that should be evaluated by patients themselves. Domains included in the QoL concept are the physical, psychological, social, spiritual, and global. QoL is influenced by health-related factors, environmental factors, and personal factors. The patients' families and significant others are very important in palliative care and the importance of family relations is pointed out by researchers, but there are probably cultural differences. Support from family and friends should be encouraged. The role of healthcare professionals in social support delivery is ambiguous, it has been indicated that their role should be to provide informational support and give support to families to enhance their ability to give social support. The importance for QoL of dyspnea and other symptoms, social support and coping capacity in patients with lung cancer needs to be further delineated and if QoL could be predicted it might also be possible to enhance.

Symptoms are problematic for cancer patients, especially for patients with lung cancer and symptom relief is thus an integral part of palliative care. Dyspnea is a subjective and multidimensional experience, consisting of various sensations. The patients' self-report is necessary and it is important to illuminate the different dimensions in the dyspnea experience. An important issue is to use validated instruments when assessing dyspnea and to use different methods to optimally capture the complexity of the dyspnea experience. Other common symptoms among patients with lung cancer are pain, fatigue, anxiety and depression. If dyspnea could be predicted it might be possible to prevent and it is important to delineate the patients' own management strategies before

designing interventions. Although the main focus of the present thesis was to describe the experiences of QoL and dyspnea from the patients' perspective, some issues concerning the lung cancer disease have to be included as possible influencing factors. The importance of personal and health-related factors to the dyspnea experience in patients with lung cancer also needs to be described.

#### 4. AIM

The overall aim of this thesis was to describe how patients with lung cancer, not amenable for treatment with curative and life prolonging intent, experience dyspnea and QoL over time.

##### SPECIFIC AIMS

The specific aims of the papers were:

- I. To describe the validity and reliability testing of the Cancer Dyspnea Scale in a Swedish population of patients with lung cancer, and to compare it with the published English version.
- II. To describe the dyspnea experience and examine the relation of dyspnea to other symptoms, personal and health-related factors in patients with lung cancer, not amenable for treatment with curative or life prolonging intent.
- III. To describe and follow QoL in lung cancer patients not amenable to curative or life-prolonging treatments and to determine how QoL is related to symptoms, with special focus on the dyspnea experience, coping capacity and social support.
- IV. To describe lung cancer patients' experience of dyspnea and their strategies for managing the dyspnea.

## RESEARCH QUESTIONS

The research questions for the papers were:

- I Is the Swedish version of the Cancer Dyspnea Scale (CDS-S) valid, reliable and feasible to describe dyspnea in patients with lung cancer when curative and life prolonging treatments are closed?
  - I.1 What is the construct validity of the CDS-S scale?
  - I.2 What is the criterion-related validity of the CDS-S scale?
  - I.3 What is the reliability of the CDS-S scale as measured by internal consistency?
  - I.4 How does the CDS-S compare with the visual analogue scale of dyspnea (VAS-D) with respect to convergent validity?
  
- II How do patients with lung cancer, not amenable for treatment with curative or life prolonging intent, report dyspnea? Which personal and healthrelated factors influence and predict the experience?
  - II.1 How are different aspects of dyspnea experience reported by the patients?
  - II.2 What are the relationships between dyspnea experience and the personal factors, gender and coping capacity?
  - II.3 What are the relationships between dyspnea experience and the healthrelated factors, performance status and other symptoms?
  - II.4 Which of the following variables are predictors of dyspnea experience: other symptoms, performance status, age gender or coping capacity?
  
- III How do patients with lung cancer, not amenable for treatment with curative or life prolonging intent, describe quality of life over time and how is quality of life related to symptoms, coping capacity and social support?
  - III.1 How do patients with incurable lung cancer report symptoms and quality of life over time?
  - III.2 What are the relationships between demographic and medical variables, coping capacity, social support, symptoms with special reference to dyspnea experience, and quality of life?
  - III.3 What are the predictors of quality of life over time?
  
- IV How do patients with lung cancer, not amenable for treatment with curative and life prolonging intent, describe the dyspnea experience and what management strategies do they use?

## 5. METHODOLOGY

### RESEARCH DESIGN

Positivistic and naturalistic paradigms were contrasted by Lincoln and Guba (1985), where differences between the paradigms were shown regarding the nature of reality; the relationship of research focus and researcher; the possibility of generalization; the possibilities to show causal linkages; and the role of values. In the positivist paradigm there is only one truth and reality exists independent of human perception. The researcher is independent of the research object. In the naturalistic paradigm, there are multiple socially constructed realities and the researcher interacts with the “research object”. The present thesis was inspired by the reciprocal interaction world view, with a holistic view of the person and reality is considered as multidimensional, context dependent and relative (Fawcett 2005). According to Creswell (2003), there is a logical sequence in choice of epistemology, philosophical stance, methodology and research methods concerning use in research. He conceptualized these assumptions to address three questions concerning design of research: about knowledge claims, strategies of inquiry and methods of data collection and analysis. In pragmatic knowledge claims, the problem is in focus and researchers use the most appropriate approaches to obtain the best understanding of the problem. According to Creswell (2003), pragmatism is not committed to any system of philosophy or reality and consequently there is a freedom of choice concerning methods, techniques and procedures. Pragmatism has also been found to be relevant to nursing knowledge development since nursing as a practice discipline is problem-solving-oriented; its subject matter is experientially grounded; and nursing practice has been stifled by theorizing that assumes objectivity in knowledge (Kim & Sjöström 2006).

The mixed methods approach was defined by Creswell (2003) as one “in which the researcher tends to base knowledge claims on pragmatic grounds (e.g. consequence oriented, problem-centred and pluralistic). It employs strategies of inquiry that involve collecting data simultaneously or sequentially to best understand the research problems. The data collections involve both numeric information (e.g. instruments) as well as text information (e.g. interviews) so that the final database represents both quantitative and qualitative information” (p. 19-20). There exist three general strategies in mixed methods research (Creswell 2003; Hanson *et al.* 2005): sequential procedures, concurrent procedures and

transformative procedures. Inherent in mixed methods research is that all stages of the study are mixed, i.e. research questions, methods, data collection, analysis and inference process (Teddle & Tashakkori 2003). This mixed method approach was not feasible in all phases of the present thesis and therefore the thesis could be considered to use a multi-method design (Morse 2003). In a multi-method design, it is important that the parts of the project are complete in themselves. Morse (2003) emphasizes three principles in multi-method design: identify the theoretical drive of the project; develop overt awareness of the dominance of each project; and respect methodological integrity.

The studies in the present thesis have been inspired by the SMM when formulating the research questions. Due to the complexity of the dyspnea experience and the assumed interactions with other factors explicated in the SMM, the theoretical drive of the present thesis was mainly deductive, with some inductive elements. The project was predominantly quantitative with both quantitative and qualitative methods used simultaneously, although the methods and assumptions used in the studies were kept intact. In concurrent procedures, quantitative and qualitative data were collected simultaneously and were integrated in the interpretation of the overall results to yield a comprehensive understanding of the dyspnea experience in patients with lung cancer in palliative care.

The designs of the specific studies of inquiry were as follows:

Paper I: A validation study of the Swedish version of the Cancer Dyspnea Scale (CDS).

Paper II: Descriptive and correlational.

Paper III: Descriptive, correlational and longitudinal.

Paper IV: Descriptive, qualitative.

An overview of the research methodologies is presented in Table 1.

*Table 1. An overview of conceptual framework, study variables and included instruments with validity and reliability.*

| Conceptual framework concepts          |                              | Study variables                           | Instruments                             | Validity / Reliability                                                                                                                     | Paper        | Time       |
|----------------------------------------|------------------------------|-------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|
| Factors influencing dyspnea experience | Personal domain              | Demographic: Age, gender                  | Demographic form                        | NA                                                                                                                                         | I - IV       | BL         |
|                                        |                              | Coping capacity                           | SOC-13                                  | Cronbach's alpha: 0.74-0.91 <sup>1</sup><br>0.79-0.90 in 5 Swedish samples, Test-retest 0.88 <sup>2</sup>                                  | II, III      | BL         |
|                                        | Environmental domain         | Social support                            | SSS                                     | Correlated with the assumed factors: 0.72-0.90 <sup>3</sup><br>Cronbach alpha: 0.91-0.97; Stability 1 year: 0.72-0.78                      | III          | BL         |
|                                        | Disease/illness domain       | Type of lung cancer, Time since diagnosis | From medical record                     | NA                                                                                                                                         | I-IV         | BL         |
|                                        |                              | Prevalence of metastases                  |                                         |                                                                                                                                            |              |            |
| The Symptom Experience                 | Dyspnea Perception           | Pain, fatigue, functioning                | EORTC QLQ-C30                           | Cronbach's alpha: fatigue: 0.81 pain: 0.87 <sup>4</sup><br>Construct validity physical & role functioning, fatigue: 0.61-0.73 <sup>5</sup> | I, II        | BL         |
|                                        |                              | Pain                                      | AQEL                                    | Test-retest: 0.65, Concurrent validity: 0.78 <sup>6</sup>                                                                                  | III          | BL +       |
|                                        |                              | Performance status                        | From medical record                     | NA                                                                                                                                         | I-III        | BL         |
|                                        | Dyspnea Evaluation           | Occurrence of dyspnea                     | VAS-D                                   | Face                                                                                                                                       | I, II        | BL +       |
|                                        |                              | Frequency                                 | Ad hoc question with 5 possible answers | Face                                                                                                                                       | I, II        | BL +       |
|                                        |                              | Intensity                                 | VAS-D                                   | Face                                                                                                                                       | I, II        | BL +       |
|                                        |                              | Dyspnea discomfort                        | VAS-Dis                                 | Face                                                                                                                                       | I, II        | BL +       |
|                                        | Responses                    | Qualities                                 | CDS-S                                   | Construct validity: 0.61-0.94, Cronbach's alpha: 0.81-0.93 <sup>7</sup><br>Present sample: 0.81-0.90 <sup>8</sup>                          | I-III        | BL +       |
|                                        |                              | Dyspnea related to activity               | EORTC QLQ-LC13                          | Cronbach's alpha: 0.83 <sup>9</sup>                                                                                                        | I, II        | BL         |
|                                        |                              | Anxiety, depression                       | HADS                                    | Cronbach's alpha anxiety: 0.80 - 0.93<br>Cronbach's alpha depression: 0.81-0.90 <sup>10</sup>                                              |              | BL +       |
| Symptom Management Strategies Outcomes | Strategies to manage dyspnea |                                           | Qualitative interview                   | NA                                                                                                                                         | IV.          | Once       |
|                                        |                              | Quality of life                           | EORTC QLQ-C30<br>AQEL                   | Reliability: 0.52-0.90.<br>Concurrent validity: 0.54-0.78 <sup>6</sup>                                                                     | I, II<br>III | BL<br>BL + |

BL = Baseline; BL + = Baseline and every third month; NA = not applicable

<sup>1</sup> Antonovsky 1993; <sup>2</sup> Langius, Björvell & Antonovsky 1992; <sup>3</sup> Sherbourne & Stewart 1991; <sup>4</sup> Aaronson *et al.* 1993; <sup>5</sup> Sigurdadottir *et al.* 1993; <sup>6</sup> Axelsson & Sjöden 1999;

<sup>7</sup> Tanaka *et al.* 2000; <sup>8</sup> Paper I 2006; <sup>9</sup> Bergman *et al.* 1994; <sup>10</sup> Zigmond & Snaith 1983.

## SAMPLE

### **Setting**

The population was persons suffering from lung cancer who initially were treated in the Department of Respiratory Medicine at Sahlgrenska University Hospital.

### **Sample size**

The sample size was estimated according to Cohen (1988) with the intent to reach a medium effect size of a correlation of 0.30, significance level of 0.05, two-tailed and power above 0.80. Based on the literature review, anxiety was found to be profound in patients suffering from dyspnea and the correlation of 0.30 was chosen in accordance to other studies. Dudgeon *et al.* (2001b) found a correlation among patients with cancer of different sites between visual analogue scale (VAS) of dyspnea and VAS of anxiety of 0.26 ( $p=0.03$ ). Bruera *et al.* (2000) found a correlation between shortness of breath and anxiety of 0.30 ( $p=0.0003$ ). Under these circumstances, the sample should include at least 84 participants. Since this thesis includes a longitudinal study (Paper III) in a vulnerable group of patients among whom attrition was expected, the sample size needed was determined to be 100.

An additional consideration regarding sample size was made in Paper I. According to Kline (1998), a sample size of 100 is a desirable minimum to conduct a factor analysis. The ratio of participants to items has also been discussed and it was suggested that a ratio of 2 to 1 may be enough. Therefore, the sample size in Paper I was determined to 100.

In the qualitative study (Paper IV) the sample size was determined to be 20 patients.

### **Patients**

Inclusion criteria for the studies were that the participants

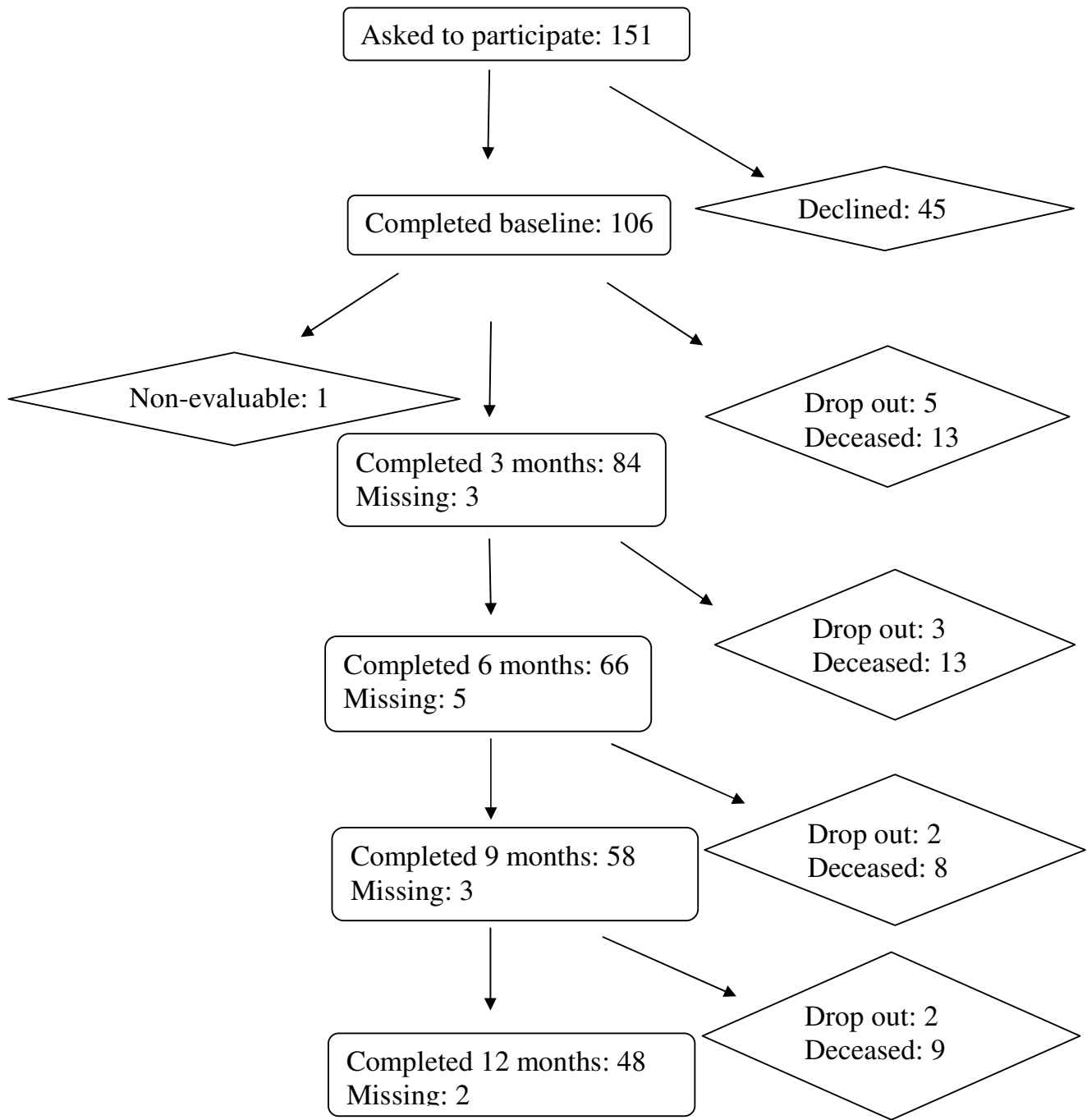
- had received a diagnosis of lung cancer, not amenable to curative treatment;
- had no remaining treatment options with a life-prolonging intent;
- should speak and read Swedish; and
- gave informed consent.

The exclusion criterion was:

- patients suffering from severe mental or cognitive impairment.

An additional inclusion criterion for Paper IV was that the patients had experienced dyspnea.

One hundred and fifty-one persons were asked to participate in the studies (Papers I-III) and 45 (30%), 22 men and 23 women, declined, mostly because they were feeling too ill. Median age of non-participants was 74 years (range 58 to 85). Seven persons participated but were excluded from the analysis since they did not complete the CDS-S correctly (Paper I). Ninety-nine persons, 49 men and 50 women, participated and were included in the analysis in Paper I. The questionnaires from one person were deemed non-evaluable and were excluded and 105 persons participated (Papers II and III). In Paper III assessments were repeated every third month during one year following study entry. Follow-up questionnaires were completed by 84 patients at 3 months, by 66 patients at 6 months, by 58 patients at 9 months, and by 48 patients at 12 months. Forty-three patients died during the data collection period, and another 2 dropped out due to disease progression and deterioration. The remaining 12 patients chose to discontinue participation in the study. A flow chart of the patients included in the study, along with those who declined to participate, those with missing questionnaires and those who dropped out or died over time is presented in Figure 3.



*Figure 3. Flow chart of the patients included in the study, missing, drop outs and deceased over time.*

## METHODS

An overview of the variables, instruments and in what papers the instruments were used is presented in Table 1. Background demographic information was obtained from patient self-reports and included age, gender, marital status and education. Knowledge about the type of disease, presence of metastases and physicians' scoring of performance status were secured from medical records.

### **Measurements (Papers I-III)**

Measurements of the variables used in the thesis are presented below. Dyspnea was measured in the present thesis with frequency, intensity of dyspnea and dyspnea discomfort, dyspnea qualities and dyspnea related to activity. Dyspnea frequency was measured by an ad hoc question with four response categories: all the time, some time every day, some time every week, and less than once a week.

#### *Visual analogue scale of dyspnea and discomfort*

Dyspnea intensity was measured with a visual analogue scale (VAS-D), a 100-mm line anchored by the terms "no dyspnea" and "worst possible dyspnea". It was used to assess the current, usual and worst dyspnea intensity during the last days. In addition, a visual analogue scale was constructed to measure discomfort from dyspnea, with a question phrased: "How uncomfortable do you think it is when you are out of breath?" This visual analogue scale is anchored by the terms "no discomfort" and "very discomforting" (VAS-Dis).

#### *Cancer Dyspnea Scale*

In the present thesis, dyspnea qualities were used as descriptions of how dyspnea feels like in accordance with Lenz *et al.* (1997). Dyspnea qualities were measured by the Cancer Dyspnea Scale (CDS). The CDS consists of 12 items, with a 5-point scale ranging from 1 (not at all) to 5 (very much), which may be grouped into three factors according to the original validation analysis (Tanaka *et al.* 2000). The factors include a physical factor called sense of effort (5 items), a psychological factor called sense of anxiety (4 items), and a factor reflecting the uncomfortable feeling at rest called sense of discomfort (3 items). Completion times average 140 s (Tanaka *et al.* 2000). The construct validity of the original instrument was determined by factor analysis and the factor loadings ranged from 0.61 to 0.94 within the factors. Convergent validity was demonstrated by comparing the factors as well as the total CDS score with a visual analogue scale (VAS) of dyspnea, the Borg's scale, the physical status as indicated by performance status and oxygen saturation, the State-Trait Anxiety Inventory (STAI), and the presence of

patophysiological causes of dyspnea as evaluated by the physician (Tanaka *et al.* 2000). Internal consistency was good, with Cronbach's alpha ranging from 0.81 to 0.93 for the three subscales. Paper I assessed the validity of the CDS in a Swedish population of patients with lung cancer (see below).

### *EORTC QLQ-LC13*

Dyspnea related to activity was measured with the EORTC QLQ-LC13, a module elaborated for patients with lung cancer that measures the following symptoms dyspnea (3 items), cough, haemoptysis, sore mouth, dysphagia, peripheral neuropathy, alopecia, pain in chest, pain in arm and shoulder and pain other parts of body (1 item each) (Bergman *et al.* 1994). The QLQ-LC13 dyspnea scale has demonstrated a Cronbach's alpha of 0.83 in a study including patients with lung cancer from 17 countries (Bergman *et al.* 1994). In this thesis, only the dyspnea scale and a single item measuring cough were used.

### *Hospital Anxiety and Depression Scale*

Anxiety and depression were assessed with the Hospital Anxiety and Depression Scale (HADS), a validated and frequently used 14-item questionnaire measuring anxiety and depression in two separate subscales (Zigmond & Snaith 1983; Herrmann 1997). The HADS was originally developed for assessment of emotional disorders in medical and surgical patients and has excluded somatic aspects of depression and anxiety such as fatigue, sleep disturbances, and weight loss. In the original paper, patients with anxiety scale scores from 0 to 7 were classified as non-cases of anxiety (Zigmond & Snaith 1983), while scores from 8 to 10 were classified as doubtful cases and from 11 to 21 as cases of anxiety. The same classification was made for the depression subscale. It has been validated and used in a wide range of somatic disorders. A Swedish version was developed in 1986 and was initially validated in patients with spinal cord injuries (Sjösteen *et al.* 1990). Since then it has been used and documented in patients with various malignant diagnoses, including lung cancer (Bergman, Sullivan & Sörenson 1991). Cronbach's alpha has ranged from 0.80 to 0.93 for the anxiety subscale and 0.81 to 0.90 for the depression subscale (Herrmann 1997).

### *EORTC QLQ-C30*

The EORTC QLQ-C30 is a QoL instrument for use in patients with cancer and consists of physical functioning (5 items), role functioning (2 items), emotional functioning (4 items), cognitive functioning (2 items) and social functioning (2 items). Other symptoms measured by the EORTC QLQ-C30 are: fatigue (3 items), nausea and vomiting (2 items),

pain (2 items), dyspnea (1 item), insomnia (1 item), appetite loss (1 item), constipation (1 item), diarrhoea (1 item), financial difficulties (1 item). It takes about 11 minutes to complete. The range of the scales is three (Aaronson *et al.* 1993). Acceptable internal consistency, exceeding 0.70, was found in patients with malignant melanoma for all scales except role functioning (Sigurdadottir *et al.* 1993). High construct validity (0.61-0.73) was found between physical functioning, role functioning and fatigue/malaise scales. The EORTC QLQ-C30 was only used at baseline.

#### *Assessment of Quality of Life at the End of Life*

At baseline and the following measurements, QoL was assessed by the Assessment of Quality of Life at the End of Life (AQEL) (Axelsson & Sjöden 1999). The AQEL is a QoL assessment scale elaborated for palliative care and consists of 20 questions about QoL and one complementary question. The physical domain is assessed with the items need to rest at daytime, activities of daily living, strength, pain, nausea, bowel problems, and dyspnea (7 items). The psychological domain is measured by memory, worry, insomnia, concentration, and depression (5 items). The social dimension is measured by sharing problems with family and being regarded as usual by family and friends (2 items). The spiritual dimension is measured by ability to do what one wants, meaningfulness and happiness (3 items). Satisfaction with care (2 items) and global QoL (1 item) were also measured. Reliability was measured in patients with incurable symptomatic cancer by test-retest correlation and was found to be 0.78 for the total score and between 0.52-0.90 for individual items. Concurrent validity was assessed against suitable items in the Cancer Inventory of Problem Situations (CIPS) and ranged between 0.54-0.78, excepting a weak correlation for one social item (0.07) (Axelsson & Sjöden 1999).

#### *Social Support Survey*

Data on social support was obtained by the Medical Outcomes Study (MOS) Social Support Survey (SSS) (Sherbourne & Stewart 1991). The SSS consists of a single question about number of friends and four subscales emotional/informational support (8 items), tangible support (4 items), affectionate support (3 items), positive social interaction (3 items), and one additional item. In the original study of 2987 patients to general practitioners, the items were found to highly correlate with the assumed factors (0.72 to 0.90). Cronbach alpha ranged from 0.91 to 0.97 and stability after one year ranged from 0.72 to 0.78.

### *Sense of Coherence Scale*

Coping capacity was measured by the short form of the Sense of Coherence Questionnaire (SOC-13) (Pallant & Lae 2002). The SOC does not explicitly measure coping, but instead measures the resources the person has to cope with difficulties, i.e. comprehensibility, manageability and meaningfulness. The internal consistency of the SOC-13 has been between 0.74-0.91 in published studies (Antonovsky 1993). SOC has been translated to Swedish and correlations of 0.88 were found in a test-retest with first visual analogue format and a week later with Likert format and visual analogue format (Langius *et al.* 1992).

### *Performance status*

Performance status was estimated by the consulting physician or one of the researchers (BB) at baseline, using the performance status scale recommended by WHO (WHO 1979) ranging from 0 (no limits to activity) to 4 (unable to perform self-care).

### **Content analysis (Paper IV)**

Content analysis was used by the church during the 18<sup>th</sup> century for inquisitorial purposes, but was not named content analysis until 1941 during World War II, when it was used in newspaper and propaganda analysis (Krippendorff 2004). There are now several approaches to qualitative content analysis with roots in literary theory, social sciences and critical scholarship. Content analysis has been defined as “a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the context of their use” (Krippendorff 2004, p. 18). The main steps in content analysis are unitizing, sampling, coding, reducing, inferring and narrating. Unitizing refers the process in which segments of texts that are of interest for the analysis are systematically distinguished. Sampling is not always applicable to qualitative content analysis. Coding refers to the process of transforming texts to analysable representations. The objective in reducing data in qualitative content analysis is to condense the diversity of the text to essential components in order to create a category system that must be defined and revised. Categories have to be mutually exclusive and exhaustive (Krippendorff 2004).

### **Procedure**

#### *Papers I-III*

Potential participants who fulfilled the inclusion criteria were identified by the author together with a research nurse at the outpatient clinic for patients with lung cancer at Sahlgrenska University Hospital. These

patients were then phoned by the author and asked to participate. After the patients agreed to participate, an appointment was made with the author at the outpatient clinic in connection with a regular visit to the clinic. At the appointment, the author gave detailed verbal and written information about the study as to its aims and procedure. Patients who were willing to participate gave written informed consent. Baseline data was gathered when the patients had entered the study and the questionnaires were thereafter completed every third month. The time schedule for administering the instruments is presented in Table 1. Baseline data collection started May 2003 and was completed February 2005; the last follow up was completed February 2006.

### *Statistical analysis*

Descriptive statistics were used to describe the sample, occurrence and severity of dyspnea and occurrence of other symptoms and QoL, with means and medians where appropriate. Since the collected data had ordered categorical characteristics, the median and range were used. To enable comparisons with other published studies means and standard deviations were also presented. Spearman's rank correlation coefficient was used for correlations between dyspnea and QoL and the other symptoms, performance status, coping capacity and social support in Paper II. Spearman's rank correlation coefficient was also used in Paper III to examine the relationships of demographic and medical variables, coping capacity, social support, and symptoms with QoL at baseline and over time. Differences between baseline and follow-up measurements in each sub-sample, that completed both baseline and the specific follow-up measurement, were analysed by Wilcoxon signed ranks test. Predictors of dyspnea experience were determined by stepwise linear regression. The CDS total dyspnea score and activity-related dyspnea were considered the most comprehensive measures of dyspnea, and were therefore used as dependent variables in regression analyses in Paper II. In Paper III, predictors of QoL were determined by stepwise linear regression with global QoL from the AQEL over time as dependent variables. All tests were two-tailed and  $p \leq 0.05$  was used as significance level. Due to the quantity of comparisons conducted the number of significant correlations should be regarded with caution.

To minimize measurement error research instruments should meet validity and reliability criteria. Validity concerns systematic errors in measurements and includes content validity, criterion-related validity and construct validity (Polit & Beck 2004; Burns & Grove 2005; Higgins & Straub 2006). Content validity refers to how representative the questions

in the instrument are of the universe of all questions that might be asked on this topic and may be determined by experts in the area. Criterion-related validity concerns the relationship between the instrument and some criterion. It can be divided into predictive validity, the adequacy of an instrument in differentiating between the performance or behaviours of persons on some future criterion; and concurrent validity, i.e. the ability of an instrument to distinguish persons who differ in their present status on some criterion. Construct validity concerns the linkage with theory and theoretical conceptualization. Construct validity may be measured in several ways but always with an emphasis on logical analysis and the testing of relationships predicted on the basis of theoretical considerations. Examples of methods to assess construct validity are known-groups technique, multitrait- multimethod matrix method and convergence i.e. that different methods of measuring a construct yield similar results. Factor analysis can also be used to identify clusters or related variables.

Reliability examines the amount of random error in the measurement technique. Reliability exists in degrees and is usually expressed as a correlation coefficient. If the researcher is interested in group-level comparisons the reliability coefficient should be 0.70 or even 0.60 (Polit & Beck 2004). If measures are used to make decisions about individuals the reliability coefficient should be 0.90 or better. Reliability can be measured by stability, internal consistency and equivalence. Stability concerns the extent to which the same results are obtained on repeated administrations of the instruments, mostly measured by test-retest. Internal consistency measures the extent that all subparts of the instrument are measuring the same characteristics and may be estimated by Cronbach's alpha. Equivalence may be measured by inter-rater-reliability or parallel forms reliability (Polit & Beck 2004; Burns & Grove 2005; Higgins & Straub 2006).

In Paper I, assessing the validity and reliability of the CDS-S, construct validity was determined by factor analysis and convergence; criterion-related validity was determined by concurrent validity; and internal consistency reliability was evaluated. Factor analysis was used to confirm if the factors found in the original validation study could be reproduced in the Swedish sample. Convergence, concerning the ability of different methods to yield similar results, was evaluated by comparing the factors found in CDS with other instruments (Polit & Beck 2004; Burns & Grove 2005). The factor "sense of effort" in the CDS was expected to correlate strongly with the physical functioning scale in the

EORTC QLQ-C30. The “sense of anxiety” factor was assumed to correlate with the HADS and the emotional functioning scale in the EORTC QLQ-C30. The factor “sense of discomfort” was hypothesized to correlate with VAS-Dis. The total dyspnea score of the CDS was compared with the VAS-D and EORTC dyspnea scales. Concurrent validity was assessed by examining the ability of the CDS scale to distinguish persons who differ in their present health status as assessed by VAS-D and performance status (Polit & Beck 2004). Internal consistency, homogeneity, was measured by Cronbach’s alpha coefficient (Polit & Beck 2004; Burns & Grove 2005; Higgins & Straub 2006).

#### *Paper IV*

Patients in the project who were recognized as experiencing dyspnea were asked to participate in a tape-recorded interview study. If they were willing to participate an appointment time and place for the interview was made. Before the interview started the patients received further verbal and written information about the study and informed consent was given. The interviews were conducted from September 2003 to November 2004. Most of the interviews took place in the patients’ home, one at the patient’s work place and three at the outpatient lung cancer clinic. The interviews were of a narrative character where patients were asked to respond to two main questions (Mishler 1986; Kvale 1997):

1. How is it when you have dyspnea?
2. What do you do to manage when you have dyspnea?

Additional questions were used to gain a deeper understanding of the physical, emotional and cognitive experience of dyspnea and its’ interference with daily life and about the patients’ own dyspnea management strategies, about help from others, the effectiveness of the strategies and additional needs. The interviews lasted between 10 to 45 minutes (median=18). The interviews were tape-recorded and transcribed verbatim by the interviewer.

#### *Analysis of interview data*

The interviews were read thoroughly and meaning units, which are words or statements referring to some central meaning, were extracted. Meaning units were then condensed into codes. Codes with similar content were grouped into subcategories and categories. The category system was defined and revised by the researchers until all codes were categorised and the categories were mutually exclusive (Krippendorff 2004). Although two main questions were asked in the interviews, four areas with one, two or three categories emerged from data.

### *Validity and reliability in qualitative studies*

The concepts of validity and reliability in qualitative studies have been discussed. Lincoln and Guba (1985) refer to four criteria concerning trustworthiness: truth value, applicability, consistency and neutrality. In quantitative research these demands are met by internal validity, external validity, reliability and objectivity whereas in the naturalistic paradigm the demands will be met by credibility, transferability, dependability, and confirmability. Lincoln and Guba (1985) suggest several techniques to fulfil the credibility criteria. Others have also written about techniques to enhance trustworthiness in qualitative studies (Leininger 1994; Morse *et al.* 2002; Graneheim & Lundman 2004). Therefore, in Paper IV techniques used to enhance trustworthiness were chosen with care.

Credibility was established in Paper IV through the choice of patients with an experience of dyspnea such that the sample included various ages, a mix of men and women and variation in time since diagnosis (Lincoln & Guba 1985; Graneheim & Lundman 2004). During the analysis, the similarities and differences of the categories were discussed continuously by the authors until consensus was reached, which corresponds to the peer debriefing technique mentioned by Lincoln & Guba (1985). The interview questions were formulated in congruence with the aim, although some of the answers to the question of experience were unexpected. To compare the emerging model with an existing model (i.e. SMM) is also congruent with referential adequacy, another credibility criterion (Lincoln & Guba 1985). Dependability means that the research method should be stable over time. This was established by means of replicating the main procedures and questions in all interviews (Graneheim & Lundman 2004). The method also was coherent with the intent of the study to establish descriptions of experiences and management strategies of dyspnea (Morse *et al.* 2002). Confirmability refers to the procedure to analyse trends and patterns in the analysis, when defining and revising the category scheme (Krippendorff 2004). This is also coherent with one part of the credibility criteria, i.e. negative case analysis, mentioned by Lincoln and Guba (1985). Whether or not the results are possible to transfer to another context or group, is a decision made by the reader. The transferability was made possible by the description of the procedure and analysis (Lincoln & Guba 1985; Leininger 1994; Graneheim & Lundman 2004).

## ETHICS

All studies were carried out in accordance with the World Medical Association Declaration of Helsinki (WMA 2002). Ethical considerations concerning autonomy and risk of causing emotional injury through questionnaires were approached. All patients received oral and written information and gave verbal and written consent. They were also informed about their right to disclosure at any time and without reason. A potential risk for the patients participating in the study was of a psychological character in that patients might find it distressing to talk about the illness situation. The researcher was observant patients who wanted to withdraw during the interviews, either due to psychological distress or lack of energy. All data were treated confidentially. The Ethical Committee of Göteborg University approved the study (S 112-03).

## 6. RESULTS

### VALIDITY OF THE SWEDISH VERSION OF CANCER DYSPNEA SCALE (PAPER I)

The Swedish version of Cancer Dyspnea Scale (CDS-S) was found to be valid and reliable in a Swedish sample of patients with lung cancer. Construct validity was determined by factor analysis and by convergence. The factor solutions corresponded acceptably, but not completely with the factors in the original validation study. Convergence was determined by correlations between CDS-S subscales and other patient-rated scales and measures. Other measures of dyspnea, VAS-D, EORTC QLQ-C30 and LC13 dyspnea scales, correlated significantly with each of the factors in CDS-S, most strongly with sense of effort, as with the total CDS-S score. The correlation pattern with physical functioning was unspecific, with moderate correlations between each of the CDS-S factors and the QLQ-C30 physical functioning scale. As expected, the QLQ-C30 emotional functioning scale and both HAD scales correlated significantly with the CDS-S sense of anxiety factor as well as with the total CDS-S score. In addition, the dyspnea frequency item correlated moderately with the CDS-S effort and discomfort factors. Criterion-related validity of the CDS-S was assessed by comparing the groups of patients who reported some level of dyspnea on the VAS-D (n=57) with those who reported no dyspnea (n=42). Comparisons showed significant group differences for all three factors as well as the total CDS-S score. Reliability, i.e. internal consistency, measured by Cronbach's alpha coefficients of the CDS-S subscales ranged from 0.81 to 0.88. Regarding the convergent validity of VAS-D and CDS-S, strong correlations were seen with the dyspnea measures in QLQ-C30 and QLQ-LC13 as well as moderate correlations with QLQ-C30 physical functioning. In contrast to the CDS-S, no significant correlations were seen between the VAS-D and the EORTC or HADS emotional factors.

### DYSPNEA EXPERIENCE (PAPER II)

More than half of the patients (n=105) perceived some level of dyspnea, as indicated by ratings of intensity or frequency of dyspnea. Dyspnea caused some degree of discomfort to 56% of these patients. Considerably more patients perceived dyspnea during effort than during rest. The highest symptom scores were seen in dyspnea and fatigue.

### **Factors related to dyspnea**

Coping capacity in the sample was in the upper part of the scale, indicating a relatively good coping capacity. Total coping capacity was negatively related to all qualities of dyspnea as well as total dyspnea and activity-related dyspnea. There were no significant differences in the experience of dyspnea between men and women. Performance status was related to dyspnea intensity and activity-related dyspnea. Cough correlated with all measures of dyspnea. Fatigue correlated with the CDS-S factors sense of effort and sense of anxiety, as well as with the CDS-S total dyspnea score and activity-related dyspnea. Anxiety and depression correlated significantly with some of dyspnea experience measures, sense of effort, sense of anxiety, total dyspnea and activity-related dyspnea, but not with intensity or frequency of dyspnea. When comparing the groups of patients perceiving dyspnea (dyspnea frequency >0; n=56) versus not perceiving dyspnea (dyspnea frequency=0; n=49), of all other symptoms only cough was reported more frequently in the group of patients perceiving dyspnea (median 33.3 vs. 0,  $p<0.001$ ).

### **Predictors of dyspnea**

Variables correlated with CDS-S total dyspnea and activity-related dyspnea were entered into a stepwise regression analysis with symptoms (anxiety, depression, fatigue and cough), performance status and coping capacity as independent variables, and CDS-S total dyspnea score and activity-related dyspnea score as the dependent variables. The regression analysis resulted in a model with cough and coping capacity as significant predictors, explaining 35% ( $R^2$ ) ( $p<0.001$ ) of the variance in CDS-S total dyspnea. Fatigue, coping capacity and cough predicted activity-related dyspnea ( $R^2=32%$ ,  $p<0.001$ ). Since cough was considered an airway symptom closely related to and commonly co-existing with dyspnea, the stepwise regression analysis was repeated excluding cough as an independent variable. The new regression resulted in models where coping capacity and anxiety were independent predictors of CDS-S total dyspnea, explaining 21% ( $R^2$ ) of the variance in the CDS-S score and fatigue and coping capacity predicted activity-related dyspnea, explaining 29% of the variance.

## **QUALITY OF LIFE EXPERIENCE (PAPER III)**

### **Dyspnea, emotional functioning and QoL over time**

Follow-up measurements of dyspnea showed higher mean scores compared with baseline measures in the same subpopulation, although sig-

nificant differences were seen only in relation to the sense of discomfort and total dyspnea scores. HADS depression scores increased from baseline to follow-up assessments, with a significant difference at 12 months, however, no similar changes were noted in HADS anxiety. The mean global QoL score was slightly above 7 out of 10 at baseline, indicating a relatively high perception of global QoL in this group of patients. There were significant decreases in global QoL scores between baseline and 3, 6 and 9 months, respectively. Of the individual AQEL items, only bowel function, dyspnea and possibility to reach staff showed significant deterioration at follow-up assessments. Total QoL ratings deteriorated at follow-up time points in all subgroups of patients.

### **Factors related to QoL**

Significant, although moderate, correlations were seen between performance status and the total and global QoL scores at all measurement points. Of the core symptom measures which were assessed repeatedly, anxiety and depression correlated most strongly with the QoL measures both at baseline and over time, while the dyspnea and pain measures correlated moderately with the QoL measures at most of the assessment times. Correlations between coping capacity and QoL measures were most consistent with the meaningfulness subscale, while total social support showed less consistent correlations with QoL.

### **Predictors of QoL over time**

Variables significantly correlated with global QoL in the univariate analysis were entered in stepwise regression analyses with global QoL at baseline, 3, 6, 9 and 12 months as the dependent variables. Age, performance status, total coping capacity, total social support, anxiety, depression, total dyspnea and pain at baseline were used as independent variables. These analyses resulted in models where depression was a predictor of QoL in all analyses except for 3 months. Coping capacity, anxiety, performance status, pain and total social support were significant predictors on two occasions each. Total dyspnea, as measured by the CDS-S, did not enter the multivariate model at any time point.

### **Additional measurements of predictors**

In order to exclude measurement bias due to the choice of instruments, other measures of dyspnea included in the thesis, i.e. VAS, frequency, dyspnea in QLQ-C30 and dyspnea in QLQ-LC13, were used as independent variables to predict QoL (AQEL) at baseline. Depression and coping capacity remained as predictors explaining about 47% of the variance in QoL (data not shown). When EORTC QLQ-C30 global QoL

was used as the dependent variable, the only dyspnea predictor was activity-related dyspnea (EORTC QLQ-LC13). This predictor, together with depression pain and anxiety explained 52% of the variance in QoL. When using the other dyspnea measures, 52% of the variance in QoL was explained by depression, pain, anxiety and performance status.

#### PRECEDINGS, EXPRESSIONS, CONSEQUENCES AND MANAGEMENT STRATEGIES OF DYSPNEA (PAPER IV)

From patients' descriptions of dyspnea experience and managements strategies a model emerged with 4 areas, 8 categories and 15 sub-categories. The areas were precedings, expressions and long-term consequences of dyspnea, as well as strategies to manage dyspnea.

##### **Precedings of dyspnea**

The precedings of dyspnea were “circumstances contributing to dyspnea” concerning physical, psychosocial and environmental influences.

##### **Expressions of dyspnea**

The expressions of dyspnea were “physical features”, with characteristic bodily manifestations and other bodily symptoms. Characteristic bodily manifestations were considered the core of the dyspnea experience. Other expressions were “immediate reactions”, divided into bodily, emotional, cognitive and affective impact. These reactions were effects of the physical features and occurred immediately, without reflection.

##### **Long-term consequences of dyspnea**

The long-term consequences became apparent to the patients after some consideration about their situation. The long-term consequences were “life is changing”, concerning limitations and increased dependence. Other consequences were “existential reflections”, including values and hope; insecurity; resignation and hopelessness; and thoughts of death.

##### **Strategies to manage dyspnea**

Strategies to manage dyspnea were of three kinds, “bodily”, “psychological” and “medical measures”.

## 7. DISCUSSION

In this section the most important issues in this thesis will be discussed, namely the Symptom Management Model (SMM), symptom clusters, the dyspnea experience, the nursing science domains, dyspnea management strategies and outcomes. Since this thesis was guided by the adapted SMM when designing the research, formulating research questions and interpreting results, the usefulness of the SMM will therefore be discussed. Symptom clusters is an emerging area of research and should be mentioned in connection with symptom experience. Dyspnea experience, the nursing science domains, dyspnea management strategies and outcomes are essential parts of this thesis and are related to SMM. Before starting this discussion a word of clarification about an ostensible contradiction in this thesis is needed: in the section describing the theoretical framework of this thesis a holistic view of the person was advocated, yet some of the results are divided into physical, psychological, social and spiritual dimensions. This division was made in order to give a comprehensive description of the persons' experiences. The experience should be regarded as a whole, but could be described in parts.

### SYMPTOM MANAGEMENT MODEL

Although the Symptom Management Model (SMM) was elaborated to understand patients' symptom experience, to support development of management strategies and to evaluate outcomes of strategies (Dodd *et al.* 2001), it was based on the assumption that a symptom is "a subjective experience reflecting changes in the biopsychosocial functioning, sensations, or cognitions of an individual" (Larson *et al.* 1994, p. 273). This definition explicates the dysfunction, altered sensations and cognitions in relation to symptoms, but fails to take into account the experienced distress, discomfort or the deteriorated well-being (Papers II-IV). The thesis was also guided by a definition of dyspnea that states that dyspnea is a discomfortable experience (American Thoracic Society 1999) and by a definition of palliative care (WHO 2002) that expresses the concern of relief of suffering. Both of these definitions emphasize the importance of subjectively experienced discomfort, which was included in the model in evaluation, responses and outcomes. The apparent discrepancy between the definition and the conceptualization in the SMM may be solved by using another definition of symptoms, as done in the present thesis.

The nursing science domains that are included in the model are person, environment and disease/illness. These correspond with the metaparadigmatic concepts of nursing, namely human beings, environment and health (Fawcett 2005). The metaparadigmatic concept of nursing is included in the model with the three main components: experience, components of management strategies and outcomes. Some of the variables included in the disease/illness domain in the present thesis do not concern subjective experiences, since the main disease/illness-related deficit in the present sample was the lung cancer disease and its consequences. Performance status and other symptoms were considered here to be consequences of the lung cancer disease and therefore belonging to the health-related domain. Performance status was not regarded as an outcome of the dyspnea experience as indicated by Dodd *et al.* (2001) in the SMM.

The SMM was applicable to patients in palliative care, since the model concerns symptom experience, symptom relief and QoL as outcome. The appropriateness of the SMM was also confirmed by the model that emerged (Paper IV). The areas and categories in that model could be incorporated into the SMM. Precedings of dyspnea are congruent with the personal, environmental and disease/illness nursing science domains. Expressions of dyspnea are similar to the dyspnea experience, with perception, evaluation and responses. The immediate reactions of a bodily, emotional, cognitive and affective nature correspond with responses that according to Dodd *et al.* (2001), include physiological, psychological, sociocultural and behavioural components. Management strategies were explicated by the patients (Paper IV) as bodily, psychological and medical measures. Outcomes are congruent with the long term consequences of limitations and dependence. However, it is unclear if and where the existential reflections fit into the model. They could be considered to be either responses or outcomes, or the category existential reflections could be regarded as an extension of the SMM. Such an extension would make the SMM even more useful in palliative care, where existential issues are essential.

In summary, when adapting the SMM to explicate the subjective experiences of the patients, it was useful for recognising concepts that had relations to dyspnea experience and moreover could be useful when evaluating interventions to manage dyspnea in late stage patients with lung cancer. The symptom definition on which the SMM is based should be modified to better account for the subjectively experienced discomfort in relation to symptoms. Furthermore, in patients suffering from life-

threatening illness existential issues are integral to their symptom experience, and therefore such issues must be integrated in the model.

## SYMPTOM CLUSTERS

Cough, anxiety, depression and fatigue coexisted together with dyspnea, yet cough was the only symptom that was related to all measures of dyspnea. Therefore, no symptom clusters were defined. There is however an ongoing discussion as to whether two symptoms could constitute a cluster and if this should be called symptom pairing (Dodd, Miaskowski & Lee 2004). Dyspnea and cough might constitute such a symptom pair. Although not a requirement for defining clusters, these symptoms are also of the same origin. Chan *et al.* (2005) considered a cluster to exist if there are moderately high correlations between the intensity scores and internal consistency of the correlations among the symptoms. In the present thesis, correlations were found between fatigue and anxiety and some measures of dyspnea, but only dyspnea was measured comprehensively. Had other components or symptoms been similarly measured other relationships might have been uncovered. Relations between specific components of symptoms have not been discussed in the emerging symptom cluster literature. For example, pain was an independent predictor of QoL in two of our multivariate models, which is consistent with previous findings (Boström *et al.* 2003; Borglin *et al.* 2005). Pain in patients with advanced cancer is a multidimensional concept, comprising both physical and psychological aspects (Cleeland *et al.* 1996), and varies with physical activity. Thus, a more comprehensive measurement method should be employed to fully investigate the relations between pain and dyspnea. Dodd *et al.* (2001) also discussed that the position of symptoms in the model might change after interventions and other symptoms might become more or less distressing.

## DYSPNEA EXPERIENCE

The main focus of the present thesis was the subjective experience of dyspnea. The perception and evaluation of dyspnea will be discussed in the following paragraph. The response to dyspnea will be discussed in a later section.

### **Perception and evaluation of dyspnea among patients with lung cancer**

Papers I, II and IV explicitly concern the dyspnea experience component, although in different ways. This section concerns the relationships

between the different aspects of dyspnea, patients' descriptions of dyspnea in relation to the CDS items, as well as triggers of dyspnea.

The complexity of the dyspnea experience has been described in the present thesis. A comprehensive picture of this experience has to include several aspects, as indicated by the discrepancies found between measures of intensity, discomfort, frequency, dyspnea qualities and dyspnea related to activity. That occurrences of dyspnea varies between diagnoses, illness trajectory and among settings has earlier been stated (Ripamonti 1999), but this thesis shows that dyspnea also varies between measurement methods which needs to be regarded in comparisons. When considering intensity or frequency, more than half of the patients experienced dyspnea. Concerning total dyspnea (total CDS score), 80% scored above zero. If zero were considered a cut-off point - although not specified as such by Tanaka *et al.* (2000), then CDS may be considered to be a more sensitive instrument than VAS-D. Symptom distress includes the degree of discomfort experienced in response to the symptom (McDaniel & Rhodes 1995). Symptom distress was measured by discomfort caused by dyspnea. When comparing ratings of dyspnea intensity and discomfort, 23% of the patients scored in the upper part of the discomfort scale, while only 3% scored in the upper part of the intensity scale. This observed discrepancy supports the findings by Tishelman *et al.* (2000) that patients weigh symptoms differently concerning importance and intensity. The disparity between the ratings of frequency, intensity, discomfort, dyspnea qualities and dyspnea in relation to exertion emphasize that dyspnea is a multidimensional experience and that it thus needs to be measured in a comprehensive way.

Concerning development of dyspnea over time, numerical increases were seen in all dimensions of dyspnea from baseline to different follow-up time points. Significant deteriorations were confined to sense of discomfort, suggesting that this dimension of dyspnea is important to acknowledge by healthcare professionals.

The validity and of the Cancer Dyspnea Scale was demonstrated in Paper I. Attempts have previously been made to distinguish between descriptions of dyspnea that are assumed to refer to different origins of the symptom (Skevington *et al.* 1997; Wilcock *et al.* 2002; Scano *et al.* 2005). Wilcock *et al.* (2002) found descriptors used by patients with lung cancer to be "out of breath" and "not having enough air", which correspond with some codes belonging to the subcategory "characteristic bodily manifestations" in Paper IV and with some CDS items. When

comparing the CDS items with the descriptions of categories and subcategories in Paper IV, most of the items are represented in the area “expressions of dyspnea”. The exceptions were item 4 and item 12. Item 4 asks “are you out of breath” but as this was the topic of the interviews it was not explicated by the interviewees. Item 12, “does it feel like anything is stuck in your airways”, this was not mentioned explicitly. The area “expressions of dyspnea” consists of the categories “physical features” and “immediate reactions”. The category “physical features” has two subcategories, “characteristic bodily manifestations” and “other bodily symptoms”. Codes from the category “immediate reactions”, especially the subcategory “emotional impact” were similar to some of the CDS items. The subcategory “characteristic bodily manifestations” was considered to be the core of dyspnea experience and “immediate reactions” to be the inevitable consequences. Thus, the fit of CDS items with these categories and subcategories supports the validity of the CDS as a comprehensive measure of dyspnea. In short, the validity of the CDS was strengthened by the qualitative study (Paper IV).

Results from Paper IV show that the patients were aware of what provoked their dyspnea. The avoidance or pacing of straining activities has also been encouraged in nursing interventions (Hatley *et al.* 2003). In order to respect patients’ autonomy, their apprehension of what precedes dyspnea should be highlighted and used in individual care plans to manage dyspnea. In Paper II, dyspnea related to activity was inquired and most patients experienced some dyspnea at walk (72%) or when climbing stairs (79%). The category “circumstances contributing to dyspnea” in Paper IV consisted of physical, psychosocial and environmental influences. Except for physical activities, no other circumstances contributing to dyspnea were inquired in the quantitative studies. This is a limitation that has to be further investigated. The precedings of dyspnea as having physical, psychosocial and environmental influences is also in line with the American Thoracic Society definition of dyspnea (1999).

### **Response to dyspnea**

The results from Paper IV discriminate between the manifestations of dyspnea and the immediate reactions to the manifestation, which were physical, emotional, cognitive and affective impacts. Anxiety was one of the immediate reactions, which strengthens the rationale for including anxiety as a response to dyspnea. Anxiety and depression were considered as responses to dyspnea in this thesis. They were found to be significantly related to qualities of dyspnea (CDS-S) and activity-related dyspnea (LC-13), although depression was not related to sense of

discomfort. Sense of discomfort only reflects the ability to perform breathing and may not influence depression. Analyses in Paper I yielded significant correlations of the CDS items with anxiety and depression, as well as the lack of correlations of psychological distress with VAS dyspnea and discomfort. This indicates that the CDS could better recognize the emotional component of dyspnea experience than could VAS. That there exists a relation between anxiety and dyspnea in advanced cancer patients has been shown by others (Bruera *et al.* 2000; Chiu *et al.* 2004; Tanaka *et al.* 2002a). Dudgeon *et al.* (2001a) found that anxiety was a predictor of dyspnea. The importance of psychological factors to the dyspnea experience is explicated in the American Thoracic Society definition of this concept (1999).

Anxiety and depression measures were negatively correlated also with global QoL over time and depression was a predictor of global QoL in four out of five regression analyses, as was anxiety in two analyses in Paper III. This is congruent with previous findings (Heinonen *et al.* 2004) that emotional well-being is an important QoL domain. Depression in patients with lung cancer has also been shown to correlate with physical dysfunction (Bergman *et al.* 1991), indicating that depression in these patients is related to the severity of the underlying disease. The importance of functional status to depressive symptoms was also found by Barsevick, Dudley and Beck (2006), who considered functional status as a mediator between fatigue and depression.

Although there were relationships between dyspnea, psychological distress and QoL, the causal connection between these has not been established. Therefore, anxiety and depression might be responses to the fact that the patients suffer from an incurable disease and not related to dyspnea. Whatever the origin of emotional distress may be, the impact of depression has to be considered by healthcare professionals when designing interventions aimed at improving QoL.

#### NURSING SCIENCE DOMAINS

Of the nursing science domains, the environmental domain, i.e. social support was found to correlate with QoL, but not consistently over time. Social support was also a predictor of QoL at two of five occasions. From the disease/illness domain, performance status correlated and was a predictor of QoL also at two of five occasions. The personal domain was represented by demographics and coping capacity. The latter of the two showed to be important to both QoL and dyspnea and therefore, this

discussion about the nursing science domains concentrates on coping capacity.

### **Personal domain: Coping capacity**

The importance of coping capacity was demonstrated by its relations to both dyspnea and QoL in Papers II and III. The total coping capacity was negatively related to qualities of dyspnea and activity-related dyspnea and remained as a dyspnea predictor in the multivariate analysis. The association between QoL and coping capacity has been found by others in critically ill patients (Fok *et al.* 2005) and in patients with heart failure (Ekman, Fagerberg & Lundman 2002). It is important for professionals to be aware of the association between coping capacity and dyspnea and QoL when supporting patients to cope with this experience. In a quasi-experimental study of the effect of a nursing intervention in patients receiving treatment for cancer coping capacity was negatively correlated with intensity of pain, psychological symptoms and social symptoms (Delbar & Benor 2001). Coping capacity significantly increased after intervention in both the total score and in the subscales. Adaptation has been used in nursing to capture a person's adjustment to illness and it was recently proposed that the environment could be an important factor to explain why some persons adapt better than others (Schwartz-Barcott 2006).

Comprehensibility was negatively related to sense of anxiety, sense of discomfort and total dyspnea. Correlations between the component comprehensibility and QoL were not stable over time, which could be due to the fact that coping capacity was only measured at baseline. In an interview study in brain tumour patients and their relatives, coping related to comprehensibility was recognized as information-seeking, intellectualization, redefinition and rationalization (Strang & Strang 2001). This is congruent with the psychological strategies to manage dyspnea delineated in Paper IV, which consisted of both cognitive steps and deliberate actions.

Somewhat surprisingly, the manageability component was only weakly correlated to both dyspnea and QoL. Manageability refers to the perceived adequacy of the resources disposed by a person to meet demands in life (Antonovsky 1979) and therefore weak relations to dyspnea and QoL could indicate that the patients perceived their resources to be inadequate to manage either one of these.

The meaningfulness component correlated with qualities of dyspnea and activity-related dyspnea (Paper II) and the correlation between the meaningfulness component and global QoL remained stable over time (Paper III). Meaningfulness could be considered to be an existential component and thus, the relationship between meaningfulness and both dyspnea and QoL strengthens the importance of the existential reflections in Paper IV. Among patients with brain tumour the meaningfulness component was found to comprise close relations to family, music and work, but also adaptation and acceptance. Acceptance was characterized as a reappraisal their lives (Strang & Strang 2001). The reappraisal of life corresponds to the subcategory values and hope (Paper IV).

## DYSPNEA MANAGEMENT STRATEGIES

Patients' management of dyspnea was inquired in Paper IV, although the deliberate management strategies should be distinguished from the immediate reactions. The immediate reactions were inevitable and could not be avoided. Patients' management strategies were bodily, psychological and medical measures. Several non-pharmacologic interventions to manage dyspnea in patients with lung cancer have been introduced. Such interventions have included assessment of breathlessness, advice and training of management strategies, explorations of the meaning of breathlessness, as well as early recognition of problems amenable to pharmacological or medical intervention (Corner *et al.* 1996; Bredin *et al.* 1999), breathing retraining, relaxation techniques, activity pacing and psychosocial support (Hatley *et al.* 2003) and exercise training, (Spruit *et al.* 2006). Although worthwhile, some of these interventions are similar to strategies the patients themselves used in Paper IV and represent efforts by the patients to take control over their dyspnea experience. This is also congruent with an analysis of symptom management, where it was stated that symptom management is a subjective, experiential, intentional and dynamic process (Fu, LeMone & McDaniel 2004). The individuals' own experiences enable them to make decisions and undertake activities to alleviate symptoms and to evaluate these activities. Therefore, when designing interventions the patients' own strategies to take control and manage dyspnea should first be delineated and supported. Patients should as far as possible be encouraged to take part in decisions regarding their own care and to be as self-determinant as possible (Sahlberg Blom, Ternstedt & Johansson 2000; Randall & Downie 2006).

## OUTCOMES

A primary focus of the project was to explore the dyspnea experience and its relevance for QoL in patients with advanced lung cancer disease. The univariate analysis indicated an interaction effect of dyspnea on QoL, but in the multivariate analysis dyspnea as measured by the CDS-S did not significantly predict the variance in global QoL. One explanation for this lack of interaction probably relates to the relatively low levels of dyspnea in the study sample. Both QoL and dyspnea deteriorated over time in our patients with non-curable lung cancer. Even though the most severely diseased patients dropped out from the study, due to death or disease progression during follow-up, decreases in global QoL scores were seen in all subgroups of patients who completed follow-up measurements, reflecting that this is a vulnerable group of patients with ongoing deterioration.

Regarding the psychological and social dimensions of QoL (measured by AQEL), a consistent pattern was seen only with the depression score that decreased from baseline to follow-up measurements, corresponding to the HADS assessments. No significant changes were seen regarding the existential item scores, although numerical score changes indicating deterioration were seen in 11 out of 12 follow-up measurements. Overall, the changes in AQEL scores gave a picture of the patients with lung cancer as suffering not only from physical impairment, but also from psychological, social and existential distress. This emphasizes the importance of a multidimensional approach to QoL evaluation, as indicated in the definitions of QoL (Ferrell 1996; Haas 1999) and in research in palliative care patients (Axelsson & Sjöden 1999; Kaasa & Loge 2003; Echteld, Deliens & Klein 2006). This is also congruent with the results from Paper IV, where the area “long-term consequences” explicates that the dyspnea experience influences life in a comprehensive way, by changing life with restrictions in living, loss of autonomy with dependence on others and by threatening the patient’s whole existence. That dyspnea created barriers in aspects of living was found by Roberts *et al.* (1993), which is congruent with the subcategory “limitations” in Paper IV.

Randall and Downie (2006) question the use of QoL as the goal of palliative care, since QoL is a concept that is impossible to define and they conclude that the goals of palliative care instead of QoL should be to:

- relieve pain and other symptoms; and
- provide the patients with information about their illness, in order to enable them to participate in decisions.

There is a close connection between symptom management and QoL in that the experience of symptom distress has an impact on the patients' QoL, which emphasizes the importance of alleviation of the symptom (Ferrell & Grant 2003). Although QoL may be a principal goal or outcome of intervention, its assessment would seem to be a roundabout way or surrogate to evaluate intervention since the primary outcome is in fact current symptom status. This is also congruent with the previous version of SMM (Larson *et al.* 1994), where symptom status was the most central outcome to which other concepts are related.

It has been suggested that research on QoL should be qualitative (Randall & Downie 2006). The use of qualitative methods is essential to develop new knowledge about humans' thoughts, experiences, behaviour, interaction and culture (Öhman 2005) and was useful in this thesis to gain understanding of patients' existential reflections. In Paper IV the "existential reflections" were grouped into the subcategories "values and hope", "insecurity", "resignation and hopelessness" and "thoughts of death". Fear of death during breathlessness was also found by O'Driscoll *et al.* (1999). These results highlight the patients' need of support and acknowledgement of their worries about future, which might only be possible in a caring model where there is a partnership with reciprocity and mutual inquiry between patient and healthcare professional (Krishnasamy *et al.* 2001). The patients' need to be confirmed has been found by others (Nåden & Sæteren 2006). The significance of patients' worries was also confirmed by the consistent correlation between psychological distress and QoL over time in Paper III, as well as by their appearance as predictors of QoL over time in the regression analyses.

## 8. METHODOLOGICAL CONSIDERATIONS

### SAMPLE SELECTION

The consecutive inclusion of patients enhances the generalizability of the results, although a systematic drop-out of patients who were severely ill and did not wish to participate in the study is a limitation. For ethical reasons, medical data on non-participants were not systematically collected, nor were the reasons for non-participation. However, a general clinical impression was that poor performance patients were overrepresented among the non-participants, which could have resulted in a selection bias toward less disabled patients for the study. When designing the study the intention was to follow the patients from the outpatient clinic through the illness trajectory, until some of them finally were admitted to hospice. Therefore, patients from Sahlgrenska University Hospital were recruited since patients with lung cancer from that hospital are referred to the hospices in the same metropolitan area. However, this intention was not fulfilled, since only a minority of the patients reached hospice during the study period, either due to the fact that their disease was not sufficiently advanced at inclusion or that fewer patients with lung cancer were admitted to hospice during the study period. It cannot be excluded that the dyspnea experience and QoL predictors vary by the severity of the disease, and that the outcome would have been somewhat different with a completely unselected population. However, the major findings were fairly consistent over time, indicating that emotional functioning and depression in particular, and aspects of coping capacity are important explanatory factors for QoL experience in a palliative setting. The use of a consecutive sample, with consistent inclusion criteria and mostly validated instruments has strengthened the generalizability of our results (Polit & Beck 2004; Burns & Grove 2005).

The fact that respondents dropped out over time might also threaten the results. But according to our power estimates (Cohen 1988), with our sample size of  $n=48$  (at 12 month follow-up) a correlation coefficient of 0.40 in the population would be possible to detect, given a statistical power of 0.80 and a two-tailed 0.05 significance level. Therefore, the correlation between age and QoL at 12 months follow-up should be regarded with caution; other significant correlations at that time point exceed 0.40.

## RESEARCH DESIGN

The use of both quantitative and qualitative methods has broadened the results. One example of this is that all areas that emerged in Paper IV were not explicated by the other studies. Both methodologies have been used advantageously to enhance the value of research. In quantitative research it is possible to collect data from a larger sample and make inferences to the population. In descriptive designs, pre-existing differences in the sample regarding variables not included in the study may explain observed differences (Polit & Beck 2004). The use of questionnaires with pre-determined response formats might not always fit the participants' opinions. Therefore, the use of qualitative methods could be seen as a complement, where the patients are allowed to express themselves in their own words and the theory or pattern of understanding emerges during the study (Creswell 2003).

The observed changes in QoL might be affected by response shift. Response shift refers to a change in meaning of one's self-evaluation of QoL, concerning a change in internal standards of measurement; a change in respondent's values; or a redefinition of QoL (Schwartz & Sprangers 1999). To bring response shift into the study might have changed the results. In a study of the existence of change in internal standards of QoL, no consistent change was found (Broberger, Sprangers & Tishelman 2006), but it was discussed if an adaptation to symptoms occurred prior to diagnosis. The patients in the studies in this thesis were included with varying but sometimes considerable time since diagnosis and might therefore be well adapted to symptoms and deteriorated QoL.

The present thesis includes a large number of variables, but in hindsight other potentially important variables could have been included. For example, the amount of time since treatment completion could have influenced the experience of dyspnea. The EORTC QLQ-C30 was only used at baseline and therefore fatigue for example, was not included in Paper III as a possible predictor of QoL. This might be a limitation.

## STATISTICAL TESTS

Negative relations between coping capacity and psychological distress have earlier been found (Eriksson & Lindström 2005). This could explain why coping capacity correlates negatively with both dyspnea and QoL, as it could be mediated by anxiety and depression. With more advanced statistical tests the associations between the concepts included in the study might have been captured in a more comprehensive way.

The assumptions incorporated in multiple regression analysis are that the relationships between the dependent variable and each of the independent variables are linear and that the effects of the independent variables on the dependent are the same regardless of the other variables (Altman 1999). These assumptions were not taken into account in this thesis. An alternative might have been to use logistic regression, requiring that the dependent variable be dichotomous. The variables that were used as dependent variables in the regression analyses were total dyspnea measured by the CDS, activity-related dyspnea and global QoL measured by the AQEL. To be able to dichotomize these variables would require relevant cut-off points. Since the CDS-S and AQEL are fairly new and not yet widely used, it was considered that further research was needed to determine such cut-offs. Therefore, these assumptions incorporated in multiple regression analysis were not considered.

## 9. CONCLUSIONS

This thesis has described the complexity of the dyspnea experience, the influence of other variables on the dyspnea experience as well as the influence of dyspnea on QoL in a sample of patients with lung cancer. The SMM guided the formulation of research questions and helped to distinguish between factors influencing dyspnea and factors affected by the dyspnea. The use of both quantitative and qualitative methods strengthened the results of the thesis. These results have yet to be further studied in other populations, beginning with patients with other cancer diagnoses with lung metastases. The main results of the thesis were:

- The Swedish version of the Cancer Dyspnea Scale (CDS-S) is a valid, reliable and feasible measure of dyspnea among patients with lung cancer and the CDS-S was able to capture the emotional component of dyspnea better than visual analogue scale of dyspnea (VAS-D).
- Dyspnea increased over time, with significant deterioration in the sense of effort component.
- Coping capacity was important to both dyspnea and quality of life (QoL) and predicted dyspnea, both together with and independent of cough. Coping capacity was one predictor of QoL and the coping capacity component of meaningfulness at baseline correlated significantly with dyspnea and with QoL measures over time.
- QoL decreased significantly from baseline to 3, 6 and 9 months and correlated most strongly with anxiety and depression over time. Depression at baseline was the most consistent predictor of QoL over time.
- The relationship between QoL and dyspnea was not consistent over time, and dyspnea did not predict QoL in this group of patients.
- The experience of dyspnea was preceded by physical, psychosocial and environmental factors. Expressions of dyspnea were described by patients to involve physical features and immediate reactions. The long-term consequences involved life changes with limitations and dependence as well as existential reflections.
- Patients' own strategies to take control and manage their dyspnea involve bodily, psychological and medical measures.

## 10. IMPLICATIONS

The thesis has shown that dyspnea is a complex experience that may be assessed both qualitatively and quantitatively, taking into account various aspects such as frequency, intensity, relation to activity and more complicated descriptions, such as qualities. The great variety of assessment tools used here was necessary in order to catch the multidimensionality of dyspnea and may help to guide in the selection of potential outcome measures in clinical research. These tools may also provide clinical practice with possibilities both to make more comprehensive assessments of dyspnea on admission, which in turn may contribute to clinical decision making regarding care plans and interventions, as well as to subsequently evaluate treatment effects.

The adapted Symptom Management Model (SMM) was useful to recognize concepts related to the dyspnea experience and could also be useful when evaluating interventions to manage dyspnea. The symptom definition on which the SMM is based needs to be modified to better account for subjectively experienced discomfort in relation to symptoms. The model that emerged from data in Paper IV may be seen to broaden our understanding of the dyspnea experience in patients suffering from a life-threatening illness and could be used to further develop the SMM. The precedings in the model are congruent with the personal and environmental conditions under which dyspnea develops. Expressions of dyspnea correspond to the dyspnea experience, involving perceptions, evaluations and responses, where immediate reactions could be seen as responses. The long-term consequences, i.e. life changes with limitations and increased dependence, could be used to develop the outcome component in SMM. Existential reflections are not explicated in the SMM, but seem to be important to patients and therefore ought to be included.

Coping capacity predicted both the dyspnea experience and QoL. This is important knowledge both to scientific theory, e.g. for designing research studies and to nursing practice, e.g. for developing individual care plans for patients with dyspnea.

Patients use several strategies to cope with the dyspnea experience. This is important for healthcare professionals to acknowledge, particularly when designing interventions to support patients in clinical practice, but also in research to evaluate such interventions.

## **11. RECOMMENDATIONS FOR FUTURE RESEARCH**

Although the present thesis has explicated the multidimensionality of dyspnea experience and the influences of other factors in patients with lung cancer, there are further gaps in the knowledge. Further research is needed:

- To investigate predictors of dyspnea over time.
- To investigate the relations between dyspnea and other symptoms when all symptoms are investigated in a comprehensive way.
- To investigate the validity of the AQEL.
- To investigate how QoL and dyspnea are experienced at the end of life.
- Qualitative research is needed to gain a deeper understanding of the existential issues among patients with lung cancer.
- To investigate if a nursing intervention guided by the model from Paper IV effectively decreases the dyspnea experience and minimizes its long-term consequences.

## 12. POPULÄRVETENSKAPLIG SAMMANFATTNING

### Upplevelse av andnöd och livskvalitet hos patienter med lungcancer i palliativ vård

#### *Bakgrund*

Andnöd är en subjektiv, mångdimensionell upplevelse av obehag i samband med andning, som påverkas av fysiologiska, psykologiska, sociala och omgivningsmässiga faktorer. Andnöd är ett av flera symptom som kan drabba personer som lider av lungcancer. När andnöden beror på en obotlig sjukdom kan den komma att påverka flera aspekter av livet hos de drabbade personerna. För att förbättra livskvaliteten så mycket som möjligt hos personer med lungcancer, för att kunna identifiera de mest sårbara individerna och för att adekvat kunna utvärdera åtgärder för att förbättra andnöd och livskvalitet behövs mer kunskap. För att kunna vidta adekvata åtgärder för att förbättra patienternas andnöd är det viktigt att först kartlägga vilka strategier patienterna själva har att hantera sin andnöd.

#### *Syfte*

Det övergripande syftet med avhandlingen var att beskriva hur patienter med lungcancer upplever andnöd och livskvalitet över tid när botande och livsförlängande behandling är avslutad.

#### *Metod*

När forskningsfrågor har formulerats har en modell varit vägledande, som tydliggör komplexiteten i symptomupplevelsen. Upplevelse av andnöd, strategier för att hantera andnöden och andnödens påverkan på livskvalitet har undersökts. I modellen ingår att man antar att dessa tre centrala delar påverkas av olika faktorer runt patienten, såsom personliga faktorer, omgivningsmässiga och olika faktorer som har med hälsa och sjukdom att göra. Avhandlingens uppläggning är beskrivande och består av tre kvantitativa studier och en kvalitativ. Deltagarna i de kvantitativa studierna var 105 konsekutiva patienter diagnostiserade med lungcancer, som inkluderades i studien när aktiv anti-cancerbehandling var avslutad. I den av studierna som gällde tillförlitligheten för en svensk version av Cancer Dyspnea Scale (CDS-S), ett frågeformulär om andnöd, deltog 99 av patienterna. I den kvalitativa studien ingick 20 av patienterna.

En uppsättning frågeformulär användes, dessa mäter olika aspekter av andnöd, intensitet av andra symptom, såsom ångest, nedstämdhet, smärta

och trötthet, funktioner, livskvalitet, copingkapacitet och socialt stöd. Copingkapacitet avser en persons resurser att klara svårigheter och är indelat i om de svårigheter man möter är begripliga, hanterbara och om man upplever det meningsfullt att engagera sig. Andnöd, ångest, nedstämdhet och livskvalitet mättes också efter 3, 6, 9 och 12 månader efter första mätningen. Vissa data hämtades dessutom från medicinsk journal, t.ex. performance status, dvs. en persons förmåga att sköta sig själv. Berättande intervjuer genomfördes i den kvalitativa studien med frågor om upplevelsen av andnöd och patienternas egna sätt att hantera andnöden. Intervjuerna analyserades med innehållsanalys.

### **Resultat**

Mer än hälften av patienterna upplevde andnöd. Ju värre andnöd patienterna upplevde avseende olika aspekter, desto mer ångest, nedstämdhet, trötthet, hosta samt sämre förmåga att klara sig själva hade patienterna. Ju högre copingkapacitet desto bättre livskvalitet upplevde patienterna. Lägre copingkapacitet och högre nivåer av ångest påverkade den totala upplevelsen av andnöd. Mätt över tid ökade andnöd och nedstämdhet och livskvalitet försämrades. Det fanns samband mellan livskvalitet och förmåga att klara sig själv, ångest, nedstämdhet, olika aspekter av andnöd, smärta. Samband mellan livskvalitet och komponenten meningsfullhet i copingkapacitet kvarstod också vid flera av uppföljningstillfällena. Nedstämdhet var en viktig förklaring till variationen av livskvalitet över tid. Andra faktorer som förklarar förändringen i livskvalitet var copingkapacitet, ångest, förmåga att klara sig själv, smärta och upplevt stöd från närstående.

Frågeformuläret om andnöd (CDS-S) mottogs väl av patienterna, besvarades på ca 2 minuter och visade tillfredsställande tillförlitlighet och kunde på ett bra sätt fånga den känslomässiga komponenten i andnöd.

I den kvalitativa analysen framträdde fyra områden. Området om vad som "Föregår andnöd" visade på *omständigheter som bidrar till andnöden* vilket var fysisk, psykosocial och omgivningsmässig påverkan. Området "Andnödens uttryck" bestod av *fysiska särdrag* indelade i karakteristiska yttringar i kroppen och andra fysiska symptom; och *omedelbara reaktioner* som bestod av kroppslig, känslomässig, tanke- mässig och affektiv effekt. Området "Långsiktiga konsekvenser av andnöd" inkluderade att *livet förändras* genom begränsningar och ökat beroende; och *existentiell reflektion* som gäller olika nivåer av hopp, såsom värden och hopp, osäkerhet, hopplöshet och resignation samt

tankar på döden. "Strategier för att bemästra andnöden" utlöstes både av omständigheter som bidrar till andnöden och andnödens uttryck och bestod av att man tog kontroll med olika *kroppsliga, psykologiska* och *medicinska* åtgärder. Resultatet av den kvalitativa studien presenterades i en modell som skulle kunna användas för att få en större förståelse för upplevelsen av andnöd i såväl i praktisk omvårdnad som i forskning.

### ***Diskussion***

Avhandlingen beskriver hur en grupp patienter med lungcancer upplever andnöd. Andnöd är en komplex upplevelse och innefattar fysiska och psykologiska aspekter, vilket man bör ta hänsyn till när man mäter andnöd. I avhandlingen har andnöd mätts med intensitet, obehag, frekvens, dess relation till aktivitet och olika aspekter av andnöd, representerade av CDS-skalans faktorer, en fysisk faktor, en psykologisk faktor och faktor som gäller obehag i samband med andning. Dessa mätningar visade olika grader för olika aspekter av andnöd, vilket ytterligare styrker vikten av att använda flera metoder för att fånga komplexiteten i patientens upplevelse. CDS-S visade sig vara ett tillförlitligt instrument att använda såväl inom palliativ vård som inom forskning. Copingkapacitet visade sig vara ett viktigt begrepp både för andnöd och livskvalitet och skulle kunna utnyttjas för att förbättra båda inom palliativ vård. Det fanns samband mellan meningsfullhet och både andnöd och livskvalitet. Detta tillsammans med de existentiella reflektionerna som var viktiga i den kvalitativa studien visar på vikten av existentiella frågor vid svår sjukdom. Andnöd var huvudintresset för denna avhandling, men när den mättes med CDS-S föll den inte ut som en förklaring till livskvalitet, det gjorde däremot nedstämdhet och även ångest. Det psykologiska obehag som patienter med lungcancer upplever härrör troligen från sjukdomen, och dess allvarliga natur. Att psykologiskt obehag har samband med andnöd kan bero på att andnöden påminner om sjukdomen, vilket också framgick i intervjustudien. Det är viktigt att hälso- och sjukvårdspersonal strävar efter att hjälpa patienterna med deras psykologiska reaktioner. Resultatet från den kvalitativa studien bekräftade också korrektheten i CDS-skalan och den använda modellen.

### **13. ACKNOWLEDGEMENTS**

I would like to express my sincere gratitude to everyone who has contributed to this thesis by sharing their experiences and knowledge with me and by supporting me when completing this work. I particularly wish to thank the following people:

All patients, who were willing to participate in the studies for offering your time and sharing your experiences and thoughts.

Professor Ella Danielson, my main supervisor during the last year and seminar leader during the whole doctoral programme, for your great support and guidance through the research process, for always stimulating me to reach a higher level, for your engagement and for your never-ending support.

Professor Fannie Gaston-Johansson, my main supervisor during the first four years of doctoral programme, for your guidance through research process during these years and for asking the questions that I needed to increase my knowledge.

Associate professor Bengt Bergman, supervisor, for giving me your time and engagement, for sharing your great knowledge and experience of research, for helping me to understand my own thoughts and writings.

Senior lecturer Marianne Gustafsson, supervisor, for always giving support and encouragement, for challenging me to apply for the doctoral programme, for your persistence in reminding me of the patients and reading my texts, for your friendship through these years.

The Institute of Health and Care Sciences, for making this thesis possible by economic support through educational allowance and doctoral employment.

The Bräcke Diakoni, for generously letting me be off duty and thereby enable this thesis to come true.

The staff at the lung oncology out-patient clinic, who kindly received me and allocated time and place for me to be able meet the patients during data collection period.

My friends and colleagues at Helhetsvården, Bräcke Diakoni, for your friendship and support and believing in my capacity, for your understanding of my

preoccupation with my studies and for your love and care of the dying patients and for all constructive reflections we have made together when caring for these patients. You are all in my heart, but I especially want to mention Marit Jansson, manager of Helhetsvården, for your understanding and generosity with time off duty, and Barbro Petzén, previous manager, for encouraging me to apply for the doctoral programme.

My friends and colleagues in the doctoral programme at the institute, for constructive and stimulating discussions during the courses and seminars and for sharing our different problems.

Eva Deutsch, research secretary, for your capacity to solve most administrative problems.

My relatives and friends who have supported my and still being my friends even if we have not had the time to see each other as often as I had wished.

And last but not least I would like to thank my family for putting up with a wife and mother preoccupied by studies. My husband Anders, for being loving and supportive and always believing in my capacity and having practical solutions of different kinds of problems. My daughter Sara, for challenging me to believe in my capacity, her husband Anders, for having practical solutions to any computer problems, their children Simon and Sofia, who both have been born during these years and being a new joy of my life. My son Magnus, for always being patient and having practical solutions when the computer or computer programmes are not working as I want them to do. My daughter Maja, for helping me see what is important in life and my son Jonas, who patiently draws me back to reality when demanding an absent mother to be present.

*I am most grateful for the financial support from the Swedish Society of Nursing (SSF) and the Association for the Cancer and Traffic injured (CTRF).*

## 14. REFERENCES

- Aaronson NK., Ahmedzai S., Bergman B., Bullinger M., Cull A., Duez NJ., Filiberti A., Flechtner H., Fleishman SB., de Haes JCJM., Kaasa S., Klee M., Osoba D., Razavi D., Rofe PB., Schraub S., Sneeuw KA., Sullivan M. & Takeda F. (1993). The European Organisation for Research and Treatment of Cancer QLQ-C30: A quality-of-life instrument for use in international clinical trials in oncology. *Journal of the National Cancer Institute* 85(5), 365-76.
- Ahlberg K., Ekman T., Wallgren A. & Gaston-Johansson F. (2004). Fatigue, psychological distress, coping and quality of life in patients with uterine cancer. *Journal of Advanced Nursing* 45(2), 205-13.
- Ahmedzai S. (1998). Palliation of respiratory symptoms. In D. Doyle, GWC. Hanks & N. MacDonald (Eds.) *Oxford Textbook of Palliative Medicine*. (2<sup>nd</sup> ed.) (pp. 583-616). Oxford: Oxford University Press.
- Aitken RCB. (1969). Measurement of feelings using visual analogue scales. *Proceedings of Royal Society Medicine* 62(10), 989-93.
- Altman DG. (1999). *Practical Statistics for Medical Research*. London: Chapman & Hall/CRC.
- American Thoracic Society. (1999). Dyspnea. Mechanisms, assessment and management: A consensus statement. *American Journal of Respiratory and Critical Care Medicine* 159(1), 321-40.
- Ando M., Ando Y., Hasegawa Y., Shimokata K., Minami H., Wakai K., Ohno Y. & Sakai S. (2001). Prognostic value of performance status assessed by patients themselves, nurses, and oncologists in advanced non-small cell lung cancer. *British Journal of Cancer* 85(11), 1634-39.
- Antonovsky A. (1979). *Health, Stress and Coping*. San Francisco: Jossey-Bass inc., Publishers.
- Antonovsky A. (1993). The structure and properties of the sense of coherence scale. *Social Science and Medicine* 36(6), 725-33.
- Armstrong TS. (2003). Symptom experience: A concept analysis. *Oncology Nursing Forum* 30(4), 601-06.
- Arnold R., Ranchor AV., Sanderman R., Kempen GIJM., Ormel J. & Suurmeijer TPBM. (2004). The relative contributions of domains of quality of life to overall quality of life for different chronic diseases. *Quality of Life Research* 13(5), 883-96.
- Axelsson B. & Sjöden P-O. (1999). Assessment of quality of life in palliative care: psychometric properties of a short questionnaire. *Acta Oncologica* 38(2), 229-37.
- Barsevick AM., Dudley WN. & Beck SL. (2006). Cancer-related fatigue, depressive symptoms and functional status: A mediation model. *Nursing Research* 55(5), 366-72.
- Bausewein C., Farquhar M., Booth S., Gysels M. & Higginson IJ. (2006). Measurement of breathlessness in advanced disease: A systematic review. *Respiratory Medicine* in press.
- Bergman B. (1991). *Quality of Life and Related Issues in Small Cell Lung Cancer*. Doctoral dissertation. Faculty of Medicine, Department of Pulmonary Medicine and Health Care Research Unit, Department of Medicine I, University of Göteborg, Sweden.
- Bergman B., Sullivan M. & Sörenson S. (1991). Quality of life during chemotherapy for small cell lung cancer. I. An evaluation with generic health measures. *Acta Oncologica* 30(8), 947-57.
- Bergman B., Aaronson NK., Ahmedzai S., Kaasa S. & Sullivan, M. (1994). The EORTC QLQ-LC13: a modular supplement to the EORTC core quality of life questionnaire (QLQ-C30) for use in lung cancer clinical trials. *European Journal of Cancer* 30A(5), 635-42.
- Booth S., Kelly MJ., Cox NP., Adams L. & Guz A. (1996). Does oxygen help dyspnea in patients with cancer. *American Journal of Respiratory and Critical Care Medicine* 153(5), 1515-18.

- Booth S., Farquhar M., Gysels M., Bausewein C. & Higginson IJ. (2006). The impact of a breathlessness intervention service (BIS) on the lives of patients with intractable dyspnea: A qualitative phase 1 study. *Palliative and Supportive Care* 4(3), 287-93.
- Borg GAV. (1982). Psychophysical bases of perceived exertion. *Medicine and Science in Sports and Exercise* 14(5), 377-81.
- Borglin G., Jakobsson U., Edberg A-K. & Hallberg IR. (2005). Self-reported health complaints and their prediction of overall and health-related quality of life among elderly people. *International Journal of Nursing Studies* 42(2), 147-58.
- Boström B., Sandh M., Lundberg D. & Fridlund B. (2003). A comparison of pain and health-related quality of life between two groups of cancer patients with differing average levels of pain. *Journal of Clinical Nursing* 12(5), 726-35.
- Boyle P., Gandini S. & Gray N. (2000). Epidemiology of lung cancer: A century of great success and ignominious failure. In HH. Hansen (Ed.), *The International Association for the Study of Lung Cancer: Textbook of Lung Cancer* (pp. 13-25). London: Martin Dunitz Ltd.
- Bredin M., Corner J., Krishnasamy M., Plant H., Bailey C. & A'Hearn R. (1999). A multicentre randomized controlled trial of nursing interventions for breathlessness in patients with lung cancer. *British Medical Journal* 318(7188), 901-04. (full version: [www.bmj.com/cgi/content/full/318/7188/901](http://www.bmj.com/cgi/content/full/318/7188/901))
- Broberger E., Sprangers M. & Tishelman C. (2006). Do internal standards of quality of life change in lung cancer patients? *Nursing Research* 55(4), 274-82.
- Brown ML., Carrieri V., Janson-Bjerklie S. & Dodd MJ. (1986). Lung cancer and dyspnea: The patient's perception. *Oncology Nursing Forum* 13(5), 19-24.
- Bruera E., de Stoutz N. Velasco-Leiva A., Schoeller T. & Hanson J. (1993). Effects of oxygen on dyspnoea in hypoxemic terminal cancer patients. *Lancet* 342(8862), 13-15.
- Bruera E. & Ripamonti C. (1998). Dyspnea in patients with advanced cancer. In A. Berger, RK. Portenoy & DE. Weissman (Eds.), *Principles and Practice of Supportive Oncology* (pp. 295-308). New York: Lippincott-Raven Publishers.
- Bruera E., Schmitz B., Pither J., Neumann CM. & Hanson J. (2000). The frequency and correlates of dyspnea in patients with advanced cancer. *Journal of Pain and Symptom Management* 19(5), 357-62.
- Bruera E., Sweeney C., Willey J., Palmer JL., Strasser F., Morice RC. & Pisters K. (2003). A randomized controlled trial of supplemental oxygen versus air in cancer patients with dyspnea. *Palliative Medicine* 17(8), 659-63.
- Buccheri G., Ferrigno D. & Tamburini M. (1996). Karnofsky and ECOG performance status scoring in lung cancer: A prospective, longitudinal study of 536 patients from a single institution. *European Journal of Cancer* 32A(7), 1135-41.
- Burns N. & Grove SK. (2005). *The Practice of Nursing Research. Conduct, Critique & Utilization* (5<sup>th</sup> ed.). St. Louis: Elsevier Saunders.
- Carrieri-Kohlman V., Gormley JM., Douglas MK., Paul SM. & Stulbarg MS. (1996a). Differentiation between dyspnea and its affective components. *Western Journal of Nursing Research* 18(6), 626-42.
- Carrieri-Kohlman V., Gormley JM., Douglas MK., Paul SM. & Stulbarg MS. (1996b). Exercise training decreases dyspnea and the distress and anxiety associated with it: monitoring alone may be as effective as coaching. *Chest* 110(6), 1526-35.
- Cella DF. (1994). Quality of life: concepts and definition. *Journal of Pain and Symptom Management* 9(3), 186-92.
- Cella DF., Bonomi AE., Lloyd SR., Tulsky DS., Kaplan E. & Bonomi P. (1995). Reliability and validity of cancer therapy – Lung (Fact-L) quality of life instrument. *Lung Cancer* 12(3), 199-220.

- Chan CWH., Richardson A. & Richardson J. (2005). A study to assess the existence of the symptom cluster of breathlessness, fatigue and anxiety in patients with advanced lung cancer. *European Journal of Oncology Nursing* 9(4), 325-33.
- Chiu T-Y., Hu W-Y., Lue B-H., Yao C-A., Chen C-Y. & Wakai S. (2004). Dyspnea and its correlates in Taiwanese patients with terminal cancer. *Journal of Pain and Symptom Management* 28(2), 123-32.
- Clark, D (2002). Between hope and acceptance: the medicalisation of dying. *British Medical Journal* 324(7342), 905-07.
- Cleeland CS., Nakamura Y., Mendoza TR., Edwards KR., Douglas J. & Serlin RC. (1996). Dimensions of the impact of cancer pain in a four country sample: new information from multidimensional scaling. *Pain* 67(2-3), 267-73.
- Cohen J. (1988) *Statistical Power Analysis for the Behavioural Sciences* (pp.75-107). London: Laurence Erlbaum Associates Publishers.
- Cohen SR. & Leis A. (2002). What determines the quality of life of terminally ill cancer patients from their own perspective? *Journal of Palliative Care* 18(1), 48-58.
- Cooley ME. (1998). Quality of life in persons with non-small cell lung cancer: A concept analysis. *Cancer Nursing* 21(3), 151-61.
- Cooley ME. (2000). Symptoms in adults with lung cancer: A systematic research review. *Journal of Pain and Symptom Management* 19(2), 137-53.
- Cooley ME., Short TH. & Moriarty HJ. (2002). Patterns of symptom distress in adults receiving treatment for lung cancer. *Journal of Palliative Care* 18(3), 150-59.
- Corner J., Plant H., A'Hern R. & Bailey C. (1996). Non-pharmacological intervention for breathlessness in lung cancer. *Palliative Medicine* 10(4), 299-305.
- Courtens AM., Stevens FCJ., Crebolder HFJM. & Philipsen H. (1996). Longitudinal study on quality of life and social support in cancer patients. *Cancer Nursing* 19(3), 162-69.
- Coyne PJ., Viswanathan R. & Smith TJ. (2002). Nebulized fentanyl citrate improves patients perception of breathing, respiratory rate, and oxygen saturation in dyspnea. *Journal of Pain and Symptom Management* 23(2), 157-60.
- Creswell JW. (2003). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. (2<sup>nd</sup> ed.). London: Sage Publications.
- Degner LF. & Sloan JA. (1995). Symptom distress in newly diagnosed ambulatory cancer patients and as a predictor of survival in lung cancer. *Journal of Pain and Symptom Management* 10(6), 423-31.
- Delbar V. & Benor DE. (2001). Impact of a nursing intervention on cancer patients' ability to cope. *Journal of Psychosocial Oncology* 19(2), 57-75.
- Dodd M., Janson S., Facione N., Faucett J., Froelicher ES., Humphreys J., Lee K., Miaskowski C., Puntillo K., Rankin S. & Taylor D. (2001). Advancing the science of symptom management. *Journal of Advanced Nursing* 33(5), 668-76.
- Dodd MJ., Miaskowski C. & Paul SM. (2001a). Symptom clusters and their effect on the functional status of patients with cancer. *Oncology Nursing Forum* 28(3), 465-70.
- Dodd MJ., Miaskowski C. & Lee KA. (2004). Occurrence of symptom clusters. *Journal of National Cancer Institute Monographs* (32), 76-78.
- Downe-Wamboldt B., Butler L. & Coulter L. (2006). The relationship between meaning of illness, social support, coping strategies and quality of life for lung cancer patients and their family members. *Cancer Nursing* 29(2), 111-19.
- Dudgeon D. (2001). Dyspnea, death rattle, and cough. In BR. Ferrall & N. Coyle (Eds.), *Textbook of Palliative Nursing* (pp. 164-74). Oxford: Oxford University Press.

- Dudgeon DJ., Kristjanson L., Sloan JA., Lertzman M. & Clement, K. (2001a). Dyspnea in cancer patients: Prevalence and associated factors. *Journal of Pain and Symptom Management* 21(2), 95-102.
- Dudgeon DJ., Lertzman M. & Askew GR. (2001b). Physiological changes and clinical correlations of dyspnea in cancer outpatients. *Journal of Pain and Symptom Management* 21(5), 373-79.
- Eakin EG., Resnikoff PM., Prewitt LM., Ries AL. & Kaplan RM. (1998). Validation of a new dyspnea measure: the UCSD shortness of breath questionnaire. *Chest* 113(3), 619-24.
- Echteld MA., Deliens L. & Klein M. (2006). EORTC QLQ-C15-PAL: the new standard in the assessment of health-related quality of life in advanced cancer? *Palliative Medicine* 20(1), 1-2.
- Ekman I., Fagerberg B. & Lundman B. (2002). Health-related quality of life and sense of coherence among elderly patients with severe chronic heart failure in comparison with healthy controls. *Heart Lung* 31(2), 94-101.
- Eriksson M. & Lindström B. (2005). Validity of Antonovsky's sense of coherence scale: a systematic review. *Journal of Epidemiology and Community Health* 59(6), 460-66.
- Esbensen BA., Østerlind K., Roer O. & Hallberg IR. (2004). Quality of life of elderly persons diagnosed with newly diagnosed cancer. *European Journal of Cancer Care* 13(5), 443-53.
- Faller H. & Schmidt M. (2004). Prognostic value of depressive coping and depression in survival in lung cancer patients. *Psycho-Oncology* 13(5), 359-63.
- Fawcett J. (2005). The structure of contemporary nursing knowledge. In J. Fawcett (Ed.), *Contemporary Nursing Knowledge. Analysis and Evaluation of Nursing Models and Theories* (2<sup>nd</sup> ed.). (pp.3-30). Philadelphia: F.A. Davis Company.
- Ferrell BR. (1996). The quality of lives: 1525 voices of cancer. *Oncology Nursing Forum* 23(6), 909-16.
- Ferrell BR. & Grant M. Quality of life and symptoms. In CR. King & PS. Hinds (Eds.), *Quality of Life from Nursing and Patient Perspectives: Theory Research Practice*. London: Jones and Bartlett Publishers.
- Finfgeld-Connett D. (2005). Clarification of social support. *Journal of Nursing Scholarship* 37(1), 4-9.
- Fok SK., Chair SY. & Lopez V. (2005). Sense of coherence, coping and quality of life following critical illness. *Journal of Advanced Nursing* 49(2), 173-81.
- Fu MR., LeMone P. & McDaniel RW. An integrated approach to an analysis of symptom management in patient with cancer. *Oncology Nursing Forum* 31(1), 65-70.
- Gallo-Silver L. & Pollack B. (2000). Behavioral interventions for lung cancer-related breathlessness. *Cancer Practice* 8(6), 268-73.
- Garman KS. & Cohen HJ. (2002). Functional status and the elderly patient. *Critical Reviews in Oncology/Hematology* 43(3), 191-208.
- Gift AG. (1990). Dyspnea. *Nursing Clinics of North America* 25(4), 955-65.
- Gustafsson M. (1999). *Chronic Pain Experiences: Studies of Perception, Evaluation and Responses to Pain in Patients with Rheumatoid Arthritis and Musculoskeletal Pain*. Doctoral dissertation. Faculty of Medicine, Department of Rehabilitation, Institute of Community Medicine, University of Göteborg, Sweden.
- Graneheim UH. & Lundman B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today* 24(2), 105-12.
- Haas BK. (1999). A multidisciplinary concept analysis of quality of life. *Western Journal of Nursing Research* 21(6), 728-42.
- Hanson WE., Creswell JW., Plano Clark VL., Petska KS. & Creswell JD. (2005). Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology* 52(2), 224-35.
- Hately J., Laurence V., Scott A., Baker R. & Thomas P. (2003). Breathlessness clinics within specialist palliative care settings can improve the quality of life and functional capacity of patients with lung cancer. *Palliative Medicine* 17(5), 410-17.

- Haugen A. (2000). Etiology in lung cancer. In HH. Hansen (Ed.), *The International Association for the Study of Lung Cancer: Textbook of Lung Cancer*. (pp. 1-12) London: Martin Dunitz Ltd.
- Hayes MHS. & Patterson DG. (1921). Experimental development of the graphic rating method. *Psychological Bulletin* 18(2), 98-99.
- Heedman P-A. & Strang P. (2001). Symptom assessment in advanced palliative home care for cancer patients using the ESAS: Clinical aspects. *Anticancer Research* 21(6A), 4077-82.
- Heinonen H., Aro AR., Aalto A-M. & Uutela A. (2004). Is the evaluation of global quality of life determined by emotional status? *Quality of Life Research* 13(8), 1347-56.
- Henoch I. (2002). Palliativ - en begreppsanalys. *Vård i Norden* 22(3), 10-14.
- Herrmann C. (1997). International experiences with the hospital anxiety and depression scale - a review of validation data and clinical results. *Journal of Psychosomatic Research* 42(1), 17-41.
- Higgins PA. & Straub AJ. (2006). Understanding the error of our ways: Mapping the concepts of validity and reliability. *Nursing Outlook* 54(1), 23-29.
- Hill Bailey P. (2004). The dyspnea-anxiety-dyspnea cycle – COPD patients’ stories of breathlessness: “It’s scary / When you can’t breathe”. *Qualitative Health Research* 14(6), 760-78.
- Hinds C. & Moyer A. (1997). Support as experienced by patients with cancer during radiotherapy treatments. *Journal of Advanced Nursing* 26(2), 371-79.
- Hinson Langford CP., Bowsher J., Maloney JP. & Lillis PP. (1997). Social support: a conceptual analysis. *Journal of Advanced Nursing* 25(1), 95-100.
- Hollen PJ., Gralla RJ., Kris MG. & Potanovich LM. (1993). Quality of life assessment in individuals with lung-cancer – testing the lung cancer symptom scale (LCSS). *European Journal of Cancer* 29A(Suppl. 1), S51-S58.
- Hollen PJ., Gralla RJ., Kris MG., Eberly SW. & Cox C. (1999). Normative data and trends in quality of life from Lung Cancer Symptom Scale (LCSS). *Support Care Cancer* 7(3), 140-48.
- Holritz Rasmussen B. (1999). *In Pursuit of a Meaningful Living amidst Dying: Nursing Practice in a Hospice*. Umeå University Medical Dissertation, New Series No 602, Sweden.
- Hupcey JE. (1998). Social support: Assessing conceptual coherence. *Qualitative Health Research* 8(3), 304-18.
- Jablonski A. & Wyatt GK. (2005). A model to identifying barriers to effective symptom management at the end of life. *Journal of Hospice and Palliative Nursing* 7(1), 23-36.
- Jantarakupt P. & Porock D. (2005). Dyspnea management in lung cancer: Applying the evidence from chronic obstructive pulmonary disease. *Oncology Nursing Forum* 32(4), 785-95.
- Johansson L. (2001). Histopatologisk klassifikation. In *Lungcancer: Nationellt vårdprogram 2001*. Regionalt Onkologiskt Centrum Uppsala/Örebroregionen. Temdahls tryckeri. Retrieved 2006-11-02 from [www.roc.se-yp\\_lunga\\_01.pdf](http://www.roc.se-yp_lunga_01.pdf)
- Kaasa S. (1989). *Quality of Life and Survival in Patients with Non-Small Cell Lung Cancer*. Doctoral dissertation. Department of Medical Oncology and Radiotherapy, The Norwegian Radium Hospital, and the Norwegian Cancer Society.
- Kaasa S. & Loge JH. (2003). Quality of life in palliative care: principles and practice. *Palliative Medicine* 17(1), 11-20.
- Kendrick KR., Baxi SC. & Smith RM. (2000). Usefulness of the modified 0-10 Borg scale in assessing the degree of dyspnea in patients with COPD and asthma. *Journal of Emergency Nursing* 26(3), 216-22.
- Kim HJ., McGuire DB., Tulman L. & Barsevick AM. (2005). Symptom clusters: concept analysis and clinical implications for cancer nursing. *Cancer Nursing* 28(4), 270-82.

- Kim HS. & Sjöström B. (2006). Pragmatism, nursing, and nursing knowledge development. In HS. Kim & I. Kollak (Eds.), *Nursing Theories: Conceptual and Philosophical Foundations* (2<sup>nd</sup> ed.) (pp. 184-201). New York: Springer Publishing.
- King C., Haberman M., Berry DL., Bush N., Butler L., Dow KH., Ferral B., Grant M., Gue D., Hinds P., Kreuer J., Padilla G. & Underwood S. (1997). Quality of life and the cancer experience: The state-of-the-knowledge. *Oncology Nursing Forum* 24(1), 27-41.
- Kline P. (1998). *The New Psychometrics. Science: Psychology and Measurement*. London: Routledge.
- Kohara H., Ueoka H., Aoe K., Maeda T., Takeyama H., Saito R., Shima Y. & Uchitomi Y. (2003). Effect of nebulized furosemide in terminally ill cancer patients with dyspnea. *Journal of Pain and Symptom Management* 26(4), 962-67.
- Kornblith AB., Herndon JE., Zuckerman E., Viscoli CM., Horwitz RI., Cooper MR., Harris L., Tkaczuk KH., Perry MC., Budman D., Norton L. & Holland JC. (2001). Social support as a buffer to the psychological impact of stressful life events in women with breast cancer. *Cancer* 91(2), 443-54.
- Krippendorff K. (2004). *Content Analysis: An Introduction to its Methodology*. (2<sup>nd</sup> ed.). London: Sage Publications.
- Krishnasamy M. (1996). Social support and the patient with cancer: a consideration of the literature. *Journal of Advanced Nursing* 23(4), 757-62.
- Krishnasamy M., Corner J., Bredin M., Plant H. & Bailey C. (2001). Cancer nursing practice development: understanding breathlessness. *Journal of Clinical Nursing* 10(1), 103-08.
- Kuo TT. & Ma FC. (2002). Symptom distress and coping strategies in patients with non-small cell lung cancer. *Cancer Nursing* 25(4), 309-17.
- Kvale S. (1997). *Den kvalitativa forskningsintervjun*. (In English: [Interviews: An Introduction to Qualitative Research Interview]). Lund: Studentlitteratur.
- Langius A., Björvell H. & Antonovsky A. (1992). The sense of coherence concept and relation to personality traits in Swedish samples. *Scandinavian Journal of Caring Sciences* 6(3), 165-71.
- Larsen J., Nordström G., Ljungman P. & Gardulf A. (2004). Symptom occurrence, symptom intensity, and symptom distress in patients undergoing high-dose chemotherapy with stem-cell transplantation. *Cancer Nursing* 27(1), 55-64.
- Larson PJ, Carrieri-Kohlman V., Dodd MJ., Douglas M., Faucett J., Froelicher ES., Gortner SR., Halliburton P., Janson S., Lee KA., Miaskowski C., Savedra MC., Stotts NA., Taylor D. & Underwood PR. (1994). A model for symptom management. *Image: Journal of Nursing Scholarship* 26(4), 272-76.
- Lavoie Smith E., Hann DM., Ahles TA., Furstenberg CT., Mitchell TA., Meyer L., Maurer LH., Rigas J. & Hammond S. (2001). Dyspnea, anxiety, body consciousness and quality of life in patients with lung cancer. *Journal of Pain and Symptom Management* 21(4), 323-29.
- Lazarus RS. & Folkman, S. (1984). *Stress, Appraisal and Coping*. New York: Springer Publishing Company.
- Lazarus RS. (1992). Coping with the stress of illness. In A. Kaplun (Ed.), *Health Promotion and Chronic Illness: Discovering a New Quality of Health*. Copenhagen: WHO Regional Publications, European Series (44), 11-31.
- LeGrand SB. (2002). Dyspnea: the continuing challenge of palliative management. *Current Opinion in Oncology* 14(4), 394-98.
- Leininger M. (1994). Evaluation criteria and critique of qualitative research studies. In JM. Morse (Ed.), *Critical Issues in Qualitative Research Methods*. (pp. 95-115). London: Sage Publications.
- Lenz, ER., Pugh, LC., Milligan, RA., Gift, A. & Suppe, F. (1997). The Middle-Range theory of unpleasant symptoms: An update. *Advances in Nursing Science* 19(3), 14-27.
- Lincoln YS. & Guba EG. (1985). *Naturalistic Inquiry*. London: Sage Publications.

- Lundh Hagelin C., Seiger Å. & Fürst CJ. (2006). Quality of life in terminal care – with special reference to age, gender and marital status. *Support Care Cancer* 14(4), 320-28.
- Lutz S., Norrell R., Bertucio C., Kachnic L., Johnson C., Arthur D., Schwartz M. & Palardy G. (2001). Symptom frequency and severity in patients with metastatic or locally recurrent lung cancer: A prospective study using the lung cancer symptom scale in community hospital. *Journal of Palliative Medicine* 4(2), 157-65.
- MacDonald S., Yates J., Lance R., Giganti N., & Cherpurko, D. (2005). Are you asking the right admission questions when assessing dyspnea? *Heart & Lung* 43(4), 260-69.
- Mancini I. & Body JJ. (1999). Assessment of dyspnea in advanced cancer patients. *Support Care Cancer* 7(4), 229-32.
- Manning HL. & Schwarzstein RM. (1995). Pathophysiology of dyspnea. *New England Journal of Medicine* 333(23), 1547-53.
- Mast ME. (1995). Definition and measurement of quality of life in oncology nursing research: review and theoretical implications. *Oncology Nursing Forum* 22(6), 957-64.
- McCarley C. (1999). A model of chronic dyspnea. *Image: Journal of Nursing Scholarship* 31(3), 231-36.
- McCord M. & Cronin-Stubbs D. (1992). Operationalizing dyspnea: focus on measurement. *Heart & Lung* 21(2), 167-79.
- McCorkle R. & Young K. (1978). Development of a symptom distress scale. *Cancer Nursing* (October), 373-78.
- McDaniel RW. & Rhodes VA. (1995). Symptom experience. *Seminars in Oncology Nursing* 11(4), 232-34.
- McMillan SC. & Weitzner M. (2000). How problematic are various aspects of quality of life in patients with cancer at the end of life? *Oncology Nursing Forum* 27(5), 817-23.
- McMillan SC. & Small BJ. (2002). Symptom distress and quality of life in patients with cancer newly admitted to hospice home care. *Oncology Nursing Forum* 29(10), 1421-28.
- Mishler EG. (1986). *Research Interviewing, Context and Narrative*. London: Harvard University Press.
- Montazeri A., Gillis C. & McEwen J. (1998). Quality of life in patients with lung cancer: a review of literature from 1970 to 1995. *Chest* 113(2), 467-81.
- Montazeri A., Milroy R., Hole D., McEwen J. & Gillis C. (2001). Quality of life in lung cancer patients. As an important prognostic factor. *Lung Cancer* 31(2-3), 233-40.
- Moody LE. & McMillan S. (2003). Dyspnea and quality of life indicators in hospice patients and their caregivers. *Health and Quality of Life Outcomes* 1:9. Retrieved 2006-11-02 from <http://www.hqlo.com/content/pdf/1477-7525-1-9.pdf>
- Morse JM., Barrett M., Mayan M., Olson K. & Spiers J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods* 1(2), Article 2. Retrieved 2006-11-02 from <http://www.ualberta.ca/~ijqm>
- Morse JM. (2003). Principles of mixed methods and multimethod research design. In A. Tashakkori & C. Teddle. (Eds.), *Handbook of Mixed Methods in Social & Behavioural Research* (pp. 189-208). Thousand Oaks, CA: Sage Publications.
- Naess S. (1987). *Quality of Life Research: Concepts, Methods and Applications*. Oslo, Institute of Applied Social Science.
- Nordenfelt L. (1991). *Livskvalitet och hälsa: teori och kritik*. Stockholm: Almqvist & Wiksell Förlag AB.
- Nåden D. & Sæteren B. (2006). Cancer patients' perception of being or not being confirmed. *Nursing Ethics* 13(3), 222-35.
- O'Boyle CA. & Waldron D. (1997). Quality of life issues in palliative medicine. *Journal of Neurology*, 244(Suppl. 4), S18-S25.

- O'Driscoll M., Corner J. & Bailey C. (1999). The experience of breathlessness in lung cancer. *European Journal of Cancer Care* 8(1), 37-43.
- Oi-Ling K., Man-Wah DTSE. & Kam-Hung DNG. (2005). Symptom distress as rated by advanced cancer patients, caregivers and physicians in the last week of life. *Palliative Medicine* 19(3), 228-33.
- Okuyama T., Tanaka K., Akechi T., Kugaya A., Okamura H., Nishiwaki Y., Hosaka T. & Uchitomi Y. (2001). Fatigue in ambulatory patients with advanced lung cancer: Prevalence, correlated factors, and screening. *Journal of Pain and Symptom Management* 22(1), 554-64.
- Pallant JF. & Lae L. (2002). Sense of coherence, well-being, coping and personality factors: further evaluation of the sense of coherence scale. *Personality and Individual Differences* 33(1), 39-48.
- Parker PA., Baile WE., De Moor C. & Cohen L. (2003). Psychosocial and demographic predictors of quality of life in a large sample of cancer patients. *Psycho-Oncology* 12(2), 183-93.
- Polit DF. & Beck CT. (2004). *Nursing Research: Principles and Methods* (7<sup>th</sup> ed.). London: Lippincott Williams & Wilking.
- Randall F. & Downie RS. (2006). *The Philosophy of Palliative Care: Critique and Reconstruction*. Oxford: Oxford University Press.
- Research Center for Symptom Management, School of Nursing, University of California, USA. (2006). Retrieved 2006-11-02 from <http://nurseweb.ucsf.edu/www/rasm.htm>
- Rhodes VA., McDaniel RW., Homan SS., Johnson M. & Madsen R. (2000). An instrument to measure symptom experience: symptom occurrence and symptom distress. *Cancer Nursing* 23(1), 49-54.
- Ripamonti C. & Bruera E. (1997). Dyspnea: Pathophysiology and assessment. *Journal of Pain and Symptom Management* 13(4), 220-32.
- Ripamonti C. (1999). Management of dyspnea in advanced cancer patients. *Support Care Cancer* 7(4), 233-43.
- Ripamonti C. & Fusco F. (2002). Respiratory problems in advanced cancer. *Support Care Cancer* 10(3), 204-16.
- Roberts DK., Thorne SE. & Pearson, C. (1993). The experience of dyspnea in late-stage cancer: patients' and nurses' perspectives. *Cancer Nursing* 16(4), 310-20.
- Sahlberg Blom E., Ternstedt B-M. & Johansson J-E. (2000). Patient participation in decision making at the end of life as seen by a close relative. *Nursing Ethics* 7(4), 296-313.
- Sarna L. & Brecht M-L. (1997). Dimensions of symptom distress in women with advanced lung cancer: a factor analysis. *Heart & Lung* 26(1), 23-30.
- Saunders CM. (1979). Terminalvårdens filosofi. I CM. Saunders (Red.), *Den goda döden: om vård av döende cancerpatienter*. Stockholm: Almqvist & Wiksell. (The original English edition [*The Management of Terminal Disease*] published 1978).
- Scano G., Stendardi L. & Grazzini M. (2005). Understanding dyspnea by its language. *European Respiratory Journal* 25(2), 380-85.
- Schwartz CE. & Sprangers MAG. (1999). Methodological approaches for assessing response shift in longitudinal health-related quality-of-life research. *Social Science & Medicine* 48(11) 1531-48.
- Schwarz-Barcott D. (2006). Adaptation as a basic conceptual focus in nursing theories. In HS. Kim & I. Kollak (Eds.), *Nursing Theories: Conceptual and Philosophical Foundations*. (2<sup>nd</sup> ed.), (pp. 27-41). New York: Springer Publishing.
- Shepherd FA. & Carney DN. (2000). Treatment of NSCLC: Chemotherapy. In HH. Hansen (Ed.), *The International Association for the Study of Lung Cancer: Textbook of Lung Cancer*, (pp. 213-42). London: Martin Dunitz Ltd.
- Sherbourne CD. & Stewart AL. (1991). The MOS social support survey. *Social Science and Medicine* 32(6), 705-14.

- Shimoyama N. & Shimoyama M. (2002). Nebulized furosemide as a novel treatment for dyspnea in terminal cancer patients. *Journal of Pain and Symptom Management* 23(1), 73-76.
- Sigurdadottir V., Bolund C., Brandberg Y. & Sullivan, M. (1993). The impact of generalized malignant melanoma on quality of life evaluated by the EORTC questionnaire technique. *Quality of Life Research* 2(3), 193-203.
- Simon PM., Schwartzstein RM., Weiss JW., Fencel V., Teghtsoonian M. & Weinberger SE. (1990). Distinguishable types of dyspnea in patients with shortness of breath. *American Review of Respiratory Disease* 142(5), 1009-14.
- Sjösteen A., Lundqvist C., Blomstrand C., Sullivan L. & Sullivan M. (1990). The quality of life of three functional spinal cord injury subgroups in a Swedish community. *Paraplegia* 28(8), 476-88.
- Skevington SM., Pilaar M., Routh D. & Macleod RD. (1997). On the language of breathlessness. *Psychology and Health* 12(5), 667-89.
- Sloan JA., Cella D., Frost M., Guyatt GH., Sprangers, M. & Symonds T. (2002). Assessing clinical significance in measuring oncology patient quality of life: Introduction to the symposium, content overview, and definition of terms. *Mayo Clinics Proceedings* 77(4), 367-70.
- Smith KW., Avis NE. & Assmann SF. (1999). Distinguishing between quality of life and health status in quality of life research: a meta-analysis. *Quality of Life Research* 8(5), 447-59.
- Smith EM., Gomm SA. & Dickens CM. (2003). Assessing the independent contribution to quality of life from anxiety and depression in patients with advanced cancer. *Palliative Medicine* 17(6), 509-13.
- Socialstyrelsen, National Board of Health and Welfare. (2005). *Cancer incidence in Sweden 2004*. Retrieved 2006-11-02 from [http://www.socialstyrelsen.se/Statistik/statistik\\_amne/Cancer](http://www.socialstyrelsen.se/Statistik/statistik_amne/Cancer)
- Sprangers MAG. (2002). Quality of life assessment in oncology: achievements and challenges. *Acta Oncologica* 41(3), 229-37.
- Spruit MA., Janssen PP., Willemsen SCP., Hochttenbag MMH. & Wouters EFM. (2006). Exercise capacity before and after an 8-week multidisciplinary inpatient rehabilitation program in lung cancer patients: a pilot study. *Lung Cancer* 52(2), 257-260.
- Steele B. & Shaver J. (1992). The dyspnea experience: Nociceptive properties and a model for research and practice. *Advances in Nursing Science* 15(1), 64-76.
- Strang S. & Strang P. (2001). Spiritual thoughts, coping and "sense of coherence" in brain tumour patients and their spouses. *Palliative Medicine* 15(2), 127-34.
- Strömrgren AS., Sjögren P., Goldschmidt D., Petersen MA., Pedersen L. & Groenvold M. (2006). Symptom priority and course of symptomatology in specialized palliative care. *Journal of Pain and Symptom Management* 31(3), 199-206.
- Tamburini M., Brunelli C., Rosso S., & Ventafridda V. (1996). Prognostic value of quality of life scores in terminal cancer patients. *Journal of Pain and Symptom Management* 11(1), 32-41.
- Tanaka K., Akechi T., Okuyama T., Nishiwaki Y. & Uchitomi Y. (2000). Development and validation of the Cancer Dyspnoea Scale: a multidimensional, brief, self-rating scale. *British Journal of Cancer* 82(4), 800-05.
- Tanaka K., Akechi T., Okuyama T., Nishiwaki Y. & Uchitomi Y. (2002a). Factors correlated with dyspnea in advanced lung cancer patients: Organic causes and what else? *Journal of Pain and Symptom Management* 23(6), 490-500.
- Tanaka K., Akechi T., Okuyama T., Nishiwaki Y. & Uchitomi, Y. (2002b). Prevalence and screening of dyspnea interfering with daily life activities in ambulatory patients with advanced cancer. *Journal of Pain and Symptom Management* 23(6), 484-89.
- Tang W-R., Aaronson LS., & Forbes SA. (2004). Quality of life in hospice patients with terminal illness. *Western Journal of Nursing Research* 26(1), 113-28.

- Teddlé C. & Tashakkori A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioural sciences. In A. Tashakkori & C. Teddlé (Eds.), *Handbook of Mixed Methods in Social & Behavioural Research* (pp. 3-50). Thousand Oaks, CA: Sage Publications.
- Thoits PA. (1995). Stress, coping, and social support processes: Where are we? What next? *Journal of Health and Social Behavior* 35(Extra issue), 53-79.
- Thomas JR. & von Gunten CF. (2002). Clinical management of dyspnoea. *The Lancet Oncology* 3(4), 223-228.
- Tishelman C., Taube A. & Sachs L. (1991). Self-reported symptom distress in cancer patients: reflections of disease, illness or sickness? *Social Science and Medicine* 33(11), 1229-40.
- Tishelman C., Degner LF. & Mueller B. (2000). Measuring symptom distress in patients with lung cancer: a pilot study of experienced intensity and importance of symptoms. *Cancer Nursing* 23(2), 82-90.
- Tishelman C., Degner LF., Rudman A., Bertilsson K., Bond R., Broberger E., Doukkali E. & Levealahti H. (2005). Symptoms in patients with lung carcinoma: distinguishing distress from intensity. *Cancer* 104(9), 2013-21.
- Travis WD., Colby TV., Corrin B., Shimosato Y. & Brambilla E. (1999). In collaboration with Sobin, L.H. and Pathologists from 14 countries. *Histological Typing of Lung and Pleural Tumours*. (3<sup>rd</sup> ed.). Berlin: Springer.
- Tylecote FE. (1927). Cancer of the lung. *Lancet* (July 30), 256-57.
- Von Leupoldt A., Mertz C., Kegat S., Burmester S. & Dahme B. (2006). The impact of emotions on the sensory and affective dimension of perceived dyspnea. *Psychophysiology* 43(4), 382-86.
- Walker MS., Zona DM. & Fisher EB. (2005). Depressive symptoms after lung cancer surgery: their relation to coping style and social support. *Psycho-Oncology* 15(8), 684-693.
- Wang T-J. (2004). Concept analysis of functional status. *International Journal of Nursing Studies* 41(4), 457-62.
- Webb M., Moody LE. & Mason LA. (2000). Dyspnea assessment and management in hospice patients with pulmonary disorders. *American Journal of Hospice and Palliative Care* 17(4), 259-64.
- WHO. (1979). *WHO Handbook for Reporting Results of Cancer Treatment*. Geneva: WHO Offset Publication 48.
- WHO (2002). *National Cancer Control Programmes. Policies and Behavioural Guidelines*. (2<sup>nd</sup> ed.). Retrieved 2006-11-02 from <http://www.who.int/cancer/media/en/408.pdf>
- Wilcock A., Crosby V., Hughes A., Fielding K., Corcoran R. & Tattersfield AE. (2002). Descriptors of breathlessness in patients with cancer and other cardiorespiratory diseases. *Journal of Pain and Symptom Management* 23(3), 182-89.
- WMA (2002) World Medical Association Declaration of Helsinki. Retrieved 2006-11-02 from <http://www.wma.net/e/policy/b3.htm>
- Yan H. & Sellick K. (2004). Symptoms, psychological distress, social support and quality of life of Chinese patients newly diagnosed with gastrointestinal cancer. *Cancer Nursing* 27(5), 389-99.
- Zigmond AS. & Snaith RP. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* 67(6), 361-70.
- Öhman A. (2005). Qualitative methodology for rehabilitation research. *Journal of Rehabilitation Medicine* 37(5), 273-80.