The complexity of nutritional status for persons with chronic obstructive pulmonary disease – a nursing challenge
To my mother
The complexity of nutritional status for persons with chronic obstructive pulmonary disease – a nursing challenge
© Sigrid Odencrants 2008

Title: The complexity of nutritional status for persons with chronic obstructive pulmonary disease – a nursing challenge

Publisher: Örebro University 2008
www.oru.se

Editor: Maria Alsbjer
maria.alsbjer@oru.se

Printer: Intellecta DocuSys, V Frölunda 02/2008

ISSN 1652-1153
ISBN 978-91-7668-577-8
ABSTRACT

Chronic obstructive pulmonary disease (COPD) is one of the most widespread diseases globally. A commonly reported symptom is impaired nutritional status, which is often discussed in the literature as difficult to assess. Because nurses play a key role in the care of patients with COPD, knowledge needs to be supplemented with clinically relevant methods that can be used for identification of nutritional needs. The overall aim of this thesis is to investigate factors associated with the nutritional status of persons with COPD and to describe the assessment of nutritional status in different settings and for persons of varying ages.

Both qualitative and quantitative methods were used. Two studies with descriptive and exploratory designs (I, II) and two studies with comparative (III), and correlational design (IV). In three of the studies participants were persons with COPD (I, III, IV), whereas one involved registered nurses (RNs). Qualitative data were collected using diaries (I), vignettes (II) and interviews (I, II) and analyzed using qualitative content analysis. Data collection (III, IV) included body size and body composition measurements, assessment of nutritional status using the Mini Nutritional Assessment (MNA), the Malnutrition Universal Screening Tool (MUST), the Evaluation of Nutritional Status (ENS), and lung function measurements. These were analyzed using statistical methods.

The main findings from the interviews with 13 respondents in PHC in study I showed that eating difficulties alone do not cause reduced nutritional intake for persons with COPD. Eating is only one aspect in a chain of meal-related situations that involve additional physiological and psychological demands. Assessment of nutritional status, performed by 19 RNs, consisted mainly of single observations. For a half of the RNs it was more important to establish trustful relationships with patients than to give nutritional information, while the other RNs had different opinions on when it was best to provide nutritional information and assess nutritional status.

Study III findings showed poor nutritional status for nearly half of the 50 older participants. Many who were identified as malnourished lived alone and were dependent on daily community services. Six out of the 81 participants in Study IV were similarly identified as malnourished by each of the three instruments (MNA, MUST and ENS). There was a significant correlation between each of the instruments and body composition, assessed as fat-free mass index (FFMI). The MNA Short Form (MNA-SF) incorrectly identified thirteen participants’ nutritional status as not needing attention for their nutritional status. To be evaluated as ‘in need of qualified help with nutrition’ by the ENS the respondents needed to be identified as malnourished by the MNA.

A general conclusion is that nutritional status is complex for persons with COPD and is difficult to measure by currently recommended methods. Individuals’ experiences are important to elicit because some of their experiences, in combination with RNs’ judgement, might serve as a hindrance for nursing care and delay the sharing of important information. The methods currently recommended for identification of nutritional status should be used with caution, and assessment should not depend on one single method. The findings from this thesis can contribute to early accurate identification of nutritional status and prompt interventions that have importance for an improved disease trajectory and better quality of life for individuals with COPD.

Keywords: Chronic obstructive pulmonary disease (COPD), diary, ENS, experiences, instruments, interviews, MNA, MUST, nursing, nutritional status, vignette technique.
Original Publications

The present thesis is based on the following four studies, which will be referred to in the text by their Roman numerals:


III. Odencrants S, Ehnfors M & Ehrenberg A. Nutritional status and patient characteristics for hospitalized elderly patients with chronic obstructive pulmonary disease. Accepted for publication in Journal of Clinical Nursing.


Reprints were made with the kind permission of the publishers.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATS</td>
<td>American Thoracic Society</td>
</tr>
<tr>
<td>BMI</td>
<td>body mass index</td>
</tr>
<tr>
<td>CC</td>
<td>calf circumference</td>
</tr>
<tr>
<td>COPD</td>
<td>chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>ENS</td>
<td>Evaluation of Nutritional Status</td>
</tr>
<tr>
<td>ERS</td>
<td>European Respiratory Society</td>
</tr>
<tr>
<td>FEV</td>
<td>forced expiratory volume</td>
</tr>
<tr>
<td>FM</td>
<td>fat mass</td>
</tr>
<tr>
<td>FFM</td>
<td>fat-free mass</td>
</tr>
<tr>
<td>FFMI</td>
<td>fat-free mass index</td>
</tr>
<tr>
<td>GOLD</td>
<td>Global Initiative for Chronic Obstructive Lung Disease</td>
</tr>
<tr>
<td>LTOT</td>
<td>long-term oxygen therapy</td>
</tr>
<tr>
<td>MAC</td>
<td>mid-arm circumference</td>
</tr>
<tr>
<td>MNA</td>
<td>Mini Nutritional Assessment</td>
</tr>
<tr>
<td>MUST</td>
<td>Malnutrition Universal Screening Tool</td>
</tr>
<tr>
<td>PHC</td>
<td>primary health care</td>
</tr>
<tr>
<td>PHCC</td>
<td>primary health care clinics</td>
</tr>
<tr>
<td>RN</td>
<td>registered nurse</td>
</tr>
<tr>
<td>SF</td>
<td>skin fold</td>
</tr>
<tr>
<td>SLMF</td>
<td>Svensk Lungmedicinsk Förening (Swedish Respiratory Society)</td>
</tr>
<tr>
<td>WHR</td>
<td>waist-hip ratio</td>
</tr>
</tbody>
</table>
SUMMARY IN SWEDISH (SVENSK SAMMANFATTNING)

Komplexa näringsstillstånd hos personer med kroniskt obstruktiv lungsjukdom—en utmaning i omvårdnad

BAKGRUND


KOL är en kronisk lungsjukdom, till största delen orsakad av rökning. Symtomen är andnöd, nedsatt fysisk aktivitetsförmåga och försämrat näringsstillstånd, vanligtvis rapporterat som undervikt. Flera faktorer påverkar näringsstillståndet negativt vid KOL, och den främsta orsaken beskrivs i litteraturen som okänd. Svårigheter att bedöma näringsstillstånd vid KOL beskrivs, eftersom bedömningen ofta baseras på body mass index (BMI), ett mått som inte tar hänsyn till kroppssammansättning i form av vätska, fett eller fettfri kroppsmassa.

Ingen medicinsk behandling kan bota KOL, utan endast lindra sjukdomens symtom. Multiprofessionell, ickefarmakologisk behandling, inkluderande omvårdnadsåtgärder, har dock visat dokumenterad effekt genom att förebygga försämring och öka livskvaliteten hos personer med KOL. KOL är en av de största folksjukdomarna i världen, med en prognostiserad ökning i framtiden. Sjuksköterskan är en yrkesgrupp som tidigt får kontakt med patienterna i vårdkedjan. Kontakten bör innefatta en tidig bedömning av näringsstillstånd, initiering av relevanta omvårdnadsåtgärder för att förebygga försämring samt stöd till
patienten för en ökad medvetenhet om kostens betydelse vid KOL. För att utveckla rutiner för
tidig identifiering, behandling och kontinuerlig uppföljning vid ett försämrat näringstillstånd i
samband med KOL behövs komplettering av tidigare forskning, företrädesvis ur ett
omvårdnadsperspektiv. Resultatet kan bidra till ökade möjligheter till behandling av
näringstillståndet hos patienter med KOL, vilket har betydelse för sjukdomsutveckling och
livskvalitet.

**SYFTE**

Det övergripande syftet med avhandlingen är att undersöka faktorer i samband med
näringstillstånd hos personer med KOL samt att beskriva bedömning av näringstillstånd i
olika grupper och åldrar hos personer med KOL. Specifika mål är:
att beskriva måltidssituationer ur individers KOL’s perspektiv (I),
att undersöka hur sjuksköterskor inom primärvården beskriver bedömning av näringstillstånd
och omvårdnadsåtgärder för patienter med KOL med ett försämrat näringstillstånd (II),
att beskriva och jämföra näringstillstånd, sociala och medicinska karaktäristika hos
inneliggande äldre patienter med KOL på en akut vårdavdelning för lungmedicinsk vård (III),
at avgöra om det finns ett samband mellan näringstillstånd och kroppssammansättning hos
personer med KOL (IV).

**MATERIAL OCH METOD**

Både kvalitativ och kvantitativ metod användes för datainsamling. Tabell 1 åskådliggör
samtliga delstudier med avseende på design, deltagare, plats för datainsamling,
datainsamlings- och analysmetod.
Tabell 1. Översikt av avhandlingens olika delstudier. Förkortningar utöver KOL förklaras i texten efter tabellen

<table>
<thead>
<tr>
<th>Studie</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Deskriptiv/utforskanke</td>
<td>Deskriptiv/utforskanke</td>
<td>Deskriptiv/jämförande</td>
<td>Deskriptiv/korrelativ</td>
</tr>
<tr>
<td>Deltagare</td>
<td>n =13 8 kvinnor och 5 män från register vid vårcentraler i primärvård (öppenvård)</td>
<td>n =19 19 kvinnliga sjuksköterskor vid vårcentraler i primärvård (öppenvård)</td>
<td>n =50 33 kvinnor och 17 män med KOL, inskrivna vid en akut lungmedicinsk våravdelning (slutenvård)</td>
<td>n =81 47 kvinnor och 34 män med KOL, från register vid en lungmedicinsk klinik (slutenvård)</td>
</tr>
<tr>
<td>Plats för insamling av data</td>
<td>De deltagandes hem</td>
<td>Vårdbcentral, d v s sjukunjörskans arbetsplats</td>
<td>Akut lungmedicinsk våravdelning</td>
<td>Örebro universitet och fyra vårcentraler i primärvård</td>
</tr>
<tr>
<td>Data insamling</td>
<td>Dagbok, under 5 dagar med strukturerade och öppna frågor, intervju med semistrukturerade frågor som bandinspelades, kroppsvikt, kroppslängd, BMI, spirometri</td>
<td>Vinjettteknik och intervju med semistrukturerade frågor som bandinspelades</td>
<td>Bedömning av näringsstillstånd med MNA, kroppsvikt kroppslängd, BMI, MAC, CC, spirometri</td>
<td>Bedömning av näringsstillstånd med MNA, MUST, en nationell utvärdering (ENS) kroppsvikt, kroppslängd, BMI, MAC, CC, spirometri midja-höst- kvot, fyra hudvecksmått, spirometri, strukturerade frågor</td>
</tr>
<tr>
<td>Data- analys</td>
<td>Kvalitativ innehållsanalys</td>
<td>Kvalitativ innehållsanalys</td>
<td>Deskriptiv och inferens- statistik</td>
<td>Deskriptiv och inferens- statistik</td>
</tr>
</tbody>
</table>

Urvalet till studierna gjordes via patientregister i öppen- och slutenvård, konsekutivt inskrivna patienter och ett nätverk för sjuksköterskor med ansvar för KOL/astma-mottagning inom primärvården. Dagbok, fallbeskrivningar (vinjetter) och intervjuguide för kvalitativ datainsamling utvecklades av forskargruppen och baserades på litteraturgenomgång. Studie I inleddes med en femdags dagboksperiod, och därefter genomfördes en intervju med dagboken som underlag. Den andra studien, som baserades på s k vinjettteknik, innebar att
sjuksköterskorna fick läsa tre olika vinjetter (autentiska patientfall) och uppmanades att i samband med läsningen tänka, kommentera eller resonera högt om fallen. Antropometriska data om kroppssstorlek och kroppssammansättning i studie III och IV baserades på kliniskt genomförbara metoder: mätning av kroppslängd, kroppsvikt, omkrets av överarm och vad (III, IV), midjans och höftens omkrets samt underhudsfett (IV). Bedömning av näringsställand gjordes i studie III med Mini Nutritional Assessment (MNA) och i studie IV med MNA, Malnutrition Universal Screening Tool (MUST) samt ett sjukdomsspecifikt bedömningsinstrument, i arbetet benämmt som ENS (Evaluation of Nutritional Status). Lungfunktion testades med spirometri. Pilotstudier utfördes för studie I, III och IV. Samtliga studier med patienter hade etiskt tillstånd.

De bandinspelade intervjuerna skrevs ut ordagrant och analyserades med kvalitativ innehållsanalys. Efter genomläsning och kondensering av meningsenheter som svarade mot studiens syfte sorterades text med likartat innehåll i subkategorier för att senare skapa slutliga kategorier. Analysen var manifest beträffande mer synliga, framträdande data och latent, med tolkning av data som inte framträdde lika synligt. Kvantitativa data analyserades deskriptivt, med inferens- och sambandssökande statistik. Powerberäkning gjordes för studie IV.
RESULTAT

Erfarenhet av måltidsrelaterade situationer (I)

**Sjuksköterskans bedömning och åtgärder (II)**


**Antropometri (III, IV)**

BMI för de äldre sjukhusvårdade deltagarna (m = 75 år), varierade från 13.5 till 34.1 (m = 21.2). För deltagarna i den fjärde studien varierade BMI från 15.9 till 43.8 (Md = 25.3). Median för index av fettfri massa-index (FFMI) var 16.8 och 0.94 för midja-höft-kvot (WHR). Deltagare klassificerade som överviktiga hade lägre värde av fettfri massa-index än de som klassificerades som normalviktiga.

**Näringstillstånd bedömt med nutritionsbedömningsinstrument (III, IV)**

I den tredje studien identifierades 48 % av deltagarna som undernärda med MNA, lika många identifierades vara i risk för undernäring och två deltagare bedömdes som välnärda, men med
poäng nära gränsvärdet för risk för undernäring. MNA-poäng i gruppen varierade från 9.5 till 24.5 av totalt 30. Tjugosex deltagare uppgav att de inte hade några problem med sitt näringstillstånd, varav fem bedömdes som undernärda. I den fjärde studien identifierades sju deltagare som undernärda med MNA, 34 i risk för undernäring och nästan hälften (49 %) som välnärda. Med MUST bedömdes 11 % vara i hög risk för undernäring, 12 % i måttlig risk och 77 % i låg risk. Slutligen bedömdes med ENS 16 % av de deltagande vara i behov av kvalificerad hjälp för sin nutrition, medan resterande bedömdes som välnärda. Vid initial bedömning med MNA–SF (IV) hade 51 deltagare höga poäng, vilket indikerade att ingen fullständig bedömning med MNA behövde göras. Trots detta visade fullständig bedömning med MNA att 13 av de 51 deltagarna var i risk för undernäring.

**Näringstillstånd och antropometri (IV)**

En signifikant korrelation rapporterades för MNA och FFMI ($r_s = 0.537$), MUST och FFMI ($r_s = -0.325$) och ENS och FFMI ($r_s = -0.381$). Sex deltagare identifierades som undernärda med MNA, hög respektive måttlig risk för undernäring med MUST och i behov av kvalificerad hjälp för sin nutrition med ENS. Deras antropometriska värden var övervägande lägre än rekommenderade värden för BMI, MAC, CC och FFMI. Nitton av de deltagande hade ett värde av FFMI lägre än rekommenderat. Fyra av dessa klassificerades med BMI som överviktiga och en som mycket överviktig (BMI > 30). WHR nära eller som gränsvärde för fetma rapporterades för sex av de 19 deltagarna.

**Näringstillstånd, viktgrupp och boende (III, IV)**

De flesta av de äldre deltagarna, inskrivna i slutet vård, som identifierades som undernärda i den tredje studien bodde ensamma och hade kommunal hemtjänst och matleverans. Färre av dem bodde i ett eget boende jämfört med dem som identifierades med risk för undernäring. Av dem som med BMI klassificerades som underviktiga i den fjärde studien bodde nästan två tredjedelar ensamma, och i de andra grupperna var det ungefär en tredjedel i respektive grupp som levde ensamma.
KONKLUSION


* * * * * *
INTRODUCTION

My interest in the area of eating and nutrition started long ago. I have vivid memories from a summer job at a local nursing home for chronically ill older patients. My first task was to feed an older man, and a nurse gave me a deep dish containing a mishmash of coffee, sandwich, eggs and porridge. When I asked what to do with the dish, she answered, ‘He [the older man] will have the food in that way.’ I am still mentally transported to this occurrence when I smell coffee and eggs together in the morning.

The challenge of feeding patients who need assistance or who have eating difficulties has followed me throughout my nursing years as I have worked in various care settings. I have witnessed forced feedings of patients as well as eating situations with attention for individual needs in home-like environments. Later in life, when working as a registered nurse (RN) at an infection clinic, I became interested again as I became responsible for dietary practice guidelines at the clinic. This task included staying regularly informed and updated on practice guidelines from the hospital’s dietary apartment and informing my colleagues on the ward. Some years later international and national researchers drew attention to the consequences of worsened nutritional status among patients in health care. The concept of nutrition was introduced into nursing again, and courses on nutrition from a nursing perspective were offered.

The experience and understanding I had gained from nursing patients with chronic obstructive pulmonary disease (COPD) was limited when I started my doctoral study. I had previously worked as a RN at an infection clinic for several years. During my early clinic years there was a section of the ward for respiratory patients, and I remember those patients as smokers, always in combination with their need for extra oxygen. My later experiences came from nursing patients with COPD only occasionally, especially during the annual flu season. I remember patients with COPD as being in need of extra time for all daily activities, in need of more medical treatments than others and always in need of extra oxygen. I believe that patients with COPD are often viewed by health care professionals as a problematic group of patients, resulting in their being offered less attention than patients with other diagnoses. Later, my understanding of and experiences with COPD patients changed significantly as a consequence of the half-year of the data collection for my first study. I visited the respiratory ward about twice a week and spent, on average, an hour with each patient. Those visits gave
me insights and understanding into an existence controlled by daily difficulties with dyspnoea, cough and fatigue. Patients had several physical limitations, and many expressed shame as a result of their ‘self-inflicted disease’. Today I see those patients as persons in very vulnerable conditions. After almost every visit at the lung medical ward for data collection, I stood alone in the hallway and took deep, deep breaths. These early memories and many encounters and situations during subsequent data collection have deepened my experience and followed me throughout this dissertation. Sometimes I still take a deep breath and with great thankfulness remember many of those persons I have met, cared for and interviewed during these years.
BACKGROUND

Nutritional status

By the mid 20th century research on the importance of diet and nutrition was progressing. Early on it was focused mostly on healthy diets; however, later more attention was given to the relation between diet and various diseases (Lupton 1996). Recent decades’ reports from the health disciplines on care of older people have focused on patients’ impaired nutritional status in relation to their bodily needs. Nutritional status describes how well the energy and nourishment needs of the human body are met through dietary intake in combination with the body’s ability to use that nourishment (Gibson 2005). An impaired nutritional status has consequences for disease states and increases the risk of complications (Correira & Witzberg 2003). Within some diagnoses, for example COPD, the focus of this thesis, the prevalence of malnutrition is high (Gariballa & Forster 2007, Pirlich et al. 2003).

Malnutrition

Malnutrition is an overall term that includes both under- and overnourishment. Undernourishment can be classified as mild or severe, helpful (for obesity) or dangerous (Schenker 2003). It can result from insufficient food intake (whereas overnourishment is caused by excessive food intake) or specific nutrient deficiencies and/or imbalances because of disproportionate intakes (Keller 1993). Although, both over- and undernourishment are forms of malnutrition (Whitney et al. 2001), it is commonly associated with undernourishment.

The most common form of malnutrition in health care and among older people with illness is protein energy malnutrition (PEM), a combination of insufficient intakes of both protein and energy (Morley et al. 1998). Schenker (2003) defined undernutrition/undernourishment as ‘the consequence of a dietary intake that does not meet nutritional needs, and may result from one or more of the following: decreased energy intake, increased nutritional requirements/losses, impaired ability to absorb or utilise nutrients’ (p. 92). This definition describes the many different factors that contribute to the development of undernourishment, a development that is usually slow but can set in rapidly in conditions of acute metabolic stress. The factors can be related to effects from lifestyle or disease and/or its treatment.
**General assessment of nutritional status**

In preventing and treating PEM, the first intervention is to identify those who are at risk for developing malnutrition and in need of nutritional attention (Klein *et al.* 1997). Nutritional assessment can be described as the interpretation of information from dietary, laboratory, anthropometric and clinical studies (Gibson 2005). The identifying process can also be done as a screening or assessment process using an instrument or a tool (Green & Watson 2005). Currently there is no gold standard in the literature for an optimal method of assessing nutritional status, but there are many parameters or methods available and recommended. Gibson (2005) has described methods as laboratory, anthropometric, clinical and ecological. The last includes socioeconomic and demographic data.

Laboratory methods consist of biochemical tests and functional tests. The most common variable for information on protein intake is serum protein, measured as albumin. The usefulness of albumin measurement has been questioned, however, as a low value might be influenced by either low protein intake or an acute state of stress from a medical condition (Morley *et al.* 1998). Two functional methods are common. General muscles functioning and strength can be measured by handgrip strength (Gibson 2005) and respiratory muscle function by use of the peak expiratory flow (PEF) (Unosson & Rothenberg 2000, in Socialstyrelsen 2000).

Anthropometric methods include measurement of bodily physical characteristics; the term is derived from the Greek words *anthropos* (human) and *metric* (measure) (Whitney *et al.* 2001). Anthropometric methods consist of two types: one assessing for body size and one for body composition. Body size is assessed from body length and weight, which, combined as body mass index (BMI), yields a value related to body weight and height commonly used for general gross classification as either under- or overweight. For adults the World Health Organization’s classification for underweight is a BMI less than 18.5, whereas 18.5 to 24.99 is normal weight and 25 or greater overweight, (Gibson 2005). Body weight can also be described as weight index percentage (WI%), used for defining under- and overweight by comparing the body weight with a sex-, age- and height-matched reference standard (Bengtsson *et al.* 1981).

The use of both WI% and BMI has been questioned, however, as values derived from body weight fail to take into account the distribution of body fat or oedema (Whitney *et al.* 2001).
Body composition, consisting of fat mass (FM) and of fat and fat-free mass (FFM), includes the skeletal muscle, nonskeletal muscle, soft lean tissues and skeleton. This is measured using assessment techniques (Gibson 2005) that require special equipment and trained and experienced personnel. These are available primarily in designated clinical settings.

One alternative to this specialized equipment is measurement of skin fold thickness (SF) with a Harpenden calliper®. This measurement can either be taken from a single skin fold, the triceps skin fold (TSF), or as multiple skin folds from different places on the body. This measurement needs training and experience to be performed accurately (Gibson 2005). Other useful techniques include mid-arm and calf circumference (MAC and CC). MAC is described as useful in the diagnosis of PEM (Kuczmarski et al. 2000), and CC is reported as an important marker of nutritional state proposed for diagnosing malnutrition in hospitalized older people (Bonnefoy et al. 2002). One other measurement, the waist circumference divided by the hip circumference, known as the waist-hip ratio (WHR), may also be used for identifying obesity (Favier et al. 2005).

Clinical methods for assessment of nutritional status include medical history and a physical examination. These laboratory and anthropometric methods can contribute to the medical history along with the ecological and socioeconomic factors and demographic data that are elicited. Data from past records, in combination with socioeconomic and demographic data, provide important information on factors that influence nutritional status. Basic data also include medical diagnoses, as many are known to influence the nutritional status in negative ways. For example, Gariballa and Forster (2007) recently reported that patients with COPD and heart failure had poor anthropometric measures compared to those with other diagnoses. The use of medications and possible drug interactions is also important information, as diet-medication interactions can range from mild to severe (Whitney et al. 2001). The physical examination should include careful observations of the body for indications of impaired nutritional status. Saltzman and Morgensen (2001) have described some of these as signs from the mouth, eyes, skin, nails and hair. The physical examination is discussed in the literature only briefly as a limited source of relevant data; however, data collection from this source requires an experienced observer.

An important part of the history includes personal habits such as eating patterns, dentition, swallowing and bowel function (Kondrup et al. 2003). Information on these dietary habits can
be elicited through questions about present and previous dietary intake and appetite. Food intake can also be investigated using various methods. However, these methods might be unreliable as dietary habits might change over the course of data collection and because determining accurate estimates of the quantity of food consumed from patients’ self-report or staff observations might be problematic (Whitney et al. 2001). Finally, obtaining information about the patient’s social living conditions is important because the living situation, such as living alone, is often associated with poor nutritional status, especially for older people (Pirlich et al. 2005). Much of the historical data can be collected when interviewing patients or families.

**Instruments for assessment and screening**

The complete assessment of nutritional status involves a detailed examination, a much longer process than screening (Kondrup et al. 2003). It might include different measures for identifying nutritional status, where both qualitative descriptions and quantitative scores can be used (Green & Watson 2005). McLaren and Green (1998) stated that it is necessary to use several measures of nutritional status to overcome the shortcomings of any single approach. The European Society for Clinical Nutrition and Metabolism (ESPEN) has published recommended guidelines for nutritional screening. They recommend that the following components be included: height, weight and BMI; recent weight loss or ongoing involuntary weight loss; and whether food intake has decreased. The ideal screening protocol for hospital patients should also identify patients at risk for malnutrition and should be practical to use so that health care staff find it rapid, simple and intuitively purposeful (Green & Watson 2005, Kondrup et al. 2003, Whitney et al. 2001).

Many instruments are available for nutritional screening and assessment. Commonly described assessment instruments include the Subjective Global Assessment (SGA) for hospitalized patients (Detsky et al. 1987) and the Mini Nutritional Assessment (MNA) (Guigoz et al. 1996). The SGA was developed to enable hospitalized patients’ classification as well nourished, moderately well nourished or suspected of being malnourished, or severely malnourished (Detsky et al. 1987). The MNA was developed for geriatric patients and classifies them as malnourished, at risk for malnutrition, or well nourished (Guigoz et al. 1996). The MNA has had further development as a two-part screening instrument. Part 1, the Mini Nutritional Assessment Short Form (MNA-SF), is based on six sensitive items for identifying nutritional status and is recommended for use as a rapid screening tool, whereas
the whole instrument yields a more detailed assessment (Rubenstein et al. 2001). Other screening instruments include the Malnutrition Universal Screening Tool (MUST) and Nutritional Risk Screening (NRS), both of which contain just a few items (Kondrup et al. 2003). An advantage of both the MNA and the MUST is that they recommend strategies for nutritional support according to patients’ scores and identified nutritional status.

Nursing for patients with eating difficulties

When the concept of nutrition was highlighted and began receiving attention in nursing, discussions arose about RNs’ responsibilities. Nutrition includes aspects such as physiology, nutritious substances, energy requirements and consumption, so all of those factors should be taken into consideration. Later the concept of nutrition evolved to be concerned with eating, processes on which nurses could have an influence. In a nursing context the concept of eating offers a better explanation for RNs’ responsibilities related to patients’ nutritional difficulties as patients’ problem frequently relate to eating and food intake (Axelsson 1988, Westergren et al. 2001), whereas nutrition is a broader and more complex phenomenon.

According to Cederholm and Rothenberg (2000, cited in Socialstyrelsen 2000) nutrition for sick individuals must be regarded in the same way as medical treatments, with the same demands for investigation, diagnosis, treatment, follow-up and recording. General nursing, that is, nursing independent of disease and medical treatment, can be performed by all health professionals and care workers (Willow 2000). Activities focused on eating can be described as general nursing care when they involve patients without eating difficulties or patients who have been assessed as well nourished or identified as not being at risk of malnutrition. On the other hand, nursing care and treatment for those with eating difficulties and/or impaired nutritional status require specific knowledge from a team of professionals. The physician, the dietician and the RN share the responsibility of helping to maintain or improve the patient’s nutritional status and to identify and exchange information concerning the patient to other caregivers.

Although an RN has many responsibilities, an experienced nurse who pays attention to nutrition can help patients (Whitney et al. 2001). He or she is in an ideal position to identify patients’ nutritional status (Arrowsmith 1999, McLaren & Green 1998) and, according to Whitney and co-workers, has the most important nutrition-related responsibility to identify patients in need of nutritional interventions. The nursing process, involving assessment,
diagnosis, outcome identification, implementation and evaluation, is a systematic approach that supports these efforts. The possibility of identifying patients’ nutritional needs and initiating relevant interventions is one of the most important and essential parts of this process (Kara 2005, Whitney et al. 2001).

In addition to measuring body weight and BMI the use of an instrument for risk identification is necessary. This involves questions regarding appetite, eating difficulties, functional impairments, the need for special diets, diet history, diagnosis, social conditions and weight changes (Gary & Fleury 2002, Schenker 2003, Whitney et al. 2001). Implementation involves a variety of nutritional interventions: nutritional support, including individually tailored food; the use of nutritional supplements; and perhaps both enteral and parenteral nutrition (Gary & Fleury 2002). Further interventions are related to where, when and how patients will eat, attending to their cultural habits, and the need for special facilities or feeding assistance, including the use of a dietary record. Basic essential interventions might include arranging for the patient to eat together with others and/or changing the mealtime environment as these factors are considered to relate to the meal procedure (Sidenvall 1995). The evaluation might be performed later using a re-assessment of nutritional status or based on a dietary record.

**Chronic obstructive pulmonary disease**

*Ethiology and prevention*

Nutritional status is reported to be an independent risk factor for morbidity and mortality in COPD, which is described as a disease characterized by an airflow limitation that is not fully reversible. The limitation is chronic and progressive, involving expiratory breathing difficulties (Gomez & Rodriguez-Roisin 2002). The consequences are increased difficulty for the lungs to deliver oxygen to all organs and tissues in the body and to excrete carbon dioxide (Pride 1995). The stages of COPD are described as ranging from mild, with light symptoms, to very severe, with pronounced symptoms and the needs for supplemental oxygen. The most frequent symptoms described are dyspnoea, cough, impaired physical activity, anorexia and decreased body weight (Global Initiative for Chronic Obstructive Pulmonary Lung Disease [GOLD] 2005).

Smoking is the main risk factor for development of COPD (Gomez & Rodriguez-Roisin 2002), but even passive smoking has been reported as a factor (Chen et al. 2000, Kalucka 2006). For a few, air pollution or heredity, with a lack of alpha1-trypsin, might be the cause.
As a disease that often appears insidiously between the ages of 50 and 60, it develops slowly and might be interpreted by an individual as normal ageing (GOLD 2005). Today COPD is described as a systemic disease, not solely a lung disease (Decramer et al. 2005, Wouters et al. 2002). Exacerbations, commonly caused by bacterial infections in the lower respiratory tract (Dewan et al. 2000), are a frequent complication, and their recurrence is associated with physical deterioration in persons with COPD (Burge & Wedzicha 2003).

The most important intervention to prevent worsening of COPD is smoking cessation. The prognosis is improved by early smoking cessation (Gomez & Rodriguez-Roisin 2002). It is generally believed, but not confirmed scientifically, that medical treatment cannot cure COPD. The medical treatment for COPD is described as only palliative for symptoms and with limited results (Wouters 2005). Despite this, persons with COPD as a group consume many different drugs (GOLD 2005). With the intention of increasing survival and improving quality of life for persons who develop this respiratory insufficiency, treatment with additional oxygen is effective (SBU 2000). Rehabilitation, delivered by a multidisciplinary team, is considered an essential treatment that can prevent physical complications and help individuals maintain optimal health status and quality of life (Troosters et al. 2005). Nonpharmacological treatments based on nursing and caring interventions, such as information and education for COPD, include dietary advice, physical activities, and breathing and stress management techniques, all of which may be included in a rehabilitation programme (Nici et al. 2006, Troosters et al. 2005).

Prevalence and diagnosis
COPD is a disease with increasing worldwide prevalence, especially in developed countries. Within 10 years it is predicted to be the third most common global disease. The global burden from COPD in health care will continue to increase worldwide. It is not only a global burden; the perspective of affected individuals must also be considered. Moreover, a general and international definition is lacking, which makes it difficult to compare and evaluate COPD research and care. With respect to the different definitions, epidemiological studies from northern Europe have reported 4 to 6% of the population as diagnosed with COPD (Gulsvik 2001, Hasselgren et al. 2001, Lundbäck et al. 2003). Recently published studies also report a large number of undiagnosed (DeJong & Veltman 2004, Sciurba 2004, Vrijhoef et al. 2003) or incorrectly diagnosed persons who have a diagnosis of asthma instead of COPD (Lundbäck et al. 2003, Vrijhoef et al. 2003). In some countries the death of women as a result of COPD...
has overtaken that of men (Ulrik 2003), but it has been reported that women receive fewer spirometric tests than men (Watson et al. 2004).

Spirometry is a diagnostic lung function test for persons with COPD. The forced expiratory volume (FEV) is the amount of air a person can exhale during a forced breath. The amount of air exhaled is measured during the first second (FEV), with a predicted value then given as a percentage (FEV%). FEV% is used to define the extent of obstruction, and a value less than 70 would result in a COPD diagnosis. Differences in classifications exist, however. According to a national recommendation (Socialstyrelsen 2004) that is based on European recommendations and is used in this thesis, a value of FEV between 60 and 80% of predicted is classified as mild COPD, values from of FEV 40 to 59% of predicted indicate a severe stage of COPD, and values of FEV less than 40% of predicted refer to a very severe stage of COPD (Socialstyrelsen 2004). The American Thoracic Society (ATS) uses lower values overall, defining moderate COPD as an FEV of 50% to less than 80% of predicted, severe as values between 30 and 49% of predicted, and values of FEV less than 30% of predicted referring to a very severe stage of COPD (GOLD 2005).

**Symptoms and consequences of COPD**

**Dyspnoea**
The most common COPD symptom is dyspnoea, defined as severe or strained breathing. There are two stages of dyspnoea. Acute dyspnoea is a rapidly occurring shortness of breath, whereas chronic dyspnoea is an enduring state with changes in intensity (McCarley 1999). Dyspnoea is described as being associated with fear of dying (Bailey & Tilly 2002) and feelings of panic or inability to get clear air (Bailey 2004, Fraser et al. 2006) or of helplessness (Fraser et al. 2006, Heinzer et al. 2003), or as a connection between breathing difficulties and anxiety (Bailey 2004). Anxiety frequently occurs with dyspnoea, whereas dyspnoea contributes to anxiety. Anxiety causes further dyspnoea, in a cycle in which it is sometimes difficult for both the affected person and the health care professionals to distinguish dyspnoea from anxiety (Midgren 2003).

**Impaired physical activity**
Exercise intolerance caused by dyspnoea and/or fatigue limits individuals’ activities of daily living. The reasons are ventilatory and gas change limitations, dysfunction of the skeletal and the respiratory muscles (Nici et al. 2006) and also psychological factors (Yeh et al. 2004).
Studies concerning rehabilitation commonly report on persons’ physiological energy and capacity in clinical settings but not from ordinary daily activities. However, one study reported oxygen saturation (SaO₂) for persons with COPD from daily activities and sleep. During daytime the highest values reported were for rest, and low and decreased values were reported from walking and eating (Sougel Schenkel et al. 1996).

**Fatigue**

Fatigue is a common symptom for persons with COPD. In one study nearly half of the respondents reported daily fatigue compared to 13.5% for an age- and sex- matched control group (Theander & Unosson 2004). Fatigue has been defined as ‘an overwhelming sustained sense of exhaustion and decreased capacity for physical and mental work at usual level’ (North American Nursing Diagnosis Association [NANDA] 2005, p. 75). Fatigue is considered to have a protective function because of signals to the body for rest (Trendall 2001). On the other hand, chronic fatigue is described as dangerous and without a function (Woo 1995). Woo reported the causes for fatigue as dyspnoea, improper nutrition, inactivity, drugs, stress and depression. An interaction between fatigue and physical activity has been described for patients with COPD because fatigue decreases physical activity and thereby increases further fatigue (Woo 2000). Often there are difficulties in distinguishing fatigue from dyspnoea or depression (Meek & Lareau 2003).

**Stigma**

Stigma is a concept that relates to feelings of shame and guilt from a self-inflicted disease. The concept was described by Goffman (1963) on three levels: the first level, caused by physical deformities; the second from weakness (being weak-willed, dishonest, or abusive, or having mental disorder) of character; and, finally, stigma caused by race or religion. Stigma is often described in relation to chronic diseases (Joachim & Acorn 2000). Boyle and Waters (1999) reported that patients with COPD experience themselves as stigmatized because of their smoking habits. Respondents in a study by O’Neill (2002) described preconceived opinions from physicians because of the respondents’ smoking habits. Feelings of shame about their smoking habits and feelings of blaming themselves are often expressed by COPD patients (Jones et al. 2004). One way that older people with COPD avoid stigmatization is by stating a diagnosis of asthma instead of COPD, as asthma is considered as a non–self-inflicted disease (Midberg 2003).
Impaired nutritional status in persons with COPD

Anorexia with reduced body weight that results in severe consequences and risk for malnutrition is another symptom of COPD (Congleton, 1999). The reasons are multifactorial and have been the focus of much research. One early study reported malnutrition among persons with COPD as follows:

Marked weight loss can lead to cachexia and the suspicion of malignancy arises. Nevertheless, only limited data are available in the literature on the beginning, the degree, the duration, the causes and the repercussions on lung function due to this weight loss. (Vandenbergh et al. 1967, p. 556)

In the past 15 years the number of studies reporting causes, effects and consequences of nutritional status on persons with COPD has increased. A multiprofessional research group from the Netherlands is particularly productive, reporting studies from physiological and even behavioural perspectives (Brug et al. 2004, Chavannes et al. 2005, Groenvegen et al. 2003, Schols et al. 2005). A Swedish research group (Slinde et al. 2002, 2005) has contributed to Swedish national guidelines for nutritional treatment. Despite this research, however, the cause of impaired nutritional status in COPD is unknown, and many research questions remain unanswered, as discussed by many authors. This lack of knowledge has been attributed to the complexity and the multifactorial origin of COPD.

Malnutrition among persons with COPD is thought to be caused by a combination of many factors. Schols (2002) has described ‘pulmonary cachexia’, a state that combines starvation with energy deficit and an inflammatory condition. Malnutrition is present both in patients in stable condition (Vermeeren et al. 2006) and in those with acute exacerbation (Hallin et al. 2006). Different physiological and therapeutic factors affect the nutritional status in COPD, including higher metabolism caused by increased breathing frequency (Baarends et al. 1997), medications (Saudny-Unterberger et al. 1997) and inflammations (Nguyen et al. 1999). Inadequate dietary intake caused by altered breathing (i.e. dyspnoea) that occurs while chewing and swallowing (Schols et al. 1991) and gastric filling, resulting in early satiety, represents other factors (Vermeeren et al. 2001). Recurrent acute exacerbations are known to worsen nutritional status, and the weight loss connected with them follows a stepwise pattern for some patients (Schols & Wouters 2000). There is a known relationship between COPD phase and malnutrition: a BMI of less than 20 is a risk factor for hospitalization. Low BMI indicates an independent risk factor for mortality, especially in persons with COPD. The association is strongest in persons with severe COPD (Landbo et al. 1999).
Overweight is also reported for persons with COPD. Marquis and co-workers (2005) reported the metabolic syndrome as frequent among patients in a cardiopulmonary program. Steuten and colleagues (2006) reported the prevalence of obesity as high in patients with mild stages of COPD. The reasons for overweight might be that persons with decreased breathing capacity cannot manage physical activities, and overweight with abdominal obesity might result in more dyspnoea because of increased diaphragm pressure (Congleton 1999). However, the risk for mortality is less for those with overweight compared to persons in normal weight (Landbo et al. 1999). Despite this, the consequences related to COPD and overweight are an unexplored area of research.

In the past decade of research one of the most central problems described and discussed is the loss of fat-free mass (FFM). A major component of FFM is the body’s muscles, which are largely composed of protein. A calculated index of FFM (FFMI) indicates the protein reserves of the body. Muscle wasting results from depleted reserves caused by chronic undernourishment (Gibson 2005), and the skeletal muscles, intercostals muscles and diaphragm deliver most of the protein during starvation (Hesov 2001). Therefore, muscle wasting is a common state among persons with COPD and has been reported to be closely related to mortality risks (Marquis et al. 2002, Slinde et al. 2005). Many other etiological factors are well studied and reported but not yet completely understood (Debigaré et al. 2003, Eisner et al. 2007).

The nutritional status of persons with COPD is discussed as difficult to assess and evaluate in daily clinical practices. Currently recommended methods and instruments for risk identification lack any evaluation of body composition (Foley & ZuWallack 2001, Steiner et al. 2002, Thorsdottir & Gunnarsdottir 2002). As previously mentioned, an important variable in body composition is the FFM. Schols and colleagues (1993) reported impaired nutritional status for persons with COPD and normal body weight. They categorized patients in four groups based on body weight and evaluation of FFM: (1) normal body weight and normal FFM, (2) normal body weight and reduced FFM, (3) underweight and normal FFM and (4) underweight and reduced FFM. The conclusion has been that body weight and BMI are insufficient for assessment of nutritional status for persons with COPD (Schols et al. 2005).
The progression of COPD reduces an individual’s daily activities (Fraser et al. 2006) and might cause social isolation (Barnett 2005), which relates to nutritional status. Moreover, higher prevalence of depression is reported in older patients with COPD, especially those with low BMI (Chavannes et al. 2005). Some studies have reported difficulties in daily activities, such as food shopping and cooking, which are important for nutrition (Poole et al. 1997, Sexton & Munro 1988, Williams & Bury 1989).

**Recommendations for persons with COPD and impaired nutritional status**

Knowledge about nutritional status is highlighted as a very important aspect in the treatment of COPD. International and national guidelines recommend assessment of a patient’s body weight, BMI and nutritional interventions for the COPD patients (GOLD 2005, Pauwels et al. 2001, Socialstyrelsen 2004). Provision of early information on changes in food intake, before loss of weight, is recommended (Brug et al. 2004). Evidence of nutritional support is thought to affect a patient’s nutritional status positively and has been reported in numerous studies (Akner & Cederholm 2001, Slinde et al. 2002, Vermeeren et al. 2001). Nevertheless, it remains unclear why improved nutritional status does not occur for all individuals receiving such support (Wouters 2005). For persons with COPD the general nursing/dietary interventions are alleviating anorexia, advising consumption of energy-rich foods and drinks, use of snacks and reducing problems with early satiety (Cochrane & Afolabi 2004). Other strategies cited are frequent meals and limiting fatigue at meals (Chapman-Novakofski 2001). Despite available national and international guidelines and nursing/dietary interventions, Cochrane and Afolabi (2004) reported patients with extreme malnutrition and unnoticed weight loss.
RATIONALE FOR THE THESIS

Malnutrition should be viewed and treated as an independent risk factor in the management of COPD, according to Godoy and colleagues (2000). Ambrosini and Clini (2004) reported that interventions should be extended to prevent early weight loss, including loss in primary care patients, before they become underweight. Kara (2005) has drawn attention to the fact that if RNs are to be prepared for ‘the global pandemic of COPD’ (p.127) they must be aware of health promotion and prevention aspects of COPD as well as nursing interventions concerned with nutritional strategies.

A holistic approach is an important part of COPD care. To understand individuals with COPD and impaired nutritional status in different age groups, settings and stages of COPD, extended knowledge is needed. Because nurses play a key role in caring for patients with COPD, existing knowledge needs to be supplemented with clinically relevant methods that could be used for rapid and reliable identification of patients’ nutritional needs. A nursing perspective might also facilitate the interpretation and understanding of the patients’ eating problems and how they relate to impaired nutritional status. The result can increase the possibilities of the early identification of an impaired nutritional state for persons with COPD, resulting in interventions that might affect the disease trajectory and the person’s quality of life.
AIMS

The overall aim of this thesis is to investigate factors associated with the nutritional status of persons with COPD and to describe the assessment of nutritional status in different settings and for elderly persons of varying ages.

The specific aims are

- to describe experiences of the meal-related situations as viewed from the perspective of individuals with COPD (I),
- to investigate how nurses in primary health care describe nutritional assessment practices and their nursing interventions for COPD patients with impaired nutritional status (II),
- to describe and compare nutritional status and social and medical characteristics among older COPD patients admitted to an acute care hospital ward for respiratory medicine (III), and
- to determine whether relationship exist between nutritional status, assessed by three recommended instruments, and persons’ body composition for older persons with COPD (IV).
MATERIAL AND METHODS

Design

Three studies comprise individuals with COPD (I, III, IV), and one study focuses on RNs’ responsible for the care of patients with COPD (II). Two are qualitative studies (I, II), and in two a quantitative method was used (III, IV). We chose a qualitative approach to obtain a deeper understanding of COPD individuals’ experiences of meal-related situations (I) and RNs’ experiences of nursing care for COPD patients with impaired nutritional status (II) and a quantitative approach to obtain descriptions and comparisons of nutritional status assessments and patient characteristics (III) and to examine the correlation between nutritional status and body composition in individuals with COPD (IV). The data collection for the four studies was done over different time periods. An overview of the designs and methods in the thesis is shown in Table 1.

Table 1. Overview of design, participants, setting, data collection and analyses in the four studies in the thesis.

<table>
<thead>
<tr>
<th>Study</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>Descriptive/Exploratory</td>
<td>Descriptive/Exploratory</td>
<td>Descriptive/Comparative</td>
<td>Descriptive/Correlational</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
<td>$n = 13$ 8 women and 5 men with diagnosis COPD from outpatient register at PHCCs</td>
<td>$n = 19$ 19 female RNs working at PHCCs</td>
<td>$n = 50$ 33 women and 17 men with diagnosis COPD admitted to a hospital ward for respiratory medicine</td>
<td>$n = 81$ 47 women and 34 men with diagnosis COPD, from an inpatient register at a respiratory medicine clinic</td>
</tr>
<tr>
<td><strong>Setting for data collection</strong></td>
<td>The participant’s home</td>
<td>PHCCs</td>
<td>Hospital ward for respiratory medicine</td>
<td>Laboratory at a University and PHCCs</td>
</tr>
<tr>
<td><strong>Data collection</strong></td>
<td>One-week diary: structured and open-ended questions; Interview with semi-structured questions Audiotape recorded Body weight Body height BMI Spirometry</td>
<td>Vignettes Interview with semi-structured questions Audiotape recorded</td>
<td>Nutritional assessment with MNA, Body height Body weight BMI MAC CC Spirometry</td>
<td>Nutritional assessment with MNA MUST A national evaluation status measure (ENS) Body weight Body height BMI MAC CC WHR 4 skin fold measurements Spirometry Structured questionnaire</td>
</tr>
<tr>
<td><strong>Data analysis</strong></td>
<td>Qualitative content analysis</td>
<td>Qualitative content analysis</td>
<td>Descriptive and inferential statistics</td>
<td>Descriptive, inferential and correlation statistics</td>
</tr>
</tbody>
</table>
All four studies use a descriptive design as a base. One study is comparative (III) and one is correlational (IV). The choice of design was directed by two basic assumptions for a descriptive design (Brink & Wood 1998). First, the single variable of focus for the study exists in the population, which in this thesis is nutritional status among persons with COPD. Second, there is lack of descriptions of the study variables and the population. In this thesis references to the concepts of meal-related situations as experienced from the individual’s perspective and of assessments of nutritional status performed by RNs are the key data sources. Studies I and II have, in addition, an exploratory design, which is useful when a new area or topic is being investigated. This design helps us in understanding a problem that we do not know much about or when limited literature exists (Brink & Wood 1998, Polit et al. 2001). We knew from the literature only that persons have impaired nutritional status, but we did not know how they experienced situations related to eating, the mealtime-related situations. Moreover, RNs’ nursing care for those persons was also a poorly described area. We chose a comparative design to compare and describe individual characteristics in already existing groups (III). Finally, a correlational design was used (IV) because there was an assumed relationship between two variables (Brink & Wood 1998). These variables were nutritional status and body composition, measured as fat-free mass index (FFM), a far more valid measure than body mass index (BMI) alone.

**Participants**

**Study I**

Participants included eight women and five men diagnosed with COPD who were registered at four primary health care clinics (PHCC) in one city. The criteria for inclusion were COPD diagnosis; age between 65 and 75 years, a value of FEV₁% of predicted less than 50%, able to understand and read the Swedish language, and not treated with long-term oxygen therapy (LTOT). Exclusion criteria were conditions assumed to influence nutritional status, such as diabetes type I and II, cancer and diseases of the liver or kidney. Twenty-two persons were invited to participate; of these, four men and five women declined. The reasons for declining were no interest in the study, lack of energy to participate, or depression. All participants were living independently in the community, and their average age was 69 years. Of the five who were living alone, four were women. They had been diagnosed with COPD for a median of five years. Median value of lung function in the sample, FEV₁% of predicted, was 28.5% for women and 34% for men. Eight of the participants were ex-smokers, whereas the remaining five still smoked.
**Study II**

Twenty-five RNs with specific responsibility for nursing COPD or asthma patients in PHCCs and members of a local group of 25 RNs (responsible for patients with COPD and asthma at PHCCs) were invited to participate. Six (24%) declined, and 19 RNs were study participants. Some of the RNs had responsibility at a PHCC for patients participating in study I. The RNs who declined stated that they had no time or felt that the study did not relate to their particular duties. All 19 RNs were female with a mean age of 48 years. The RNs’ length of nursing experience ranged from 10 to 40 years, and their median length of experience in caring for COPD and asthma patients was four years. Eighteen RNs were advanced practice nurses with a specialty in PHC nursing, whereas 12 were specialists in COPD and asthma nursing. Their current responsibility for COPD and asthma patients ranged from 4 hours to 2.5 days per week. The RNs’ responsibility included counselling and teaching patients by telephone and delivering nursing care at the clinics.

**Study III**

Fifty-six consecutive patients diagnosed with COPD were asked to participate on admission to an acute care hospital ward for respiratory medicine at a Swedish university hospital. The inclusion criterion was age 65 years or older; exclusion criteria were conditions assumed to influence nutritional status, such as diabetes type I and II, cancer, diseases of the liver or kidney, or being at a terminal stage of COPD. Six declined, resulting in a sample of 50, and no participants dropped out of the study. Of the 50 participants, with a mean age of 76 (SD = 7) years, two thirds were women and one third men. Forty of the participants lived in their own homes; however, most of the women (70%) lived alone. Eighteen (36%) of the participants had social services for daily activities and meals-on-wheels. The 39 participants that managed to perform the lung function test had very severe COPD; their median FEV$_1$% of predicted was 28%. Fifteen participants were using long-term oxygen therapy (LTOT). Nearly all were smokers or ex-smokers. Their hospital length of stay (LOS) ranged from 2 to 102 days (Md = 8 days). After the study period, when the participants’ LOS was finally checked, I learned that seven of those participants identified as malnourished had died during the study period.

**Study IV**

Participants were recruited from an inpatient register at a respiratory medicine clinic at a university hospital. Inclusion criteria were a diagnosis of COPD and age from 58 to 70 years.
Exclusion criteria were diabetes type I or II, severe ischemic heart failure, renal failure, cancer, LTOT, or a terminal state of COPD. Of the 330 identified patients, 56 were excluded because their addresses could not be identified or they could not be reached by phone. Ultimately 134 patients were included as participants. For five of them either the mail was returned or we could not reach them by phone; an additional 48 (37%) declined participation, resulting in a final sample of 81 participants (Table 2).

Table 2. Description of study population (IV), excluded persons and study participants.

<table>
<thead>
<tr>
<th>Study population</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified patients with COPD and without diabetes type I or II, born 1936-1947</td>
<td>330</td>
</tr>
<tr>
<td>Excluded because of</td>
<td></td>
</tr>
<tr>
<td>severe heart or kidney disease, asthma; long-term oxygen therapy;</td>
<td>102</td>
</tr>
<tr>
<td>psychiatric diagnosis or alcoholism;</td>
<td>34</td>
</tr>
<tr>
<td>living far away from the study location; or</td>
<td>4</td>
</tr>
<tr>
<td>no address or telephone number found</td>
<td>56</td>
</tr>
</tbody>
</table>

| Study participants                                                              |        |
| Participants included                                                           | 134    |
| Participants excluded because                                                   |        |
| mail returned, no telephone contact or                                           | 5      |
| patient declined                                                                | 48     |
| **Total study participants**                                                     | 81     |

Reasons given for not participating were no interest in the study or an acute illness. There were no significant differences between participating and nonparticipating subjects according to gender, age, or severity of COPD. Further, of those who declined participation, more were noted as active smokers during their last contact with the respiratory ward. The final sample comprised 47 women and 34 men with a mean age of 65 (SD = 4) years. Thirty-four of the participants (41%) lived alone. Nearly half (52%) had taken old-age retirement, and 28% had an early retirement pension, mainly because of COPD. Almost half of the participants (48%) had severe COPD. Eighteen participants were still smokers, whereas three had no smoking history.
Qualitative data

Diaries
A diary for collecting data on meal-related situations was constructed for the study of persons with COPD (I). The concept meal-related situation was used to cover all situations in relation to the mealtimes, shopping, cooking and eating. Previous studies used concepts such as food-related work, eating habits (Gustavsson & Sidenvall 2002) or food-related activities (Fieldhouse 2002), which do not capture all necessary components simultaneously. Using diaries for data collection is common in social research, and the method can be an alternative to interviews or used as a memory support (Corti 1993). The diary developed for this thesis was based on structured questions for daily, recurrent meal-related situations. Questions elicited participants’ descriptions of their dietary habits and changes in food intake; if changes had occurred, and why; any eating-related problems; and how shopping and preparation of food was described. There were both fixed- and open-ended response alternatives. The purpose of the diary was to explore participants’ meal-related situations for five days, and it was to be used as a starting point for interviews that were to follow at a later time in study I. The diary period included five days from Thursday to Monday.

Vignettes
A vignette technique was used with the interviews (II). Vignettes, defined as simulations of real events (Flaskerud 1979), can be used to illuminate attitudes and have been described as an ethical and practical technique (Hughes & Huby 2002). An absolute necessity for internal validity when using vignettes is an authentic description: a ‘real case’. This was achieved, as the vignettes were developed using three authentic cases from the data collection for meal-related situations (I). The first vignette described a person with underweight, the second a person with overweight and the last one a person with normal weight but with a slight weight reduction; all persons in the vignettes had COPD. RNs were encouraged to share their thoughts freely while reading the vignettes; and the vignettes were also used as a way of starting the interview.

Semi-structured interviews
A semi-structured interview guide was developed and used for the interviews so that I could collect additional data on meal-related situations (I) in addition to vignettes (II). The question areas were the same as those in the diary (I), but the questions were stated differently. For example, to collect experiences of the meal-related situations, the following questions were
posed: ‘Can you describe how you feel when you have problems related to the meal-related situation?’ and ‘What are your feelings related to the meal-related situation with relatives or friends?’ The use of a semi-structured interview in addition to the diary was an attempt to capture a deeper description of experiences from meal-related situations. We chose to use semi-structured questions in combination with vignettes to cover data on both assessments and interventions (II). The semi-structured questions that followed the readings of the vignettes related to how RNs identified patients’ nutritional status, which nursing interventions they considered and used, and when they thought it was timely to inform patients about diet and nutrition.

**Quantitative data**

**Anthropometry**

The patients’ body weight and height were measured for calculation of BMI. Patients were weighed on a ‘sitting scale’ (III) and standing (I, IV). All participants were weighed without shoes and dressed in light clothes. Weight was measured to nearest 0.1 kg. For all participants except two (III), body length was measured standing straight against a wall, without shoes, to the nearest 0.5 cm. Those two patients who could not be measured standing were measured lying on a flat bed using special equipment with a fixed foot-plate and an adjustable head-plate. The BMI was determined by dividing the weight (in kilograms) by the square of the height in centimetres.

Mid-arm circumference (MAC) and calf circumference (CC) were measured (III, IV) to the nearest 0.5 cm with a soft tape measure, as described in the manual for MNA and by Gibson (2005). Hip and waist circumferences were measured (IV) with a soft measuring tape, and the waist-hip ratio (WHR) was calculated; values greater than or equal to 1.0 for men and greater than or equal to 0.9 for women were used to indicate obesity (Favier et al. 2005). To establish body composition, skin fold thickness was measured (IV) with a Harpenden skin fold calliper© at four different places on the patient’s body: the triceps, the biceps, the subscapula and the suprailiac, as described and recommended by Gibson (2005). Calculation of the fat-free mass (FFM) was carried out according to Durnin and Womersley’s (1974) body density equations. Fat-free mass index (FFMI) was calculated as FFM (kg) divided by the body length² (m²) (Kyle et al. 2003). Reference values used as FFM depletion were 15 or lower for women and 16 or lower for men (Vermeeren et al. 2006). Measurement error of skin folds
was evaluated from five repeated measurements of five individuals not involved in the project. The measurements were done before the data collection of the project.

**Nutritional status**

Nutritional status was identified using the following instruments: total Mini Nutritional Assessment (MNA) (III, IV), the MNA Short Form (MNA-SF) (IV), the Malnutrition Universal Screening Tool (MUST) and a national disease-specific instrument for evaluation of nutritional status, hereafter referred to as ENS (IV). The MNA consists of 18 score-weighted items, with a maximum score of 30. Scores less than 17 indicate malnutrition, those from 17 to 23.5 indicate risk for malnutrition, and those 24 or more indicate a well-nourished state. In the original version, which included four sections, (Guigoz et al. 1996), these three categories are classified as MNA 3 (malnourished), MNA 2 (risk for malnutrition) and MNA 1 (well nourished).

The original version of the MNA, divided into four sections, was used in study III. The first section deals with BMI, weight loss, appetite, and MAC and CC, giving scores between 0 and 8. A second general section includes physical and cognitive activity, daily intake of prescribed drugs and pressure sores or skin ulcers: in total 9 points. Dietary intake and habits constitute the third section, with items for daily mealtimes, intake of food and liquid, appetite and feeding assistance, including up to 9 points. Finally, the fourth section is a subjective assessment of the respondent’s health and nutritional status, in total 4 points. The revised MNA, as recommended with the MNA-SF, was used in study IV, whereby total scores greater than 11 from the first part indicate no need for further assessment and scores of 11 or less indicate the need for a full assessment by the total MNA (Rubenstein et al. 2001). The MNA has been evaluated for validity and reliability in numerous studies and has been described as one of the most commonly used tool for nutritional screening and assessment of older persons (Vellas et al. 2006).

The assessment with MUST (IV) is performed using three items with fixed response alternatives and scores from 0 to 2 for BMI and weight loss; a score of 2 is awarded for acute illness or no nutritional intake for more than 5 days. These scores are added to calculate the overall risk of malnutrition. The maximum score is 6, and a total score of 0 shows low risk for malnutrition, 1 indicates a moderate risk for malnutrition, and a score of 2 or more shows a high risk of malnutrition (Stratton et al. 2004). MUST is described as having face validity,
content validity and internal consistency. The tool has been reported as useful for assessing malnutrition in both in- and outpatients (Stratton et al. 2004).

An instrument from a national guideline for managing COPD and evaluating nutritional status among patients with COPD, in this study referred to as the ENS, was also used (IV). The ENS consists of three items with fixed response alternatives and scores. The first item deals with weight changes and gives a score of 0 to 1, the next item scores 0 or 1 for appetite, and the last item, the value of the BMI, is scored 1 to 2. The maximum score is 4, and a total score of 0 or 1 indicates a well-nourished state, whereas a score of 2 to 4 indicates that the patient is in need of ‘qualified help for nutrition’ (Svensk Lungmedicinsk Förening [SLMF] 2004). The instrument has, to our knowledge, not been studied or scientifically reported.

**Lung function and demographic data**

Lung function was measured in studies I and II using the SpirometerMicrolab 3300®. Spirare® was used for all patients, except for one in study IV that used Spiroperfect®. Demographic data were collected in all studies. These data included LOS (III), gender, age, living conditions, need for daily community service, occupation, years diagnosed with COPD, smoking habits and lifestyle (I, III, IV). For the RN participants, data on age, gender, education, experience as an RN and weekly scheduled time caring for patients with COPD were collected (II).

**Pilot studies**

Several pilot studies were carried out in connection with three of the studies (I, III, IV). Both the diary and the interview guide were tested in a pilot study involving two persons from a COPD rehabilitation programme (I). Feedback from the pilot participants resulted in the inclusion of three probing questions and minor rewording of the diary. A pilot study of the demographic data collection that included two patients resulted in the addition of a question regarding living conditions (III). A third study, including three persons (IV), resulted in caution about use of the MNA-SF. Relying on scores from the screening part and not completing the whole assessment following preliminary scores greater than 11 can result in failure to detect patients at risk for malnutrition because some of the persons had scores greater than 11 for MNA-SF but their scores from the total MNA were less than 24. Another conflicting result from the pilot study was that patients had to be identified as malnourished by MNA if, by the ENS scores, they were evaluated as ‘in need of qualified help for
nutrition’. The values chosen for this study’s subdivision of participants into weight groups according to BMI were also based on the findings from the pilot study and were an attempt to find manageable values to recommend for classification of both under- and overweight patients with COPD. Those values were, in addition, chosen based on the literature and following consultation with an experienced dietician.

**Procedure**

Data collection always started with the diary (I). About one week later one of the researchers (SO) collected all data in the participant’s home, where an audiotape-recorded interview took place. When the interview was completed, the participants were weighed on a personal scale, and their height was measured. Later, using the same type spirometer for all participants, a co-assessor and experienced RN assessed their lung function (Microlab 3300®). All assessments of lung function, except for one, took place in the participant’s home. All interviews with the RNs were performed by SO and took place at each RN’s PHC centre (II). The RN interviews, which lasted about an hour each, were also audiotaped. Data collection was planned as close in time as possible to COPD participants’ discharge from the ward (III). The COPD participants’ last days at the ward were chosen for data collection to obtain data when the participants were in a stable condition. A structured interview was performed after breakfast time in the participant’s room or in a separate room on the ward and lasted about 45 minutes. All data were collected by SO, who had experience in using the MNA and was trained in performing the lung function test. For participants living in or near the city, data were collected at the School of Health and Medicine at a university (IV). For patients who were unable to travel to the city and for 13 patients who lived in a smaller town, the data collection was done at the local PHCC. A trained co-worker in the project assessed the nutritional status of some patients.

**Analysis**

*Qualitative content analysis*

Qualitative content analysis is a widely used method of analyzing texts and is sometimes described as the first phase in qualitative research studies (Hsieh & Shannon 2005). Downe-Wamboldt (1992) described content analysis as a research technique for systematic and objective possibilities to describe and quantify phenomena. The analysis includes a manifest analysis from an obvious level of content but also a latent approach, with interpretations from an invisible level of content (Graneheim & Lundman 2004). Three approaches to qualitative
content analysis have recently been described as conventional, directed and summative (Hsieh & Shannon 2005). The differences between those approaches relate to the coding schemes, the origins of codes and threats to trustworthiness. A conventional approach, including both manifest and latent content analysis, was used for analyzing interviews (I, II), and for the analysis of the diaries manifest content analysis was used (I). SO transcribed all of the tape-recorded interviews verbatim. Transcripts were then compared with the tapes to verify their accuracy (I, II).

The analysis of the diaries started with a matrix of text, facilitating a closer view of the content, with colours used for coding the text related to the different mealtime situations. Analysis of the subsequent interviews started with a reading through of the transcripts to obtain a primary understanding of the content as a whole. Next, memos were written, and marks were made on transcripts to denote any special expressions and quotations in the text (I). After a second careful reading of the interviews, meaning units, including similar data, were marked with the same colours as used for the diaries and sorted according to the content areas of the meal-related situations, in a kind of deductive analysis (I). The texts were condensed into shorter sentences and then read repeatedly for the purpose of finding similar and related content. The intent was to find similar experiences among the individuals that took place in different meal-related situations. Analysis of the RNs’ narratives from the vignettes and the interviews with the RNs also started with a careful reading of the text to obtain a sense of the whole content. Meaning units with similar content from the RNs’ experiences of assessment and interventions were identified and condensed into shorter text units (II). Condensed texts from interviews (I, II) were read several times. Subcategories emerged, and those with similar meaning were indicated as such. During this analysis subcategories were moved back and forth until the most suitable or descriptive subcategories and final categories emerged. An example of meaning units, condensation, subcategories and categories from study II is shown in Table 3.
Table 3. Example of analysis from meaning units to category constructed from content analyses of interviews with nurses in PHCC (n = 19).

<table>
<thead>
<tr>
<th>Meaning units</th>
<th>Condensed meaning units</th>
<th>Subcategory</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can’t say it exactly, that this person is emaciated, you feel an insight that it is an involuntary weight reduction</td>
<td>Involuntary weight reduction is something the nurse feels as an insight</td>
<td>A feeling of insight</td>
<td>Intuition</td>
</tr>
<tr>
<td>It is something you recognize even if you haven’t seen the patient before. The special breathing pattern gives you thoughts of a weight reduction</td>
<td>Special breathing pattern is recognized and related to COPD and weight reduction</td>
<td>Recognition, thoughts and experience</td>
<td>Intuition</td>
</tr>
<tr>
<td>Yes, weight reduction you can feel that something is going on even if the patient is in good condition</td>
<td>A feeling of weight reduction for a patient in good condition</td>
<td>Feeling something is going on</td>
<td>Intuition</td>
</tr>
</tbody>
</table>

Trustworthiness in analyzing and interpreting the data included having a person experienced in content analysis but not a member of the research group involved (Graneheim & Lundman 2004). This co-assessor read three randomly selected interviews from persons with COPD and four of the interviews from the RNs and performed thereafter an independent analysis. The analyses were later compared with the analysis done by SO. Agreement was found to be nearly perfect, as the content areas and subcategories for the most part included the same data for the seven interviews. Findings were later presented to the RN participants (III) for confirmation, and the RNs recognized the categories as corresponding to their experiences from clinical practice.

Statistical methods
In a power analysis (IV) using significant levels set at 0.05 and 80% power to detect differences in FFMI, more than 74 participants were calculated as needed for the study.

The statistical software Statistical Package for the Social Sciences (SPSS) version 14.0 ® was used for statistical calculations (III, IV). The MNA classification was dichotomized into two
classes, (1) well nourished and at risk for malnutrition (MNA 1/MNA 2) and (2) malnourished (MNA 3). Study participants (IV) were classified into three groups (underweight, normal weight and overweight) based on recommended BMI values for persons with COPD (Griffiths et al. 2000, Landbo et al. 1999) and for older persons (Beck & Ovesen 1998), and after consulting an experienced dietician.

Data were described as frequencies and percentages (III, IV). Means (III, IV) and medians (III, IV) were used for descriptions of central tendency. Standard deviation (III), ranges (III, IV) and the first, second and third quartile (q1, q2 and q3) (IV) reported the dispersion of the values. The choice of q2 and median (Md) for continuous data was based on a nonsymmetrical distribution of the data. The first and third quartiles were chosen to describe variability. Pearson’s chi-square test was used for tests of differences between groups for the following nondependent variables: classification by MNA, social conditions and lung function (III). The significance level was for all analyses set at $p$ less than 0.05. Spearman’s rank correlation coefficient ($r_s$) was calculated to study correlation between the FFMI and the scores from the MNA, MUST and ENS (IV).

**Ethical considerations**

The research was performed based on four basic ethical principles: respect for autonomy, beneficence, nonmaleficence and justice (World Medical Organization 1996). Ethical approval was given by the research ethics committee at the university hospital (I, III) and the regional ethical vetting board (IV). Because study III did not involve patients, no ethics review was performed, in conformity with current Swedish regulations for ethical research praxis, and each director of the PHCC approved the study where the participating RNs worked. The participants (I-IV) were provided with both verbal and written information, and informed consent was obtained. Information about their rights to withdraw at any time during data collection was also given, according to the principle of autonomy. This principle includes respect for privacy and confidentiality of data of a personal nature. All data were labelled with code numbers to ensure confidentiality.

Data collection was performed in private to protect the participants’ integrity, and they did not have to undress for the physical examination (III, IV). Participants identified as being at risk of malnutrition or as malnourished or with low BMI were, with the permission of the patient, reported to the RN in charge (III) and to the RNs in the PHCC responsible for persons with
COPD (II, IV). All participants were informed of how to contact the RN responsible for patients with COPD in PHCC (IV).

All studies illuminated essential knowledge and made all involved participants aware of the importance of their nutritional status. Because the main factor that causes COPD is smoking, for some participant the disease might be related to feelings of blame and shame. It might be hard to talk about the disease, and both the interview and diary might even have evoked thoughts that they denied or exposed unknown areas of their thinking. The participants (I, III, IV) were invited to phone the researcher if they felt the need to discuss matters concerning the study; however, only two participants called (IV). Contact with potential participants was made with careful considerations of the individuals’ possible feelings about a self-inflicted disease (IV). Some of those contacted did not want to talk about the study or to be reminded of their disease. They ended the first telephone call as quickly as possible.
RESULTS
This thesis includes four studies, which are reported in the following order: experiences of meal-related situations (I), nursing interventions (II) and nutritional status of patients with COPD (III, IV).

Experiences of meal-related situations were categorized as Physical influences but also as Negative and positive feelings, Dependence, Being alone or together with other, and the Need for time when eating and cooking (I). The RNs described observations of obvious bodily signs and the use of intuition in assessing patients’ nutritional status. Nursing interventions were expressed as making the patient aware of the illness trajectory and were nearly always influenced by respect for the patients’ feelings of shame and guilt (II). Through the MNA nearly half of the older inpatients were identified as at risk for malnutrition and an equal number as malnourished (III). Despite these findings and in contrast to most reported studies for persons with COPD, in our study (IV) only a few respondents were identified by screening as malnourished or in need of attention because of their nutritional status. Many of the patients were instead assessed as overweight or even obese (IV). Some of the overweight and obese patients had low FFMI values, which concealed their impaired nutritional status.

Experiences of meal-related situations (I)
Common expressions in all COPD patients’ interviews and for all meal-related situations were the respondents’ conception of COPD as a self-inflicted disease, how the disease had influenced their life in many different ways and remorse for not having quit smoking earlier. The respondents described varying physical factors that influence their meal-related situations. Cooking was reported as being physically difficult, with some respondents feeling tired and needing to sit down and rest. One woman reported feeling faint whenever she had to stand while preparing food. Coughing just before or during meals was mentioned as a problem, as well as dyspnoea and tiredness as the actual causes of problems when eating. Early satiety, bloated stomachs, fungal infections and dry mouth were also recurrent problems. Days when cooking and eating were very difficult or impossible to accomplish were expressed by one respondent as follows: ‘Tired, very tired. I cannot manage standing there peeling an onion. It is not like me at all.’ The respondents expressed primarily negative feelings in meal-related situations. They described being angry or sad, or having feelings of failure when they did not manage to eat their meals: ‘Then I do not succeed, so I feel like a
failure; I’ve been standing there making food and then I can’t eat it up.’ Positive feelings were described when eating together with relatives, at special events, or on ‘good days.’

Being dependent on others and being alone or together with others were expressed in various ways. Being dependent when shopping was described frequently, and some reported that they could no longer manage shopping on their own. The use of a trolley while shopping made it possible for respondents to leave their walking frame at home. Some did not want to use the walking frame as an aid for shopping, however; their excuse was that they did not want to show their bad condition. Even when going by car, it was important to park near the store. Lifting the groceries into or out of the trolley and then into bags was also reported as difficult. Carrying groceries from the store to their home was reported as extremely difficult or even impossible. One person reported, ‘I take a small basket in the shop and that way I buy only a few items at a time. This makes it easier when I have to carry the items home.’

Being alone or together with others affected their meal-related situations in varying ways, not only when shopping. One respondent reported, ‘If I were alone, I would starve to death.’ Being with others was described as a situation that made cooking more appealing and that improved the taste of the food they cooked. According to the respondents, relatives and friends did not know why the respondents ate such small portions and did not understand their eating problems. Some also mentioned that they felt that they were being observed by relatives when eating. Comments from others about their eating or coughing made them feel ashamed, and eating with others made them nervous to the point where some started to cough. Sometimes relatives and friends had to respond and defend the respondents when unpleasant comments were expressed. Some reported that they never ate out or together with friends.

Appetite, hunger and the reduced intake of food were mentioned as observable changes. One respondent described the loss of appetite in the following terms: ‘The main change is the loss of appetite and that it doesn’t taste as good as before; it doesn’t matter what kind of food it is.’ Poorer appetite was also expressed in relation to exacerbation. When talking about hunger, some participants reported managing without food, choosing to smoke instead of eating. Problems reported were a lack of taste or desire to eat and that warm food sometimes was particularly repulsive. As well, because they needed to rest frequently during food preparation, some respondents mentioned the need to plan and prepare their meals early. They talked about an awareness of a reduction in food intake that had taken place over the past few
years and mentioned that relatives expressed concern about their level of consumption. Respondents described their reduced intake of food in a similar manner. One male respondent said that he had eaten copious amounts of food when he was younger and wished that he could eat like that now. Another stated, ‘Oh my God I have not eaten anything yet, and I’m already full.’ The respondents described different personal eating strategies. Eating smaller portions and spreading a larger number of meals throughout the day was presented as a way of dealing with eating problems. Furthermore, a decrease in body weight was expressed as something positive, and several of the respondents expressed that low body weight was ‘good’ for persons with COPD. Several respondents experienced eating as time consuming. For example, one respondent wrote, ‘Eating takes a lot of time.’ Many respondents reported that they had a rest and sat quietly after eating.

**Nutritional assessment and nutritional interventions by RNs (II)**

The RNs often met patients with impaired nutritional status in all stages of COPD, but those nurses who met patients primarily in the early stages (i.e., mild COPD) reported that average-weight or overweight patients were more common than underweight patients. However, according to these RNs the later stages were different: ‘Often they [patients] are either under- or overweight, and seldom are they just right.’ The nurses reported comparing the patients’ current weight with their earlier record. Those RNs who did not weigh the patients relied on the weight figures that the patients reported. However, not all RNs assessed their patients’ body weight. Some were informed of or observed weight loss at the first contact with the patient. They made observations regarding whether the patients’ bodies were lean, thin or obese; their breathing pattern; how they held their bodies; the elasticity, dryness and colour of the skin; and the patients’ nails and hair. They also mentioned rosy cheeks, freshness, paleness or the patients’ facial expressions. How the patients’ clothes fit was another important source of information. The RNs described their observations as intuitive feelings or as ‘insights.’ One nurse expressed, ‘I can’t say it exactly. It’s the glimpse in their eyes, and you feel that their weight loss isn’t of their own free will and choice.’

The RNs reported that patients were suspicious when they were advised to adopt an energy-rich diet: ‘When you inform the patients to avoid an energy-light diet they just look at me as if I am a stupid person.’ RNs described how thin patients or patients with significant weight loss viewed this weight loss as something positive and in accordance with current information about body weight and healthy foods as presented by the health care system and the media.
Couples or patients with two diagnoses, commonly COPD and diabetes, were also considered a problem because of the complexity of the different dietary needs involved. Patients with COPD did not give information about nutritional status high priority. The first contacts were focused primarily on smoking cessation and medical information, and patients were often in a state of denial and therefore not receptive to nutritional information. Some RNs reported that they considered establishing a good relationship with the patients more important than discussing nutrition and body weight, which the patients might perceive as sensitive and embarrassing issues. Others expressed an opposite view, believing that nutritional information should be given during the first meeting. RNs reported that individualizing the information, sensing the right time and being sensitive to and aware of the patient’s signals were important. This was expressed as follows: ‘You have to be careful and try and then prepare (catch) them when you feel it’s the right moment.’

RNs advised patients with or at risk of low body weight to eat smaller portions more frequently and to eat quickly prepared food and energy-rich foods and snacks. A rest before and after mealtimes was mentioned as well as storing food for ‘bad days’. Giving advice to overweight patients was more difficult than giving advice to underweight individuals, and nurses wanted to consult a dietician more often for overweight than for underweight patients. The RNs’ personal thoughts about the patient’s illness trajectory were conveyed in all of the interviews. Development of the patient’s condition along the illness trajectory results in a number of losses related to nutritional status: decreased activity and capacity to shop, cook and eat; and progressive loss of taste and general interest in food as well as decreased pleasure and dignity perceived when eating together with friends. RNs expressed that weight control could make patients more aware of their nutritional status and their COPD. Patients’ basic lack of knowledge about COPD and its illness trajectory was an obstacle in their ability to participate fully in and understand their care needs. RNs described the importance of early nursing intervention aimed at preventing nutritional problems and rapid progression downward on the illness trajectory. The RNs reported that many patients contacted health care providers only after they were already experiencing severe symptoms. One nurse described the consequences of only a few kilos’ weight reduction for the patients as follows: ‘They have such small margins: it is easy to cross the border and fall over to the other side.’

Patients’ feelings of shame and guilt influenced every meeting between the RNs and patients. The RNs described several examples of how the patients were ashamed of their medical
condition. For instance, the patients always reported a higher body weight than their actual weight. Some wore bulky clothes to conceal weight loss or did not mention weight loss unless forced to do so. For those with a cough, eating with others could be a problem. One nurse said about patients who suffered coughing attacks while eating, ‘You don’t behave like this at the table, coughing and spitting out food, as such behaviour is a sign of degradation.’

**Anthropometry (III, IV)**

The mean BMI in the hospitalized elderly patients (n = 50) was 21.2 (SD 4.8), and the values ranged from 13.5 to 34.1 (III). The BMIs for the participants in study IV ranged from 15.9 to 43.8, and the median (Md) was 25.3. The median FFMI and WHR (IV) were 16.8 and 0.94, respectively. All anthropometric values in study IV are presented in Table 4.

**Table 4.** Anthropometry for the study participants (n = 81), by BMI category. Median and quartiles are given.

<table>
<thead>
<tr>
<th></th>
<th>Underweight BMI &lt; 22 (n = 16) Md (q1; q3)</th>
<th>Normal Weight BMI 22–26 (n = 37) Md (q1; q3)</th>
<th>Overweight BMI &gt; 27 (n = 28) Md (q1; q3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body weight (kg)</td>
<td>55.7 (50.6; 60.5)</td>
<td>68.0 (64.1; 75)</td>
<td>86 (79.6; 95)</td>
</tr>
<tr>
<td>Body mass index (BMI)</td>
<td>21.1 (18.0; 21.3)</td>
<td>25.1 (23.5; 26.0)</td>
<td>30.6 (28.6; 32.5)</td>
</tr>
<tr>
<td>(weight/height)$^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waist-hip ratio (WHR)</td>
<td>0.86 (0.83; 0.93)</td>
<td>0.93 (0.90; 0.99)</td>
<td>0.98 (0.93; 1.04)</td>
</tr>
<tr>
<td>waist/hip</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-arm circumference (MAC) cm</td>
<td>25.0 (23.5; 28.1)</td>
<td>32.0 (28.2; 32.0)</td>
<td>35 (33.1; 37)</td>
</tr>
<tr>
<td>Calf circumference (CC) cm</td>
<td>30.1 (29.6; 33.5)</td>
<td>36.0 (34.0; 38.0)</td>
<td>38.5 (37.6; 40.7)</td>
</tr>
<tr>
<td>Fat-free mass index (FFMI) (FFM/height)$^2$</td>
<td>15.5 (13.1; 17.1)</td>
<td>17.4 (15.5; 18.6)</td>
<td>16.4 (15.1; 19.3)</td>
</tr>
</tbody>
</table>

* Weights grouped according to recommended BMI for the patient group.

**Nutritional status assessed by screening instruments (III, IV)**

Using the MNA, we identified malnutrition (MNA 3) in 24 (48%) of the 50 patients (III). An equal number were identified as being at risk for malnutrition (MNA 2), and two patients were identified as well nourished (MNA 1) but very close to the cut-off score, indicating risk
of malnutrition. Therefore, these two lower groups are treated as one (MNA 1/MNA 2) in the following text. The mean MNA score for the study was 17.2 (SD 4.0), and the MNA scores ranged from 9.5 to 24.5. The items in the MNA for which a majority of the patients had low scores were a CC less than 31 and intake of more than three prescribed drugs per day. On the other hand, all but two participants could eat independently and therefore received high scores for that item. Twenty-six participants (52%) reported no nutritional problems; however, five of these were identified as malnourished (MNA 3). Eight identified as at risk of malnutrition or malnourished stated that their health status was better than others in the same age group. Scores from the four sections and the total MNA score (III) are presented in Table 5.

Table 5. Scores from the four sections and total score of the Mini Nutritional Assessment (MNA) instrument in older inpatients with COPD (n = 50) identified as being at risk for malnutrition (MNA1/MNA2) or malnourished (MNA3).

<table>
<thead>
<tr>
<th>Sections of MNA (maximum scores)</th>
<th>MNA1/MNA2* (n=26)</th>
<th>MNA3** (n=24)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropometry (8)</td>
<td>5.4 ± 1.9</td>
<td>2.6 ± 1.6</td>
<td>0.001</td>
</tr>
<tr>
<td>General assessment (9)</td>
<td>6.0 ± 1.1</td>
<td>4.8 ± 1.4</td>
<td>0.001</td>
</tr>
<tr>
<td>Dietary history (9)</td>
<td>6.4 ± 1.4</td>
<td>5.1 ± 1.9</td>
<td>0.015</td>
</tr>
<tr>
<td>Subjective assessment (4)</td>
<td>2.7 ± 0.9</td>
<td>1.31 ± 0.9</td>
<td>0.001</td>
</tr>
<tr>
<td>Total MNA (30)</td>
<td>20.4 ± 2.2</td>
<td>13.8 ± 2.1</td>
<td>0.001</td>
</tr>
</tbody>
</table>

*Risk of malnutrition (MNA1/MNA2) and **malnourishment (MNA3).

According to the MNA (IV) 7 patients (9%) were identified as malnourished, 34 were at risk for malnutrition, and nearly half of participants (49%) were well nourished. Through the MUST 9 participants (11%) were assessed to be at high risk for malnutrition, 10 (12%) at medium risk and 62 (77%) at low risk. According to the ENS 13 participants (16%) were identified as in need of qualified nutrition care, and the rest (84%) were identified as well nourished. Scores from all instruments (MNA, MUST, ENS) for the participants are presented in Table 6. For the first section of the MNA, the MNA-SF, 51 participants (63%) had scores of 12 or more. Of those 51 with first MNA section scores indicating no need for further assessment, 13 (25%) had total scores less than 24, indicating risk for malnutrition. Six participants were independently assessed by each instrument as needing special attention for their nutritional status. These six participants are further reported on in the next section, on nutritional status and anthropometry.
Table 6. Assessment scores by the MNA-SF, MNA, MUST and ENS for the study participants (n = 81), by BMI categories. Median and quartiles are given.

<table>
<thead>
<tr>
<th>BMI Category</th>
<th>MNA-SF*</th>
<th>MNA total**</th>
<th>MUST***</th>
<th>ENS****</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>9.0 (5.2; 12.75)</td>
<td>13.0 (12.0; 14.0)</td>
<td>1.0 (0; 3)</td>
<td>0.5 (0; 3)</td>
</tr>
<tr>
<td>BMI &lt; 22 (n = 16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Weight</td>
<td>18.7 (12.5; 22.5)</td>
<td>25.0 (23.0; 26.0)</td>
<td>0 (0; 0)</td>
<td>0 (0; 0)</td>
</tr>
<tr>
<td>BMI 22–26 (n = 37)</td>
<td>Md (q1; q3)</td>
<td>Md (q1; q3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>12.0 (10.2; 14)</td>
<td>23.0 (21.1; 25.0)</td>
<td>0 (0; 0)</td>
<td>0 (0; 0)</td>
</tr>
<tr>
<td>BMI &gt; 27 (n = 28)</td>
<td>Md (q1; q3)</td>
<td>Md (q1; q3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Score of 12 or more = no need of further assessment, 11 or less = risk for malnutrition, the total MNA should be completed.
** Score of 24–30 score = well nourished, 17–23.5 = risk for malnutrition, < 17 = malnourished.
*** Score of 0 = low risk for malnutrition, 1 = moderate risk for malnutrition, 2 or more = high risk for malnutrition.
**** Score of 0–1 = well nourished, 2–4 = in need of qualified help with nutrition.

Nutritional status and anthropometry (III, IV)

There was a significant difference between patients’ values regarding body weight, BMI, mid-arm circumference (MAC) and calf circumference (CC) for the patients identified as malnourished or at risk for malnutrition (III) (Table 7).

Table 7. Anthropometry in older COPD inpatients (n = 50) identified as at risk for malnutrition (MNA1/MNA2) or malnourished (MNA3).

<table>
<thead>
<tr>
<th>MNA1/MNA2*</th>
<th>MNA3**</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 26</td>
<td>n = 24</td>
<td></td>
</tr>
<tr>
<td>M ± SD</td>
<td>M ± SD</td>
<td></td>
</tr>
<tr>
<td>Body weight (kg)</td>
<td>63.5 ± 14.6</td>
<td>48.3 ± 10.1</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>23.3 ± 4.9</td>
<td>18.9 ± 3.6</td>
</tr>
<tr>
<td>Mid-arm circumference (cm)</td>
<td>27.3 ± 5.1</td>
<td>21.3 ± 3.4</td>
</tr>
<tr>
<td>Calf circumference (cm)</td>
<td>31.7 ± 3.9</td>
<td>26.9 ± 3.0</td>
</tr>
</tbody>
</table>

* Risk of malnutrition (MNA1/MNA2) and **malnourishment (MNA3).

A negative correlation was reported for FFMI and MUST scores (rₛ = −0.325) and for FFMI and ENS scores (rₛ = −0.381). The FFMI and MNA scores were positively correlated (rₛ = 0.537). Correlations were significant at the 0.05 level for each of these three instruments (MUST, ENS, MNA) and the FFMI.
Four women and two men were assessed by each of the three instruments—the MNA, MUST and ENS—to be in need of special attention as a result of their nutritional status. The scores from each instrument (MNA, MUST, ENS) —body weight, BMI and FFMI—for those six patients are presented in Table 8.

**Table 8.** Scores for six study participants with COPD from three instruments assessing nutritional status (Mini Nutritional Assessment – Short Form (MNA-SF) Mini Nutritional Assessment (MNA), Malnutrition Universal Screening Tool (MUST), Evaluation of Nutritional Status (ENS), and body weight, body mass index (BMI) and fat-free mass index (FFMI).

<table>
<thead>
<tr>
<th>Sex and age</th>
<th>MNA-SF*</th>
<th>MNA**</th>
<th>MUST***</th>
<th>ENS****</th>
<th>Body Weight (kg)</th>
<th>BMI</th>
<th>FFMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman, 60</td>
<td>4</td>
<td>11.5</td>
<td>3</td>
<td>3</td>
<td>49.8</td>
<td>18.0</td>
<td>13.0</td>
</tr>
<tr>
<td>Woman, 61</td>
<td>4</td>
<td>12</td>
<td>3</td>
<td>4</td>
<td>43.2</td>
<td>17.2</td>
<td>13.1</td>
</tr>
<tr>
<td>Woman, 63</td>
<td>6</td>
<td>14.5</td>
<td>1</td>
<td>3</td>
<td>54.5</td>
<td>20.3</td>
<td>15.6</td>
</tr>
<tr>
<td>Woman, 63</td>
<td>5</td>
<td>11.5</td>
<td>3</td>
<td>4</td>
<td>46.4</td>
<td>15.9</td>
<td>12.5</td>
</tr>
<tr>
<td>Man, 60</td>
<td>6</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>56</td>
<td>18.7</td>
<td>16.3</td>
</tr>
<tr>
<td>Man, 64</td>
<td>4</td>
<td>11.5</td>
<td>3</td>
<td>3</td>
<td>57.0</td>
<td>19.7</td>
<td>15.1</td>
</tr>
</tbody>
</table>

* Shaded areas show values indicating malnutrition or risk of malnutrition.

* A score of 12 or more = no need of further assessment; 11 or less = risk of malnutrition, the total MNA should be completed.
** A score of 24–30 = well nourished, 17–23.5 = risk of malnutrition, < 17 = malnourished.
*** A score of 0 = low risk for malnutrition, 1 = moderate risk of malnutrition, 2 or more = high risk of malnutrition.
**** A score of 0–1 = well nourished, 2–4 = in need of qualified help with nutrition.

Nineteen (23%) of the 81 participants had FFMIIs lower than recommended (IV); these are reported in Tables 9 and 10. Those 19 included four of the participants identified as in need of special attention according to each of the instruments. For those 19 patients, despite the fact that their FFMI were less than recommended, certain combinations of body size and body composition meant that although the WHR indicated obesity or near obesity, they were classified as under- or overweight by the BMI and assessed as well nourished or malnourished by the instruments MNA, MUST and ENS.
Table 9. Scores for 9 men with COPD related to fat-free mass index (FFMI) as FFM depletion, the Mini Nutritional-Short Form (MNA-SF), the Mini Nutritional Assessment (MNA), the Malnutrition Universal Screening Form (MUST) and the Evaluation of Nutritional Status (ENS). The column headings show the values that would signify no FFM depletion; the cut-off scores indicating no need of further assessment (MNA-SF), well nourished (MNA, ENS) or at low risk for malnutrition (MUST); and the values for body mass index (BMI) that denote normal weight, waist-hip ratios (WHR) that indicate non-obese and calf circumference measurements (CC) indicating no protein-energy malnutrition. The shaded areas show where the participants’ values fell outside of these limits.

<table>
<thead>
<tr>
<th>Man’s age</th>
<th>FFMI</th>
<th>MNA-SF</th>
<th>MNA</th>
<th>MUST</th>
<th>ENS</th>
<th>BMI</th>
<th>WHR</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
<td>12.5</td>
<td>4</td>
<td>11.5</td>
<td>3</td>
<td>3</td>
<td>15.9</td>
<td>1.01</td>
<td>27.5</td>
</tr>
<tr>
<td>69</td>
<td>14.4</td>
<td>11</td>
<td>21.5</td>
<td>0</td>
<td>1</td>
<td>27.8</td>
<td>0.98</td>
<td>36</td>
</tr>
<tr>
<td>65</td>
<td>14.5</td>
<td>11</td>
<td>21.5</td>
<td>0</td>
<td>1</td>
<td>28.1</td>
<td>0.98</td>
<td>38</td>
</tr>
<tr>
<td>70</td>
<td>14.7</td>
<td>14</td>
<td>24.0</td>
<td>0</td>
<td>0</td>
<td>27.1</td>
<td>0.98</td>
<td>38</td>
</tr>
<tr>
<td>63</td>
<td>15.3</td>
<td>13</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>22.9</td>
<td>1.04</td>
<td>38</td>
</tr>
<tr>
<td>68</td>
<td>15.4</td>
<td>13</td>
<td>22.5</td>
<td>0</td>
<td>0</td>
<td>21.9</td>
<td>1.05</td>
<td>30.5</td>
</tr>
<tr>
<td>68</td>
<td>15.4</td>
<td>13</td>
<td>24.5</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>0.94</td>
<td>35</td>
</tr>
<tr>
<td>67</td>
<td>15.5</td>
<td>6</td>
<td>13.5</td>
<td>2</td>
<td>0</td>
<td>24</td>
<td>0.91</td>
<td>35</td>
</tr>
<tr>
<td>68</td>
<td>15.6</td>
<td>13</td>
<td>25</td>
<td>1</td>
<td>1</td>
<td>23.4</td>
<td>1.04</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 10. Scores for 10 women with COPD related to fat-free mass index (FFMI) indicating FFM depletion, the Mini Nutritional-Short Form (MNA-SF), the Mini Nutritional Assessment (MNA), the Malnutrition Universal Screening Form (MUST) and the Evaluation of Nutritional Status (ENS). The column headings show the values that would signify no FFM depletion; the cut-off scores indicating no need of further assessment (MNA-SF), well nourished (MNA, ENS) or at low risk for malnutrition (MUST); and the values for body mass index (BMI) that denote normal weight, waist-hip ratios (WHR) that indicate non-obese and calf circumference measurements (CC) indicating no protein-energy malnutrition. The shaded areas show where the participants’ values fell outside of these limits.

<table>
<thead>
<tr>
<th>Woman’s age</th>
<th>FFMI</th>
<th>MNA-SF</th>
<th>MNA</th>
<th>MUST</th>
<th>ENS</th>
<th>BMI</th>
<th>WHR</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>12.5</td>
<td>5</td>
<td>11.5</td>
<td>3</td>
<td>3</td>
<td>15.9</td>
<td>0.93</td>
<td>29.5</td>
</tr>
<tr>
<td>60</td>
<td>13.0</td>
<td>4</td>
<td>11.5</td>
<td>3</td>
<td>3</td>
<td>18.0</td>
<td>0.83</td>
<td>27</td>
</tr>
<tr>
<td>69</td>
<td>13.0</td>
<td>9</td>
<td>18.5</td>
<td>2</td>
<td>1</td>
<td>18</td>
<td>0.81</td>
<td>30</td>
</tr>
<tr>
<td>61</td>
<td>13.1</td>
<td>4</td>
<td>12</td>
<td>2</td>
<td>4</td>
<td>17.2</td>
<td>0.87</td>
<td>31.0</td>
</tr>
<tr>
<td>67</td>
<td>14.0</td>
<td>9</td>
<td>19.5</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>0.86</td>
<td>31</td>
</tr>
<tr>
<td>66</td>
<td>14.0</td>
<td>12</td>
<td>21.5</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>0.93</td>
<td>33.5</td>
</tr>
<tr>
<td>70</td>
<td>14.1</td>
<td>9</td>
<td>21.0</td>
<td>0</td>
<td>0</td>
<td>22.5</td>
<td>0.90</td>
<td>33</td>
</tr>
<tr>
<td>68</td>
<td>14.5</td>
<td>13</td>
<td>21.5</td>
<td>0</td>
<td>0</td>
<td>27.8</td>
<td>0.98</td>
<td>39</td>
</tr>
<tr>
<td>63</td>
<td>14.7</td>
<td>11</td>
<td>20.5</td>
<td>0</td>
<td>0</td>
<td>21.4</td>
<td>0.72</td>
<td>38</td>
</tr>
<tr>
<td>69</td>
<td>15.0</td>
<td>12</td>
<td>24.0</td>
<td>0</td>
<td>0</td>
<td>30.5</td>
<td>0.98</td>
<td>38</td>
</tr>
</tbody>
</table>
**Nutritional status, weight group and social conditions (III, IV)**

There was a significant difference in the patients’ social conditions and identified nutritional statuses (III). Most of the patients assessed as malnourished lived alone and had daily community services and meals-on-wheels. Some had daily community service without meals-on-wheels, or vice versa. Living in their own residence was reported more often by those assessed as at risk of malnutrition (III). Nearly two thirds (62.5%) of those assessed by the BMI as underweight lived alone; in the two other groups (normal and overweight) the corresponding part was more than one third (37.8 and 35.7%, respectively) (IV).

**Nutritional status, weight group and lung functions (III, IV)**

There were no significant differences in stages of COPD between those identified as being at risk of malnutrition (MNA 1/MNA 2) and those identified as malnourished (MNA 3) (III). An equal share of those identified as being at risk for malnutrition (n = 14) and malnourished (n = 14) reported FEV₁% of predicted less than 40%.

Median values reported for FEV₁% of predicted were 40% for all participants (IV). In the underweight group FEV₁% of predicted ranged from 16 to 82% and Md was 31.5%. Corresponding values in the normal weight group were from 17 to 85% of predicted and Md 42% and in the overweight group from 18 to 68% and Md 40% of predicted.
DISCUSSION

Taken together, the four studies in this thesis provide a picture of the complexity of assessing nutritional status for those with COPD. The first study gives insight into and reports on the respondents’ physical but also, not previously reported, psychological experiences of meal-related situations, especially when eating together with others. For half of the RNs in the second study it was more important to establish trusting relationships with the patients than to give early nutritional information. The third study described frail elderly patients with poor nutritional status, many of whom were living alone and in need of daily community services. Some of the participants who were identified as malnourished stated that they had no nutritional problems when compared to persons of similar age and without COPD. Finally, the fourth study demonstrated that an MNA score of 12 on the revised MNA does not always reliably indicate that there is no need of further nutritional assessment. There were also conflicting data reported using clinical methods and the MNA, MUST and ENS for some study participants. The best correlations were observed between the MNA scores and the FFMIs ($r_s = 0.537$).

Individuals’ perspective: meal-related situations

Categories identified show factors common to all people, such as a desire to have company at mealtime, but also findings associated with the ageing process, such as altered intake of food and decreased activity levels. In addition, some of the findings were of a more disease-specific nature. One problem is determining which of the respondents’ problems were affected by COPD rather than normal ageing. Research evidence indicates that the development of COPD can be insidious, with deterioration of the physical condition and reduced physical activity (GOLD 2005), conditions that can be interpreted as normal ageing. However participants in the first study were not particularly old, but despite no functional or obvious handicap, they exhibited serious limitations in meal-related situations.

Many respondents described shopping as a major problem, a finding consistent with Poole et al. (1997) and Guthrie and colleagues (2001). Nearly all of the respondents described difficulties when walking to and from the store. Similar to Poole’s findings, cooking caused various problems, although the participants still managed to perform fairly well if they had opportunities to sit and rest. Studies focused on eating situations for patients with COPD are based primarily on data from patient records. From these studies, oxygen saturation has been
found to decrease during eating (Sougel Schenkel et al. 1996) or shortly afterwards (Vermeeren et al. 2001). These findings correspond to what our respondents reported regarding their feelings of tiredness. These were described as tiredness after eating and the need to rest. A common experience in meal-related situations was expressed as heavy tiredness, whereas the concept of fatigue might have provided a better explanation. A problem is to differentiate general tiredness from fatigue or disease-related tiredness. Study respondents even reported early satiety, anorexia, loss of appetite and altered taste and smell. Similar, mainly physical problems were reported by Grönberg and co-workers (2005) for 73 stable outpatients. They reported anorexia, dyspeptic symptoms and reduced food intake in an attempt to reduce body weight as the most common dietary problem.

The major limitation for persons with COPD in connection with mealtime might be that eating is a physical activity where the focus is on managing daily intake of food with chewing, swallowing and breathing simultaneously. For persons without breathing difficulties eating is, besides satisfying dietary intake, a social activity. The pleasure of eating in the company of others, talking while eating and eating without physical symptoms or complications is regarded as natural. The respondents reported that they had to discover strategies and ways of compensating for their eating problems on their own because the RNs rarely provided such information. They also often mentioned the need for time and rest in relation to meals, which can be compared with the descriptions of energy utilization and restoration reported by Small and Lamb (1999). A notable result in our study was that even underweight patients regarded reduced body weight as ‘good’, and similar results are reported by Grönberg and co-workers (2005) as an expression of fear of gaining weight. The respondents’ attitudes might be hard to change but are closely related to the need for early nursing interventions, such as information and eating support to prevent consequences of reduced nutritional status in the illness trajectory.

One of the distinctions between patients with COPD and those with other diagnoses is that the former might conceive of their disease as self-inflicted and that their lives could have been different if they had quit smoking earlier. COPD is a disease without obvious symptoms in the early stages, and the participants do not want to show either their needs for support in daily activities or their vulnerability. This was expressed by some respondents, who described struggling with food shopping and cooking to demonstrate their maintenance of control of daily meal-related situations. Comparable results were reported by Fraser and colleagues.
(2006), in that performing routine household activities seemed to give a sense of gaining control, even though the respondents still experienced a severe loss of function.

**RNs’ perspectives**

**Assessment of nutritional status**

The RNs described how they assessed the patients’ body weight, observations of obvious bodily signs, the use of intuition, detection of patients’ current beliefs about the importance of food and sensitivity about when and how to provide information. These results about RNs’ clinical assessment complement existing studies on the nutritional status of patients with COPD that are reported mainly in biomedical terms (e.g., body composition, physical capacity, or biochemical tests) (Vermeeren *et al*. 1997, 2001). Some of the RNs’ observations of such things as obvious bodily signs and their use of intuition were not sufficient for the assessment of nutritional status. However, in addition to other data, these observations provide rich data for holistic assessment. Seldom mentioned in the literature is the nurses’ use of intuition, that is, their drawing a line from several isolated data points to a meaningful conclusion. Intuition is defined here as the interaction of a number of factors that can be developed through education and practice (Effken 2001). All of the RNs had more than four years’ experience in caring for patients with COPD, which probably explains why they often seemed to use their observations and their intuition in drawing conclusions. On the other hand, another explanation for their reliance on intuition might be that some of these RNs lacked formal knowledge about systematic methods of assessing nutritional status. This lack of knowledge might increase the risk that nurses will fail to identify COPD patients’ nutritional status early enough to initiate nursing/dietary interventions in patients’ trajectory of illness and COPD.

**Nursing interventions for patients with impaired nutritional status**

The RNs’ concern with providing information on preventing impaired nutritional status, and at the right time, was based on opposing perspectives. Delaying nutritional information for later appointments was mentioned, although the RNs reported that delaying such information could be detrimental to patients in terms of their illness trajectory. This delaying tactic would be contrary to recommendations that early information about diet and nutritional status is important because development of impaired nutritional status ultimately occurs (Brug *et al*. 2004). Nurses’ supportive interventions related to eating did not differ from what has previously been reported in the literature (Cochrane & Afolabi 2004, Grönberg *et al*. 2005). A
prerequisite for providing information or supportive eating interventions is to detect the patients’ current beliefs, as reported by the RNs. One of the problems related to these nursing interventions was that the RNs were concerned about patients’ suspicions regarding the RNs’ proposing an energy-rich diet. According to Brug and colleagues (2004), nutritional consultation with patients with COPD is not exceptional, but how and when advice is provided is significant. They described a nutritional education plan based on altered behaviour and noted the difficulties that patients have in adapting to an energy-rich diet. Comparable results were reported in a study of older Swedish women, who were frustrated by the different messages they received about food and health (Gustafsson & Sidenvall 2002). This kind of situation can create a challenge for RNs when informing and trying to convince patients, families and other health care professionals of the value of such a diet, which is contrary to beliefs currently embraced by society’s media.

The results demonstrated that RNs sometimes delay both nutritional assessment and interventions; this further confirms the findings from study I, in which some respondents noted that low body weight was ‘good’ for persons with COPD. Some of the findings, however, were inconsistent with earlier research with COPD patients and their impaired nutritional status. Other researchers have suggested, for instance, the importance of early assessment of patients’ nutritional status (Ambrosini & Clini 2004) and the monitoring of their body weight and BMI (GOLD 2005). This was not the standard of care reported by the RNs. When a decrease in weight persists in persons with severe COPD, their mean time for survival is reported to be 2.9 years (Vandenbergh et al. 1967). This is one reason why RNs should have a core assignment of early identification of at-risk persons to initiate individual and relevant interventions (Kara 2005).

Individuals’ with COPD and RNs’ common perspective: expressions of feelings of shame and guilt

COPD, like other chronic conditions, can cause feelings of guilt and stigma from a self-inflicted disease (Joachim & Acorn, 2000). Feelings of shame were obvious when respondents in the first study described their experiences in meal-related situations. The pleasure of eating with friends or eating at restaurants was, for some of the participants, no longer possible. Respondents frequently mentioned feelings of shame when eating with others, caused mostly by coughing and dyspnoea or when they did not manage to eat a normal portion. Knowing that relatives and friends observed their low food intake resulted in the
respondents’ feelings of guilt from the disease. The male respondents in this study in particular expressed their awareness of reduced food intake, as eating a small portion can be regarded as an effeminate behaviour. Development of COPD, with a gradual reduction in body weight, might also explain why many older inpatients in the third study did not report weight loss or nutritional problems, even though they were assessed as malnourished. Participants identified as malnourished gave subjective assessments of their nutritional status and even health status as better than those of a person of the same age but without COPD. For some MNA items it was necessary to obtain self-reported information about the participants’ daily eating habits and to make suppositions about their normal performance. This could have produced socially desirable answers. In addition, admitting lifestyle problems, such as nutritional and health status and dietary habits, might be distressing.

Nurses’ awareness of patients’ feelings of shame and guilt affected both assessment and interventions and was related to an overall attitude that influenced the RNs’ behaviour. This awareness, in combination with patients’ lack of knowledge about the disease and feelings of shame and guilt, might be hard for both patients and RNs to overcome, thus obstructing good nursing care. According to the RNs one reason for patients to avoid confrontations with feelings of shame and guilt might be that they usually contact PHC for the first time when symptoms are fully developed, generalized and advanced. Another reason might be that patients deny or try to conceal their nutritional problems or simply do not consider malnutrition as a problem. Half of the RNs felt that their most important task was to establish an open and trusting relationship with patients early because such a strategy would promote further contact and more intervention opportunities. A trusting relationship, according to the RNs, might be disturbed by early sensitive issues, such as dietary information. It is likely that the attitudes of RNs towards self-inflicted diseases or towards some patients’ inability to stop smoking might have influenced their ability to offer support. These biased attitudes, the desire to develop trusting relationships and/or the awareness of early sensitive issues tend to result in a focus more on smoking cessation than on information provision about patients’ self-care in daily activities. These judgements might also act as invisible barriers for an RN as some nurses, based on their subjective opinion, might judge the patients as self-inflicting victims and not as vulnerable individuals in need of special attention.

However, that RNs sometimes have different opinions and behaviours is supported by Lundh and colleagues (2006), who described nurses as either task or individual oriented. The task-
oriented nurses mostly perform examinations and analyses according to instructions from the physician, whereas the individual-oriented nurses have the patients’ problems in focus. For an individual-oriented nurse, it might be important that patients understand the disease and illness trajectory; the task-oriented nurse, on the other hand, might focus primarily on smoking cessation and medical information.

**Perspectives on assessment based on different methods**

*Nutritional assessment by the MNA, the MUST and the ENS (III, IV)*

Nearly half of the older inpatients in the third study were identified as malnourished, with an equal number identified as being at risk for malnutrition. Only two inpatients were well nourished. Previous studies have reported nutritional status mainly for outpatients with COPD or stable patients at rehabilitation clinics. Few studies have reported nutritional status for older hospitalized patients with COPD, although this group requires extensive health care. An explanation for the few well-nourished patients might be that individuals with COPD whose nutritional status is less impaired do not need hospital care to the same extent as those who are malnourished.

The most important results from study IV concern the use of the MNA and ENS instruments. Using the MNA-SF but not completing the total assessment for scores greater than 11 might have resulted in failure to detect persons at risk for malnutrition. More than half of the respondents had MNA-SF scores indicating no need for further assessment. However, scores from the total MNA identified a fourth of those who did not need a further assessment according to the MNA as at risk for malnutrition. In the Swedish national guidelines the ENS is recommended for nutritional assessment, but according to our results the respondents need to be identified as malnourished (by the MNA) to be evaluated as ‘in need of qualified help with nutrition’ by the ENS. Perhaps the ENS is more useful and valid for patients with advanced COPD. However, it seems that the instrument needs further development and testing for adaptation to early COPD stages. Data from the ENS have not been reported elsewhere in scientific publications. Perhaps the optimal questions to use for assessing nutritional status are not included in either the MNA or the ENS. The important question is whether some other data might be better. Additional research is needed to establish a more valid, useful and sensitive method for correctly identifying the nutritional status of patients with COPD, especially those in the early stages.
In the fourth study only 8% of the patients were identified as malnourished by the MNA, 11% at high risk of malnutrition by the MUST and 16% as in need of qualified help with nutrition by the ENS. Only a small group of patients (7.4%) was identified by all the instruments as needing special attention for poor nutritional status. However, just a glance at those patients by experienced RNs might have been sufficient; they were all extremely thin with predominantly low anthropometric values. A visual assessment of the patients’ general appearance can, according to the Canadian Dietetic Association, provide a relatively accurate assessment of nutritional status (Peterson et al. 2004). The participants’ nutritional status according to the different stages of COPD is not deliberately described or discussed in this thesis. Nearly all of the participants had severe or even very severe COPD. The results and clinical implications concerning these studies might be relevant and should be designed to include persons in all stages of COPD. Although impaired nutritional status is more frequent for persons with advanced COPD, it also affects those in milder stages (Soler-Cataluna et al. 2005).

The BMI is used to calculate the MNA, the MUST and the ENS. However, these instruments do not include data about fat mass or fat-free mass; that is, body composition. Information about the body’s distribution of muscle, the fat-free mass, is an important prerequisite for determining nutritional status, according to Kyle and collaborators (2003). The BMI, which is based on body weight and body length, has previously been discussed as insufficient for nutritional assessment in COPD (Cano et al. 2002). Using the BMI to identify underweight might provide misleading results as patients with normal BMIs could have low FFMs and high FMs (Schols et al. 2005). Therefore, an estimate of body composition might be a better predictor of nutritional status, although these methods require specific equipment, training and experience that are seldom available in PHCs. However, body composition might be a more precise indicator of body protein than gross measures of height and weight.

The use of a risk or screening instrument has been described by Green and Watson (2005) as useful for RNs. They described screening tools as questions with a focus on factors measured to reflect nutritional status, indicating nutritional risks based on combined quantitative and qualitative data. Separate items from the MNA provided valuable knowledge and explanations about the inpatients’ nutritional status in study III. The items from the anthropometric and general sections yielded low scores for most participants. Thirty-one of them had a calf circumference (CC) of less than 31 cm, which corresponds well with the
findings of ZuWallack and collaborators (1996), who reported a reduction in FFM in the legs of patients with COPD. The participants reported the intake of more than three prescribed drugs, and similar results were reported in a French study evaluating the nutritional status of patients admitted to a haematology department (Bauduer et al. 2003). Medications are reported as one risk factor for impaired nutritional status (Whitney et al. 2001) and are associated with the later stages of COPD. High consumption of medications is related to both COPD and the presence of co-morbidities (GOLD 2005).

Body size and body composition
The mean BMI for the participants, older hospitalized inpatients, in the third study was low or even very low. The result is in concordance with a recent Swedish study that reported 57% of inpatients admitted at a lung clinic having a BMI value lower than 22 (Sundvall et al. 2005). Both extremely low and high BMI values are reported in this thesis. Nearly one third of the patients were overweight or even obese in the fourth study. Those variations of BMI must have been influenced by the difference in mean ages between the patients in the samples and also by the respondents’ varying conditions. The participants in the third study had been admitted to hospital as a result of an acute exacerbation. High frequencies of overweight patients (classified by BMI) and with abdominal obesity are reported for the fourth study, which is consistent with Marquis and colleagues (2005), who reported 47% of patients having three or more determinants of the metabolic syndrome.

For the overweight patients in study IV, the median value for the WHR was very close to the cut-off value for obesity. This result might be attributed to successful smoking cessation as this is known to contribute to weight gain. The mean weight gain reported (4.2 kg) for smoking cessation in a population-based study (Pisinger & Jorgensen 2007) probably does not explain the high body weight and WHR values of the participants in our study. Based on the variable FFMI, indicating muscle depletion, the median value in the current overweight group was lower than for the patients whose weight was classified as normal. This result is in line with earlier results and might indicate that obesity masks muscle depletion. DeBenedetto and colleagues (2003) identified malnourished subjects in their overweight COPD patients group and reported that the more severe the stage of the pulmonary disease, the higher the degree of protein breakdown, regardless of body weight. A notable result is that some of the respondents with very low body weight had WHRs that indicated obesity; however, the utility of the WHR in COPD needs to be elucidated further. It appears that it does not always reflect
abdominal obesity accurately. WHR would be a confusing and misleading result for patients in practice, seeing that individuals might view themselves as normal or even overweight because of their belly (e.g., waist circumference). Soler-Cataluna and colleagues (2005) stated that obese patients with COPD might suffer more from physical impairment than underweight patients.

Another problematic perspective on obese individuals with COPD is derived from the RNs’ views on nutritional assessment and interventions in the second study. The RNs thought it might be easier to support a patient with underweight compared to an overweight patient and also expressed the need for help from a dietician to support those patients in PHC. This result shows that the overweight or lean patient with a belly might be incorrectly assessed as well nourished.

The RNs also considered the patient’s whole appearance and body size in assessing his or her nutritional status. They described their feelings about patients’ involuntary weight reduction when they looked at patients. On the other hand, those respondents with certain combinations of variables—FFMI less than recommended, WHR near 1.0, classified as normal or overweight by BMI, or assessed as being well nourished or malnourished—are problematic to identify in clinical practice, probably because of the patients’ appearance as overweight or obese. The depleted muscle mass is masked by the FM, and a general opinion of health care staff is that overweight patients with COPD would lose body weight sooner or later. The RNs also expressed that overweight patients were seldom supported by weight reduction advice and that patients were rarely informed about the important relationship between nutritional status and COPD.

Nutritional status and living conditions
It was more common for older inpatients identified as malnourished to live alone, to not live in their own homes, and to be dependent on daily community services, such as meals-on-wheels, compared to those identified as well nourished or at risk for malnutrition. Living alone was also reported more often for underweight patients than for those with normal or overweight status in the fourth study. These results are consistent with Pirlich and co-workers’ (2005) reporting advanced age, poly-morbidity, living alone, and cancer as the main risk factors for malnutrition. However, in comparison to Pirlich’s sample the participants in the third study were older but not advanced in age, and COPD is a nonmalignant disease.
Methodological considerations

COPD is predicted to become the third most common global disease within 10 years; it is also the only widespread disease that is not decreasing. Most COPD patients are provided care in PHC, and health professionals, especially RNs, need to be aware of clinical methods for reliable and rapid methods of prevention and health promotion related to nutritional needs. One strength of this thesis is that data were collected from different sources: diaries and interviews as well as quantitative measurements of anthropometry and systematic assessment of nutritional status. The triangulation, a combination of data sources, design and analysis approaches, has broadened the perspectives and strengthened the results (Patton 2002).

The samples of persons with COPD were chosen for the thesis to represent persons with COPD at different ages and from different settings. Samples for the first and the second study were chosen in a first attempt to describe patients’ experiences in meal-related situations and early COPD nursing in PHC, findings that have not been reported previously in the literature. An alternative study sample for the first study might have been older patients who were cared for at home. Probably a sample of older patients provides fewer experiences with meal-related situations as they might have been patients with similar living conditions as in the third study, dependent on help with daily activities. Findings from the first and the second study cannot be generalized to other populations because of the small sample size. However, this is not the purpose of qualitative studies; the purpose is to gain a deeper understanding of the phenomenon studied.

The third study might have limitations because of the small sample and the sampling method. Patients who satisfied the inclusion criteria were consecutively asked by the responsible RN to participate. Using a convenience sample limits the ability to generalize from the results. Despite these limitations, however, the results might be of interest to RNs working with older patients in that we describe additional risks for impaired nutritional status among elderly inpatients. The sample in the fourth study was chosen to find younger respondents and respondents without other diagnoses that could be assumed to influence nutritional status. Many of the patients in study IV had a diagnosis in their patient records registered by the ICD number for COPD, but in the text they were diagnosed as having asthma, or vice versa. This is a well-known problem: many patients have an incorrect diagnosis, predominantly registered as asthma instead of COPD (Sciurba 2004). Another possible limitation was that patients who
declined participation might have been those with impaired nutritional status. Patients with poor nutritional status might be more likely to be elderly, a group not included in this study. The respondents’ stages of COPD in relation to identified nutritional status are briefly reported in the third study. In the fourth study we described only lung function values of COPD for the different weight groups (under-, normal and overweight), not nutritional status according to COPD stage. This can be a limitation, but one focus of the thesis was to describe data from the individuals’ perspectives, data that can be translated to clinical praxis for RNs. Data collected can be further analyzed for the respondents’ COPD stages in relation to assessments by the different screening instruments and anthropometric values.

The approach taken in studies I and II was multi-methodological (Polit et al. 2001). The combination of diary and interviews in the first study made it possible to gather data during some specific days as well as during ordinary days. Obtaining data from diaries, including a weekend, might have provided a good starting point for the interviews. After termination of the diary period, interviews were used to explain changes that occurred during the ordinary days. Vignettes were used in the second study to stimulate rich descriptions, and the RNs expressed how they recognized the cases as typical and made parallel comparisons to their experiences. An advantage of using vignettes is the reduced risk of the respondents’ giving socially desirable responses (Hughes & Huby 2002). The RNs expressed their thoughts and talked freely about their nursing assessment experiences and interventions without being interrupted by the researcher.

Analysis for the first study started with a deductive analysis of the diaries concerning the meal-related situations as a way of sorting the material. This kind of analysis might be discussed as influencing the following interviews, which were taken into consideration during the analysis. However, one subsequent step was the reading of the content without attention to the obvious situations and an attempt to find similar experiences in different situations. The co-assessor did not read the diaries, and her analysis resulted in coding of interviews about meal-related situations similar to that of the researcher.

Another consideration in the data analysis for studies I and II was that some categories were closely related to one another or might have influenced each other. Closely related categories are activity and feelings of dependence, and having company and being alone. For instance,
two categories from the third study, *making patients aware of the illness trajectory* and *respecting patients’ feelings of guilt and shame*, did not emerge until after repeated readings and long processing of the data. This was partly because this content required latent analysis to be understood. A critique of the content analysis might be the use of different sources for methodological guidance and the semi-structured questionnaire. Patton (2002) discussed the challenge in qualitative content analysis and interpretation: that no absolute rules exist. The only rule, according to Patton, which I have tried to follow, was ‘Do your very best with your full intellect to fairly represent the data and communicate what the data reveal given the purpose of the study’ (p. 433).

Trustworthiness is a central concept in critiquing qualitative analysis. It is best described using the terms credibility, dependability and transferability (Graneheim & Lundman 2004). Credibility can be discussed based on the respondents’ differences in gender and age for the first study and on RNs’ ages, educational backgrounds and clinical experience in the second. These differences allowed for a wide variation in responses and thereby added strength to the credibility of the findings. Quotations from interviews were chosen to show representative content for categories and to enhance credibility. Dependability was achieved in that we used a single interviewer who gave identical instructions to every respondent. It was also achieved through our use of realistic vignettes so that the RNs could describe nursing interventions and their reflections on the same patient scenarios instead of the researcher having to question the RNs individually (II). Transferability can be from the study sample in study I to other groups with the same diagnosis or other groups with respiratory impairments but probably not to other chronic diseases. Some findings from the second study, especially from the category *respecting patients’ feelings of shame and guilt*, provide useful knowledge about the nursing care of patients across primary care settings and across similar conditions, such as asthma or lung cancer.

Quantitative data from the third and the fourth studies are reported with different measures for central tendency due to a predominantly non-normal distribution of data. For the third study mostly arithmetic means are used, but these are completed with medians and ranges. Data from the fourth study are reported by medians and quartiles. The report of a non-normal distribution of anthropometric data might strengthen the assertion that nutritional status is complex for persons with COPD. The choice of instruments in study III and IV might be discussed as the MNA is developed for an older population; despite this, however, most of the
items in the MNA were considered suitable for the sample, even in study IV. Items from the MNA that were less well suited to the sample were neuropsychological problems, living independently or not, and mode of feeding. Results from the third study showed that only two patients needed feeding assistance. Older individuals with COPD are able to manage feeding independently but are in need of more time for eating, as described in the first study.

The data for the thesis were collected over seven years. This is one of the reasons why two different versions of the MNA were used. The older version, used in the third study, was divided into four sections that were regarded as an advantage for the data reported. Different sections provided the possibility of comparing assessment scores from the distinct areas of anthropometric, general, dietary and the subjective assessment, which was done in the third study. Although the MNA-SF, which was developed later, has been reported on favourably and is recommended for use (Vellas et al. 2006), the screening part was not accurate for all respondents in the fourth study. Some respondents were incorrectly assessed by the total MNA as not needing further assessment, something that needs to be investigated further.

Reliability and validity can be discussed in relation to measures and measuring instruments. The internal validity of the instruments used can be questioned if they do not measure what they are supposed to (Polit et al. 2001). This internal validity was achieved for the MNA and MUST as both instruments have previously been validated (Christensson et al. 2002, Stratton et al. 2004). However, validity and reliability of the national disease-specific instrument ENS has, to our knowledge, not been reported in the literature. Data for lung functions in studies I, III and IV and body composition in the fourth study were measured with special equipment, and assessments were performed according to general recommendations for these tests. The measure of skin fold thickness might be discussed as needing precision and trained clinicians. Gibson (2005) described skin fold measurements with good, fair or poor trainee-trainer agreement, based on calculations from repeated skin fold measurements by the tester. According to Gibson (2005) difference of 0.0-0.9 mm indicates a good level, 1.0-1.9 fair and 2.0-4.9 poor level of proficiency in the measurement technique. The differences in repeated measurements, before the start of the project from five individuals not involved, ranged from lowest difference of measurement as 0.1 to highest as 2.4 mm which means we had good to fair measurement technique.
CONCLUSIONS

This thesis highlights the complexity of assessment of nutritional status for patients with COPD. The complexity and difficulties in assessing nutritional status can result in insufficient assessments and the risk of overlooking needs for nutritional care. Therefore, relevant and useful clinical methods for nutritional assessment for patients with COPD are needed.

- The main findings from patients’ experiences of meal-related situations, such as physical influences, the need for time, and feelings of shame and guilt while eating, have not previously been reported for patients with COPD. It is not only eating difficulties that cause reduced nutritional intake for persons with COPD. Eating is only one aspect in a chain of meal-related activities involving both physiological and psychological influences. Data from both physiological and psychological perspectives for persons with COPD are essential in the nursing process and for further co-ordination of care with other health professionals.

- For some of the RNs it was more important to establish trusting relationships with the patients than to give early nutritional information, and RNs had different opinions on when it was best to provide nutritional information and assess nutritional status. Some RNs were task oriented and performed tasks according to instructions from the physician, and some were individual oriented, with the patients’ problem in focus. For patients, feelings of shame and guilt could lead to denial and be a hindrance to seeking care and understanding the illness trajectory. Feelings of shame and guilt could also be present when patients identified as malnourished assessed themselves as not having problems with nutrition. On the other hand, sometimes the RNs’ respect for patients’ feelings of shame and guilt might be a hindrance to appropriate nursing interventions. Nursing interventions might therefore be delayed. Because no medical treatment can cure COPD, early identification of patients’ needs and nutritional interventions might prevent further deterioration.

- Many of the older inpatients were frail and had a poor nutritional status. The results highlight such characteristics as living conditions, use of daily community services and bodily signs that might facilitate the identification of nutritional status in elderly inpatients.

- Nutritional assessment of patients with COPD is complex and difficult. Assessments performed with different clinically available methods and recommended instruments resulted in inaccurate judgement of nutritional status for some participants.
Nutritional status would be easy to identify for the ‘thin’ patients, but identifying nutritional status in overweight and obese patients is difficult. The overall conclusion is that the assessment of nutritional status for patients with COPD might not depend on one single measurement; there is also a need for the ‘clinical eye’ developed from RNs’ experience and knowledge as well as listening to the patients’ experiences.

- No current literature reports positive outcomes from early information, early identification of nutritional status, or early nursing/dietary interventions for patients with COPD. However, it is reasonable to think that findings from this thesis might serve in clinical practice to prevent further impaired nutritional status for some persons and therefore have importance for the disease trajectory and quality of life. They might also serve to highlight the importance of using accurate measures for the assessment of nutritional status because overweight might mask true nutritional status.
CLINICAL IMPLICATIONS

- An initial assessment of nutritional status for frail elderly patients with severe COPD could be performed by an experienced RN, who can rapidly observe the patient’s nutritional status, including his or her whole appearance and body weight, especially depletion of muscles. A more detailed assessment can be accomplished later.

- Patient characteristics, such as single living, need for assistance in daily activities and daily use of more than three prescribed drugs, could be sufficient indicators in identifying patients with COPD at high risk for malnutrition. Additional indicators might be that the patients deny nutritional problems or consider their dietary intake as good, contrary to objective indicators.

- By using a wide range of observations, nurses can employ a holistic approach to the assessment of nutritional status. Such a strategy should also help RNs to identify patients’ needs.

- The MNA is recommended, with awareness and caution, for use among these patients. Reliance only on the MNA-SF could be harmful as patients at risk of malnutrition might show false negative results.

- Nurses should be careful when assessing patients with the MNA, WHR or BMI so that they are not misled by results, which might cause them to overlook the overweight or obese patient. The assessment of nutritional status cannot depend only on using instruments; there is also a need for nurses to use their ‘clinical eye,’ developed from knowledge and experiences, in caring for patients with COPD.

- Nursing care for patients with COPD involves finding a balance between identifying patients early and at the right time to provide them with information about their nutritional condition. Sensitivity to patients’ knowledge of their disorder and their coping strategies towards their disease, as well as discerning which kinds of advice they need and their desire for self-care, are also of great importance.

- Education and information within the meal-related situation area and participation of the family can provide essential knowledge to patients and their relatives about the meaning of nutritional status and COPD.

- Helping patients acquire insight into their disorder and become cognizant of the intricate relationship between diet, disease and lifestyle should assist individuals with COPD in gaining a better understanding of the illness trajectory.
Structured nursing documentation is an absolute requirement for the adequate management of the patient’s condition and nursing support. Because older persons with COPD are often transferred between different health care facilities, a detailed transfer report might also facilitate continuity in supportive interventions.

Assessing patients with COPD regarding shopping, cooking and eating activities might initiate coordination and support from dieticians, occupational therapists, physical therapists and home care staff. A multi-professional perspective is a prerequisite in successful care interventions for patients with COPD.

Because patients with COPD need more time for eating, it is important to arrange to keep the food warm during the meal. Warm food usually tastes better and might trigger the appetite. Oxygen treatment during meals might be useful when eating has become a demanding activity. Listening to, respecting and learning from patients’ own solutions for reorganization in the kitchen and energy-saving strategies is important.
ACKNOWLEDGEMENT

I wish to express my deep and sincere gratitude to everyone who has made this research project possible and in different ways supported me. I am particular grateful to:

The School of Health and Medical Sciences, Örebro University, for employing me as a doctoral student and providing the practical and financial needs, as well as The Swedish Heart and Lung Association and Hj af Peterséns foundation for financial support.

All the patients and RNs participating in my studies, without whom this work would have been impossible to realize.

Professor Margareta Ehnfors, my main advisor, for encouraging, supporting and inspiring me with all your knowledge. You have influenced me from our first meetings in my nursing education, in clinical nursing with testing the VIPS-structure, and you have taught me to trust in myself through all the ‘ups’ and ‘downs’.

Associate Professor Anna Ehrenberg and Professor Susan Grobe, my co-advisors, for support and constructive comments that helped me, including when Margareta was unreachable in Burma.

Professor Mona Kihlgren, who introduced me to the world of nursing research.

My previous place of work, the Infection Clinic at Örebro University Hospital, for encourage me and giving me the opportunities to achieve my pre-doctoral education.

Margareta Anshelm, for helping me in analysis, sharing and organizing thoughts and just being there, always believing in me.

Ann-Britt Zackrisson, for organizing future teamwork, discussing nursing challenges and providing untiring support and guidance into the world of COPD.

Birgitte Kolsung and Katarina Perälä, administrators at Örebro University, for all practical but even warm social support.

Librarian Carina Bark-Hörving and all the staff at the University Library.

Moira Calder and Les Shaps for excellent language review.

All colleagues as well as past and present doctoral students at School of Health and Medical Sciences: nobody mentioned, nobody forgotten.

Relatives and friends for showing interest and still being there.

Lockhyttans Icelandic Horses for being a place of recovery and without scientific demands.
Finally, thanks to my big family and my animals, all together being the balance in my life: Jens and Ghina, Sofia and Nicklas with Edwin and Hugo, Arvid, Stina, my horses Stjarni and Ödlingur, and my dogs Tova (R.I.P.) and Sigge and, last but not least, my beloved Ubbe: Where do you get your patience from?
REFERENCES


Vermeeren MAP, Wouters EF, Nelissen LH, Lier A, Hofman Z & Schols AM (2001) Acute effects of different nutritional supplements on symptoms and functional capacity in


