

From The Department of Medicine
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OBESITY, LIFE STYLE AND SOCIETY

Psychological and psychosocial factors in
relation to body weight and body weight
changes.

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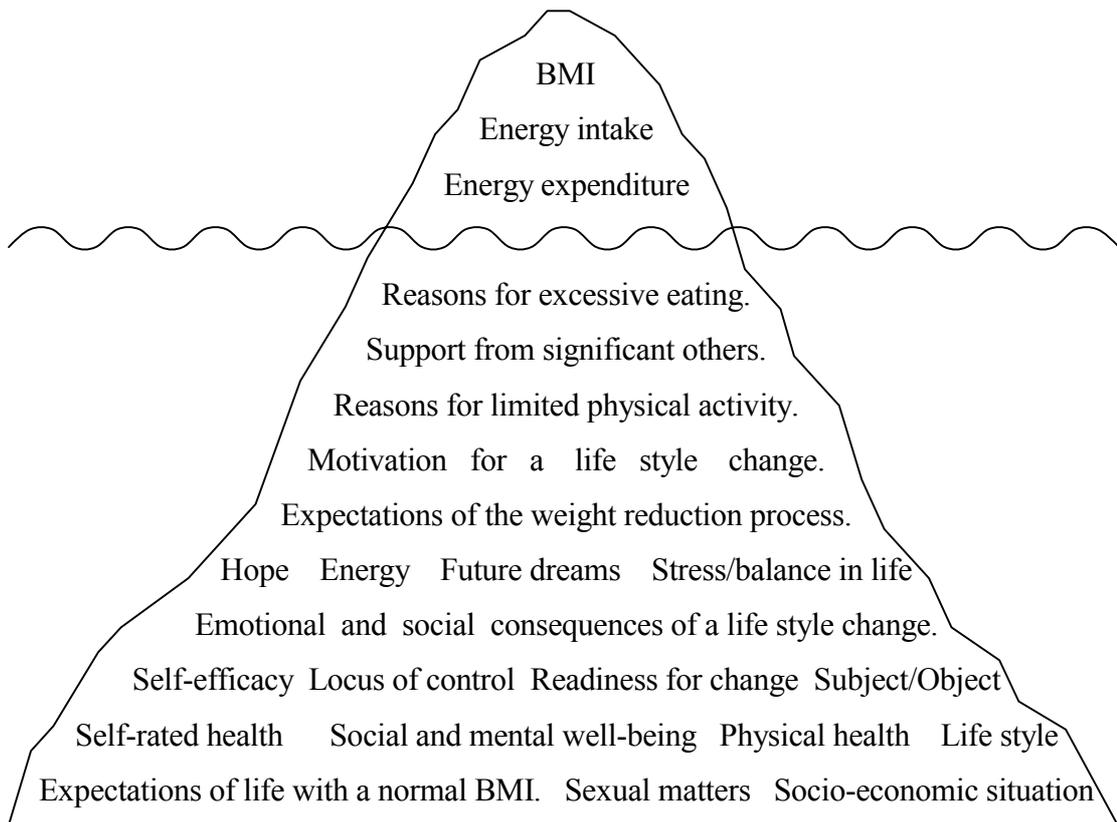


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FOREWORD

The thesis focuses on concepts brought forward in clinical meetings with obese persons working to achieve a life style change for weight control. An iceberg is used as a metaphor for obesity. A small part of the iceberg is above the surface, visible to the eye and measurable. The part of the iceberg under the surface is not visible at an immediate glance but has to be considered and dealt with in order to affect the top.



ABSTRACT

This dissertation consists of two cross-sectional population studies (studies I and IV), and two prospective studies (studies II and III).

In study I the relative importance of obesity for self-rated health with focus on age and gender differences were examined among 5,080 (2,366 males) participants in a national survey. Data were gathered through questionnaires. An inverse association was found between BMI and self-rated health. The relation was most pronounced among middle-aged men and women. An association between obesity and functional impairment, chronic disease and an impaired mental well-being was found for both men and women. For women there was also an association between obesity and chronic pain.

In study II a qualitative method was used to examine which factors 15 participants in a one-year behaviour modification weight reduction programme considered important for eating habits and weight change. The participants were interviewed three times during the programme and once one year after the programme had ended. The interviews were analysed with a qualitative method, grounded theory. External stimuli, stress and emotional reasons affected eating habits before the programme started and one year after the programme had ended. Non-sufficient support was another reason mentioned for regain of lost weight.

In study III an association between locus of control orientation and weight loss was examined in a one-year follow up of 41 participants in a weight reduction programme. A questionnaire with 40 questions was used to assess the locus of control orientation before the programme started and one year later. There was no change in locus of control orientation after one year. The weight loss after one year was positively associated with an initial internal locus of control orientation.

In study IV a representative sample of 2,810 subjects from a population study was interviewed on sexual satisfaction, sexual abuse and life satisfaction. Age and gender were controlled for in the analyses. The older group of obese men reported a decrease in sexual desire compared with five years earlier and the older group of overweight men reported involuntary participation in sexual activities more often than the normal weight group. Though the older group of obese women more often than the other BMI-groups were diagnosed with a lingering disease, there was no difference in satisfaction with physical health between the BMI-groups.

An inverse association between BMI and self-rated health as well as an association between obesity and impaired physical and mental well-being implies a dialogue between care taker and care giver on which treatment would match the care taker's current needs for an improved well being. The results indicate that unless the factors behind an excessive eating are addressed in obesity treatment, they will obstruct the weight reduction and maintenance of lost weight. An internal locus of control orientation could be supported in weight reduction treatment. Untreated experiences of sexual trauma could be an important pre-treatment variable to consider in weight reduction programmes.

Key words: BMI-group, change process, functional impairment, life style intervention, locus of control, mental well-being, motivation, obesity, physical health, population sex survey, risk factor, self-rated health, sexual abuse, sexual satisfaction, weight reduction, weight reduction programme.

LIST OF PUBLICATIONS

The present thesis is based on the following studies, referred in the text by the Roman numerals I-IV.

- I Adolfsson B, Elofsson S, Rössner S, Undén A-L.
Does obesity influence self-ratings of health? Results from a representative sample of the Swedish adult population.
Resubmitted after minor corrections to the International Journal of Obesity. 2004
- II Adolfsson B, Carlson A, Undén A-L, Rössner S.
A qualitative evaluation of a behaviour modification weight reduction programme.
Health Education Journal 2002;61:244-58.
- III Adolfsson B, Andersson I, Elofsson S, Rössner S, Undén A-L.
Locus of control and weight reduction.
In press Patient Education and Counseling. 2004
- IV Adolfsson B, Elofsson S, Rössner S, Undén A-L.
Is sexual dissatisfaction and sexual abuse associated with obesity? Results from a population based study.
In press Obesity Research. 2004

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
CHD	Coronary Heart Disease
CVD	CardioVascular Disease
GQLI	Gothenburg Quality of Life Inventory
HDL	High Density Lipoprotein
HPA	Hypothalamic-Pituitary-Adrenal
HRQL	Health Related Quality of Life
I-E	Internal-External
LC-NE	Locus Coeruleus-NorEpinephrine
LDL	Low Density Lipoprotein
LOC	Locus Of Control
MSEK	Million SwEdish Krona
QOL	Quality Of Life
SEK	SwEdish Krona
SES	Socio-Economic Status
SRH	Self-Rated Health
VLCD	Very Low Calorie Diet
WC	Waist Circumference
WHO	World Health Organization
WHR	Waist-to-Hip Ratio

1 INTRODUCTION

1.1 OBESITY

1.1.1 Definition

Obesity is defined as excess fat accumulation under the skin and around organs in the body.³² There are different anthropometric measures for describing obesity. A generalized obesity is measured by body mass index (BMI), which is the currently most common measure. BMI is calculated as weight in kilograms divided by height in metres squared (kg/m^2). The World Health Organization (WHO) has classified BMI-groups in adults based on the association between BMI and morbidity/mortality (Table 1).²¹⁶ The BMI-limits are age-independent and the same for both sexes.

Table 1. Classification of overweight/obesity in adults according to BMI.²¹⁶

<i>Classification</i>	<i>BMI (kg/m^2)</i>	<i>Risk of co-morbidities</i>
Underweight	< 18.5	Low
Normal range	18.5 – 24.9	Average
Overweight		
Pre-obese	25.0 – 29.9	Increased
Obese class I	30.0 – 34.9	Moderate
Obese class II	35.0 – 39.9	Severe
Obese class III	\geq 40.0	Very severe

BMI does not take into account the proportion of weight related to increased muscle or the distribution of excess fat within the body, both of which affect the health risks associated with obesity. For example, very tall and lean Australian Aboriginals tend to have a misleadingly low BMI; a healthy BMI-range for this population appears to be between 17 and 22 kg/m^2 , with metabolic complications developing rapidly as BMI increases above this level.²¹⁶ Another example is that of Polynesians who tend to have a lower fat percentage compared to Caucasian Australians at an identical BMI.¹⁹² In addition the percentage of body fat mass increases with age up to 60-65 years in both sexes, and is higher in women than in men of equivalent BMI.^{55,160,163} BMI can be used to estimate the prevalence of obesity within a population and the risks associated with it. However, it does not account for the wide variation in the nature of obesity between different individuals and populations.²¹⁶

Body fat may be preferentially located in the abdomen (android obesity pattern) or surrounding the hips and thighs (gynoid obesity pattern). Abdominal obesity often reflects an accumulation of fat surrounding the abdominal visceral organs and is associated with a variety of metabolic derangements and cardiovascular disease (CVD) risk factors including type 2 diabetes (non insulin dependent), hypertension and dyslipidaemia.^{36,96} Abdominal (visceral) obesity is generally estimated by measuring waist circumference (WC) at the midpoint between the lower border of the rib cage and the iliac crest, or waist-hip ratio (WHR) where the hip is measured at the level of trochanter major.^{16,216} There is significant inter-individual variability in the amount of visceral fat at a given waist circumference.¹³² The cut-off values for WC and WHR and associated cardiovascular risk factors are shown in Table 2.^{11,216}

Table 2. Cut-off values for waist circumference (WC), waist-hip ratio (WHR) and associated CVD risk factors.^{11,216}

<i>Risk factor</i>	<i>Men</i>		<i>Women</i>	
	<i>WC, cm</i>	<i>WHR</i>	<i>WC, cm</i>	<i>WHR</i>
Overweight, increased risk	94.0 -101.9	0.90-0.99	80.0 -87.9	0.80-0.84
Obesity, substantially increased risk	≥ 102.0	≥ 1.0	≥ 88.0	≥ 0.85

BMI, WC and WHR have been found to identify different proportions of the population, as measured by prevalence of obesity and CVD risk factors.³⁶ While WHR had the strongest correlation with CVD risk factors before adjustment for age, the three obesity measures performed similarly after adjustment for age. The difficulty of using age-adjusted associations in the clinical setting leads to the suggestion that WHR is the most useful measure of obesity for identifying individuals with CVD risk factors.³⁶ Some controversy exists in the lay press and in the medical literature about the health risks of obesity.¹³² However, for those whose present or future health is at risk because of their obesity and who are motivated to make life style changes, a recommendation for weight loss has been considered appropriate.

1.1.2 Prevalence

Numerous reports during the past decade have clearly indicated that the prevalence of obesity is rapidly increasing.²¹⁶ In Sweden the rate of obesity among adults aged 16-84 years has increased between 1980/81 and 1996/97 from 7 % to 10% in men and from 9% to 12 % in women (adjusted values).¹¹⁵ As seen in Table 3 the situation is even worse in the rest of Europe and other parts of the world.¹⁹³ In the United States the latest available information tells that among adults aged 20 – 74 years 28 % of the men and 34 % of the women were obese.⁵¹

Table 3. Body Mass Index by sex, 1960 – 1999, in selected countries all over the world.¹⁹³

Country	Year	Age (y)	BMI - Men			BMI - Women		
			Mean (kg/m ²)	≥25 (%)	≥ 30 (%)	Mean (kg/m ²)	≥ 25 (%)	≥ 30 (%)
Sweden	1980-1	16-84	24.2	35.7	4.7	23.4	27.6	5.4
	1996-7	16-84	25.0	45.9	6.8	24.0	33.6	7.2
United Kingdom	1980	20-64	24.8	43.0	8.0	24.0	34.0	9.0
	1998	16 +	26.5	62.8	17.3	26.4	53.3	21.2
France	1980-1	20 +	24.6	39.4	6.4	23.2	26.8	6.3
	1991-2	20 +	24.7	40.8	6.5	23.3	27.5	7.0
Italy	1983	15 +	24.6	41.2	7.1	23.4	28.9	7.6
	1994	15 +	25.1	46.1	6.5	23.7	31.3	6.3
South Africa	1979	15-64	26.0	56.6	14.7	25.8		18.0
	1998	15 +	23.4	28.5	9.1	26.5	54.9	29.4
China	1989	20-45	20.4	6.4	0.3	20.9	11.7	0.9
	1993	20-45	20.9	9.0	0.7	20.9	12.0	0.7
Japan	1976	20 +	21.0		0.7	22.0		2.8
	1993	20 +	22.5	22.1	1.8	21.9	20.6	2.6
Australia	1980	25-64	25.3	49.9	9.3	23.7	28.2	8.0
	1995	19 +	26.7	64.5	17.9	26.0	49.2	16.7
United States	1960-2	20-74	25.2	48.2	10.4	24.6	38.6	15.0
	1988-94	20-74	26.3	59.4	20.0	26.1	49.8	24.9
Samoa	1978	25-74	27.1		27.5	29.1	74.8	48.5
	1991	25-74	30.5		46.8	33.2		66.1

1.1.3 Economic consequences of obesity

A positive association has been found between obesity and health care costs in Sweden.¹⁷² The direct expenses associated with obesity and obesity-related co-morbidity has been estimated to about 3 billion (10⁹) SEK, which is two percent of the total health care costs a year. Added to this are the indirect expenses for sick leave and disability pension that are estimated to at least the same amount as the direct costs. About 10% of the total indirect costs for sick leave and disability pension among women have been estimated to be attributable to overweight/obesity.¹²⁹ In a Swedish population survey the annual costs for medication in the severely obese were about 77 % higher and the use of diabetic medication 9 times higher compared with reference subjects.^{91,130}

1.2 OBESITY AND HEALTH

The reason behind the strong interest in obesity is the association with health variables like type 2 diabetes, CVD and the development of chronic disease. Different perspectives of health can be identified in the scientific literature.^{42,89,199} One perspective is a polarized view with health, as the opposite of sickness expressed in a diagnosis as a description of medical circumstances. Another perspective on health is more of a holistic and dynamic one; the person is seen as a whole where changes in living conditions affect health and quality of life.^{5,89,151} As a foundation for future work within preventive and curative medicine, the WHO in 1948 proclaimed the following definition of health: “We conceive of health as being a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity”.²¹⁷ Health could also be defined as “...the realization of one’s human potential.”¹²¹ and “...the capacity to participate effectively in one’s social and physical environment.”³⁸

1.2.1 Physical health

Most observational studies show a U- or J-shaped relationship between BMI and mortality, with individuals at very low and very high weights being at increased risk.¹³² The co-morbidity associated with obesity is not only related with BMI, but also with the distribution of fat.^{17,132,216} An important relationship between increasing WHR and the incidence of CVD and type 2 diabetes has been reported in epidemiological studies.^{20,90} The co-existence between type 2 diabetes and obesity has been frequent enough to create the expression “diabesity”.^{a,10} The concept “metabolic syndrome” is used to describe a cluster of diseases (obesity, CVD, hypertension and dyslipidaemia) seen in conjunction with type 2 diabetes. Alberti and Zimmet have formulated a WHO definition of the metabolic syndrome.¹ Respiratory difficulties, chronic musculo-skeletal problems, cancers, skin problems and infertility are other health problems associated with obesity. The relative risks of health problems associated with obesity are shown in table 4.²¹⁶

Table 4. Relative risk of health problems associated with obesity.²¹⁶

<i>Greatly increased (relative risk much greater than 3)^a</i>	<i>Moderately increased (relative risk 2-3)^a</i>	<i>Slightly increased (relative risk 1-2)^a</i>
Type 2 diabetes Gallbladder disease Dyslipidaemia	Coronary heart disease (CHD) Hypertension Osteoarthritis (knees)	Cancer (breast cancer in postmenopausal women, endometrial cancer, colon cancer)
Insulin resistance Breathlessness Sleep apnoea	Hyperuricaemia and gout	Reproductive hormone abnormalities Polycystic ovary syndrome Impaired fertility Low back pain due to obesity Increased anaesthetic risk Fetal defects associated with maternal obesity

^a All relative-risk estimates are approximate.

Numerous studies have shown that, over the short term (weeks or months), intentional weight loss in obese individuals reduces risk factors for and improves symptoms of obesity-related conditions, including heart disease, type 2 diabetes, osteoarthritis, and others.^{2,72,131,139} Follow-up studies of severely obese individuals, who have undergone weight loss through bariatric surgery, have shown durable improvement in type 2 diabetes¹⁴² and health-related quality of life (HRQL).⁹¹ There are no conclusive data providing that long-term intentional weight loss diminishes mortality rate or reduces the incidence of obesity-related disease in those who are moderately obese.^{211,212,221}

1.2.2 Self-rated health

It has been argued that a proper assessment of health should take into account health as perceived by the individuals themselves.²¹⁸ An individual's estimation of her/his own health is usually called self-rated health (SRH). SRH is assessed by a single question where the person is asked for a general estimation of her/his health. Global measures of SRH could mainly be categorized as non-comparing, age comparing or retrospective. The first measure is a general judgement of one's health, the second is a comparison to others in the same age and the third is comparing to an earlier age.¹⁹⁹ Factors predicting SRH could be grouped in different categories. Associations between the predictor groups as well as between the groups and SRH have been studied. Relatively strong direct and/or indirect associations between the predictors sociodemographic factors, psychosocial factors, life-style factors, functional health, physical health and mental health and SRH have been found.¹⁹⁹ Several studies have shown SRH to be an independent and often better predictor for future morbidity and mortality than medical diagnoses.⁸⁵ Quality of life (QOL) is used to describe events that range from satisfaction with one's work or leisure activities to the physical and economic burden imposed by specific illnesses.⁶⁷ Although predictors for assessing SRH may coincide with the domains in QOL questionnaires, the instruments are different. SRH gives the respondent's single estimation of a multifactor concept like her/his health. A respondent's QOL is assessed by professionals based on the values of different domains in the used instrument. It is argued that quality of life measures should include instruments in which patients rate their own global quality of life, a chief indicator of overall health.¹⁰⁴

Very little data exist to date concerning the relationship between obesity and self-rated health in national surveys. Available data indicate a significant association between increased BMI and impaired self-rated health.^{25,46,118,128,136,197,206,222} There are divergent findings as to whether the significance remains when controlling for covariates.^{46,118,136} The impairment from obesity has been found to diverge among subgroups. Gender and age differences for a negative association between BMI and self-rated health have been described.^{118,136}

1.2.3 Mental well-being

Another perspective of health is that of experienced well-being. Different expressions for mental well-being are used in scientific literature on mental well-being and obesity.

Mental and psychosocial well-being and obesity could be associated in two directions. An impaired mental well-being could lead to excessive eating in order to soothe feelings of anxiety, sorrow, and sadness etc, thus in the long run causing obesity. (In Chapter 1.4 reported emotional reasons for eating are presented.) On the other hand consequences of obesity in form of prejudices from a non-supportive social environment and social stigmatisation could cause an impaired mental well-being.

Studies on an association between obesity and mental well-being could vary in the instrument used, covariates controlled for in the study and subjects. Population studies have generally failed to find differences in psychological status behind obese and non-obese populations.^{91,166,187}

The obese population is found to be as heterogeneous as a non-obese population regarding mental distress.¹⁶⁶ Differences could be due to gender, community and clinical samples. Obesity has been noted to affect men and women differently, where women report more impaired mental well-being than men.^{28,53,86,99,190} Another difference within the obese group seems to be that between patients and non-patients, where the obese seeking treatment report higher levels of distress compared to those not seeking treatment,^{50,61,100} as do those who prefer more drastic weight-reduction methods, such as surgery.^{92,100} It is important to note that the mechanisms leading to impaired psychological health are different from those of physical illness.¹⁸⁸ The prevailing opinion among most researchers is that impaired mental well-being in the obese is likely to be a consequence rather than the cause of weight gain and obesity.^{158,187} A substantial decrease in mental well-being has been found among the very severely obese (BMI \geq 40 kg/m²) suggesting a threshold effect along the BMI-range where the burden of obesity and co-morbidity add to a decrease in mental well-being.⁹¹

A history of weight fluctuation has been associated with impaired well-being regardless of body weight.⁵⁶

1.2.4 Psychosocial well-being

The concept “psychosocial” emphasizes that to understand a person one must pay attention to her/his personal traits and circumstances in family, work and society. The psychosocial consequences of obesity are not the inevitable consequences of obesity but derive from culture-bound values by which people view body fat as “unhealthy” and “ugly”. Even with no differences in psychological functioning between normal weight and obese groups, there are numerous examples of social prejudices and discrimination, which may affect the psychosocial situation and mental well-being among the obese.^{12,146,168} Stunkard and Sobal noted that: “...

obesity does not create a psychological burden. Obesity is a physical state. People create the psychological burden.”¹⁸⁸ It has been shown that since critical attitudes towards fat people are so prevalent, some fat people internalise negative social messages.^{12,61,155,156} This can cause fat people – or even average people who feel fat – to place restrictions on important aspects of their lives, such as going to school, changing jobs, buying stylish clothes, dating or enjoying a sexual relationship, or even seeking medical care.¹⁵⁷ When considering that obesity may be more noticeable in severely obese individuals, it is likely that the stigma associated with being obese may be greater for these persons and that the associated psychological suffering may also be greater. In a recent study Puhl and Brownell documented clear and consistent stigmatisation, and in some cases discrimination, of obese in three important areas of living: employment, education and health care.¹⁴⁶ In another survey primary care physicians selected “lack of will power” and “lack of self-discipline” as the major causes of poor regimen adherence among their [obese] patients with diabetes.^{6,140} The psychological and psychosocial consequences from being obese may trigger emotional eating and contribute to a maintained obesity and even to further weight gain.

1.3 OBESITY AND LIFE STYLE

The increased rate of overweight/obesity in Sweden is considered to be a result of changes in life style concerning eating habits and physical activity and could not be explained by genetic or other biological factors.^{114,149,172}

1.3.1 Life style

Life styles have been defined as social practices and ways of living adopted by individuals that reflect personal, group and socio-economic identities.⁶⁶ It is suggested that life styles not only provide self-identity, but also promote a sense of stability and belonging for an individual by providing an anchor in a particular social constellation of style and activity.²⁹ The relationships between life styles and peer relations, socio-economic status and the influence of advertising and mass media campaigns have not yet been fully explored.

1.3.2 Health life style

There has been growing recognition that major disease patterns, like heart disease and stroke, cannot be cured by medical care only and that certain life styles might jeopardize health. Increased physical activity and a healthy diet may improve at least some of the negative health consequences associated with obesity.^{98,132,198} Individual strategies for healthier life styles have gained in popularity.^{35,69,70,73} Health life styles involve decisions about food, exercise, coping with stress, smoking, alcohol and drug use, risk of accidents and physical appearance.³⁰ It has been emphasized that “the involvement of media and business corporations in post modern health life styles is an important area of research in need of extensive study with respect to motives, the ‘commodification’ of health, cultural images and power relations”.^{30,31}

1.4 FACTORS ASSOCIATED WITH OBESITY

If the intake of energy for a long time exceeds the expenditure the result is weight gain, which eventually will lead to obesity. Research has shown that interacting cultural, social, psychological, behavioural and genetic factors are involved in the development of obesity.¹⁷²

1.4.1 Emotional factors

There is a growing awareness that emotions, even more than cognitions, affect the eating behaviour of obese people.⁶⁴ Obese persons have been found more inclined to act at the spur of the moment, have a higher degree of monotony avoidance and be more affected by external cues, such as the sight of food and its availability, compared with normal weight subjects.^{167,174} Bruch found obesity to be related to “faulty” hunger awareness.²¹ Bruch indicated that due to an upbringing not answering to the child’s need some people are unable to differentiate accurately between various unpleasant physiological and emotional states and may thus overeat in response to virtually any internal arousal state.^{21,167} In particular emotional distress becomes confused with hunger. That eating and a feeling of physical satisfaction can gratify and balance feelings of anxiety, anger, sadness, sorrow and loneliness has been supported elsewhere.^{33,37,122,167} Individuals who are unable to readily label and differentiate between various unpleasant emotional and physiological states suffer a greater risk of overeating in response to such states.¹⁶⁷ Defences that effectively neutralise threatening stimulation would protect against anxiety and other painful emotions, such as depression or shame. A faltering defence strategy, permitting anxiety to become manifest, would increase the individual’s difficulties in resisting the temptation to eat in anxiety-evoking situations.^{126,167} Furthermore, eating has a social function.^{22,116} Meals often bring people closer together. Food preferences and meal habits could be ways to state a social and cultural belonging. A lack of belonging to a social network and lack of social support have been found to coincide with obesity.⁶⁵

1.4.2 Stress

Stress has been found to affect eating, body weight and the distribution of fat.^{16,76,108,138} Stress is defined as an imbalance between a person’s resources and experienced demands. Hans Selye differentiated between the actual demands put upon a person (stress) and how the person experienced them (strain).¹⁷⁸ The same stress could thus lead to different strain depending on the person’s internal and external coping resources. Henceforth the word stress will be used for both concepts. It is not stress itself that has unfavourable consequences for the person, but failure to cope effectively in stressful situations, i.e., to manage stress successfully.⁸⁸

A regular meal pattern with breakfast, lunch, dinner and two/three planned snacks together with a nourishing composition of the meal provide two corner stones for weight stability.³ Lack of time implies a risk situation for excluding a nourishing meal in favour for low quality fast food or a snack. The number of snacks has been positively associated with obesity.^b Stress involves a

risk of forgetting to plan meals and to purchase vegetables, two important factors for achieving a maintained weight loss (Paper II).

There are different explanations for the relation between stress, eating and obesity. From one perspective stress related eating is described as a psychological defence mechanism, as a way to repress feelings of tension associated with a stressful situation.⁴⁹ Henry and Stephens described the relation between stress, eating and obesity and introduced the concept “fight or flight” as active coping patterns for perceived stress stimulus.⁸⁰ The main physical component is the locus coeruleus-norepinephrine (LC-NE) system with the major hormones adrenaline and noradrenaline (among others).²²⁰ The other coping pattern is passive and described as a “defeat-reaction”, a loss of control. The “defeat-reaction” could either be a first reaction on a perceived stress situation or the result of trying to act on a stressor for a long time without result. This reaction is strongly connected with release of the hormone cortisol in the hypothalamic-pituitary-adrenal (HPA) axis in the neuroendocrine system.^{18,117,138,220} The increased release of cortisol is strongly associated with visceral obesity, type 2 diabetes and other components in the metabolic syndrome.^{18,117,138,220} The action and interaction between the hormones involved in the “fight or flight” and “defeat”- reactions to stress are described elsewhere.^{97,117,138}

Chronic disease is defined as a disruption of bodily function that develops slowly, sometimes insidiously, and persists for an extended period, often a lifetime.²³ The passive form of chronic stress has been strongly associated with eating for comfort, and strong cravings for sweet and fat have been described.¹³⁸ Fat has been shown to have a calming effect.²⁰⁸ Excessive eating might camouflage problems, experienced to be hard or impossible to solve, in the life of the individual. Overeating might, just as the abuse of alcohol, function as a passive coping strategy, a way to escape problems instead of confronting them.^{109,141} Especially obese women have described eating as a way to feel better in stressful situations.¹⁰⁸ Obese persons have been found to use passive coping more than problem focused, active coping.¹⁶⁶ The relation between a passive “defeat-reaction” to stressful stimuli and visceral obesity is strong enough to entitle WHR as a measure of hopelessness.¹⁸

Research has mostly focused the stress reactions “fight/flight” and “defeat” and not how to strengthen the balancing system for relaxation and rest.²⁰¹ Oxytocin, a calmness hormone, is released after the consumption of fat (after a detour over the digestive hormone cholecystokinin) as well as by nursing, massage and sexual arousal and orgasm.^{27,201,202} Social support serves as a protective factor in times of stress.¹⁹⁴ Physical activity has been found effective in balancing negative consequences of stress besides being an important tool for weight maintenance after weight reduction. Unfortunately, this may turn out to be a vicious circle for an obese person. Obesity quite commonly induces musculo-skeletal pain, which may worsen from physical activity that is too vigorous to suite the obese persons physical ability.

1.4.3 Sexuality

Sexual satisfaction and intimacy are important parts of life contributing to physical and emotional well-being. Eating and a feeling of physical satisfaction can gratify and balance distress including feelings of anxiety, anger, sadness, sorrow and loneliness.^{33,122,167} A feeling of balance and peace could for some persons be derived through an intimate relationship which besides providing sexual satisfaction provides support in times of distress. The balance and peace sought for could for other persons be reached through the consumption of fat. Obese individuals have been expected to be less sexually interested, attractive and capable of developing a satisfying romantic relationship than persons of normal weight.^{79,150} Changes in sexual interest and rate of sexual activity have been described to coincide with weight change. A decrease in sexual activity and sexual satisfaction has been reported during periods of weight gain²¹ and an increase during weight loss.^{78,209,219} Obesity, just as sexuality, has been recognized to have a homeostatic function in relations. If, after weight reduction, a formerly obese partner in a relation becomes more sexually active, the homeostasis is disturbed and problems might appear.¹²⁰

Studies on the association between obesity and experience of sexual abuse have given contradictory results. Obesity has been significantly associated with a history of sexual abuse in some studies^{44,45,59,94,154} but not in others.^{77,183,210} Obese victims of former sexual abuse have been reported to experience more difficulties losing weight than non-victims, unless treatment has been given for their trauma.⁹⁵ Obesity has sometimes been observed to have a protective function insulating the individual from sexual advances by potential partners or providing a defense for avoiding sexual intimacy, which may be anxiety provoking or traumatic for the obese person.²¹⁰ It has been speculated that at least one third of the female patients in primary care are aware that they have had a history of childhood sexual abuse.¹⁵⁴ The prevalence of sexual abuse in the general female population ranges from 10 to 70 percent, depending on the criteria used.^{52,165} Recent health economic analyses suggest that women with a history of sexual abuse (18% in a sample of 1225 women) had significantly higher health care costs.²⁰⁴ Research on the relation between obesity and sexuality has focused almost exclusively on individuals with eating disorders or on the effects of surgically induced weight loss on the self-reported sexual function of formerly obese persons, particularly women.¹⁵⁰

Few studies control for age of the subjects and sometimes no information on age is given or differ between the groups examined. Since age has been found to be the most important factor influencing sexual activity in some studies^{127,175} but not in others,^{19,203} this might confuse our understanding of the relationship between obesity and sexuality.

We have not found any population-based study focusing on the association between obesity and sexual satisfaction nor between obesity and experience of sexual abuse, although there are studies addressing the issue of sexual satisfaction.^{101,112,113,203,207} The obese population has been found to be heterogeneous in causes behind the excessive eating, psychological well-being and HRQL.^{28,50,54,61,86,91,100,190} The heterogeneity among obese subgroups is supposedly also true for sexual matters.

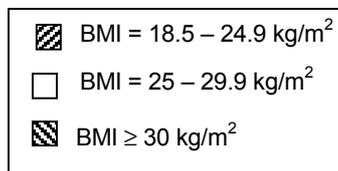
1.4.4 Socio-economic status

In a plan of action from 2003 the Swedish Government stressed the obvious effect of SES on life style and health.⁷⁴ Studies have shown the prevalence of obesity to be inversely related to SES.^{107,143,153,172,216} The relationship is clearer for women^{171,206} than for men.^{128,182} Lower SES has been associated with difficulties in coping with stress among men.¹⁶² Psychosocial stress has, together with unhealthy eating habits and reproductive history (higher parity and earlier age at menarche), been found to account for a large part of the association between low SES and obesity among women.²⁰⁶

1.5 RESULTS FROM A POPULATION BASED STUDY

In 1995 a selection of 8,200 people above the age of 17, from two health care regions in the Stockholm area was drawn from the population register filed by the County Census Bureau. They received a questionnaire on physical, social and mental well-being, health care utilization, satisfaction with care and quality of life.⁴⁰ In this chapter data from the population study are used in order to compare demographic, physical, life style, mental and psychosocial factors between BMI-groups. Satisfaction with health care is reported in chapter 1.7.

Normal weight is defined as BMI 18.5-24.9 kg/m², overweight as BMI 25-29.9 kg/m² and obesity as BMI ≥ 30 kg/m². The results showed that 65 % women and 53 % men were in the normal weight group, 24 % women and 37 % men were in the overweight group and 7 % women and 9 % men were in the obese group. Significant differences between BMI-groups are marked accordingly * = p<0.05, ** = p<0.01, *** = p<0.001.



1.5.1 Demographic factors

The result was in line with other studies of an association between SES and obesity. The obese groups of men and women more often than the other BMI-groups lived without a partner, were less educated and more often immigrants.

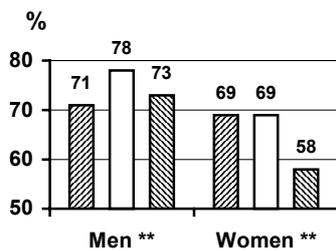


Figure 1. Married/partnership (%)

Marital status was classified as married/cohabitating or living alone.

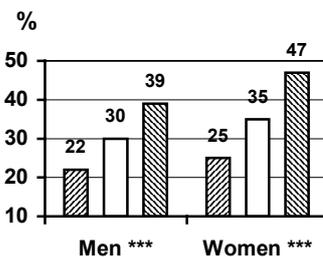


Figure 2. Education (Mandatory school) (%)

Education level was classified into five levels, ranging from mandatory school to university.

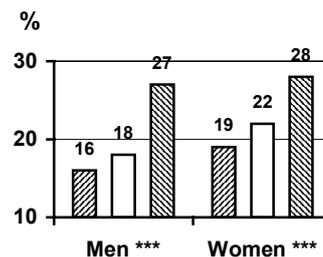


Figure 3. Immigration (%)

The question “Were you born in Sweden?” answered by yes or no was used to indicate immigrant background.

1.5.2 Physical factors

The obese groups of men and women rated their health as being “good” less often than did those in the other BMI-groups (Figure 4). They more often had problems with chronic pain and chronic musculo-skeletal disorders. Diabetes, heart problems and hypertension were more common among the obese men and women (Figure 5-9). The results correspond with other studies on the association between BMI and self-rated health and physical health.

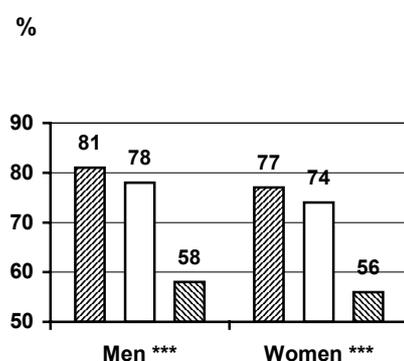


Figure 4. Good self-rated health (%)

Self-rated health was measured using the question “How would you rate your general health status?” with the reply alternatives: Very good, Quite good, Neither good nor Poor, Quite poor and Very poor. A dichotomous variable was constructed from self-rated health with “good health” (very or quite good) opposed to “poor health” (neither good nor poor, quite poor or very poor).

Chronic disease was measured by the question “Are you suffering from any of the following chronic diseases?” followed by cardiovascular disease, diabetes, hypertension, musculo-skeletal disorders and pain answered by yes or no.

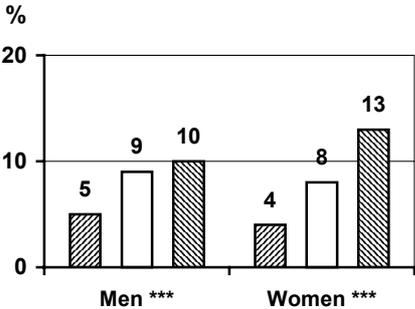


Figure 5. Chronic cardiovascular disease (%)

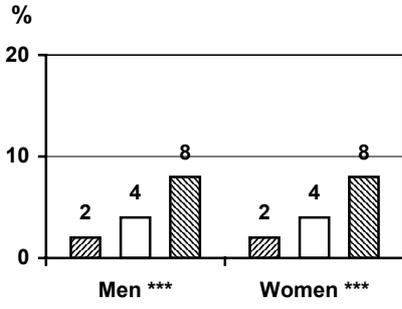


Figure 6. Diabetes (%)

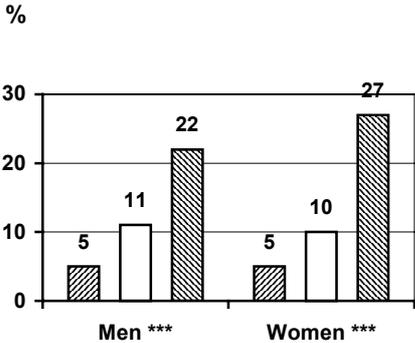


Figure 7. Chronic hypertension (%)

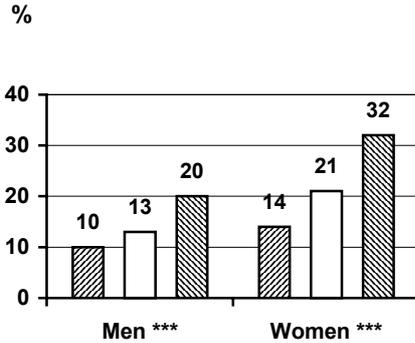


Figure 8. Chronic musculo-skeletal disorders (%)

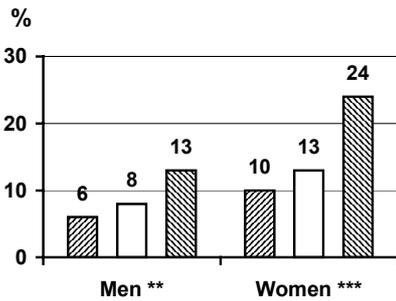


Figure 9. Chronic pain (%)

1.5.3 Life style factors

An inverse relation between physical activity and BMI was found for both men and women (Figure 10). Among men the overweight group declared the healthiest meal habits while no difference between BMI-groups was reported for women (Figure 11). There was no difference in smoking between BMI-groups (Figure 12). The association between physical activity and BMI is consistent with other findings.

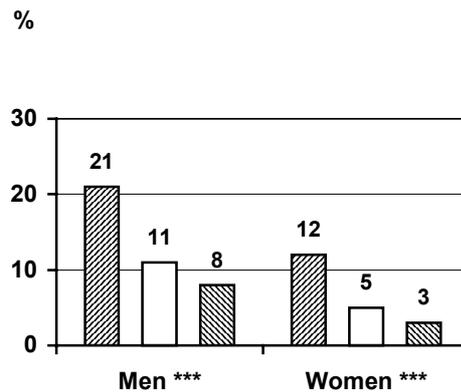


Figure 10. Physical activity ≥ 3 times/week (%)

The question was “How much have you been physically active during leisure time the last year?” with the answers walking (or similar) less than 2 hours/week, walking (or similar) at least 2 hours/week, vigorous physical activity 1-2 times/week at least 30 minutes/occasion and vigorous physical activity at least 3 times/week at least 30 minutes/occasion was used as measure of physical activity.

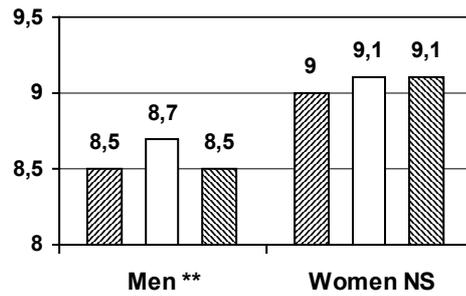


Figure 11. Meal habits (mean)

The question on meal habits concerned the consumption of fat, fruit and vegetables, fibres and cookies and candies. Three alternatives were given for each of the four areas. The response alternatives were summed, higher values indicating healthier meal habits. Range 4-12.

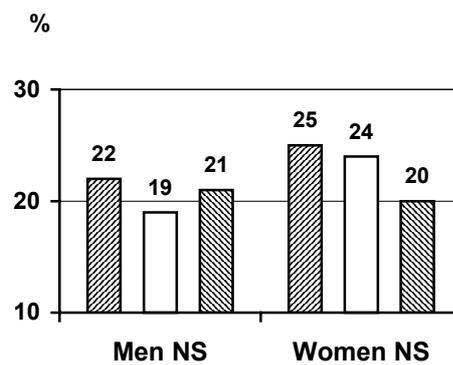
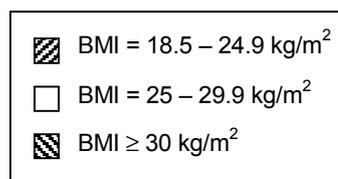


Figure 12. Smoking (%)

The question “Do you smoke?” answered by yes or no was used as a measure of smoking.



1.5.4 Mental well-being and psychosocial factors

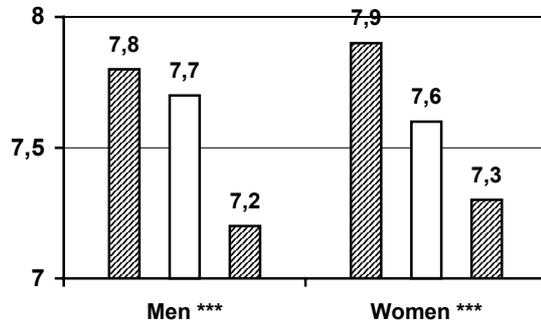


Figure 13. Future expectations (mean)

The “ladder of life” was used as a measure of future expectations. The question was formulated as: ”Here is a figure that symbolizes the ladder of life. The top step (10) represents the best life you could think of and the bottom step represents the worst life you could think of. When you think about your future, on which step will you be in one year?” Range 1-10.

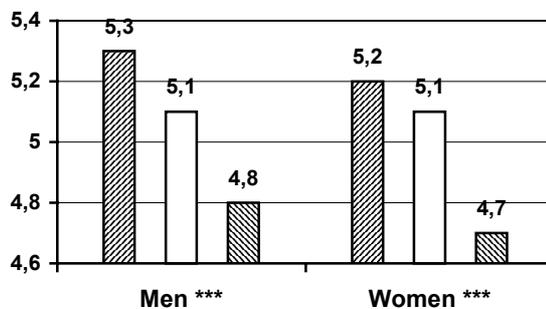


Figure 14. Energy (mean)

The subject was asked to rate her/his energy on a seven-grade Lickert scale ranging from Very bad (1) to Excellent, could not be better (7). This variable is included in the Gothenburg Quality of Life Inventory (GQLI), representing one of the items in mental well-being.¹⁹⁵

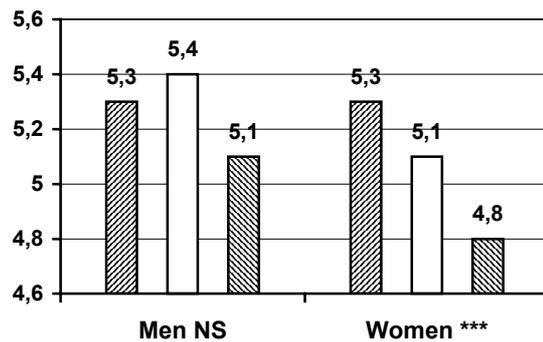


Figure 15. Sleep (mean)

The subject was asked to rate her/his sleep on a seven-grade Lickert scale ranging from Very bad (1) to Excellent, could not be better (7). This variable is included in the GQLI, representing one of the items in mental well-being.¹⁹⁵

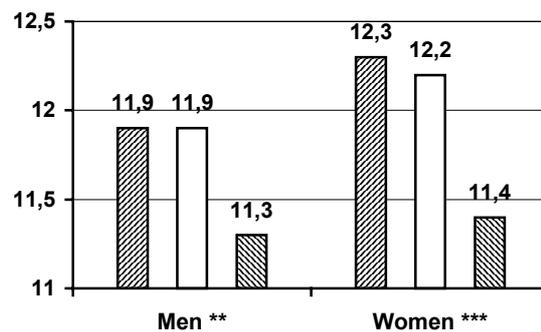


Figure 16. Social support (mean)

Social support is a composite measure of instrumental (two questions) and emotional (three questions) support. There were three reply alternatives for each question. The reply alternatives were summed, higher values indicating a higher degree of social support. Range 5-15.

In summary the results show that the obese group of men and women have an impaired self-rated health as well as physical health and mental well-being compared with the other BMI-groups. The obese groups of men and women experienced a lower degree of social support compared with the other BMI-groups.

1.6 WEIGHT REDUCTION AND WEIGHT CONTROL

From a medical perspective a sustained weight reduction of five to 10 percent is considered successful for a decrease of obesity related risks.²¹⁶ The main methods for weight reduction, used separately or in combination are low calorie diets, physical activity, behaviour modification, drug therapy and bariatric surgery. The methods aim at changing the obese person's eating pattern and the balance between the intake and expenditure of energy. In this chapter motivation and the implementation and maintenance of a life style change for weight control are discussed.

1.6.1 Motivation

If asking a patient before entering a weight reduction programme if she/he is motivated to lose weight the answer in 99% of the cases would be "yes". Experience shows that the result seldom corresponds to the intensity in the word "yes". Undoubtedly the person wants to lose weight but this is not the same as carrying out a life style change for weight reduction and maintenance of the lost weight. The question should be rephrased to "Are you motivated to carry out life style changes in different areas of your life which could affect your mental and social well-being?". Entering a weight reduction regimen sometimes has been compared with stopping smoking. However, there is an important difference between stopping smoking and changing eating habits. A smoker could easily cut out cigarettes without dying and would be rewarded for doing so. Nobody can stop eating. An obese person has to learn a new relation to food and eating in order to lose weight and achieve weight stability. A successful maintenance of lost weight has been found to be associated with at least three behaviours; less than 30% of the calories from fat, monitor weight at least once a week and physical activity of at least 30 min a day.^{34,214} A daily intake of breakfast is often included among the success-factors. Thus, there are between one and four new behaviours an obese person has to acquire in order to reach weight control.

A person's readiness for change has been explained as the attributed importance of the change and the person's confidence in making the change.¹⁶¹ Self-efficacy refers to a person's confidence in her/his ability to make a specific change in behaviour.¹⁴ Self-efficacy varies across situations. An emotional over-eater might feel very confident about resisting the temptation to over-eat at work, but less so when socializing or needing emotional comfort, stress-release and so on. The concept "locus of control" (LOC) refers to the belief individuals have in the amount of control they have over their lives. Control orientation, which describes to what extent one's actions are instrumental to goal attainment, was first measured in Rotter's internal-external (I-E) scale.¹⁶⁴ Internals were reported to be more likely than externals to exert efforts to control their environment and to take responsibility for their actions. An external locus of control orientation indicates that goal attainment is attributed to external factors outside the control of the individual. Sometimes the external orientation has been divided into "powerful others" and "chance".¹³⁵ There are contradictory results on control orientation as predictive for success in weight reduction activities.^{13,71,134,159,196} Successful weight loss may be dependent on

both internal and external locus of control orientation. It has been noted that subjects whose locus of control orientation was consistent with the type of weight control programme selected for them (a self-directed programme for internals or a group programme for externals) were significantly more satisfied with the programmes and tended to lose more weight than individuals whose locus of control orientation and treatment programmes were not consistent.^{84,205} It is a challenge for weight-reduction activities to address the participant's perceived ability to master situations, which has been shown to be a success factor for life style changes and to maintain congruence with the readiness of the individual to change.^{7,186}

1.6.2 Life style change for weight reduction

Participants in weight reduction programmes are generally expected to change eating habits and start to lose weight immediately upon entering the programme. The amount of lost weight has become a measure of success for the participants, the supervisors and the programme. The methodologies of weight loss programmes are seldom questioned; more often the participants are seen as non-compliers if they fail to attend to the programme.⁸ According to what is reported in the media, weight loss can be achieved through applying some quick weight loss diet for one or two weeks or the purchase of magic pills, which will make body fat melt like butter in the sun. Depending on the study, such lost weight is regained after between two and five years. Although the results from weight reduction activities differ, these weight reduction methods do not seem to be sufficient for a sustained weight control.

Since the increased rate of obesity is associated with individual life style variables it is important to develop strategies for weight reduction through life style changes that are suited to individual needs and values. Two models for behavioural change, the “transtheoretical model of process of change” and “patient empowerment” take into account that a motivational phase with emotional arousal and self-re-evaluation regarding a problem behaviour should precede a decision to change.^{7,144} The transtheoretical model of change describes the structure of different stages in a process aiming at life style change. Patient empowerment is both a philosophy about the roles of health care professionals and patients participating in life style changes and a method for interaction between caregiver and patient. The two models for life style change are compatible and sometimes overlapping.

The transtheoretical model of change

The transtheoretical model of change divides the process of change into five stages. The stage in which the individual is situated predicts her/his readiness for behavioural change and provides information on what kind of support she/he needs in order to proceed in the change process.^{75,102,144} The first three stages are motivational. The individual identifies the problem behaviour, makes an emotional revision about what a change would mean for self-image and one's relationship with significant others and the outside world, and takes responsibility for carrying out the change. The actual change of behaviour takes place in the fourth stage and is maintained in the fifth.

Stage 1: Precontemplation. People at this stage usually have no intention of changing their behaviour, and often deny having a problem.

Stage 2: Contemplation. Contemplators struggle to understand their problem, to see its causes and to wonder about possible solutions.

Stage 3: Preparation. Most people in the preparation stage plan to take action within the very next month. Preparation is a time for trying, training and making adjustments of the new behaviour.

Stage 4: Action. In this stage people make the move for which they have been preparing.

Stage 5: Maintenance. During this stage the previous changes are consolidated and the energy is focused on preventing relapses. This stage can last from six months to a lifetime.

The stages of change and associated facilitating techniques are presented in Table 5.

Table 5. Stages of change and associated change process techniques.

<i>Change process technique</i>	<i>Stage</i>				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Consciousness-raising. Increase information about self and problem.	x	x	x		
Social liberation. Increase alternatives for non-problematic behaviours.	x	x	x	x	
Support. Enlist the help of someone who cares.	x	x	x	x	x
Emotional arousal. Experience and express feelings about one's problems and solutions.	x	x	x		
Self-re-evaluation. Assess feelings and thoughts about self with respect to a problem.	x	x	x		
Commitment. Choose and commit to act, or belief in ability to act.			x	x	x
Countering. Substituting alternatives for problem behaviours.				x	x
Environmental control. Avoid stimuli that elicit problem behaviours.				x	x
Reward. Reward self, or being rewarded by others, for making changes.				x	x

The table is reproduced and slightly modified.¹⁴⁴

Many weight reduction activities focus on the fourth stage, action. According to Prochaska et al only 20% of participants who enter weight reduction programmes are in the fourth stage, the rest are in the first three stages and not ready for a behavioural change.¹⁴⁴ A sustained weight reduction of 10 % has been reported among 20% of the participants in Weight Watchers.¹⁷² The preparing motivational phase and the concluding phase for maintenance of lost weight are often omitted from weight reduction programmes.

Patient Empowerment

The patient empowerment method for behavioural change could be used individually and in group treatment. It is used in the care of diabetics and could just as well be used in the treatment of obesity and other conditions where a life style change is called for and the patient is responsible for carrying out behavioural changes.²⁶ Henceforth “obesity” will represent any condition where a person has to perform a life style change.

A paradigm is defined as an interrelated collection of beliefs shared by scientists (for our purposes, health care professionals) i.e., a set of agreements about how problems are to be understood.^{9,103} The way problems are defined, in large part, determines the nature of the strategies designed to solve them. Health care professionals are socialized to a paradigm derived from the treatment of acute illness. It has become evident that the acute paradigm does not work for life style changes, where the patient provides daily decisions leading to weight control. Patient empowerment builds on the theory that the patient accepts responsibility for her/his life style and cannot be forced by professional care givers to follow a life style imposed on her/him. This is not the same as following the expert’s directions, which is the focus of traditional medical care, based on the treatment of acute illness.⁵⁸ The process of empowerment is defined as the discovery and development of one’s inborn capacity to be responsible for one’s own life. Anderson and Funnell suggest people to be empowered, when they have enough knowledge to make rational decisions, enough control and resources to implement their decisions and enough experience to evaluate the effectiveness of their actions.⁷

The empowerment approach to weight control care is based on the recognition that patients are in control of the most important weight control management decisions affecting their well-being. Because the control of weight management rests with the patient it follows that the responsibility for making such decisions and living with the consequences rests with the patient as well. Health care professionals are not being asked to give up control – merely the illusion of control.⁹ The empowerment approach requires a change from feeling responsible **for** patients to feeling responsible **to** patients. This means acting as collaborators who provide patients with the information, expertise and support to make the best possible weight control self-management decisions based on her/his own health priorities and goals.⁶³

The patient empowerment model involves a redefinition of the traditional, acute care model concerning roles and relationships of health care professionals and patients (Table 6).⁷

Table 6. Comparisons between the acute care model and the patient empowerment educational model.

<i>Acute care model</i>	<i>Patient empowerment educational model</i>
1. Obesity is a physical illness.	1. Obesity is a bio-psycho-social illness.
2. Relationship of provider and patient is authoritarian based on provider expertise.	2. Relationship of provider and patient is democratic and based on shared expertise.
3. Problems and learning needs are usually identified by professionals.	3. Problems and learning needs are usually identified by the patient.
4. Professional is viewed as problem solver and caregiver, i.e., professional is responsible for diagnosis and outcome.	4. Patient is viewed as problem solver and care giver, i.e., professional acts as a resource and helps the patient set goals and develop a self-management plan.
5. Goal is behaviour change. Behavioural strategies are used to increase compliance with recommended treatment. A lack of compliance is viewed as a failure of patient and provider.	5. Goal is to enable patients to make informed choices. Behavioural strategies are used to help patients experiment with behaviour changes of their choosing. Behaviour changes that are not adopted are viewed as learning tools to provide new information that can be used to develop future plans and goals.
6. Behaviour changes are externally motivated.	6. Behaviour changes are internally motivated.
7. Patient is powerless, professional is powerful.	7. Patient and professional are powerful.

The table is slightly modified and reproduced.⁷

The five steps in the patient empowerment method for life style change are: identify the problem, explore feelings, set goals, make a plan and evaluate the result.^{7,26} The steps and facilitating questions that can be asked the care taker in each step are shown in table 7.⁷

Table 7. The five steps and facilitating questions in the patient empowerment method for life style change.

1. Identify the problem
* What is it like for you to be obese?
* What is your greatest concern?
* What is hardest for you about trying to lose weight?
* What do you think makes it so hard for you?
* Why do you think that this is happening?
2. Explore the feelings
* How do you feel about...?
* What are yours thoughts about...?
* How will you feel if things don't change?
* Can you tell a story about this situation, including how you feel about it?
3. Set goals
* How does the situation you describe need to change for you to feel better about it?
* What will you gain if you change? What will you have to give up?
* Is it worth it for you to change?
* What needs to happen for you to get what you want?
* What do you need to do?
4. Make a plan
* What are some ideas you have about strategies that might work?
* What have you tried in the past?
* Why do you think that did/didn't work?
* What are some steps you could take to bring you closer to where you want to be?
* What do you need to do to get started?
* Is there <i>one</i> thing that you can do when you leave here to improve things for yourself?
5. Evaluate the result
* What did you learn as a result of setting this goal?
* What did you learn as you attempted to achieve this goal?
* What would you do differently next time? What would you do the same?
* What barriers did you encounter? What ideas do you have for strategies to overcome those?
* What did you learn about yourself as the result of this experiment?
* Did you learn things about the type of support you have, want or need?
* What did you learn about how you feel about this problem or area of change?

The table is slightly modified and reproduced.⁷

The variables listed in Table 8 have been found to influence both the process and outcome of diabetes education for life style change and could just as well influence weight reduction activities.^{7,147} These variables could be controlled in studies. However, Anderson and Funnell state that educational research in diabetes care (could be replaced with “life style intervention for weight reduction and maintenance”) has found the educator to be the most important variable: “When concerned patients interact with skilled educators using almost any theory or method, there are positive outcomes.”⁷ This has been supported elsewhere.¹⁵⁹

Table 8. Variables other than educational method used that could influence that patient’s self-management.

<i>Patient variables</i>	<i>Educator variables</i>	<i>Environmental variables</i>
Age	Vision	Reimbursement
Gender	Profession	Physical setting
Educational level	Values	Rural, urban or suburban
Past experience with weight control	Knowledge	locale
Race	Skills	Part of the country
Ethnicity	Attitudes	Weather
Socio-economic status	Personality	Other patients in class
Attitudes	Gender	Patient’s family
Personality	Energy level	Patient’s friends
Energy level	Experiences in weight control	Patient’s work
Physical health	education	Resource group (i.e. support group)
Mental well-being	Flexibility	Organizational culture
Religion	Personal experience with weight control	Recommendations in
Emotional state	Ethnicity	* Nutrition
Stress	Religion	* Exercise
Reason for being overweight		* Medication

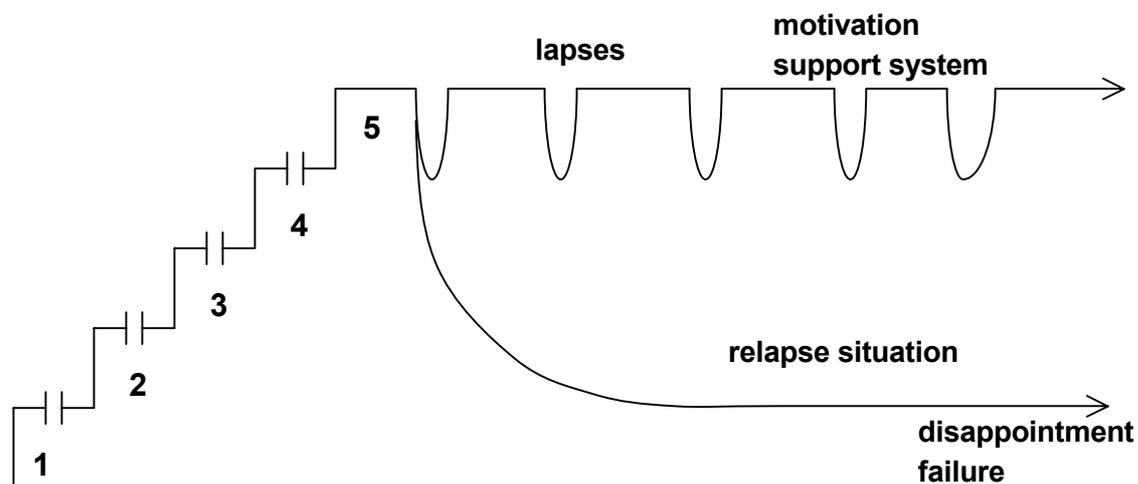
Outcome: Patient’s self-management behaviours

The table is slightly modified and reproduced.⁷

1.6.3 Maintenance of lost weight

It is a consistent finding that most participants in weight reduction programmes regain lost weight in five years.^{24,133} With a maintained weight up to five years the chance for long-term success greatly increases.²⁴ Relapses to the old behaviour are natural in a life style change. For successful ex-smokers 3-4 lapses have been seen as natural before a person can be considered to be a non-smoker.¹⁷³ Four behaviours have been associated with a maintained weight loss. Thus, here might be four behaviours to be changed and the risk for a lapse would be $3 \times 3 \times 3 \times 3 = 81$ times for a weight reducer compared with a non-smoker. In situations of return to an old behaviour it is important that the person does not judge this as an irreversible relapse, but as a lapse and an occasion for learning, and that she/he gets support to continue the newly acquired behaviour. It might be necessary to repeat the change process a couple of times. Including a maintenance period and control for relapse situations in a weight reduction programme would strengthen the continuity for the participants and increase the odds for success.

Figure 17. Difference between lapse and relapse



Psychological and psychosocial factors have been found associated with weight regain. Long-term maintenance of weight loss has been associated with increased anxiety.¹⁷⁰ Individuals who habitually use food and eating in order to alleviate painful feelings have to face these feelings when dieting, unless they can be neutralised by psychological defences.¹⁶⁷ Sarlio-Lähteenkorva found weight regain associated with lack of social support, values contradicting keeping a diet and emotional reasons like sadness, anger, frustration and disappointment.¹⁶⁹ That the importance of social support should be taken into account when one is studying, preventing and treating obesity is supported elsewhere.^{57,87,93,108,137,144,215} If the emotional or social functions of eating have not been considered in a motivational phase before the actual change of behaviour, or in the actual phase of behavioural change, it will continue to jeopardize the maintenance of lost weight until the function of eating has been compensated for. Often people who regain lost weight feel ashamed and consider themselves as lacking will power. Feelings of shame might cause emotional overeating. Physical activity is an important factor for weight loss maintenance. Obese more often than non obese suffer from physical pain and functional impairment. Finding ways to be physically active without increased pain would be beneficial for weight loss maintenance.

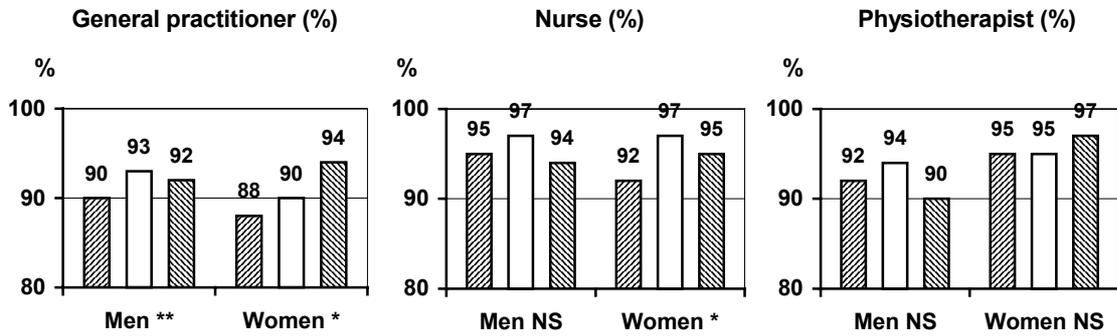
1.7 OBESITY AND PRIMARY HEALTH CARE

In Sweden primary health care is available for everybody. The health care centre is located in a neighbourhood area, which makes it convenient to reach. The cost for medical care (as for medicine) for a one-year period is limited (Högbkostnadsskydd). When the limit is reached medical care is free of charge for the rest of the one-year period. The health care centre can be attended to get acute health care and/or collaborative health care, the latter as support for making a life style change due to obesity, diabetes, hypertension, dyslipidemia or any other reason for an impaired well-being. The personnel at the health care centre consists of general practitioners, nurses, dieticians and physiotherapists. Social workers and psychologists are appreciated, though not frequent, members of the health care personnel. Diabetes teams already exist in many health care centres. Obesity teams are being formed. Primary health care has the advantage of continuity in the contact with patients. This makes it possible to follow the patient's well-being and also to work prophylactically in checking risk factors.

In the population study partly reported in chapter 1.5 and in paper I on primary health care, the respondents answered questions about satisfaction with service and treatment, medical care, trust, support with life style changes and attitudes towards increased resources.⁴¹ In figure 18-22 the results concerning general practitioner (gp), nurse (n) and physiotherapist (pt) are reported. In this section the answers are reported for men and women in different BMI-groups. Significant differences are marked accordingly * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$.

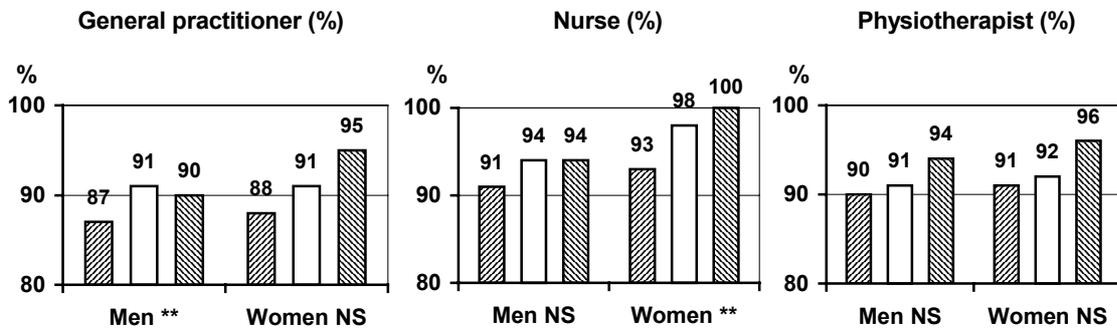
	BMI = 18.5 – 24.9 kg/m ²
	BMI = 25 – 29.9 kg/m ²
	BMI ≥ 30 kg/m ²

Figure 18. Very/rather satisfied with service and treatment from



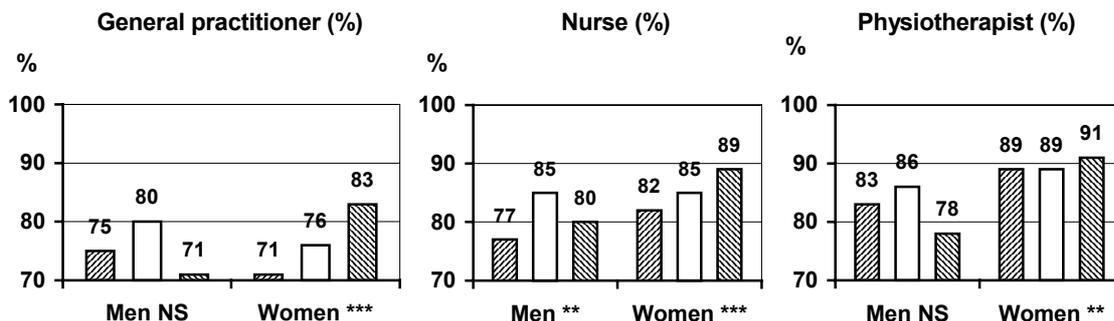
The question “Have you during the last 12 months been satisfied/dissatisfied with service and treatment from gp/n/pt? with the reply alternatives Very satisfied/ Rather satisfied/ Rather dissatisfied/ Very dissatisfied, was used as a measure of satisfaction with service and treatment.

Figure 19. Very/rather satisfied with medical care from



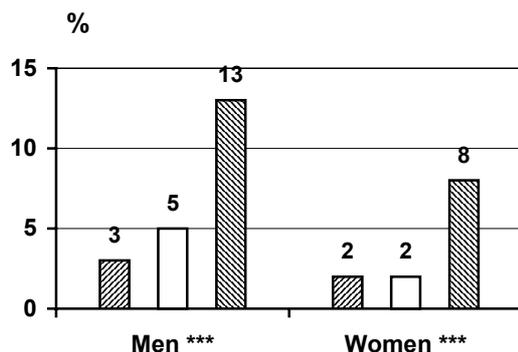
The question “Have you during the last 12 months been satisfied/dissatisfied with medical care from gp/n/pt?” with the reply alternatives Very satisfied/ Rather satisfied/ Rather dissatisfied/ Very dissatisfied, was used as a measure of satisfaction with medical care.

Figure 20. Very/rather good trust with health care from



The question “How good is your trust with health care from gp/n/pt?” with the reply alternatives Very good/ Rather good/ Rather small/ Very small, was used as a measure of trust with health care.

Figure 21. Received good support in life style changes (%)



The question “Have you received or been without support from your health care centre in life style changes like smoking cessation, changing eating habits, increasing physical activity or changing the use of alcohol?” with the reply alternatives Received some support/ Received good support/ Not received any support, was used as a measure of support with life style changes.

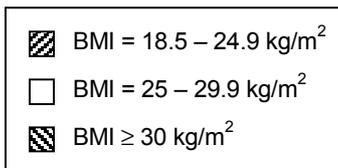
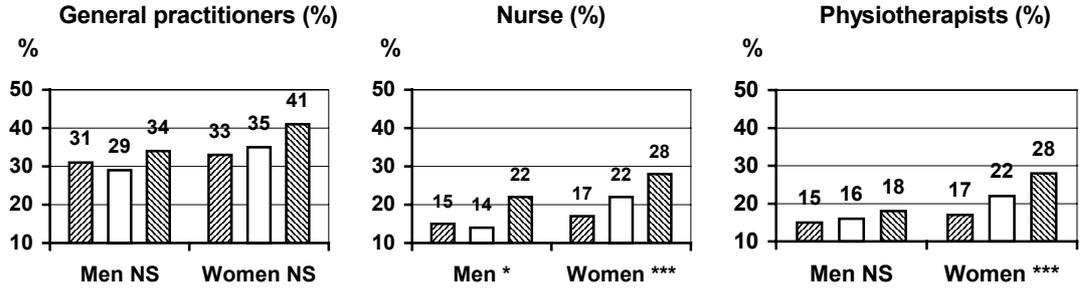


Figure 22. Health care resources should be increased for



The question “To what extent should the resources be changed for gp/n/pt?” with the reply alternatives Should be increased/ It is good as it is/ Should be decreased, was used to measure attitudes towards changed resources for the occupational groups.

The result does not confirm that the obese groups of men and women are being treated with neglect and prejudice from health personnel as reported in other studies.^{140,146} The obese groups of men and women report to have received good service and care, and trust primary health care personnel. The obese subjects have been supported in life style changes but especially obese women think that the primary health care resources for nurses and physiotherapists should increase.

2 AIMS OF THE THESIS

The overall aims of this thesis were to get a better understanding of psychological and psychosocial factors and processes involved in a life style change for weight control. The specific aims were:

Paper I

- to analyse the relative importance of obesity for self-rated health with focus on age and gender differences

Paper II

- to examine which circumstances obese individuals, participating in a life style intervention weight reduction programme at a primary health care centre, considered to be important for the result; and
- to what extent the programme addressed those factors

Paper III

- to analyse whether locus of control orientation was associated with weight loss among participants in a life style intervention weight reduction programme

Paper IV

- to analyse the association between obesity, sexual satisfaction and sexual abuse in a population based sample

3 METHODS

An overview of study designs and study groups is given in Table 9.

Table 9. Study design and number of participants in Papers I-IV.

<i>Paper</i>	<i>Design</i>	<i>Analysis</i>	<i>Study</i>	<i>n</i>
I	Cross-sectional	Quantitative	Population study	5,025
II	Prospective, 5 years	Qualitative, year 0 – 2. A follow up of this study is enclosed in Appendix and included in the general discussion.	Weight reduction programme at a primary health care centre	15
III	Prospective, 1 year	Quantitative	An outpatient weight reduction programme at a hospital	41
IV	Cross-sectional	Quantitative	Population study	2,810

The ethical committee at Karolinska Institutet, Karolinska University Hospital – Huddinge approved all studies.

3.1 PAPER I

3.1.1 Study group

A random sample of 8,200 persons over 17 years from two health care regions in the Stockholm area was drawn from a population register filed by the County Census Bureau (Undén 1998). The participants received a postal questionnaire in spring 1995 with questions about subjective health status, chronic diseases, health care visits, socio-demographic factors, life style factors, psycho-social factors and quality of life. After two reminders 69 % of the net population (73 % of the women and 65 % of the men; unidentified, dead and people living abroad excluded) had answered the questionnaire. Of these 5,374 persons 19 persons did not state their sex and 208 persons did not give any information on their weight/height. The remaining sample consisted of 5,147 persons, 2,389 (46%) men and 2,758 (54%) women. The mean age and range was 46.6 (18-93) years for men and 47.3 (18-100) years for women. BMI was calculated as weight in kilograms divided by height in metres squared (kg/m^2). Of the men, 1 % were underweight ($\text{BMI} < 18.5 \text{ kg/m}^2$), 53 % normal weight ($\text{BMI} 18.5\text{-}24.9 \text{ kg/m}^2$), 37 % overweight ($\text{BMI} 25.0\text{-}$

29.9 kg/m²) and 9 % obese (BMI \geq 30 kg/m²). Of the women, 4 % were underweight, 65% normal weight, 24 % overweight and 7 % obese. Underweight reporters were excluded from the study. The study group finally consisted of 5,025 persons: 2,366 men and 2,659 women.

3.1.2 Measurements

A questionnaire to measure health in a wide sense was constructed for the national survey. The present study analysed data on self-reported weight and height, socio-demographic factors, self-rated health, functional impairment, physical health and mental well-being.

Anthropometric and socio-demographic characteristics. Weight and height were self-reported. BMI was calculated as weight in kilograms divided by height in meters squared (kg/m²). Socio-demographic variables included in the present analyses were age, education level, marital status and immigrant background. Education level was classified into five levels, ranging from mandatory school to university. For presentation the results were collapsed into three levels. Marital status was classified as married/cohabitating or living alone. The question “Were you born in Sweden?” answered by yes or no, was used to indicate immigrant background and will henceforth be referred to as “immigration”.

Self-rated health. Self-rated health was measured using the question “How would you rate your general health status?” with the reply alternatives: Very good (1), Quite good (2), Neither good nor poor (3), Quite poor (4) and Very poor (5). In the logistic regression analyses a dichotomous variable was constructed from self-rated health with “good health” (very or quite good) opposed to “poor health” (neither good nor poor, quite poor or very poor).

Functional impairment. Health factors that affect daily living were classified as functional well-being. The question “Do you suffer from any disease or handicap that continually, or for limited periods, makes you (or can make you) unable to lead a normal life?” answered by yes or no was used as a measure of functional impairment.

Physical health. The question “Are you suffering from any of the following chronic diseases?” followed by cardiovascular disease, diabetes, hypertension, musculo-skeletal disorders and pain answered by yes or no, was used as a measure of physical health. From this question two composite variables were constructed. The first composite variable “chronic disease” implied acknowledging at least one of the three alternatives cardiovascular disease, diabetes and hypertension. The second composite variable “chronic pain” implied acknowledging at least one of the alternatives musculo-skeletal disorders and pain.

Mental well-being. The GQLI was used to measure mental well-being covering the following five ratings: general emotional state, energy, patience, self-esteem and sleep.¹⁹⁵ The items were rated on a seven-grade Lickert scale ranging from Very bad (1) to Excellent, could not be better (7). The mean value was calculated and referred to as “mental well-being”. We see this measure as a way to score the type of mental illness, which has become quite common but does not sort under any diagnostic code. Cronbach’s alpha for this measure was 0.82.

3.1.3 Statistical analysis

Chi-squared statistics, Duncan’s multiple range test or one way analyses of variance were used to compare prevalence and means between BMI-groups among men and women in socio-demographic characteristics, self-rated health, functional impairment, physical health and mental well-being. Associations between BMI-group and self-rated health in different age groups among men and women were initially analysed as product-moment correlations (Pearson). To determine risk factors associated with impaired self-rated health we used logistic regression analyses. In model 1 we compared the odds ratios of reporting reduced health in overweight and obese individuals with that of individuals of normal weight adjusting for age, education level, marital status and immigration. In model 2 we adjusted for the same variables as in model 1 plus functional impairment and physical health. In model 3 we adjusted for the same variables as in model 2 plus mental well-being. BMI-groups and confounding variables were also compared with respect to explained variance in the different models. Significant differences are indicated as: * = $p < 0.05$, ** = $p < 0.01$ and *** = $p < 0.001$. All analyses were conducted using SPSS, version 11.0.

3.2 PAPER II

3.2.1 Study group

The study involved participants in a weight reduction programme led by certified supervisors. The learning centre for supervisors offered a list of supervisors working in the Stockholm area. Ten supervisors were telephoned, asked if they were starting groups and whether they wanted to participate in the study. Two supervisors from the same health care centre responded to the request. They planned two groups with identical programmes.^{123,124} Together the groups consisted of 15 obese persons, 12 women and three men. Their BMI ranged from 29 to 40 kg/m^2 . The group members had either been recommended weight reduction by their general practitioner or seen a poster at the centre, informing about the programme. When asked if they wanted to participate in the study, they were assured full anonymity and to continue the programme even if they decided to leave the study. All persons in the two groups agreed to participate.

3.2.2 Methods

A qualitative approach was adopted in order to understand what factors contributed to the result.¹⁰⁵ This is a somewhat extended description of qualitative method and grounded theory, which in paper II had to be rather short due to a limited space for the article in the journal. Qualitative research produces findings not aimed at by statistical procedures or other means of quantification. Qualitative methods can be used to explore areas about which little is known, or about which much is known to gain novel understanding.¹⁸⁴ Grounded theory, originally developed by the two sociologists B. Glaser and A. Strauss, is one type of qualitative research method. Their first book on grounded theory was published in 1967.⁶⁸ They chose the name “grounded theory” because the theory was derived from data, which were systematically gathered and analysed through the research process. A specific query addressed by the research is called “research question”. The researcher seeks to identify significant concepts related to the research question and to explore how the concepts are related.¹⁸⁵ Interpretations are the researcher’s abstractions of what is in the data. The interpretations, which take the form of concepts, categories and relationships, are continuously validated through comparisons with incoming data. The sampling of data continues until the categories are saturated, i.e., no new information have emerged from the last set of data. The theoretic preunderstanding for this study was a psychodynamic view that excessive eating may have an emotional and psychosocial function. A longitudinal design was used in order to elucidate temporal aspects of the weight reduction process.

3.2.3 Interviews

Four semi-structured interview guides with open-ended questions were constructed in order to understand how the interviewees experienced their eating, the programme and how the programme influenced their eating (Table 10). The participants were interviewed before the programme started (interview 1), half a year after start (interview 2), one year after start, when the programme ended (interview 3) and one year after the termination (interview 4). The interviews were held at the health care centre. They lasted between one and one and a half hours and were tape-recorded.

Table 10. Content of the four interview guides.

<i>Topic</i>	<i>Interview</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Family situation, work and social environment	x			
History of obesity, including parents’ and siblings’	x			
Earlier experiences of dieting and regain of lost weight	x			
Reasons for starting and expectations of the programme	x			
Motivation and responsibility for the result	x			
Eating habits	x	x	x	x
Reasons for eating	x	x	x	x
Weight change, and reasons for the change, since last interview		x	x	x
Support from significant others		x	x	x
Experiences of the weight reduction programme		x	x	
The importance of the assignments and lessons for a behavioural change		x	x	
Other weight reduction efforts after terminating the programme				x

3.2.4 Interpretation of data and analysis

All interviews were transcribed. The transcripts were interpreted and coded according to topic using both a vertical and horizontal coding system.¹⁵² Themes in the group were identified, compared and formed into categories, validated through comparison with incoming data, ordered into levels and after the third interview into an analytic scheme in order to generate a formal theory, which was checked after the fourth interview.¹⁸¹ Although it is recognised that 15 is a relatively small number of participants, it was considered an adequate number for the purpose of the study. In addition, no new information emerged from the last few interviews of each round, indicating that saturation had indeed occurred. The theory will be slightly limited in explanatory power for other weight reduction activities, i.e., bariatric surgery, where the meal order and Plate model have to be modified, and for low calorie diets, which primarily aim at a weight loss and not a life style change.

3.2.5 Appendix – methods and measurements for interviews 5-7

Methods

Interviews 5-7 followed the four interviews reported in Paper II. Hence, each participant was interviewed seven times in a five year period. A structured interview was adopted for interviews 5-7 in order to describe weight development, factors associated with weight development and the importance the weight reduction programme had for a changed life style and achieved weight control.

Study group

The participants (12 women and three men) who participated in the weight reduction programme and the qualitative study were interviewed in the interviews 5-7.

Measurements

For each interview a structured questionnaire, in order to describe how the interviewees experienced factors associated with eating and weight change, was constructed.

Anthropometrics. The participants' weights were registered at each interview. BMI was calculated as weight in kilograms divided by height in metres squared (kg/m^2).

Reasons for weight change were measured by one open question: "What is causing the weight change?"

Reasons for being obese were measured by the question: “What is causing your current obesity?” answered by choosing from a list of 26 different reasons. The list was a summary of all reasons for excessive eating given by participants in interviews 1- 4, supplemented with reasons for obesity often referred to by obese patients in a clinical setting. Two open alternatives defined as “Other reasons” were added to the list.

Meal order. The person was asked if she/he ate breakfast, lunch and/or dinner.

Plate model. The Plate model is defined as half the plate with vegetables, one quarter with proteins and one quarter with carbohydrates (pasta, potatoes, rice). The person was asked if she/he followed the Plate model for lunch and/or dinner.

Factors associated with maintenance of lost weight. This variable was measured by the questions “Do you monitor your weight regularly?”, “Does less than 30 % of the energy in your diet come from fat?”, “Are you physically active 30 minutes a day and/or vigorously physically active for at least one hour four times a week?” Each of the questions could be answered with one of the alternatives yes/no/ I don’t know.

Life style change. Engagement in a current life style change was measured by the question: “Are you involved in making a life style change now?” answered by yes or no. If the answer was yes the person was asked “What area do you prioritise in your present life style change?” with the answering options changing eating habits, increasing physical activity, decreasing stress level or another area.

Support for current life style change. This was measured by the three questions “How do you experience the support from family/friends/colleagues for your changed life style?” with the answers very good, rather good, neither good nor bad, rather bad and very bad. The alternatives very good and rather good were registered as “good” and the alternatives, neither good nor bad, rather bad and very bad were registered as not good.

An open question about the interviewee’s opinion of the weight reduction programme was included in the last interview (number 7).

Interviews

The participants were interviewed two years (interview number 5), three years (interview number 6) and four years (interview number 7) after the weight reduction programme had terminated. The interviews were held at the same health care centre as the interview numbers 1- 4, and lasted for about half an hour. One interviewee, who had moved to another part of the country, was interviewed on the telephone.

Analysis

The number of participants was sufficient for the qualitative method used for the analyses of interviews numbers 1-4, but not appropriate for making statistically significant conclusions about the result. Thus, no statistical analyses have been made on the results from interviews numbers 5-7. The aim for conducting interviews numbers 5-7 was to follow each person's development in matters associated with weight control up to four years after the programme was ended, and to get their reflective view on the weight reduction programme.

3.3 PAPER III

3.3.1 Study group

The study subjects were participating in a two year long group programme for weight reduction at Huddinge University Hospital. A general or private practitioner had referred them there. Forty-one participants divided into four groups with identical life style intervention programmes were asked to participate in the study. They were assured full anonymity and permitted to continue the programme even if they decided to leave the study. All persons in the four groups agreed to participate. The study group consisted of 24 women and 17 men with a mean age of 44.2 years.

3.3.2 Measurement

Anthropometric data. The participants were weighed in indoor clothing with no shoes, on calibrated scales, to the nearest 0.1 kg. Systolic and diastolic blood pressure, waist (at the level between the lowest rib and the iliac crest) and hip (at the level of trochanter major) circumferences were measured on blood sampling occasions according to the clinical standard procedure at the Obesity Unit.¹¹⁰ BMI was calculated as weight in kilograms divided by height in meters squared (kg/m^2).

Blood samples. Blood samples were drawn at the start and after one year, in a fasting state and in a supine position. Triglycerides, serum cholesterol and serum HDL cholesterol were estimated using enzyme kits from Roche Diagnostic (Mannheim, Germany).^{179,180,189} LDL cholesterol was calculated using the Friedewald formula.⁶⁰ Blood glucose was measured using a hexokinase method from Roche Diagnostic (Mannheim, Germany).¹⁷⁶

Locus of control. A modified form of Rotter's I-E scale with 40 items measuring control orientation was used. Eisemann et al have described the construction of this Swedish locus of control inventory aimed for clinical use.³⁹ The scale is a four point forced-choice scale of Lickert type with the following alternatives and their corresponding weights: Strongly disagree (1), disagree (2), agree (3) and strongly agree (4). The higher the score, the more external the locus of control. The maximum score would be 160 and the minimum 40. The scale does not distinguish between the two external factors "powerful others" and "chance", when assigning locus of control orientation. The control orientation of the participants was assessed twice; when they started the programme and after one year of participation. The participants were asked to fill in the LOC-form at home and return it in an enclosed envelope. If the form was not filled in completely, the participant was contacted by telephone and asked for the missing values.

3.3.3 Statistical analysis

The skewness of the LOC distribution was calculated as the third moment about the mean. Chi-square statistics were used to test for associations between study group and categorical variables and one way analysis of variance to test for associations between study group and continuous variables. A paired t-test identified significant differences in anthropometric and endocrine characteristics after one year of participation in the weight reduction programme. The Pearson correlations were determined between LOC-score at baseline, separate LOC-items and weight reduction after one year. All analyses were conducted using SPSS, version 11.0.

3.4 PAPER IV

In 1996 the Swedish National Institute of Public Health initiated and financed a national field survey of sexual attitudes, habits and experiences in Sweden. Responsibility for this study was assigned to the Department of Sociology at Uppsala University.¹¹³ The raw data were made available to researchers and projects through the National Institute of Public Health. The data presented in this paper are selected from this population sex survey.

3.4.1 Study group

A random sample of 5,250 women and men between the ages of 18 and 74 was drawn from the central population register. The population was defined as people in Sweden who could speak, read and write in Swedish. Four hundred sixty-nine persons not fitting this definition were excluded from the original sample. The final sample thus consisted of 4,781 individuals. Of this group, 2,810 individuals agreed to participate, resulting in a response rate of 59 percent. The sensitive topic, a lack of time, and a matter of principles were some of the reasons for refusing to participate.⁸¹ The material was subject to careful analyses regarding issues such as systematic effects, internal consistency and external validation. The only sign of distortion of the material was an under representation of older people, especially women. The data were thoroughly analyzed for biases, and were judged to be valid by the Uppsala research team.⁸¹

3.4.2 Data collection

Personal interviews with a strictly structured questionnaire included a combination of face-to-face interviews and self-report questionnaires.⁸¹ The face-to-face interview dealt with issues such as education, family situation and social background. The interviewer read and recorded the answers to the questions. The self-report questionnaire included questions of a more personal nature, such as sexual attitudes, sexual experiences and habits, and number of sexual partners. The self-report questionnaire was put in an envelope, which was sealed by the respondent. The interviewer did not see the answers and all questionnaires were unidentifiable. The interviews took approximately 90 minutes and were usually carried out in the respondents' homes.⁸¹

3.4.3 Measurements

The population sex survey consisted of approximately 800 variables covering the following overall themes: social background, life style, health, sexual behaviour, attitudes and knowledge.⁸¹ A selected number of these variables are used in the present study.

Demographic factors. Questions about having a steady partner (yes/no), a steady sexual partner (yes/no) and living with a partner (yes/no) were used to define present relationship status, as well as a question on whether the relationship included mutual children (yes/no). The occupation variable described the subject's main occupation during the last two weeks, and was defined by one of the following categories: student, employed, unemployed, sick leave, "homemaker" and retired (yes/no).

Sexual satisfaction. Sexual satisfaction was assessed using two questions about sexual satisfaction, one question on the importance of sexuality, two questions about the frequency of sexual desire and two questions about sexual interest. Sexual satisfaction was rated on a 6-grade scale from 1 (very unsatisfied) to 6 (very satisfied). Evaluation of sexual life was rated on a 5-grade scale from 1 (very satisfactory) to 5 (very unsatisfactory). Importance of sexuality was rated on a 5-grade scale from 1 (no importance) to 5 (very important). Frequency of sexual desire was rated on a 4-grade scale from 1 (never) to 4 (often). Subjects rated sexual desire today compared to five years ago on a 5-grade scale from 1 (much greater today) to 5 (much less today). A score above 3 indicated a decreased sexual desire compared to five years ago. A decreased sexual interest compared to 12 months ago was rated on a 6-grade scale from 1 (always) to 6 (never). A problem with a decreased sexual interest during the last 12 months was rated on a 6-grade scale from 1 (always) to 6 (never).

Sexual abuse. The participants were asked if they had ever been the victims of unwanted violence in a sexual setting. The answers were categorized as yes or no. They were also asked if they ever had been forced to participate, or to participate without really wanting, in any of 11 listed sexual acts. The answers were categorized as yes or no.

Health and life satisfaction. A subjective method was used to estimate life satisfaction. Using a checklist the subjects reported their level of satisfaction within the following ten different domains of life: life in general, partner relationship, family life, managing on one's own, friends, leisure activities, work situation, economy, psychological and physical health. The answers were rated on a 6-grade scale where 1 was rated as very unsatisfactory, 2 as unsatisfactory, 3 as rather unsatisfactory, 4 as rather satisfactory, 5 as satisfactory and 6 as very satisfactory.⁶² The estimates were supplemented with a question on any experience of a diagnosed lingering disease (more than one month) during the last year (yes/no/don't know) and a question on the respondents' subjective estimation of their general health as good, bad or something in between. A social activity variable was calculated as a composite measure of 10 leisure time activities where the subjects were asked about their participation in the activity during the last month (yes/no/don't know). The 10 listed activities were physical training, outdoor life, having a hobby, visiting a cinema, visiting a theater or opera, going to a public dance, going to a bar or pub, going to a restaurant, attending a sporting event and participating in morning service.

3.4.4 Statistical analysis

Chi-squared statistics were used to test for associations between BMI-group and categorical variables and one way analyses of variance to test for associations between BMI-group and continuous variables. In both cases separate analyses were made by gender in the two age groups 18 – 49 and 50 – 74 years. Statistical significance was set at $p < 0.05$. To study the independent association between BMI-group and some specific variables, gender- and age group-specific logistic regression analyses were computed. Normal weight persons were compared to overweight subjects and to obese individuals. The results are presented as odds ratios and significance levels. The independent variables included were: no steady sexual partner, satisfaction with sexual life, sexual desire compared with five years ago, has unwillingly participated in one or more sexual acts, age, satisfaction with leisure activities, satisfaction with work situation, satisfaction with economy, satisfaction with physical health, lingering disease during the last year and social activities. All analyses were conducted using SPSS, version 11.0.

4 MAIN RESULTS

4.1 PAPER I

In this study self-rated health was compared between normal weight, overweight and obese groups in total and in the age groups 18-24 yrs, 25-34 yrs, 35-44 yrs, 45-54 yrs, 55-64 yrs, 65-74 yrs and 75 yrs and older. A pronounced difference in self-rated health between BMI-groups among men and women was found. A higher proportion of the normal weight and overweight groups rated their health as very or quite good. The association between self-rated health and BMI was also studied with correlation analysis. There was a significant correlation between self-rated health and BMI for both men and women taking the whole group into consideration. Poorer self-rated health was correlated with increased BMI. The association differed slightly between age groups and were most pronounced in the age groups between 35 and 64 years. In the oldest age group the association was reversed, compared with the younger age groups for both men and women.

The association between BMI and self-rated health could be confounded by circumstances in a person's life situation. As a second step gender and age group specific trends in reporting reduced health with higher BMI were calculated with logistic regression analyses. In a first model age, education, marital status and immigration were included. As in the correlation analyses there was a trend of increasing odds of reporting reduced health with increasing BMI for both men and women. However, the association between BMI and self-rated health found in the correlation analyses applied in the regression analyses to the obese group and not to the overweight group. There were independent associations between educational level, marital status and immigration and self-rated health for men and women in some age groups.

As problems of functional impairment, poor physical health and impaired mental well-being naturally interact with self-rated health this interaction could of course confound the association between BMI and self-rated health. To control for confounding factors the association between BMI and self-rated health were studied in logistic regression models, the first model including back-ground factors. In a second model we calculated gender and age group specific trends in the association between BMI and self-rated health including factors relating to functional impairment, chronic disease and chronic pain. The trend of increasing odds for reduced self-rated health with increasing BMI remained almost in the same way as before. Functional impairment and chronic disease were independently associated with self-rated health for some age groups among men and women. Chronic pain was independently associated with self-rated health in a majority of age groups. The association between socio-demographic characteristics and self-rated health, which was found in model 1, remained in model 2.

In model 3 mental well-being was included in the model. The general pattern of association between BMI-group and self-rated health did not change to any greater extent. The odds ratios for impaired self-rated health among obese men in the age groups 35-44 and 55-64 years and obese women aged 35-44 and 45-54 years remained significantly higher compared with normal

weight respondents. There was an independent positive association between mental well-being and self-rated health for both men and women in all age groups. The association between socio-demographic characteristics and self-rated health weakened, when mental well-being was included in the model. The general pattern of association between functional impairment and physical health vs. self-rated health did not change when mental well-being was included in the model.

4.2 PAPER II

The findings from the interviews 1- 4 about factors affecting eating habits fell into five main themes.

Eating habits. The majority of participants followed the recommended meal plan and Plate model during the first half of the programme. They also replaced high-fat products with leaner alternatives. During the second half of the programme, the participants found it harder to follow the meal plan and Plate model. One year after the programme had terminated, the participants used leaner varieties of high-fat products and included vegetables in the meal. They had otherwise regained their previous eating habits, where eating had some other significance in their lives besides satisfying hunger.

Eating habits and weight change. Most participants lost weight during the first six months of the programme but gradually regained the weight lost. The major change in eating habits had been to eat according to the Plate model and to the meal plan. Those who gained weight reported a shortage of time for planning meals or for eating the recommended number of meals and insufficient support from significant others in the planning and composition of meals. One year after the programme had ended most participants thought differently about their eating habits even if they had not lost any weight. They were aware of what they did wrong but had problems keeping to the routines taught by the programme. The lack of support from group meetings increased the difficulty to stick to the new routines.

Factors other than hunger reported to affect eating habits. Before the programme started all but one of the participants declared other reasons than hunger for eating. Eating could be related to a visual stimulus or to the pleasure of doing it. Eating was expected to decrease stress or contribute to relaxation. It was also expected to soothe feelings of aggression, sorrow, tiredness, worry or pain. After six months some participants declared that other factors than knowing what and when to eat affected their eating behaviour. After two years the reasons for eating besides hunger were almost the same as when the programme started.

How the weight reduction programme affected eating habits. After six months the major change had been to eat according to the Plate model and to follow a meal plan. The group meetings were judged as equal to the lectures and support from supervisors in influencing the result. The optimal frequency of meetings was considered to be every week or every second week. After the programme was ended the participants did not experience a lack of knowledge about what and when to eat, but rather a lack of support when trying to apply this knowledge in daily life. The programme was criticised for not addressing problems which prevented the efforts of participants to stick to the Plate model and meal plan.

Practical factors outside the programme that affected eating habits. All participants who gained weight during the two years had children living at home. Time spent with the children and practical arrangements for them took considerable time and obstructed their ability to stick to the programme. Information on how to change old recipes instead of using new ones would have facilitated the adjustment for the rest of the family. Just as eating was reported as a way of coping with stress, a stressful day with too little time to plan meals and to eat the recommended number of meals was mentioned as an obstacle to adhering to the programme.

In summary: Other factors than hunger were important for eating habits of the participants. Information on how to change a current behaviour was not sufficient for a changed life style. Emotional factors associated with excessive eating and emotional consequences of a changed life style were related to the result. The participants wished that a period for maintenance of reduced weight should be included in the programme.

4.2.1 Appendix – results from interviews 5-7

Results

The results are from interview number 7 if nothing else is reported.

Table 11. Weight change and reasons for weight change between interviews 1-7.

Person	Gen-der ^a	Age, year, int 1	BMI kg/m ²				Reasons for weight change between int. 4-7	Other weight loss activities int. 4-7 ^b	Satisfied with current weight
			Int 1	Int 4	Int 5	Int 7			
1	F	34	36	39	41	42	Emotional factors	1	No
2	F	38	35	37	38	32	Smoking	1	No
3	F	36	37	38	37	37	Cannot tell	1	No
4	F	54	32	34	34	33	Cannot tell	2	No
5	F	32	30	30	22	23	Smoking	-	Yes
6	F	35	32	33	36	33	Following the meal order and plate model	-	No
7	F	60	34	34	34	36	Cannot tell	2	No
8	M	61	29	29	30	30	Cannot tell	1	No
9	F	49	36	37	36	33	Drinking water, following the meal order, having breakfast	-	No
10	F	53	40	40	43	44	Physical impairment	2	No
11	F	65	30	28	29	28	Following the meal order and sometimes one or two weeks of intensive diet	3	No
12	M	47	30	30	31	33	Life style change	-	No
13	F	65	35	33	32	32	Weight stable	-	Yes
14	M	68	33	31	31	30	Less fat in diet	-	No
15	F	67	30	28	32	32	Physical impairment	-	No

^a F = Female, M = Male ^b Reported in interviews 5-7.

Reasons for weight change.

As seen in Table 11 the majority of participants had been weight stable. Two persons with the greatest weight loss had started to smoke since interview number 4. Two persons with a noticeable weight gain attributed this to functional impairment and pain. Half of the participants had used other weight reduction activities between interview 4 and 7. Two participants were satisfied with their current weight.

Table 12. Reasons for being obese at interview number 7.

<i>Reason</i>	<i>Frequency</i>	<i>Reason</i>	<i>Frequency</i>
Lack of physical activity	11	Eating for comfort	3
Bad character	7	Pregnancy	3
Candy, chocolate, cookies, chips, ice cream	6	Eating because of tiredness	2
Big portions of food	5	Snacking between meals	2
Social eating	5	Eating as a reward	2
Late evening eating	4	Bad economy	2
Sandwich overeating	4	Genetics	1
Depressive feelings	4	Alcohol use	1
Worry	4	Perceived low metabolic rate	1
Stress	4	Meal order problems	1
Anger	3	Other reasons:	
Pain	3	Lack of hunger or satiety	1
Medication	3	Considerable pain and difficulties moving	1
Difficulty to resist something good	3		
Smoking cessation	3		
Sickness	3		

Reasons for being obese. As seen in Table 12 lack of physical activity was the most referred reason for being obese, followed by “bad character” (which was not defined) and eating snacks like candy, chocolate, cookies, chips and ice cream.

Behaviours associated with a maintained weight loss. As seen in Table 13 most participants regularly monitored their weight. Almost everybody was physically active. A majority of the participants did not know how much of their daily energy intake came from fat.

Life style change. As seen in Table 13 a majority of the participants involved in a life style change tried to increase their physical activity. Some participants received support for their life style change, others not.

Table 13. Weight control and life style.

Person	Meal order ^a	Plate model ^b	Behaviours associated with maintained weight loss ^c			Current life style change ^d	Good support for current life style change ^e	
			Monitoring weight	Low fat diet	Physical activity		Family and/or friends	At work
1	BLD	LD	0	2	0	S	0	0
2	BL	-	1	2	0	A	1	1
3	BLD	D	1	2	1	E	1	1
4	BD	-	1	2	1	-	-	-
5	L	L	1	1	1	-	-	-
6	BLD	LD	1	2	1	P	0	0
7	BLD	D	1	2	1	P	0	0
8	BLD	LD	1	2	1	P	1	1
9	BLD	LD	1	2	1	E	1	0
10	BLD	LD	1	2	0	P	1	0
11	BLD	-	1	2	1	-	-	-
12	BD	-	0	1	0	P	1	0
13	BD	-	0	2	1	-	-	-
14	BLD	D	0	1	1	-	-	-
15	BLD	LD	1	2	0	E	0	0

^a B=Breakfast, L=Lunch, D=Dinner,

^b L=Lunch, D=Dinner,

^c 0=No, 1=Yes, 2=Don't know

^d E=Changing eating habits, P=Increasing physical activity, S=Decreasing stress level, A=Another area, ^e 0=Not good, 1=Good

Weight reduction programme. As seen in Table 13 most participants followed the meal order but not so many used the Plate model recommended in the weight reduction programme.

The programme was appreciated for the information on fat and sugar.

“The programme was very informative on what and how often to eat which was good.” (P12)

The group meetings were supportive for changing eating habits and the participants wished that they should have lasted for an extended period.

“I enjoyed to share experiences with and get support from the group.” (P3)

“I wish we could go swimming together. I don't want to go to the pool alone and be a lonely fatso. We could also go for walks together and enjoy physical activity in a mode suited to our ability.” (P9)

The programme was criticized for being too general and not providing individual advice important for a behavioural change.

“I thought the programme should be more individual. I wanted more advice on how to structure my eating (shift worker).” (P8)

“The participants in the group were too different and not on the same level. The group was not supportive for me.” (P5)

4.3 PAPER III

LOC-orientation, changes in medical risk factors and body weight were measured and compared among participants in a life style intervention programme for weight reduction. Of 41 persons who started the programme, 28 participants remained after one year. The demographic and anthropometric characteristics of the dropouts were similar to those of the completers. They were significantly different only in one respect: the completers more often had a family situation involving another adult. The mean age of the study group was 47.2 years.

T-test was used in comparing body weight, anthropometrics and LOC-values after one year with base-line data. Body weight had decreased significantly and some medical risk factors had improved. There was no significant change in locus of control orientation. In correlation analyses a significant association between the LOC-score at baseline and the absolute weight reduction (kg) after one year was found. The more internal orientation of locus of control, i.e., the more the person believed in her/his capacity for goal attainment and assumed responsibility for the result, the greater was the weight reduction. The obese study group was significantly more externally oriented than a group of healthy subjects used for comparison, when the LOC questionnaire was constructed (data not shown). Four statements in the LOC-questionnaire were significantly negatively associated with weight reduction. These statements were “It is really only chance that determines if one feels well”, “People are often mad at me for no reason”, “Many of the negative things that have happened to me were because of bad luck” and “If work is unpleasant one can only hope of getting a better job”.

4.4 PAPER IV

A majority of participants were of normal weight, except in the group of older men where overweight was common. The normal weight men in the younger age group, ≤ 49 years, had a lower mean age compared with the other BMI-groups. Overweight men in the younger age group more often than men in the other two BMI-groups had a stable life; they had a steady partner, a steady sexual partner and were living with a partner. The proportion of unemployed or retired subjects was higher in the obese groups of men and women, compared with the other BMI-groups.

In variance analyses the obese men in the younger age group scored lower on satisfaction with sexual life than the other BMI-groups. This difference did not remain in the multivariate analyses. Obese men in the older age group experienced a greater decrease in sexual desire during the last five years than normal weight men. In the younger age group a smaller proportion of obese men had a steady sexual partner and were satisfied with sexual life compared with the other BMI-groups. They also more often declared a decrease in sexual desire, compared with five years earlier. These differences between BMI-groups among younger men did not appear in the multivariate analyses. The data do not to any great extent support the hypothesis that obesity would be associated with sexual abuse and sexual satisfaction. One exception is the older group of men, in which there is a positive association between overweight/obesity and involuntary participation in sexual activities in both the univariate and multivariate analyses.

The associations between BMI-group and different other aspects of health were in general agreement with previous findings. Overweight, and especially obese, individuals have poorer physical and general health and more often have a lingering disease compared with normal weight persons. No other consistent associations were revealed. In the multivariate analyses it was found that overweight and obese persons in the younger age group were less satisfied with their physical health, compared with the normal weight group. There was no such difference between BMI-groups in the older age group, in spite of the fact that there was a difference between BMI-groups among women in experiences of a lingering disease during the last year.

5 GENERAL DISCUSSION

This thesis consists of four different studies with different design, study groups and measures. The aim has been to illustrate different perspectives on obesity in order to get a better understanding of some factors affecting weight reduction and weight control. Thus, it has not been possible to follow one study group through all studies. However, the intention is that the results from this thesis will give information on some separate issues associated with obesity and life style change for weight control, which could be important when treating obesity and designing intervention programmes. The results could be summarized as:

An inverse association was found between BMI and self-rated health for men and women in study I. The association was most pronounced in the middle-aged groups. In this study a strong positive association between obesity and functional impairment and chronic disease also appeared for both men and women. A positive association between obesity and impaired mental well-being was found among both men and women and a strong positive association between obesity and chronic pain appeared among women.

In study II external stimuli, a stressful life and emotional reasons for eating were related to eating habits before the weight reduction programme started. After the programme was ended the same reasons, together with a non-sufficient support for a behavioural change, continued to affect eating habits and obstructed a maintained weight loss.

An internal locus of control orientation was in study III associated with increased weight loss among the patients of one particular weight reduction programme.

In study IV no consistent indications of an association neither between obesity and sexual satisfaction, nor between obesity and experiences of sexual abuse were found. However, obese older men reported a greater decrease of sexual desire during the last five years and overweight older men reported involuntary participation in sexual activities more often than normal weight men. The latter indicates that traumatic experiences could be associated with obesity.

In this chapter these results will be discussed in a wider context.

5.1 OBESITY AND HEALTH

Obesity has been identified as a risk factor for impaired physical health and impaired mental well-being.^{10,17,20,90,132,216} This is confirmed in papers I and IV. An association between obesity and impaired mental well-being reported for both men and women in paper I have been reported in other studies.^{158,187} One possible explanation is that the frequently reported prejudice and social stigmatisation of obesity results in an impaired mental well-being.^{12,61,140,146,155,156,168,188} Self-rated health has been reported to be an independent and often better predictor for future morbidity and mortality than medical diagnoses.⁸⁵ An inverse association between BMI and self-rated health was found (Paper I). The association was most pronounced among obese men in the age groups 35-44 years and 55-64 years and obese women in the age groups 35-44 years and 45-54 years. An association between obesity and self-rated health has been confirmed in other studies. However, in some studies the association disappeared when controlling for other factors.^{25,46,118,128,136,197,206,222} The obese group of men and women more often than the other BMI-groups reported functional impairment and chronic disease (Paper I). A strong association between obesity and chronic pain appeared among woman. The findings emphasize the importance of addressing self-rated health as well as physical health and mental and psychosocial well-being in obesity treatment.

WHO gives a definition of obesity as a chronic disease.²¹⁶ This definition could be discussed. Obesity could also be seen as a the consequence of a sustained imbalance between the intake and expenditure of energy and a risk factor for impaired physical health, mental and psychosocial well-being.⁸³ Obesity does not have to be labelled a disease in order to be taken seriously. Public health measures and preventive medicine often receive generous funding (i.e., annual physical examination, smoking cessation campaigns, promotion of exercise and active life styles). Whether and how our institutions and organizations pay for obesity treatment should ultimately depend on what health outcomes we value, how much we value them and the cost of achieving them, not on whether obesity is labelled a disease.²¹³

5.2 REASONS FOR EXCESSIVE EATING

The participants in study II reported different reasons for an excessive eating. One reason was an insufficient knowledge of the relation between the intake and expenditure of calories. Two highly appreciated lessons in the weight reduction programme reported in Paper II were on fat and sugar. In the last interview in the same study, four years after the programme had ended, a majority of the patients did not know how much of their daily intake of calories came from fat (Chapter 4.2.1). Studies of diet records for a few days have shown that obese persons tend to under-report their energy intake more than normal weight persons.¹⁷⁷ “Diet record” was the most appreciated exercise in the weight reduction programme reported in Paper II. In clinical practice when patients sometimes report eating without being aware of it or cannot tell any reason behind being overweight, it might be useful to ask the person to keep a diet record for a couple of days, which would increase the consciousness of the intake.

An external stimulus, to see or smell something good, was mentioned as a cue for excessive eating (Paper II). Sensitivity for external stimuli was inversely associated with weight reduction (Paper III). These findings are in line with other reports of obese persons as being more easily affected by external cues for eating than normal weight persons.^{167,174} Very low calory diets (VLCD) usually provide a diet with an acceptable minimum energy level of about 400-800 kcal/day in the form of protein, mineral and vitamin-enriched meals or drinks.²¹⁶ In a VLCD the person does not have to decide on what and how much to eat, just keep to the prescribed nutritional blend. Tempting external cues for eating are avoided during the diet. In clinical practice patients tell that it is easier to keep to a VLCD than to eat in a non-excessive way. One explanation might be that given an own choice, ambivalent feelings towards what and how much to eat are more prominent and tougher to handle.

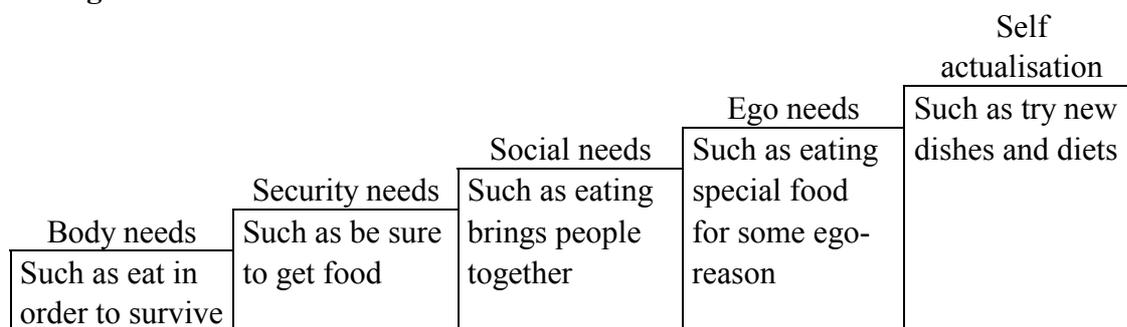
Sensitivity for external stimuli brings about vulnerability for stressful situations.¹⁶⁷ Two ways for stress to affect eating habits were reported in Paper II. Stress obstructed the planning for purchase of vegetables, a vital ingredient in the Plate model.³ Eating was also a way to relax after a stressful day. Overeating has been described as a passive coping strategy, a way of escaping problems instead of confronting them.^{109,138,141} Obese persons have been found to use passive coping more than active, problem focused coping.¹⁶⁶ The passive coping strategy of excessive eating has been found more often among women than among men.¹⁰⁸

Excessive eating could be a symptom of untreated traumatic situations. In Paper IV no consistent association was found between experience of sexual abuse and obesity. However, an association between overweight and experience of sexual abuse was found in the older group of men. Obese victims of former sexual abuse have been reported to experience more difficulties losing weight than non-victims, unless treatment has been given for their trauma.⁹⁵ Individuals with a history of sexual abuse may become uncomfortable with their body as their appearance becomes more attractive to the opposite sex through weight loss. Therefore they may discontinue weight loss treatment. If eating and obesity has the function to repress traumatic memories of a sexual trauma it is when the eating pattern is changed that the underlying problems become perceptible. Given that the long-term effects of sexual abuse could interfere with obesity treatment, it appears that a history of sexual abuse may be an important pre-treatment variable to consider.^{45,95} This could also be the case for other traumatic experiences, which unless treated, would affect the result of weight reduction activities.

In the first and last interviews in Study II a number of reasons were given for excessive eating (Paper II and Chapter 4.2.1). Most of them were emotional. That eating and feelings of physical satisfaction could gratify and balance feelings of anxiety, anger, sadness, sorrow and loneliness have been reported elsewhere.^{33,37,122,167} If reasons for excessive eating are not addressed during a weight reduction programme they will obstruct the weight reduction and weight loss maintenance after the programme has ended.

Eating has thus been found to have various functions besides getting sufficient amount of energy for living. Maslow's motivational hierarchy could exemplify different needs food, cooking and eating could satisfy.¹²¹ This is presented in Figure 23.

Figure 23. Maslow's motivational hierarchy from the perspective of food, cooking and eating.



5.3 LIFE STYLE AND LIFE STYLE CHANGE

“Life style” could be interpreted in different ways and is often interpreted as “health life style” in weight reduction activities. “Health life style” has been defined as decisions in health matters like food, physical activity, smoking and coping with stress.³¹ Socio-demographic factors like family situation, immigrant background and socio-economic status and the psychosocial factor social support have been associated with obesity (Papers I and IV), weight reduction (Papers II and III) and weight loss maintenance (Paper II). It could be discussed whether these factors are “health life style” variables or “life style” variables.

The Swedish parliament (Riksdagen) in 2003 decided on a national strategy for public health.⁷⁴ The parliament confirmed the association between life style and health life style and underlined the importance of social equality in health matters. The strategy is to be based on the overall aim “the creation of societal conditions which ensure good health, on equal terms, for the entire population” and contained 11 defined goals. Two of the goals, physical activity and good eating habits and safe food, are important tools not only for accomplishing weight control, but also for reducing risks related to obesity and the metabolic syndrome.^{98,198}

Even if there has been an increase of obesity in Europe during the last decades, the increase has not been uniform. A process where the inhabitants have been accustomed to make conscious personal choices in health life style matters has been used to explain the low increase of obesity in France and Italy compared with other European countries.⁸² These countries also have well defined meal patterns with minimal “between meal snacking”.^c Constant snacking, no routines for regular meals and a glorification of “fast” as in “quick weight loss diet” often advertised in media, alienates from the real process of life style change for weight control. A truthful report of the process would provide more realistic expectations and counteract the disappointment from previous unsuccessful weight loss efforts.

As described in chapter 1.6 a life style change includes three phases; first a motivational phase preparing for the change, then the active behavioural change and finally the maintenance of change. Before the weight reduction programme reported in Paper II started, all patients declared themselves to be highly motivated to lose weight. After five years the result measured in kg (Chapter 4.2.1) did not correspond to their initial motivation. A motivational phase preparing for a behavioural change might have matched their readiness for change in another way than the expectation for an instant weight loss did. In the motivational phase the patient identifies and makes an emotional revision of the problem behaviour, finds alternative ways to handle a problematic situation, explores possible emotional and practical outcomes of the alternatives, decides for one of them and makes a plan for action.⁷

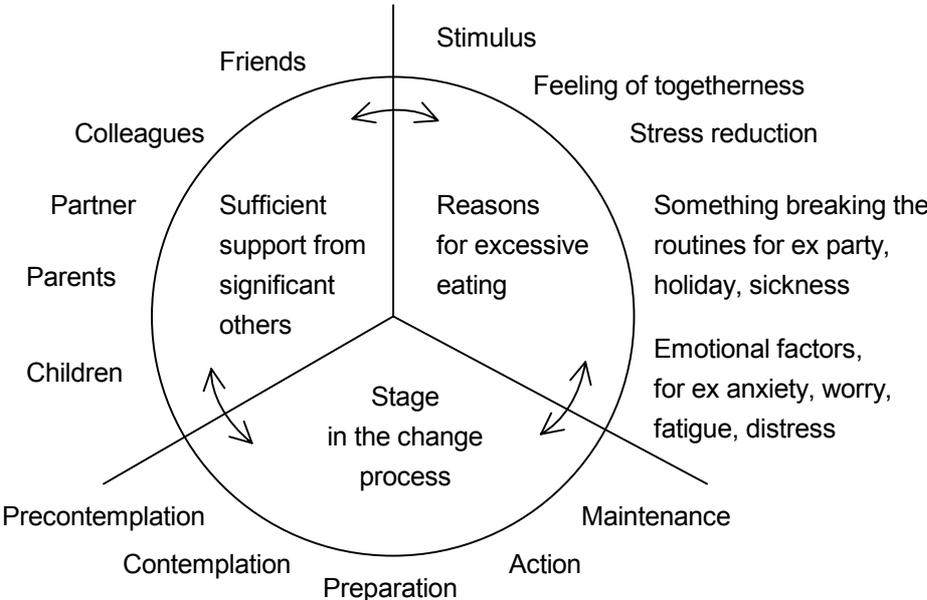
In a long-term perspective it might be rewarding for weight control programmes to consider the patient's whole life situation and let her/him participate in the decision on what issue to prioritise in treatment. In Paper I an inverse association was found between BMI and self-rated health for men and women. An association between obesity and functional impairment, chronic disease and impaired mental well-being was found among both men and women. Among women a strong association was also found between obesity and chronic pain. Obesity may lead to functional impairment, impaired physical health or mental well-being, on the other hand numerous health problems can lead to weight gain, underlying processes may cause weight gain as well as health impairment and finally, these mechanisms likely act simultaneously.

An internal locus of control orientation was associated with increased weight loss in paper III. Supporting a patient's responsibility for what realistic changes to make would improve her/his internal locus of control orientation and self-efficacy.⁷ As WHR is strongly correlated to hopelessness,¹⁸ it is interesting to reflect on the concept of hope and its meaning for weight reduction programmes. In a concept analysis of hope, an association between hope and future orientation, positive expectation, activity, realism and goal setting was found.⁴³ Consequences of hope include ability to cope, renewal, new strategies, peace, improved quality of life and well-being.¹⁵ Sources of hope can be constituted by family, friends and religious or philosophical beliefs,^{106,148} but also by information, quick attention of health problems, and professional support.¹⁰⁶ Hope is associated with a perceived ability to master situations, which has been shown to be a success factor for life style changes.¹⁸⁶ Hope is emphasized as the cornerstone of the patient empowerment philosophy, which is based on the premise that human beings have the capacity to make choices, and are responsible for the consequences of their choices.⁴⁸

A period of maintenance of the behavioural change belongs in a life style intervention.¹⁴⁴ The maintenance period differs from the period of active behavioural change. Not getting the usual feed back from decreasing weight numbers on the scale, as in the active behavioural change, might feel monotonous and boring. Though a majority of the patients followed a recommended meal order and the Plate model four years after the programme had ended, the emotionally affected eating still maintained an important function (Chapter 4.2.1). The two patients with the greatest weight loss had used smoking to achieve changed eating habits. The health hazards from smoking one-pack-a-day of cigarettes have been equalized to the risk of an extra 57 kg of body weight.¹⁴⁵ Excessive eating was reported when affinity with a group and social support from that group was prioritised before keeping the meal order and Plate model. During the programme support from the weight reduction group helped patients to stick to the meal plan and Plate model (Paper II). This effect vanished when the programme was terminated. The patients wished that the programme had continued for at least another year, with meetings every week or once a fortnight (Paper II). That the importance of social support should be taken into account when one is studying, preventing and treating obesity is supported elsewhere.^{57,87,93,108,137,144,215}

This section will be closed with a figure on factors affecting eating behaviour and behavioural change. The figure was made during the first two years of interviewing patients in the weight reduction programme reported in Paper II. The figure has been useful in situations when speaking about a life style change for weight control.

Figure 24. Factors affecting weight change among obese



6 REFLECTIONS AND FUTURE PERSPECTIVES

These reflections are based on research, literature studies and personal clinical experience.

6.1 PRIMARY HEALTH CARE

The Swedish Parliament (Riksdag) underlined the importance of social equality in the strategy on public health matters presented in 2003.⁷⁴ Primary health care is an instance with great possibilities to put social equality in health matters into practice. Primary health care is available for everybody. Primary health care centres are mostly located in a neighbourhood area and easy to reach for everybody. Since obese women more often live alone, are less socially active and report a lower degree of social support than the other BMI-groups, they may need special support systems (Papers I and IV). Support groups could be established at the primary health care centre for people living in the area. An inverse association between obesity and SES has been found.^{107,143,153,172,216} It is thus important that the cost for weight control activities is reasonable. The cost for health care is limited during a one-year period. Life style changes are long-term activities.⁴ The organization of primary health care facilitates long-term continuity in the relation between patient and caregiver. This makes primary health care centres optimal for long-term treatment as well as primary prevention (prevent the occurrence) and secondary prevention (prevent the re-occurrence) of obesity. Primary health care personnel have been found to have a good reputation among the obese, who especially wished for nurses and physiotherapists to increase their services (Chapter 1.7). These reasons support the argument that primary health care personnel should be given resources as time, patient education material, supervision and organizational support necessary to facilitate a life style change for their obese patients.

As reported in Papers I and IV functional impairment and chronic pain are more prevalent in the obese group compared with the other BMI-groups. The support from a physiotherapist/naprapath could be necessary in order to increase the obese person's physical activity. It is unrealistic to ask a person, who suffers from functional impairment and chronic pain to walk for 30 minutes. If the ultimate goal would be a 30 minute walk, the first step for an obese person might be to stretch the arms above the head or to rise from sitting or lying on the floor to an upright position.

A dietician has the knowledge of food and nutrition to support a life style change for good eating habits and safe food. Psychological and psychosocial factors have been associated with excessive eating.^{33,37,122,167} The participation of a psychologist seems natural when addressing emotionally affected eating patterns. The nurses often have the most frequent contacts with the patients in the health care centre. This, together with the appreciation and trust from the obese group of patients reported in Chapter 1.7, makes the nurse an important person when working with weight reduction activities as well as with primary and secondary prevention of obesity. A suggestion is that a physiotherapist/naprapath, a dietician, a psychologist and a nurse could support life style change activities for weight reduction at primary health care centres.

In order to provide primary and secondary prevention of obesity it could be routine procedure to register BMI and WHR when a patient visits the centre. It is easy to measure weight and height and to calculate and register BMI. Since WHR has been identified as the best predictor for co-morbidity when not controlling for age it could also be helpful with a registration of WHR.³⁶ In this way persons at risk would be identified and could be offered support from the centre for a life style change.

6.2 INTERVENTION

When working with life style changes it is considered to be important to match the intervention with the patient's needs and readiness for change. From my experiences as a psychologist having worked in this field I would suggest a structure and a model for life style changes for weight control. The structure and model have to be evaluated against other structures and models in clinical practice before any conclusions could be made about their usefulness. The structure consists of an interview and an intervention.

1. Interview

The obese group is heterogeneous.^{54,100} A personal interview could be an important tool before starting an intervention. The interview could be initiated by an increased BMI/WHR or by a patient's own interest for participation in a weight control activity. The care giver could inform on and answer questions about the activities and match activity with the patient's preferences. Issues that could be addressed during the interview are self-rated health and well-being, reasons for excessive eating, motivation and readiness for a behavioural change, support, family situation, experienced stress, expected weight loss and experiences from former weight loss activities.

The following questions could be used to find out the person's motivation.¹⁶¹ The first two would tell about the attributed importance of a weight reduction, the latter two would tell about the person's self-efficacy in realising the change.

How important is it for you to lose weight?

Not important 0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10 Very important

What is more important for you than losing weight?

How big are your chances to succeed with a weight reduction?

Nonexistent 0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10 Very big

What obstacles can you see for a weight reduction?

A regular self-monitoring of weight, eating breakfast daily, physical activity like walking for 30 min a day and <30% of the calories coming from fat have been identified as success factors for weight loss maintenance.^{34,214} The transtheoretical scheme could be used for assessing a person's position in the ladder of change for each of the four behaviours.¹⁴⁴ The same structure of questions could be used for all behaviours, here exemplified by physical activity.

Do you walk or do any similar activity for 30 min/day? Yes No I don't know

Precontemplation (Do not need to change)

I do not need to increase my physical activity

Contemplation (Reflection and re-evaluation)

I need to increase my physical activity, but it is not the right time

I have some emotional reasons and physical reason that makes it hard for me to increase my physical activity now

I would like to start in the coming six months

Preparation (Prepare, try and train)

- I have started to prepare for increasing my physical activity
- There are no emotional or physical reasons preventing me from increasing my physical activity
- I would like to start in the coming month
- I have looked around for alternatives and tried some of them

Action

- I walk, or do something similar, 30 minutes a day, since less than six months
- Sometimes it works, sometimes not

Maintenance

- I walk, or do something similar, 30 minutes a day, since more than six months
- It works

2. Intervention

A match between a patient's needs and intervention would, together with the patient's realistic expectations of the intervention, increase the odds for a satisfactory result. If the patient wishes support for a life style change the intervention could be discussed in the interview. Here follow some suggestions for different interventions.

a) Increased physical activity.

Due to functional impairment and/or chronic pain the patient might need the support from a physiotherapist/naprapath to be able to increase her/his physical activity.

b) Learning effective strategies for coping with stress.

As described in Chapter 1.4.2 a stressful life situation has been associated with excessive eating. The patient might experience a stressful life and needs to acquire effective coping strategies before being able to make any other changes in her/his life. In clinical practice patients explain that after having learned to manage potentially stressful situations, it has become easier to follow the recommendations on meal order and Plate model.

c) Debriefing of traumatic life events.

As reported in Chapter 1.4.3 excessive eating and difficulties in losing weight have been associated with untreated traumatic experiences. A debriefing of these episodes with a psychologist might be necessary before participating in any weight reduction activity.

d) Life style intervention for weight control.

This model is a suggestion for life style change for weight control. The model is based on own experiences from clinical practice, on Paper II and Paper III, on literature on obesity and weight reduction, on the transtheoretical model for life style change,¹⁴⁴ on the patient empowerment method for life style change,⁷ and on research on the importance of social support for weight reduction activities and a maintained weight loss.^{57,87,93,108,137,144,215} The model has to be evaluated in a clinical setting and compared with other models before anything could be said about its effectiveness. The suggested model includes three phases; a motivational phase, a phase for active weight reduction and a phase for weight loss maintenance. The model aims for allowing for individual variation in a group setting.

In the *motivational phase* the patient would be helped to explore a problem behaviour associated with excessive eating, clarify feelings and values associated with the problem and identify goals and possible choices. This phase could be in the form of life style seminars. Based on six issues for life style seminars used in diabetes care,⁴⁷ extended with four issues related to excessive eating the issues for ten seminars could be: Explore feelings and values of being obese and trying to lose weight, Motivation, Good eating habits and safe food (a dietician could participate), Stress and coping behaviours, Social support and communication, Emotional eating, Physical activity (a physiotherapist could participate), Goal setting, How to make a plan for action and evaluate it, Weight maintenance and relapse prevention. The seminar could start with an informative short lecture by the supervisor on today's issue but mainly consist of a dialogue between participants, in small groups, with personal reflections on the issue. The supervisor could provide some cue questions for the dialogue. The reflection and verbalisation of feelings and thoughts would make the issue meaningful from a personal perspective for the participants. Participation in the seminars could be optional. Significant others could be invited to participate. A life style change for weight control would be facilitated with support from the obese person's social system. This phase could last for one semester. After a sequence of seminars the participant could be asked if she/he wants to continue with the next phase, an active behavioural change and weight reduction. Some participants might want to participate in another sequence of seminars before continuing with the next step.

In the *active behavioural change* the participants could be given tools for a weight reduction of 0.5 kg a week. An existing manual for a weight reduction programme could be used during this phase.¹²⁵ Ten meetings with homework between the meetings could address issues on: The importance of a regular meal pattern,¹¹⁹ The Plate model, Individual energy lists¹⁹¹, Behaviour techniques, Hunger and craving, Risk situations, The behaviour chain, Physical activity (theory), Planning everything e.g. purchase lists, menus, cooking, Fast food, Nutritional lectures, Christmas and other holidays, Alcohol and other beverages, Some physiology, Eating habits, Positive reinforcement, Plans for the future. The meeting could start with a discussion of the homework in small groups, followed by a lecture given by the supervisor and an introduction of the homework to the next meeting. Participation in the meetings could be optional. This phase could last for one semester.

The last phase in the suggested model would be the *maintenance of lost weight*. This phase could aim for patients to get accustomed to new eating habits and reach weight control. In order to address problems experienced by the patients, each semester could start with the group deciding on what issues they want to address during the semester. The Metaplan method could be used for this.^d All patients could write topics they want focused during the following semester on a small piece of paper, which would be nailed to a screen in front of the group by a supervisor. The group would arrange the topics into issues, name the issues and prioritize among them. Due to own interest the patients could form subgroups, responsible for the meeting when the issue would be addressed. The meetings during this phase could start with participants telling their experiences on eating and physical activity since the last meeting. Then a participant or the supervisor could introduce today's issue. This could be followed by a dialogue in subgroups on cue questions. Participation in the maintenance phase could be obligatory.¹¹¹ This phase could last for two semesters. Support groups could be constituted during the last semester and it could be arranged for regular appointments to register weight.¹¹¹

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