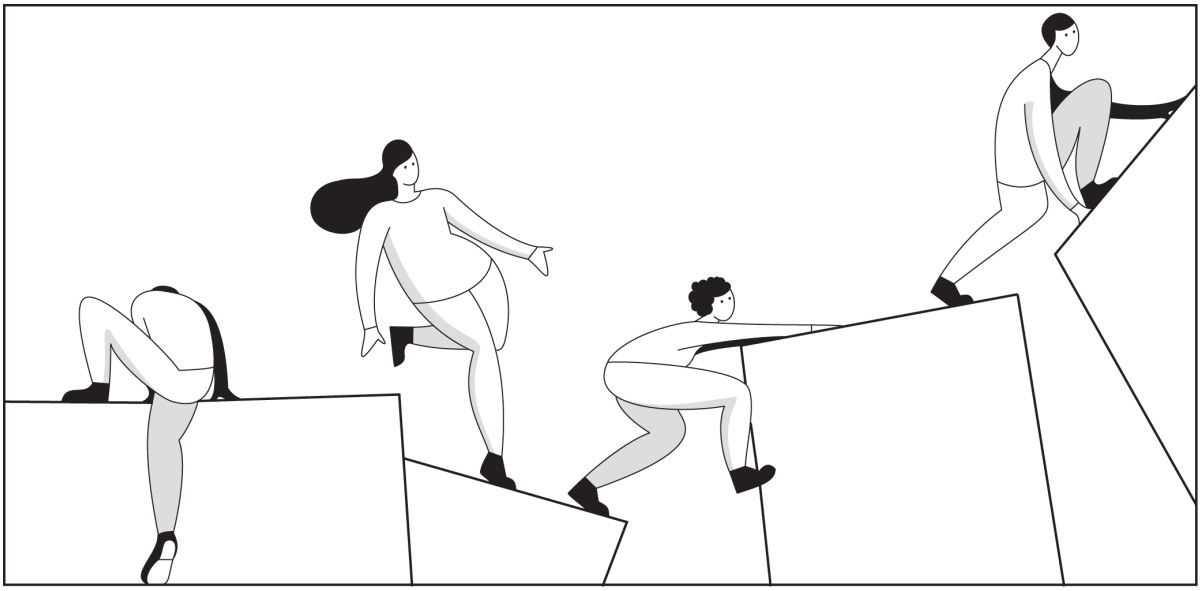
Preventive health consultations in general practice for vulnerable adults with psychosocial problems

Freund, Kirsten Schierup

DOI (link to publication from Publisher):
10.54337/aau492714658

Publication date:
2022

Document Version
Publisher's PDF, also known as Version of record

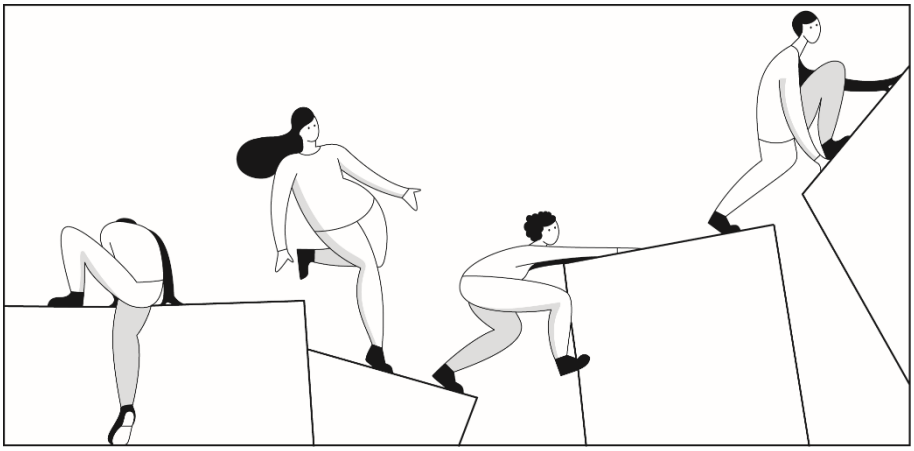


PREVENTIVE HEALTH CONSULTATIONS IN GENERAL PRACTICE FOR VULNERABLE ADULTS WITH PSYCHOSOCIAL PROBLEMS

BY
KIRSTEN SCHIERUP FREUND

DISSERTATION SUBMITTED 2022

AALBORG UNIVERSITY
DENMARK



Preventive health consultations in general practice for vulnerable adults with psychosocial problems

PhD Dissertation

Kirsten Schierup Freund

Dissertation submitted March 2022

Dissertation submitted: March 2022

PhD supervisor: Prof. Asbjørn Mohr Drewes, MD, PhD, DMSc.
Aalborg University Hospital and Aalborg University
Denmark

Assistant PhD supervisors: Emerita Associate Prof. Annette Davidsen, MD, PhD, DMSc, The Research Unit for General Practice and Section for General Practice, Department of Public Health, University of Copenhagen, Denmark

Prof. Janus Laust Thomsen, PhD, MD, Centre for General Practice, Department of Clinical Medicine, Aalborg University, Denmark

PhD committee: Clinical Professor Søren Paaske Johnsen (chair)
Aalborg University, Denmark

Professor Flemming Bro
Aarhus University, Denmark

Associate Professor Stefan Hjørleifsson
University of Bergen, Norway

PhD Series: Faculty of Medicine, Aalborg University

Department: Department of Clinical Medicine

ISSN (online): 2246-1302
ISBN (online): 978-87-7573-800-7

Published by:
Aalborg University Press Kroghstræde 3
DK – 9220 Aalborg Ø Phone: +45
99407140 aauf@forlag.aau.dk
forlag.aau.dk

Printed in Denmark by Rosendahls, 2022

CV

1979-2016	General practitioner, Gandrup, Denmark
1985-1990	Member of "The GP group for health policy in Northern Jutland". Design, implementation, and evaluation of the pre-study 1987-88
1989-	Clinical lecturer in programmes for general practitioners and medical students, Aarhus, Copenhagen, and Aalborg University
1998-2000	Design and implementation of "Preventive health consultations in general practice for 20-44-year-olds"
2016-	Retired as a general practitioner
2017	Supervisor and examinator of Master´s thesis, Aalborg University
2018	Supervisor of Master´s thesis, Aalborg University
2000-2020	Evaluation and publications from "Preventive health consultations in general practice for 20-44 -year-olds"

Published papers from 2002 to 2020

Freund KS, Lous J. (2002) Potentielt marginaliserede 20-44-årige i almen praksis. Hvem er de? Resultat af en spørgeskemascreening. (Potentially marginalized 20-44-year-olds in general practice. Who are they? Results from questionnaire screening). English summary. *Ugeskr Laeger*,164,5367-72.

Freund KS, Lous J.(2012) The effect of preventive consultations on young adults with psychosocial problems: A randomized trial. *Health Educ Res.*,27(5), 927–945.

Hansen E., Fonager K., Freund. KS., Lous J. (2014) The impact of non-responders on health and lifestyle outcomes in an intervention study. *BMC research Notes*, 7,1-9

Lous J, Freund KS. (2016) Predictors of weight loss in young adults who are overweight or obese and have psychosocial problems: a post hoc analysis. *BMC Fam Pract*., 17,1-12.

Soot L, Freund KS, Lous J, Vass M, Hvas L. (2018) How younger adults with psychosocial problems experienced person-centred health consultations. *Patient Experience Journal*, 5,116-122

Comins JD, Freund KS, Christensen KB, Lous J, Brodersen J. (2019) Validation of a health screening questionnaire for primary care using Rasch models. *J Patient Rep Outcomes*, 3,1-10

Freund KS, Guassora AD, Hegelund T, Hvas L, Lous J. (2020) Resources in vulnerable young adults: self-assessments during preventive consultation with their general practitioner in Denmark. *Health Promot Int.,* 35(5): 1180-89.

List of papers

This thesis is based on four studies presented in the following papers:

I. Freund KS, Lous J. (2002) Potentielt marginaliserede 20-44-årige i almen praksis. Hvem er de? Resultat af en spørgeskemascreening. (Potentially marginalized 20-44-year-olds in general practice. Who are they? Results from questionnaire screening). English summary. *Ugeskr Laeger*, 164, 5367-72.

II. Freund KS, Lous J. (2012) The effect of preventive consultations on young adults with psychosocial problems: A randomized trial. *Health Educ Res.*, 27(5), 927–945.

III. Lous J, Freund KS (2016) Predictors of weight loss in young adults who are overweight or obese and have psychosocial problems: a post hoc analysis. *BMC Fam Pract*., 17,1-12.

IV. Freund KS, Guassora AD, Hegelund T, Hvas L, Lous J. (2020) Resources in vulnerable young adults: self-assessments during preventive consultation with their general practitioner in Denmark. *Health Promot Int.*, 35(5):1180-1189.

English summary

The thesis is based on four of seven papers published in the period 2002 to 2020. The papers evaluate structured preventive health consultations for vulnerable 20-44-year-old patients with psychosocial or lifestyle problems who attended their general practitioner (n=28) in the period from 1998 to 2000. Despite increasing discussions of inequality in health no other intervention studies in primary care are known to focus on resources in this target group of attending patients without evident disease, but with basic problems associated with self-care and health- behaviour.

Objectives

The aims of the thesis are to investigate 1) whether screening of adults attending general practice could identify patients with few resources and many psychosocial or lifestyle problems and 2) whether two preventive health consultations with their general practitioner (GP) with a focus on the whole person, individual goals, resources, and barriers could increase patients´ wellbeing and awareness of resources or lead to health-related changes.

Method and material

The quantitative and qualitative evaluation is based on four questionnaires, used as working material for the preventive process. Patients were offered participation if the screening questionnaire (Q33) reflecting e.g. essential health theories revealed ≥ 7/33 problems. After returning a baseline Q (Q1), patients were randomised to control (treatment as usual) (n=255) or two person-centred consultations with their GP (n=240). Both groups were sent a 1-year follow-up Q (Q2). During the consultation, a conversation sheet (CS1-Q) was answered concerning prioritized goals within lifestyle or life circumstances, resources, barriers, and time frame to reach the goal.

Results

Of the attending patients, 30% reached the cut-off level. Problems were mainly related to ability to solve own problems in everyday life, confidence, network, and self-rated global health (paper I). One-year results showed improvement in both groups, yet more so in the consultation group than in the control group regarding mental health (Mental Component Score of the 12-Item Short Form Survey; MCS-SF-12), number of screening problems and subjective effect of the participation (paper II). Weight loss when having BMI ≥25 was mainly related to the two predictors mentioned below and not significantly to randomization. The main predictors of an approximate 5% weight

loss (-4,7 kgs) after one year were 1) pre-consultation consideration of weight loss within 30 days, and 2) weight loss chosen as the first prioritized goal during the consultation (paper III).

The statements of own resources to reach the goal in CS1-Q show awareness of own constitution, especially willpower and tenacity, and of network (paper IV). Own experience was seldom stated as resource (paper IV).

Conclusion

The thesis indicates that psycho-socially vulnerable adults can set health related goals and state resources to reach this. After one year they had improved mental health and lifestyle and a reduced number of problems. Preconditions were thorough preparation with reflections on own psychosocial situation and priorities for change. The changes were more pronounced in the consultation group indicating positive follow-up on these reflections by two structured consultations with own GP.

Predictors for weight-loss underlines the importance of respecting individual priorities to reach a goal. The mentioned resources support the theory of salutogensis (Antonovsky) and self-determination theory (Deci and Ryan) as they reflect self-identity and social support (paper II, III and IV). The seldom statement of own experience as resource contradicts the major source in Bandura´s theory of self-efficacy, "mastery experience". This might reflect low self-efficacy in this study population (paper I and IV). Despite this the resource statements and one-year results seem to reflect increased self-efficacy to reach their prioritized goal within lifestyle or life circumstances.

Perspectives

The free and frequent attendance to general practice in Denmark is a unique frame for primary prevention. Inequality in health is mainly discussed as social inequality, but many personal resources are involved that might be supported. A structured working method might facilitate awareness and essential support of selfcare among patients, who are overwhelmed by everyday problems and lack of confidence. Hopefully awareness of this complexity can be implemented in future offers from primary healthcare.

Dansk resume

Afhandlingen bygger på fire ud af syv artikler, der er publiceret i perioden 2002-2020. Artiklerne evaluerer effekten af forebyggende helbredssamtaler med egen læge for sårbare 20-44-årige med psykosociale problemer. Interventionsstudiet er udført i perioden 1998-2000 af 28 praktiserende læger i Nordjyllands Amt. Trods tiltagende diskussioner om ulighed i sundhed foreligger så vidt vides ikke andre interventionsstudier overfor denne målgruppe, der uden egentlig sygdom har basale problemer med at udøve egenomsorg og relevant sundhedsadfærd.

Formål

De overordnede formål med afhandlingen er 1) at analysere om screening af lægesøgende 20-44-årige kan identificere patienter med få ressourcer, mange psykosociale problemer og livsstilsrisici og 2) om to forebyggende personcentrerede samtaler hos egen læge med fokus på personens helhedssituation, individuelle mål, ressourcer og barrierer kan bidrage til bedre trivsel, opmærksomhed på egne ressourcer eller føre til sundhedsrelaterede ændringer.

Materiale og metode

Kvantitative og kvalitative analyser er foretaget ud fra fire spørgeskemaer, der er brugt som arbejdsredskab i den forebyggende proces. Deltagere blev udvalgt vha. et screenings-spørgeskema med 33 spørgsmål udviklet bl.a. ud fra helbredsteorier vedr. sundhedsadfærd (Q33). Patienter med ≥7 problemer blev tilbudt deltagelse. Efter udfyldelse af omfattende basisskema (Q1) blev deltagerne randomiseret til kontrol (sædvanlig behandling) (n= 255) eller konsultation med to samtaler med egen læge (n=240). Begge grupper fik tilsendt et opfølgende spørgeskema efter et år (Q2). Under samtalen udfyldtes et samtaleark (CS-1) om prioriterede mål for ændring i livsstil eller livsvilkår, ressourcer og barrierer samt tidshorisont for at opnå disse.

Resultater

30% af de lægesøgende 20-44-årige havde cut-off værdien. De adskilte sig markant fra restgruppen og baggrundsbefolkningen, bl.a. ved nedsat evne til at løse deres dagligdagsproblemer, nedsat tryghed, manglende netværk og lavt selvvurderet helbred (artikel I). Etårsresultaterne viste effekt i begge grupper på mentalt helbred (MCS-SF-12), antal problemer og subjektiv effekt af deltagelsen. Effekten var større i samtalegruppen end i kontrolgruppen (artikel II). Analyser fortaget af deltagere med BMI >25

uafhængigt af randomisering viste ca. 5% vægttab (-4,7 kg) hos den gruppe af overvægtige som inden samtalen "ønskede vægttab inden for 30 dage", eller som ved samtalen havde et "vægttab som prioriteret mål" (artikel III).

Kvalitativ analyse af ressourceudsagn mhp. at opnå prioriteret mål viste bevidsthed om egen konstitution som vilje og stædighed samt om netværk. Der blev sjældent anført egen erfaring (artikel IV).

Konklusion

Afhandlingen viser at psykosocialt sårbare unge voksne kan opnå bedre mental trivsel, færre problemer samt vægttab hos de overvægtige, der har vægttab som prioritet. Forudsætningen har været både en grundig struktureret forberedelse med refleksioner over egen psykosociale situation og ønsker om ændring. Der opnås større ændring hvis disse refleksioner bliver efterfulgt af to person-centrede samtaler med egen læge.

Arbejdsmetoden synes at facilitere bevidsthed om patienternes egen prioritering i deres livssituation, egen konstitution og netværk, hvorved deres indre motivation for ændringer kan øges (artikel II, III og IV). Dette bekræfter helbredsteorierne salutogenese (Antonovsky) og self-determination theory (Deci og Ryan). De få udsagn om egen erfaring som ressource støtter ikke Bandura´s teori. om self-efficacy, hvor hovedkilden er "mastery experience". Dette kan reflektere, at der netop er lav self-efficacy i denne studiepopulation (artikel I og IV). Ressource udsagn og etårsresultaterne synes dog at reflektere øget selvtillid til at opnå deres prioriterede mål indenfor livsstil eller livsvilkår.

Perspektiver

Den frie og hyppige kontakt til almen praksis giver en unik ramme for primær forebyggelse. Ulighed i sundhed bliver primært diskuteret ud fra sociale forhold, men mange personlige ressourcer er involveret, som vil kunne italesættes og støttes. En struktureret arbejdsmetode kunne facilitere patientens opmærksomhed og lægens støtte af egenomsorg hos patienter, der er tynget af dagligdags problemer og mangel på tryghed og tillid. Forhåbentlig kan opmærksomhed på denne kompleksitet blive implementeret i fremtidige tilbud fra den primære sundhedstjeneste.

Acknowledgements

I owe thanks to many persons who have inspired and helped me with design, implementation, discussions, and publications throughout the trial and evaluation period. My main contacts have through the more than twenty years differed related to the actual issue, and only for the last years I have been working with the PhD.

I am grateful to the county of Northern Jutland, who was foresighted by proposing the preventive trial focusing their challenged adult patients to prevent disease or further problems. I am deeply grateful to the 28 general practitioners who accepted the challenges and extra workload from 1998 to 2000, and to their staff and the nearly 500 patients who took part in the study.

The trial was initiated and paid for by the county of Northern Jutland. It was implemented in 1998-2000 in collaboration with the county's secretary and sociologist Jens Tøllbøll-Mortensen who critically revised the design of the study and participated in courses on psychosocial topics relevant to the general practice perspective. Thanks for this insight in psycho-social topics. Particular thanks are due to emeritus professor, general practitioner Jørgen Lous who has been my loyal and indispensable research collaborator for more than 30 years. Thank you for offering timeless inspiration when designing, conducting and evaluating the study and for essential discussions and contribution when publishing the quantitative statistical papers. I also wish to acknowledge the initial help from professor Frede Olesen, Section of General Practice, Aarhus University. Thank you for supporting the process of transforming questionnaires into SPSS by your staff. In the trial period secretary Liselotte Winther, Aalborg, demonstrated an immense overview, collecting and controlling all study materials. I owe thanks to all of you for the successful process of conducting this trial. I am especially indebted to my general practitioner colleagues who contributed with open-minded discussions and constructive input optimizing the process. Regrettably, although they wished so, they have not yet had the possibility to implement a similar structured primary preventive approach in general practice. This preventive offer has not yet been part of the collective agreement for general practice. I hope this thesis will give you an overview of how much you contributed to your patients' well-being.

Being an external lecturer since 1989, I have met many inspiring persons who have fuelled my scientific interest and contributed to the process in various ways. From the very beginning of my lecturer career, my subjects were screening, chronic diseases, and prevention; later combined with communication, e.g., motivational interviewing, which in Copenhagen was carried out together with Anders Beich to whom I owe thanks for critical reflections. In Copenhagen, I met researchers, among others Professor Hanne Hollnagel and Professor Kirsti Malterud, with whom over many years I

have had very interesting and stimulating discussions about, e.g. risk/resource balance, self-efficacy, self-evaluated personal health resources and received specific support for qualitative research. This has been essential to the design and scientific evaluation of the study. Writing the papers has been a process that has spanned many years and included inspiring qualitative discussions in the latest years especially with Ann Dorrit Guassora and Lotte Hvas regarding paper IV. I owe thanks to all of you for your continuous support with critical, constructive, and encouraging discussions of the importance of the study and dissertation despite the long process.

Considering whether and how to make this dissertation without having been enrolled in a PhD program, I have been supported and encouraged by Mogens Lytken Larsen, Søren Risom Kristensen and Asbjørn Mohr Drewes, the Clinical Institute, Aalborg University Hospital. Through the writing process, I have enjoyed positive support from my supervisors Janus Laust Thomsen who provided constructive critique and underlined the importance of an intervention study to a primary care population that usually cannot be reached by preventive interventions; and from Annette Davidsen who has delivered prompt, critical, thorough, and constructive criticism along the way. I deeply appreciate the critique and supportive supervision from both of you. Last but not least, I owe thanks to Asbjørn Mohr Drewes. Without your enthusiastic and constructive critical support and supervision, this thesis would hardly have been initiated or completed.

My lovely family has been extremely tolerant and supporting, accepting the extra work required to conduct the trial and a pre-study before this; and to write the dissertation itself. I am deeply grateful to my husband and our four children who have both inspired me along the way and – fortunately - required my presence at home as well, even if the preventive health consultations were sometimes called “family-destroying health conversations”. Still, we have grown together and enjoyed an atmosphere of mutual support, joy, and leisure time with lots of activities. Thanks a lot.

Funding after the trial period

My scientific work after the trial period has been supported by different funds: Lundbeck-fonden, Sara Krabbes legat, Helsefonden, Forskningsfonden, PLU-fonden, to whom I owe thanks for my months of leave from clinical work.

Kirsten Schierup Freund, March 2022

Preface

In this thesis, I present background and results of my scientific work with a preventive offer to patients in general practice who have problems basic to adequate health behaviour. The process of publishing has taken place over many years, but the results still seem relevant. Possibilities of reducing inequality in health and improving person-centredness in general practice are two essential ongoing research questions.

Personal background, preconceptions, and motivation

My interest in coherence between patients' somatic and mental situation was essential to my choice of profession as a general practitioner. From1979 until 1993, when a colleague joined me, I have been working in my singlehanded practice in a rural setting. My family and I have been part of the local community, giving me the privilege of being witness to my patients' psychosocial situation. This contributed to understanding how much they differed in terms of how they managed everyday life situations and crises. The importance for people of having a job, a role to play in their local community and a good network was evident. Patients accepted telling me about their private or working situation even when it was complex. Their willingness to do so was often the foundation for establishing a common ground when discussing their health problems. This openness and confidentiality made it possible for me to support them in coping with their psychosocial situation. Improvement was seen in relation to disease/illness, general wellbeing, and everyday life problems.

When general director Søren K. Sørensen of the Danish Health Authority in 1983-84 proposed that preventive health consultations could be offered in primary healthcare to reduce pressure on hospitals (County Council of Ringkøbing, 1983; Kamper-Jørgensen, 1984), I became one of three members of a working group established by the Association of GPs in Northern Jutland. As fulltime GPs, we developed the pre-study in 1987-1988 in collaboration with the county of Northern Jutland. This was a preventive offer with structured health consultations to the general population in four different age groups developed in collaboration with DIKE (Danish Institute of Clinical Epidemiology), which evaluated the results. The purpose of the pre-study was to evaluate whether the GP could serve as a health collaborator and advisor to the patient. Evaluation of this study showed that the 45 participating GPs were able to listen constructively to participants presenting their concerns and priorities. After 6 months, about a quarter of the participants had contemplated or completed health-related changes (Bille et al., 1990; Rasmussen, 1993).

After this preventive offer had been initiated, other GPs in Denmark designed population-based preventive health checks with the intention to detect and prevent cardiovascular disease in the middle-aged population (Lauritzen et al., 1995).

The county of Northern Jutland did not want to offer preventive health consultations with a focus on specific diseases. They wanted to use the experience from the pre-study to develop a new offer of primary prevention for the adult attenders to general practice s with "*most problems within lifestyle or life circumstances to prevent further problems or disease."* (Appendix A). I was invited to design and implement this offer in collaboration with sociologist Jens Tøllbøll-Mortensen and general practitioner, professor Jørgen Lous. The trial, entitled "Preventive health consultations to 20-44-year-olds in Northern Jutland, Denmark" was completed in 1998-2000 and forms the foundation of this thesis.

As my general practice has been a training practice, important inspiration was gained from younger colleagues, especially when they met the everyday life of the patients and had to combine their knowledge from medical education with individual clinical work. From 1989, the work as a lecturer at the Section of General Practice at the Department of Public Health, University of Copenhagen, and Aarhus, later Clinical Institute, Aalborg, inspired and worried me. Especially during the first decades I realized that a big part of medical students neglected or minimized the importance of personal aspects of health and disease/illness. Fortunately, this has through years changed to a more holistic view.

Having discussions with researchers and lecturers supported and inspired me to conduct the trial, even if the two GPs with whom the pre-study was designed had left the county. In the meantime, work in practice became more flexible when my GP colleague Jørgen R. Hansen joined me in 1993. The many years as an external lecturer in Copenhagen were essential for my interest and attention to the risk of worsening instead of improving health by focusing on risk factors and screening without focusing on psychosocial consequences (Møller et al., 1996; Brodersen et al., 2007; Hvas et al., 2009). Seeing the personal context and the whole person behind the patient was often discussed, especially with associate professor, sociologist Dorthe E. Gannik (Gannik, 2002a), professor Hanne Hollnagel and professor Kirsti Malterud, who also introduced me to qualitative research (Malterud and Hollnagel, 1997; Malterud, 2011). The discussions about social risk factors, risk/resource balance and self-evaluated health have been essential to the design of the trial (Malterud, 1994).

The discussion of how to counter existing health inequalities has gained new momentum in recent years, notably after the trial was conducted. Still, health inequality remains pervasive even if average life-expectancy has improved ("Sundhedsstyrelsen", 2020). This dissertation is intended to show how general practice may work preventively in structured ways with person-centeredness. Adopting this approach may be

particularly productive vis-à-vis the large share of our patients with many problems or lack of resources. Psychosocial problems are usually not verbalised sufficiently in everyday consultations, even if these problems may obstruct implementation of relevant coping strategies to improve lifestyle and psychosocial life (Street et al., 2007; Gérvas et al., 2008; Starfield, 2011; Verlinde et al., 2012).

Table of Contents

Figures and Tables

Tables

Explanations and abbreviations

Explanations

BMI: Body Mass Index (body weight in kg)/ (height in metres)^2

SF-36: 36-Item Short Form Health Survey, a generic score system of general health.

SF-12: 12-Item Short Form Health Survey, a generic score system of general health.

SRGH: Self-rated global health is used in this study: subjective overall assessment of health answering *the non-comparative question*: "How is (or: do you consider) your health in general/ all in all?" answered on a five-point Likert scale.

SRH: When used in this thesis citing other studies, SRH most often refers to the *comparative question:* "How do you rate your health compared to others at your age?" or "compared to one year ago". In other studies, SHR is used as the above-mentioned non-comparative question, SRGH.

SES: Socioeconomic status is the social standing or class of an individual or a group, often measured as a combination of education, income, and occupation.

Abbreviations

ANOVA: Analysis of variance

BMI: Body Mass Index

BP: Bodily pain

CI: Confidence interval

CVD: Cardiovascular disease

DIKE: Danish Institute of Clinical Epidemiology, now VIVE

DM: Diabetes mellitus

EHPP: Ebeltoft Health Promotion Project

GH: General health

GHR: General health resources

GP: General practitioner

GRR: General resistance resources

HL: Health literacy

HRQOL: Health-related quality of life

IHD: Ischemic heart disease

MCS-SF12: Mental Component Score of SF12.

MH: Mental health
MI: Motivational interviewing
MUS: Medically unexplained symptoms
NCD: Non-communicable disease
NNH: Number needed to harm
NNT: Number needed to treat
OR: Odds ratio
PCS-SF12: Physical component score of SF12.
PF: Physical function
QOL: Quality of life
RE: Role emotional
RF: Role physical
RR: Relative risk
SCT: Social cognitive theory
SDT: Self-determination theory
SE: Self-efficacy
SES: Socio-economic status
SOC: Sense of coherence
SRGH: Self-rated global health
SRH: Self-rated health
STC: Systematic text condensation
TTM: Trans-theoretical model of change
VIVE: National Research Centre of Welfare

Chapter 1. Background

The scientific literature on preventive trials and basic conditions for mental and physical health is presented in different sections. This illustrates the patients´ complexity and the complexity of prevention, which forms the background for the thesis and the education of the participating general practitioners (GPs) during the trial period. The importance of individual psychosocial factors for health and health behaviour is illustrated before presenting the evidence for the role of general practice in this respect.

1.1 Lifestyle interventions with general health checks

Mortality from non-communicable diseases (NCD) like cardiovascular diseases (CVD), diabetes mellitus (DM) and cancer is most often related to lifestyle and social determinants (WHO and Commision on Social Determinants of Health, 2008). An early systematic review described that many of the general practice-based lifestyle interventions were promising in effecting small changes in behaviour (smoking, alcohol consumption, diet and exercise), but none appeared to produce substantial changes (Ashenden et al., 1997). The lack of influence on mortality rates from CVD was concluded by Cochrane reviews (Karmali et al., 2017; Krogsbøll et al., 2019). These reviews included two large Danish studies; Ebeltoft (Lauritzen et al., 1995, 2008; Bernstorff et al., 2019) and Inter99 (Jørgensen et al., 2003, 2014), which were performed in the same period as our trial, yet with another focus.

Medical and social scientific literature has investigated why mortality from NCD does not decline at the expected pace and the role of social disparities in this regard (Dray-Spira et al., 2008; Weires et al., 2008; Sundhedsstyrelsen and Danish Health Authority, 2011; Mackenbach, 2012; Mackenbach et al., 2019; Sundhedsstyrelsen, 2020). A growing body of evidence suggests that factors such as personal characteristics, self-rated health (SRH) and mental wellbeing are important predictors of differences in morbidity and mortality rates. These factors also to some degree capture social differences (Møller et al., 1996; Idler and Benyamini, 1997; Kunst et al., 2005; Mackenbach et al., 2008; Jylhä, 2009; Mackenbach, 2012; Sundhedsstyrelsen, 2020). Research into the relation between health, wellbeing and strengths has been called for in several studies (Kristén et al., 2015; Monsen et al., 2015; Gao et al., 2018; Kubzansky et al., 2018).

1.2 Characteristics of attenders/non-attenders to general health checks

International studies

Non-attenders to general health checks or preventive health checks for cardiovascular disease (CVD) most often had the highest risk of such disease according to a scoping review (Dryden et al., 2012). The review underlines socioeconomic reasons combined with personal reasons for non-attendance as seen for example in men, especially single men, with low-socioeconomic status (SES) and risky lifestyle. Non-attenders seem to value health less strongly, have more barriers, have low self-efficacy (SE), feel less in control of their health and be less likely to believe in the efficacy of health checks (Dryden et al., 2012). Obviously, lower social classes face strains and have other priorities than lifestyle, even if they do recognize the importance of lifestyle to their health (Coulter, 1987; Pill and Stott, 1988; Waller et al., 1990; Thorogood et al., 1993; Dryden et al., 2012).

Danish studies

The above findings were confirmed by Danish studies of general health checks. In these studies attendance was 50%-60% irrespective of whether health counselling after biomedical screening was performed by the patients' own GP as in the Ebeltoft study (the Ebeltoft Health Promotion Project, EHPP) (Lauritzen et al., 1995, 2008; Engberg et al., 2002) or at a health centre as in Inter99 (Jørgensen et al., 2003, 2014). In both studies, socioeconomic inequality was seen at baseline. In Inter99, a strong increase in socioeconomic inequality in participation was seen across the 5-year follow-up among high-risk patients (Bender et al., 2014), whereas the EHPP did not report socioeconomic status (SES) at follow-up (Lauritzen et al., 2008; Bernstorff et al., 2019). Non-attendance in Inter99 was associated not only with individual SES and risky lifestyle but also with neighbourhood and social capital (Bender et al., 2014, 2015), which is known to be essential to health behaviour (Seeman et al., 1987; Aiello, 2017).

In "Check Your Health Preventive Program" with invitation of 30-49-year-olds to screening and subsequent health counselling from 2012-2017, the overall attendance was 55%; highest when having higher SES, better health and higher use of preventive services (Bjerregaard et al., 2017). The initial questionnaire screening by SF-12 revealed low mental health among 9% of attenders, corresponding to the background population. Of these, 38.5% had no other high-risk factors according to their health check (Geyti et al., 2020). The intended follow-up at the GP for mental health care was seen for only one out of four with poor mental health, especially no follow-up when being disadvantaged socioeconomically (Geyti et al., 2018, 2020). Despite the

free offer of follow-up on mental problems, the offer was not accepted by a majority of those with low mental health, perhaps because acceptance needs personal intervention (Geyti et al., 2020).

Reaching citizens with socioeconomic or mental problems with preventive interventions remains a challenge for the healthcare system.

1.3 Preventive interventions with specific focus on high-risk persons

Preventive health checks with partner involvement

The Oslo Study Diet and Antismoking Trial from 1972 offered individual preventive health checks to 1,232 healthy 40-49-year-old men at high risk for CVD (normotensive, high se-cholesterol and 80% daily smokers) with good results. Intervention was individual dietary and antismoking advice with partner involvement (Hjermann et al., 1981). The attendance rate was 65%. Follow-up every 6 months for a total of 5 years in combination with group sessions with partners had a significant effect and lowered tobacco consumption and se-cholesterol without use of drugs compared with controls, who had yearly follow-up. At 60 months follow-up, the incidence of fatal and nonfatal myocardial infarction was 47% lower in the intervention group mainly correlated to significant reduction in cholesterol level, but also related to the tobacco reduction (Hjermann et al., 1981). This difference in CVD and cardiovascular mortality was maintained after 8-9 years, even if the difference in lifestyle had diminished (Hjermann et al., 1986). This study included group-based lifestyle advice to partners, who are seldom involved in health preventive offers even if social relations are known to have great influence on health behaviour (Dean and Hunter, 1996; Hardcastle et al., 2015).

Case finding in general practice

A longitudinal study of a case-finding program spanning a 25-year period from a highly deprived area in Wales showed effect of intense whole population care in general practice. The effect was a reduction in risk factors (smoking among men, and blood pressure) and a lower age-standardized mortality ratio than in a comparable neighbouring community without this offer (Hart et al., 1991). Critical to the success of this offer was accessibility, continuity, flexibility and good structure in the general practice with high work load and personal costs for staff and GPs (Hart et al., 1991).

Social prescribing for psychosocial problems

In the UK, the possibilities for GPs to refer to community offers (social prescribing) were extended about 20 years ago, but so far evidence fails to provide sufficient details to judge whether these extended possibilities are successful and value for money (Bickerdike et al., 2017; Pescheny et al., 2018). Social prescribing enables GPs to refer patients with psychosocial problems to a link worker to co-design a non-clinical social prescription to improve their health and wellbeing (Bickerdike et al., 2017). Despite this free opportunity, acceptance is sparse and related to personal trust to the GPs and the link workers (Pescheny et al., 2018). The offer was often rejected because of fear of stigmatization due to psychosocial problems, and low patient expectations (Mercer and Watt, 2007; Pescheny et al., 2018).

Referral to a municipality centre

It has been speculated that a change in behaviour may be more easily accomplished through a free offer of activities and group counselling with other people in a similar situation but sufficient evidence is lacking (Bickerdike et al., 2017). Referral to a municipality centre may reduce workload in general practice (Popay et al., 2007) and give effect for patients (Pescheny et al., 2018). In the inter 99, 60% of the attenders were high-risk patients. Among the smokers, 27% accepted smoking cessation in groups. During the first year, most of them attended at least one out of six planned sessions. Predictors for abstinence were being a man, higher educated and having a job, but predictors seem not to be related to group counselling (Pisinger et al., 2005a; b).

The "Check-in" study invited 45-64-year-olds with no formal education beyond secondary school to health checks at the persons' own GP with the possibility of referral to municipality health centers free of charge (Kamstrup-Larsen et al., 2019b). Only half of eligible patients were referred, most often because the GPs doubted their motivation and feared that patients would lose trust in the doctor-patient relation if pushed (Kamstrup-Larsen et al., 2019b; a). This is in accordance with experience from the UK (Pescheny et al., 2018).

Continuity

Studies indicate that continuity and trust in the relation between the patient and the GP are fundamental factors to empower the patient as a person and thus increase health in a society even with less expenditures, as confirmed by international studies (Shi et al., 2002, 2003; Starfield et al., 2005).

1.4 Basic conditions for physical and mental health

To illustrate inequality in health, some literature will be presented concerning basic conditions for both physical and mental health and their interaction. These basic conditions inspired the design of the working method of the thesis.

Psychosocial situation

The effect of specific socioeconomic differences in CVD incidence cannot be explained only by classic risky lifestyle factors (Kunst et al., 2005; Martikainen et al., 2007; Strand et al., 2010; Mackenbach et al., 2019). An English 10-year prospective population study of more than 22,000 persons aged 39-79 years in Norfolk (1993-2006) showed a relative risk (RR) of 1.9 for all-cause mortality among both men and women in social class 5 compared with social class 1. The association was only slightly attenuated when adjusted for classic risk factors at baseline: to RR 1.7 for men and 1.56 for women (McFadden et al., 2008).

The complexity of predictors of health was illustrated by an English study showing that the combination of negative material and psychosocial conditions in childhood was almost as powerful as smoking in accounting for the inequality in adult mortality (Giesinger et al., 2014). This may be supported by a much earlier review showing that main factors for developing coping strategies to prevent illness and ensure children's healthy development was a close adult person who could support and interpret life situations when problems or somatic symptoms occur (Dean, 1981).

The importance of not only *lifestyle* but also a *close social network* for mortality risk was first emphasized in the results of the longitudinal descriptive Alameda County Study and has since been confirmed (Berkman and Syme, 1979; Housman and Dorman, 2005) and specified (Kotler and Wingard, 1989; Reynold and Kaplan, 1990; Roberts et al., 1990; Strawbridge et al., 2000). In the Alameda County Study, physical health was significantly worse with the following *lifestyle*: having 30% overweight, no physical leisure activity, sleeping less than 6 hours at night, being a smoker and drinking more than 5-6 drinks per setting (Brock et al., 1988). In average, life expectancy at the age of 45 years increased by 11 years for men 7 years for women with six or more positive health behaviours compared with those with fewer than four (Belloc, 1973). Sub-studies of the Alameda County Study underline the importance of having a *social network*. Married working women with children had the lowest mortality risk of any status group, even if they were more likely to be current smokers and drink alcohol (Kotler and Wingard, 1989). For women, weekly religious attendance was as protective as each of the health behaviours: smoking, physical activity and alcohol consumption (Strawbridge et al., 2000).

Studies exploring the causal relation between mental health and social isolation show differences according to social group and gender (Kawachi and Berkman, 2001). Awareness of the association of social interaction with mortality shown by Berkman and Syme is still emphasized as important to understanding conditions for health (Aiello, 2017).

The consequences of social isolation can now to some degree be explained by the emerging science of neurobiology as the brain responds to isolation with, e.g., stress, anxiety, depression, reduced cognitive function, increased vascular resistance and altered genes and immunity (Cacioppo et al., 2015).

Barriers to lifestyle change related to socioeconomic status

Recent trials have examined barriers to lifestyle change within different socioeconomic groups. Such barriers often correlate with individual abilities and priorities in persons' lives (Nielsen et al., 2004, 2017; Niederdeppe et al., 2008; Pisinger et al., 2011; Meillier et al., 2012). Individuals with low SES report more environmental challenges and fewer psychosocial resources to change behaviour (Coulter, 1987; Kristenson et al., 2004; Pedrana et al., 2016). In poorer communities, the possibilities to perform healthy behaviour like physical activity may also be fewer due to lack of facilities, security issues and little social support (Macintyre, 2000; Anderson et al., 2006).

A prospective observational study (1991-98) in the Netherlands assessed the relative and interdependent influence of material, psychosocial and behavioural factors on educational inequalities in health. Material factors like health insurance, financial difficulties and housing tenure contributed most to the explanation, partly via psychosocial and behavioural factors (van Oort, 2005). In a recent European analysis, better health care, health policy and rising health care expenditure were associated with narrowing inequalities, especially in the eastern European Countries Hungary and Estonia (Mackenbach et al., 2019).

Even if society offers equal possibilities for health services, education and decent housing, some important inequalities remain (Kunst et al., 2005; McFadden et al., 2008; Mackenbach, 2012; Pega et al., 2012; Mackenbach et al., 2019). In the Inter 99, those with lower SES mentioned their motivation to quit smoking being costs and *having* health problems more often than participants with higher SES, who mentioned a desire to *prevent* health problems as a motivation for attempts to quit smoking (Pisinger et al., 2011). This illustrates some implications of SES for preventive farsighted attitude and behaviour both in relation to concern about financial costs but also consideration of the immediate and long-term effect on health.

Self-rated global health

Throughout the twentieth century, evidence emerged that self-rated global health (SRGH) is an independent predictor of mortality that should be considered together with the numerous specific health status indicators and other relevant biomedical covariates known to predict all-cause mortality, such as mortality of CVD (Idler et al., 1990; Idler and Kasl, 1995; Møller et al., 1996; Idler and Benyamini, 1997). This was first clearly demonstrated in the Manitoba longitudinal study among elderly (Mossey and Shapiro, 1982); and it is in accordance with the results of the 30-year follow-up on the Alameda County study which found that *"self-rated health is a deceptively simple variable that likely measures a great deal more than disease burden"* (Strawbridge and Wallhagen, 1999). The meaning of SRGH has been a subject of investigation in relation to gender, age, SES, countries and cultures for many years (Jylhä, 2009; Huisman and Deeg, 2010; Layes et al., 2012). SRGH seems to reflect psychosocial, cognitive, and biological factors, including actual state, experience, acceptance, expectancy and history within family and surroundings. Answering questions on SRGH, one evaluates oneself in terms of these individual psychosocial factors rather than objective disease (Manderbacka et al., 1999; Kwaśniewska et al., 2007; Jylhä, 2009; Layes et al., 2012). Self-rated health is measured with a non-comparative (SRGH) or comparative question (SRH), usually with a five-point Likert scale. The non-comparative measure puts the question "How is (or: do you consider) your health in general/ all in all." The comparative question can be divided into age and time: "compared with others of your age" or "compared with one year ago". The Likert scale has four or five possible answers: "(excellent), very good, good, fair, poor (very poor)". The small differences in the standard question and possibilities for answers between different studies do not affect the robustness of the questionnaire (Krause and Jay, 1994; Idler and Kasl, 1995; Idler and Benyamini, 1997; Fayers and Sprangers, 2002). Evaluation of self-rated health in relation to objective health status is higher among older than younger respondents, and the ability to predict mortality and morbidity declines with age (Sternhagen Nielsen et al., 2008; Jylhä, 2009), perhaps because ability seems to harbour two components: latent health and reporting behaviour (Huisman and Deeg, 2010; Layes et al., 2012; Bjorner et al., 2013). Poor SRGH predicts a two-fold higher mortality risk than good SRGH, and this relationship was robust in studies adjusting for co-morbid illness, functional status, cognitive status, depression, gender and country of origin, with higher predictive value in younger age groups (Sundquist and Johansson, 1997; Burström and Fredlund, 2001; DeSalvo et al., 2006).

SRGH was one of the screening questions used in this thesis (papers I, II, III).

Health literacy

Health literacy (HL) was defined by the WHO in 1998: *"Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health"* (Nutbeam and Kickbusch, 1998). Various conditions for achieving HL have been investigated, including people's knowledge, motivation and competences to access, understand, appraise and apply health information in order to make judgements and make decisions in everyday life concerning health (Osborne et al., 2013; Bo et al., 2014; Aaby et al., 2017). Health literacy is thus dependent on individual capacity but also associated with the social structure of the community, e.g. accessibility of leisure time facilities (Van Der Heide et al., 2013; Sentell et al., 2014; Aaby et al., 2017). Low HL is, among others, related to lower educational level and living alone and is associated with poor SRH (Van Der Heide et al., 2013; Bo et al., 2014). In an European survey of 8,000 people from eight countries, insufficient or problematic HL was seen among 47%, with substantial difference between the countries (Sørensen et al., 2015). Increased HL is associated with an increase in self-reported physical and mental health (Aaby et al., 2017). HL is developed throughout life. Education and interaction with society and health professionals may develop HL specific to specific domains such as food or physical activity (Maindal and Aagaard-Hansen, 2020). Some HL indicators are modifiable and dependent on good communication, mutual understanding and cooperation between health care and social authorities on the one hand and the individual and the population on the other hand (Bo et al., 2014). In the present thesis, several questions were raised in relation to HL (paper I) (Appendix 2); however, the validated Health Literacy Questionnaire was not used (Osborne et al., 2013).

Self-assessed health resources and risk/resource balance

The importance of shifting attention from objective risk factors to the person's self-assessed health resources has been underlined by specific qualitative research on individual resources in both genders to illustrate the importance of person- and patient-centred consultations with skilful listening and specific questions (Malterud et al., 2001). A positive balance between individual risk and resources is essential to have the surplus to react when strain occurs as illustrated by the risk/ resource balance. Wellbeing presupposes a balance between the requirements made, own priorities and the available resources; inner (e.g. physical and mental health) as well as outer (time, network, functional framework, economy) (Acton and Malathum, 2000; Lindbladh and Lyttkens, 2002; Gannik, 2002b; Lindberg et al., 2011). In some people, strain and illness will result in long-lasting symptoms or disease, whereas others have the knowledge, support or other beneficial circumstances that make them overcome

symptoms and remain healthy as discussed in the salutogenic theory by Antonovsky (Antonovsky, 1987; Dean and Hunter, 1996; Eriksson et al., 2007; Adler, 2009).

An essential aim for preventive health care is to unearth any resources that the person can invest either alone or together with the family, friends, colleagues, doctor or community in enhancing wellbeing or achieving a change of behaviour, e.g. by reducing stress to support good health (Hollnagel and Malterud, 1995, 2000; Malterud et al., 2001; Nielsen et al., 2004; Starfield, 2011; Ebstrup et al., 2011; Shippee et al., 2012). However, GPs are highly challenged by evidence-based medicine within biomedical subjects and have little room to focus on relevant individual resources and priorities (Gérvas et al., 2008; Starfield, 2011; Hardcastle et al., 2015).

In the present thesis, resources, and barriers to reach a self-chosen goal were identified and written down during the consultation (paper IV).

Mental health

The importance of understanding and investigating conditions for mental health was highlighted by the WHO in 2001, emphasizing the need for seeing mental health as an integrated component of health as there is "*no health without mental health*" (World Health Organization (WHO), 2001). Mental disorder was the main subject of the 2001 report. In 2004, the WHO underlined that people with poor mental health are not only those who have a diagnosis of mental disorder, but also those with functional impairments due to mental problems (World Health Organization (WHO), 2004). Physical ill-health was seen as detrimental to mental health as much as poor mental health was detrimental to physical health, both of which were related to individual and societal factors. In 2004, mental health was defined by the WHO as "*a state of well-being in which every individual realizes his or her own potential, can cope with normal stressors of life, can work productively and fruitfully, and is able to make a contribution to his or her community*" (World Health Organization (WHO), 2004).

This definition and the importance of mental health form the foundation of the present thesis, where support of mental health and coping strategy is the main issue, as it is perceived as a precondition for preventive health behaviour (papers II, III and IV).

Mental health cannot be captured with a single measure. In the Danish Health Survey 2010, the internationally validated MCS-SF-12 was used. The MCS-SF-12 was also used in the present thesis (Ware et al., 1998; Christensen et al., 2012). Low MCS is stated by 10% of the Danish background population, more frequently by women (11.9%) than men (8.1%) and more so among people with low educational attainment (13.7%) than among those with the highest educational attainment (7.4%). Low mental health implies social expenditures as it is seen in Denmark among 27.6% of early retirees and 22.4% of unemployed citizens (Christensen et al., 2010). A similar social inequality is seen in ratings of SRGH, self-efficacy (SE), life-satisfaction, influence

on working conditions and lifestyle regarding physical activity, smoking and overweight (Sundhedsstyrelsen, 2020). In the most recent Danish survey, focus on mental health was prioritized because of these associations (Sundhedsstyrelsen, 2020).

All these factors are discussed in the thesis (paper I, II, III and IV).

1.5 The therapeutic nature of the consultation in general practice

When the disease pattern gradually changed from primarily infectious diseases to primarily non-communicable diseases (NCDs), the complexity of health/ disease required a new approach in health care both for prevention and treatment (International Conference on Primary Health Care, 1978; Stewart et al., 1979; McCracken et al., 1983; Levenstein et al., 1986; Brown et al., 1986; McWhinney, 1993).

Patient-centredness

The doctor–patient relationship, seeing the patient-as-person and realizing the therapeutic nature of the consultation itself have been core themes in the professional development of general practice for decades (Stewart et al., 1979, 2000; Levenstein et al., 1986; Brown et al., 1986; McWhinney, 1993; Mead and Bower, 2000). Patient-centredness has been discussed in relation to the patients' illness/disease (Mead et al., 2002; Langberg et al., 2019) and is seen in relation to a specific episode or disease (Starfield, 2011). Different instruments to measure patient-centredness have been discussed to see how they might improve patient outcome (Mead and Bower, 2000). A recent Danish review narrows down the understanding of patient-centredness linked to high-quality patient care from more dimensions to the following three focus areas: *"1) understanding of the patients' experience of the illness in their life situation, 2) the professional's relationship with the patient* and *3) coordination of care in the system",* with coordination of care becoming increasingly important (Langberg et al., 2019).

In the 1950s, the American psychologist Carl R. Rogers introduced the concept of client-centred therapy (Rogers, 1952). The medical doctor and psychotherapist Michael Balint promoted a psychodynamic way of thinking in the medical field. In innumerable international working session and discussion groups - often together with his wife Enid Balint - GPs were trained in this psychodynamic method (Balint M., 1964; Balint, 1969). Enid and Michael Balint wanted the GP to be a therapist, not a psychotherapist, of the whole person, seeing each person as an individual. Several Balint Societies evolved, using the Balint method for supervision in seminars. Education through these group sessions has shown increased job satisfaction for GPs and

better patient outcomes, the latter measured as fewer concerns and better emotional health (Kjeldmand et al., 2004).

Person-centredness

Patient-centredness and person-centredness seems to have the same themes but are derived from different contexts; patient-centredness from medical and person-centredness from psychological context (Hughes et al., 2008; Langberg et al., 2019), Person-centredness is used in a broader context than patient-centredness when describing the consultation, seeing the whole person and the total life situation irrespective of illness/ disease (Starfield, 2011). Barbara Starfield underlines the importance of a long-term relationship with patients in primary care irrespective of disease as a prerequisite to work in a person-centred manner and support enablement to cope with health situations and different problems in life. Primary care focused on continuity of care and mutual understanding has shown to improve health and reduce health expenditures in society (Shi et al., 2002; Starfield et al., 2005; Bazemore et al., 2016).

Motivational interviewing

The interpersonal communication method, *motivational interviewing* (MI), has shown effect in facilitating behaviour change (Rollnick and Miller, 1995; Britt et al., 2003; Brown et al., 2014; Hardcastle et al., 2015). Rollnick and Miller developed MI as a directive, client-centred counselling style for eliciting behaviour change by helping clients to explore and resolve ambivalence (Rollnick and Miller, 1995; Rubak et al., 2005). MI was developed from experience in treating alcoholism but is now used widely in health care and social contexts. Core issues are reflective listening, exploring, and resolving ambivalence in a supportive way perceiving benefits and costs of actual and possible changed behaviour. The therapist supports autonomy with attention and confrontation upon remarks of resistance, denial, or possibilities of change, thus exploring the ambivalence. This method promotes *internal motivation* and has been effective in eliciting behavioural change with regard to alcohol, tobacco and chronic diseases among ambivalent patients (Rubak et al., 2005; DiClemente et al., 2008). MI has shown to be most effective in vulnerable persons, who will often react with resistance and anger when confronted with their behaviour with other methods (Beich et al., 2002; Britt et al., 2003, 2004).

Chapter 2. Pre-study 1987-88

The pre-study "Preventive health conversations/examinations to adults in Northern Jutland" in 1987-88 (Bille et al., 1990; Rasmussen, 1993) formed an essential background for the idea, questionnaires and working method in the preventive study 1998-2000 on which the present thesis is based.

2.1 Background

In 1985, the Danish Ministry of the Interior proposed to develop two one-year experiments with different types of preventive health examinations to adults in general practice focusing on health education and screening for a few diseases to reduce pressure on hospitals (Coordination Committee in Health, 1985). One of these was the pre-study. Short-time evaluation should be performed to examine acceptability and feasibility. Collaboration concerning design and evaluation was established with the Danish Institute of Clinical Epidemiology (DIKE) (Kamper-Jørgensen, 1984). From 1985, DIKE (later SIF/ VIVE) has been registering health and illness development in different adult age groups in Denmark every fifth year (Rasmussen, 1988).

2.2 Aims of the pre-study

The aim of the pre-study was 1) to develop and test the possibility for GPs to carry out health-preventive and informative work with their patients, and 2) through a preventive health consultation to stimulate their patients' understanding of primary and secondary prevention of individual health, life-situation, illness, and risk factors.

Following wishes from the Ministry of the Interior, the county of Northern Jutland and DIKE, the intervention was examined in four different age groups, viz. 20-, 35-55- and 75-year-olds.

2.3 Material

Questionnaires

The questionnaires were developed in collaboration between sociologist Niels Kr. Rasmussen, DIKE, and the appointed working group consisting of three practically but not scientifically experienced colleagues within the Organisation of General Practice, Northern Jutland (P.E Bille, J. Frimodt-Møller and K.S. Freund).

Some questions were copied from DIKE, e.g. to compare participation with the background population. These questions were supplemented with new, clinically relevant questions for the preventive consultation and derived from our experience as GPs

with the purpose of exploring knowledge, attitude and possible reasons for health and illness behaviour. The questionnaires were revised after a pilot testing with 20 patients in the four age groups by three GPs and discussed with the participating GPs at the introduction course. The final questionnaires (Qs) were 1) a baseline questionnaire Q with 71 questions answered by the patient before the consultation, 2) a two-page registration scheme from the GP, 3) an immediate one-page evaluation by the patient, and 4) a postal 6-month' follow-up Q answered by the patient.

General practitioners

All GPs (around 320) in the county were informed and invited to participate. Of these, 45 agreed to participate and attended a weekend course covering the following subjects: the General Health and Illness Study in Denmark (Rasmussen, 1988); relevant expectations from the preventive study; medical sociology with a focus on work-related injury and prevention; dietary advice; and evolutional psychology from childhood to adulthood with a focus on stress, continuity and relationship (Antonovsky, 1979, 1987; Kjeldsen, 1987). The GPs received an instruction manual on background and methods for the examinations. This was followed by conversations and three follow-up courses with discussions of the role as a health educator based on patient's individual priorities and possibilities without being authoritative (Bille et al., 1990).

Patients

After information in the daily newspapers, a random sample of 2,254 enrolees aged 20, 35, 55 and 75 years were invited and sent the baseline questionnaire by the county administration. However, because of declining attendance, the invitation and an attached personal letter was sent to half of the invited citizens by their GP in the last two of the four periods.

2.4 Method

Intervention

The intervention was a 45-minute preventive consultation with the GP based on the questionnaire answered by the patient. To facilitate the GP's person-centred approach, three opening questions were recommended: "What was it like to complete the questionnaire?";" How did the answering influence you?"; and "What do you prefer to discuss?". After the conversation, the patient's Body Mass Index (BMI) and blood pressure were measured and, if indicated, se-cholesterol and cervical cytology, and any other indicated examinations. Such additional examinations could

also be postponed to later consultations. The GPs described the subjects and problems that had been discussed, planned follow-up on the conversation and estimated possibilities for change. They also registered use of alcohol, drugs, tobacco, and exercise, and whether the patient harboured any disease. Immediately after the conversation, the patient was asked to post a one-page evaluation questionnaire to the county's trial secretary about the perceived relevance of the subjects and the contents of the conversation. The GP was not informed of the answers.

Follow-up

After 6 months, the patients received a follow-up questionnaire from the county containing 71 questions and inviting the patient to evaluate the study and its impact on his or her everyday life.

2.5 Results

The mean participation rate was 43%; higher among middle-aged, women or patients with short-term illness and higher when invited by the GP (for men, from 37% to 51%; for women, from 40% to 56%). The main subjects discussed were estimated to be relevant by the patients. For the 20-year-olds, the main subjects were education and partner relationship; for the 35-year-olds, work and family; for the 55-year-olds, health problems and workload; for the 75-year-olds, health, loneliness and housing (Bille et al., 1990; Rasmussen, 1993).

Attendance among the 20-year-olds was low (23% men, 33% women), which was often reasoned for by lack of relevance. However, at 6 months' follow-up, the 20-year-old attenders reported as much benefit as the other age groups, e.g. 7% of the 20-year-olds had changed their working situation because of the conversation. Patient satisfaction was high and consistent between age-, gender-, health- and risk factor groups both immediately after the consultation and at 6 months. Among all participants, 11% claimed to have changed to healthier lifestyle, a further 15% considered to do so; 12% evaluated the conversation not worth the trouble. No derived expenses in health service were found despite new diagnoses and problems related to health and social conditions in one third of the participants. Intention to follow-up was ticked off by the GPs for about 80% of the participants. The follow-up was planned primarily at the GP (about 55%), some at medical specialists or hospitals, a few at a physiotherapist or with the social services. We have no specific analyses on that point.

At follow-up courses, 86% of the 45 GPs claimed that the method was a feasible preventive supplement in general practice in Denmark to facilitate development of healthier lifestyle in patients. Apart from over-representativeness of acute illness, the

participants were not especially the "worried well". Effect was primarily seen on health attitudes and belief in importance of one's own effort and behaviour (Bille et al., 1990; Rasmussen, 1993).

2.6 Seeds of the pre-study

During the 10 years following the pre-study, intense political discussion took place in Denmark whether GPs should offer preventive health consultations to every adult person at set intervals, or if it was reasonable to select a special group of the population.

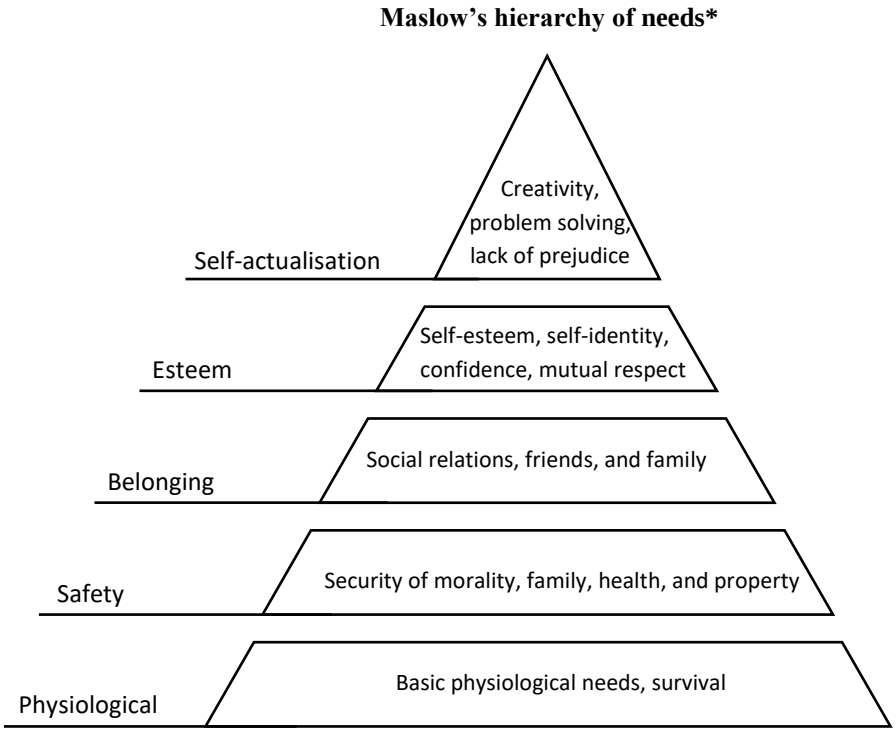
After some years, the Health Administration of the County of Northern Jutland wanted to use the experience from the pre-study to develop a new preventive offer from general practice, not to every adult person but to younger adult patients with special needs. Based on experience from the pre-study, I was asked to discuss, design, and implement a new offer. The offer was introduced in 1998-2000 and it forms the basis for the present thesis.

Chapter 3. Theoretical framework

This section will present theories about determinants for health and health behaviour including wellbeing. Behaviour is determined by reflective and impulsive processes as well as habits (Barry et al., 2000; Strack and Deutsch, 2004). Several theories have sought to explain these processes of which the following will be presented: the theory of salutogenesis and sense of coherence (SOC) (Antonovsky, 1979; Mittelmark and Bull, 2013), self-determination theory (SDT) (Deci and Ryan, 2000; Ryan and Deci, 2000, 2006), self-efficacy (SE) and social cognitive theory (SCT) (Bandura, 2004). Unmotivated persons often have low self-efficacy, outcome expectancies, effort beliefs and value beliefs (Hardcastle et al., 2015), which is illustrated by these theories and the hierarchy of need theory by Maslow (Maslow, 1943). In the transtheoretical model (TTM) specific interventions are proposed in the different stages of change (Prochaska et al., 1988, 1992).

3.1 Maslow's hierarchy of needs

Maslow's theory of motivation and basic needs satisfaction (Maslow, 1943) forms a model to illustrate how basic needs must be fulfilled before higher needs evolve. From the bottom of the hierarchy and upwards, the needs are physiological, safety, love and belonging, esteem and self-actualization. Unsatisfied needs produce anxiety and tension that hinder higher needs from being brought in mind. Self-esteem, confidence, and social connectedness are basic to, e.g., evolve morality and ability to solve problems. The theory has been verified in many studies regarding health attitude (Deci and Ryan, 2000; Acton and Malathum, 2000; Tay and Diener, 2011; Henwood et al., 2014). One of these studies has examined basic needs fulfilment in relation to subjective wellbeing (Tay and Diener, 2011). There was a tendency, but not a strong one, to fulfil the needs in the specific order theorized by Maslow. Basic and safety needs were most likely to be fulfilled at low levels of total need fulfilment. Conversely, respect and mastery were likely to be fulfilled only at moderate to high levels of need fulfilment. Basic need fulfilment and wellbeing seem strongly influenced by a person's society, also in low SES. People in poor nations may achieve psychosocial needs such as respect and autonomy before they have their basic needs like safety fully met. In this way, a person can gain wellbeing by meeting psychosocial needs regardless of whether his or her basic needs are fully met (Tay and Diener, 2011).



*Non-exhaustive

Figure 1. Maslow's hierarchy of needs

Inspired by Maslow (Maslow, 1943)

If a person has essential problems with security, work or family, the mind is concentrated on these problems and not on self-actualization, which is verified in studies investigating Maslow's theory (Acton and Malathum, 2000). If a person in this situation is met with a preventive consultation focused on efforts to change risky lifestyle, this will probably produce resistance against further contact or change because of a feeling of insufficiency and low self-esteem (Beich et al., 2002; Hardcastle et al., 2015). The health professionals might interpret this as unwillingness to change although the patient's reaction is most often a feeling of insufficiency and need to focus other problems and needs first (Acton and Malathum, 2000; Beich et al., 2002; Nielsen et al., 2004). Based on these primary care preventive studies, it makes good sense to be aware of Maslow's theory and respect the hierarchy of needs in individual preventive consultations.

3.2 Salutogenesis

The American/Israeli professor in medical sociology Aaron Antonovsky declared that the broad definition of health as a statement without disease was a sign of medical imperialism as it reflected the assumption that everything in life falls within the frames of the health system (Antonovsky, 1979, 1987). In 1979, A. Antonovsky proposed that medical theory and practice should focus more on salutogenesis (the origin of health) than on pathogenesis (the origin of disease) (Antonovsky, 1979). He wondered why some people managed to feel at ease despite stressors that would make other people feel uneasy and wanted to explore the strengths and determinants of health.

He described health as a dynamic characteristic of the individual, the social group, and the socioeconomic system. He considered health to be a balance between oneself and the surroundings. His opinion was that perfect health was not possible, and he described one's experience of health as a movement along a continuum of pain and suffering (ease/dis-ease). One will experience varying degrees of breakdown. The position just now depends on the actual stressors and the resources within one-self and the surroundings (Antonovsky, 1987).

His key question was to study factors determining tension management (Antonovsky, 1987), i.e. the ability to make sense out of the countless stressors with which one is constantly bombarded. His tentative answer was that generalised resistance resources (GRR) are fundamental psychological and social factors essential for the individual, the group or the surroundings to overcome stressors and prevent movement to the disease end of the continuum (Antonovsky, 1979, 1987) (Fig.2). Depending on the specific context, GRR may be, e.g., material goods, knowledge, intelligence, self-identity, social network and support, cultural traditions, preventive health orientation and having both *commitment* (continuance, cohesion, and control) and *coping strategy* (being rational, flexible, and farsighted). Over time, the GRR will generate a strong *SOC*, which means the ability to feel coherence in one's life, to make life *comprehensive, manageable, and meaningful*. GRR are the potential resources, which the person can mobilize through SOC and then apply in seeking a solution to the instrumental problem and prevent transformation of tension into stress (Fig.2). SOC strengthens the ability to move to the ease end of the continuum when meeting challenges in one's life; in this way, SOC is causal to health.

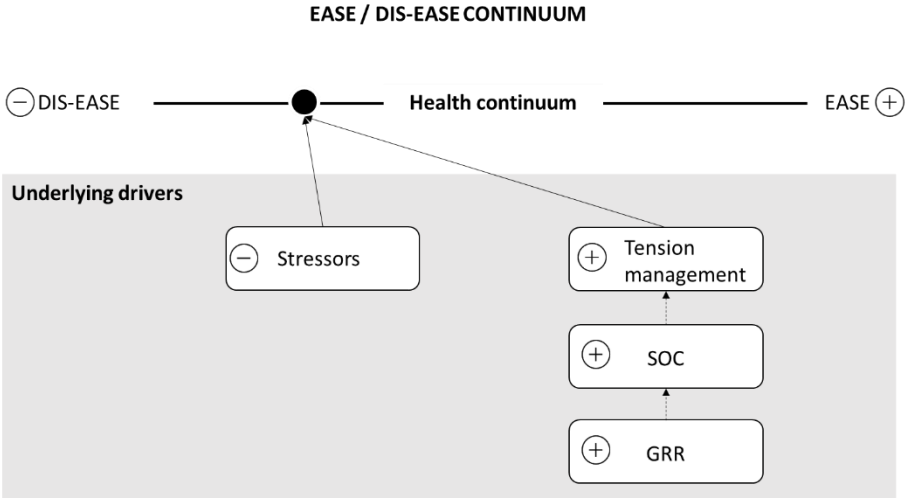


Figure 2. Health, tension management and GRR / SOC

Tension management by using SOC and GRR to move to the ease end of the ease/ dis-ease continuum, inspired by Antonovsky (Antonovsky, 1987).

To measure the strength of SOC, Antonovsky developed a 29-point SOC scale as a life questionnaire (Antonovsky, 1987) (ibid p190-194), with scaled questions for comprehensibility, manageability and meaningfulness. He also recommended how to reduce it to a 13-point scale. In some reviews, the 13-point SOC scale is still estimated as reliable and valid because the SOC concept has shown to be a health resource influencing quality of life (QoL) and SRH (Eriksson, 2005, 2006; Eriksson et al., 2007; Eriksson and Lindstrom, 2007). When having strong SOC, stressors do not necessarily produce a long-lasting movement towards the dis-ease end of the continuum but can, by successful tension management, further strengthen the person's SOC if the stressors are temporary, understandable and manageable (Fig.2) (Antonovsky, 1987; Mittelmark and Bull, 2013).

3.3 Self-efficacy

The theory of SE was developed by A. Bandura (1997) and is still considered essential to both understand reasons for and support of human behaviour and wellbeing. SE refers to an individual's belief in his or her capacity to execute a behaviour necessary to produce a specific outcome (Bandura, 1977, 1997). Belief in own capability (SE) has a powerful effect on *behaviour*. People choose to engage in activities that they believe they can manage, and tend to avoid the situations they think will exceed their

capability (Bandura, 1977). Self-motivation to work toward a goal requires both *efficacy* expectation to the behaviour needed and *outcome* expectation to the value of the goal, and whether a given effort will lead to the specific outcome.

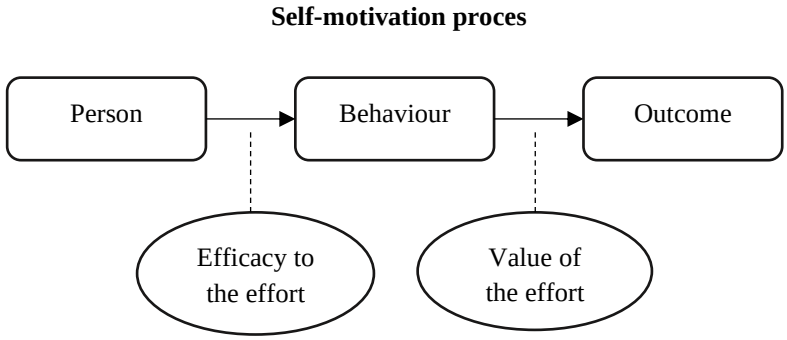


Figure 3. Self-motivation.

Inspired by (Bandura, 1997) *to illustrate the difference between efficacy expectations and outcome expectation*.

SE reflects confidence in the ability to exert control over own motivation, behaviour and the social environment influencing this. Like Antonovsky, Bandura claimed that the field of health was changing from a disease model to a health model, and that health is a social matter, not just an individual one. "Self-management is good medicine learned in the social context" (Bandura, 1977). In his social cognitive theory (SCT), Bandura offers an understanding of *how* people change behaviour and not only *why* (Bandura, 2004) (fig.4).

Causal Model of Social Cognitive Theory
The reciprocal triangulation of learning

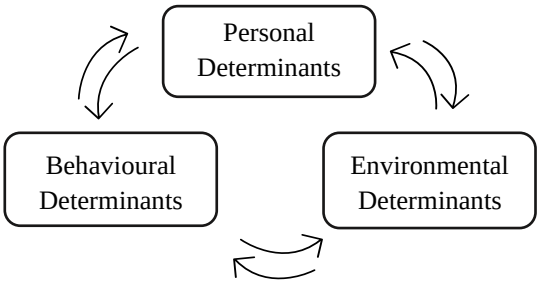


Figure 4. Social cognitive theory. *Inspired by* (Bandura, 2012).

According to SCT, learning occurs within a dynamic and reciprocal interaction in a triangulation between *a person, the environment and the behaviour* that is displayed, which influences positive or negative development of SE (Bandura, 1997, 2004, 2012) (Fig.4).

SCT specifies a set of *determinants* for effective health practices: *knowledge* about health risks and benefits, *perceived SE* that one can exercise control over own health habits (Fig.3 and 4); *outcome expectations* about costs and benefits associated with the health habits and goals (Fig.3 and 4) , and the *perceived facilitators* and social and structural *impediments* to change (Bandura, 2004) (Fig.4). Choices determine which potentialities are cultivated and which remain undeveloped and are highly influenced by the social context (Bandura, 1977, 2004). The relative influence differs with different activities and circumstances (Bandura, 1977, 2004; Anderson et al., 2007; Ghazi et al., 2018).

Bandura categorizes **four sources of SE** (Bandura, 1997). The most important source of SE is one's own experience: *"own mastery experience"* of the same or a similar situation, as this is the most authentic evidence of performance capacity. With high SE, this success may also transfer to SE related to other performances. Others' experience: *"vicarious experience"* can be used in developing SE provided these others are comparable with oneself ("modelling"). The third source: being persuaded to do something (*"verbal persuasion"*) is effective only when performed by somebody one trusts mainly based on knowledge of one's performance capacity. The fourth source: to be aware of one's psychological reactions: "p*sychological and affective states"* is especially relevant in domains that involve physical accomplishments, health functioning and coping with stressors. Those who have high achievements often view

arousal as an energizing facilitator, whereas low achievers regard arousal as a debility (Bandura, 1997).

The **mediating processes** through which efficacy beliefs produce their effects include *cognitive, motivational, affective,* and *selective processes*. These different processes operate in concert rather than isolation in the ongoing regulation of human functioning. By making retrospective reasoning, SE is supported in the person (Bandura, 1997).

SE support has shown significant effect on behaviour change in several studies both related to performance in school and at work and change in health behaviour (Kok et al., 1991; Anderson et al., 2006; Bandura, 2012; Primdahl et al., 2012). Persons with low SE will benefit from stepwise guidance with stepwise goals, dependent on motivation as every success improves SE (Bandura, 2004). If one can visualize success scenarios on effective courses of action, one creates positive guides for performance. If one is plagued with self-doubt, the thinking processes will be self-hindering. SE is not a fixed ability but related to distinct areas of functioning. According to SCT, SE is a generative capability in which cognitive, social, emotional, and behavioural subskills must be organized and effectively orchestrated in the triangulation to serve innumerable purposes (Fig 4). People with a high level of perceived SE possess many subskills and are able to integrate them well under difficult circumstances (Bandura, 2012).

3.4 Self-determination theory

SDT, developed by Deci and Ryan, describes factors that either facilitate or undermine self-motivation, personal growth, and wellbeing mainly by exploring the concepts *intrinsic* and *extrinsic motivation* in different situations. Three basic needs for *intrinsic motivation* (self-motivation and personality integration) basic to growth and wellbeing were identified: *competence, relatedness* and *autonomy* (Deci and Ryan, 2000; Ryan and Deci, 2000, 2006). The authors describe these needs to be essential for facilitating optimal functioning of the natural possibilities for growth and integration, as well as for constructive social development and personal wellbeing during a lifespan and in all cultures.

According to SDT, no single phenomenon reflects the positive potential of human nature as much as *intrinsic motivation*, the inherent tendency to seek out novelty and challenges, to extend and exercise one's *competence*, to explore and to learn (Ryan and Deci, 2000). However, maintaining and developing intrinsic motivation and sustain competence requires *relatedness,* being part of a group or a society. People are moved to act by different factors, experiences, and consequences. If the action is based on intrinsic motivation, it will lead to enhanced performance, persistence and creativity (Deci and Ryan, 2000; Ryan and Deci, 2000).

Extrinsic motivation might be integrated in intrinsic motivation under certain conditions. Acknowledgment of feelings and opportunities for self-direction were found to enhance intrinsic motivation because they allow people a greater feeling of *autonomy*. On the contrary *extrinsic motivation* as rewards or punishments will undermine performance and intrinsic motivation in the long term because the result is not integrated into one-self based on interest and relatedness, but obtained through extrinsic pressure (Deci et al., 1999). According to SDT, extrinsically motivated behaviours are typically not interesting. External values can be internalized and thus support creativity, persistence and flexibility if the individual is met with genuine interest and support and not with pressure in the social context (Deci et al., 1999; Saether, 2020).

3.5 Trans-theoretical model of change

A scoping review showed that among health theories, the trans-theoretical model of change (TTM) is the most frequently used model for describing reasons for individuals' change of behaviour at specific stages (Prochaska et al., 1985; Davis et al., 2015) (fig.5). This is potentially relevant to public health interventions encompassing aspects of psychology, sociology, anthropology and economics (Davis et al., 2015).

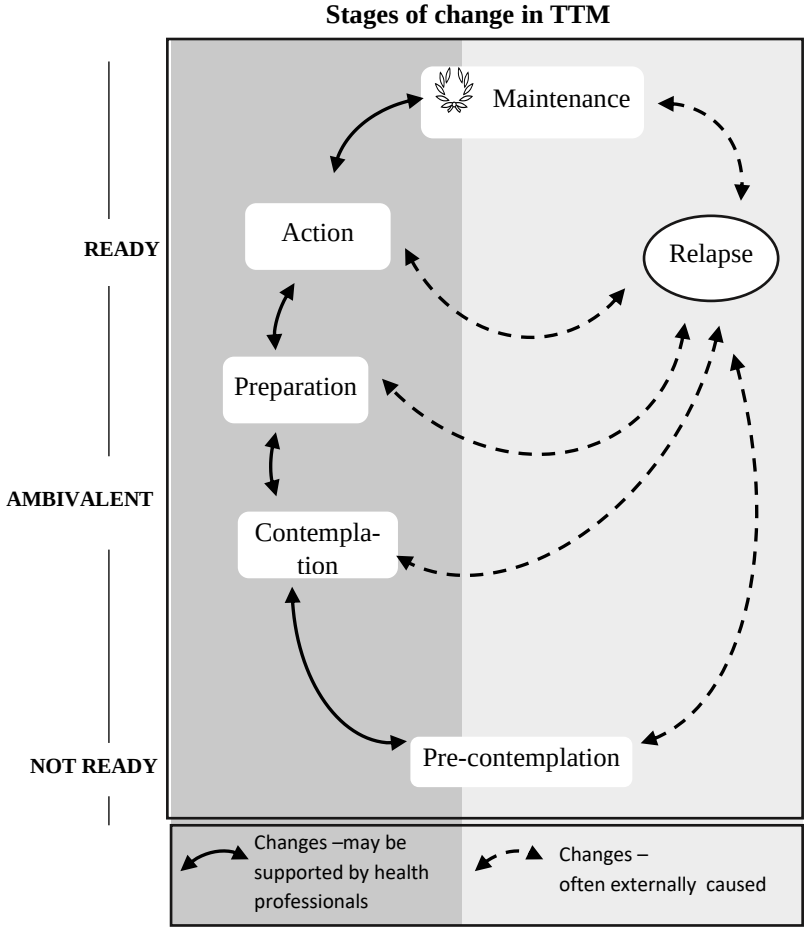


Figure 5. Trans-theoretical model of change.

Inspired by Prochaska and DiClemente (Prochaska et al., 1985).

TTM was developed in observational research on addictive behaviour, specifically in smokers, to describe different stages of change (Prochaska et al., 1988, 1992). Prochaska et al. sought to reveal common principles or structures of intentional change in addictive behaviour occurring with or without psychotherapy to explain how and why smokers change. This research should contribute to an understanding of why some smokers relapse irrespective of professional help.

The TTM (Fig. 5) describes five stages of change in a circular structure where relapse can occur between the different stages: 1. Pre-contemplation (I do not consider to stop/ resistance). 2. Contemplation (I am considering/aware of a problem/ weighing pros and cons). 3. Preparation (I have made small changes and want to stop within 30 days). 4. Action (I have stopped for more than 24 hours/ still struggling). 5. Maintenance (I have stopped for more than 6 months/ work to prevent relapse and maintain the gains). Being aware of the patient's stage of change is basic to the preventive effort (Prochaska et al., 1993; Hardcastle et al., 2015). Three to four action attempts are expected before a permanent maintenance stage is reached. Most "relapsers" were seen to recycle to the contemplation or preparation stage.

The theory behind the model suggests that progress through the different stages is driven by ten processes specific to the stages, and that it is essential for therapists to be aware of these processes (Fig.5). At the *contemplation stage*, e.g. consciousness-raising was emphasized which was based on discussing pros and cons/ i.e. using decisional balance, evolving to self-re-evaluation before being able to move to *action stage*, where self-liberation, stimulus control and the need for helping relations were emphasized (Prochaska et al., 1985). The multiple cognitive and interpersonal problems that individuals can experience at the different levels of change are included in the theory, e.g. SE described by Bandura (Bandura, 1977; Prochaska et al., 1985). The TTM is one of several theory-based models, and it is most often used as a practical tool for health professionals. The model with different stages of individual behaviour offers a relatively functional explanation of possibilities for behaviour change and what kinds of support might be relevant at the different stages (Davis et al., 2015). It has also been criticized for being too simple and optimistic even if the design is pragmatic and useful, especially in primary care (Whitelaw et al., 2000).

Chapter 4. Problems and aims

4.1 Problems

Attendance to general practice represents low inequality and high continuity (Sundhedsstyrelsen, 2020). Therefore, general practice is a relevant framework for developing and introducing new preventive initiatives focused on the psychosocial complexity in health (Mackenbach et al., 2019; Sundhedsstyrelsen, 2020). In Denmark GPs are obliged by contract to offer consultations with both preventive and therapeutic content and provide continuity and coordinated care (RTLN . PLO, 2021).Nearly all citizens (99%) in Denmark are listed with a self-chosen specific general practice. Contact is free of charge and patients on average contact their GP seven times a year (Sundhedsdatastyrelsen [The Danish Health Data Authority], 2016). More than 90% of women and slightly more than 80% of men contact their GP every year. Low grade of social inequality in attending is seen among men, but no social inequality is seen among women (Sundhedsstyrelsen, 2020).The collective agreement refers to prevention as a possibility for providing advice and guidance to patients, including initial MI, yet without specifying contents or a fee for this service. For patients with chronic diseases, the preventive tasks are mentioned in connection with diagnosis, treatment, control, referral to municipality offers and coordination.

Despite this broad agreement on the possibilities of preventive actions, no specific agreement on time and structure of primary preventive consultations to adults without evident disease exists in Denmark, in contrast to, e.g., England, yet so only focused on risk factors for specific diseases (Martin et al., 2018; Bunten et al., 2020). A recent report from the Danish Health Authority describes the extent of inequality in health in Denmark and emphasizes the importance of equality and continuity in attendance to general practice as fundamental to the GP's role (Sundhedsstyrelsen, 2020). In contrast to people with multiple problems, people with larger resources often benefit from information on risk factors and have the energy to reduce risky lifestyle. This difference persists whether they receive such information from public media (Niederdeppe et al., 2008; Gillison et al., 2019), in connection with population-based health check (Bender et al., 2014, 2015; Bjerregaard et al., 2017) or individual preventive consultations (Christensen, 1995; Kristenson et al., 2004; Van Der Heide et al., 2013; Grabovschi et al., 2013; Kristensen et al., 2017). Individuals with many psychosocial problems often have difficulty changing behaviour in response to information and advice on risk factors, perhaps because more urgent problems take precedence (Mercer et al., 2007, 2016; Mackenbach, 2012; Hardcastle et al., 2015; Diderichsen et al., 2019). Discussing risk factors without considering their relevance or people's readi-

ness to change often creates' resistance and difficulty in establishing the rapport necessary for supporting relevant health behaviour change (Beich et al., 2002; Guassora and Baarts, 2010; Guassora and Gannik, 2010).

Our population-based, non-randomised pre-study in 1987-88 with health conversations for four age groups in general practice showed some effect on participants' attitude to their own responsibility and some improvement in health and social situation (Bille et al., 1990; Rasmussen, 1993) also for the 20-year-old participants who had a lower attendance rate than the other age groups

The aim of a new study was therefore to investigate whether a preventive offer would be accepted and benefit a group of adults with psychosocial challenges known to bar change towards healthier behaviour, but seldom verbalized in ordinary consultations (Dean and Hunter, 1996; Malterud et al., 2001; Mercer et al., 2007; Browne et al., 2012; Reeve et al., 2013; Liu et al., 2016).

4.2 Aims and objectives

The overall aims of this PhD thesis are to investigate 1) whether screening of adults attending general practice could identify patients with few resources and many psychosocial or lifestyle problems; and 2) whether two preventive health consultations with their GP with a focus on the whole person, individual goals, resources, and barriers could increase patients' wellbeing and awareness of own resources or lead to health-related changes.

The specific objectives of the PhD thesis are:

1. To describe the characteristics of 20-44-year-old patients who were screened for lack of resources, psychosocial problems and lifestyle when attending their GP for any reason (I).

2. To analyse the effect of two preventive health consultations offered by general practitioners to their 20-44-year-old patients with lack of resources or many psychosocial or lifestyle problems, measured as change in SF-12, self-rated health, number of problems and lifestyle stated by these patients one year after the health consultations (II).

3. To analyse potential predictors of weight loss after one- year in patients with BMI ≥25 (III).

4. To analyse the patients' self-assessed resources to reach self-selected goals at the end of the first consultation (IV).

Chapter 5. Design, material, and method

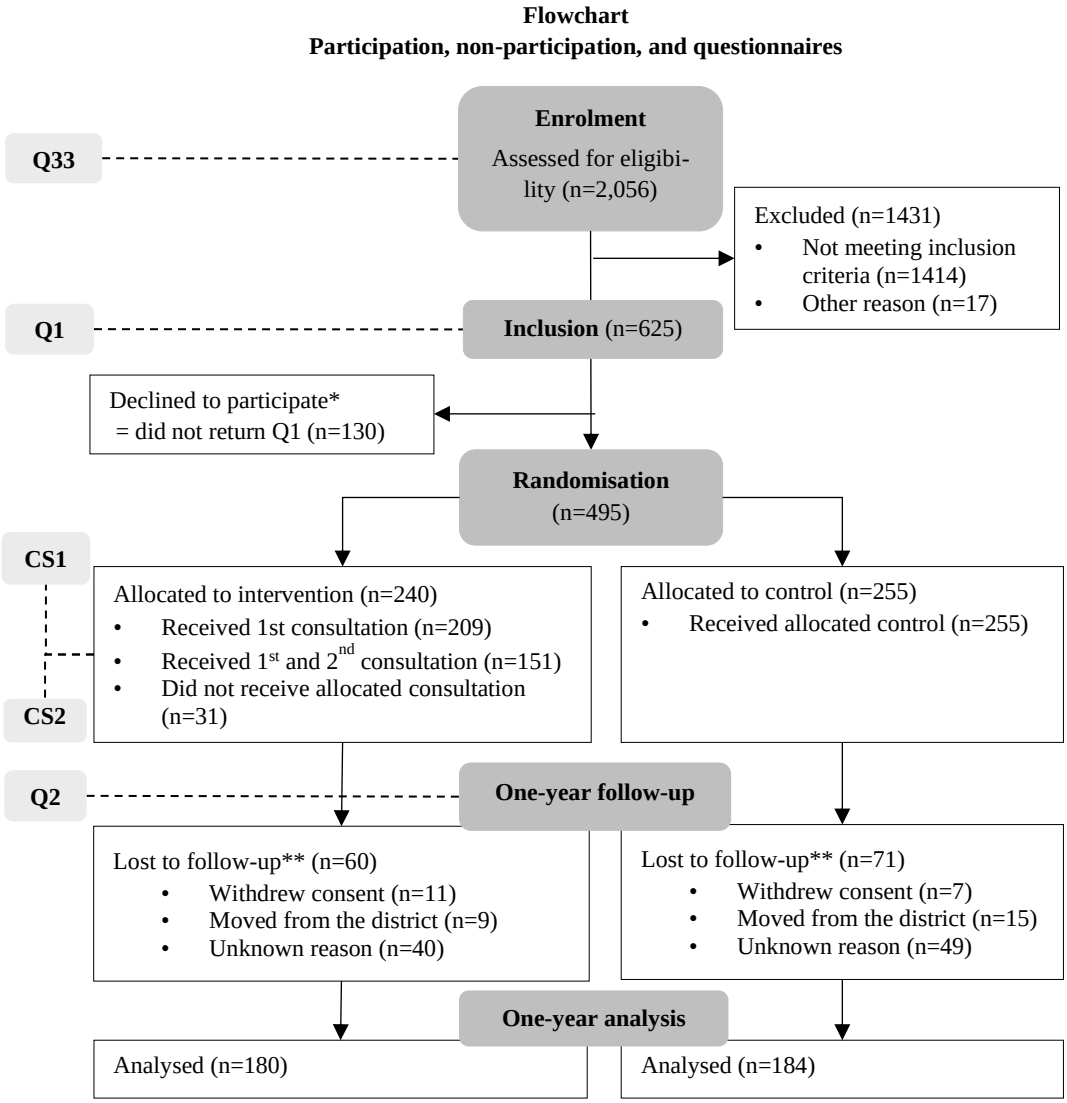
In this chapter, the design, material, recruitment of patients and GPs is described as well as the working methods used in the trial "Preventive health conversations to 20-44 -year-olds" in Northern Jutland, Denmark 1998-2000 on which this thesis is based (papers I-IV). Finally, some aspects of the data analyses in the four papers of the thesis will be described.

In 1996, after negotiations between the Health Administration in the county of Northern Jutland, the local union of GPs and me as the project leader (§2 agreement), an agreement was made for purpose and remuneration of GPs participating in *"a preventive trial with health conversations for 20-44-year-olds with children and persons with multiple problems regarding lifestyle to reveal and change undesirable behaviour and conditions of life*" (extract in Appendix1).

5.1 Design

Eligible patients were identified by the clinic staff using a screening questionnaire with 33 questions (Q33) concerning psychosocial problems and lifestyle. The Q33 was handed over to all 20-44 years-old attenders after they had provided informed consent upon arrival to the clinic for any reason (paper I) (Fig. 6, Flow-chart).

Those who had seven or more problems out of 33 designated problems were eligible for participation upon answering a 23-pages basic questionnaire with 84 questions (Q1) at home before randomization to control group or consultations (Fig. 7, Structure). The consultation group was offered two consultations with their GP within 3 months. The consultations were structured by means of the Q1 and a conversation sheet (CS1-Q and CS2-Q). One year after the randomization, a second questionnaire (Q2) was sent to both randomized groups (Fig 6, Flowchart).



*Before randomisation (n=130): 1.5 years younger, more often smokers (72%) than participants (55%)

**One-year follow-up: did not return Q2: (n=131). More often men (p= 0.02)

Figure 6. Flowchart of the study

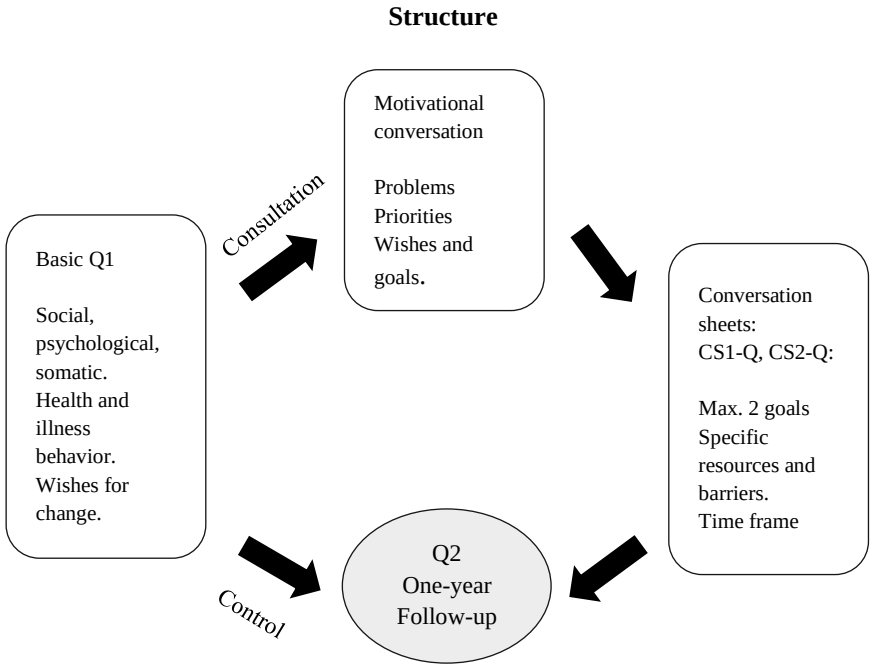


Figure 7. Structure of the intervention

5.2 Material

The material in the trial consisted of five questionnaires illustrated in Fig. 6 and Fig. 7, but in this thesis the CS2-Q answered during the second consultation is not analysed, leaving four for analyses.

5.2.1 Q33| Screening questionnaire

A screening questionnaire (Q33) intended to select a relevant target group of patients attending their GP for any reason (Appendix 2) (paper I).

The questions in Q33 were selected in accordance with existing literature on factors fundamental for healthy lifestyle. A few questions had been internationally validated, i.e. (SRGH as described in the background section (Idler et al., 1990; Pill et al., 1993; Kjoeller et al., 1995; Møller et al., 1996; Idler and Benyamini, 1997) and the CAGE

questionnaire concerning use of alcohol (Ewing, 1984). The other questions were formulated in collaboration with researchers at the University of Copenhagen, Section of General Practice, who were experienced in developing and testing questionnaires and discussing resources in relation to theories of GRR, SOC (Antonovsky, 1979, 1980; H.Antonsky, 1986) and basic need satisfaction (Maslow, 1943). Questions concerning relation to and conditions for own children were based on international and Danish research concerning fundamental factors for a healthy childhood and its influence on healthy lifestyle in adulthood, e.g. prolonged unemployment, difficulties in interpreting life circumstances and supporting one's children (Antonovsky, 1980; Dean, 1981; Kjoeller et al., 1995; Nygaard Christoffersen and Socialforskningsinstituttet, 1996a; Dean and Hunter, 1996).

The purpose of Q33 was to identify issues relevant to early preventive measures in the family for parents and children. To the authors' knowledge, no a priori validated questions existed within these areas. The research group assumed that the selected 33 questions in Q33 would reflect the patient's basic needs as conditions for self-care and preventive health behaviour both towards oneself and one's children and in this way signal the possibility to discuss problems lying outside the usual biomedical health and lifestyle concept (paper I). This was confirmed by pilot testing.

The 33 questions were arranged in the following sequence for psychological reasons: personal resources including SRGH (n= 9), lifestyle (n=8), family situation (n=10) and conditions for and relation to own children (n=6) (Appendix 2).

A five-point Likert scale was used in the questions about SRGH, resources and the situation of one's children. The answers were dichotomized, the best and second best being considered no problem and the remaining three answers being considered a problem, which is in accordance with dichotomizing of SRGH in most studies (Fayers and Sprangers, 2002; Mildestvedt et al., 2018). The other questions were answered by yes/no. With this design, the staff could easily count the number of problems before including those with seven problems or more.

5.2.2 Q1 | Basic questionnaire

Q1 consisted of 84 questions in 23 pages, most of which were also used in the pre-study but supplemented with SF-12 questions and further details about the influence of one's problems on everyday life and wishes for change.

Validated questions in Q1 - The 12-item Short Form (SF-12) Health Survey

We included the SF-12, which is a shortened and validated version of the generic questionnaire SF-36 (Gandek et al., 1998). The SF-36 was developed over decades in the US and has shown high psychometric validity in measuring general health-related

quality of life (HRQOL) compared to longer questionnaires (Gandek et al., 1998). In 1997, the Danish manual on SF-36 was published (Bjorner et al., 1997). In the late 1990s, the 36 items from SF-36 were reduced to 12, i.e. the SF-12 (Gandek et al., 1998). Both questionnaires measure HRQOL with items for consequences of illness/handicap, physical and mental capacity, and general health without specific disease-related questions. The reduction in the number of items from the SF-36 to the SF-12 was validated by the scientific collaboration project IQOLA from eight European countries and the US (Gandek et al., 1998), which regarded the SF-12 as more practical for large-group comparisons (Gandek et al., 1998; Ware and Gandek, 1998). In the SF-36, one question concerns change in health and lies outside the scale. The other 35 questions fall in eight categories with different numbers of items (2-10). The Physical Component Score (PCS) consists of items that describe physical function (PF), role physical (RF), bodily pain (BP) and general health (GH). The Mental Component Score (MCS) consists of items describing vitality (VT), social functioning (SF), role emotional (RE) and mental health (MH) (Ware, 2000) After multiple tests with cross-validation within different age groups and nationalities, one or two items from each of the eight categories were selected by IQOLA to form the SF-12. Within the SF-12, six items describe physical health (PCS-6), including SRGH; and six items describe mental health (MCS-6). Whether the SF-36 or the SF-12 is the most appropriate to use in a study depends on its purpose. If the purpose is to obtain specified information within each category, the SF-36 will be most reliable. The SF-12 has the advantage of being short, reliable, and easy to answer. It is appropriate to use in a longitudinal study to measure PCS and MCS (Gandek et al., 1998; Ware and Gandek, 1998).

As no validated questionnaires existed with PROM (patient reported outcome measure) for quality of life regardless of illness/ handicap, the SF-12 was chosen as the best international validated generic PROM. We included the SF-12 version 2 consisting of six physical items (PCS-SF-12) and six mental items (MSC-SF-12) in Q1 (papers II and III).

Validated questions in Q1 - Self-rated global health

SRGH is used in many studies as a single question but is also part of the PCS-SF-12. Self-rated global health is included as a single question in Q33 and is part of the SF-12 in Q1 and Q2 (paper II). As the SRGH reflects complex and essential aspects of a person's' situation, it is placed as the first question in Q33 to make the answer as unaffected by the subsequent questions as possible. In most studies, SRGH is dichotomized from a five-point Likert scale like in our study with the two best scores being equivalent to no problem (DeSalvo et al., 2006). In our study, the expression "excellent" is, however, replaced by "really good" in both the SF-12 and the separate SRGH

like in DIKE's survey and as recommended by the WHO (Kjoeller et al., 1995). For a further description of SRGH, see the background section.

Not validated, but standardized questions in Q1

Many questions about people's psychosocial situation were as in the pre-study standardized by DIKE in their periodic interviews regarding health and illness including social conditions such as education, housing and work conducted every fifth year since 1987 with 5,000 Danes above the age of 16 (Kjoeller et al., 1995). From DIKE, we knew that about two thirds of the working population were exposed to some physical load and many to a mental load as well. People outside the working population also often had somatic and mental symptoms. About 30% of all interviewed persons were exposed to one or more inappropriate environmental factors in their homes such as moisture, draught, traffic noise or passive smoking (Kjoeller et al., 1995). These environmental factors were included in Q1 using the DIKE' wording. We supplemented the DIKE questions about symptoms, problems, behaviour, and limitations with more specific questions about health and illness behaviour, stress factors, satisfaction and wishes for change related to physical and mental conditions in both private and working life. These additional questions were informed by the pre-study and experience from international and Danish health and social science regarding conditions for healthy family life, children and work (Belloc and Breslow, 1972; Belloc, 1973; Kaplan and Camacho, 1983; Breslow and Breslow, 1993; Nygaard Christoffersen and Socialforskningsinstituttet, 1996a; b). We used the same categories as DIKE regarding lifestyle questions about diet, exercise, use of tobacco, alcohol, medicine and drugs, but the questions were more detailed to allow them to serve as a platform for reflection (Ewing, 1984; Kjoeller et al., 1995). Some questions about resources were constructed based on more than 20 years´ of experience as a GP to support a holistic view of the patient. These questions were not used for statistical purpose; they were included in the consultation as part of the intervention to set the scene for the discussion.

The Q1 was mostly answered in a close-ended manner with a possibility to supply extra information in some open-ended questions. A few questions were answered on a five-point Likert scale like in the Q33.

5.2.3 CS1-Q | Conversation sheet 1

At the end of the first conversation, the CS1-Q was answered. Five questions were answered separately by the patient and the GP in the same CS1-Q using a five-point Likert scale to evaluate the conversation, general health, resources, network, and lifestyle. In addition, the patient 1) ticked off one or two goals among 14 preselected and

one optional goal, all supplied with open-ended descriptions of the goal, 2) for each goal described in two lines resources and barriers to reach the specific goal (paper IV) and 3) ticked off the estimated time frame for obtaining the goal. Objective findings such as blood pressure, height, weight (paper III) and if indicated, cholesterol, blood sugar and urine test were noted by the GP. Any need for further intervention from others or extra consultations for symptoms or objective findings was noted as was also appointments for follow-up conversation within 3 months.

5.2.4 CS2-Q | Conversation sheet 2

In the follow-up conversation, it was ticked off on the CS2-Q whether the topics of the conversation were related to the goals or objective findings from the first conversation, whether the goal was reached and whether the conversation had influenced this, or whether other important changes had happened. At the end of the 20-min' follow-up conversation, questions about goals, resources, barriers, time schedule and need for any referral or new conversation were answered like in the CS1. Evaluation of anything missing or anything of special value in the study could be answered in two lines by both the GP and the patient. This CS2-Q is not analysed in the thesis, but it was part of the intervention and might have some importance for the one-year results (papers II and III).

The CS1-Q and CS2-Q had three copies, one for each: the patient, the GP, and the trial secretary.

5.2.5 Q2| One-year questionnaire

Both the consultation and control group received a postal Q2 from the trial secretary in the county one year after inclusion. In the Q2, the Q33 and Q1 were included to evaluate any change (papers II and III) supplemented by seven evaluation questions of the study: 1) whether the Q or the conversations had influenced the patient's life the past year, and a specification of this, 2) whether the conversations had been "worth the trouble", and why: yes/no, 3) any proposal for changes in the study, and 4) how often they estimated they needed such conversations, 5) whether they had received any specific advice, whether this was followed or not, and why, 6) if the GP had behaved differently, and 7) whether they would like to use a similar offer again (Soot et al., 2018).

5.2.6 Summary

The questionnaires used in this study were developed with three different purposes. 1) Q33 was developed according to existing health theories to include vulnerable patients with a certain number of problems related to selfcare and well-being fundamental to health for themselves and their children. 2) Q1, CS1 and CS2 was intended to prepare the patient and structure the preventive process for both the patient and the GP. 3) the Q2 was used to evaluate whether some changes had taken place after one-year and whether the health consultation had contributed. The primarily quantitative data were in this way supplied by some qualitative data, mainly with the purpose to support the personal preventive process, but also to enable process-evaluation.

5.3 Method and participants

5.3.1 Pilot test

As no former study had conducted a similar intervention, the questionnaires and working method was pilot tested before implementation.

Four GPs each with 7-8 patients, pilot-tested all Qs except the one-year Q2; the pilot-test revealed that the Qs were considered understandable, reasonable, and relevant, both by the patient and the GP, as a basis for a person-centred holistic preventive consultation. After the pilot-test, the GPs estimated that a cut-off of ≥7 out of 33 problems would include about 25% of patients in the relevant age group. Following possible dropout, this would likely imply that a maximum of 20 patients would be included every year for each GP as described in the §2 agreement with the county (Appendix1).

5.3.2 Sample size calculation

The items in the SF-12, which were included in Q1 have different response categories (2-5). The scoring of the SF-12 like the SF-36 questionnaire is transformed to give a mean score of 50 (1-100) in the background population with a standard deviation of 10, both for PCS and MCS (Ware et al., 1998). The higher score the better HRQOL. The correlation between score measured by the SF-36 and the SF-12 was about 0.96 both for PCS and MCS across the nine countries (Gandek et al., 1998). Half a SD (five points) was defined by the IQOLA as a clinically relevant difference in SF-12 score (Ware et al., 1998). With a significance level of 5%, this meant that a sample size of at least 160 patients was needed in each group in our study (paper II).

5.3.3 General practitioners

Recruitment

In the late 1997, all 325 GPs in the county were invited to an introduction weekend course. Of the fifty participating GPs, 40 expressed their intent to join the trial. Of these, 28 managed to participate in the trial and received the scheduled approximately 40 hours of training (weekend and evening). The remaining GPs declared having too much work or other problems in their clinics.

Intervention and courses for GPs and their staff

In the weekend course, local specialists within clinical psychology and social medicine performed educational activities and together with the trial group led discussions related to the new preventive role using experience from the pre-study. The staff, i.e. practice nurses and secretaries, were invited to attend some of the evening courses; especially those with discussion of procedure, expectations and problems.

The weekend course was designed by the trial group. A clinical psychologist introduced the GPs to psychosocial theories such as the biopsychosocial model of health (Engel, 1977) with acute and chronic pain as an example, using the *Central System Theory* by Ludwig von Bertalanffy (Bertalanffy, 1984) (Feigl and Bonet, 1989; Drack and Wolkenhauer, 2011) as a starting point. This theory contradicts the linear causality and explains how reactions to somatic or psychiatric disturbance give not only symptoms in one function but disturb the whole system, thus reflecting a circular and dynamic causality both in the body/mind and in relation to social connections. The difference between *disease* as a biomedical diagnosis in the healthcare system and the patients' *illness* as a bio-psychosocial perception of symptoms was discussed (Engel, 1977; Adler, 2009). Individual differences in behaviour related to illness and health were dealt with by an educational psychologist from the point of view that GPs use conversation as a tool that has important individual cognitive and affective elements. Acknowledgement of the background for the contact, reciprocity in information, authenticity in solutions and follow-up on agreements were emphasized (Kjeldsen, 1987).Training elements comprised the physician's reaction patterns in patient encounters, awareness of unvoiced agendas, resistance against change, conversation techniques including elements of MI (Rollnick and Miller, 1995), the TTM (Prochaska et al., 1985, 1988; DiClemente et al., 2008) and the importance of SRGH (Idler et al., 1990; Idler and Kasl, 1995; Møller et al., 1996; Idler and Benyamini, 1997). At a follow-up course ,the "risk/resource balance" and the salutogenic perspective (Hollnagel and Malterud, 1995, 2000), as described in the background section, were introduced and discussed. Education in social medicine focused on frequent work-site problems such as physical and mental load at the patient's job and possible prevention of these.

It was underlined that the GP should respect the patients' autonomy through active listening by exploring their priorities regarding health and social situation and their wishes for change in order to strengthen their confidence of their own abilities to reach their desired goals, thus raising their 'consciousness of and faith in their own resources (Deci et al., 1999; Ryan and Deci, 2006; Williams et al., 2006).
In evening courses during the trial, the subjects raised were scientific knowledge of tobacco, diet, cholesterol, alcohol, and cardiovascular prevention primarily through healthy lifestyle presented by specialists. In all courses, we discussed experiences so far with the trial.
The GPs answered a questionnaire after the course and the trial about their expectations and experience, supplemented with telephone contact and focus group interviews. The staff answered a questionnaire after the trial. Neither of these have so far been published.

5.3.4 Patients

Recruitment: Screening for vulnerability (Q33)

From May 1998 until December 1999, all patients aged 20-44 years visiting their GP for any reason in specific project periods were consecutively invited by the staff who provided verbal and written invitation (paper I). Those who accepted the invitation to participate (n= 2,056) gave written informed consent on the invitation sheet, where the trial was shortly presented with method, ethics and purpose: *"....to support you using your strong sides as well as possible, in this way preventing bigger problems and illness from occurring. Science has shown that wellbeing is essential to maintain good health."* The screening questionnaire (Q33) about resources, lifestyle and psychosocial conditions was ticked off at the clinic and number of problems were counted to decide inclusion or not (Appendix 2). To respect the workload, the clinic could decide appropriate project days and intervals, but the clinic was required to schedule consecutive hours on these project days to reduce the risk of inclusion bias by recruiting selected patients. Only patients not understanding Danish or with severe acute illness or severe psychiatric disease were not invited.

Inclusion by randomization

All 625 persons (n=30%) with the cut-off level of seven problems were included in the trial by answering a more comprehensive questionnaire at home (Q1) (Fig. 6 Flowchart). After delivering the Q1 at the clinic, the patients (n=495) were randomized to the consultation or control group by the staff phoning the trial secretary at the Department of Clinical Epidemiology, University of Aalborg, Denmark. From a per-

sonal GP-related computer-generated list of random numbers, the staff received a consecutive patient number for each GP (01-40) (paper II). Even numbers were controls, uneven were offered intervention with two consultations with their GP. With this allocation, concealment bias was prevented (Moher et al., 2005; Pittler et al., 2011). Neither the patients nor the GPs were blinded.

Intervention by consultation

The intervention at the patients' own GP was a structured maximum one-hour preventive conversation based on Q33 and Q1 and a 20-min follow-up within 3 months (Fig. 7, Structure). As in the pre-study, the GPs were recommended to introduce the conversation by asking: "What was it like to complete the questionnaire?";" How did the answering influence you?"; "What do you prefer to discuss?" (paper II). In this way, the topics of the conversation could facilitate the patient's' agenda and minimize the risk of GPs being authoritative. The GP was supposed to listen actively, be person- and patient-centred (Balint, 1969; Bower, 1998; Starfield, 2011) and try to mobilize the patient's intrinsic motivation and goals (Deci et al., 1999; Ryan and Deci, 2000) in order to make the patient verbalize priorities and pros and cons of a possible change (Prochaska et al., 1988; Rollnick and Miller, 1995). Lastly, the patient summarized in writing their goals, resources, barriers, and time frame in the CS1-Q (paper IV). Follow-up within three months was conducted in relation to goals, resources, and barriers to reach the desired change on the one hand and in relation to biomedical measures if indicated on the other hand. Both parts were answered in CS2-Q, the data of which have not yet been analysed. The follow-up was scheduled at CS1-Q to support completion despite possible problems.

5.4 Method and data

5.4.1 Data collection and anonymity

All questionnaires (Qs) except the Q2 were handed over to the patients by clinic staff. Only the clinic and the trial secretary knew the patient's unique ten-digit Central Personal Register (CPR) number. The CPR number was used to identify the person on the participating GP's list. The numerated Qs were identified by the GP's trial number (1-40), number of patients' Q33 and the patient's randomization number (01-40 at each GP), received by telephone contact with the trial secretary. Clinic staff mailed answered Qs to the study coordinator at the Department of Clinical Epidemiology, Aalborg University, Denmark, who registered participation. The one-year Q (Q2) to the patient was sent by and returned to the study coordinator, Aalborg, who performed reminders and questionnaire collection. She posted the material to a trial secretary at

the Section of General Practice, Aarhus University, Denmark, who transferred the data from the paper-based questionnaires to an electronic database, using the Tele-Form reading system (info@cardiff-teleform.com).

5.4.2 Data material

Participants

Fig. 6 flowcharts participation, non-participation, and use of Qs throughout the trial. Of the 2,056 patients screened by Q33 (paper I, Table 1), 30% (n=625) satisfied the inclusion criteria (≥ 7 problems out of 33). Of these 625 patients, 130 (21%) did not return the Q1, leaving 495 for randomization. By randomization, 255 patients were allocated to the control group and 240 to the consultation group. The control group only answered Q1 and one-year follow-up Q2. Among consultation group patients, 209 received only the first health consultation, whereas 151 received both consultations as planned. At 1-year follow-up, 180 persons remained for analyses in the consultation group and 184 in the control group after reminders (papers II and III).

Non-participants

At screening: We do not know how many declined the screening. Unfortunately, the staff was not asked, until the last few months of the trial, how they estimated the interest of their patients to participating in the screening. At the 15 participating clinics, the staff estimated the patients' lack of interest within a range of 1-30% (average 13%), showing big difference between the clinics. The reasons were estimated as no energy, no need, or no desire of participation (paper I).

At randomization: The 130 patients (20.8%) who did not return the Q1 despite reminders (i.e. non-responders/ not randomized) were 1.5 years younger and more often daily smokers (72%) than responders (55%); difference =17% (95% CI 7-25) (Fig 6, Flowchart). However, no significant differences between responders and non-responders were seen in terms of SRGH, length of unemployment or total number of problems (paper II, Table 1).

At the health consultations: Randomized respondents who did not attend a health consultation (n=31; 13%) stated as reasons for their non-attendance that they had no problem anymore, they lacked time, had moved to another district, or just withdrew their consent. Fifty-eight (24%) only received the first consultation for similar reasons (n=43) or following agreement with their GP (n=15) (paper II) (Flowchart 6).

At one-year follow-up: After two written reminders, non-responders at the one-year follow-up were contacted by telephone by a physician who had participated in the trial. This increased attendance from 64% (n=316) to 74% (n=364) (Hansen et al., 2014). Being a man was the only significant factor predicting non-response before

telephone contact. The 131 final non-responders were also significantly more often men (p=0.02) and had higher PCS-SF-12 score (p=0.04) (Hansen et al., 2014). This increase in the one-year response rate strengthened but did not alter the outcome of the study (paper II), (Hansen et al., 2014).

5.4.3 Data analysis

The Section of General Practice, University of Aarhus, Denmark, transformed all data from the Qs to SPSS version 9-10 in the years 1998-2000 and provided us with the dataset for statistical analyses, which were primarily performed by Jørgen Lous. Data were analysed in SPSS ver. 9-10 for study I (paper I). In the later studies (papers II-IV), the SPSS ver. 16 and 22 were used.

Study 1

In Study 1, quantitative analyses of Q33 (Appendix 2) were performed using SPSS and Statistic with Confidence 2nd Edition (paper I). All answers were dichotomized as described in Chapter 5.2. Analyses include percentage of each answer registered as a problem in three groups: all screened (n= 2,056), "few problems" group (n=1,431) and "multiple problems" group having ≥7 of the 33 possible problems in Q33 (n=625) (paper I, Table 1).

Odds for each answer being a problem in the two problem groups were used to calculate crude OR (paper I, Table1). The adjusted OR with 95% CI was calculated to eliminate attribution of the specific question to the sum of problems (1-33) and problem group ("few"/ "multiple") (paper I, Table 1). The relation between problem group, age group (20-32-year-old/ 33-44-year-old) and gender was also analysed by crude OR and adjusted OR (paper I, Table 1).

The rank of specific questions in pointing out problem group was analysed by logistic regression using either total number (n=2,056), female gender (n=1,497) or male gender (n=553) as the independent variable and the question as the dependent variable (paper I, Table 2). Correlation between questions was expected and explored using other models such as non-parametric correlation and factor analysis (paper I).

Study 2

In Study 2, results of the randomized trial were analysed by the intention to treat approach using SPSS vers.16. Results after one year were analysed comparing answers ticked off by the consultation and the control group at baseline (Q1, Q33) and at the

one-year follow-up (Q2, which includes Q33) (paper II). Analyses were performed for all patients who returned the Q2 (74%, n= 364). Baseline information from drop-outs and completers were analysed.

Differences in change between consultation and control groups were compared using Students-*t* test, Mann-Whitney U-test, Chi-square, and Kendall´s tau test. Two-sided significance tests were used throughout the whole material, and $p<0.05$ was considered statistically significant. The 95% CI is stated when relevant.

The primary outcome was change in the internationally standardized and validated *SF-12 (PSC-SF-12 and MCS-SF-12)* (paper II, Table 2). The SF-12 scores from Q1 and Q2 were transformed according to the SF-12 recommendations.

The secondary outcomes were 1) total number of problems comparing answers in Q33 and Q2 (paper II, Table 3), 2) change in SRGH score (part of the PCS-SF-12) comparing Q1 and Q2 (paper II, Table 3) and 3) positive and adverse effects declared by the patient (Q2) (paper II, Table 4).

Study 3

Weight loss among overweight patients was seen in both groups with non-significant difference, why other potential predictors were also analysed (paper III). In Study 3, post-hoc analysis of change in weight irrespective of randomization group was performed for the 160 patients with over-weight (BMI 25-30 kg/m2) or obesity (BMI 30-54 kg/ m2) comparing baseline (Q1) and one-year follow-up (Q2). For control patients, self-reported data in these two Qs were analysed. For the consultation group, self-reported height, and weight in Q1 were compared with the values measured by the GP in the consultation. An agreement analysis was performed using a correlation plot and a Bland-Altman plot. A difference of 0.89 kg (95% CI0.2-1.6 kg) and Spearman's rho of 0.97 were found (paper III, Fig. 2). These agreements justify the analysis of self-reported weight in Q1 and Q2 in Study 3.

Baseline characteristics of overweight or obese patients were compared to those of normal-weight patients for socioeconomic status, age, gender, number of problems, SRGH, mental score (MCS-SF-12), physical score (PCS-SF-12) and randomization group, including whether weight loss was considered at baseline or was a prioritized goal in the consultation for the next year (paper III, Table 1). Variation between the two groups (overweight/obese and normal weight) was analysed using analysis of variance (ANOVA) for the continuous variables to estimate if average values in each group differed between the two groups (paper III, Table2). For the nominal variables, RR was analysed with CI 95%. P-values were two sided and $p< 0.,05$ was considered statistically significant (paper III, Table 1 and 2).

Weight loss:

The two dependent variables 1) *achieved weight loss (yes/ no)* after one year and 2) *size of weight loss* after one year were analysed in several ways (paper III, Tables 3 and 4).

The variables were analysed as scaled and, as far as possible, as dichotomized variables with biologically meaningful cut-points, as fewer cells meant a more stable model with our number of cases (paper III, Table 2, 3 and 4).

Possible baseline predictors of weight loss were listed with their relation to mean weight changes using ANOVA, and by crude ORs for weight loss or not with 95% CIs (paper III, Table 2).

Analysis with a *logistic regression* model was performed for *weight loss (yes/no)* with the eight variables with p-values < 0.2 in the ANOVA supplied with age group (paper III, Table 3).

Predictors of *the size of weight loss* were analysed in a *linear regression* model to further illustrate the importance of the identified variables (paper III, Table 4).

Study 4

Paper IV presents a qualitative analysis of the strengths needed to reach a specific self-selected goal for a better lifestyle or life circumstances described at the end of the first consultation by the patients in CS1-Q. These are defined as resources.

Of the 209 patients attending the first consultation, at least one goal was selected by 191 (=91%) and two goals were selected by 150 (72%). A total of 12 with one or two goals listed no strengths, 45 listed one strength and 134 with two goals listed two strengths, leaving 313 statements of strength from 179 patients for analysis (Fig. 8) (paper IV, Fig. 1).

Frequently, only one or a few words or short statements of resources were written, rarely a whole sentence. As the 313 statements were short, the material available for qualitative analysis in the present thesis is unusual. Inspiration for analysis of these short text extracts was sought in the method of *systematic text condensation* (STC) developed by A. Giorgi, modified and described by Kirsti Malterud (Malterud, 2003, 2012). STC is not pre-determined by a particular theory but intends to identify units in the text where the researcher tries to divorce herself from any pre-understanding and theories. STC is a descriptive and explorative method for thematic cross-case analysis of qualitative data. It is, however, usually used for analysis of more comprehensive materials from fewer participants, why we had to adjust the method.

We used the four steps in the STC in a modified way and not in its more categorical form. We adopted the following approach. First, the total material with 313 statements

was read thoroughly to identify preliminary themes. Second, from these statements, we subsequently identified meaning units that were coded. Third, the codes were reconsidered and reorganized into themes and subthemes, and condensates were formed of all subthemes. Fourth, the condensates were further adjusted, synthesized, and described in the analytic text. The most illustrative statements were quoted in relation to the description of the specific goal.

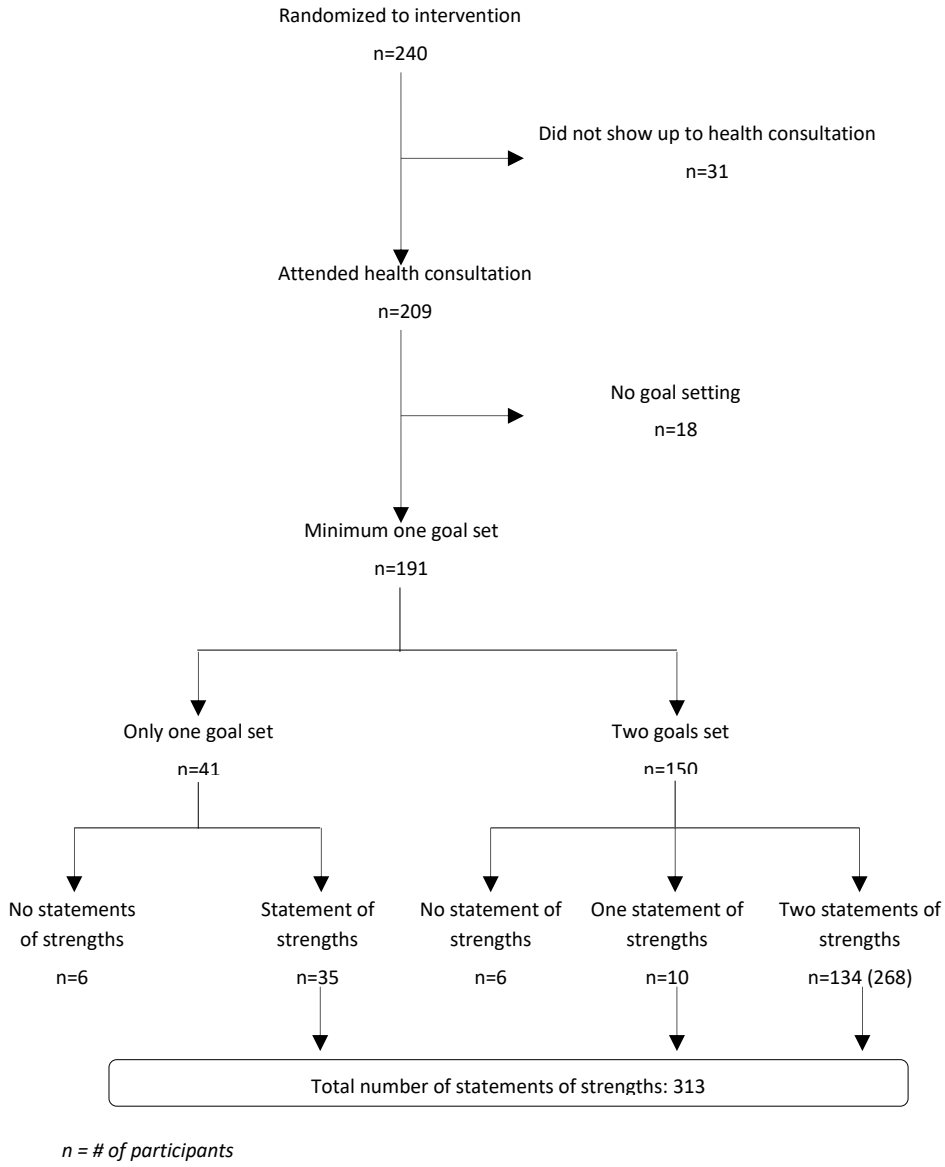


Figure 8. Flowchart for goals and statements of strengths

Chapter 6 Results

This section presents the main results of the four studies in the thesis. Further results can be read in the papers I-IV. Characteristics of the patients included after screening for psychosocial and lifestyle problems are presented first (Study 1, paper I). After this, the main one-year results are described (Study 2, paper II). As the largest sub-group of patients was overweight or obese and the most frequent goal was weight loss, possible predictors of weight loss in this sub-group are reported (Study 3, paper III). To further illustrate individual resources for change, a qualitative analysis of all statements about strength to reach individual goals is presented (Study 4, paper IV).

6.1 Study 1 Screening results

OR of screening questions

All answers of the 33 screening questions except "Living quite alone" had high crude ORs and adjusted ORs, i.e. higher Odds in the "multiple problems" group than in the "few-problems" group (paper I, Table 1) (Appendix 2).

More older patients (33-44-year-old) than younger (20-32-year-old) patients were in the "multiple problems" group (adjusted OR 1.9 (95% CI: 1.6-2.3)), but no difference was related to gender (paper I, Table1). At baseline, SRGH was stated as bad (fair, poor and very poor) by 28% in the total group of all screened patients (n=2,056), by 56% of the included patients ("multiple problems" group) and by 16% in the "few-problems" group (<7 problems). Bad SRGH had an adjusted OR of 4.4 (95% CI: 3.6-5.5) (paper I, Table 1).

The 15 questions with the highest adjusted OR highlighted in Appendix 2 illustrate a varied picture of the psychosocial situation of patients attending GPs.

Rank of screening questions to point out problem group

To possibly optimize a future screening tool, we analysed the ability of each question to identify "multiple problems" group. The rank of the different questions in the logistic regression differed between men and women (Table 1) (paper I, Table 2).

		All n = 2.056*	Women n = 1497	Men n = 553
6.	Difficulty finding solutions to every-day problems	1	1	6
27.	Miss security	2	2	1
1.	Self-assessed health (SRGH)	3	3	9
8.	Miss confidant in family	4	5	2
31.	Difficulty setting boundaries for child	5	4	8
13.	Smoke every day	6	6	11
10.	Pronounced feeling of stress	7	9	3
20.	Unemployed for more than 6 months during the past year	8	10	7
24.	Significant problems for yourself	9	7	12
17.	Rarely exercises	10	11	4
9.	Miss confidant in circle of friends	11	12	13
3.	Know enough to improve health and wellbeing	12	8	15
29.	Problems with child's short-term ill-nesses	13	13	10
22.	Liquor problems for you or your partner	14	15	5
7.	Own psychological problems	14	14	14
***Six did not state gender**				

Table 1. Rank of the ability of questions to point out problem group based on logistic regression analysis.

The rank among women was almost the same as in the total group as women represented three quarters of the study population. The same 15 out of 33 questions had the highest rank in both genders, with some important similarities: *"miss security in everyday life"* and *"miss a confidant person in the family".*

The answers had some gender differences. The SRGH reached ranked third among women and only ninth among men. The importance of being unemployed for more than 6 months the past year and feeling extreme stress ranked higher among men than among women, whereas having important mental problems in daily life or not enough

knowledge to improve health ranked higher among women. As far as lifestyle problems were concerned, smoking ranked higher among women, whereas liquor use or lack of exercise ranked higher among men (Table1) (paper I, Table2). These differences were not analysed further.

6.2 Study 2 One-year results

At baseline, no difference was found between those randomized to control (n=240) and those randomised to consultation (n=255) regarding gender, age, number, and kind of problems, SRGH, MCS-SF-12 or PCS-SF-12 (paper II, Table 1).

6.2.1 Primary outcome SF-12

SF-12: At baseline, MCS-SF-12 was about 10 points below the international mean score of 50 (paper II, Table 2). After one year, an improvement in MCS-SF-12 was seen both in the consultation (n=177) and the control group (n=176). This improvement was two-fold higher in the consultation group than in the control group (paper II, Table 2): 7.3 points/and 3.0 points, respectively. The difference of 4.3 points (95% CI: 1.6-6.9) is significant (p=0.002). No difference was found in the PCS-SF-12, where both groups improved about one point from a near average score (paper II, Table 2). A box plot at GP level for the 21 GPs with at least 10 included patients showed a mean improvement in MCS-SF-12 in patients listed with 19 of the 21 GPs (paper II, Fig.3).

6.2.2 Secondary outcomes

Number of problems

At baseline, both the consultation group and the control group had an average of 10 problems within the 33 screening questions (paper II, Table1). At the follow-up after one year, the total number of problems was reduced: in the consultation group by 1.8 problems and in the control group by 0.8 problem. The difference of -1 problem is significant (p=0,03) (paper II, Table3).

Self-rated global health (SRGH)

At baseline, poor SRGH was stated by 49% of the 130 patients in “multiple problems” group who declined randomization, by 59% in the consultation group (n=240) and 57% in the control group (n=255); hence, no statistical difference was seen at baseline

within the randomized "multiple problems" group (paper II, Table 1). At the 1-year follow-up, SRGH was unchanged among 52% in both groups. SRGH had improved among 30% in the consultation group and 25% in the control group; at the same time, it had deteriorated in 14% of the consultation group and 21% of the control group. These differences are not significant when analysed by Mann-Whitney U-test (p=0.085) (paper II, Table 3).

Positive or adverse effect

We analysed any positive or negative effect of the study by asking: "Has completing the questionnaire or participating in the health consultations had any impact on your life during the past year?" (Q2). The question could be answered by "yes"/"no", and the answer category was followed by specification within four subjects and by one open question. In the consultation group, 92 (51%) answered "yes"; in the control group, 27 (15%) answered "yes", which is equivalent to a significant difference of 36% (p=0.0001) (paper II, Table 4).

In both groups, more than 75% of those having had any effect had experienced a positive effect on their well-being, and more than 50% had experienced a positive effect on their physical health. In both groups, more than one third had experienced a positive effect on their use of liquor, tobacco, or drugs. Any negative effect was also mainly related to this use, both in the consultation group (n=15/92; 16%) and in the control group (n=5/27, 19%) (paper II, Table 4). The total number who had benefitted was significantly higher in the consultation group. The number needed to treat (NNT) was 3.1 and number need to harm (NNH) was 25 (paper II, Table 4).

Goal setting and lifestyle after one year

At the first consultation (n=209), 91% set one or two goals for health-related change in lifestyle or psychosocial factors for a better life within a scheduled time of max one year (paper II). The overweight group was the biggest subgroup among the randomized patients (n=218/495; 44%). Weight loss was the most frequent goal at the consultation either as prioritized or second goal (n=58/209; 28%). Among one-year responders, the 75 overweight patients in the control group had a mean weight loss of 1.5 kg compared with 2.9 kg among the 85 overweight patients in the consultation group (paper II, Table 3). This difference of 1.4 kg was not statistically significant.

Weight loss as the most frequent goal was followed by better mental health (n=51, 21%), better partner relationship (n=41, 20%), better working situation (n=38, 18%) and less use of tobacco (n=33, 16%) (paper II).

Lifestyle change was reported by both groups: about 50% ate more fibres, one third did more exercise and about 20% had reduced use of tobacco and liquor with no statistical difference between the two groups (paper II, Table 3).

The statistically significant effects of the consultation in the overall analysis consisted of improvement in MCS-SF-12 (paper II, Table 2), number of problems (paper II, Table 3) and self-reported benefit (paper II, Table 4).

6.3 Study 3 Predictors for weight -loss

Of the randomized 495 patients a total of 218 (44%) reported overweight (BMI 25-30 kg/m2 n=128) or obesity (BMI 30-54kg/m2 n=90) in the consultation group and the control group. These 218 are referred to below as the *overweight group* (paper III, Fig. 1 and table 1).

The difference in weight loss between overweight patients in the control and consultation group of 1.4 kg was not statistically significant (paper II, Table 3). We therefore analysed potential predictors for weight loss among overweight patients irrespective of randomization group comparing answers in Q33, Q1 and Q2 (paper III).

Of the 218 overweight patients, 56 (27%) were lost to follow-up after one year and two had missing values leaving 160 to the analysis for predictors for weight loss (paper III, fig1). The drop out was not related to baseline weight.

Baseline characteristics of the overweight group

Patients with overweight (n=218) had a mean weight of 88.6 kg (BMI 30.2 kg/m2). Normal-weight patients (n=270) had a mean weight of 63.2 kg (BMI of 21.8 kg/m2) (paper III, Table 1). The overweight group was significantly more often men, approximately one year older and had lower physical score (PCS-SF-12) than the normal-weight group. There was no significant difference in number of problems, mental score (MCS-SF-12), SRGH, educational level or cohabitation status between the two groups (paper III, Table 1).

Consideration of weight loss at baseline

Quick weight loss within 30 days was considered by 46 (21,4%) of the overweight and 15 (5,6%) of the normal-weight patients (paper III, Table 1). Of the 46 in this overweight group, 37 responded after one year (paper III, Table 2).

Consideration of weight loss at the consultation

Weight loss was a prioritized goal at the consultation for 32 patients, of whom 27 were in the overweight group (paper III, Table 1) and 22 answered Q2 (paper III, Table 2). The main part of the overweight group having a consultation (n=84) did not have weight loss as their first prioritized goal, but often as their second goal (paper III, Table 2).

Predictors of weight loss in the overweight group

In unadjusted analysis (ANOVA and OR) (paperIII,Table2), the two most important predictors of weight loss after one year were 1) having a preventive consultation (CS1-Q) *where weight loss was chosen as the first prioritized goal* for a better life for the coming year (n=22 weight loss: 4.7 kg) compared with the overweight consultation patients without weight loss as a prioritized goal (n=62: weight loss 1.6 kg) (OR=4.6 (95%CI 1.5-14.4)), and 2) *consideration before the consultation of quick weight loss within 30 days* (Q1) (n=37, weight loss 4.3 kg.) compared with no consideration or a longer time schedule (OR 3.4 (95%CI 1.5-7.9) (paper III, Table 2). Significantly higher un-adjusted OR for weight loss or not with 95% CI was seen among the one half of the overweight patients having poor SRGH, having 10 or more problems at baseline Q33, and for females compared to men (paper III, Table 2). These predictors were partly confirmed by logistic regression, where "considering quick weight loss" reached p=0.001 and having "weight loss prioritized at the consultation" and having many problems both reached p= 0.005 However, SRGH did not reach significance in the logistic regression model (paper III, Table 3).

The *size of weight loss* related to the possible predictors was analysed by linear regression model, which had limited precision because of the small number. This explained 11.5% of the size of the weight loss (paper III, Table 4), with "considering quick weight loss" before randomization as the most significant predictor (p=0.007), followed by being obese (p=0,017) (paper III, Table 3).

Overall, overweight patients achieved an average weight loss of minimum 1.5 kg (consultation group 2.9 kg/ control group 1.5 kg) (paper II, Table 3) relative to their average baseline weight of 88.6 kg (paper III Table 1). The weight loss was higher when being obese, having more problems or poor SRGH (paper III, Table 2). Overweight patients in whom one of the two main predictors were present achieved in average a weight loss of about 5%. The largest weight loss was achieved by the overweight patients in the consultation group who had weight loss as a prioritized goal (4.7 kg) (paper III, Table 2).

6.4 Study 4 Resource statements

Paper IV describes a qualitative study of the 313 strengths to reach one or two self-selected goals registered by 179 patients during the first consultation (Fig. 8). These strengths are described as resources. Most statements were short: a few words; seldom a single sentence. Despite the brevity of these descriptions, the qualitative analysis revealed three main categories of resources to reach the desired goal. A minority of the patients described a *need to free up resources* before being able to make a desired change.

The three categories of resources were *personal constitution (willpower* and *tenacity), network,* and *personal experience.* These resources will be described shortly (Fig. 9). Further illustration with quotations can be found in paper IV.

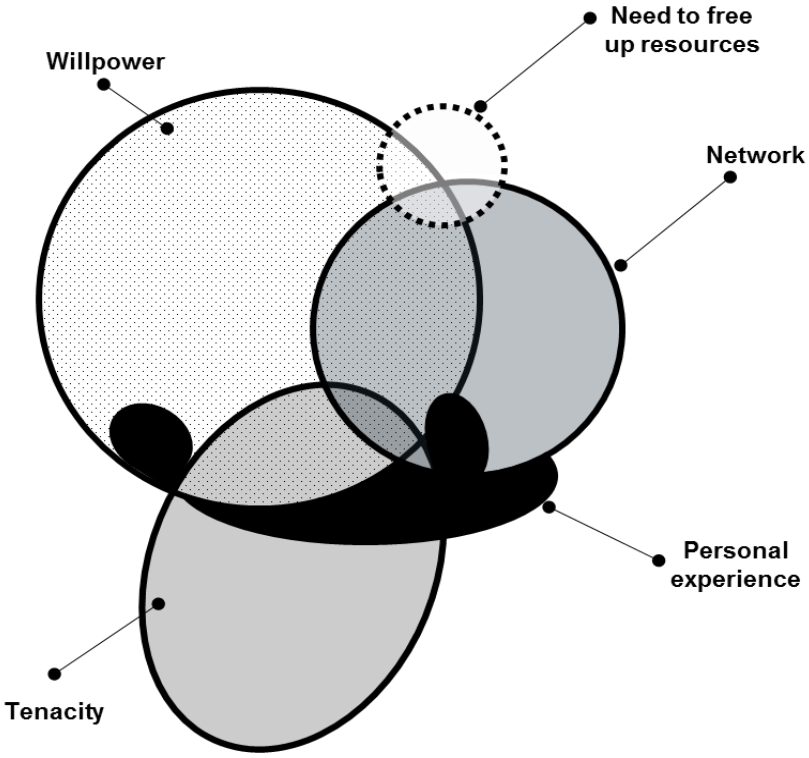


Figure 9. Relation among resources

Personal constitution

Most patients described some elements of their constitution as a strength; most often *willpower* and *tenacity*, but also being energetic, open-minded, or having a sense of humour. *Willpower* was the most frequent resource and was described as *will*, *iron will* or *strong will*, sometimes described together with having a network and a need for external support. *Tenacity* was mentioned about half as often as willpower and seldom related to external support. Tenacity was often mentioned alone, sometimes combined with personal experience and confidence in reaching goals.

Network

Network was mentioned about half as often as willpower, and often together with this. Most often, the *family* was mentioned as a safe setting in which to discuss problems, develop resources and receive support - also in relation to mental issues. *Partner relationship* was also mentioned as a space for discussing problems and priorities. When *work* was mentioned, which was seldom, it was referred to as a safe base where one feels appreciated and gets power to change an unsatisfactory working situation. *Friends* were mostly mentioned as a resource that provided support and set a good example for lifestyle change, e.g. regarding exercise and smoking "They are able to do so, and so am I".

Personal experience

Different statements focused on previous achievements or experiences of handling the same or a similar problem. In relation to the most common goal, i.e. weight loss, several patients had previously lost weight and referred to this positive experience of losing weight as a strength because they remembered that they felt better or that their back, knee or loin hurt less. Some described both positive and negative experiences as a resource. A negative experience with their present behaviour was underlined as a personal, motivating factor that helped them achieve the desired change: A 43-year-old woman wanted to do exercise and reduce her use of alcohol: *"I feel very much at unease by drinking too often and want to feel better both mentally and physically".*

A combination of resources was seen in some statements combing personal constitution, experience, and network (Fig. 9).

Apart from these three categories of resources, some patients described "a need to free up resources". This was primarily the case among the 21% of the patients who defined improved mental wellbeing as a goal. Many of these patients described both willpower

and a need to change their mental health by accepting openness, treatment, social support, or social change in network such as friends or working place before being able to make a specific lifestyle change.

Chapter 7. Discussion

The first part of the discussion focusses on the validity of the material and the appropriateness of the methods for answering the objectives. The next part discusses the results in relation to health theories and other studies, first by discussing the potential importance of the screening characteristics for the patients' health and HRQOL (paper I). The one-year results will be discussed in relation to change in the SF-12 and SRGH, number of problems, and weight (paper II and III). Finally, the self-assessed resources to reach a health-related change will be discussed more thoroughly in relation to the health theories presented in Chapter 3 (paper IV).

7.1 Discussion of material and methods

7.1.1 Validity of the questionnaires

Q33

In *Q33* only SRGH has been validated internationally, as described in chapter 1 (Mossey and Shapiro, 1982; Idler and Kasl, 1995; Idler and Benyamini, 1997). The main part was constructed by the author in agreement with theories of psycho-social health and important lifestyle factors, as described in chapter 5.

These theories explore personal factors that determine health and illness behaviour in triangulation with social factors. Our "vulnerability" questionnaire Q33, tried to catch these personal elements of vulnerability combined with known lifestyle and social factors. In health and social research "vulnerability" is used in relation to groups or populations that need e.g. political support. However a definition in research is asked for to combine the individual capacity with political and social aspects of vulnerability (Rogers et al., 2012; Katz et al., 2020).

In *Q1 and Q2* many questions were copied from the Danish health survey (Rasmussen, 1988; Kjoeller et al., 1995). Many of these were also used and evaluated in the pre-study (Rasmussen, 1993). The SF-12 in Q1 is internationally validated (Ware et al., 1998; Ware, 2000). Q1 and Q2 were mainly used for facilitating the preventive process and give opportunity to compare our study population with the background population,

Pilot testing of the questionnaires, that all included patient reported outcome measures (PROM), revealed validity as defined in COSMIN manual for systematic review of PROMs (Mokkink et al., 2018). *Face validity* is described as "the items look as though they are an adequate reflection of the construct to be measured" (Mokkink et al., 2018),and "perceived to be relevant by clinicians and researchers" (Comins et al.,

2021). They were also considered by the patients and GPs a to have high *content validity* i.e." content relevance and content coverage for the targeted patient group" (Mokkink et al., 2018; Comins et al., 2021). The Q33 showed high adjusted ORs for most questions, indicating high *sensitivity* to reflect differences between the 30% included and both the non-included and the background population (paper1, Table1).
After the trial period the psychometric properties of the SQ-33 (=Q33) were assessed using Rasch item response modelling (Comins et al., 2019). The paper analyzed the *responsiveness* and *predictive validity* of Q33 (=SQ33) to the outcome after one-year (Q2): *"Follow-up analysis was performed on a subsample of 364 persons one year after initial inclusion to assess responsiveness and predictive validity using a general health anchor item. Twenty-three of the SQ-33 items in the four subscales fit a Graphical loglinear Rasch model (GLLRM) at baseline and follow-up, thus confirming the scaling properties. The modified 23-item version (HSQ-23) revealed superior responsiveness and predictive validity compared with the SQ-33"* (Comins et al., 2019).
Non-attendance to preventive offers focusing on biomedical risks is a problem as non-attenders tend to have an increased risk of poor health and increased mortality and at the same time do not prioritize health related behaviour (Nielsen et al., 2004, 2009; Tolonen et al., 2015; Groenenberg et al., 2016; Bjerregaard et al., 2017). To address and potentially avoid this problem, the process of enrolling patients in the present study included informed consent underlining the purpose of the trial being increased wellbeing and reduction of future problems before answering Q33 This procedure intended to signal openness and thereby facilitate a discussion of fundamental problems related to health (Dryden et al., 2012; Mercer et al., 2016; Sundhedsstyrelsen, 2020). We do not know the characteristics of the 1%-30% patients who declined to participate. However, the staff estimated their reasons for not being interested as "no need", "no wish of interference "or "no energy", which may cover the same reasons for non-attendance as reported in other studies (Nielsen et al., 2004, 2009; Tolonen et al., 2015; Groenenberg et al., 2016; Bjerregaard et al., 2017). Significantly more older patients (30-44-year-olds) than younger (20-30-year-olds) were in the group with many problems (paper I, Table 1), but we have not sub analysed these problems.

The included "multiple problems" group was characterized by high adjusted ORs not only for bad SRGH but also for many psychosocial problems and lifestyle risks compared to the background population and "few problems" group (paper I, Table 1) (Appendix 2). This underlines the ability of the Q33 as an instrument capable of including attenders with high lifestyle risk combined with psychosocial problems important to health which often go unnoticed by GPs in ordinary consultations (Salmon et al., 2004; Frostholm et al., 2010). The screening included ordinary attenders in general practice. This strengthens the external validity of the study even if 1%-30% of the potential participants were not interested in participating (paper I).

Using logistic regression analysis, we found that the same 15 of the 33 screening questions ranked higher than the other questions within both genders in identifying the group with many problems even if they ranked differently in men and women (paper I, Table2). The questionnaire might be optimized by using gender-specific questions.

About 3% of the patients needed help to answer the Q33. Assessing patients' problem group and thereby eligibility for inclusion was facilitated by the design of the Q33 e.g. with dichotomization of questions. As this was done immediately missing values and classification bias were avoided in the eligibility assessment (paper I).

Q1 and Q2

The questions in the questionnaire at baseline (Q1) and one-year follow-up (Q2) used for evaluation are from either internationally validated questionnaires like the SF-12 (Ware et al., 1998) and the SRGH or copied from the Danish health survey by DIKE (Kjoeller et al., 1995), supplied by some evaluation questions in Q2. In this way, the Q1 and Q2 can be used to compare our study population with the Danish background population and with populations in international studies (papers II and III). The fact that 130 included "multiple-problems" group (20% of the included) did not return the Q1 and thereby dropped out prior to randomization might reflect that the Q1 was too demanding for those not sufficiently motivated to reconsider their own psychosocial situation and possibilities for change. These 130 patients differed from the randomized patients by being significantly more often daily smokers (72% vs. 55%) and 1.5 years younger (paper II, Table 1), which is a weakness concerning the external validity.

A higher percentage of smokers (55%) among the randomized patients than in the Danish background population at that time (41% of men and 37% of women) (Kjoeller et al., 1995)signals a fair acceptance of participation also by those with risky lifestyle (paper II, Table 1). Another strength of the study is that acceptance of participation was confirmed by 74% at the one-year follow-up irrespective of their problems, mental health or use of tobacco (paper II, Table 5), which is unusual in preventive offers (Aadahl et al., 2011; Cook et al., 2016; Bjerregaard et al., 2017). It is possible that acceptance was high because the questionnaire covered a broad range of psychosocial aspects.

Correlation between Q1 and Q33

Unemployment for more than 12 months during the past three years was seen among 26% of the "multiple problems" group compared with 13% of all patients screened by Q33 (paper I, Table 1). Interim socioeconomic analysis of Q1 and Q33 showed that two thirds of the "multiple-problems" patients had only basic education, i.e. 9 years in public school (unpublished Master´s thesis Jensen, 2018), compared with 20% of

the background population (Kjoeller et al., 1995). This reflects hight sensitivity of Q33. In Q1, several questions reflected elements predicting HL such as education, working life and psychosocial situation. Many specific work-related problems were raised in Q1, and better working conditions were a frequent goal (18%) (paper II). Other studies show an interrelation between HL, education, income, and health, where health was measured as chronic disease (Friis et al., 2016) or SRGH, MCS-SF-12 and the PCS-SF12 (Van Der Heide et al., 2013; Bo et al., 2014; Jayasinghe et al., 2016). Patients with low HL have a more risky lifestyle (Jayasinghe et al., 2016).

We did not use the nine validated questions about HL (Osborne et al., 2013; Maindal et al., 2016).

Some of the questions in Q33 addressed the issues of knowledge and social support essential to HL, e.g. "Do you know enough to improve health and wellbeing" and "Do you have confidence in family or friends when having problems" (Appendix 2). These questions were among the 15 questions ranking highest in pointing out the "multiple problems" group (Table 1) (paper I, Table 2).

Both the Q1 and Q33 seem to be able to identify patients in general practice with a high number of problems found in international literature to be important for health irrespective of evident disease. This strengthens the external validity of the study.

The SF-12 is used in the present Danish Survey of Social Inequality in Health and Illness to evaluate inequality in physical and mental health in the general population (Sundhedsstyrelsen, 2020). This underlines the usefulness of the SF-12 as a part of a questionnaire aiming at supporting a population in general practice with many challenges.

Conversation sheets CS1-Q and CS2-Q with resource statements

The questions in the conversation sheet answered during the first consultation (CS1-Q) analysed qualitatively in the thesis are the self-defined strengths (resources) to reach one or two self-selected goals (paper IV). Goalsetting was stated by 91% of patients in the consultation within a broad range of mostly psychosocial but also lifestyle goals (paper II).

As the GP was present during the statements, these might be biased. This risk was possibly reduced because difficulties (barriers) in reaching the goal were also described and appointments for follow-up consultations were made. This might imply a rather realistic statement. At the follow-up consultation, a similar CS2-Q was answered. This questionnaire was not analysed but was part of the intervention, and therefore the CS2-Q may influence the one-year results in Q2 (papers II and III).

No other studies are known to use a similar open-ended statement of resources and barriers to reach specific goals. It was assumed that at the end of a 45-60-min consultation, patients would accept making short statements rather than writing long descriptions. The short statements of strengths were not optimal for qualitative evaluation but were considered the best obtainable (paper IV).

We know from meetings with GPs that patients often spontaneously said that they had no resources. The GPs then had to remind them of the content of the conversation where some resources had been verbalised. The statements of goals, resources, barriers, and time frame seem to have supported the preventive process. The data facilitates process evaluation.

7.1.2 Structure

The RCT study was conducted in accordance with the CONSORT statements (Moher et al., 2005). Allocation concealment in the RCT was obtained by telephone randomization after delivering the Q1 as described in chapter 5.

Invitation and inclusion

The staff performed face-to face invitation to reach patients despite vulnerability and obtain informed consent without introducing unnecessary bias before acceptance or refusal (paper I).

In a primary prevention program, a personal invitation procedure, either by telephone, personal letter or face-to-face, yields the highest attendance. Thus, telephone contact to younger patients at low risk and personal letter to those at high risk have been shown to be more productive than general public screening invitations (Gidlow et al., 2019; Bunten et al., 2020). The last part of the pre-study confirmed that higher attendance was achieved using a personal letter from the GP, described in chapter 2 (Bille et al., 1990). A recent Danish study with step-wise digital invitation to health check had 30% initial attendance, highest among those with low SRGH and low SE (Larsen et al., 2019), whereas most other studies have lower acceptance of patients with these characteristics (Dryden et al., 2012; Bender et al., 2015) as discussed in Chapter 1.

The difference in participation interest reported by the staff (99-70%) late in the study period may reflect selection bias. The only exclusion criteria being non-Danish speaking or having serious acute or psychiatric disease should not be registered. Individual reasons for not offering participation cannot be excluded, which weakens the study. The inclusion periods of hours or days were voluntary for the staff dependent on workload.

Because of the multifactorial and unexplored nature of the problems investigated, it was assumed that face-to-face invitation and a possibility for raising questions were essential to clarify the focus on wellbeing and resources opposite the usual focus on risky lifestyle within preventive offers. This procedure may explain why a minimum of 70% of the patients accepted the screening participation. Of those screened, around 80% of the "multiple problems" group accepted the subsequent inclusion by randomization, despite this required answering a comprehensive Q1 (Fig.6. Flowchart) (paper II, Fig. 2). One-year follow-up was accepted by 74% (Hansen et al., 2014). These participation rates reflect high external validity and generalisability of the study.

Q1 before randomization

The included patients were required to answer a comprehensive Q1 before randomization to control or two consultations (Fig. 7).

Among the included, 20% did not return the Q1 perhaps because of the required effort (paper II, Table 2). Another and perhaps related reason might be illustrated by the fact that more non-attenders were smokers and men, who also in other interventions do not want interference. We have not analysed if non-attendance differed between clinics or GPs.

Reflections by answering the Q1 may have been essential to the positive one-year results in both groups (papers II and III). The Q1 was returned by 80% of the included after screening, and 74% of the randomized answered the one-year Q2. This high percentage might reflect relevance of the intervention, starting with Q1. The background for possible positive consequence of the structure in the study with thorough preparation, possibly followed by two consultations will be discussed in relation to international literature.

Structured well-prepared consultations with vulnerable patients

Poor SRGH and low MCS-SF-12 score characterized the majority of the included patients, in contrast to the background population (paper I, Table 1 and paper II, Table 1) (Kjoeller et al., 1995). Both of these characteristics have been reported to be associated with low HL and medically unexplained symptoms (MUS) in other studies (Frostholm et al., 2010; Van Der Heide et al., 2013; Bo et al., 2014; Aaby et al., 2017). Low HL and MUS are both essential to inequality in health and associated with high health care expenditures (Sundhedsstyrelsen, 2020). Studies confirm that GPs find it difficult to be aware of and focus on psychological aspects during patient encounters despite patients´ desire and efforts to verbalize their concerns (Salmon et al., 2004; Frostholm et al., 2010; Verlinde et al., 2012; Hardcastle et al., 2015).

In a Danish consultation study GPs made the right diagnosis in only 26% of the consultations where patients described that their health problem had both a psychological and physical explanation (Frostholm et al., 2007, 2010). A discrepancy between a received diagnosis and one's personal illness perception was shown to predict self-reported poor mental health up to two years after consulting the GP and to lead to higher health care use for patients with MUS compared with patients with a specific physical diagnosis (Frostholm et al., 2007).

In the present study both psychological and physical aspects of health were considered and verbalized by the patients (paper II, Table 2, and paper IV).

The fact that more frequent attendance in general practice among people with low socioeconomic status (SES) is associated with a greater number of serious conditions, higher levels of anxiety and lower levels of self-assessed health calls for a new approach to preventive consultations in primary care (Wyke et al., 2003; Dixon-Woods et al., 2006; Dixon-Woods, 2019). The higher workload of GPs in deprived areas is related partly to these factors and partly to lack of professional SE in helping patients who have difficulty verbalizing their complex situation (Verlinde et al., 2012; Hardcastle et al., 2015; Moreno-Peral et al., 2015).

The structure required much paperwork both for the patient and the GP. The variation in number of included might reflect this workload (paper II, Fig3).

In the present study, a holistic person-centred focus was facilitated by the courses for the GPs and structure of the study which is considered essential to the one-year results (paper II, Tables 2 and 3) (Fig. 7). One-year statements which are not part of the thesis underline the importance of a new frame for the encounter, (Soot et al., 2018). Around 79% found the preventive consultations worthwhile, reasoned by *"meeting the doctor in a different way"/ "the consultation had been a "supportive dialogue" "furthering discussion of things one usually does not mention"/ "food for thought"* with reflection and awareness of goals/ *"opportunity for change"* increasing self-confidence to change difficult life circumstances (Soot et al., 2018). These descriptions reflect several stages of change (Prochaska et al., 1993). Thorough reflections were probably facilitated by the required preparation at home (paper II and III) and further supported through the structured consultation and follow-up (paper IV).

The target group, who represent one third of ordinary attenders to general practice setting, will probably not profit from consultations without such a focus on individual priorities, psychosocial situation and resources (Nielsen et al., 2004; Mercer and Howie, 2006; Ruiz-Moral et al., 2007; Brotons et al., 2012; Verlinde et al., 2012; Mercer et al., 2016).

7.2 Discussion of results

7.2.1 Screening results

The answers of Q33 show that 1) attenders to general practice have higher OR of basic psychosocial problems including poor SRGH than the background population in the same age group, and 2) the included patients had even higher ORs (paper I, Table 1). SF-12 was not measured in the Danish health survey at the time of the present study. Regarding HRQOL we have therefore compared the patients' SRGH with the survey's measurements of SRGH at that time (Kjoeller et al., 1995).SRGH, which is an independent predictor of mortality (Idler et al., 1990; Idler and Kasl, 1995; Møller et al., 1996; Idler and Benyamini, 1997) encompasses not as much the biomedical health status as the resources and threats perceived by the person (Jylhä, 2009), which is confirmed by the present study (paper I, Tables 1 and 2), (Appendix 2).

The answers with highest OR in Q33 reflect many basic conditions for developing coping strategies such as *personal strain, lack of security in everyday life, social network, extreme stress*. These conditions all lie low in Maslow's hierarchy of needs and as such have to be fulfilled before self-actualization can evolve (paper I, Table 1) (Maslow, 1943; Acton and Malathum, 2000; Mittelmark and Bull, 2013; Henwood et al., 2014; García-Moya and Morgan, 2016). Some of the answers with the highest OR in " multiple problems" group also illustrate lack of GRR such as *SRGH, self-esteem* and *sufficient knowledge to improve health and wellbeing*, which are described in salutogenic theory and SOC as fundamental resources for being at the ease end of the health ease/dis-ease continuum (paper I, Table2) (Fig.2) (Antonovsky, 1987). Having *no one to confide in when problems arise* and *difficulty in solving everyday problems* are basic problems according to both the theory of SOC by Antonovsky and SCT by Bandura (paper I, Tables 1 and 2). Knowledge and social support are essential to HL and fundamental to health behaviour (Van Der Heide et al., 2013; Aaby et al., 2017). These aspects seem to be captured by the Q33.

"Living quite alone" was the only question whose screening ability did not reach a significant adjusted OR in Q33 (paper I, Table 1). Living alone is generally seen as a proxy for low social support (Bjerregaard et al., 2017), which implies a lack of social network and a subjective perception of loneliness, both of which are associated with poorer health status and have different implications in different countries (Rico-Uribe et al., 2016). Living alone is more prevalent among non-attenders in most health checks (George and Rubin, 2003; Bender et al., 2014; Gidlow et al., 2019). In Q33, no questions directly addressed the feeling of loneliness: instead, we asked whether the participant "*lived quite alone*". Patients were asked about feelings of loneliness in several ways, reflecting negative consequences e.g. if they had a "*confidant person*

within the family or among their friends" and whether they "*missed security in everyday life"*, which all reached high adjusted ORs (paper I, Table 1) (Appendix 2).

7.2.2 One-year results

One-year results reveal a positive effect in both randomized groups on the mental component of the SF-12 (MCS-SF-12) (paper II, Table 2), number of problems (paper II, Table 3) and intended weight loss among overweight patients (paper III, Table 2). Higher effect was seen on MCS-SF-12 and number of problems in the consultation group. This may indicate that the stated resources during the consultation have been used to a significant degree (paper IV).

Focus on HRQOL measurements as well as difficulty in interpreting the measures are considered increasingly important for research on health behaviour and outcome because HRQOL is associated with inequality in health (Fortin et al., 2004; Jones et al., 2017; Daundasekara et al., 2019, 2020; Galenkamp et al., 2019; Sundhedsstyrelsen, 2020; MacDonald et al., 2021). Most studies using SF-12, SF-36, SRGH or other measurements of HRQOL assess the relation to different chronic diseases or mortality (Idler and Kasl, 1995; Idler and Benyamini, 1997; Sternhagen Nielsen et al., 2008; Jylhä, 2009; Vejen et al., 2017; Christensen et al., 2020).

Most studies of HRQOL are encumbered with methodological challenges (Haraldstad et al., 2019). The generic SF-12 is more sensitive for measuring physical and mental health among those without severe morbidity than the often used generic European Quality of Life-5 dimensions (EQ-5D), which have important ceiling effects (Johnson and Coons, 1998; Johnson and Pickard, 2000). The importance of focusing on the MCS-SF-12, SRGH as in this study (papers I and II) and elements of HL(paper I) to reduce social inequality in health has recently been emphasized by the Danish National Board of Health (Sundhedsstyrelsen, 2020).

Primary outcome: Change in mental component score of SF-12, MCS-SF-12

In this study, the baseline MCS-SF-12 score for the randomized patients was low: (mean score of 40) (paper II, Table 2, and paper III, Table 1). In the Danish health survey from 2010, the lowest group of MCS-SF-12 was defined as counting around 10% of the Danish background population, yet 11.9% of the women. This lowest group of MCS-SF-12 had a mean score of 35.76 (Christensen et al., 2012).

To the author's knowledge, no previous studies have monitored the effect of an intervention in patients with MCS-SF-12 score as low as that of the patients in the present study. A mean MCS-SF-12 of around 46 was seen in patients with MUS in a Danish study (Frostholm et al., 2007). In the following studies of chronic diseases, changes in score from a higher MCS-SF-12 are reported to have an effect. One-year data in

the DenHeart survey showed that for both the mental and physical component summary score, a one point lower score meant a 2% higher risk of re-admittance to hospital and a 5% increase in the risk of all-cause mortality (Christensen et al., 2020). A one point lower score on selected items on the SF-36 was associated with an excess risk of hospitalization of 2%, of mortality of 9% and inability to work of 12% in three US cohorts of patients with type 2 DM followed for 2-7 years (Bjorner et al., 2013). In our study improvement in MCS-SF12 score from a low score was seen in both groups:7,3 points in the consultation group, 3 points in the control group (paper II, Table 2). We have not performed any detailed analyses of specific questions in the MCS-SF-12 or PCS-SF-12 besides SRGH (paper II, Table 3).

After one year a one-point insignificant improvement in the physical part of the SF-12 score (PCS-SF-12) was seen in both groups from a mean score three points below the cut-off for good physical health (paper II, Table 2). Physical activity was an infrequent goal in this young target group and exercise might be a difficult task to accomplish when having many problems (Jepson et al., 2010).

Average MCS-SF-12 score improved in both groups; twice as much in the consultation group (39.6-46.8) as in the control group (41.5-44.5), and it remained unaffected by dropouts (paper II, Table 2). This improvement seems extraordinary. In our study two third had only basic education. This subgroup had even higher improvement (unpublished Master´s thesis Jensen, 2018).

Like poor SRGH, a low mental and physical SF-12 score is associated with low education and low level of HL Detailed analyses have shown that HL has " *mediation effect on the relationship between education and health status"* (Van Der Heide et al., 2013). Change in indicators for HL are not analysed directly, but the results reflect increased awareness of own possibilities to improve health and life-circumstances, which is interpreted as an indicator of improved HL (paper IV) (Jayasinghe et al., 2016; Soot et al., 2018).

Self-rated global health, SRGH

Poor baseline SRGH was stated by 56% of the randomized patients, compared to 28% in the background population (paper I, Table 1) (Kjoeller et al., 1995). Improvement was seen in both randomized groups after one year, being non-significantly higher in the consultation group (p=0.085) (paper II, Table 3). Post hoc analysis showed significant improvement in SRGH after one year among consultation participants with only basic education (unpublished Master´s thesis, Jensen, 2018). Further analyses of SRGH of potential relevance to other one-year results have not been performed. Because poor SRGH predicts a two-fold higher mortality risk than having good SRGH with higher predictive value in younger age groups, the improvement might have

some long-term effect (Sundquist and Johansson, 1997; Burström and Fredlund, 2001; DeSalvo et al., 2006; Sternhagen Nielsen et al., 2008).

Number of screening problems

At one-year follow-up, the average baseline number of 10 screening problems in Q33 had fallen by 1.8 points in the consultation group and 0.8 points in the control group (p=0.032) (paper II, Table 1). The screening problems reflected psychological challenges, lifestyle, and social interactions (paper I, Table I). In Denmark, social inequality in health is highly or moderately related to stress, overweight, lack of exercise, use of tobacco, low influence on own working situation and having more than one risk factor (Sundhedsstyrelsen, 2020). At baseline, many of these problems had the highest rank in pointing out problem group (paper I, Table 2) (Appendix 2).

The interaction between the psychosocial complexity, social interactions and mortality as described thoroughly by Berkman in the Alameda County studies remains relevant as highlighted in several health studies (Berkman and Breslow, 1983; Seeman et al., 1987; Jylhä, 2009; Berkman et al., 2011; Aiello, 2017). Long-term unemployment ranked high in identifying the" multiple problems" group (paper I, Table 2) (Table 1). Specific psychosocial aspects of work-life were answered through questions in Q1 about working situation such as job control, influence, satisfaction and wishes for change, which has not been analysed specifically. A better working situation and improved mental health were two frequent goal settings (respectively 18% and 21%) in the consultation (papers II and IV). Satisfaction with one's job situation is an important health resource and affects SF-12 (Kudielka et al., 2005; Olesen et al., 2013; Sundhedsstyrelsen, 2020). In a German study, psychosocial work conditions accounted for about 20% of the subjective perception of mental health measured by the MCS-SF-12 (Kudielka et al., 2005). In an Australian study, mental health was both a consequence and a risk factor for unemployment, yet with gender differences (Olesen et al., 2013).

In the population based pre-study in which a similar working method was used, 7% of the 20-year-old participants had changed their working situation at the 6-month follow-up because of the conversation which underlines the importance of the person-centred focus (Bille et al., 1990). In the present thesis, resources to change mental health, working situation, stress, interpersonal relations, and lifestyle were among others stated during the consultation (paper IV). The change in total number of problems were analysed but not the specific changes undertaken (paper II). One-year statements revealed that the consultation had been a *supportive dialogue*, that *gave food for thoughts, increased self-confidence* and *opportunity for change* (Soot et al., 2018). An intervention study showed better work stress management after three half-days of training with awareness of thinking patterns and formulation of desired goals at work

and in personal life focusing on SE and intrinsic motivation (Lloyd et al., 2017). In the present study SE and intrinsic motivation was focused, which seems reflected in the results (papers II, III and IV).

Benefit and harm

The improvement in MCS-SF-12 and the reduction in the number of problems after one year in both randomized groups might partly reflect regression towards the mean; however, the improvement was significantly higher in the consultation group than in the control group (paper II, Table 2). Of the 97% answering whether their participation had had some effect on their lives after one year, an affirmative answer was given by 51% of the patients in the consultation group and 15% of the patients in the control group (paper II, Table 4). The mostly positive effect in both groups was related mainly to physical health, wellbeing (mood, resources, sleep, relation to my children and work) and addiction (paper II, Table 4). The calculated NNT (benefit) of 3.1 and NNH (harm) of 25, based on positive and negative influence on patients after one year within the specific subjects (paper II, Table 4), might be interpreted as evidence of a further need for improvements of the working method but seems acceptable in relation to the target group and the short intervention period.

7.2.3 Overweight

At baseline, 44% of the randomized were in the overweight group (overweight/ obesity) with a mean BMI of 30,2 and mean weight of 88,06 kgs. The weight loss of around 5% among the overweight, who were characterised by one of the two main predictors for weight loss "consideration of quick weight-loss" before or "weight-loss prioritized" at the consultation, will be discussed below in relation to interventions in other studies and the beneficial effect of weight loss on health (paper III, Tables 1 and 2).

The overweight group had a lower PCS-SF-12, were one year older and more often men than the normal weight group, but no difference was observed in terms of MCS-SF-12, SRGH, number of problems or educational level (paper III, Table1). Drop out was not related to overweight (Hansen et al., 2014).

In a meta-analysis of the association between HRQOL and BMI among adults, mostly assessed by the SF-36, low physical health score was associated with increased weight, whereas the mental health score was more inconsistent and related to educational level (Ul-Haq et al., 2013; Galenkamp et al., 2019). Irrespective of weight group our study population had low MCS-SF-12, poor SRGH and many problems (paper III, Table1) as well as low education, as two thirds of the "multiple problems" patients had only basic education (unpublished Master´s thesis Jensen, 2018)

In many studies, a minor weight loss is reached despite intensive intervention and follow-up. This was the case, for example, in a Norwegian study where the intervention encompassed an initial one month' stay at a health centre, which was followed by three one-week stays throughout a year with regular telephone contact in between. The intervention focused on physical activity, eating habits and SE. The one-year results showed an 8% weight loss. A larger one-year weight loss was predicted owing to an initially larger 12-weeks weight loss, lower mental HRQOL, being employed and being older (Karlsen et al., 2013). In our overweight group weight-loss was also higher when considering weight-loss within 30 days, having many problems or low MCS-SF12 (paper III, Table 2).

In a review, intensive intervention to 21-65-year-olds with a BMI >25 with weekly follow-up for 10-52 weeks showed a weight loss after one year of 10-20%, higher when combining diet and exercise than if diet was the only intervention, but an equal 50% regain in both groups after one year (Curioni and Lourenço, 2005). Successful weight maintenance seems associated not only with healthy food, regular meals including breakfast and physical activity, but also with rapid initial weight loss, reaching the self-determined weight goal and having social support, SE, autonomy and coping strategies to handle stress (Elfhag and Rössner, 2005). Other studies confirm this and the higher effect achieved when having poor mental health, presupposed that the trial focuses on individual psychological strength and SE (Elfhag and Rössner, 2010; Karlsen et al., 2013). These preconditions seem to be confirmed by the thesis. The weight-loss was reached after short and structured intervention, where the goal was self-selected among many possibilities for change (paper II, III, IV).

The importance of allostatic load among obese patients is basic to the health risk and reflect the complexity of physiological and psychological factors (Daly et al., 2019; Stranden et al., 2020).

Reviews of studies focused on diet and exercise have variable and minimal or no effect of interventions. This questions whether studies should be more focused on examining the psychological elements of change (Benedict and Arterburn, 2008; Patnode et al., 2017). The present thesis confirms the importance of focus on psychological problems and own priorities, which might explain the higher weight loss seen among those who were comparatively more overweight and had poorer mental health, more problems, and poor SRGH (paper III, Table2). The main predictors: considering a "quick weight loss" at baseline or "prioritizing weight loss" at the consultation underlines the importance of "intrinsic motivation" (paper III, Tables 2 and 4). A similar conjecture is raised in the Danish diabetes study showing that change in SRGH was associated with the persons perceived illness burden (mental and practical) and not with the objective illness severity (Nielsen et al., 2015).

Several studies have shown that a maintained weight loss of 5%-10% has a beneficial effect on risk factors for CVD such as hypertension, dyslipidaemia and diabetes (Klein et al., 2004; Diabetes Prevention Program Research Group, 2009; Turk et al., 2009). The ideal weight loss has been estimated as 5%-10% and should be reached within 6 months and maintained for at least one year (Wing and Hill, 2001; Stevens et al., 2006). It is apparently not quite clear how to define an ideal weight loss (Elfhag and Rössner, 2005; Turk et al., 2009). However, an average weight loss of 5% after one year shown in this thesis for those who are overweight and exhibit one of the main predictors is considered beneficial according to these studies (paper III, Tables 1 and 2).

Interventions to reduce the risk of growing overweight worldwide should focus partly on psychosocial situations to support psychological strength, mental health and SE , partly on a combination of physical activity, diet and rapid initial weight loss (Lindström et al., 2006; Eriksson et al., 2007; Diabetes Prevention Program Research Group, 2009). A Norwegian study has recently shown impressive long-term results on work-related SE, HRQOL and weight-loss of vocational rehabilitation among obese workers at risk of sick leave. The intervention was *"focusing on the workplace, cognitive approaches to develop skills for coping strategies, lifestyle change purposing BMI reduction, physical activity, and support from the surroundings"* (Linge et al., 2021a; b). In our study the most frequent goals were weight loss, psychological wellbeing, partner relationship and work situation (paper II),. One-year results also for the overweight indicate salutogenic perspectives of the intervention (paper III, IV) (Soot et al., 2018).

7.2.4 Self-assessed resources

The resource statements to reach the self-chosen goal for change will be discussed in relation to the health theories presented in Chapter 3 to elucidate the relevance of the theories for clinical work. A prerequisite for support in the consultation focused on a self-chosen goal was the GP's awareness of the patient's stage of change according to TTM (Prochaska et al., 1993). This awareness was facilitated by the patient's preparation. The preparation meant that most patients were likely at the contemplation stage (Fig. 5) (paper IV). One year statements show that such contemplation often had been unvoiced so far, but now verbalised, structured and encouraged during the preventive consultation (Soot et al., 2018).

Despite the fundamental problems revealed in Q33 (paper I, Tables 1 and 2) (Appendix 2), almost all patients mentioned *positive constitution*, some mentioned *network* and fewer *own experience* as resources (paper IV) (Fig. 9).

Positive constitution most often encompassed *willpower* and half as often *tenacity*, both of which reflect self-identity and self-esteem, which, according to Maslow, are fundamental needs (Maslow, 1943; Henwood et al., 2014). Moreover, in his theory of salutogenesis, Antonovsky argues that self-identity and self-esteem are important elements of GRR (Antonovsky, 1996; Mittelmark and Bull, 2013). Another basic need and GRR is social stability, which was mentioned as *network* by about one fourth of the patients, most often the family, more seldom partner or friends (paper IV). This is remarkable as low confidence in network reached high OR at inclusion (paper1, Table1). When receiving social support during life, GRR are used to develop and strengthen SOC, i.e. the ability to make life comprehensible, manageable and meaningful (Antonovsky and Sagy, 1986; Eriksson et al., 2007). SOC enables a person to develop coping strategies to reduce strain by tension management and move to the ease end of the health continuum (Fig. 2) (Antonovsky, 1987).

Having improved SOC after one-year might be reflected in the positive change in MCS-SF-12 score and number of problems described in the thesis (paper II, Tables 2 and 3) (Eriksson, 2006). The observed improvement in lifestyle, especially smoking and diet (paper II, Table 3 and 4) took place parallel to improvements in MCS-SF-12 (paper II, Table 2) and a reduction in the number of problems (paper II, Table 3).

A thorough review of salutogenic research published from 1992 to 2003 shows that SOC is strongly related to perceived health (Mittelmark and Bull, 2013; Benz et al., 2014), especially mental health (Eriksson, 2006); moreover, SOC is a health resource with a strong bearing on QoL (Eriksson and Lindstrom, 2007; Naaldenberg et al., 2011). We did not use a SOC scale (Antonovsky, 1987), but many of the questions in Q33 and Q1 were rooted in SOC (paper I, Table 1) (Appendix1) (Eriksson, 2005).

Some of the conditions required to strengthen SOC resemble Bandura's SCT, describing that the cognitive ability necessary to enhance SE develops in a triangulation involving person, society and behavior (Fig.4) (Bandura, 1977, 2004, 2012). In the statements, *network* - encompassing family, friends, partner, and the GP - was described as a resource (Fig 9). This resource influencing outcome expectancy and self-regulation was often combined with willpower irrespective of whether the goal was weight loss, exercise, or better psychological wellbeing (Fig 9) (paper IV)

Before the consultation, many patients had low self-esteem and -confidence e.g. in their ability to solve problems they considered important and in discussing personal problems and values with their network (paper I, Table 1) (Apendix2). This is an indicator for being in the lower part of Maslow´s hierarchy of needs (Maslow, 1943; Acton and Malathum, 2000).However, the resource statements during the consultation of having willpower and network might be interpreted as the patients´ insight in using this platform for obtaining better comprehensibility and the ability to manage one's own situation and move to a higher level in the hierarchy of needs (Fig. 9) (paper IV).

These statements are in accordance with both Antonovsky's SOC and Bandura's SCT (Antonovsky, 1987; Bandura, 2004). These theories are illustrated with a citation of resource statement from a 38-year-old woman: *"Will. I have great willpower if I get support from the ones who mean most to me"* (paper IV).

Support of SE is considered essential to reach lifestyle goals (Vancouver et al., 2001; Lloyd et al., 2017; Linge et al., 2021a). According to Bandura, *"Mastery experience"* is a major source of SE as it presents authentic evidence of one's own ability to reach a specific goal (Bandura, 1977; Vancouver et al., 2001). In this thesis, a statement of *"mastery experience"* was rarely voiced, and when so it was mentioned together with *tenacity,* the constitution of which was almost never combined with network (Fig. 9) (paper IV). This might indicate that the patients were characterized by low SE and represent a vulnerable population that rarely participate in studies inclusive those examined by Bandura at schools, working places, and sport activities (Bandura, 1977, 1997; Bandura and Locke, 2003). Bandura describes that self-motivation needs to develop step-wise in challenged individuals, but does not pay much attention to this problem (Bandura, 2004).

As described by Antonovsky and Bandura, development of self-motivation is based on *relatedness* and *confidence* in one's own ability, which is further explored and elaborated by SDT (Ryan and Deci, 2000). SDT emphasises the importance of *intrinsic motivation and autonomy*. A greater feeling of *autonomy* is reached through acknowledgement of feelings and opportunities for self-direction. In this way, external motivation may be internalized when individual capacity and values are respected and pressure from outside is avoided (Ryan and Deci, 2000; Williams et al., 2006). According to SDT, *intrinsic motivation* will lead to permanently enhanced performance and increase own competence as it is based on inherent curiosity and willingness to learn (Deci and Ryan, 2000). Awareness from both the GP and the patient of the patient's wishes and psychosocial situation was in the present study essential to ensuring respect of *autonomy* and support *intrinsic motivation.* This formed the context for verbalising basic needs and resources such as personal constitution and network essential for developing motivation for change (paper IV) (Fig. 9). (Soot et al., 2018).

Bandura's second source of SE: others' experience, *"vicarious experience",* can be used only if these others are comparable with oneself. Friends were seldom mentioned as a resource; but when so, they were described as setting an example, e.g. in connection with starting exercising or reducing tobacco consumption, e.g.: *"Only a few of my friends smoke"* (paper IV).

The third source: being persuaded to do something (*"verbal persuasion"*) was dissuaded in the education of the GPs as they should avoid being authoritative. According to Bandura, verbal persuasion is effective only when performed by somebody you

trust and when reasoned in thorough knowledge of the person's ability and values, which might be an option for the GP. The continuity in general practice represents a fundamental condition for "verbal persuasion" if this knowledge is used. Otherwise, persuasion will lead to resistance, which is further explained in SDT as being due to lack of feeling autonomy. Therefore, *extrinsic motivation* will seldom be internalised and a possible performance change will only be temporary (Deci et al., 1999; Gillison et al., 2019; Saether, 2020)

Other studies have shown a positive effect of using SDT in work situations, smoking cessation and physical activity training among college students (Williams et al., 2006; Farholm et al., 2017; Behzadnia et al., 2018). Both resource statements in CSQ-1 and one year statements in Q2 confirm that respect of own values, resources and priorities was experienced and essential to the outcome expectancy (fig 3) (paper IV) (Soot et al., 2018).

Some statements in CSQ-1 were not categorised as resources, but as a "need to free up resources" (Fig. 9) (paper IV). This shows that the patients were conscious of psychological problems giving rise to actual stress, and that they prioritised reducing these problems and such stress before focusing on another lifestyle goal. Consciousness and management of psychological and affective states in a constructive way reflect the fourth source of SE (Bandura, 1997). Parallel to this, Antonovsky describes that the ability to manage tension is developed in a dynamic health balance. Through tension management, a movement towards the ease end of the ease/ dis-ease continuum is facilitated, as stressors only cause a temporary break down of health if stressors are understandable, temporary, and manageable (Fig. 2) (Eriksson et al., 2007; Mittelmark and Bull, 2013; García-Moya and Morgan, 2016). The statements: " need to free up resources" reflect ability of tension management (paper IV) (Antonovsky, 1987; Bandura, 1997; Soot et al., 2018).

7.2.5 Future use of health theories

Numerous studies have described and tested different theories of health behaviour, and none can stand alone (Hagger, 2009). Few studies translate the theories into practical interventions (Hagger, 2009). Probably new theories will develop following new intervention studies that examine complexity and context for the individual or a group (Moore and Evans, 2017). Recently more studies have examined both the nature and consequences of *optimism*, indicating that optimism is dispositional, yet with possibilities to change by intervention. Optimism is an essential contributor to health with similarities to SRGH (Malouff and Schutte, 2017; Lee et al., 2019; Rozanski et al.,

2019). Our study population was not characterised by optimism at inclusion, but despite this, many statements during the consultation reflect trust in personal resources to reach a self-chosen goal (paper I, IV).

Every person is individual with a unique psychosocial situation, cognition and values (Starfield, 2011). These differences influence the individual ability to contain symptoms or biomedical disease without developing important restraints in daily life as described in the social theory of "situational disease" (Gannik, 2002a). "Situational treatment" requires a person-centred approach in health prevention with exploration of the individual's ability to make the situation and society comprehensive, meaningful and manageable as described in SOC. Respecting these individual abilities requires that health professionals are ready to accept not being authoritative and underscores the fact that the choice of behaviour remains the patient's (Gannik, 2002a; Hardcastle et al., 2015). Openness towards exploring and discussing values and choice will support individual coping ability and intrinsic motivation. The theories of salutogensis, SOC, SCT and SDT supplied by Maslow seem relevant to understand both similarities and differences in health and health behaviour, which is crucial to both primary and secondary prevention, especially among those in whom many problems lie at the root of their behaviour. Using this understanding as a frame to support the patients' intrinsic motivation and SE seems fundamental to improve the patients' control of outcome (Lee et al., 2019). The value of using these theories in practice is recently confirmed by a Norwegian longitudinal study on overweight workers, who reached a great weight loss parallel to improvement in HRQOL (Linge et al., 2021a; b).

Collectively, these studies emphasise how important it is for GPs to award attention to patients' perceived burden in straining life situations in tandem with making objective diagnosis and preventive consultations. This is a key message of the present thesis (papers I, II, II and IV).

7.2.6 Evaluation design

Evaluation was based on both quantitative and qualitative data, obtained during the same preventive process. This gave opportunity for process evaluation of the complex intervention with patient preparation, randomization, consultation and one-year follow-up. Public health science, especially the new MRC guidelines call for a new approach in intervention studies with increased focus on process evaluation and context (Moore et al., 2015; Craig et al., 2019).

Having quantitative material both before, during and after the intervention and qualitative material during and one-year after the consultation process, strengthens the study. The qualitative part of CS1-Q was primarily intended to support the process, why the short statements were not ideal for qualitative analysis. Despite this shortness

they gave meaningful information of the motivational process. In one-year statements, which are not included in this thesis, the patients described personal impact of the preventive process, which is summarized above (Soot et al., 2018).

Chapter 8. Conclusion

The overall aims of this PhD thesis were to investigate whether screening of adults attending general practice could identify patients with few resources and many psychosocial or lifestyle problems (paper I), and whether two preventive health consultations with their general practitioner (GP) with a focus on the whole person, individual goals, resources, and barriers could increase patients' wellbeing and awareness of own resources or lead to health-related changes (papers II, III and IV).

A screening questionnaire (Q33) was designed based on international health and social theories on personal determinants for health. Ordinary 20-44 years old attenders in general practice were invited to participate in the study with focus on improving their wellbeing and prevent further problems. Screening revealed that 30% of these met the cut-off of ≥7 of 33 eligible psychosocial or lifestyle problems. Basic problems with self-rated global health, self-esteem, confidence, lifestyle, and network, reached a high OR among the included compared to the non-included patients (paper I). According to international studies described in the thesis these problems are fundamental to health. So even if the Q33 was not a validated Q, it seems to be able to include a relevant part of vulnerable attenders to general practice. Awareness of personal vulnerability and psychosocial situation is considered a precondition for establishing a beneficial doctor-patient relation based on trust and understanding.

Most of the included patients (79%) accepted answering a comprehensive Q1 regarding their psychosocial situation, health and illness behaviour and wishes for change before randomization (paper II). A thorough preparation with reflections at home is considered essential to vulnerable patients as this might facilitate their awareness of potential complexity in their lives. This awareness also facilitates a person-centred and not authoritative consultation. Furthermore, it is timesaving and might increase possibility for verbalising difficult problems, support possibilities for prioritized change and avoid misunderstanding. By answering the Q1 this preparation was more concrete and specific than just having time to reflect. At the consultation 91% of the patients set goals primarily related to weight, psychological well-being, partner relationship and working situation (paper II), Answering the Q1 may have raised awareness of these essential elements of health.

The statements of resources reflect the health theories discussed in this thesis apart from Bandura´s theory of self-efficacy (SE). According to Bandura, the major source of SE is "mastery experience", which is a seldom statement in our study population characterized by few resources, whereas the other sources of SE are mentioned. Awareness and support of specific resources, social relations, intrinsic motivation, and autonomy seems to have a potential to improve health, and wellbeing among psychosocially vulnerable patients.

One-year results of the study showed a significant reduction in the number of problems and improvement in mental health measured by the mental component score of the SF-12 in both randomized groups most distinct in the consultation group. The improvement in MSC-SF12 was consistent among the GPs having more than ten patients included, which underlines that the working method can be used by most GPs (paper II).

Weight loss as the most frequent goal and improvement in self-rated global health were seen after one year with a non-significant difference between the two groups (paper II). Main predictors for weight loss were therefore post-hoc analysed independent of randomization (paper III). Main predictors were *consideration of quick weight-loss* before the consultation and *prioritizing weight-loss* at the consultation. This indicates the importance of respecting *intrinsic motivation*, as emphasised by the theory of self-determination. Answering the comprehensive baseline questionnaire (Q1) before randomization seems to have some independent effect; an effect that was enhanced by the subsequent consultations (paper II and III).

A trustful person- and patient-centered relation will according to international literature diminish patient disappointment and demotivation and be able to address the complex interplay between patients' physical and mental health. Other studies have shown that these complex problems are seldom focused by the GP, which implies deterioration of health and increased health care expenditure. This thesis proposes a structure of consultations for patients with complex problems.

The results of the thesis elucidate that even patients with basic psychosocial problems can mobilise awareness of personal resources essential to coping strategies for improving health and can reach health related goals.

Chapter 9. Implications for general practice

Attendance to general practice represents low inequality and high continuity (Sundhedsstyrelsen, 2020). Therefore, general practice is a relevant framework for developing and introducing new preventive initiatives focused on the psychosocial complexity in health (Mackenbach et al., 2019; Sundhedsstyrelsen, 2020).

The thesis describes possibilities for revealing and supporting individual potential in health promotion when the complexity in many cases is too heavy to be verbalised in ordinary consultations. The intervention was undertaken by 28 out of 50 interested GPs who accepted the extra workload. After having attended approximately 40 hours of courses, they managed to incorporate the preventive consultations in their daily schedule. The outcome for patients measured in terms of improvement in MCS-SF-12 was consistent among the GPs who included 10 or more patients (paper II). The number of included patients varied among GPs, probably because of varying interest, time, or trust in their own ability to conduct the intervention. This is perhaps reflected in the fact that 12% of the patients in the consultation group at one-year evaluation stated that it was "not worthwhile". The majority stated that it had been a new and encouraging experience: "meeting the GP in a different and supportive way", "opportunity for change", "increasing self-confidence"(Soot et al., 2018).

An encouraging experience will probably facilitate better communication in future consultations and reduce health care use among patients with complex problems. The comprehensive questionnaires used in this study formed the structure of the new working method and gave the data for process evaluation using both quantitative (paper I, II, III) and qualitative (paper IV) methods. According to data from an unpublished post-trial questionnaire and focus group interviews, the participating GPs wanted to use a similar offer again. Routine facilitated the task, but despite this they wanted less paper material, which might be possible in a new preventive offer.

Patient preparation and structured consultations may be a positive approach to vulnerable patients. Whether less paperwork might increase attendance without diminishing the outcome cannot be answered by this thesis. The thesis shows that such an approach facilitates a doctor-patient relationship based on person-centredness, supporting patients in finding individual possibilities for improving their health. Scheduled follow-up irrespective of outcome will diminish feeling of failure by means of the opportunity to discuss a possible need for a stepwise approach, reconsideration of goal, resources, and barriers.

During the post-trial period of more than twenty years, increasing possibilities to focus inequality in health related to multimorbidity have developed within the collective agreement for general practice in Denmark. In the latest collective agreement (OK 22) new primary preventive offers were introduced. According to this, GPs now get a fee for offering a longer consultation to those of the families not attending preventive child consultations who are supposed to be vulnerable. Some of these families are possibly challenged by problems that the GP is not aware of. No structure is decided neither for including nor performing or evaluating the intervention. Using the Q33 in the beginning of these consultations may enhance understanding of whether vulnerability is a reason for non-attendance. This insight might be essential to the outcome. Experience from this trial and the results discussed here might elucidate preventive opportunities in general practice using structured person-centred methods also to families.

During the past twenty years motivational methods and person-centredness have been an increasingly important subject of courses and scientific papers. According to international studies many GPs and some patients still find that the GP's main task is to find a solution for the patient, such as diagnosis, referral, or prescription. Courses might improve self-efficacy of the GPs especially in preventive consultations with vulnerable patients, where exploring and resolving ambivalence and supporting autonomy is essential to further intrinsic motivation for change.

A fee for longer consultations lasting 30-45 minutes and the cost of relevant courses for the GPs will probably be set off by less health care use and reduced workload for GPs in the future.

Chapter 10. Implications for future research

This study showed that the Q33 screening questionnaire was understandable, feasible and reliable for identifying vulnerable patients in primary care. Recently, the psychometric properties of the four subscales: resources, lifestyle, family life, and relationship with children in Q33 were thoroughly examined using Rasch models. A reduction to a 23-item version comprising the four subscales (HSQ-23) had better psychometric properties than the Q33 and showed superior responsiveness and predictive validity to clinical change (Comins et al., 2019). Future studies are necessary to assess the predictive value of the HSQ-23 for morbidity and mortality.

We do not know whether the HSQ-23 can identify who might benefit from a preventive consultation. We tested the face-to face validity and content validity of Q33 by asking the patients and GPs. In the meantime, much scientific discussion has targeted the value of PROMs. Whether other questions are relevant could be assessed in a study with development of a valid PROM as described in COSMIN rules. The logistic regression analysis of Q33 gave different rank in men and women. Specification within genders might heighten the internal validity (paper I, Table 2). Using the HSQ-23 or the Q33 in the beginning of a consultation with a vulnerable patient may enhance understanding and thus increase the outcome. This could be evaluated in a new study.

The comprehensive baseline questionnaire Q1 could be reduced in future studies. Nevertheless, all questions were answered including the detailed questions of diet, exercise, tobacco, and alcohol. Some of the positive effect after one year was related to these subjects. However, according to international studies of preventive issues, these elements seem less important for the target population than the psychosocial elements of the Q1. The specific questions concerning, e.g., health complaints, working situation, job satisfaction, partner relationship, weight and addiction seem crucial to elucidate patients' life-situation, priorities and wishes for change.

In this study, patient preparation was essential for both the patient and the GP. How much the preparation can be reduced and still give "food for thought" through specific questions is a topic for future investigation.

Unfortunately, the duration of the study did not exceed one year. However, patients have accepted further contact and a follow-up study might be possible and relevant. No other studies have included a similar study group. It might be relevant to study the patients´ and their children´s use of health care, medicine, and social support in the two groups compared to the background population in the Region of Northern Jutland.

Whether well-prepared and structured preventive consultations to vulnerable psycho-socially challenged patients should be carried out by GPs or by nurses in primary care settings could also be a focus for future research.

References

Aaby, A., Friis, K., Christensen, B., Rowlands, G. and Maindal, H.T. (2017) Health literacy is associated with health behaviour and self-reported health: A large population-based study in individuals with cardiovascular disease. *European journal of preventive cardiology*, **24**, 1880–1888.

Aadahl, M., von Huth Smith, L., Toft, U., Pisinger, C. and Jorgensen, T. (2011) Does a population-based multifactorial lifestyle intervention increase social inequality in physical activity? The Inter99 study. *British journal of sports medicine*, **45**, 209–215.

Acton, G.J. and Malathum, P. (2000) Basic need status and health-promoting self-care behavior in adults. *Western journal of nursing research*, **22**, 796–811.

Adler, R.H. (2009) Engel's biopsychosocial model is still relevant today. *Journal of psychosomatic research*, **67**, 607–611.

Aiello, A.E. (2017) Invited commentary: Evolution of social networks, health, and the role of epidemiology. *American Journal of Epidemiology*, **185**, 1089–1092.

Anderson, E.S., Winett, R.A. and Wojcik, J.R. (2007) Self-regulation, self-efficacy, outcome expectations, and social support: Social cognitive theory and nutrition behavior. *Annals of Behavioral Medicine*, **34**, 304–312.

Anderson, E.S., Wojcik, J.R., Winett, R. and Williams, D.M. (2006) Social-cognitive determinants of physical activity: the influence of social support, self-efficacy, outcome expectations, and self-regulation among participants in a church-based health promotion study. *Health psychology : official journal of the Division of Health Psychology, American Psychological Association*, **25**, 510–520.

Antonovsky, A. (1979) Health, Stress and Coping. Jossey-Bass Publishers, San Francisco.

Antonovsky, A. (1980) Implications of socio-economic differentials in mortality for the health system. *Population bulletin*, 42–52.

Antonovsky, A. (1987) Unraveling the Mystery of Health : How People Manage Stress and Stay Well. Jossey-Bass, San Francisco.

Antonovsky, A. (1996) The salutogenic model as a theory to guide health promotion 1. *Health Promotion International*, **11**, 11–18.

Antonovsky, H. and Sagy, S. (1986) The development of a sense of coherence and its impact on responses to stress situations. *The Journal of social psychology*, **126**, 213–225.

Ashenden, R., Silagy, C. and Weller, D. (1997) A systematic review of the effectiveness of promoting lifestyle change in general practice. *Family Practice*, **14**, 160–176.

Balint, E. (1969) The possibilities of patient-centered medicine. *Journal of the Royal College of General Practitioners*, **17**, 269–276.

Balint M. (1964) The Doctor, His Patient, and the Illness, 2. Pittman Medical Publishing, London.

Bandura, A. (1977) Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, **84**, 191–215.

Bandura, A. (1997) Self-efficacy : the exercise of control. , 604.

Bandura, A. (2004) Health promotion by social cognitive means. *Health education & behavior : the official publication of the Society for Public Health Education*, **31**, 143–164.

Bandura, A. (2012) On the Functional Properties of Perceived Self-Efficacy Revisited. *Journal of Management*, **38**, 9–44.

Bandura, A. and Locke, E.A. (2003) Negative self-efficacy and goal effects revisited. *The Journal of applied psychology*, **88**, 87–99.

Barry, C.., Bradley, C.P., Britten, N., Stevenson, F.A. and Barber, N. (2000) Patients' unvoiced agendas in general practice consultations: qualitative study. *BMJGeneral Practice*, **320**, 1246–1250.

Bazemore, A., Stange, K.C. and Ferrer, R.L. (2016) The paradox of primary care. *Family Medicine: The Classic Papers*, 307–316.

Behzadnia, B., Adachi, P.J.C., Deci, E.L. and Mohammadzadeh, H. (2018) Associations between students' perceptions of physical education teachers' interpersonal styles and students' wellness, knowledge, performance, and intentions to persist at physical activity: A self-determination theory approach. *Psychology of Sport & Exercise*, **39**, 10–19.

Beich, A., Gannik, D. and Malterud, K. (2002) Screening and brief intervention for excessive alcohol use: qualitative interview study of the experiences of general practitioners. *Bmj*, **325**, 870.

Belloc, N.B. (1973) Relationship of health practices and mortality. *Preventive medicine*, **2**, 67–81.

Belloc, N.B. and Breslow, L. (1972) Relationship of physical health status and health practices. *Preventive medicine*, **1**, 409–421.

Bender, A.M., Jorgensen, T., Helbech, B., Linneberg, A. and Pisinger, C. (2014) Socioeconomic position and participation in baseline and follow-up visits: the Inter99 study. *European journal of preventive cardiology*, **21**, 899–905.

Bender, A.M., Kawachi, I., Jørgensen, T. and Pisinger, C. (2015) Neighborhood social capital is associated with participation in health checks of a general population: A multilevel analysis of a population-based lifestyle intervention-the Inter99 study. *BMC Public Health*, **15**, 1–9.

Benedict, M.A. and Arterburn, D. (2008) Worksite-based weight loss programs: A systematic review of recent literature. *American Journal of Health Promotion*, **22**, 408–416.

Benz, C., Bull, T., Mittelmark, M. and Vaandrager, L. (2014) Culture in salutogenesis: The scholarship of Aaron Antonovsky. *Global Health Promotion*, **21**, 16–23.

Berkman, L.F. and Breslow, L. (1983) Health and Ways of Living : The Alameda County Study. Oxford University Press, Oxford.

Berkman, N.D., Sheridan, S.L., Donahue, K.E., Halpern, D.J. and Crotty, K. (2011) Low health literacy and health outcomes: an updated systematic review. *Annals of internal medicine*, **155**, 97–107.

Berkman, L.F. and Syme, S.L. (1979) Social networks, host resistance, and mortality: a nine-year follow-up study of Alameda County residents. *American journal of epidemiology*, **109**, 186–204.

Bernstorff, M., Deichgræber, P., Bruun, N.H., Dalsgaard, E.M., Fenger-Grøn, M. and Lauritzen, T. (2019) A Randomised Trial Examining Cardiovascular Morbidity and All-Cause Mortality 24 years following General Health Checks: The Ebeltoft Health Promotion Project (EHPP). *BMJ Open*, **9**, 1–7.

Bertalanffy, L. von. (1984) General System Theory: Foundation, Development, Applications., revised. Braziller,George,Inc. New York.

Bickerdike, L., Booth, A., Wilson, P.M., Farley, K. and Wright, K. (2017) Social prescribing: Less rhetoric and more reality. A systematic review of the evidence. *BMJ Open*, **7**.

Bille, P.E., Schierup Freund, K. and Frimodt-Møller, J. (1990) [Preventive Health-Examinations/ Conversations for Adults in the County of Northern Jutland. A Study Report]. Forebyggende Helbredsundersøgelser/Helbredssamtaler for Voksne i Nordjyllands Amt : En Forsøgsrapport. Eget forlag, S. l.

Bjerregaard, A.L., Maindal, H.T., Bruun, N.H. and Sandbæk, A. (2017) Patterns of attendance to health checks in a municipality setting: the Danish 'Check Your Health Preventive Program.' *Preventive Medicine Reports*, **5**, 175–182.

Bjorner, J.B., Damsgaard, M.T., Watt, T., Bech, P., Rasmussen, N., Kristensen, T., et al. (1997) Dansk Manual Til SF36. Et Spørgeskema Om Helbredsstatus. [Danish Manual for SF-36]. Lif Lægemiddelindustriforeningen, Copenhagen-DK Denmark.

Bjorner, J.B., Lyng Wolden, M., Gundgaard, J. and Miller, K.A. (2013) Benchmarks for interpretation of score differences on the SF-36 health survey for patients with diabetes. *Value in Health*, **16**, 993–1000.

Bo, A., Friis, K., Osborne, R.H. and Maindal, H.T. (2014) National indicators of health literacy: Ability to understand health information and to engage actively with healthcare providers - A populationbased survey among Danish adults. *BMC Public Health*, **14**, 1–12.

Bower, P. (1998) Understanding patients: implicit personality theory and the general practitioner. *The British journal of medical psychology*, **71 (Pt 2)**, 153–163.

Breslow, L. and Breslow, N. (1993) Health practices and disability: some evidence from Alameda County. *Preventive medicine*, **22**, 86–95.

Britt, E., Blampied, N.M. and Hudson, S.M. (2003) Motivational Interviewing: A Review. *Australian Psychologist*, **38**, 193–201.

Britt, E., Hudson, S.M. and Blampied, N.M. (2004) Motivational interviewing in health settings: A review. *Patient Education and Counseling*, **53**, 147–155.

Brock, B.M., Haefner, D.P. and Noble, D.S. (1988) Alameda County redux: replication in Michigan. *Preventive medicine*, **17**, 483–495.

Brodersen, J., McKenna, S.P., Doward, L.C. and Thorsen, H. (2007) Measuring the psychosocial consequences of screening. *Health and Quality of Life Outcomes*, **5**, 1–4.

Brotons, C., Drenthen, A.J.M., Durrer, D. and Moral, I. (2012) Beliefs and attitudes to lifestyle, nutrition and physical activity: The views of patients in Europe. *Family Practice*, **29**, 49–55.

Brown, J., Michie, S., Geraghty, A.W.A., Yardley, L., Gardner, B., Shahab, L., et al. (2014) Internet-based intervention for smoking cessation (StopAdvisor) in people with low and high socioeconomic status: a randomised controlled trial. *The Lancet. Respiratory medicine*, **2**, 997–1006.

Brown, J., Stewart, M., McCracken, E., McWhinney, I.R. and Levenstein, J. (1986) The patient-centred clinical method. 2. Definition and application. *Family practice*, **3**, 75–79.

Browne, A.J., Varcoe, C.M., Wong, S.T., Smye, V.L., Lavoie, J., Littlejohn, D., et al. (2012) Closing the health equity gap. *International Journal for Equity in Health*, **11**, 59.

Bunten, A., Porter, L., Gold, N. and Bogle, V. (2020) A systematic review of factors influencing nhs health check uptake: Invitation methods, patient characteristics, and the impact of interventions. *BMC Public Health*, **20**, 1–16.

Burström, B. and Fredlund, P. (2001) Self rated health: Is it as good a predictor of subsequent mortality among adults in lower as well as in higher social classes? *Journal of Epidemiology and Community Health*, **55**, 836–840.

Cacioppo, J.T., Cacioppo, S., Capitanio, J.P. and Cole, S.W. (2015) The neuroendocrinology of social isolation. *Annual Review of Psychology*, **66**, 733–767.

Christensen, B. (1995) Payment and attendance at general practice preventive health examinations. *Family medicine*, **27**, 531–534.

Christensen, A.V., Bjorner, J.B., Ekholm, O., Juel, K., Thrysoee, L., Borregaard, B., et al. (2020) Increased risk of mortality and readmission associated with lower SF-12 scores in cardiac patients: Results from the national DenHeart study. *European Journal of Cardiovascular Nursing*, **19**, 330–338.

Christensen, A.I., Davidsen, M., Kjøller, M. and Juel, K. (2010) Mental Sundhed Blandt Voksne Danskere : Analyser Baseret På Sundheds- Og Sygelighedsundersøgelsen 2005 [Mental Health among Adult Danes: Analyses Based on the Danish Health and Morbidity Survey 2005]. Danish Health Authority, Copenhagen 2010, Copenhagen-DK Denmark.

Christensen, A.I., Ekholm, O., Davidsen, M. and Juel, K. (2012) Sundhed Og Sygelighed i Danmark 2010 Og Udviklingen Siden 1987 [Health and Illness in Denmark 2010]. University of Southern Denmark, Copenhagen-DK Denmark.

Comins, J.D., Brodersen, J., Siersma, V., Jensen, J., Hansen, C.F. and Krogsgaard, M.R. (2021) How to develop a condition-specific PROM. *Scandinavian*

Journal of Medicine and Science in Sports, **31**, 1216–1224.

Comins, J.D., Freund, K.S., Christensen, K.B., Lous, J. and Brodersen, J. (2019) Validation of a health screening questionnaire for primary care using Rasch models. *Journal of patient-reported outcomes*, **3**, 1–10.

Cook, E.J., Sharp, C., Randhawa, G., Guppy, A., Gangotra, R. and Cox, J. (2016) Who uses NHS health checks? Investigating the impact of ethnicity and gender and method of invitation on uptake of NHS health checks. *International Journal for Equity in Health*, **15**, 1–11.

Coordination Committee in Health. (1985) Betænkning Fra Det Af Indenrigsministeren Nedsatte Samordningsudvalg for Sundhedsvæsenet [Report], Betænkning (ed Indenrigsministeriet). Copenhagen, DK.

Coulter, A. (1987) Lifestyles and social class: implications for primary care. *Journal of the Royal College of General Practitioners*, **37**, 533–536.

County Council of Ringkøbing, D. (1983) Konference Om Almen Lægegerning i Fremtiden [Conference about General Practice in the Future].

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I. and Petticrew, M. (2019) Developing and Evaluating Complex Interventions: New Guidance.

Curioni, C.C. and Lourenço, P.M. (2005) Long-term weight loss after diet and exercise: A systematic review. *International Journal of Obesity*, **29**, 1168–1174.

Daly, M., Sutin, A.R. and Robinson, E. (2019) Perceived Weight Discrimination Mediates the Prospective Association Between Obesity and Physiological Dysregulation: Evidence From a Population-Based Cohort. *Psychological Science*, **30**, 1030–1039.

Daundasekara, S.S., Arlinghaus, K.R. and Johnston, C.A. (2019) The Importance of Language in Behavior Change. *American Journal of Lifestyle Medicine*, **13**, 239–242.

Daundasekara, S.S., Arlinghaus, K.R. and Johnston, C.A. (2020) Quality of Life: The Primary Goal of Lifestyle Intervention. *American Journal of Lifestyle Medicine*, **14**, 267–270.

Davis, R., Campbell, R., Hildon, Z., Hobbs, L. and Michie, S. (2015) Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review. *Health Psychology Review*, **9**, 323–344.

Dean, K. (1981) Self-care responses to illness: a selected review. *Social science & medicine. Part A, Medical sociology*, **15**, 673–687.

Dean, K. and Hunter, D. (1996) New directions for health: Towards a knowledge base for public health action. *Social Science & Medicine*, **42**, 745–750.

Deci, E.L. and Ryan, R.M. (2000) The " What " and " Why " of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychological Inquiry*, **11**, 227–268.

Deci, E.L., Ryan, R.M. and Koestner, R. (1999) A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation.

Psychological Bulletin, **125**, 627–668.

DeSalvo, K.B., Bloser, N., Reynolds, K., He, J. and Muntner, P. (2006) Mortality prediction with a single general self-rated health question. *Journal of General Internal Medicine*, **21**, 267–275.

Diabetes Prevention Program Research Group. (2009) 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. *The Lancet*, **374**, 1677–1686.

DiClemente, C.C., Schlundt, D. and Gemmell, L. (2008) Readiness and stages of change in addiction treatment. *The American journal on addictions / American Academy of Psychiatrists in Alcoholism and Addictions*, **13**, 103–119.

Diderichsen, F., Hallqvist, J. and Whitehead, M. (2019) Differential vulnerability and susceptibility: How to make use of recent development in our understanding of mediation and interaction to tackle health inequalities. *International Journal of Epidemiology*, **48**, 268–274.

Dixon-Woods, M. (2019) How to improve healthcare improvement - An essay by Mary Dixon-Woods. *The BMJ*, **367**, 1–4.

Dixon-Woods, M., Cavers, D., Agarwal, S., Annandale, E., Arthur, A., Harvey, J., et al. (2006) Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. *BMC medical research methodology*, **6**, 1–13.

Drack, M. and Wolkenhauer, O. (2011) System approaches of Weiss and Bertalanffy and their relevance for systems biology today. *Seminars in Cancer Biology*, **21**, 150–155.

Dray-Spira, R., Gary, T.L. and Brancati, F.L. (2008) Socioeconomic position and cardiovascular disease in adults with and without diabetes: United States trends, 1997-2005. *Journal of General Internal Medicine*, **23**, 1634–1641.

Dryden, R., Williams, B., McCowan, C. and Themessl-Huber, M. (2012) What do we know about who does and does not attend general health checks? Findings from a narrative scoping review. *BMC Public Health*, **12**, 1–23.

Due, E.P. and Holstein, B.E. (1998) ["Sense of coherence", social class and health in a Danish population study]. *Ugeskrift for laeger*, **160**, 7424–9.

Ebstrup, J.F., Eplov, L.F., Pisinger, C. and Jorgensen, T. (2011) Association between the Five Factor personality traits and perceived stress: is the effect mediated by general self-efficacy? *Anxiety, stress, and coping*, **24**, 407–419.

Elfhag, K. and Rössner, S. (2005) Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain. *Obesity Reviews*, **6**, 67–85.

Elfhag, K. and Rössner, S. (2010) Initial weight loss is the best predictor for success in obesity treatment and sociodemographic liabilities increase risk for drop-out. *Patient Education and Counseling*, **79**, 361–366.

Engberg, M., Christensen, B., Karlsmose, B., Lous, J. and Lauritzen, T. (2002) General health screenings to improve cardiovascular risk profiles: a randomized controlled trial in general practice with 5-year follow-up. *The*

Journal of family practice, **51**, 546–552.

Engel, G.L. (1977) The need for a new medical model: a challenge for biomedicine. *Science (New York, N.Y.)*, **196**, 129–136.

Eriksson, M. (2005) Validity of Antonovsky's sense of coherence scale: a systematic review. *Journal of Epidemiology & Community Health*, **59**, 460–466.

Eriksson, M. (2006) Antonovsky's sense of coherence scale and the relation with health: a systematic review. *Journal of Epidemiology & Community Health*, **60**, 376–381.

Eriksson, M. and Lindstrom, B. (2007) Antonovsky's sense of coherence scale and its relation with quality of life: a systematic review. *Journal of Epidemiology & Community Health*, **61**, 938–944.

Eriksson, M., Lindstrom, B. and Lilja, J. (2007) A sense of coherence and health. Salutogenesis in a societal context: Aland, a special case? *Journal of Epidemiology & Community Health*, **61**, 684–688.

Ewing, J.A. (1984) Detecting alcoholism. The CAGE questionnaire. *JAMA*, **252**, 1905–1907.

Farholm, A., Halvari, H., Niemiec, C.P., Williams, G.C. and Deci, E.L. (2017) Changes in return to work among patients in vocational rehabilitation: a self-determination theory perspective. *Disability and Rehabilitation*, **39**, 2039–2046.

Fayers, P.M. and Sprangers, M.A.G. (2002) Understanding self-rated health. *The Lancet*, **359**, 187–188.

Feigl, W. and Bonet, E.. (1989) Systemtheorie in der Medizin und Biologie. *Wiener Medizinsche Wochenschrift*, **139**, 87–91.

Fortin, M., Lapointe, L., Hudon, C., Vanasse, A., Ntetu, A.L. and Maltais, D. (2004) Multimorbidity and quality of life in primary care: A systematic review. *Health and Quality of Life Outcomes*, **2**.

Friis, K., Lasgaard, M., Osborne, R.H. and Maindal, H.T. (2016) Gaps in understanding health and engagement with healthcare providers across common long-term conditions: A population survey of health literacy in 29 473 Danish citizens. *BMJ Open*, **6**, 1–10.

Frostholm, L., Oernboel, E., Christensen, K.S., Toft, T., Olesen, F., Weinman, J., et al. (2007) Do illness perceptions predict health outcomes in primary care patients? A 2-year follow-up study. *Journal of Psychosomatic Research*, **62**, 129–138.

Frostholm, L., Ørnbøl, E., Hansen, H.S., Olesen, F., Weinman, J. and Fink, P. (2010) Which is more important for outcome: the physician's or the patient's understanding of a health problem? A 2-year follow-up study in primary care. *General Hospital Psychiatry*, **32**, 1–8.

Galenkamp, H., Van Oers, H.A.M., Kunst, A.E. and Stronks, K. (2019) Is quality of life impairment associated with chronic diseases dependent on educational level? *European Journal of Public Health*, **29**, 634–639.

Gandek, B., Ware, J.E., Aaronson, N.K., Apolone, G., Bjorner, J.B., Brazier, J.E., et al. (1998) Cross-validation of item selection and scoring for the SF-12 Health Survey in nine countries: Results from the IQOLA Project. *Journal of Clinical Epidemiology*, **51**, 1171–1178.

Gannik, D. (2002a) Situational disease: Elements of a social theory of disease based on a study of back trouble. *Scandinavian Journal of Primary Health Care, Supplement*, **20**, 25–30.

Gannik, D.E. (2002b) [Situational perspective of disease. A social theory of disease based on a study of back trouble]. *Ugeskrift for laeger*, **164**, 5230–5234.

Gao, G., Kerr, M.J., Lindquist, R.A., Chi, C.-L., Mathiason, M.A., Austin, R.R., et al. (2018) A strengths-based data capture model: mining data-driven and person-centered health assets. *JAMIA Open*, **1**, 11–14.

García-Moya, I. and Morgan, A. (2016) The utility of salutogenesis for guiding health promotion: the case for young people's well-being. *Health Promotion International* .

George, A. and Rubin, G. (2003) Non-attendance in general practice: A systematic review and its implications for access to primary health care. *Family Practice*, **20**, 178–184.

Gérvas, J., Starfield, B. and Heath, I. (2008) Is clinical prevention better than cure? *The Lancet*, **372**, 1997–1999.

Geyti, C., Christensen, K.S., Dalsgaard, E.M., Bech, B.H., Gunn, J., Maindal, H.T., et al. (2020) Factors associated with non-initiation of mental healthcare after detection of poor mental health at a scheduled health check: A cohort study. *BMJ Open*, **10**.

Geyti, C., Dalsgaard, E.M., Sandbæk, A., Maindal, H.T. and Christensen, K.S. (2018) Initiation and cessation of mental healthcare after mental health screening in primary care: A prospective cohort study. *BMC Family Practice*, **19**, 1–10.

Ghazi, C., Nyland, J., Whaley, R., Rogers, T., Wera, J. and Henzman, C. (2018) Social cognitive or learning theory use to improve self-efficacy in musculoskeletal rehabilitation: A systematic review and meta-analysis. *Physiotherapy Theory and Practice*, **34**, 495–504.

Gidlow, C.J., Ellis, N.J., Riley, V., Chadborn, T., Bunten, A., Iqbal, Z., et al. (2019) Randomised controlled trial comparing uptake of NHS Health Check in response to standard letters, risk-personalised letters and telephone invitations. *BMC Public Health*, **19**, 1–11.

Giesinger, I., Goldblatt, P., Howden-Chapman, P., Marmot, M., Kuh, D. and Brunner, E. (2014) Association of socioeconomic position with smoking and mortality: The contribution of early life circumstances in the 1946 birth cohort. *Journal of Epidemiology and Community Health*, **68**, 275–279.

Gillison, F.B., Rouse, P., Standage, M., Sebire, S.J. and Ryan, R.M. (2019) A meta-analysis of techniques to promote motivation for health behaviour change from a self-determination theory perspective. *Health Psychology Review*, **13**,

110–130.

Grabovschi, C., Loignon, C. and Fortin, M. (2013) Mapping the concept of vulnerability related to health care disparities: a scoping review. *BMC Health Services Research*, **13**, 94.

Groenenberg, I., Crone, M.R., van Dijk, S., Ben Meftah, J., Middelkoop, B.J.C., Assendelft, W.J.J., et al. (2016) Determinants of participation in a cardiometabolic health check among underserved groups. *Preventive Medicine Reports*, **4**, 33–43.

Guassora, A.D. and Baarts, C. (2010) Smoking cessation advice in consultations with health problems not related to smoking? Relevance criteria in Danish general practice consultations. *Scandinavian Journal of Primary Health Care*, **28**, 221–228.

Guassora, A.D. and Gannik, D. (2010) Developing and maintaining patients' trust during general practice consultations: The case of smoking cessation advice. *Patient Education and Counseling*, **78**, 46–52.

H.Antonsky, S.S. (1986) The Development of a Sense of Coherence and Its Impact on responss to Stress Situations. *The Journal of Social Psychology*, **126**, 213–225.

Hagger, M.S. (2009) Theoretical integration in health psychology: Unifying ideas and complementary explanations. *British Journal of Health Psychology*, **14**, 189–194.

Hansen, E., Fonager, K., Freund, K.S.K.S. and Lous, J. (2014) The impact of non-responders on health and lifestyle outcomes in an intervention study. *BMC research notes*, **7**, 1–9.

Haraldstad, K., Wahl, A., Andenæs, R., Andersen, J.R., Andersen, M.H., Beisland, E., et al. (2019) A systematic review of quality of life research in medicine and health sciences. *Quality of Life Research*, **28**, 2641–2650.

Hardcastle, S.J., Hancox, J., Hattar, A., Maxwell-Smith, C., Thøgersen-Ntoumani, C. and Hagger, M.S. (2015) Motivating the unmotivated: how can health behavior be changed in those unwilling to change? *Frontiers in Psychology*, **6**, 1–4.

Hart, J.T., Thomas, C., Gibbons, B., Edwards, C., Hart, M., Jones, J., et al. (1991) Twenty five years of case finding and audit in a socially deprived community. *British Medical Journal*, **302**, 1509–1513.

Van Der Heide, I., Wang, J., Droomers, M., Spreeuwenberg, P., Rademakers, J. and Uiters, E. (2013) The relationship between health, education, and health literacy: Results from the dutch adult literacy and life skills survey. *Journal of Health Communication*, **18**, 172–184.

Henwood, B.F., Derejko, K.S., Couture, J. and Padgett, D.K. (2014) Maslow and Mental Health Recovery: A Comparative Study of Homeless Programs for Adults with Serious Mental Illness. *Administration and Policy in Mental Health and Mental Health Services Research*, 1–9.

Hjermann, I., Holme, I., Byre, K.V. and Leren, P. (1981) Effect of Diet and

Smoking Intervention on the Incidence of Coronary Heart Disease. *The Lancet*, **318**, 1303–1310.

Hjermann, I., Holme, I. and Leren, P. (1986) Oslo study diet and antismoking trial: Results after 102 months. *The American Journal of Medicine*, **80**, 7–11.

Hollnagel, H. and Malterud, K. (1995) Shifting attention from objective risk factors to patients' self- assessed health resources: A clinical model for general practice. *Family Practice*, **12**, 423–429.

Hollnagel, H. and Malterud, K. (2000) From risk factors to health resources in medical practice. *Medicine, health care, and philosophy*, **3**, 257–264.

Housman, J. and Dorman, S. (2005) The alameda county study: A systematic, chronological review. *American Journal of Health Education*, **36**, 302–308.

Hughes, J.C., Bamford, C. and May, C. (2008) Types of centredness in health care: themes and concepts. *Medicine, health care, and philosophy*, **11**, 455–463.

Huisman, M. and Deeg, D.J.H. (2010) A commentary on Marja Jylhä's "What is self-rated health and why does it predict mortality? Towards a unified conceptual model"(69:3, 2009, 307-316). *Social Science and Medicine*, **70**, 652–654.

Hvas, L., Brodersen, J. and Hovelius, B. (2009) Kan Sundhedsvæsenet Skabe Usundhed? [Can the Health Care System Create Unhealthiness?]. Månedsskrift for Prakitisk Lægegerning, Copenhagen-DK Denmark.

Idler, E.L. and Benyamini, Y. (1997) Self-rated health and mortality: a review of twenty-seven community studies. *Journal of health and social behavior*, **38**, 21–37.

Idler, E.L. and Kasl, S. V. (1995) Self-ratings of health: do they also predict change in functional ability? *The journals of gerontology. Series B, Psychological sciences and social sciences*, **50**, S344-53.

Idler, E.L., Kasl, S. V and Lemke, J.H. (1990) Self-evaluated health and mortality among the elderly in New Haven, Connecticut, and Iowa and Washington counties, Iowa, 1982-1986. *American journal of epidemiology*, **131**, 91–103.

International Conference on Primary Health Care. (1978) Declaration of the Alma-Ata.

Jayasinghe, U.W., Harris, M.F., Parker, S.M., Litt, J., van Driel, M., Mazza, D., et al. (2016) The impact of health literacy and life style risk factors on health-related quality of life of Australian patients. *Health and Quality of Life Outcomes*, **14**, 1–13.

Jensen, E. (2018) Effect on Mental, Phsysical,Social and Self-Evaluted Health after One or Two Preventive Health Consultations with Own GP Measured by SF-12. University of Aalborg, Denmark.

Jepson, R.G., Harris, F.M., Platt, S. and Tannahill, C. (2010) The effectiveness of interventions to change six health behaviours: a review of reviews. *BMC public health*, **10**, 538.

Johnson, J.A. and Coons, S.J. (1998) Comparison of the EQ-5D and SF-12 in an

adult US sample. *Quality of Life Research*, **7**, 155–166.

Johnson, J.A. and Pickard, A.S. (2000) Comparison of the EQ-5D and SF-12 health surveys in a general population survey in Alberta, Canada. *Medical Care*, **38**, 115–121.

Jones, G.T., Jones, E.A., Beasley, M.J. and Macfarlane, G.J. (2017) Investigating generalizability of results from a randomized controlled trial of the management of chronic widespread pain: The MUSICIAN study. *Pain*, **158**, 96–102.

Jørgensen, T., Borch-Johnsen, K., Thomsen, T.F., Ibsen, H., Glümer, C. and Pisinger, C. (2003) A randomized non-pharmacological intervention study for prevention of ischaemic heart disease: baseline results Inter99 (1). *European Journal of Cardiovascular Prevention & Rehabilitation*, **10**, 377–386.

Jørgensen, T., Jacobsen, R.K., Toft, U., Aadahl, M., Glümer, C. and Pisinger, C. (2014) Effect of screening and lifestyle counselling on incidence of ischaemic heart disease in general population: Inter99 randomised trial. *BMJ (Online)*, **348**, 1–11.

Jylhä, M. (2009) What is self-rated health and why does it predict mortality? Towards a unified conceptual model. *Social Science and Medicine*, **69**, 307–316.

Kamper-Jørgensen, F. (1984) Generelle helbredsundersøgelser. [General Health examinations]. *Ugeskrift for laeger*, **146**, 2323–4.

Kamstrup-Larsen, N., Dalton, S.O., Broholm-Jørgensen, M., Larsen, L.B., Thomsen, J.L., Johansen, C., et al. (2019a) Using general practitioners to recruit individuals with low socioeconomic position to preventive health checks is feasible: a cross sectional study. *Scandinavian Journal of Primary Health Care*, **37**, 294–301.

Kamstrup-Larsen, N., Dalton, S.O., Grønbæk, M., Broholm-Jørgensen, M., Thomsen, J.L., Larsen, L.B., et al. (2019b) The effectiveness of general practice-based health checks on health behaviour and incidence on non-communicable diseases in individuals with low socioeconomic position: A randomised controlled trial in Denmark. *BMJ Open*, **9**, 1–11.

Kaplan, G.A. and Camacho, T. (1983) Perceived health and mortality: A nine-year follow-up of the human population laboratory cohort. *American Journal of Epidemiology*, **117**, 292–304.

Karlsen, T.I., Søhagen, M. and Hjelmesæth, J. (2013) Predictors of weight loss after an intensive lifestyle intervention program in obese patients: A 1-year prospective cohort study. *Health and Quality of Life Outcomes*, **11**, 1–9.

Karmali, K., Persell, S., Perel, P., Lloyd-jones, D., Berendsen, M. and Huffman, M. (2017) Risk Scoring for the Primary Prevention of Cardiovascular Disease (Review).

Katz, A.S., Hardy, B.J., Firestone, M., Lofters, A. and Morton-Ninomiya, M.E. (2020) Vagueness, power and public health: use of 'vulnerable' in public health literature. *Critical Public Health*, **30**, 601–611.

Kawachi, I. and Berkman, L.F. (2001) Social ties and mental health. *Journal of Urban Health*, **78**, 458–467.

Kjeldmand, D., Holmström, I. and Rosenqvist, U. (2004) Balint training makes GPs thrive better in their job. *Patient Education and Counseling*, **55**, 230–235.

Kjeldsen, P. (1987) Samtalens teknik og psykologi : fragmenter af en helhed. [The technique and psychology of the conversation]., 1. udgave,. Adapta, Vestbjerg.

Kjoeller, M., Rasmussen, N. and Al., E. (1995) Sundhed Og Sygelighed i Danmark 1994 - Og Udviklingen Siden 1987 [Health and Illness in Denmark 1994]. DIKE, Copenhagen-DK,Denmark.

Klein, S., Burke, L.E., Bray, G.A., Blair, S., Allison, D.B., Pi-Sunyer, X., et al. (2004) Clinical implications of obesity with specific focus on cardiovascular disease: A statement for professionals from the American Heart Association Council on Nutrition, Physical Activity, and Metabolism. *Circulation*, **110**, 2952–2967.

Kok, G., de Vries, H., Mudde, A.N. and Strecher, V.J. (1991) Planned health education and the role of self-efficacy: Dutch research. *Health Education Research* , **6**, 231–238.

Kotler, P. and Wingard, D.L. (1989) The effect of occupational, marital and parental roles on mortality: the Alameda County Study. *American journal of public health*, **79**, 607–612.

Krause, N.M. and Jay, G.M. (1994) What Do Global Self-Rated Health Items Measure ? *Medical care*, **32**, 930–942.

Kristén, L., Ivarsson, A., Parker, J. and Ziegert, K. (2015) Future challenges for intervention research in health and lifestyle research-A systematic meta-literature review. *International Journal of Qualitative Studies on Health and Well-being*, **10**.

Kristensen, M.A.T., Hølge-Hazelton, B., Waldorff, F.B. and Guassora, A.D. (2017) How general practitioners perceive and assess self-care in patients with multiple chronic conditions: A qualitative study. *BMC Family Practice*, **18**, 1–10.

Kristenson, M., Eriksen, H.., Sluiter, J.., Starke, D. and Ursin, H. (2004) Psychobiological mechanisms of socioeconomic differences in health. *Social Science & Medicine*, **58**, 1511–1522.

Krogsbøll, L.T., Jørgensen, K.J. and Gøtzsche, P.C. (2019) General Health Checks in Adults for Reducing Morbidity and Mortality from Disease (Review).

Kubzansky, L.D., Huffman, J.C., Boehm, J.K., Hernandez, R., Kim, E.S., Koga, H.K., et al. (2018) Positive Psychological Well-Being and Cardiovascular Disease. *Journal of the American College of Cardiology*, **72**, 1382–1396.

Kudielka, B.M., Hanebuth, D., Von Känel, R., Gander, M.L., Grande, G. and Fischer, J.E. (2005) Health-related quality of life measured by the SF12 in working populations: Associations with psychosocial work characteristics. *Journal of Occupational Health Psychology*, **10**, 429–440.

Kunst, A.E., Bos, V., Lahelma, E., Bartley, M., Lissau, I., Regidor, E., et al. (2005)

Trends in socioeconomic inequalities in self-assessed health in 10 European countries. *International journal of epidemiology*, **34**, 295–305.

Kwaśniewska, M., Kaleta, D., Dziankowska-Zaborszczy, E., Drygas, W. and Makowiec-Dąbrowska, T. (2007) Lifestyle index and self-rated health status. *International Journal of Occupational Medicine and Environmental Health*, **20**, 349–356.

Langberg, E.M., Dyhr, L. and Davidsen, A.S. (2019) Development of the concept of patient-centredness – A systematic review. *Patient Education and Counseling*, **102**, 1228–1236.

Larsen, L.B., Sondergaard, J., Thomsen, J.L., Halling, A., Sønderlund, A.L., Christensen, J.R., et al. (2019) Step-wise approach to prevention of chronic diseases in the Danish primary care sector with the use of a personal digital health profile and targeted follow-up- An assessment of attendance. *BMC Public Health*, **19**, 1–14.

Lauritzen, T., Ager Jensen, M.S., Thomsen, J.L., Christensen, B. and Engberg, M. (2008) Health tests and health consultations reduced cardiovascular risk without psychological strain, increased healthcare utilization or increased costs: An overview of the results from a 5-year randomized trial in primary care. The Ebeltoft Health Promotion P. *Scandinavian Journal of Public Health*, **36**, 650–661.

Lauritzen, T., Leboeuf-Yde, C., Lunde, I.M. and Nielsen, K.D. (1995) Ebeltoft project: baseline data from a five-year randomized, controlled, prospective health promotion study in a Danish population. *The British journal of general practice : the journal of the Royal College of General Practitioners*, **45**, 542–547.

Layes, A., Asada, Y. and Kepart, G. (2012) Whiners and deniers - What does self-rated health measure? *Social Science and Medicine*, **75**, 1–9.

Lee, L.O., James, P., Zevon, E.S., Kim, E.S., Trudel-Fitzgerald, C., Spiro, A., et al. (2019) Optimism is associated with exceptional longevity in 2 epidemiologic cohorts of men and women. *Proceedings of the National Academy of Sciences*, **116**, 18357–18362.

Levenstein, J.H., McCracken, E.C., McWhinney, I.R., Stewart, M.A. and Brown, J.B. (1986) The patient-centred clinical method. 1. A model for the doctor-patient interaction in family medicine. *Family practice*, **3**, 24–30.

Lindberg, L.G., Thorsen, T. and Reventlow, S.D. (2011) Arbejdet Med Sårbare Patienter Og Perspektiver På Social Ulighed i Almen Praksis : En Fokusgruppeundersøgelse Med Alment Praktiserende Læger i København, Odense Og Århus [Work with Vulnerable Patients and Perspectives on Social Inequality in General Pract. Forskningsenheden for Almen Praksis, København.

Lindbladh, E. and Lyttkens, C.H. (2002) Habit versus choice: the process of decision-making in health-related behaviour. *Social science & medicine (1982)*, **55**, 451–465.

Lindström, J., Ilanne-Parikka, P., Peltonen, M., Aunola, S., Eriksson, J.G., Hemiö, K., et al. (2006) Sustained reduction in the incidence of type 2 diabetes by lifestyle intervention: follow-up of the Finnish Diabetes Prevention Study. *Lancet*, **368**, 1673–1679.

Linge, A.D., Bjørkly, S.K., Jense, C. and Hasle, B. (2021a) Bandura ' s Self-Efficacy Model Used to Explore Participants ' Experiences of Health , Lifestyle , and Work After Attending a Vocational Rehabilitation Program with Lifestyle Intervention – A Focus Group Study. *Journal of Multidisciplinary Healthcare*, **14**, 3533–3548.

Linge, A.D., Jensen, C., Laake, P. and Bjørkly, S.K. (2021b) Changes to body mass index, work self-efficacy, health-related quality of life, and work participation in people with obesity after vocational rehabilitation: a prospective observational study. *BMC Public Health*, **21**, 1–11.

Liu, B., Floud, S., Pirie, K., Green, J., Peto, R. and Beral, V. (2016) Does happiness itself directly affect mortality? the prospective UK Million Women Study. *The Lancet*, **387**, 874–881.

Lloyd, J., Bond, W. and Flaxman, P.E. (2017) Work-related self-efficacy as a moderator of the impact of a worksite stress management training intervention: Intrinsic work motivation as a higher order condition of effect. *Journal of Occupational Health Psychology*, **22**, 115–127.

MacDonald, C.S., Nielsen, S.M., Bjørner, J., Johansen, M.Y., Christensen, R., Vaag, A., et al. (2021) One-year intensive lifestyle intervention and improvements in health-related quality of life and mental health in persons with type 2 diabetes: a secondary analysis of the U-TURN randomized controlled trial. *BMJ Open Diabetes Research & Care*, **9**, 1–11.

Macintyre, S. (2000) The social patterning of exercise behaviours: The role of personal and local resources. *British Journal of Sports Medicine*, **34**, 6.

Mackenbach, J.P. (2012) The persistence of health inequalities in modern welfare states: The explanation of a paradox. *Social Science and Medicine*, **75**, 761–769.

Mackenbach, J.P., Rubio Valverde, J., Bopp, M., Brønnum-Hansen, H., Costa, G., Deboosere, P., et al. (2019) Progress against inequalities in mortality: register-based study of 15 European countries between 1990 and 2015. *European Journal of Epidemiology*, **34**, 1131–1142.

Mackenbach, J.P., Stirbu, I., Roskam, A.J.R., Schaap, M.M., Menvielle, G., Leinsalu, M., et al. (2008) Socioeconomic inequalities in health in 22 European countries. *New England Journal of Medicine*, **358**, 2468–2481.

Maindal, H.T. and Aagaard-Hansen, J. (2020) Health literacy meets the life-course perspective: towards a conceptual framework. *Global Health Action*, **13**, 0–4.

Maindal, H.T., Kayser, L., Norgaard, O., Bo, A., Elsworth, G.R. and Osborne, R.H. (2016) Cultural adaptation and validation of the Health Literacy Questionnaire (HLQ): robust nine-dimension Danish language confirmatory factor model. *SpringerPlus*, **5**.

Malouff, J.M. and Schutte, N.S. (2017) Can psychological interventions increase optimism? A meta-analysis. *The Journal of Positive Psychology*, **12**, 594–604.

Malterud, K. (1994) Key questions - a strategy for modifying clinical communication transforming tacit skills into a clinical method. *Scandinavian Journal of Primary Health Care*, **12**, 121–127.

Malterud, K. (2003) [Qualitative Methods in Medical Research]Kvalitative Metoder i Medicinsk Forskning. Universitetsforlaget AS, 0105 Oslo, Oslo, N- Norway.

Malterud, K. (2011) Qualitative Methods in Medical Science] Kvalitative Metoder i Medisinsk Forskning : En Innføring, 3. utgave. Universitetsforlaget, N-0105 Oslo, Oslo, N- Norway.

Malterud, K. (2012) Systematic text condensation: a strategy for qualitative analysis. *Scandinavian journal of public health*, **40**, 795–805.

Malterud, K. and Hollnagel, H. (1997) Women's self-assessed personal health resources. *Scandinavian Journal of Primary Health Care*, **15**, 163–168.

Malterud, K., Hollnagel, H. and Witt, K. (2001) Gendered health resources and coping - A study from general practice. *Scandinavian Journal of Public Health*, **29**, 183–188.

Manderbacka, K., Lundberg, O. and Martikainen, P. (1999) Do risk factors and health behaviours contribute to self- ratings of health? *Social Science and Medicine*, **48**, 1713–1720.

Martikainen, P., Blomgren, J. and Valkonen, T. (2007) Change in the total and independent effects of education and occupational social class on mortality: Analyses of all Finnish men and women in the period 1971-2000. *Journal of Epidemiology and Community Health*, **61**, 499–505.

Martin, A., Saunders, C.L., Harte, E., Griffin, S.J., MacLure, C., Mant, J., et al. (2018) Delivery and impact of the NHS Health Check in the first 8 years: a systematic review. *British Journal of General Practice*, **68**, e449–e459.

Maslow, A.H. (1943) A theory of human motivation. *Psychological Review*, **50**, 370–396.

McCracken, E.C., Stewart, M.A., Brown, J.B. and McWhinney, I.R. (1983) Patient-centred care: the family practice model. *Canadian family physician Medecin de famille canadien*, **29**, 2313–236.

McFadden, E., Luben, R., Wareham, N., Bingham, S. and Khaw, K.T. (2008) Occupational social class, risk factors and cardiovascular disease incidence in men and women: A prospective study in the European Prospective Investigation of Cancer and Nutrition in Norfolk (EPIC-Norfolk) cohort. *European Journal of Epidemiology*, **23**, 449–458.

McWhinney, I.R. (1993) Why we need a new clinical method. *Scandinavian journal of primary health care*, **11**, 3–7.

Mead, N. and Bower, P. (2000) Measuring patient-centredness: A comparison of three observation-based instruments. *Patient Education and Counseling*, **39**, 71–80.

Mead, N., Bower, P. and Hann, M. (2002) The impact of general practitioners' patient-centredness on patients' post-consultation satisfaction and enablement. *Social Science and Medicine*, **55**, 283–299.

Meillier, L.K., Nielsen, K.M., Larsen, F.B. and Larsen, M.L. (2012) Socially differentiated cardiac rehabilitation: can we improve referral, attendance and adherence among patients with first myocardial infarction? *Scandinavian journal of public health*, **40**, 286–293.

Mercer, S.W., Cawston, P.G. and Bikker, A.P. (2007) Quality in general practice consultations; a qualitative study of the views of patients living in an area of high socio-economic deprivation in Scotland. *BMC family practice*, **8**, 22.

Mercer, S.W., Higgins, M., Bikker, A.M., Fitzpatrick, B., McConnachie, A., Lloyd, S.M., et al. (2016) General practitioners' empathy and health outcomes: A prospective observational study of consultations in areas of high and low deprivation. *Annals of Family Medicine*, **14**, 117–124.

Mercer, S.W. and Howie, J.G.R. (2006) CQ1-2 - A new measure of holistic interpersonal care in primary care consultations. *British Journal of General Practice*, **56**, 262–268.

Mercer, S.W. and Watt, G.C.M. (2007) The inverse care law: Clinical primary care encounters in deprived and affluent areas of Scotland. *Annals of Family Medicine*, **5**, 503–510.

Mildestvedt, T., Herikstad, V. V., Undheim, I., Bjorvatn, B. and Meland, E. (2018) Factors associated with self-rated health in primary care. *Scandinavian Journal of Primary Health Care*, **36**, 317–322.

Mittelmark, M.B. and Bull, T. (2013) The salutogenic model of health in health promotion research. *Global health promotion*, **20**, 30–38.

Moher, D., Schulz, K.F., Altman, D. and CONSORT Group. (2005) The CONSORT Statement: revised recommendations for improving the quality of reports of parallel-group randomized trials 2001. *Explore (New York, N.Y.)*, **1**, 40–5.

Mokkink, L.B., Prinsen, C.A.C., Patrick, D.L., Alonso, J., Bouter, L.M., De Vet, H.C.W., et al. (2018) COSMIN methodology for systematic reviews of Patient - Reported Outcome Measures (PROMs). User Manual. , 1–78.

Møller, L., Kristensen, T.S. and Hollnagel, H. (1996) Self rated health as a predictor of coronary heart disease in Copenhagen, Denmark. *Journal of Epidemiology and Community Health*, **50**, 423–428.

Monsen, K.A., Peters, J., Schlesner, S., Vanderboom, C.E. and Holland, D.E. (2015) The Gap in Big Data: Getting to Wellbeing, Strengths, and a Whole-person Perspective. *Global Advances in Health and Medicine*, **4**, 31–39.

Moore, G.F., Audrey, S., Barker, M., Bond, L., Bonell, C., Hardeman, W., et al. (2015) Process evaluation of complex interventions: Medical Research Council guidance. *BMJ (Online)*, **350**, 1–7.

Moore, G.F. and Evans, R.E. (2017) What theory, for whom and in which context? Reflections on the application of theory in the development and evaluation of complex population health interventions. *SSM - Population Health*, **3**, 132–

135.

Moreno-Peral, P., Conejo-Cerón, S., Fernández, A., Berenguera, A., Martínez-Andrés, M., Pons-Vigués, M., et al. (2015) Primary Care Patients' Perspectives of Barriers and Enablers of Primary Prevention and Health Promotion—A Meta-Ethnographic Synthesis. *Plos One*, **10**, e0125004.

Mossey, J.M. and Shapiro, E. (1982) Self-rated health: a predictor of mortality among the elderly. *American Journal of Public Health*, **72**, 800–808.

Naaldenberg, J., Tobi, H., van den Esker, F. and Vaandrager, L. (2011) Psychometric properties of the OLQ-13 scale to measure Sense of Coherence in a community-dwelling older population. *Health and Quality of Life Outcomes*, **9**, 37.

Niederdeppe, J., Fiore, M.C., Baker, T.B. and Smith, S.S. (2008) Smoking-cessation media campaigns and their effectiveness among socioeconomically advantaged and disadvantaged populations. *American Journal of Public Health*, **98**, 916–924.

Nielsen, K.B., Dyhr, L., Lauritzen, T. and Malterud, K. (2004) "You can't prevent everything anyway." *Family Practice*, **21**, 28–32.

Nielsen, K.B., Dyhr, L., Lauritzen, T. and Malterud, K. (2009) '" Couldn " t you have done just as well without the screening ?'' A qualitative study of benefits from screening as perceived by people without a high cardiovascular risk score. *Scandinavian Journal of Primary Health Care*, **27**, 111–116.

Nielsen, A.B.S., Jensen, P., Gannik, D., Reventlow, S., Hollnagel, H. and Olivarius, N.D.F. (2015) Change in self-rated general health is associated with perceived illness burden: A 1-year follow up of patients newly diagnosed with type 2 diabetes Disease epidemiology - Chronic. *BMC Public Health*, **15**, 1–11.

Nielsen, J.B., Leppin, A., Gyrd-Hansen, D. e., Jarbøl, D.E., Søndergaard, J. and Larsen, P.V. (2017) Barriers to lifestyle changes for prevention of cardiovascular disease - a survey among 40-60-year old Danes. *BMC Cardiovascular Disorders*, **17**, 1–8.

Nutbeam, D. and Kickbusch, I. (1998) Health promotion glossary. *Health Promotion International*, **13**, 349–364.

Nygaard Christoffersen, M. and Socialforskningsinstituttet. (1996a) Opvækst Med Arbejdsløshed : En Forløbsundersøgelse Af de to Generationer Født 1966 Og 1973. [Growing-up with Unemployment; Examined in Two Generations, Born 1966 and 1973]. Socialforskningsinstituttet, Kbh.

Nygaard Christoffersen, M. and Socialforskningsinstituttet. (1996b) Opvækst Hos Fædre : En Sammenligning Af 3-5-Årige Børns Opvækst Hos Fædre Og Mødre.[Growing-up with Single Fathers for 3-5 Years-Old Children]. Socialforskningsinstituttet, Kbh.

Olesen, S.C., Butterworth, P., Leach, L.S., Kelaher, M. and Pirkis, J. (2013) Mental health affects future employment as job loss affects mental health: Findings from a longitudinal population study. *BMC Psychiatry*, **13**, 1.

van Oort, F.V.A. (2005) Material, psychosocial, and behavioural factors in the

explanation of educational inequalities in mortality in the Netherlands. *Journal of Epidemiology & Community Health*, **59**, 214–220.

Osborne, R.H., Batterham, R.W., Elsworth, G.R., Hawkins, M. and Buchbinder, R. (2013) The grounded psychometric development and initial validation of the Health Literacy Questionnaire (HLQ). *BMC Public Health*, **13**, 1–17.

Patnode, C., Evans, C., Senger, C., Redmond, N. and Lin, J. (2017) Behavioral Counseling to Promote a Healthful Diet and Physical Activity for Cardiovascular Disease Prevention in Adults Without Known Cardiovascular Disease Risk Factors: Updated Systematic Review for the U.S. Preventive Services Task Force [Internet], 15th ed. U.S. Preventive Services Task Force Evidence Syntheses,.

Pedrana, L., Pamponet, M., Walker, R., Costa, F. and Rasella, D. (2016) Scoping review: National monitoring frameworks for social determinants of health and health equity. *Global Health Action*, **9**, 1–10.

Pega, F., Blakely, T., Carter, K. and Sjöberg, O. (2012) The explanation of a paradox? A commentary on Mackenbach with perspectives from research on financial credits and risk factor trends. *Social Science and Medicine*, **75**, 770–773.

Pescheny, J., Randhawa, G. and Pappas, Y. (2018) Patient uptake and adherence to social prescribing: a qualitative study. *BJGP Open*, bjgpopen18X101598.

Pill, R., French, J., Harding, K., Stott, N., McWhinney, I.R., Idler, E.L., et al. (1993) Lingua Medica: Rethinking Somatization. *The Journal of the Royal College of General Practitioners*, **38**, 747.

Pill, R. and Stott, N. (1988) Invitation to attend a health check in a general practice setting: the views of a cohort of non-attenders. *The Journal of the Royal College of General Practitioners*, **38**, 57–60.

Pisinger, C., Aadahl, M., Toft, U. and Jørgensen, T. (2011) Motives to quit smoking and reasons to relapse differ by socioeconomic status. *Preventive Medicine*, **52**, 48–52.

Pisinger, C., Vestbo, J., Borch-Johnsen, K. and Jorgensen, T. (2005a) It is possible to help smokers in early motivational stages to quit . The Inter99 study . *Preventive Medicine*, **40**, 278–284.

Pisinger, C., Vestbo, J., Borch-johnsen, K., Thomsen, T. and Jørgensen, T. (2005b) Acceptance of the smoking cessation intervention in a large population-based study : The Inter99 study. *Scandinavian Journal of Public Health*, **33**, 138–145.

Pittler, M.H., Blümle, A., Meerpohl, J.J. and Antes, G. (2011) CONSORT 2010 statement: Updated guidelines for reporting parallel group randomised trials. *Deutsche Medizinische Wochenschrift*, **136**.

Popay, J., Kowarzik, U., Mallinson, S., Mackian, S. and Barker, J. (2007) Social problems, primary care and pathways to help and support: Addressing health inequalities at the individual level. Part I: The GP perspective. *Journal of Epidemiology and Community Health*, **61**, 966–971.

Primdahl, J., Wagner, L., Holst, R. and Hørslev-Petersen, K. (2012) The impact on self-efficacy of different types of follow-up care and disease status in patients with rheumatoid arthritis-A randomized trial. *Patient Education and Counseling*, **88**, 121–128.

Prochaska, J.O., Diclemente, C.C. and Norcross, J.C. (1992) In Search of How People Change Applications to Addictive Behaviors. *American Psychologist*, **47**, 1102–1114.

Prochaska, J.O., Diclemente, C.C. and Norcross, J.C. (1993) In search of how people change: Applications to addictive behaviors. *Journal of Addictions Nursing*, **5**, 2–16.

Prochaska, J.O., DiClemente, C.C., Velicer, W.F., Ginpil, S. and Norcross, J.C. (1985) Predicting change in smoking status for self-changers. *Addictive Behaviors*, **10**, 395–406.

Prochaska, J.O., Velicer, W.F., DiClemente, C.C. and Fava, J. (1988) Measuring Processes of Change: Applications to Cessation of Smoking. *Journal ofConsultiing and Clinical Psychology*, **56**, 520–528.

Rasmussen, N.K. (1988) Sundhed & Sygelighed i Danmark 1987 : En Rapport Fra DIKEs Undersøgelse [Health and Illness in Denmark 1987]. Dansk Institut for Klinisk Epidemiologi, DIKE, Kbh.

Rasmussen, N.K. (1993) Evaluering Af Forebyggende Helbredsundersøgelser/Samtaler i Nordjyllands Amt. [Evaluation of Preventive Health-Examinations/Conversations in the County of Northern Jutland]. DIKE, Dansk Institut for Klinisk Epidemiologi, Kbh.

Reeve, J., Dowrick, C.F., Freeman, G.K., Gunn, J., Mair, F., May, C., et al. (2013) Examining the practice of generalist expertise: a qualitative study identifying constraints and solutions. *JRSM short reports*, **4**, 2042533313510155.

Reynold, P. and Kaplan, G.A. (1990) Social Connections and Risk for Cancer: Prospective Evidence from the Alameda Conuty Study. *Behav Med*, **31**, 101–110.

Rico-Uribe, L.A., Caballero, F.F., Olaya, B., Tobiasz-Adamczyk, B., Koskinen, S., Leonardi, M., et al. (2016) Loneliness, social networks, and health: A cross-sectional study in three countries. *PLoS ONE*, **11**, 1–18.

Roberts, R.E., Kaplan, G.A. and Camacho, T.C. (1990) Psychological distress and mortality: evidence from the Alameda County Study. *Social science & medicine (1982)*, **31**, 527–536.

Rogers, C. (1952) Client-centered psychotherapy. *Sci Am*, **187**, 1–7.

Rogers, W., MacKenzie, C. and Dodds, S. (2012) Why bioethics needs a concept of vulnerability. *International Journal of Feminist Approaches to Bioethics*, **5**, 11–38.

Rollnick, S. and Miller, W.R. (1995) What is Motivational Interviewing? *Behavioural and Cognitive Psychotherapy*, **23**, 325–334.

Rozanski, A., Bavishi, C., Kubzansky, L.D. and Cohen, R. (2019) Association of Optimism With Cardiovascular Events and All-Cause Mortality: A Systematic

Review and Meta-analysis. *JAMA network open*, **2**, e1912200.

RTLN . PLO. (2021) OK22 Collective Agreemenet for General Practitioners DK 2022.

Rubak, S., Sandbaek, A., Lauritzen, T., Christensen, B., Miller, W., Rollnick, S., et al. (2005) Motivational interviewing: a systematic review and meta-analysis. *The British journal of general practice : the journal of the Royal College of General Practitioners*, **55**, 305–12.

Ruiz-Moral, R., Perula de Torres, L.A. and Jaramillo-Martin, I. (2007) The effect of patients' met expectations on consultation outcomes. A study with family medicine residents. *Journal of general internal medicine*, **22**, 86–91.

Ryan, R. and Deci, E. (2000) Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American psychologist*, **55**, 68–78.

Ryan, R.M. and Deci, E.L. (2006) Self-regulation and the problem of human autonomy: Does psychology need choice, self-determination, and will? *Journal of Personality*, **74**, 1557–1585.

Saether, E.A. (2020) Creativity-Contingent Rewards, Intrinsic Motivation, and Creativity: The Importance of Fair Reward Evaluation Procedures. *Frontiers in Psychology*, **11**, 1–9.

Salmon, P., Dowrick, C.F., Ring, A. and Humphris, G.M. (2004) Voiced but unheard agendas: Qualitative analysis of the psychosocial cues that patients with unexplained symptoms present to general practitioners. *British Journal of General Practice*, **54**, 171–176.

Seeman, T.E., Kaplan, G.A., Knudsen, L., Cohen, R. and Guralnik, J. (1987) Social network ties and mortality among elderly in the Alameda County Study. *American Journal of Epidemiology*, **126**, 714–723.

Sentell, T., Zhang, W., Davis, J., Baker, K.K. and Braun, K.L. (2014) The influence of community and individual health literacy on self-reported health status. *Journal of General Internal Medicine*, **29**, 298–304.

Shi, L., Macinko, J., Starfield, B., Wulu, J., Regan, J. and Politzer, R. (2003) The relationship between primary care, income inequality, and mortality in US States, 1980-1995. *Journal of the American Board of Family Practice*, **16**, 412–422.

Shi, L., Starfield, B., Politzer, R. and Regan, J. (2002) Primary care, self-rated health, and reductions in social disparities in health. *Health Services Research*, **37**, 529–550.

Shippee, N.D., Shah, N.D., May, C.R., Mair, F.S. and Montori, V.M. (2012) Cumulative complexity: A functional, patient-centered model of patient complexity can improve research and practice. *Journal of Clinical Epidemiology*, **65**, 1041–1051.

Soot, L., Freund, K.S., Lous, J., Vass, M. and Hvas, L. (2018) How younger adults with psychosocial problems experienced person-centered health consultations. *Patient Experience Journal*, **5**, 116–122.

Sørensen, K., Pelikan, J.M., Röthlin, F., Ganahl, K., Slonska, Z., Doyle, G., et al. (2015) Health literacy in Europe: Comparative results of the European health literacy survey (HLS-EU). *European Journal of Public Health*, **25**, 1053–1058.

Starfield, B. (2011) Is patient-centered care the same as person-focused care? *The Permanente journal*, **15**, 63–69.

Starfield, B., Shi, L. and Macinko, J. (2005) Contribution of primary care to health systems and health. *Milbank Quarterly*, **83**, 457–502.

Sternhagen Nielsen, A.B., Siersma, V., Conradsen Hiort, L., Kreiner, S., Drivsholm, T. and Hollnagel, H. (2008) Self-rated general health among 40-year-old Danes and its association with all-cause mortality at 10-, 20-, and 29 years' follow-up. *Scandinavian Journal of Public Health*, **36**, 3–11.

Stevens, J., Truesdale, K.P., McClain, J.E. and Cai, J. (2006) The definition of weight maintenance. *International Journal of Obesity*, **30**, 391–399.

Stewart, M., Brown, J.B., Donner, A., McWhinney, I.R., Oates, J., Weston, W.W., et al. (2000) The impact of patient-centered care on outcomes. *The Journal of family practice*, **49**, 796–804.

Stewart, M.A., McWhinney, I.R. and Buck, C.W. (1979) The doctor/patient relationship and its effect upon outcome. *Journal of the Royal College of General Practitioners*, **29**, 77–81.

Strack, F. and Deutsch, R. (2004) Reflective and impulsive determinants of social behavior. *Personality and social psychology review : an official journal of the Society for Personality and Social Psychology, Inc*, **8**, 220–247.

Strand, B.H., Grøholt, E.K., Steingrímsdóttir, Ó.A., Blakely, T., Graff-Iversen, S. and Næss, Ø. (2010) Educational inequalities in mortality over four decades in Norway: Prospective study of middle aged men and women followed for cause specific mortality, 1960-2000. *BMJ (Online)*, **340**, 582.

Stranden, E., Gundersen, I.F., Getz, L., Kirkengen, A.L., Hagen, K.B. and Mjølstad, B.P. (2020) Adverse life experiences among patients with morbid obesity. *Tidsskrift for den Norske laegeforening*, **140**.

Strawbridge, W.J., Cohen, R.D. and Shema, S.J. (2000) Comparative strength of association between religious attendance and survival. *International journal of psychiatry in medicine*, **30**, 299–308.

Strawbridge, W.J. and Wallhagen, M.I. (1999) Self-rated health and mortality over three decades: Results from a time- dependent covariate analysis. *Research on Aging*, **21**, 402–416.

Street, R.L., Gordon, H. and Haidet, P. (2007) Physicians' communication and perceptions of patients: Is it how they look, how they talk, or is it just the doctor? *Social Science and Medicine*, **65**, 586–598.

Sundhedsdatastyrelsen [The Danish Health Data Authority]. (2016) Beskrivelse Af Almen Praksissektoren i Danmark. [Description of General Practice Denmark].

Sundhedsstyrelsen. (2020) Social Ulighed i Sundhed Og Sygdom 2010-2017.[Social

Inequality in Health and Illness] (eds C Udesen, C Skaarup, M Petersen, A Ersbøll, and U of S Denmark). Sundhedsstyrelsen, Copenhagen-DK Denmark.

Sundhedsstyrelsen and Danish Health Authority. (2011) Ulighed i Sundhed - Årsager Og Indsatser. [Inequality in Health- Reasons and Efforts]. Copenhagen-DK Denmark.

Sundquist, J. and Johansson, S.E. (1997) Self reported poor health and low educational level predictors for mortality: A population based follow up study of 39,156 people in Sweden. *Journal of Epidemiology and Community Health*, **51**, 35–40.

Tay, L. and Diener, E. (2011) Needs and subjective well-being around the world. *Journal of personality and social psychology*, **101**, 354–365.

Thorogood, M., Coulter, A., Jones, L., Yudkin, P., Muir, J. and Mant, D. (1993) Factors affecting response to an invitation to attend for a health check. *Journal of epidemiology and community health*, **47**, 224–228.

Tolonen, H., Kuulasmaa, K., Ahonen, S., Jentoft, S. and Heldal, J. (2015) Differences in participation rates and lessons learned about recruitment of participants - The European Health Examination Survey Pilot Project. *Scandinavian Journal of Public Health*, **43**, 212–219.

Turk, M.W., Yang, K., Hravnak, M., Sereika, S.M., Ewing, L.J. and Burke, L.E. (2009) Randomized Clinical Trials of Weight Loss Maintenance:A Review. *Journal of Cardiovascular Nursing*, **24**, 58–80.

Ul-Haq, Z., Mackay, D.F., Fenwick, E. and Pell, J.P. (2013) Meta-analysis of the association between body mass index and health-related quality of life among adults, assessed by the SF-36. *Obesity*, **21**, 322–327.

Vancouver, J.B., Thompson, C.M. and Williams, A.A. (2001) The changing signs in the relationships among self-efficacy, personal goals, and performance. *Journal of Applied Psychology*, **86**, 605–620.

Vejen, M., Bjorner, J.B., Bestle, M.H., Lindhardt, A. and Jensen, J.U. (2017) Self-Rated Health as a Predictor of Death after Two Years: The Importance of Physical and Mental Wellbeing Postintensive Care. *BioMed Research International*, **2017**.

Verlinde, E., De Laender, N., De Maesschalck, S., Deveugele, M., Willems, S., Field, K., et al. (2012) The social gradient in doctor-patient communication. *International Journal for Equity in Health*, **11**, 12.

Waller, D., Agass, M., Mant, D., Coulter, A., Fuller, A. and Jones, L. (1990) Health checks in general practice: Another example of inverse care? *British Medical Journal*, **300**, 1115–1118.

Ware, J.E. (2000) SF-36 Health Survey Update. *Spine*, **25**, 3130–3139.

Ware, J.E. and Gandek, B. (1998) Overview of the SF-36 Health Survey and the International Quality of Life Assessment (IQOLA) Project. *Journal of Clinical Epidemiology*, **51**, 903–912.

Ware, J., Kosinski, M. and Keller, S. (1998) SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales, 3rd ed. QualityMeteric

Inc.:Health Assesment Lab, Lincoln, RI,US.

Weires, M., Bermejo, J.L., Sundquist, K., Sundquist, J. and Hemminki, K. (2008) Socio-economic status and overall and cause-specific mortality in Sweden. *BMC Public Health*, **8**, 1–14.

Whitelaw, S., Baldwin, S., Bunton, R. and Flynn, D. (2000) The status of evidence and outcomes in Stages of Change research. *Health Education Research*, **15**, 707–718.

WHO and Commision on Social Determinants of Health. (2008) Closing the Gap in a Generation:Health Equity through Action on the Social Determinants of Health. Final Report of the Commission on Social Determinants of Health. Geneva.

Williams, G.C., McGregor, H., Sharp, D., Kouides, R.W., Lévesque, C.S., Ryan, R.M., et al. (2006) A self-determination multiple risk intervention trial to improve smokers' health. *Journal of General Internal Medicine*, **21**, 1288–1294.

Wing, R.R. and Hill, J.O. (2001) Successful Weight Loss Maintainance. *Annu. Rev. Nutr.*, **21**, 323–41.

World Health Organization (WHO). (2001) The WHO World Health Report 2001: New understanding - New hope. (ed R.S. Murthy), p. 169. WHO, Geneva, Geneva.

World Health Organization (WHO). (2004) Promoting mental health -Concepts, Emerging Evidence, Practice. (eds H. Herrman),, S. Saxena), & R. Moodie), p. 310. WHO Press, Geneva.

Wyke, S., Hunt, K., Walker, J. and Wilson, P. (2003) Frequent attendance, socioeconomic status and burden of ill health. An investigation in the west of Scotland. *The European journal of general practice*, **9**, 48–55.

Appendices

Appendix A.

Agreement with the county (Extract)

1.1. Aim of the §2 agreement about the trial "Preventive health conversations to 20-44-year-olds":

"The aim of the agreement is to set a fee and determine the professional contents of structured general preventive health conversations at own GP in order to reveal and change inadequate behaviour and life circumstances that cause or might later in life cause problems and/or illness."

1.2. Target group:

"The target group for the agreement is the 20-44-year-olds with children, and persons with multifactor problems regarding lifestyle."

1.3. Limitation of the appointment.

Participation involves only GPs in the county of Northern Jutland and their enrolled patients. The GPs must have or acquire the necessary knowledge and can include no more than 20 patients per year. The trial will last for a maximum of three years. The GPs are paid separately for the courses and the consultations.

Appendix B

The Q33. Origin of screening questions and answer scales

The 15 questions with the highest adjusted ORs are highlighted.

Q. no.	Question	Just-OR	Source
	Resources. Likert scale 1-5		
1	How do you assess your general health?	4,4	DIKE1987,94
2	Do you feel well enough to do what you want to?	6,9	K Dean
3	Do you know enough to improve your health and wellbeing?		K Dean
4	Do you feel appreciated by those you see every day?	17.8	SFI 1996
5	If you have a work, do you feel appreciated at work?		SFI 1996
6	Is it easy for you to find solutions to problems and difficulties in everyday life?	**6,5**	K Dean
7	Do you encounter essential psychological problems in your everyday life?	**8,1**	SFI, K Dean
8	Do you have a confidant in your family you can talk to, if you have problems?	**5,8**	DIKE 1994
9	Do you have a confidant in your circle of friends you can talk to, if you have problems?		DIKE 1994
	Lifestyle: Yes/no		
10	Do you feel stressed, to such a degree that you feel unwell, several times a week?	**5,5**	GP/KSF
11	Do you miss time for yourself in everyday life?		GP/KSF
12	Have you ever felt that you should reduce your consumption of liquor?		CAGE
13	Do you use tobacco on a daily basis?		DIKE 1994
14	Do you use pain medication on a daily basis?	**4,3**	DIKE 1994
15	Do you use addictive drugs on a weekly basis?		DIKE 1994
16	Do you rarely use vegetables in your main meal (less than three times a week)?		DIKE/KSF
17	Do you exercise less than 4 hours a week (walk, bike, do sports, gardening etc.)?		DIKE/KSF

Family life: yes/no			
18	Do you live quite alone?		SFI 1996
19	Do you live alone with one or more children?		SFI 1996
Have you or your partner been unemployed…			
20	… more than 6 months in the past year?		SFI 1996
21	… more than 1 year the past 3 years?		SFI 1996
Have there been problems with liquor, drugs or medicine within the past year…			
22	.. for you or your partner?	6,0	SFI 1996
23	.. for your child/ children?	9,3	SFI1996
Are there significant problems in daily life…			
24	… concerning yourself?	15,4	SFI 1996/ Antonovsky/ Maslow
25	… in your relationship?		SFI 1996/ Antonovsky/ Maslow
26	... concerning your child/children?	4,7	SFI/A/M
27	Do you miss security in everyday life?	14,4	Maslow
Relationship with your children. Likert scale 1-5			
28	How do you assess your relationship with your children?	10,7	GP/KSF
29	Do you have energy to act normally at home or work, if your child has short-term illnesses (e.g. the flu)?		K Dean
30	Do you actively support and improve your child's environment (e.g. school, friends)?		GP/KSF
31	How often within the past year have you felt that you lacked the energy to set boundaries for your children, even if you felt it was important?	4,7	KSF/ K Dean
32	How would you assess the conditions for your children's childcare?		GP/KSF
33	How often do you have difficulties getting your child/children to eat healthily and regularly?		KSF/ K Dean

Origin of the questions in Q33:

DIKE: Danish Institute of Clinical Epidemiology (Kjoeller et al., 1995)

SFI 1996: (Nygaard Christoffersen and Socialforskningsinstituttet, 1996a; b)

K. Dean (Dean, 1981; Dean and Hunter, 1996)

A= Antonovsky (Antonovsky, 1979, 1987; Due and Holstein, 1998)

M= Maslow (Maslow, 1943)

GP/KSF: General practice experience from the study group.

Potentielt marginaliserede 20-44-årige i almen praksis

Hvem er de? Resultat af en spørgeskemascreening

ORIGINAL MEDDELELSE

Kirsten S. Freund & *Jørgen Lous*

Resumé

Introduktion: Her beskrives resultaterne af en spørgeskemascreening af 20-44-årige foretaget som indledning til et forebyggende interventionsstudie i almen praksis. Formålet var at identificere de marginaliserede, som er defineret som dem med flest problemer eller størst mangel på ressourcer i dagligdagen og en usund livsstil.

Materiale og metoder: I et tværsnitsstudie udfyldte 2.056 20-44-årige hos 27 praktiserende læger et spørgeskema vedrørende ressourcer, livsstil, familie- og børnesituation. Personer med syv eller flere problemer ud af 33 mulige blev tilbudt randomisering mhp. intervention. De to gruppers besvarelser er beskrevet og analyseret med OR og logistisk regression.

Resultater: De fire vigtigste besvarelser til at udpege de 30% (n = 625) med syv eller flere problemer var hos kvinder: svært ved at finde løsninger, manglende tryghed, ikke godt selvvurderet helbred og svært ved at sætte grænser for børn. For mænd var det: manglende tryghed, manglende fortrolig i familien, stress og manglende motion. Godt to tredjedele af dem med mange problemer kunne findes blandt dem med problemer i to af de fire spørgsmål.

Diskussion: Hos de 30% med flest problemer/størst mangel på ressourcer genfindes udækkede basale behov vedrørende selvværd, selvoplevet belastning og tryghed som tunge markører, hvilket i andre studier har vist sig at være en forudsætning for sundhedsfremmende adfærd. En intervention, som fokuserer på mestring og ressourcer, kan måske skabe et grundlag for adækvate sundhedshandlinger og -adfærd, hvorved almen praksis kan bidrage til udjævning af sundhedskløften.

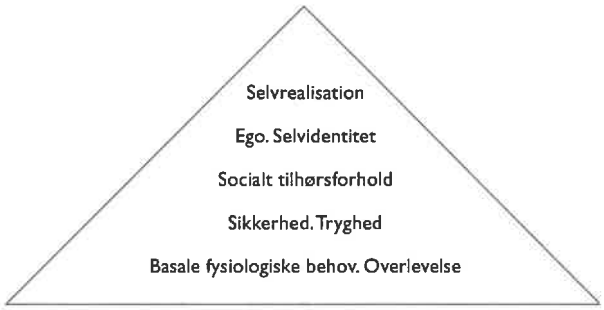


Fig. 1. Maslows *behovshierarki.*

I Danmark har knap 90% af befolkningen kontakt med egen læge i løbet af et år (1). I folkesundhedsprogrammet (2) peger man på, at almen praksis bør bruge denne brede kontaktflade til at bidrage til udjævning af sundhedskløften, dvs. den markante ulighed i fordeling af sundhed og sygdom, traditionelt illustreret ved en 20/80-problematik, hvor de 20% er karakteriseret ved social marginalisering (fx enlige mødre og arbejdsløse). I dette studie søges der ud fra en bredere problematik afgrænsede karakteristika for dem, der måske har svært ved at sætte sundhedsadfærd på dagsordenen og derved har risiko for at blive marginaliserede i forhold til sundhed og sygdom.

Forebyggelseskonsultationer med fokus på risiko, fx for udvikling af hjerte-kar-sygdomme, kan bidrage til små ændringer i sundheds- og sygdomsadfærd (3, 4). De med flest risici er ofte mennesker, som går hyppigere til læge, har et dårligere selvvurderet helbred og en mere usund livsførelse i forhold til alkohol, tobak, kost og fysisk aktivitet, samtidig med at de har sværest ved at omsætte risikoestimater og sundhedsråd til ændringer i livsførelsen (2, 5, 6). De er som sådan marginaliseret i forhold til sundhed i epidemiologisk forstand. Nogle studier viser, at man med fordel kan inddrage den enkelte persons psykosociale situation i forebyggelsesarbejdet (7-10).

I denne artikel præsenteres deskriptive resultater fra et forebyggelsesprojekt i almen praksis. Formålet er at bidrage til et vidensgrundlag for at øge opmærksomheden på karakteristika for de potentielt marginaliserede 20-44-årige.

Behov, motivation og mestring

Maslows klassiske motivations- og behovsteori kunne udgøre en psykologisk model for forståelsen af, hvorfor de marginaliserede grupper er svære at nå med forebyggelse, der er fokuseret på risiko (11). Teorien er ikke uden empirisk verifikation i forhold til sundhedsadfærd (12, 13). Behov og motivation kædes tæt sammen og anbringer menneskelige behov i et hierarki (**Fig. 1**), hvor mere basale behov skal være opfyldt, før højere behov opstår. Uopfyldte behov fører til ængstelse og anspændthed, der blokerer for at bevæge sig højere op i hierarkiet. Personer, der oplever behovstilfredsstillelse højt i hierarkiet, vil oftest være motiverede for og i stand til at træffe velovervejede beslutninger om fx sund levevis bl.a. ved at søge råd, i modsætning til personer, der oplever deprivation i forhold til mere basale behov.

Antonovskys forskning indkredser karakteristika for de personer, der magter at holde sig sunde og udvikle sig trods stress og modgang (salutogenese) i forhold til dem, der udvikler sygdom (patogenese) (14). Disse generelle modstandsressourcer er fx viden, selvidentitet, mestringsstrategier, netværk, godt selvvurderet helbred, tid til at handle i, kontakt til egen læge, fornemmelse af samhørighed, forudsigelighed og håndterbarhed i tilværelsen. Dette er i overensstemmelse med andre socialpsykologiske teorier om *coping* (15). Der er i almen praksis udviklet redskaber til at fokusere på individuelle selvvurderede helbredsressourcer som middel til at øge den enkeltes handlemuligheder (16).

De nordjyske helbredssamtaler

I Nordjyllands Amt er der ud fra ovenstående forståelsesramme gennemført to projekter om forebyggende helbredssamtaler i almen praksis. Erfaring fra det første (1987-1988) med a priori-raske 20-, 35-, 55- og 75-årige (17, 18) er brugt i et nyt interventionsprojekt (1998-1999) med 20-44-årige potentielt marginaliserede personer. Resultaterne af screeningsproceduren for at afgrænse denne målgruppe beskrives i denne artikel.

Ideen har været, at selv om de grundlæggende livsvilkår, som influerer på sundheden, kan være vanskelige at ændre, kan lægen i nogle tilfælde facilitere en forbedret mestring af oplevede problemer og en øget tro på egne ressourcer, som er forudsætninger for en ændret adfærd.

Materiale og metoder

De praktiserende læger

Alle amtets 325 praktiserende læger blev indbudt til at deltage i projektet. Af de 40 læger, der gennemgik introduktionskurser og primært tilmeldte sig, rekrutterede 27 læger patienter til projektet. De øvrige måtte melde fra på grund af manglende tid eller andre problemer i praksis.

Deltagerudvælgelse

Fra maj 1998 til december 1999 blev tilbud om deltagelse givet af klinikpersonalet konsekutivt til de fremmødte 20-44-årige uanset henvendelsesårsag på enkelte dage om måneden, dog ikke til dem der allerede havde fået tilbuddet. Efter informeret samtykke udfyldtes et skema med 33 afkrydsningsspørgsmål. Efter en pilotafprøvning i tre praksis blev interventionsgrænsen fastlagt til syv eller flere problemer/ressourcemangler, hvilket var ukendt for deltagerne, idet intentionen var at inkludere ca. 25% i projektets næste fase.

Spørgeskemaet

De 33 spørgsmål vedrørende ressourcer, problemer, livsstil, familie- og børnesituation blev udvalgt ud fra ovenstående teorier og forskningsresultater, andre studier om ressourcer og selvvurderet helbred (19) samt socialforskning (20) og almen praksis' hverdag. Udformningen sigtede på at virke imødekommende og signalere, at lægen var til rådighed for diskussion af problemområder, som lå uden for et snævert biomedicinsk sundheds- og livsstilsbegreb. Der blev således først spurgt til ressourcer, herefter til livsstil, arbejdsløshed og forhold til børn og partner (**Tabel 1**).

Tabel 1. *Spørgeskemaets 33 spørgsmål angivet med fuld tekst samt det oprindelige rækkefølgenummer, forekomsten af problem eller manglende ressource inden for spørgsmålet, både i hele materialet, i gruppen med få problemer (n = 1.431) og i gruppen med mange problemer (n = 625), desuden forekomst af ældre og kvinder i grupperne. Der er angivet rå OR og justeret OR (se artikelteksten) med 95 %'s konfidensinterval (CI) med hensyn til spørgsmålenes anvendelighed til at adskille patienter med mange og få problemer.*

Problemer og ressourcer (nummer og tekst i spørgeskemaet)	Total i % (n = 2.056)	< 7 problemer i % (n = 1.431)	7+ problemer i % (n = 625)	Rå OR	OR-just (95%'s CI)
Ressourcer					
1. Hvordan synes du dit helbred er alt i alt?	28,2	15,9	56,2	6,7	4,4 (3,6-5,5)
2. Føler du dig frisk nok til at foretage dig de ting, du har lyst til?	14,5	5,0	36,2	10,7	6,9 (5,3-9,0)
3. Synes du, at du ved nok for at forbedre din trivsel og sundhed?	24,3	14,8	45,9	4,9	3,4 (2,8-4,3)
4. Føler du dig værdsat af dem, du omgås til daglig?	7,1	1,2	20,5	21,4	17,8 (11,0-28,8)
5. Hvis du har et arbejde, føler du dig så værdsat på dit arbejde?	10,5	5,6	21,8	4,7	3,3 (2,5-4,4)
6. Er det let for dig at finde en løsning på problemer og vanskeligheder i dit liv?	30,0	14,9	64,5	10,4	6,5 (5,3-8,1)
7. Synes du, at du selv har væsentlige psykiske problemer i dagligdagen?	18,7	6,9	45,6	11,2	8,1 (6,3-10,3)
8. Hvis du har problemer, har du da en fortrolig du kan drøfte det med i din familie?	21,3	9,2	49,0	9,4	5,8 (4,6-7,2)
9. Hvis du har problemer, har du da en fortrolig du kan drøfte det med i din vennekreds?	28,7	18,4	52,2	4,8	3,2 (2,7-4,0)
Livsstil					
10. Føler du dig flere gange ugentlig så stresset, at du føler dig utilpas?	22,5	10,5	50,1	8,6	5,5 (4,4-6,9)
11. Mangler du i det daglige tid til dig selv?	43,8	34,9	64,2	3,3	2,3 (1,9-2,8)
12. Har du nogensinde følt, at du burde nedsætte dit forbrug af øl, vin og spiritus?	9,7	6,2	17,6	3,2	2,0 (1,5-2,7)
13. Har du et dagligt forbrug af tobak?	37,0	27,8	57,9	3,6	2,5 (2,0-3,0)
14. Har du et dagligt forbrug af smertestillende medicin?	6,7	2,4	16,5	7,9	4,3 (3,0-6,1)
15. Har du et ugentligt forbrug af vanedannende medicin (sovemedicin, beroligende medicin, hash eller narkotiske stoffer)?	4,6	1,3	12,2	10,9	8,4 (5,2-13,7)
16. Bruger du sjældent grøntsager i dit hovedmåltid (mindre end tre dage om ugen)?	27,5	22,5	39,0	2,2	1,6 (1,3-2,0)
17. Dyrker du sjældent motion, dvs. mindre end fire timer om ugen (gåture, cykelture, sport, havearbejde el. lign)?	41,5	34,0	58,7	2,8	1,8 (1,5-2,2)
Familiære situation					
18. Bor du helt alene?	13,6	11,7	17,9	1,7	1,1 (0,8-1,4)
20. Har du eller din partner været arbejdsløs i mere end et år inden for de seneste tre år?	13,4	7,8	26,2	4,2	2,8 (2,2-3,6)
21. Har du eller din partner været arbejdsløs i mere end 6 mdr. inden for de seneste 12 mdr.?	10,9	7,1	19,7	3,2	2,3 (1,8-3,1)
22. Er der, eller har der inden for det seneste år været problemer med forbrug af øl, vin og spiritus, stoffer eller medicin hos dig selv eller din partner?	6,3	2,0	16,3	9,8	6,0 (4,1-8,9)
23. Er der, eller har der inden for det seneste år været problemer med forbrug af øl, vin og spiritus, stoffer eller medicin hos dit barn/børn?	0,7	0,2	1,9	9,3	9,3 (2,6-33,1)
24. Er der væsentlige problemer i dagligdagen for dig selv?	11,7	1,7	34,6	29,7	15,4 (10,9-21,7)
25. Er der væsentlige problemer i dagligdagen i dit parforhold?	9,0	2,2	24,6	14,3	8,1 (5,7-11,3)
26. Er der væsentlige problemer i dagligdagen vedrørende dit barn/børn?	5,2	2,0	12,5	6,9	4,7 (3,1-7,0)
27. Savner du tryghed i din hverdag?	12,2	1,8	35,8	30,2	14,4 (10,3-20,0)
Børnespørgsmål					
28. Hvordan vurderer du forholdet til dine børn?	1,8	0,3	5,4	20,5	10,7 (4,7-24,4)
29. Hvis dit barn er kortvarigt syg (fx influenza) har du så overskud til at fungere normalt i dagligdagen (hjemme og på arbejde)?	6,1	2,8	13,6	5,5	3,2 (2,2-4,6)
30. Gør du en aktiv indsats for at støtte og forbedre dit barns miljø (skolevej, institution, kammerater)?	10,4	7,3	17,3	2,6	1,9 (1,4-2,6)
31. Hvor ofte har du inden for det seneste år følt, at du manglede overskud til at sætte de grænser for dine børn, som du selv synes er vigtige?	13,5	5,5	31,8	8,0	4,7 (3,6-6,1)
32. Hvordan vil du vurdere dine børns pasningsforhold?	4,7	2,7	9,3	3,8	2,0 (1,3-3,0)
33. Hvor ofte har du problemer med at få dit barn/børn til at spise sund og regelmæssig kost?	16,2	10,5	29,3	3,5	2,3 (1,8-2,9)
Køn og aldersgruppe					
A. Forekomst af ældre (33-44 år)	49,4	44,4	60,8	1,9	1,9 (1,6-2,3)
B. Forekomst af kvinder	73,0	74,3	70,2	0,82	0,82 (0,7-1,01)

Statistisk metode

Data er analyseret i SPSS, version 9-10, og Statistics with confidence, 2. udgave. Spørgsmål med fem svarmuligheder (ressourcer og børnesituation) blev ved inklusionen dikotomiseret, således at svar i bedste og næstbedste svarkategori blev kodet som ingen problem og de tre øvrige svar som et problem/manglende ressource. Spørgsmål vedrørende livsstil og den familiære situation blev besvaret med ja/nej. Alderen er dikotomiseret ved medianværdien 20-32-årige og 33-44-årige.

De enkelte spørgsmåls relation til problemgrupperne, »få« (seks eller færre) eller »mange« (syv eller flere), er analyseret med odds-ratio-estimat (rå OR). Da de enkelte spørgsmål kunne indgå i summen med op til en syvendedel, er der også udregnet et justeret OR, dvs. justeret for eget bidrag til problemsum (1-33) og problemgruppe (»få«, »mange«) med bibeholdelse af dikotomiseringsgrænsen, samt angivelse af 95%'s konfidensinterval (CI).

Relationen mellem de enkelte spørgsmåls samvariation er eksploreret ved hjælp af nonparametrisk korrelation, principal komponentanalyse (faktoranalyse) og logistisk regression for at belyse det enkelte spørgsmåls mulighed for at afdække problemgrupperne.

Resultater

I alt udfyldte 2.056 af de 20-44-årige spørgeskemaet, heraf var 75% kvinder, hvilket svarer til det normale lægesøgningsmønster. Bortfaldsregistrering er kun udført i de sidste to inklusionsmåneder. Efterfølgende besvarelser fra personalet på de 15 klinikker viser, at ca. 13% (1-30%) var uinteresserede. Begrundelserne var hyppigst, at disse enten ikke ønskede indblanding, ikke havde behov eller manglede overskud lige nu.

Dikotomisering ved syv problemer eller mere af de 33 mulige bevirkede, at 30% (n=625) blev kategoriseret i problemgruppen »mange«. Variationsbredden mellem lægerne var med denne grænse 21-41%.

Fordelingen af de enkelte spørgsmål fremgår af Tabel 1. Alle spørgsmål med undtagelse af »Bor du helt alene?« havde en signifikant justeret OR, der var større end 1, altså en hyppigere forekomst i problemgruppen »mange« end i gruppen »få«.

Det standardiserede spørgsmål: »Hvordan synes du dit helbred er alt i alt?« havde en OR-just på 4,4. Når det gælder brug af medicin og stimulanser, sås der også betydelige forskelle mellem grupperne. Der var en sikker aldersforskel, men ingen sikker kønsforskel mellem de to problemgrupper (Tabel 1).

Principal komponentanalyse (faktoranalyse) med alle 33 spørgsmål samt yngre/ældre og køn bekræftede vores formodning om samvariation mellem spørgsmål om netværk, personlige ressourcer og helbred. Den vigtigste komponent dækker flere spørgsmål vedr. mangel på personlige ressourcer med enkeltspørgsmål om, hvorvidt »man føler sig værdsat«, »har væsentlige problemer i dagligdagen for sig selv«, »savner tryghed i hverdagen« og »ikke har let ved at finde løsning på problemer og vanskeligheder i sit liv« som de væsentligste. Disse spørgsmål har ud over samvariationen også en meget høj justeret OR og kan derfor sandsynligvis hver især afspejle en del af samme grundlæggende problemer.

Tabel 2. *Rangorden af spørgsmålenes anvendelighed til at udpege problemgrupper på basis af logistisk regression.*

	Alle n = 2.056*	Kvinder n = 1.497	Mænd n = 553
6. Svært at finde løsning	1	1	6
27. Savner tryghed	2	2	1
1. Selvvurderet helbred	3	3	9
8. Savner fortrolig i familien	4	5	2
31. Svært ved at sætte grænser for barn	5	4	8
13. Ryger dagligt	6	6	11
10. Føler udtalt stress	7	9	3
20. Arbejdsløs mere end 6 mdr. på 1 år	8	10	7
24. Væsentlige problemer for dig selv	9	7	12
17. Sjældent motion	10	11	4
9. Savner fortrolighed i vennekredsen	11	12	13
3. Ved nok til at forbedre trivsel og sundhed	12	8	15
29. Problemer ved kortvarigt sygt barn	13	13	10
22. Spiritusproblem for dig eller partner	14	15	5
7. Egne psykiske problemer	15	14	14

*) Seks havde ikke oplyst køn.

I **Tabel 2** er spørgsmålene rangstillede for kvinder og mænd ved hjælp af logistisk regressionsanalyse for at belyse screeningsværdien. Der findes forskellig rangorden, men det er de samme 15 ud af 33, der har højest rangorden hos de to køn.

Højest rangorden for kvinder havde nr. 6 »ikke let ved at finde en løsning på problemer i dit liv«. Det samvarierede moderat med spørgsmål nr. 24 og nr. 7, men mindre med de tre næste spørgsmål i rangordenen: nr. 27: »savner tryghed i hverdagen«, nr. 1: »selvvurderet helbred« og nr. 31: »mangler overskud til at sætte grænser over for dine børn«, der således synes at have væsentlig selvstændig betydning.

Højest rangorden for mænd havde spørgsmål nr. 27: »savner tryghed i hverdagen« fulgt af nr. 8 »savner fortrolig i familien«, nr. 10 »føler udtalt stress« og nr. 17 »sjældent motion«.

Omkring 60% hos begge køn havde børn. Analyse uden børnespørgsmål ændrede ikke rangordenen. I gennemsnit kom kun 0,6 problempoint hos mænd og 0,8 hos kvinder fra de ni børnespørgsmål.

Omkring to tredjedele af problemgruppen »mange« kunne identificeres ved problemer i to af de fire nøglespørgsmål dvs. for mænd 71% for kvinder 67%. Såfremt der ikke var problemer i mindst to af de fire spørgsmål, ville kun 13-14% tilhøre gruppen med mange problemer.

Diskussion

Hos populationen i almen praksis fandtes der hos de 30%

med flest problemer/mangel på ressourcer markører for en række udækkede basale behov. De fire vigtigste spørgsmål hos kvinder og mænd (Tabel 2) kunne anvendes som både »problemfinder« og »ressourcefinder«. Ved problem i to af de fire nøglespørgsmål kunne to tredjedele af gruppen »mange problemer« identificeres.

Da flere spørgsmål angående manglende personlige ressourcer, tryghed, *coping* og netværk havde nogen samvariation, er der risiko for at foretage en ringslutning. Derfor er flere analysemetoder brugt til at belyse graden af samvariation, hvorved nøglespørgsmålene synes at have væsentlig selvstændig betydning.

Kønsforskellen i betydningen af de enkelte spørgsmål (Tabel 2) antyder et spændende og ret ueksploreret felt. En analyse af interventionsdelen kan måske belyse dette nærmere.

Den mulige lægesøgningsbias er kun delvist udlignet ved den lange inklusionsperiode. Lægerne skønnede, at deres patientpopulation afspejlede baggrundsbefolkningen, hvilket delvist bekræftes ved en sammenligning med DIKE's befolkningsundersøgelse fra 1994 (interview), idet forbrug af tobak, motion, smertestillende og vanedannende medicin samt kost svarede til forbruget i denne, om end spørgsmålene ikke er helt enslydende (6). Derimod er andelen af personer med »nogenlunde«, »dårligt« og »meget dårligt« selvvurderet helbred omkring det dobbelte (ca. 28%) i totalgruppen i forhold til DIKE's 25-44-årige (10% af mænd og 16% af kvinder). Dette antyder, at flere med nedsat selvvurderet helbred er lægesøgende.

Selvvurderet helbred er hos kvinder nummer tre i rangordenen, men hos mænd nummer ni, hvor tryghed, netværk, stress, motion, alkohol og arbejdsløshed har højere rangorden. Der er i andre danske materialer fundet relation mellem selvvurdereret helbred og usund livsstil, specielt hos mænd (5). Ved rådgivning er der også tidligere fundet behov for en forskellig adgang til mænd og kvinder (3, 16).

Skemaet er pilottestet hos tre læger, men uden guldstandard. Formålet var ikke at belyse følger af akut eller kronisk sygdom, men at afspejle mere tilgrundliggende faktorer for sygdoms- og sundhedsadfærd. Efter grundig gennemgang af validerede spørgeskemaer specielt SF-36 fandtes disse ikke egnede til at finde målgruppen. Ved at bruge spørgsmål, der er udviklet på basis af den anførte forskning samt 20 års erfaring fra forebyggelsesarbejde i almen praksis skønnes det, at der er opnået høj almen gyldighed, relevans og generaliserbarhed (ekstern validitet). Præcision på den enkelte patient dvs. den interne validitet vil kunne belyses ved brug af de fire nøglespørgsmål i fremtidige forebyggelseskonsultationer.

Dette studie afdækker en anden synsvinkel på marginalisering end den gængse 20/80-problematik, der primært fokuserer på sociale uligheder. De 30%, der her er fundet som potentielt marginaliserede, er karakteriseret ved basale personlige problemer og dårligt netværk i højere grad end ved arbejdsløshed og det at være alene. Fokus på gængse risikofaktorer kan sjældent omsættes positivt af disse personer (2, 3, 5, 8, 9), men provokerer i stedet afmagt og modstand mod forandringer, hvorved sundhedskløften bliver dybere (12, 13, 15). Fokus på mestring, ressourcer og barrierer kan måske skabe et grundlag for adækvat sundheds- og sygdomsadfærd (11, 14, 15).

Det første nordjyske projekt viste, at bred individuel samtale, der ud fra patientens prioriteter støtter til bedre at kunne mestre dagligdagen, har kunnet bevirke ikke blot en ændring i livsførelse, men også i levekår, som ofte skønnes at være uden for almen praksis' indflydelse (17, 18).

Interventionsdelen af det herværende projekt vil kunne give et fingerpeg om, hvorvidt den her foreslåede tilgang til forebyggelse vil kunne gøre en subjektiv forskel for patientgruppen og derved bidrage til et fundament for sundere levevis. Der er grund til at forske meget mere i årsager til og forudsætninger for sygdoms- og sundhedsadfærd.

Summary

Kirsten S. Freund & Jørgen Lous:
Potentially marginalised 20-44-year-olds in general practice. Who are they? The results of a questionnaire screening.

Ugeskr Læger 2002; 164: 5367-72.

Introduction: The study presents the results of a questionnaire screening of 20-44-year-old patients as introduction to a preventive intervention study in general practice. The purpose was to identify those with most problems or lack of resources and unhealthy lifestyle.

Material and methods: In a cross-sectional study of the 20-44-year-old patients at 27 general practitioners, 2056 completed a questionnaire about resources, lifestyle, and family situation. The 30% with seven or more problems out of 33 possible (n = 625) were offered randomisation with a view to intervention. The answers are described and analysed comparing the two groups by OR and logistic regression.

Results: The four most important answers to find persons with more than seven problems were in women: difficulties in finding solutions, lack of security, not good self rated health, and difficulties in handling children. In men the most important answers were: lack of security, no confidant in the family, feeling extremely stressed, and lack of exercise. A little more than two thirds of the persons with many problems could be found among those with problems in two out of the four questions.

Discussion: Important characteristics among the 30% with most problems or lack of resources were low self-esteem, personal strain, and lack of security. These uncovered basic needs are considered essential barriers to health promoting self-care behaviour. By focusing on this, general practice might contribute to bridge the gap between the healthy and unhealthy.

Reprints: *Kirsten Schierup Freund,* Egetved 9, DK-9362 Gandrup.
E-mail: kirsten.freund@ dadlnet.dk

Antaget den 17. oktober 2002.
Almen praksis, Borgergade 68A, Gandrup,
Aarhus Universitet, Forskningsenheden for Almen Medicin, og
Syddansk Universitet, Institut for Sundhedstjenesteforskning.

Cand.stat. *Henrik Støvring*, Forskningsenheden for Almen Medicin, Syddansk Universitet takkes for frugtbare diskussioner om analysen af materialet med principalkomponentanalysen.

Dette studie er finansieret af Forskningsfonden (FF-2-01-284), Praktiserende Lægers Uddannelses- og Udviklingsfond, Sygekassernes Helsefond (2001 B027), Kvalitetsudviklingsudvalget for almen praksis, Nordjyllands Amt og et Lundbeckstipendium.

Ovenstående artikel hviler på en større litteraturgennemgang end litteraturlistens 20 numre. Oplysninger om denne baggrundslitteratur kan fås fra forfatterne.

Litteratur

1. Steding-Jessen M. Kontakter til praktiserende læger under sygesikringen 1998. Nye tal fra Sundhedsstyrelsen 2000; 4: 25-39.
2. Sundhedsministeriet. Regeringens folkesundhedsprogram 1999-2008. Et handlingsorienteret program for sundere rammer i hverdagen. København: Sundhedsministeriet, 1999.
3. Ashenden R, Silagy C, Weller D. A systematic review of the effectiveness of promoting lifestyle change in general practice. Fam Pract 1997; 14: 160-76.
4. Engberg M, Cristensen B, Karlsmose B, Lous J, Lauritzen T. Kan systematiske generelle helbredsundersøgelser og helbredssamtaler forbedre den kadiovaskulære risikoprofil i befolkningen? Ugeskr Læger 2002; 164: 3354-60.
5. Iversen L, Johansen D, Grønbæk MN. Sammenhæng mellem livsstil, socioøkonomiske faktorer, socialt netværk og suboptimalt selvvurderet helbred. Ugeskr Læger 2002; 164: 1497-501.
6. Kjøller M, Rasmussen NK, Keiding L, Petersen HC, Nielsen GA. Sundhed og sygelighed i Danmark 1994 og udviklingen siden 1987. København: Dansk Institut for Klinisk Epidemiologi, 1995.
7. Thorogood M, Coulter A, Jones L, Yudkin P, Muir J, Mant D. Factors affecting response to an invitation to attend for a health check. J Epidemiology Community Health 1993; 47: 224-8.
8. Dean K, Hunter D. New directions for health: towards a knowledge base for public health action. Soc Sci Med 1996; 42: 745-50.
9. Sanders D, Pevele R, Mant D, Fowler G. Predictors of succesful smoking cessation following advice from nurses in general practice. Addiction 1993; 88: 1699-705.
10. Backett K, Davison C, Mullen K. Lay evaluation of health and healthy lifestyles: evidence from three studies. Br J Gen Pract 1994; 44: 277-80.
11. Maslow AH. A theory of human motivation. Psychol Rev; 1943; 50: 370-96.
12. Timmermann GM, Acton GJ. The relationship between basic needs satisfaction and emotional eating. Issues Ment Health Nurs 2001: 21; 691-701.
13. Acton GJ, Malathum P. Basic need status and health-promoting self-care behavior in adults. West J Nurs Res 2000; 22: 796-811.
14. Antonovsky A. Health, stress and coping. Washington: Jossey-Bass Publishers, 1979.
15. Maunsbach M. »En ting er teori – noget andet er praksis«. Aspekter af compliance og non-compliance blandt type II diabetikere [ph.d.-afhandl]. København: Månedsskrift for Praktisk Lægegerning, 1999.
16. Hollnagel H, Malterud K. Shifting attention from objective risk factors to patients' selfassessed health ressources. Fam Pract 1995; 12: 423-9.
17. Bille PE, Freund KS, Frimodt-Møller J. Forebyggende helbredsundersøgelser/helbredssamtaler for voksne i Nordjyllands Amt. Aalborg: Nordjyllands lægekredsforening, 1990.
18. Rasmussen NK. Evaluering af forebyggende helbredsundersøgelser/samtaler i Nordjyllands Amt. København: DIKE, 1993.
19. Benjamini Y, Itler EL. Community studies reporting association between selfrated health and mortality. Res Age 1999; 21: 392-401.
20. Christoffersen MN. Opvækst med arbejdsløshed – en forløbsundersøgelse af to generationer født 1966 og 1973. København: Socialforskningsinstituttet 1996; 14: 203.

The effect of preventive consultations on young adults with psychosocial problems: a randomized trial

Kirsten S. Freund[1,2] and Jørgen Lous[1]*

[1]Research Unit of General Practice, Institute of Public Health, University of Southern Denmark, J.B.Winsløw Vej 9A, DK-5000 Odense C, Denmark and [2]General Practice, Borgergade 68A, DK-9362 Gandrup, Denmark.

*Correspondence to: J. Lous. E-mail: jlous@health.sdu.dk

Received on July 15, 2011; accepted on February 28, 2012

Abstract

Patients with many problems often face difficulties in modifying their behavior as desired. Uncovered basic needs may be an important barrier. This research tests the effect of patient-centered consultations for 20- to 44-year-old patients with multiple psychosocial and lifestyle problems. We focus on resources and barriers for obtaining self-chosen goals within life circumstances and lifestyle. At 28 general practitioners, 2056 patients aged 20–44 years were screened with a 33-item problem-score on resources, network, lifestyle and social conditions. The 30% who had most problems were invited to complete a more comprehensive questionnaire at home. Intervention was preventive consultation with a 3-month follow-up. A total of 495 patients were randomized. One-year questionnaire follow-up showed significant improvement in Short Form Health-related Quality of Life Mental (MCS-SF12) in the intervention group (7.3) compared with the control group (3.0); the difference was 4.3 (95% confidence interval 1.6–7.0, $P = 0.002$). The number of problems was reduced significantly more in the intervention than in the control group (1.8 versus 0.8, $P = 0.03$). Preventive consultation focusing on resources and barriers to self-chosen goals may improve MCS-SF12 and decrease the number of problems in patients with many psychosocial and lifestyle problems. This may be an indicator of improved specific self-efficacy and a key to lifestyle changes.

Background

We are currently witnessing a worldwide increase in lifestyle diseases, e.g. obesity, type 2 diabetes, vascular diseases and psychological and psychiatric problems [1, 2]. Changes in lifestyle regarding food, exercise and tobacco and alcohol consumption are widely recommended, but improvements are rarely achieved [1, 3]. Political regulation is recommended to make the healthy choice an easy choice [1]. Most people with multiple psychosocial problems find it difficult to change their behavior in response to information about risky lifestyle, in some cases because the user perceives the behavior, e.g. use of a stimulant like nicotine and alcohol, as a solution rather than a problem. Sometimes, an adverse reaction to information and advice is seen [4, 5].

Maslow's theory 'Hierarchy of needs' offers some explanation about why people with unmet basic needs may not profit from preventive counseling focused on risk (Fig. 1) [6]. Maslow's hierarchy implies that lower needs must be met before higher needs emerge. Unmet needs result in a state of tension and anxiety, that is, they hinder self-esteem, which lies at the root of self-actualization [7, 8]. Self-efficacy theory as described and explored in several studies provides explicit guidelines for how to enable people to exercise some influence over

doi:10.1093/her/cys048

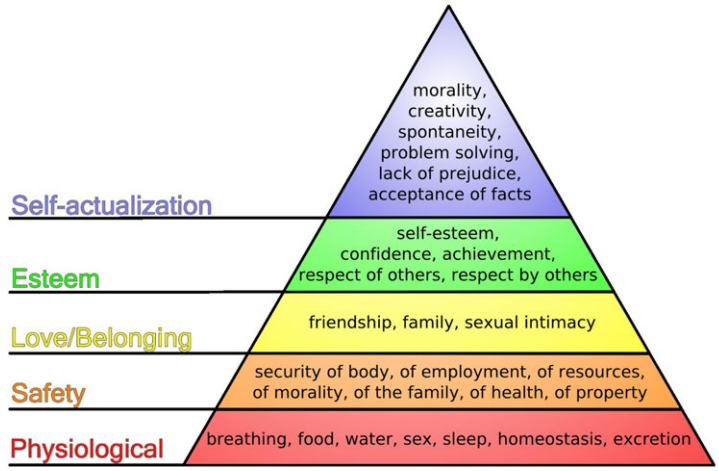


Fig. 1. Maslow's 'Hierarchy of needs' (from http://en.wikipedia.org/wiki/maslow%27s_hierarchy_of_needs; last accessed 20 March 2012)

how they live their lives and how to foster desired change [9]. Perceived self-efficacy is concerned with judgment of personal capacity. Belief in own capability has a powerful effect on behavior [10, 11].

According to Antonovsky [12], attention should be paid to the origin of health (salutogenesis) rather than solely to the origin of disease (pathogenesis). A salutogenetic perspective seems to be especially important in health promotion targeted at people with extensive psychosocial problems since coping is related to social gradients such as knowledge, intelligence, social network, self-rated health, self-identity, security and confidence.

In 1987–88, we carried out a non-randomized study on the effect of a preventive health consultation offered to a random sample of 1000 adults at 20, 35, 55 and 75 years of age at 45 general practitioners (GPs) [13, 14]. The participants completed a postal questionnaire at home about their lifestyle, social, physical and mental situation as a basis for a patient-centered consultation at their GP, where illness, problems, goals and possible solutions were written down during the consultation. At the 6-month postal follow-up, a more positive attitude to own responsibility for health improvement was found and more than 15% had made changes. Another 10% considered undertaking some changes in lifestyle or living conditions. Especially young people with social problems made changes with regard to social aspects [13].

The Secretary of Health and Prevention in the County of Northern Jutland asked us to design a new preventive study in general practice targeted at younger adults with psychosocial and lifestyle problems in order to identify and change lifestyle or life circumstances that might result in problems or illness. So we grasped the opportunity to design a new working method focused on young patients with many problems and lack of resources who find it difficult to make the healthy choices.

Aim of the study

The aim of the present study is to evaluate the effect of two preventive health consultations on health-related quality of life and lifestyle among 20- to 44-year-olds with multiple psychosocial and lifestyle problems measured by the Short Form Health-related Quality of Life Mental (MCS–SF–12) and on their goal setting, self-rated health and changes in unhealthy lifestyle.

Methods

In 1998, motivational interviewing (MI) was not in focus in general practice in Denmark, but the

patient-centered approach to consultation was being advocated [15]. This approach implies that responsibility for defining problems and making change resides with the patient. MI is a client-centered directive method for enhancing a patient's internal motivation for change by exploring and resolving the patient's ambivalence toward a specific problem. MI was developed to be used in the addiction field, but it may be used for less directive purposes as well, such as defining and prioritizing among problems. It has three main components: collaboration, evocation and autonomy [16]. The approach used in this study deploys these three elements. It does not focus on a predetermined problem, but on those problems prioritized by the patient after filling in a questionnaire at home about his or her psychosocial and lifestyle situation. MI was conducted within the context of two structured health consultations that sought to strengthen the patient's specific self-efficacy to reach self-chosen goals by describing his or her perception of specific resources and barriers to goal achievement [9, 16–18].

Consort statement

The study was planned, performed and reported in accordance with Stuart Pocock and the Consort Statement [19, 20].

General practitioners

In 1997, all 325 GPs in the County of North Jutland, which has a total catchment population of 410 000, were invited to participate. A total of 50 GPs, 15% of those invited, attended a pre-study weekend course and 28 of these GPs included patients into the study. Most of the GPs were working in group practices with two to four GPs. Ten GPs (36%) were working in a single-handed practice, which is a percentage share representative of Denmark as such. Danish primary health care was and still is organized as a fully tax-financed list system, where GPs are paid a fee for each consultation (about two-third of salary) and each patient on the list (about one-third of salary). The GPs were separately paid by the County for the time they used on courses and health consultations in this study.

GP education

All participating GPs attended an initial weekend course and were offered another three 4- to 8-hour sessions for discussion of issues related to cardiovascular disease, alcohol, smoking and drug addiction, and two evening follow-up courses to discuss the study and the GP's new role. A total of 40 hours of preventive health education was thus provided. The topics of the courses reflected the eclectic everyday of general practice and contained elements from development psychology, understanding the interaction between personality and behavior, illness and disease models, gate-control theory in chronic pain, occupational medicine and lifestyle diseases. Emphasis was placed on the patient's responsibility for defining his or her own problems and desires in a process where the GP served as facilitator. The 'stages of change' model was discussed [21]. The issue of patients' self-assessed health resources was raised and discussed [22]. Lectures, group discussion, case studies and written material were used during these courses. MI was not mentioned, but the three elements of MI were thoroughly discussed as fundamental to the communication style in order to guide and elicit internal motivation for change.

Patients and setting

On specific days of each month from May 1998 to November 1999, patients aged from 20 to 44 years were consecutively invited to participate in the study when they visited the clinic for an ordinary consultation [23]. The staff enrolled participants, obtained informed written consent and handed out a pre-trial screening questionnaire (SQ) to be completed at the clinic. Only patients with difficulties understanding Danish, patients with severe psychiatric problems or severe acute illness were excluded. All patients had the scheduled consultation with their GP on the day they completed the SQ but did not discuss the SQ with the GP on that occasion. Recruitment stopped after 18 months as planned.

Questionnaires

The 33-item pre-trial SQ was constructed using standardized questions from Danish and international

questionnaires about personal resources, network, lifestyle, social and family problems. A few self-constructed questions in accordance with these studies were added to the SQ (see appendix) [24–28]. A pre-trial pilot study conducted in four clinics with seven to eight patients each indicated that a cutoff at seven problems would include the most problematic quartile of the patients. In the study, this cut-point included 30% of the total patient population. Patients with seven or more problems in SQ were invited to participate in the study and to complete a 23-page baseline questionnaire (BQ) with 84 questions. The BQ was completed at home and included questions on desires for change in lifestyle and social situation and goals for the coming year. The BQ was constructed similarly to SQ using standardized questions on social information, SF12, self-rated health, diet, lifestyle, use of alcohol, tobacco and medicine [12–14,24–31]. To describe resources, we had to construct some questions in relation to these international studies and our more than 20 years of experience as GPs [13, 14, 23]. These questions are not used for statistical purpose, but they offer a holistic picture of the participant. One year after the first health consultation, a comparable postal 1-year questionnaire (Q1) with a few additional questions on the participant's evaluation of the health consultations was returned by the participant.

Patient randomization and allocation concealment

When the completed BQ was returned to the clinic, the staff phoned the project secretary to get a patient number from a GP-related computer-generated list of random numbers used consecutively [20]. All even numbers were controls and odd numbers intervention patients. Thus, the GPs had no influence on allocation, and neither GPs nor the patients were blinded.

Patient intervention

The intervention was a structured 1-hour preventive consultation with the patient's own GP and a 20-min follow-up within 3 months based on the BQ. The topics for the consultations were chosen by the patient. GPs were recommended to skim the BQ and then start by asking the following questions 'How was it like to complete the questionnaire?' and 'What do you prefer to discuss?' Completing the BQ was supposed to facilitate insight into the relationship between social life, health, lifestyle, own reaction on stressors and resources and barriers for gaining control and changing behavior. This insight made it easier for the GPs to offer patient-centered counseling. At the end of the consultation, the GP and the patient together made a written report of their general impression of the consultation, general health, resources, network and lifestyle. The patient might choose one or two goals for a better life among 14 predetermined choices and one free choice. Goals setting, time schedule and specific resources and barriers for reaching the goals were discussed and shortly described in the three-page report. A follow-up at 3 months was arranged. Needs for other interventions were discussed. Blood pressure and body mass index (BMI) were measured and, if indicated, blood sugar, cholesterol and urine were examined.

Control

The control group had no specific health consultations. They saw their GP for the predetermined consultation on the day of inclusion and had the possibility to see their GP later as usual.

Outcome measures

The primary endpoint was change in health-related quality of life after 1 year measured with the internationally standardized and validated SF12 survey. Self-rated health is an independent predictor of mortality [29]. Self-rated health and health-related quality of life are often used as outcome measures in intervention studies [29–31]. The scoring of the SF12 questionnaire is constructed to give a score of 50 and a standard deviation (SD) of 10 in a standardized American population for the Mental Component Score (MCS) and the same for the Physical Component Score (PCS). The higher the score, the better the quality of life [30].

Secondary outcomes were (i) participation in the preventive health consultation, (ii) goal-setting, (iii)

self-rated health, (iv) changes in number of problems and (v) lifestyle changes.

Sample size calculation

A clinically relevant difference in SF12 score was defined as half a SD (five points) or an effect size (*z*-score) of 0.5, categorized as a medium effect size by Cohen [32]. With a power of 90% and a significance level of 5%, this means that at least 160 patients in each group should be evaluated.

Statistical methods

Data analysis was carried out according to a pre-established plan as intention-to-treat analysis using SPSS version 16 and confidence interval (CI) analysis for windows [33]. The 95% CI is stated whenever relevant. SF12 scores were calculated according to the SF12 recommendations at baseline and after one year.

Differences in change were compared by using Student *t*-test, Mann–Whitney *U*-test, Kendall's tau and Chi-square test. Two-sided significance tests were used throughout and $P < 0.05$ was considered statistically significant. The analyses were carried out for all who returned the 1-year questionnaire. Analysis comparing baseline information on completers and dropouts was performed. To test the absence of cluster effect (consistency between GPs), we performed a subgroup analysis on the MCS-SF12 score for GPs with 10 or more included patients using ANOVA and a box plot. A linear regression model was used to analyze the effect of intervention on the MCS-SF12 while controlling for sex and age group.

Results

Participation

We intended to screen 2073 patients by using the SQ. A total of 2056 completed the SQ of whom 625 (30%) had seven or more problems; 75% were women. The most common problems were 'Difficulties in finding solutions to daily life problems' (65%), 'Lack of time to oneself' (64%), 'Low physical activity' (58%), 'Being a daily smoker' (57%) and 'Having fair or poor self-rated health' (56%) [23]. All 625 patients were invited to participate in the randomized trial by completing the BQ. A total of 130 (21%) did not return the BQ, which left 495 for randomization: 240 in the intervention group and 255 in the control group (Fig. 2). The 130 baseline non-responders were 1.5 years younger (95% CI 0.2–2.8) and they were more often smokers (93/130, 72%) than the responders (265/485, 55%) (Difference = 17%, 95% CI 7–25) (Table I).

No differences in baseline demographic and clinical characteristics of the intervention and control groups were found (Table I). The outcome analysis after 1 year involved all randomized patients meeting the inclusion criteria who returned the 1-year questionnaire ($n = 364$, 74%). Seventy-one patients (28%) in the control group and 60 (25%) in the intervention group were lost to follow-up after 1 year (Fig. 2); 46 of the 60 had a preventive health consultation. The reasons for missing follow-up were: moved to another district ($n = 24$), did not want to participate ($n = 16$) and unknown ($n = 91$).

Thirty-one (13%) of the 240 patients randomized to a health consultation did not receive the preventive consultation for different reasons (no problems anymore, withdrew their consent, no time, or moved to another location). Another 58 (24%) did not have the 3-month follow-up consultation for similar reasons ($n = 43$) or after agreement with their GP ($n = 15$) (Fig. 2). Nobody in the control group received the formal 1-hour health consultation or the follow-up consultation.

Main outcome measures

One year after the consultation, we found improvement in MCS-SF12 both in the control and in the intervention group (Table II). The intervention group improved about twice as much as the control group. The difference of 4.3 (1.6–6.9) was significant ($P = 0.002$). No difference was found in the PSC-SF12 (Table II). A total of 12 patients (three interventions and nine controls) had no SF12 scores because a value was missing in one or more questions in the SF12-questionaire.

An ANOVA analysis at the GP level on the 21 GPs with 10 or more included patients found that the improvement in MCS-SF12 was consistent

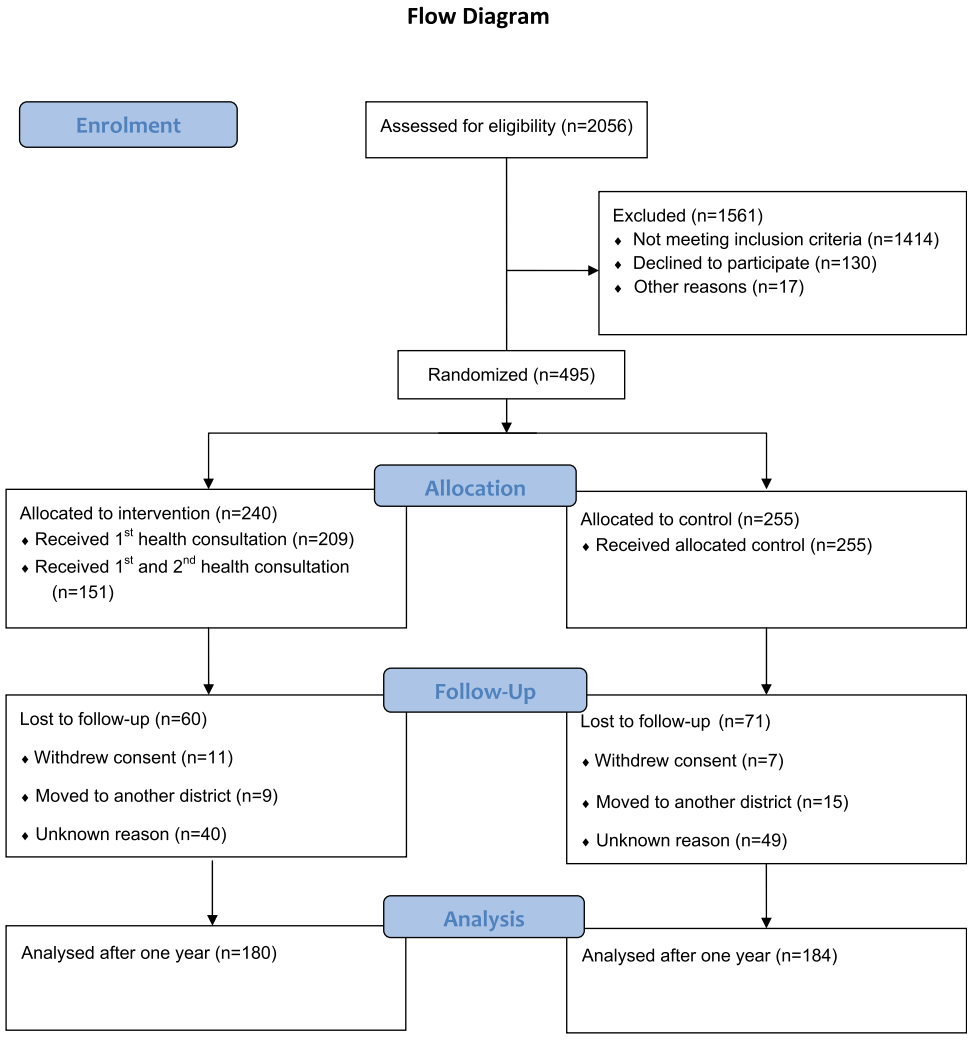


Fig. 2. Flowchart of the preventive health consultation study.

among the GPs. The box plot (Fig. 3) showed mean improvement in 19 of the 21 GPs.

Secondary outcomes

Goal setting

During the preventive health consultations, 191 of the 209 participants (91%) (95% CI 87–95) chose one or two goals for a better life for the coming year. The most frequent goals were weight loss (n = 58/209, 28%), better psychological health (n = 51, 21%), better partner relationship (n = 41, 20%), better work situation (n = 38, 18%) and less tobacco consumption (n = 33, 16%). Only 18 (9%) set no goals.

Self-rated health

In both groups (intervention and control), self-rated health had improved (intervention: 54/180, 30%; control: 46/184, 25%) more than it had deteriorated (intervention: 26/180, 14%; control: 38/184, 21%) after 1 year (Table III). A trend toward better

Table I. *Baseline characteristics of all pre-trial screened patients, dropouts before randomization and the randomized groups*

Characteristics	All pre-trial screened patients (n = 2056)[a]	Not randomized[b] (n = 130)	Randomized to health consultation group (n = 240)	Randomized to control group (n = 255)
Age, mean (SD)	32.7 (6.7)	33.2 (6.8)	34.2 (6.7)	35.1 (6.6)
Female, *n*/total	1505/2056 (73%)	91/130 (70%)	171/240 (71%)	192/255 (75%)
Not good self-rated health (fair, poor or very poor), *n*/total	579/2056 (28%)	64/130 (49%)	139/234 (59%)	143/249 (57%)
Number of problems in pre-trial SQ of a maximum of 33, mean (SD)	5.2 (4.0)	10.3 (3.6)	10·0 (3·1)	10·3 (3·2)
Unemployed (patient or partner > 1 year the last 3 years)	276/2056 (13%)	31/130 (24%)	62/235 (26%)	66/250 (26%)
Problems in partner relationship, *n*/total	186/2056 (9%)	39/130 (30%)	54/235 (23%)	58/250 (23%)
Daily use of tobacco, *n*/total	760/2056 (37%)	93/130 (72%)	127/235 (54%)	138/250 (57%)
MCS SF-12 score[c], mental health, mean (SD)	Not asked	Not asked	40.0 (11.4) N = 237	40.2 (11.1) N = 246
PCS SF-12 score[c], physical health, mean (SD)	Not asked	Not asked	48.1 (10.8) N = 237	47.7 (10.7) N = 246

[a]17 patients did not complete the pre-trial SQ.
[b]130 not randomized because of no consent or no completed BQ.
[c]12 patients had missing value in the SF12 score, n = number of patients.

Table II. *Physical component score and mental component score SF12 after 1 year*

	Intervention n = 177			Control n = 176			Difference between groups, Student t-test (95% CI)
	Baseline	1 year	Difference (1-year baseline)	Baseline	1 year	Difference (1-year baseline)	
SF12 PCS (SD)	47.2 (11.4)	48.2(10.0)	1.0	47.3 (10.8)	48.3 (10.0)	1.0	Difference = 0.01 (−1.8 to 1.9), P = 0.99, NS
SF12 MCS (SD)	39.6 (11.2)	46.8 (10.6)	7.3	41.5 (10.8)	44.5 (11.1)	3.0	Difference = 4.3 (1.6–6.9), P = 0.002

n = number of patients

self-evaluated health in the intervention group was seen (Mann–Whitney test, P = 0.085).

Number of problems

At 1-year follow-up, the total number of problems revealed in the SQ was significantly reduced in the intervention group (10.0–8.2 = 1.8 problems) compared with the control group (10.1–9.3 = 0.8 problems), difference = 1.0 (95% CI 0.17–1.83) (Table III).

Lifestyle changes

The 85 participants in the intervention group with a BMI of 25 or more had a mean weight loss of 2.9 kg compared with 1.5 kg among 75 overweight

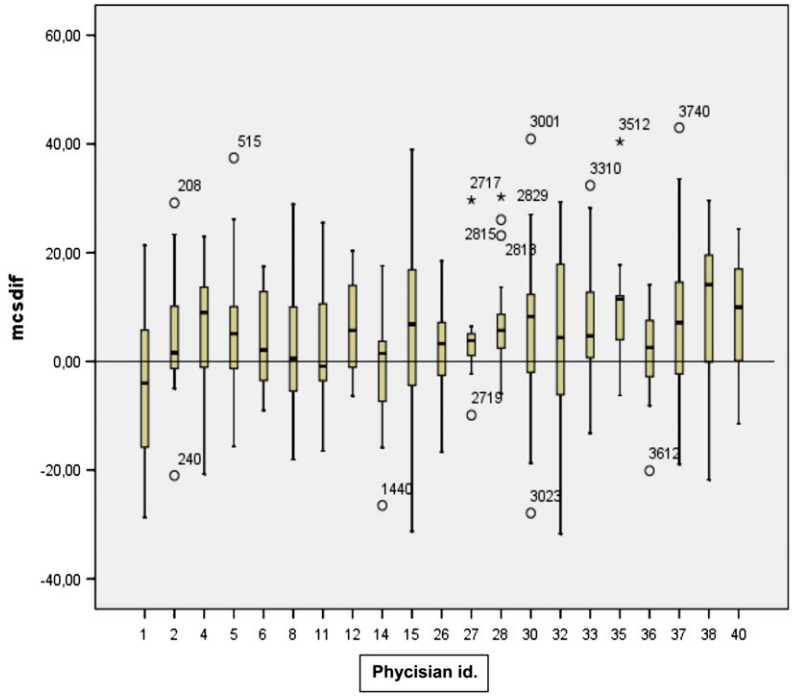


Fig. 3. Differences in improvement in MCS of SF12 between intervention and control patients after 1 year. Means of differences with 95% CIs and total ranges (excluded a few out layers marked with case number) in patients analysed among the 21 physicians with 10 or more included patients. Three hundred and twenty-eight patients included. Analyze of variance (df = 20, $F = 0.98$, $P = 0.49$).

participants in the control group. This difference of 1.4 kg was not statistically significant, but a weight loss like this over 1 year can be clinically important if continued (Table III). A trend toward reported healthier lifestyle was seen in the intervention group compared with the control group: they ate more fiber, did more exercise and smoked and drank less (Table III).

Positive or adverse effects

At the 1-year follow-up, participants were asked: 'Has completing the questionnaires or participating in the health consultations had any effect on your life during the past year?' In the intervention group, 92 (51%) said yes compared with 27 (15%) in the control group. This difference of 0.36 was significant (Table IV).

In the intervention group, 72/92 (78%) experienced a positive effect on well-being and only three (3%) reported a negative effect on mood, resources, sleep and relations to children or work.

In the intervention group, 91/180 (51%) had experienced some positive effects of their participation while 24 (13%) reported some negative effect (Table IV). In summary, 80 (44%) in the intervention group experienced more positive than negative effects, 9 (5%) were more negative than positive and 91 (51%) were neutral compared with 22 (12%) positive and two (1%) negative in the control group (Table IV). Thus, the number needed to treat (benefit) was 1/(0.44–0.12) = 3.1 and the number needed to harm was 1/(0.05–0.01) = 25.

The intervention group was asked, 'Do you think that the preventive health consultations were worth the trouble?' A total of 75 (42%) answered 'Yes, to a high degree', 67 (37%) said 'Yes, to some degree', 21 (12%) said 'No' and 17 of the 180 (9%) respondents did not answer this question.

Table III. *Changes in secondary outcomes in 180 and 184 patients at 1-year follow-up*

	At 1-year follow-up		Differences
	Intervention, n = 180	Control, n = 184	95% CI or test and P value
Change in self-rated health (five-point scale)	54 better/much better 94 unchanged 26 worse/much worse (6 no answer)	46 better/much better 97 unchanged 38 worse/much worse (3 no answer)	Mann–Whitney, P = 0.085, NS
Change in total number of problems (SD)	−1.8 (4.2)	−0.8 (4.2)	Differences = −1.0 (−1.8 to −0.2), Mann–Whitney, P = 0.032
Weight loss in kg in patients with BMI =25 or more, (SD)	−2.9 (8.0) n = 85	−1.5 (6.3) n = 75	Differences = −1.4 kg (−3.7 to 0.8), t-test, P = 0.21, NS
Eating more fibers	111/180 (62%)	97/183 (53%)	Differences = 8.7% (−1.5 to 19) NS
Doing more exercise	66/180 (37%)	52/184 (28%)	Differences = 8.4% (−1.2 to 18) NS
Smoked yesterday	88/180 (49%)	106/184 (58%)	Differences = −8.7% (−18 to 1.5) NS
Smoking less or quit	37/180 (21%)	26/184 (14%)	Differences = 6.4% (−1.4 to 14) NS
Drinking less alcohol or quit	31/177 (17%)	27/179 (15%)	Differences = 2.4% (−5 to 10) NS

n = number of patients, NS = not significant at 0.05, t-test = Student t-test.

Dropouts at 1 year

Among the 131 dropouts at the 1-year follow-up, significantly more were men than women and the dropout group had significantly better physical health measured by the PCS SF12 at baseline (Table V); but no significant difference in lifestyle, that is use of tobacco, was observed.

A linear regression analysis showed that after controlling for gender and age group, the intervention still had a significant effect on differences in mental score (MCS-SF12) between intervention and control group (Beta= −0.16, P = 0.003).

Discussion

Principal findings

A group of 20- to 44-year-olds with several problems experienced a significant positive effect of a 1-hour patient-centered structured preventive consultation and a 20-min follow-up with their own GP on their mental health-related quality of life (MCS-SF12) when measured after 1 year. The intervention group also reported fewer resource problems and lifestyle problems than the control group. The patients did not focus mainly on physical health and we found no effect on this measure (PCS-SF12). We found tendencies toward improvement in some lifestyle factors. At the consultation, 91% (191/209) defined one or two goals for a better life for the coming year. A total of 79% (142/180) of the intervention group found that their participation had been 'worth the trouble'.

Strengths and weaknesses

Outcome measures are 'self-reported' without blinding. The results can therefore be biased in several ways, for example, in the perception of own lifestyle and changes over time. The perception of lifestyle and change achieved could be influenced by the allocation group. On the other hand, numerous trials have shown that the SF12-questionnaire is a valid measure of health-related quality of life within different health specialties [34–36]. The bias that would arise if patients wished to please their GP was minimized by using a postal questionnaire at the 1-year assessment and by the sender being a research institution.

The 'dropout' in the trial is a problem. The non-participation of 130 eligible patients before the randomization represents a minor problem. Interestingly, this group comprised more smokers (72%) than the group of participants (55%) (Difference = 17%, 95% CI 8–25%) (Table I).

The 131 1-year dropouts is a problem, but they had the same problem profile, the same number of

Table IV. *Positive and negative effect of participation in the study*

Question 1	Health consultation, $n = 180$	Control group, $n = 184$	Difference, (95% CI)
Effect of participation?	Yes 92 (51%) No 84 (47%) (No answer 4)	Yes 27 (15%) No 152 (82%) (No answer 5)	Differences = 36% (27–45), Chi-square test: $P < 0.0001$
If yes	$n = 92$	$n = 27$	
A1: Effect on physical health	Positive effect 50 (54%) Negative effect 14 (15%) No answer 28	Positive 14 (52%) Negative 3 (11%) No answer 10	Not relevant
A2: Effect on well-being (mood, resources, sleep, relation to my children and work)	Positive effect 72 (78%) Negative effect 3 (3%) No answer 17	Positive 21/27 (78%) Negative 2/27 (7%) No answer 4	Not relevant
A3: Effect on use of tobacco, alcohol or misuse of drugs	Positive effect 33 (36%) Negative effect 15 (16%) No answer 44	Positive 10/27 (37%) Negative 5/27 (19%) No answer 12	Not relevant
A4: Other effects	Positive effect 19 (11%) Negative effect 4 (2%) No answer 69	Positive 6/27 (22%) Negative 0/27 No answer 21	Not relevant
All randomized	$n = 180$	$n = 184$	
Some positive effect in A1 to A4 (Scale 1–4)	Some positive effect 91/180 (51%)	Some positive 24/184 (13%)	Differences = 38%, (28–46), Kendall's tau: $P < 0.0001$
Some negative effect in A1 to A4 (Scale 1–4)	Some negative effect 24/180 (13%)	Some negative 8/184 (4.3%)	Differences = 9% (3–15), Kendall's tau: $P = 0.002$
Sum of A1 to A4 (positive effects – negative effects)	Sum positive 80/180 (44%) Sum neutral 91/180 (51%) Sum negative 9/180 (5%)	Sum positive 22/184 (12%) Sum neural 160/184 (87%) Sum negative 2/184 (1%)	Pos dif= 32% (24–41) Kendall's tau: $P < 0.0001$

Answers to question 1: 'Has completing the questionnaires or participation in the health consultation had any positive or negative effect on your life the past year?'.
n = number of patients, NS = not significant.

Table V. *Comparison at baseline between 364 patients completing the study and 131 dropouts after the randomization*

Baseline value	Completed the study, $n = 364$	Dropout after randomization, $n = 131$	Differences, Student-t or Chi–Square test (95% CI)
Female, numbers	277/364 (76%)	86/131 (65%)	Differences = 11% (2 to 20), $P = 0.02$
Age (year), mean (SD)	34.3 (6.6)	33.4 (6.8)	Differences = −0.9 (−2.3 to 0.4), $P = 0.17$ (NS)
Total number of problems at baseline, mean (SD)	10.1 (3.0)	10.4 (3.2)	Differences = 0.35 (−0.3 to 1.0), $P = 0.26$ (NS)
Daily smoker (missing $n = 10$)	190/357 (53%)	75/128 (59%)	Differences = 5.4% (−5 to 15), $P = 0.30$ (NS)
	$n = 355$	$n = 128$	
MCS SF12, mean (SD)	40.6 (11.0)	38.7 (11.7)	Differences = −1.8 (−4.1 to 0.47), $P = 0.12$ (NS)
PCS SF12, mean (SD)	47.3 (11.1)	49.5 (9.6)	Differences = 2.3 (0.2 to 4.3), $P = 0.04$

n = number of patients, NS= not significant, MCS-SF12 = Mental Component Score of SF12, PCS-SF12 = Physical Component Score of SF12.

problems and the same mental health score (MCS-SF12). They were more often men and had a better physical health (PCS-SF12) than the participants (Table V). The dropout rate was about the same in the two groups: 71/255 (28%) in the control and 60/240 (25%) in the intervention group (Fig. 2). The regression analysis controlling for sex and age group did not change the found effect of intervention. We therefore believe that the difference between intervention and control is not affected by dropouts. A dropout of 20–30% was expected in this group of young patients, which had been selected because they had many problems and few resources. In this light, a follow-up rate of 0.74 must be considered satisfactory.

'The questionnaires' were based on previous research. They were pilot-tested in four clinics before the trial. We had no resources to conduct a new genuine psychometric validation process. We find this acceptable because the questionnaires were mainly used to prime the patient before the consultation and only for some validated questions to compare their status before and after the intervention.

Some of the found improvement could represent 'regression to the mean', both in number of problems and in the SF12, as the participants were selected from among those who had many problems. Some of the improvement in the control group might be an effect of completing the questionnaires and their GPs' participation in the project. This 'rub-off effect' might have decreased the difference between the groups. The 'individually block-controlled randomized design' with telephone randomization and comparable groups at baseline is a solid contribution to the internal validity of the trial. The use of a standardized well-validated and frequently used MCS-SF12 and PCS-SF12 strengthens the study [30]. The analysis at the GP level among 21 GPs with 10 or more included patients indicates a certain consistency of the findings. The CONSORT statement has been respected and intention to treat analysis was performed whenever data were available. The question may, of course, be raised whether our findings are unique. The intervention was carried out by ordinary 'GPs with an interest in preventive health care' as a part of their daily work in their clinics after courses (about 40 hours) that focused on lifestyle psychosocial aspects of life and individual reasons for making healthy and unhealthy choices. The questionnaires primed and helped patients and GPs to form a holistic view and the GP to be non-authoritative. Completion of the evaluation report during the last part of the consultation formed a supporting structure for clarifying general health, goals, resources and barriers. This structure supported the use of the three elements of MI in a patient-centered atmosphere. This working method can be adapted by most GPs.

Why did it take more than 10 years to report this study? Because clinical work had top priority, and the writing process have been more time consuming than expected.

Comparison with other studies

Many studies on MI have been published during the past 20 years. A systematic review of 72 studies using MI found a positive effect in 74% (53/72) [37]. None of the publications reported any adverse effects. One study was comparable with our study in several ways [38]. Their target group was the most affected (upper quartile in cholesterol). The physicians were trained in patient-centered counseling with elements of MI. After 1 year, the intervention group had a significantly better total cholesterol/high density lipoprotein ratio and a 2.3 kg larger weight loss than the non-intervention group. Their intervention required 8–10 minutes extra. The health subjects explored in our study were not predetermined but reflected the problems revealed during the consultation. Approximately 20 of the 60 minutes were used for completing the evaluation report.

Studies related to specific diseases show that change in cognitive measures predict change in health-related behavior [37, 39]. A small prospective study of psychological determinants of quality of life in patients with whiplash found a high correlation between the SF12 score and the self-efficacy scale (SES). Variation in SES could explain about 40% of the variation in the SF-12 [40].

Our study has a very different idea and study population than a Danish randomized study from primary care [41], which focused on biomedical screening for traditional risk factors among 30- to 49-year-old inhabitants of the Ebeltoft municipality. About 25% had fair or bad self-rated health [42]. The patients' goals were often related to weight, exercise or tobacco and only about 2–8% had goals involving psychological or family problems. In our study, 28% of the screened and 58% of the randomized patients had fair or bad self-rated health (Table I). The difference in self-rated health in the two study populations indicates that our design managed to include patients with most need of a preventive health consultation [23]. The high prevalence of smokers dropping out before randomization in our trial may indicate that even if our invitation underlined the individual support to achieve a better quality of life, some people with risky lifestyle will refuse the offer [4, 5]. The lack of lifestyle difference among the dropouts after randomization might, on the other hand, indicate that the holistic patient-centered approach was accepted by the randomized patients.

Studies have shown that a close relationship to the GP is essential for achieving improvements in health and for a well-functioning health care system and low health care costs [43, 44]. 'Iatrogenesis' where health professionals take responsibility for health and individual values may do damage to people's health [45]. Self-esteem, which is fundamental to self-efficacy, will often be undermined and become negative if internal motivation to change is not elicited [46, 47].

We find that that the following factors are important in a health preventive consultation aiming at supporting self-efficacy: individual invitation from own GP to those in need, priming the patient with BQ revealing holistic aspects of life and filled in at home, patient-centered consultation using elements of MI regarding self-chosen goals and an evaluation scheme completed at the end of the consultation to describe resources, barriers and time schedule to obtain the goals. This provides a clear structure that supports specific self-efficacy in patients with many problems. Our finding of a marginally better self-rated health and a significantly improved MCS-SF12 indicates that the participants were empowered to better manage their psychosocial life as fundamental to improve their lifestyle.

What is already known on this topic

People with few resources and unhealthy lifestyle have problems in profiting from advice on how to reduce risk factors. Basic needs have to be met before interest in lifestyle changes can be raised.

What this study adds

In structured patient-centered consultation focusing on psychosocial situation, resources and barriers, 9 of 10 participants with few resources chose one or two goals for a better life or lifestyle, achieved a better mental health (MCS SF12) and had fewer problems after 1 year. The number needed to benefit by health consultations was 3.1 and the number need to harm 25.

Conclusions

In a group of 20- to 44-year-olds with many unmet basic needs, two preventive health consultations with their own GP have shown to have an effect on mental health (MCS-SF12). This psychological improvement may be a key to reaching a higher level in the hierarchy of basic needs and hence to developing a solid basis for self-esteem and self-efficacy, for gaining more control, and maybe for developing healthier ways of living. GPs have to be aware of fundamental needs and problems among patients when changes in lifestyle or daily life are discussed.

Funding

The North Jutland Quality Development Fund (§2 appointment 'Preventive health consultations in the County of North Jutland'); The Health Insurance Foundation (Helse Fonden, 2001 B027); The Research Foundation for General Practice (FF-2-01–284); The Danish Heart Association (1998); The

Lundbeck Foundation (reg.nr. 27989); The PLU Foundation (nr. 268).

Acknowledgements

The 2 056 initially screened patients in North Jutland, Denmark and the 28 participating GPs are thanked for their enthusiastic work: Annebeth H. Aasted, Elsebeth H. Hansen, Axel Aubertin, Erik Hauberg, Kirsti Braaten, Claus A. Nissen, Leo Thomsen, Lars Breuning, Annette Engsig, Kirsten S. Freund, Jørgen R. Hansen, Carsten Grove, Aase Hauge, Hans Jørgensen, Flemming Knudsen, Jonna Thomsen, Olse Vang, Jesper Kronsted, Dan Haffstrøm, Marianne Lund, Bjarne Uhenholt, N. Wickers Nielsen, Peter E. Bille, Jens Poulstrup, Regnar Rasmussen, René Rose, Claus Skov-Madsen and Gerhard Seth Sørensen. We wish to thank biostatistician Pia V Larsen, Research Unit of General Practice, Institute of Public Health, University of Southern Denmark for valuable advice on our analysis and drafting of the paper. K.S.F. designed the study and the data collections tools, recruited the GPs, arranged the courses, implemented the trial, discussed the data, drafted and revised the paper. J.L. designed data collection tools, monitored data collection for the whole trial, planned randomization, wrote the statistical analysis plan, cleaned and analyzed the data, drafted and revised the paper. ClinicalTrials.gov Registration: NCT 01231256

Conflict of interest statement

None declared.

References

1. The Global Economic Burden of Non-communicable Diseases. From Burden to ''Best Buys'': Reducing the Economic Impact of Non-communicable Diseases in Low- and Middle-Income Countries. World Economic Forum and the Harvard School of Public Health. Available at: http://www.weforum.org/EconomicOfNCD. Accessed: 19 March 2012.
2. Gillam S. Is the declaration of Alma Ata still relevant to primary health care? *BMJ* 2008; **336**: 536–8.
3. Ebrahim S, Beswick A, Burke M *et al*. Multiple risk factor interventions for primary prevention of coronary heart disease.*Cochrane Database Syst Rev* 2006. , Issue 4. Art. No.: CD001561. DOI: 10.1002/14651858.CD001561.pub2.
4. Beich A, Gannik D, Malterud K. Screening and brief intervention for excessive alcohol use: qualitative interview study of the experiences of general practitioners. *BMJ* 2002; **325**: 870–4.
5. Nielsen KB, Dyhr L, Lauritzen T *et al*. ''You can't prevent everything anyway''; a qualitative study of beliefs and attitudes about refusing health screening in general practice. *Fam Pract* 2004; **21**: 28–32.
6. Maslow AH. A theory of human motivation. *Psychol Rev* 1943; **50**: 370–96.
7. Timmerman GM, Acton GJ. The relationship between basic need satisfaction and emotional eating. *Issues Ment Health Nurs* 2001; **21**: 691–701.
8. Acton GJ, Malathum P. Basic need status and health-promoting self-care behavior in adults. *West J Nurs Res* 2000; **22**: 796–811.
9. Bandura A. *Selfefficacy: The Exercise of Control*. New York, NY: Freeman, 1997, 5.
10. Dallow CB, Anderson J. Using self-efficacy and a transtheoretical model to develop a physical activity intervention for obese women. *Am J Health Promot* 2003; **17**: 373–81.
11. Wallerstein N. Empowerment to reduce health disparities. *Scand J Public Health* 2002; **30**(Suppl. 59): 72–7.
12. Antonovsky A. *Health, Stress and Coping*. Washington, DC: Jossey-Bass Publishers, 1979.
13. Bille P, Freund KS, Frimodt-Moller J. *Forebyggende helbredsundersøgelser/helbreds-samtaler for voksne i Nordjyllands Amt. [Preventive health Consultations in adults in North Jutland County]*. Aalborg, Denmark: Nordjyllands Lægekredsforening, 1990.
14. Rasmussen NK. *Evaluering af forebyggende helbredsundersøgelser/helbreds-samtaler for voksne i Nordjyllands Amt. [Evaluation of preventive health consultations in adults in North Jutland County]*. Copenhagen, Denmark: DIKE, 1993.
15. Mabeck CE. *Lægen og patienten. Patient-centreret medicin i teori og praksis. [The physician and the patient. Patient-centered medicine in theory and practice]*. Copenhagen, Denmark: Munksgaard, 1994.
16. Miller WR. Motivational interviewing with problem drinkers. *Behav Psychother* 1983; **11**: 147–72.
17. Miller WR, Rollnick S. Motivational interviewing: preparing people for change. New York, NY: Guildford Press. 2002.
18. Hecht J, Borrelli B, Breger RK *et al*. Motivational interviewing in community-based research: experiences from the field. *Ann Behav Med* 2005; **29**(Suppl): 29–34.
19. Pocock SJ. *Clinical Trials. A Practical Approach*. Chichester, UK: John Wiley & sons, 1991.
20. Schulz KF, Altman DG, Moher D *et al*. CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials. *BMJ* 2010; **340**: 698–702.
21. Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. *J Cons Clin Psychol* 1983; **51**: 390–5.

22. Hollnagel H, Malterud K. Shifting attention from objective risk factors to patients' self-assessed health resources: a clinical model for general practice. *Fam Prac* 1995; **12**: 423–9.
23. Freund KS, Lous J. Potentielt marginaliserede 20-44-årige i almen praksis; Hvem er de? Resultater af en spørgeskemascreening. [Potentially marginalised 20-44-year-olds in general practice. Who are they? The results from a screening questionnaire]. English summary. *Ugeskr Laeger* 2002; **164**: 5367–72.
24. Osler M, Heitmann BL. The validity of a short food frequency questionnaire and its ability to measure changes in food intake: a longitudinal study. *Int J Epidemiol* 1996; **25**: 1023–9.
25. Kjøller M, Rasmussen NK, Keiding L *et al*. *Sundhed og sygelighed i Danmark 1994 og udviklingen siden 1987 [Health and illness in Denmark 1994; development since 1987]*. Copenhagen, Denmark: Dansk Institut for Klinisk Epidemiologi, 1995.
26. Dean K, Hunter D. New directions for health: towards a knowledge base for public health action. *Soc Sci Med* 1996; **42**: 745–50.
27. Osler M, Lous J, Rasmussen NK. Knowledge, attitudes and cardiovascular risk factors in Danish adults. *Scand J Soc Med* 1992; **20**: 151–7.
28. Christoffersen MN. *Opvækst med arbejdsløsheden; forløbsundersøgelse af to generationer født 1966 og 1973.[Growing-up with un-employment; a prospective cohort of two generations born in 1966 and 1973]* vol. 14. Copenhagen, Denmark: Socialforskningsinstituttet, 1996, 203.
29. Idler EL, Benyamini Y. Self-rated health and mortality: a review of twenty-seven community studies. *J Health Soc Behav* 1997; **38**: 21–37.
30. Ware JE, Jr, Kosinski M, Keller S. SF-12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 1996; **34**: 220–33.
31. Gandek B, Ware JE, Aaronson NK *et al*. Cross-validation of item selection and scoring for the SF-12 Health Survey in nine countries: results from the IQOLA Project. *J Clin Epidemiol* 1998; **51**: 1171–8.
32. Cohen J. A power primer. *Psychol Bull* 1992; **112**: 155–9.
33. Altman DG, Machin D, Bryant T *et al*. *Statistics with Confidence*, 2nd edn. London, UK: BMJ Books, 2000.
34. Gandhi SK, Salmon JW, Zhao SZ *et al*. Psychometric evaluation of the 12-item short-form health survey (SF-12) in osteoarthritis and rheumatoid arthritis clinical trials. *Clin Ther* 2001; **23**: 1080–98.
35. Smith DP, King MT, Egger S *et al*. Quality of life three years after diagnosis of localized prostate cancer: population based cohort study.*BMJ* 2009; **339**: b4817 doi:10.1136/bmj.b4817.
36. Kudielka BM, Hanebuth D, von Känel R *et al*. Health-related quality of life measured by the SF12 in working populations: associations with psychosocial work characteristics. *J Occup Health Psychol* 2005; **10**: 429–40.
37. Rubak S, Sandbæk A, Lauritzen T *et al*. Motivational interviewing: a systematic review and meta-analysis. *Br J Gen Pract* 2005; **55**: 305–12.
38. Ockene IS, Hebert JR, Ockene JK *et al*. Effect of physician-delivered nutrition counselling training an office-support program on saturated fat intake, weight, and serum lipid measurements in a hyperlipidemic population. Worcester Area Trial for conseling in hyperlipidemia (WATCH). *Arc Intern Med* 1999; **159**: 725–31.
39. Burke V, Mansour J, Mori TA *et al*. Changes in cognitive measures associated with lifestyle program for treated hypertensives: a randomized controlled trial (ADAPT). *Health Educ Res* 2008; **23**: 202–17.
40. Kall LB. Psychological determinants of quality of life in patients with whiplash associated disorders—a prospective study. *Disabil Rehabil* 2009; **31**: 227–36.
41. Engberg M, Christensen B, Karlsmose B *et al*. General health screening to improve cardiovascular risk profiles: a randomized controlled trial in general practice with 5-year follow-up. *J Fam Pract* 2002; **51**: 546–52.
42. Lauritzen T, Jensen MSA, Thomsen JL *et al*. Health tests and health consultations reduced cardiovascular risk without psychological strain, increased healthcare utilization or increased costs. *Scand J Pub Health* 2008; **36**: 650–61.
43. Starfield B. *Primary Care: Balancing Health Needs, Services, and Technology*. Oxford, UK: Oxford University Press, 1998.
44. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. *Milbank Q* 2005; **83**: 457–502.
45. Illich I. Medicalization and primary care. *J R Coll Gen Pr* 1982; **32**: 463–70.
46. Getz L. Sustainable and responsible preventive medicine; Conceptualizing ethical dilemmas arising from clinical implementation of advancing medical technology. (PhD-thesis) HTNU Department of Public Health and General Practice, Trondheim, Norway. 2006.
47. Hetlevik I. Evidence-based medicine in general practice: a hindrance to optimal medical care? *Scan J Prim Health Care* 2004; **22**: 136–40.

Appendix 1.

Problem Screening Questionnaire

In order to decide if you may profit from a one-hour preventive health consultation, I will kindly ask you to fill in this questionnaire as well as possible.

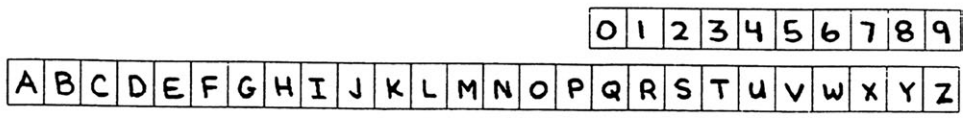
The questionnaire covers areas that are particularly important to thriving and to maintaining good health.

Please answer each question by ticking off the box that you feel best describes your situation.

Please fill in the questionnaire as follows:

Most of the questions should be answered by ticking off the box next to the answer that you feel best describes your situation.

- We prefer that you use a black roller or pencil
- Do not use a cross, but a big point.
- Figures and letters are best done like this:
-



-

What are you: Male ☐ Female ☐

When were you born: Date ☐☐ Month ☐☐ Year ☐☐

The GP fills in this section:

GP-number: ☐☐ **Number of problems:** ☐☐

Has the baseline questionnaire (BQ) been handed out: Yes ☐ No ☐

If Yes, when Date ☐☐ Month ☐☐ Year ☐☐

I Yes, the number of the BQ ☐☐☐☐☐☐

Resources

Please answer the following questions as well as you can by ticking off the box that best describes your situation:

1. In general, would you say your health is:

Very good	Good	Fair	Poor	Very poor

2. Do you feel well enough to be able to do what you would like to do?

All the time	Most of the time	Some of the time	A little of the time	None of the time

3. Do you think you know enough to be able to improve your thriving and your health?

All the time	Most of the time	Some of the time	A little of the time	None of the time

4. Do you feel appreciated by those you see on a daily basis?

All the time	Most of the time	Some of the time	A little of the time	None of the time

5. If you have a job, do you feel appreciated at work?

All the time	Most of the time	Some of the time	A little of the time	None of the time

6. Do you find it easy to find solutions to the problems and difficulties you meet in your everyday life?

All the time	Most of the time	Some of the time	A little of the time	None of the time

7. Do you feel that you are encountering significant mental problems during your everyday life?

None of the time	A little of the time	Some of the time	Most of the time	All the time

8. If you are having problems, do you then have somebody in your family whom you trust and with whom you talk about these problems?

All the time	Most of the time	Some of the time	A little of the time	None of the time

9. If you are having problems, do you then have somebody among your friends whom you trust and with whom you talk about these problems?

All the time	Most of the time	Some of the time	A little of the time	None of the time

Lifestyle	no	yes
10. Do you feel so stressed-up several times during the week that you feel physically uncomfortable?	☐	☐
11. Do you need time to tend to yourself during your daily life?	☐	☐
12 Have you ever felt that you should reduce your consumption of beer, wine and spirits?	☐	☐
13. Do you use tobacco on a daily basis?	☐	☐
14. Do you use pain killers on a **daily basis**?	☐	☐
15. Do you use drugs that have an addictive effect on **a weekly basis** (sleep medication, tranquilizers, hash, or narcotics)?	☐	☐
16. Are vegetables only rarely part of your main course (i.e. less than three times a week)?	☐	☐
17. Do you rarely exercise, i.e. less than four hours a week (walking, biking, sports, garden work and similar activities)?	☐	☐
Family life	no	yes
18. Are you living alone?	☐	☐
19. Are you living alone with one or more children?	☐	☐
Have you or have your partner been unemployed for a longer period, e.g.		
20. For more than six months within **the past year**?	☐	☐
21. For more than one year within **the past three years**?	☐	☐
Are there or have there been any problems with consumption of beer, wine and spirits, drugs or medicine during the past year		
22. For you or our partner?	☐	☐
23. For your child or any of your children?	☐	☐
Is daily life influenced by significant problems		
24. As far as you are concerned?	☐	☐
25. In your relationship?	☐	☐
26. As far as your child or your children are concerned?	☐	☐
27. Do you need to feel more secure in your everyday life?	☐	☐

The following questions should only be answered if you have a child or children (irrespective of their age)

28. How do you evaluate your relationship with your children?

Very good	Good	Fair	Poor	Very poor	Not relevant

29. If your child falls ill (e.g. has influenza) for a short period, do you then feel that you can cope with this and have a normal everyday life (at home and at work)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time	Not relevant

30. Are you actively trying to support and improve your child's physical environment? (school transportation, institution, friends)

All of the time	Most of the time	Some of the time	A little of the time	None of the time	Not relevant

31. Within the past year, have you often felt that you lacked energy to set down your foot towards your children even if you think it is important?

None of the time	A little of the time	Some of the time	Most of the time	All of the time	Not relevant

32. How would you evaluate the childcare you have for your children?

Very good	Good	Fair	Poor	Very poor	Not relevant

33. How often do you think you are having problems in making your child/children eat regularly and eat healthy food?

None of the time	A little of the time	Some of the time	Most of the time	All of the time	Not relevant

How to count number of problems

All questions with a five-grad scale count as a problem when the answer is one of the three most problematic. That means answers in one of the two left boxes = nil problem, and answers in the three right boxes = one problem.

In all yes or no questions **yes** = one problem and **no** = no problem.

Maximum score = 33 problems.

Lous and Freund *BMC Family Practice* (2016) 17:43
DOI 10.1186/s12875-016-0437-8

BMC Family Practice

RESEARCH ARTICLE Open Access

Predictors of weight loss in young adults who are over-weight or obese and have psychosocial problems: a post hoc analysis

Jørgen Lous[1*] and Kirsten S. Freund[2]

Abstract

Background: The aim of this study is in a general practice trial setting to identify predictive factors for weight loss after 1 year among young adults who are over-weight or obese and who have several psychosocial problems.

Methods: Twenty-eight general practitioners recruited 495 patients aged 20–45 years with psychosocial problems for a randomized general preventive study to increase self-efficacy to achieve a self-prioritised goal for a better life by discussions of resources and barriers for reaching the goal. The present study is a post hoc analysis of possible predictors of weight loss among all 218 patients who have over-weight or obesity. A 23-pages questionnaire was completed before and 1 year after randomization. 111 patients had a one-hour preventive health consultation with their general practitioners focused on life coaching and a follow-up consultation within 3 months, and 107 patients had no preventive consultation.

Results: Twenty-two patients stated during the preventive consultation that weight loss was a prioritised goal. They had a mean weight loss of 4.7 kgs compared with 1.6 kgs in the group without this goal and 1.6 kgs in the group without preventive consultation. In a logistic regression model, predictors of weight loss or no weight loss were a) pre-interventional consideration of weight loss within 30 days, b) having weight loss as a prioritised goal for improved quality of life, c) being female, d) being in the oldest half of participants, and e) having many psychosocial problems. In a linear regression model, the predictors together explained about 11 % of the weight loss. Important predictors were: obesity (explained 4 %), pre-interventional consideration of weight loss within 30 days (3 %), and having a preventive health consultation with weight loss as a prioritised goal (2 %).

Conclusions: Pre-interventional consideration of weight loss within 30 days and having weight loss as a prioritised goal during the health consultation were two important predictors for weight loss. By structured interventions focussing on the patients' priorities, self-chosen goals, their resources and barriers for reaching the goals, changes may be obtained; especially in participants with many problems who often do not accept participation in procedures on risks.

ClinicalTrials gov Registration: NCT 01231256, Aug. 22. 2010.

Keywords: Weight loss, Life coaching, General practitioners, Over-weight, Psychosocial problems, Specific self-efficacy, Patient-centred, Motivation

* Correspondence: jlous@health.sdu.dk
[1]Research Unit of General Practice, Department of Public Health, University of Southern Denmark, J.B. Winsløwvej 9A, DK-5000 Odense, Denmark
Full list of author information is available at the end of the article

Background

Excess bodyweight is an important risk factor for mortality and morbidity, causing nearly 3 million deaths every year worldwide [1]. Globally, body mass index (BMI) has increased since 1980 with large differences between nations and regions [1, 2]. A recent meta-analysis found that obesity, especially with BMI ≥35 kgs/m^2, was associated with significantly higher all-cause mortality, and slight overweight was associated with significantly lower all-cause mortality [3].

The importance of overweight (BMI 25–30 kgs/m^2) and obesity (BMI >30 kgs/m^2) as risk factors for myocardial infarction and ischemic heart disease is controversial. A register-based cohort study including all patients from The Western Denmark Heart Registry with coronary atherosclerosis confirmed via coronary angiography (n = 37 573) found that the death rate was lowest among pre-obese patients (BMI 25–30 kgs/m^2) during 11 years of follow-up [4]. A Danish cohort study of 71 527 individuals from the Copenhagen General Population Study with 3.6 years of follow-up reported increased risk of myocardial infarction in overweight (hazard ratio 1.26 (95 % confidence interval (CI) 1.0 to 1.6)) and obese (hazard ratio 1.88 (1.3 to 2.6)) subjects [5].

Many short-term studies have evaluated the effects of weight loss in patients with chronic diseases and often demonstrated a beneficial effect of even modest weight loss on their disease [3, 6]. Fewer long-term studies have evaluated the benefits of weight loss, but their findings tend to confirm the findings of short-term studies [7, 8]. In Denmark, overweight and obesity are significant problems increasing with age [9, 10].

While some consequences of obesity are well documented, the reasons for over-weight and obesity are very complex and difficult to address. The importance of human gut microbes is under intense investigation [11]. Imbalance between energy input and energy use is, however, part of the problem and is the focus of many interventions programmes. Intervention with dietary advice, more exercise, and improved health professional management has resulted in effects that are often limited and brief [12–14]. In contrast, focusing on self-efficacy, which is a person's judgement of his or her ability to cope effectively in a specific difficult situation, seems to result in a better change of life style over 6–12 months [15, 16].

People with mental health problems often have overweight problems as well. Several studies have shown positive effects of health promotion coaching resulting in clinical significant weight loss and an increase in the sense of coherence [17, 18].

Approximately 90 % of the Danish population, visit their general practitioners (GPs) at least once annually [19]. Thus it is evident that Danish GPs may play a central role in treating over-weight and obesity in their surgeries.

In 1998–9 we did a randomized study on the effect of patient-centred consultations in general practice for 20–44 year old patients with multiple psychosocial and lifestyle problems [20]. The focus was on resources and barriers for obtaining self-chosen goals within life circumstances and lifestyle. One-year follow-up questionnaire showed significant improvement in Short Form Health-related Quality of Life Mental (MCS-SF12) in the intervention group (7.3 point) compared with the control group (3.0 point). The difference was 4.3 point (ci 1.6 to 7.0, P = 0.002). The number of problems were reduced significantly more in the intervention than in the control group (1.8 versus 0.8, p = 0.03) [20].

This paper is a post hoc analysis of all 218 patients who are over-weight or obese, irrespective of their randomization group. In the previous paper, we found that the intervention group (independent of their weight) had a mean weight loss of 2.9 kgs compared with the control group weight loss of 1.5 kgs, (difference 1.4 kgs (ci: −0.8 to 3.7 kgs, p = 0.21) [20].

The primary aim of the present paper is to describe predictive factor for weight loss in participants with a BMI at 25 or higher. Our secondary aim is to describe the participants who are over-weight or obese compared with the participants in the normal weight group.

Weight loss was the most common chosen goal for a better life next year independent of weight. Other chosen goals were better psychological health, a better relationship to the partner, a change of job situation, smoking cessation, better health, and a better social network [20].

Methods

GPs

All 325 GPs in North Jutland County, Denmark, were invited to participate. Fifty (15 %) attended the study introduction weekend session, and 28 GPs included patients in the study. They had a total of 40 h of preventive health education, partly weekend, partly one-day or evening sessions concentrating on psycho-social factors, lifestyle problems related to cardiovascular disease, alcohol, smoking, and drug addiction, the "stages of change" model, patient-centred consultation with important elements from motivational interviewing respecting patients' goals and ambivalence, discussing and supporting patients' own resources and barriers to achieve the patients' goals [20].

Material

Participants were recruited by the secretary when attending the GPs' surgery for other reasons. They were required to be 20–45 years old, able to read and

understand Danish, and without any severe acute illness or severe psychiatric problems. A total of 2 056 people (98 %) accepted the invitation to participate in the preventive study and provided written informed consent about the purpose:"… To support your resources in order to prevent larger problems or illness…". They were screened by completing a "problem questionnaire" with 33 items about self-rated health, personal network and resources, lifestyle, and social situation [18]. A cut-off of ≥7 of 33 problems was chosen in order to include the quarter of participants with the largest number of problems, actually 625 (30 %) had ≥7 problems [21]. These 625 individuals were invited to participate in the randomised trial.

All participants had to complete a baseline questionnaire at home consisting of 80 questions (23 pages) dealing with family situation, resources, work, education, self-rated health, use of medicine, dietary and smoking habits, substance abuse, height and weight, health-related quality of life Short Form (SF12), health and illness behaviour and considerations of changes for improved quality of life the following year. A total of 495 participants returned the baseline questionnaire and were randomised to intervention or control groups regardless of their weight. All 495 were sent a postal 1-year follow-up questionnaire (23 pages) similar to the baseline questionnaire.

Intervention

Participants in the intervention group were invited to attend a one-hour preventive health consultation as well as a 20-min follow-up consultation with their GPs within 3 months. Completing the baseline questionnaire was intended to facilitate insight into circumstances regarding psychosocial life, health, lifestyle, the participant's reaction to stressors, and heath and illness behaviour. This insight made it easier for the GPs to offer patient-centred counselling [20]. The GPs were recommended to use open questions and to respect the patients' agendas by asking the following questions: "What was it like to complete the questionnaire?" and "What do you prefer to discuss?" During the health consultation, the patients were asked to choose 1 or 2 goals to improve their quality of life the following year. At the end of the health consultation, the patients' resources and barriers for achieving their goal were discussed and described, and their time schedules were written down. This style of intervention is now called life coaching [22].

Possible predictors of weight loss

The study is based on the following information: 1) the screening questionnaire and baseline questionnaire completed by all 495 participants before randomisation, 2) the goal chosen during the health consultation, and 3) 1-year follow-up questionnaires including their actual height and weight, returned by post.

Demographic variables such as age, gender, education, cohabitation status, self-rated economy (bad to fair/good), and social group were included in the baseline questionnaire as were self-rated health, Short Form Health-related Quality-of-Life Mental (MCS-SF12) and Physical (PSC-SF12), and the number of problems on the 33-item screening questionnaire [21].

Statistics

Data were collected from the questionnaires using the TeleForm^R reading system (info@cardiff-teleform.com) and analysed in IBM SPSS (Statistical Package for the Social Sciences, ver. 16 and 22). Scaled variables were analysed both as scaled and as far as possible dichotomised into two equal-sized parts. The dichotomizing was done with biological meaningful cut points. Dichotomizing means fewer cells in the analysis and a more stable model with our number of cases. Achieved 1) weight loss (yes or no) and 2) extent of weight loss after 1 year were the two dependent variables. Unadjusted analyses were performed using simple descriptive statistics such as Fisher's exact test, the chi-squared test, odds ratios (ORs) and analysis of variance (ANOVA) with 95 % confidence intervals (ci). Adjusted analyses in logistic regression models for weight loss or no weight loss as well as linear regression of the size of weight changes after 1 year were done with age group, gender, and variables that showed significant relation to weight loss in unadjusted analyses or a p-value less than 0.20. All non-over-weight respondents were excluded from the predictor analysis. All p-values are two-sided, and $P < 0.05$ was considered to indicate statistical significance.

Ethics

The Scientific Regional Ethics Committee in North of Jutland, now called North Denmark Region and the Danish Data Protection Agency approved this study. Patients were informed by their GPs, received written information, and provided written consent to participate in the study. The study protocol for the randomised controlled trial was published in ClinicalTrials.gov under registration number NCT 01231256.

Results

Participants

A total of 218 respondents with ≥7 psychosocial and lifestyle problems and who are over-weight (BMI 25–30 kgs/m^2) or obese (BMI 30–54 kgs/m^2) were included (Fig. 1). Over-weight was reported by 128 and 90 reported obesity. A total of 270 (55 %) of the

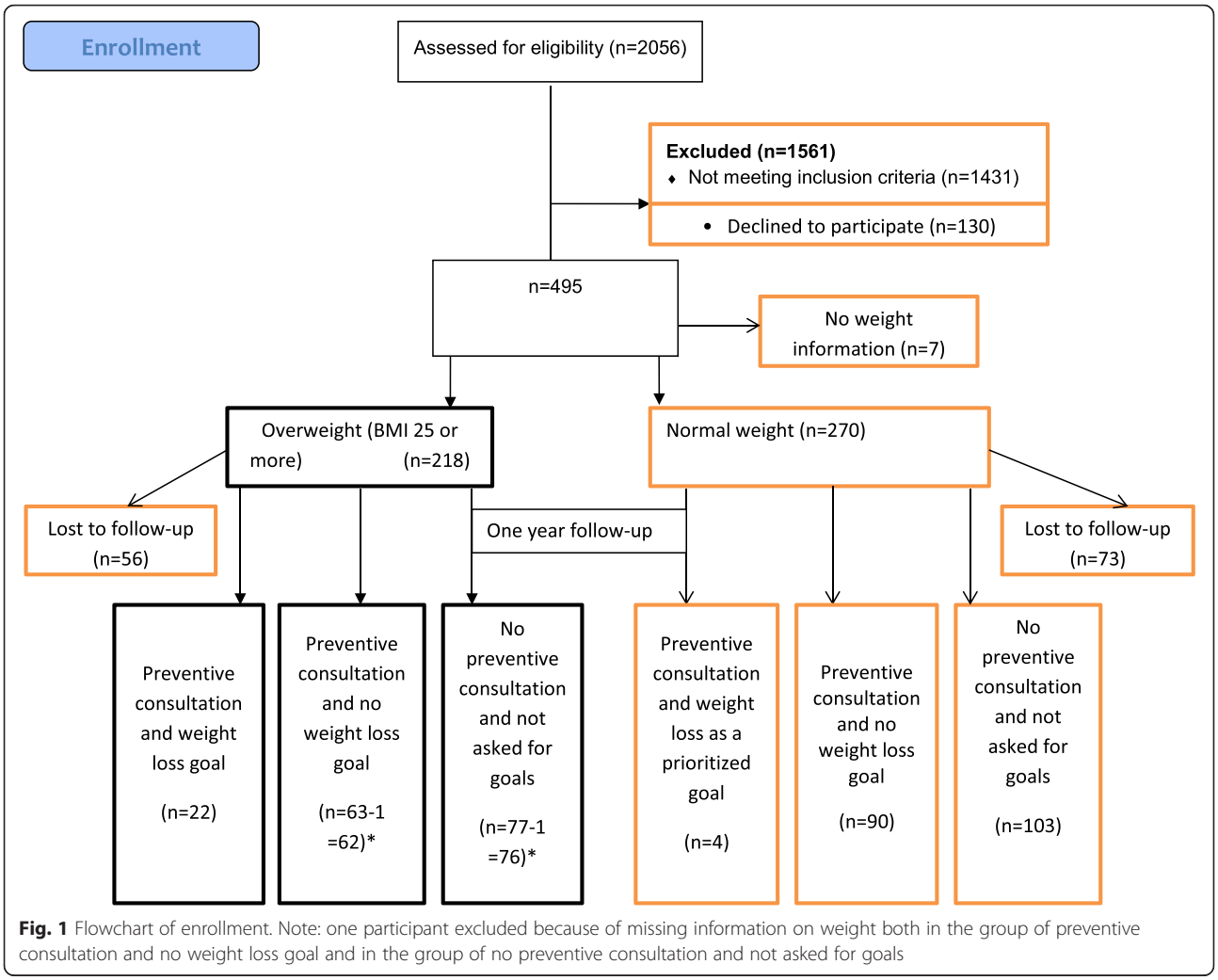


Fig. 1 Flowchart of enrollment. Note: one participant excluded because of missing information on weight both in the group of preventive consultation and no weight loss goal and in the group of no preventive consultation and not asked for goals

randomised 495 had normal weight. Seven (2 %) had not reported height or weight at baseline, which is why they were excluded. Fifty-six (26 %) of the 218 obese/over-weight participants were lost to follow-up after 1 year, and two had missing value of weight at 1-year follow-up, leaving 160 with over-weight for the predictor analysis (Fig. 1). No difference between attenders and drop-outs was found, and drop-out rate was not related to baseline weight.

Measured and stated weight

All 218 with over-weight had self-reported measurements of weight and height at baseline. In the intervention group, we could analyse the difference between measured weight during the first consultation and reported weight in the baseline questionnaire delivered to the GPs before randomisation. An agreement analysis was done with a correlation plot and a Bland-Altman plot (difference versus average plot) [23]. Spearman's rho of 0.97 and a difference of 0.89 kg (ci 0.2 to 1.6 kgs) were found (Fig. 2). These agreements justify comparison of stated weight at baseline and after 1 year in this study.

Characteristics of the over-weight group

The group of over-weight and obese patients (over-weight group; $n = 218$) had a mean weight of 88.6 kgs and a mean BMI of 30.2 kgs/m^2; the baseline values for the non-over-weight group ($n = 270$) were 63.2 kgs and BMI of 21.8 kgs/m^2, respectively (Table 1). Over-weight patients were more often male (OR = 1.40, ci 1.04 to 1.9) and were approximately 1 year older (34.7 years old) than participants with normal weight (33.5 years old). Educational background, self-rated health, and number of problems were not significantly different. The over-weight group had a lower physical health-related quality of life (PCS-SF12) (ANOVA, $P = 0.038$) and the same mental health-related quality of life as the non-over-weight group (MCS-SF12) (Table 1).

At baseline the over-weight group more often (21 %) considered weight loss within 30 days compared to 5 %

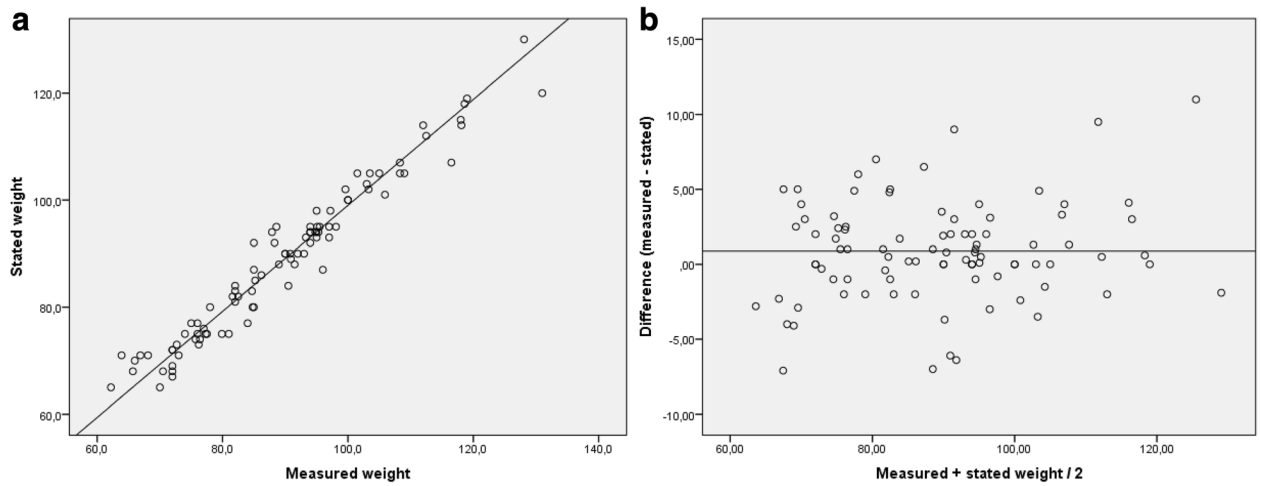


Fig. 2 a and **b** Correlation plot and "Difference versus average plot" (Bland & Altman plot) of measured and stated weight at baseline ($n = 91$)

in the non-over-weight group (RR = 3.8; Table 1). A total of 32 participants had weight loss as their top prioritised goal, and 27 of them were over-weight (relative risk = 7.49; Table 1).

Possible predictors of weight loss in the over-weight group

In Table 2, the possible predictors for weight loss are listed with their mean weight changes (ANOVA), and their relation to weight loss or no weight loss (OR). Information is from the 160 over-weight patients who returned the 1-year follow-up questionnaire with weight information.

"Having a preventive consultation and obtaining a weight loss as the first priority for better quality of life in the coming year" (OR = 4.6) and pre-interventional "consideration of weight loss within 30 days" (OR = 3.4) were the most important predictors in unadjusted analysis (Table 2). Females had an OR of 2.01 compared to males for having a weight loss, and those with low self-rated

Table 1 Baseline characteristic of over-weight or obese compared with no over-weight participants ($n = 488$)

Baseline characteristic	Overweigth		No overweigt		Anova or Relativ Risk (95 % conf interv)
	$n = 218$		$n = 270$		
Weight, kg, mean (95 % CI) (SD)	88.6 (86.5–90.9)	(16.4)	63.2 (62.1–64.3)	(9.2)	ANOVA, $F = 468.2$ $P = 0.000$
Height, cm, mean, (95 % CI) (SD)	171.2 (170.1–172.4)	(8.9)	170.1 (169.1–171.1)	(8.5)	ANOVA, $F = 2.0$ $P = 0.16$
BMI, kg/m^2 [a], mean (95 % CI) (SD)	30.2 (29.5–30.8)	(4.7)	21.8 (21.5–22.0)	(1.9)	ANOVA, $F = 702.5$ $P = 0.000$
Age, years, mean (95 % CI)(SD)	34.7 (34.4–36.2)	(6.7)	33.5 (33.3–34.9)	(6.6)	ANOVA $F = 3.9$ $P = 0.049$
Sex, number male/female (%)	70/148	(32.1 %)	62/208	(23 %)	RR = 1.40 (1.04 to 1.9) $P = 0.025$
Not single/single (%)	160/58	(73.4 %)	186/82	(w69.4 %)	RR = 1.22 (0.82 to 1.8) $P = 0.36$
11 years or more school education, number (%)	70/148	(32.1 %)	100/170	(37.0 %)	RR = 0.87 (0.68 to 1.11) $P = 0.44$
Self-rated health	133/85	(61.0 %)	154/115	(57.2 %)	RR = 1.17 (0.81 to 1.68) $P = 0.41$
Bad to fair/good to very good, number (%)					
Consider a short term weight loss, number (%)	46/169	(21.4 %)	15/254	(5.6 %)	RR = 3.84 (2.2 to 6.7) $P = 0.000$
Number of problems, mean (95 % CI) (SD) (min 7 and max 33)	9.9 (9.6–10.3)	(2.9)	10.3 (10.0–10.7)	(3.1)	ANOVA, $F = 2.1$ $P = 0.15$
Mental score (mcs-SF12), mean (SD) ($n = 216$ and 262)	40.4 (38.8–42.0)	(11.9)	39.8 (38.4–41.1)	(10.7)	ANOVA, $F = 0.40$ $P = 0.53$
Physical score (pcs-SF12), mean (SD) ($n = 216$ and 262)	46.8 (45.3–48.2)	(11.0)	48.8 (47.5–50.1)	(10.5)	ANOVA, $F = 4.31$ $P = 0.038$
Intervention/control group, number (%)	111/107	(50.9 %)	128/142	(47.4 %)	RR = 1.07 (0.90 to 1.29) $P = 0.25$
Weight loss as a prioritized goal for the next year[b] number (%)	27/191	(12.4 %)	5/265	(1.9 %)	RR = 7.49 (2.8 to 19.8) $P = 0.000$

[a]Seven had missing information of BMI
[b]Control group not asked about goals

Table 2 Possible baseline predictors for weight loss after 1 year ($n = 160$)

Variable	Category	Number (160)	Mean weight change (kg)	95 % ci of the change in mean	ANOVA		OR for weight loss or not and 95 % ci
					F-value	*P*-value	
Gender	Male	48	−1.50	−3.2 to 0.2			
	Female	112	−2.21	−3.5 to −1.0	0.41	0.52	2.01
							1.01 to 4.0
Age	21 to 34 years old	64	1.72	3.4 to −0.03			
	35 to 45 years old	96	−2.19	−3.5 to −0.9	0.20	0.65	1.43
							0.8 to 2.7
Education	School 7 to 11 years	104	−2.51	−3.8 to −1.2			
	School 12 years or more	56	−1.05	−2.6 to 0.5	1.87	0.17	0.57
							0.3 to 1.1
Social group	High (1 to 4)	97	−1.75	−2.8 to −0.7			
	Low (5)	63	−2.38	−4.4 to −0.4	0.36	0.55	0.82
							0.4 to 1.6
Occupation	No occupation	38	−1.97	−4.1 to 0.1			
	Have occupation	122	−2.01	−3.2 to −0.8	0.01	0.98	0.92
							0.4 to 1.9
Single/not single	Single	39	−0.54	−2.6 to 1.6			
	Not single	121	−2.47	−3.6 to −1.3	2.68	0.10	1.50
							0.7 to 3.1
Self-rated Economy	Good, very good	48	−2.81	−5.0 to −0.6			
	Fair, bad, very bad	111	−1.45	−2.5 to −0.4	1.62	0.21	1.22
							0.6 to 2.4
Self-rated health	Good, very good	62	−1.26	−2.6 to 0.1			
	Fair, bad, very bad	98	−2.47	−3.9 to −1.1	1.35	0.25	1.96
							1.03 to 3.7
Problem group	7-9 problems (medium)	85	−1.45	−2.7 to −0.2			
	10 or more problem	75	−2.63	−4.2 to −1.0	1.34	0.25	1.98
							1.05 to 3.7
Mental QoL (SF12)	Lower half	74	−2.30	−3.8 to −0.8			
	Upper half	86	−1.74	−3.1 to −0.4	0.29	0.59	0.65
							0.3 to 1.2
Physical QoL (SF12)	Lower half	82	−2.26	−3.8 to −0.7			
	Upper half	78	−1.73	−3.1 to −0.4	0.27	0.61	0.82
							0.4 to 1.5
Overweight group	BMI 25 to 27.49	60	−0.47	−1.9 to 1.0			
	BMI 27.5 to 29.99	31	−2.03	−3.8 to −0.3			
	BMI 30+	69	−3.32	−5.1 to −1.5	3.24	0.042	1.85[a]
							0.98 to 3.5
Considered weight loss at baseline ($n = 159$)	No	20	−1.75	−3.9 to 0.4			
	Yes, within 1 year	61	−2.05	−3.6 to −0.5			
	Yes, within 6 months	41	−0.12	−2.4 to 2.1			
	Yes, within 30 days	37	−4.27	−6.5 to −2.1	2.79	0.042	3.43[b]
							1.5 to 7.9
	Control, no goal setting	76	−1.57	−3.0 to −0.12			

Table 2 Possible baseline predictors for weight loss after 1 year ($n = 160$) *(Continued)*

Randomization group and weight loss goal	Preventive consultation without weight loss as a goal	62	−1.56	−3.2 to 0.05			
	Preventive consultation with weight loss as prioritized goal for the next year	22	−4.73	−7.7 to −1.8	2.3	0.10	4.63[c] 1.5 to 14.4

Mean size of weight loss and OR for weight loss or no weight loss in participant with BMI over 25
ANOVA analysis of variance; *OR* Odds Ratio; *Kg* Kilogram; *CI* Confidence interval
[a]The two weight groups below BMI 30 were collapsed to one group to calculate OR
[b]The three groups with no or longer time horizon for weight loss than 30 days collapsed to one group
[c]A new variable combining randomization and goal setting

health more often achieved weight loss than those with good self-rated health (OR = 1.96). Those with 10 or more problems in the screening questionnaire more often had weight loss (OR = 1.98). The 22 participants with weight loss as a prioritised goal during their health consultation had an average weight loss of 4.7 kgs (ci 1.8 to 7.7) compared to 1.6 kgs (−0.05 to 3.2) obtained by the 62 participants without a weight loss goal and those ($N = 76$) with no preventive health consultation: 1.6 kgs (0,1 to 3.0) (Table 2).

Using backward logistic regression on predictors for weight loss or no weight loss, we evaluated the eight possible predictors with p-values <0.2 in Table 2 and included age group in the analysis. In this analysis (Table 3), five variables were significantly predictive of weight loss after 1 year: 1) considering a short term weight loss before the intervention, 2) weight loss as top prioritised goal for improved quality of life during the preventive consultation, 3) having many psychosocial and lifestyle problems, 4) being in the 35–45 years-old group, and 5) being female. Over-weight group did not reach significance ($p = 0.053$), but stayed in the model. Lower levels of school education, living as a single person, and self-rated health were excluded from the model (Table 3). Thus, the number of psychosocial problems pushed self-rated health out of the model.

To further illustrate the importance of the identified predictors, we performed linear regression analysis on the size of weight changes (Table 4). The model has a problem illustrated by the fact that the constant in the model was not significant ($P = 0.29$). For that reason, the results of the linear regression shall be read with care. The linear model supported the logistic model and explained about 11 % of the changes in weight after 1 year. Over-weight group (3.8 %), consideration of short term weight loss (3.3 %), and having a preventive health consultation, and weight loss as a prioritised goal during the consultation (2.4 %) were significant predictors of the extent of weight loss. Cohabiting (2 %) stayed in the model, but did not reach significance ($P = 0.061$). The other variables (problem group, age group, school education, self-rated health, and gender) were excluded from the model (Table 4).

Discussion

Discussion of main results

Our investigation addressed possible predictive factors for weight loss among young over-weight and obese adults who have many psychosocial problems. One of

Table 3 Predictors for weight loss (yes or no) after 1 year in logistic regression model ($n = 159$)

Variable in the model	Exp (B)	95 % Conf. Interval	*P*-value
Consider a short term weight loss at baseline (30 day/6 months or more)	5.80	2.2 to 15.2	0.001
Preventive consultation and weight loss as goal	0.47	0.3 to 0.8	0.005
Number of problems (10 or more/7–9)	2.87	1.3 to 6.0	0.005
Age group (35–45/21–34 years)	2.87	1.3 to 6.3	0.009
Gender (female/male)	2.52	1.1 to 5.6	0.023
Weight group (obese/overweight)	1.48	1.0 to 2.2	0.053
Constant	0.012		0.003
Excluded from the model:			*p*-value
School education (high/low)	2.21		0.14
Single/not single	1.07		0.30
Self-rated health (bad to fair/good)	0.73		0.39

Omnibus tests of model coefficients, Chi-square = 35.3, df = 6, $P = 0.000$
Cox&Snell R Square = 0.20, Nagelkerke R Square = 0.27
Hosmer and Lermeshow test: Chi-square = 7.2, df = 8, $P = 0.52$

Table 4 Predictors for the size of weight loss in a linear regression model, ($n = 159$)

Variables	Unstandardized coefficient B (95 % ci)	*p*-value	R-square change
BMI group	−1.32 (−2.4 to −0.2)	0.017	3.8 %
(25–27.4/27.5-30/30+)			
Consider a short term weight loss at baseline (30 days/6 months or more)	−3.18 (−5.5 to −0.9)	0.007	3.3 %
Preventive consultation and weight loss as a goal	1.38 (0.1 to 2.7)	0.048	2.4 %
Single/not single	−2.15 (−4.4 to 0.1)	0.061	2 %
Constant	3.29 (−2.8 to 9.4)	0.29	
Total explained by the model (R Square)			11.5 %
Excluded from the model:		*p*-value	R Square
Problem group (10 or more/7–9)		0.11	1.5 %
Age group (35–45/21–34 years)		0.19	0.9 %
School education (high/low)		0.26	0.3 %
Self-rated health (bad-fair/good)		0.28	0.1 %
Gender (female/male)		0.76	0 %

the important factors was to have weight loss as a top prioritised goal for a better health next year and to have discussed resources and barriers for reaching the goal with their GPs during preventive consultations focusing on specific self-efficacy and life coaching. Those participants experienced an average weight loss of 4.7 kgs compared with 1.6 kgs obtained by the rest of the over-weight or obese patients (Table 2). Almost the same weight loss was experienced by the 37 who had pre-interventional consideration of weight loss within 30 days (4.3 kgs). Other important predictors were having many psychosocial problems, and being 35 to 45 years old and being female. Being obese was less important in the logistic regression model (Table 3).

At baseline, over-weight/obese participants were approximately 1 year older, were more often men, and had lower physical health-related quality of life (PCS-SF12) than members of the non-overweight group.

Limitations

Our participants were invited to participate in the GPs' clinics if they were between 20 and 44 years old and had ≥7 psychosocial and lifestyle problems out of 33 possible. Thus our results cannot be generalised to the average patient population, but only to the 30 % of younger patients with several psychosocial problems coming to the clinic for any reason [20, 21].

This study is a post hoc analysis of a previous study, but with another focus than the RCT, namely predictive factors for weight loss after 1 year in those who are overweight or obese, independent of their group in the RCT.

Our analysis is also limited by our reliance on self-reported height and weight data. The completed baseline questionnaire with height and weight was delivered to each participant's GP, and therefore a certain degree of credibility could be expected. The intervention group had their height and weight measured with good agreement (mean difference of 0.9 kg) in the Bland-Altman plot (Fig. 2b). In a web-based treatment program in the United States, self-reported weight correlated significantly with measured weight, with a difference of ~1 kg [24].

The study dropout of 56 over-weight patients out of 218 (27 %) is problematic, but it was expected in this group of young adults with several psychosocial problems. This age group moves to other regions of Denmark with a high frequency. A previous systematic review reported a mean dropout rate from lifestyle intervention programs for over-weight and obese infertile women of 24 % in 10 studies [25]. That rate is very close to our loss to follow-up.

The relatively small number of over-weight with weight loss as top prioritised goal in our analysis is a problem, which means, wide confidence intervals and limited precision in the linear regression analyses. Weight loss was the most frequently chosen goal ($n = 33$, 16 %) among the 209 patients having a health consultation.

In the statistical analysis, we dichotomised some variables. We know the problems with dichotomizing variables, primary loss of information, and the problem as to where to place the cut point. We tried to cut in a biological meaningful way that means trying to divide the material in a strait forward way or using the median as cut point. The dichotomizing meant a reduction of cells in regression analyses, and thus a more stable model.

Another limitation of your design could be our definition of "many" psychosocial problems. It could be problematic just to add up different problems of different character and importance. The reason for using this pragmatic method was that we just wanted to select

persons with multiple problems. That meant problems within several of the topics: networking, resources, life style, social life, and child care. Our pilot study showed that a cut point of 7 or more problems out of 33 possible would select the 25–30 % with most problems, and problems within several of the mentioned areas.

Training of all participating GPs may have affected their normal consultations. Their treatment might have a possible spin-over effect on the GPs' patients with no preventive consultation; the mean weight loss of 1.6 kgs may point in that direction, but it might also be an effect of completing the baseline questionnaire.

Strengths

This investigation was designed to be patient-centred, with a focus on the patient's own goal for improved quality of life during the coming year [20]. The baseline questionnaire primed the patients to think in very broad terms, encompassing relationships, work problems, psychological problems, economy, social problems, problems with children, lifestyle, and health and illness behaviour. The intervention group discussed resources and barriers for achieving their prioritised goal. Our intervention fulfils the criteria of life coaching as it was based on the patient's agenda and reflected the patient's present wishes and needs. The dialogue was holistic, individualised, without fixed agenda. It was conducted face-to-face by GPs with special training [20, 22]. In that way, we supported the subjects' feelings of competence, autonomy and relatedness, increasing their motivation and facilitating their self-determination. The goal and self-efficacy was supported by writing down both resources, barriers and time schedule for change [20, 26].

We collected baseline information on all included patients and dropouts, enabling us to compare the completers and the dropouts in detail without finding any statistical differences [27]. Another strength of this investigation is that the training program for the participating GPs has been well described [20, 21].

We selected two outcomes, 1-year weight loss (yes or no) (Tables 2 and 3) and extent of the weight loss (Tables 2 and 4) for our analysis of predictive factors for weight loss. Both outcomes are relevant in daily clinical work. The two most important predictors identified here, "considered short term weight loss before the preventive consultation" and "having weight loss as a prioritised goal for the next year during the preventive consultation," seem to be robust because they were significantly related to weight loss in non-adjusted analysis, in logistic regression, and in linear regression models. These findings should be confirmed in other studies.

Comparisons with other studies

Many GPs find the over-weight and obesity problem challenging for several reasons. In 2004, Bramlage et al. [28] reported that GPs' recognition of over-weight (20–30 %) and obesity (50–65 %) was low, that primary-care management of over-weight and obesity was largely deficient, that doctors put forth inefficient efforts to intervene, and that patients had poor acceptance of such interventions and dissatisfaction with existing lifestyle-modification strategies. They found men had higher BMI, and obesity was more prevalent in older age groups [28], as in our study.

In several randomised studies on lifestyle counselling, weight loss after 1 year was small [15, 29, 30]. In 2011, Wadden et al. [29] reported a difference of 1.1 kgs after 1 year and 1.2 kgs after 2 years. A meta-analysis of 46 trials found a change of approximately −0.1 BMI units per month from 3 to 12 months of active programs and a regain of 0.02 ~ 0.03 BMI units per month during subsequent maintenance phases [30].

We identified in our study weight loss both in the group with preventive consultation and in the group without [20], which may be due to the combined effects of completing the baseline questionnaire, training of the GPs, and regression toward the mean weight. The additional weight loss of 3.1 kgs to a total of 4.7 kgs in the preventive consultation group with weight loss as a prioritised goal (Table 2) is interesting because it illustrates the importance of the focused discussion with GPs on resources and barriers for reaching the patients' weight loss goals. Important elements of motivational interviewing were used to focus on supporting specific self-efficacy, which means the confidence in own ability to reach a specific goal [16, 17]. There were no specific advice given regarding food and exercise, but general advices focused on possible benefits of weight loss. An observational cohort study on the effect of a commercial weight loss program from Sweden found in an adjusted analysis that a low-calorie diet group lost 2.8 kgs more than the restricted normal-food group, and that the very low-calorie diet group lost 3.8 kgs more; dropout rates were 23 %, 26 %, and 18 %, respectively, in the three groups after 1 year [31].

Recently, Shikany et al. [32] compared a portion-controlled, nutritionally balanced, low-fat weight loss plan with a reduced energy, food-based diet. After 1 year, the weight reductions were 4.7 and 1.9 kgs, respectively, in the two groups [32]. A trend to regain the lost weight after the intervention was also observed. A much more intensive intervention with 42 sessions in obese type 2 diabetes patients was compared with three education sessions; the intensive intervention resulted in 8.6 kgs weight loss compared with 0.7 kg after 2 years [33].

Several investigations have focused on the importance of GPs' optimism and support with regard to weight loss [34] as well as GPs' lack of support. Wadden et al. [35] reported that nearly half of the participants in a university clinic obesity trial said that their physician had not recommended any of 10 common weight loss methods. GPs believed obesity was an important problem and used mostly brief, targeted low-intensity counselling in the face of limited patient motivation and lack of resources to support weight loss. This may reflect clinicians' self-assessment of their ineffectiveness in this area [36]. The GPs in our study had an agenda for counselling, namely listening to the patient and discussing resources and barriers to the expressed goal for the coming year (weight loss was the most commonly chosen goal), and they had scheduled a 1-hour life-coaching consultation for a patient-centred discussion with 20 mins' follow-up within 3 months [20].

We are intrigued by our finding that pre-interventional consideration of weight loss within 30 days was an important predictor of weight loss compared with time limits of 6 months or 12 months. This observation may emphasize the importance of respect for the readiness of the patient in health-preventive consultations. A study by Elfhag and Rössner showed that rapid initial weight loss is a predictor of success in obesity treatment [37]. A recent systematic review of 45 trials on weight loss found that behavioural interventions focusing on both food intake and physical activity were effective, with an average difference of 1.56 kgs after 1 year [38]. After 1 year, we detected the same weight loss in our control group who completed a 23-pages baseline questionnaire and had no preventive consultation.

A study from Norway supported the observation that relatively rapid weight loss (12 weeks) strongly predicts weight loss after 1 year [39]. In linear multiple regression analyses, occupational status, older age, and low mental health-related quality of life were associated with weight loss [39]. Our study confirms that the psychosocially disadvantaged participants experienced more weight loss than participants with few problems and a high-school education (Tables 2 and 3). This observation underscores that our participants with many psychosocial problems took advantage of the individual life-coaching method with elements of motivational interviewing [20].

Our study design and organisation facilitated the motivational interviewing process. This person-centred structure is supposed to have been critical to revealing the patient's readiness for change.

Conclusions

Participants who had a preventive consultation and identified weight loss as a prioritised goal had an average weight loss of 4.7 kgs compared to 1.6 kgs in participants without a weight loss goal or those without a preventive consultation. Consideration of weight loss within 30 days at baseline and having a preventive health consultation with weight loss as a prioritised goal for the coming year were two important predictors of weight loss after 1 year. We suggest that these two factors are important indicators of the patient's readiness or motivation for change, and therefore should be in focus when health-related behavioural change is desired; other predictors of weight loss were having many psychosocial problems, female gender and obesity.

By structured intervention with focus on the patients self-chosen goal (weight loss), and on resources and barriers for reaching the goal, significant changes can be obtained; especially in participants with many problems, who often do not accept or drop out from screening procedures with focus on risks. In this way, general practice may contribute to bridge the gap in inequality in health.

Abbreviations

ANOVA: ANalysis Of VAriance; BMI: body mass index; Ci: confidence interval; Cm: centimetre; GP: general practitioner; Kgs: kilogram; M^2: height in meter squared; MCS-SF12: mental component score - short form 12 questions; N: number; OR: odds ratio; PCS-SF12: physical component score—short form 12 questions; RR: relative risk.

Competing interest

The authors declare that they have no competing interests.

Authors' contributions

JL designed the data-collection tools, monitored data collection for the trial, wrote the statistical analysis plan, cleaned and analysed the data, and drafted and revised the paper. KSF designed the randomised study and data-collection tools, recruited the GPs, arranged the courses, implemented the study with the GPs, discussed the data, and revised the paper. Both authors read and approved the final manuscript.

Acknowledgements

We thank the 2 056 initially screened patients in North Jutland County and the 28 participating GPs for their enthusiastic work.

Funding

The North Jutland Quality Development Fund (§2 appointment "Prevention health consultations in North Jutland County"); The Health Insurance Foundation (Helse Fonden, 2001 B027); The Research Foundation for General Practice (FF-2-01-284); The Danish Heart Association (1998); The Lundbeck Foundation (reg. nr. 27989); The PLI Foundation (nr. 268); Institute of Public Health, University of Southern Denmark.

Author details

[1]Research Unit of General Practice, Department of Public Health, University of Southern Denmark, J.B. Winsløwvej 9A, DK-5000 Odense, Denmark. [2]General Practice, DK-9362 Gandrup, Denmark.

Received: 12 November 2015 Accepted: 22 March 2016
Published online: 11 April 2016

References

1. Finucane MM, Stevens GA, Cowan MJ, Danaei G, Lin JK, Paciorek CJ, et al. National, regional, and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. Lancet. 2011;377:557–67.

2. Rössner S. Obesity: the disease of the twenty-first century. Int J Obesity. 2002;26(Suppl4):s2–4.
3. Flegal KM, Kit BK, Orpana H, Graubard BL. Association of all-cause mortality with overweight and obesity using standard body mass index categories; a systematic review and meta-analysis. JAMA. 2013;309:71–82.
4. Azimi A, Charlot MG, Torp-Pedersen C, Gislason GH, Køber L, Jensen LO, et al. Moderate overweight is beneficial and severe obesity detrimental for patients with documented atherosclerotic heart disease. Heart. 2013; 99:655–60.
5. Thomsen M, Nordestgaard BG. Myocardial Infarction and ischemic heart disease in overweight and obesity with and without metabolic syndrome. JAMA Intern Med. 2014;174:15–22.
6. Ross R, Dagmone D, Jones PJ, Smith H, Paddags A, Hudson R, et al. Reduction in obesity and related comorbid conditions after diet-induced weight loss or exercise-induced weight loss in men; a randomized controlled trial. Ann Intern Med. 2000;133:92–103.
7. Blissmer B, Riebe D, Dye G, Ruggiero L, Greene G, Caldwell M. Health-related quality of life following a clinical weight loss intervention among overweight and obese adults: intervention and 24 month follow-up effects. Health Qual Life Outcomes. 2006 Jul 17;4:43.
8. Yamaoka K, Tango T. Efficacy of lifestyle education to prevent type 2 diabetes; a meta-analysis of randomized controlled trials. Diabetes Care. 2005;28:2780–6.
9. Heitmann BL. Ten-year trends in overweight and obesity among Danish men and women aged 30–60 years. Int J Obesity. 2000;24:1347–52.
10. Wildenschild C, Kjøller M, Sabroe S, Erlandsen M, Heitmann BL. Change in the prevalence of obesity and use of health care in Denmark: an observational study. Clin Epidem. 2011;3:31–41.
11. Pedersen KM, Andersen JS, Søndergaard J. General practice and primary health care in Denmark. JABFM. 2012;25(Suppl1):S34–8.
12. Le Chatelier E, Nielsen T, Qin J, Prifti E, Hildebrand F, Falony G, et al. Richness of human gut microbiome correlates with metabolic markers. Nature. 2013;500:541–6.
13. Hill JO, Wyatt H. Outpatient management of obesity: a primary care perspective. Obesity Res. 2002;10 suppl 2:124S–30S.
14. Flodgren G, Deane K Dickinson HO, Kirk S, Alberti H, Beyer FR et al. Interventions to change the behavior of health professionals and the organization of care to promote weight reduction in overweight and obese adults (Review). Cochrane Database of Systematic Reviews 2010, Issue 3. Art.No.: CD000984. Doi: 10.1002/14651858.CD000984.pub2.
15. Butler CC, Simpson SA, Hood K, Cohen D, Pickles T, Spanou C, et al. Training to deliver oppotunistic multiple behaviour change counselling in primary care: a cluster randomized trial. BMJ. 2013;346:f1191. doi:10.1136/bmj.f1191.
16. Clark MM, Abrams DB, Niaura RS, Eaton CA, Rossi JS. Self-efficacy in weight management. J Consult Clin Psychol. 1991;59:739–44.
17. Karl JP, Cheatham RA, Das SK, Hyatt RR, Gilhooly CH, Pittas AG, et al. Effect of glycemic load on eating behavior self-efficacy during weight loss. Appetite. 2014;80:204–11. doi:10.1016/j.appet.2014.05.017.
18. Bartels SJ, Pratt SI, Achbrenner KA, Barre LK, Naslund JA, Wolfe R, et al. Pragmatic replication trial of health promotion coaching for obesity in serous mental illness and maintenance of outcomes. Am J Psychiatry. 2015; 172(4):344–52.
19. Fagermoen MS, Hamilton G, Lerrdal A. Morbid obese adults increased their sense of coherence one year after a patient education course: a longitudinal study. J Multidiscip Health. 2015 Mar 27;8:157–65. doi:10.2147/JMDH.S77763.
20. Freund KS, Lous J. The effect of preventive consultations on young adults with psychosocial problems: a randomized trial. Health Educ Res. 2012;27:927–45.
21. Freund KS, Lous J. [Potentially marginalized 20–44 year-olds in general practice. Who are they? Result from a screening questionnaire]. English summery. Ugeskr Laeger. 2002;164:5367–72.
22. Ammentoep J, Uhrenfeldt L, Angel F, Ehrensvärd M, Carlsen EB, Kofoed P. Can life coaching improve health outcomes? – A systematic review of intervention studies. BMC Health Serv Res. 2013;13:428.
23. Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. Lancet. 1986;1(8476):307–10.
24. Harvey-Berrino J, Krukowski RA, Buzzell P, Ogden D, Skelly J, West DS. The accuracy of weight reported in a web-based obesity treatment program. Telemed J E Health. 2011;17:696–9. doi:10.1089/tmj.2011.0032.
25. Mutsaerts MAQ, Kuchenbecker WKH, Mol BW, Land JA, Hoek A. Dropout is a problem in lifestyle intervention programs for overweight and obese infertile women: a systematic review. Hum Reprod. 2013;28:979–86.
26. Deci EL, Ryan RM. The "What" and "Why" of goal pursuits: Human needs and self-determination of behavior. Psychological Inquiry. 2000;11:227–68.
27. Hansen E, Fonager K, Freund KS, Lous J. The impact of non-responders on health and lifestyle outcomes in an intervention study. BMC Res Notes. 2014;7:632–40.
28. Bramlage P, Wittchen H-U, Pittrow D, Kirch W, Krause P, Lehnert H, et al. Recognition and management of overweight and obesity in primary care in Germany. Int J Obes Relat Metab Disord. 2004;28:1299–308.
29. Wadden TA, Volger S, Sarwer DB, Vetter ML, Tsaiu AG, Berkowitz RI, et al. A two-year randomized trial of obesity treatment in primary care practice. N Engl J Med. 2011;365:1969–79.
30. Dansinger ML, Tatsioni A, Wong JB, Chung M, Balk EM. Meta-analysis: the effect of dietary counseling for weight loss. Ann Intern Med. 2007;147:41–50.
31. Hemmingsson E, Johansson K, Eriksson J, Sundstrom J, Neovius M, Marcus C. Weight loss and dropout during a commercial weight-loss program including a very-low-calorie diet, a low-calorie diet, or restricted normal food: observational cohort study. Am J Clin Nur. 2012;96:953–61.
32. Shikany JM, Thomas AS, Beasley TM, Lewis CE, Allison DB. Randomized controlled trial of the medifast 5&1 plan for weight loss. Int J Obesity (Lond). 2013;37:1571–8. doi:10.1038/ijo.2013.43.
33. Appel LJ, Clark JM, Yeh H, Wang N, Coughlin JW, Daumit G, et al. Comparative effectiveness of weight-loss interventions in clinical practice. N Engl J Med. 2011;365:1959–68.
34. Pollak KI, Coffman CJ, Alexander SC, Tulsky JA, Lyna P, Dolor RJ, et al. Can physicians accurately predict which patients will lose weight, improve nutrition and increase physical activity? Fam Pract. 2012;29:553–60.
35. Wadden TA, Anderson DA, Foster GD, Bennett A, Steinberg C, Sarwer DB. Obese women's perceptions of their physicians' weight management attitudes and practices. Arch Fam Med. 2000;9:854–60.
36. Leverence RR, Williams RL, Sussman A, Crabtree BF, Net Clinicians RIOS. Obesity counseling and guidelines in primary care; a qualitative study. Am J Prev Med. 2007;32:334–9.
37. Elfhag K, Rössner S. Initial weight loss is the best predictor for success in obesity treatment and sociodemographic liabilities increase risk for drop-out. Patient Educ Couns. 2010;79:361–6.
38. Dombrowski SU, Knittle K, Aveneell A, Araujo-Soares V, Sniehotta FF. Long term maintenance of weight loss with non-surgical interventions in obese adults: systematic review and meta-analyses of randomized controlled trials. BMJ. 2014;348:g2648.
39. Karlsen T, Søhagen M, Hjemesæth J. Predictors for weight loss after an intensive lifestyle intervention program in obese patients: a 1-year prospective cohort study. Health and Quality of Life Outcomes. 2013;11:165.

Health Promotion International, 2019, 1–10
doi: 10.1093/heapro/daz114
Article

Resources in vulnerable young adults: self-assessments during preventive consultation with their general practitioner in Denmark

Kirsten Schierup Freund[1,*], Ann Dorrit Guassora[2], Trine Hegelund[3], Lotte Hvas[2], and Jørgen Lous[4]

[1]Center for General Practice, Aalborg University, Fyrkildevej 7, DK-9200 Aalborg Ø, Denmark, [2]The Research Unit and Section of General Practice, Department of Public Health, University of Copenhagen, Ø. Farimagsgade 5,opg.Q, DK-1014 Copenhagen, Denmark, [3]Hovedgaden 43, DK-2970 Hoersholm, Denmark and [4]Research Unit of General Practice, Southern University, J. B. Winsløvs Vej 9A, DK-5000 Odense, Denmark

*Corresponding author. E-mail: Kirsten.freund@dadlnet.dk
ClinicalTrials gov Registration: NCT 01231256, 22 Aug. 2010.

Summary

Inequality in health is increasing. People with many problems often lack energy to improve well-being and reduce their problems. This study analyses how psycho-socially challenged younger (20- to 44-year-old) patients described their own resources to reach lifestyle goals or alter life circumstances. Within the context of a randomized controlled trial, Danish participants had two structured preventive person-centred consultations with their general practitioner. Consultations focused on well-being, salutogenesis, resources, barriers and support of autonomy. Using the qualitative method: Systematic Text Condensation, we made thematic cross-analysis of patients' goal-specific resource statements described at the first consultation. Of the 209 patients, 191 (91%) chose one or two goals for a better life next year; nearly all (179) could recall and describe which resources they would use to reach their goal. We categorized resource statements into (i) *personal constitution* as 'willpower' and 'tenacity'; (ii) *network*, e.g. family; (iii) *personal experience* with identical or similar problems. Some patients needed *to free up resources* by handling psychological problems before being able to focus on lifestyle goals. The study demonstrates that patients with particular psycho-social problems could describe essential resources in a structured, salutogenic, preventive consultation with their general practitioner. Reflecting intrinsic and extrinsic motivation, these resources reflected dimensions of essential health theories like sense of coherence, self-efficacy and self-determination theory. Increased awareness of these resources seems essential for vulnerable patients by improving psychological well-being and optimism, thereby facilitating health-related changes. This may be an important step to reducing inequality in health.

Key words: self-efficacy, salutogenesis, general practice, qualitative methods, well-being

INTRODUCTION

Health inequality is prevalent in most societies, including the more affluent ones. This inequality affects socioeconomically disadvantaged populations in particular (WHO and Commission on Social Determinants of Health, 2008). For many decades, healthcare systems have been aware of the inequitable distribution of their services, which is known as 'the inverse care law', i.e. the availability of good medical or social care tends to vary inversely with the needs of the population served (Tudor Hart, 1971; McLean *et al.*, 2015). Many studies have shown that engaging in a suite of four healthy behaviours (physical activity, eating healthy diet, drinking moderate amounts of alcohol and not smoking) delays all-cause mortality, including cardiovascular disease and cancer, by at least 10 years (Kvaavik *et al.*, 2010; Ford *et al.*, 2011). Other studies have linked psychological well-being, especially optimism, to lower risk of disease and all-cause mortality. This is also the case when potential confounders like sociodemographic characteristics, depression, health behaviours and health condition are taken into consideration (DuBois *et al.*, 2015; Kim *et al.*, 2017).

In Denmark almost all citizens are registered with a general practitioner (GP) for primary healthcare, which gives unlimited free use for treatment, but only limited possibility for preventive health consultations and only in relation to specific somatic circumstances—not general prevention.

The most socioeconomically disadvantaged and psycho-socially challenged citizens are more vulnerable to psycho-social and medical strains than less challenged citizens (Sundhedsstyrelsen, 2011; Grabovschi *et al.*, 2013). Well-being presupposes a balance between the requirements made, own priorities and available resources, i.e. both inner (e.g. physical and mental health) and outer (time, network, functional framework, economy) resources (Ryan and Deci, 2006). Focusing on this balance is a cornerstone in person-centred care (Starfield, 2011).

Helping patients become conscious about and to verbalize the pros and cons of actual and intended changed behaviour may help them achieve this balance. However this procedure is seldom used in consultations with the 'unmotivated' or 'unsuccessful intenders' (Hollnagel and Malterud, 2000; Hardcastle *et al.*, 2015). Still, by unearthing any resources that may be invested, well-being may be enhanced, and a change of behaviour accomplished. Helping disadvantaged citizens achieve this balance, we may draw on Antonovsky's salutogenetic theory, which describes health as a movement on a continuum of ease and disease. In his research on 'How does a person move toward the healthy pole?,' Antonovsky describes *generalized resistance resources* (GRR) as characteristics fundamental to an individual or a group's staying healthy despite stressors (Antonovsky, 1987; Mittelmark and Bull, 2013). GRR are, e.g. material goods, knowledge, intelligence, social network and support, personal constitution, ego identity, traditions and a preventive orientation. GRR are cornerstones in the development of a strong *sense of coherence* (SOC), which consists of the ability to feel coherence in life and to make life manageable, predictable and meaningful. SOC seems to be pivotal in developing coping strategies and avoiding and combatting a wide variety of stressors and thus prevent tension from being transformed to stress and disease. SOC is therefore a precondition for reducing vulnerability, enhancing well-being and staying healthy.

Understanding the complexity of coping strategies is fundamental to designing effective healthcare offers for vulnerable citizens. Addressing this challenge, a randomized controlled trial (RCT) in Danish general practice offered two well-prepared, structured, preventive health consultations to 20- to 44-year-old patients in whom screening revealed multiple psycho-social problems (Freund and Lous, 2002). This study was conducted from 1998 to 1999 by 28 GPs in the North Jutland Region, Denmark. The purpose of the RCT was to heighten vulnerable patients' well-being and reduce their problems by furthering their ability to reach self-selected goals for change in lifestyle and living conditions. Postal 1-year follow-up demonstrated positive results of the intervention in the form of improved mental well-being (SF12) and fewer psycho-social problems (Freund and Lous, 2012). Furthermore a large majority of patients described positive experience with the health consultation, reflecting better self-efficacy (Soot *et al.*, 2018). Overweight patients, especially those with many problems, who wanted weight loss, achieved a mean weight loss of 4.7 kg (Lous and Freund, 2016).

In order to identify factors that may lie at the root of these positive 1-year results, we decided to study the patients' statements. The present qualitative study analyses the self-assessed resources to reach self-selected goals stated by the patients at the end of their first consultation.

MATERIALS

Participants

All *patients* aged 20–44 years visiting their GP on project days were consecutively invited by the secretary to fill in a screening form (SQ-33) counting 33 questions about

lifestyle and psycho-social conditions. Patients not speaking Danish or with severe psychiatric or acute somatic illness were not invited. Those who had problems related to 7 or more of the 33 questions (30%, $n = 625$) were defined as 'vulnerable' and invited to participate in the RCT. Those who accepted the invitation ($n = 495$) completed a comprehensive questionnaire at home (Q1). They were subsequently randomized to control ($n = 255$) or an intervention that included two preventive health consultations ($n = 240$) with their own GP (Freund and Lous, 2012). This article reports data from the intervention group.

Vulnerability was related mainly to psychological, but also to social problems. The most frequent problems reported were: 'difficulty finding solutions to everyday problems', 'feeling of insecurity', 'poor self-rated health', 'no-one to confide in within the family' and 'extreme stress'. Participants with 'unemployment >6 months/1 year' were over-represented compared to the Danish background population; there was no over-representation of participants who were 'living alone', except for 'living alone with a child' (Freund and Lous, 2002).

All *GPs* in the county ($n = 327$) were invited to participate. Twenty-eight GPs accepted the invitation and participated in 40 h of training. They were introduced to psycho-social theories, the importance of self-rated health, autonomy, the 'health resource/risk balance' and elements of motivational interviewing. GPs were instructed to respect autonomy and strengthen the patient's confidence in his or her own abilities and resources with a view to reaching one or maximum two self-selected goals out of one open and 14 predefined goals for lifestyle and life conditions.

Of the 209 *patients*, 91% ($n = 191$) selected at least one goal and 72% ($n = 150$) selected two goals. The self-selected goals were related mainly to weight change (28%), mental well-being (24%), partner relationship (20%), working situation (18%), smoking (16%) and exercise (12%) (Figure 1).

Resource data

Data for this article stem from *the conversation questionnaire* completed by the patients during the first preventive consultation. This questionnaire explored goals, resources and barriers. The question analysed here was 'Which strong sides do you have that may help you reach your desired goal?'. Answers were restricted to two lines for each goal.

A total of 179 patients listed strengths related to one goal. Many of them listed strengths related to both goals. Only 7% listed no strengths (Figure 1). This article reports on the 313 strengths registered by the 179 patients.

Method of analysis

All notes concerning a patient's strengths were read individually and subsequently discussed and analysed by authors 1 and 3 using the qualitative method: Systematic Text Condensation, which is a descriptive and explorative method for thematic cross-case analysis of qualitative data suitable for the short statements in our study (Malterud, 2011, 2012). We used the four steps in the procedure: (i) reading total material from chaos to themes; (ii) identifying and sorting meaning units-from themes to codes; (iii) condensation from code to meaning; (iv) synthesizing from condensation to descriptions and concepts, which is presented in the 'Result' section using quotes.

RESULTS

The analyses show that although they ticked off many psycho-social problems before inclusion, the patients were able to list substantial strengths at the consultation. Many stated different types of strengths. The qualitative analysis revealed three categories of resources and a need to free up resources to be able to make changes.

Resources

1) *Personal constitution* was described by almost all patients.

   Other resources described were primarily:

2) *Network*.
3) *Personal experience*.

Some mentioned *need to free up resources* by dealing with a psycho-social problem before they could focus on their desired lifestyle goal.

Personal constitution

The most frequently used resource was *personal constitution*, which was captured in words like *willpower*, *tenacity*, *openminded*, *energetic and good humour*. By far the most frequently mentioned words were *willpower* and *tenacity*.

Willpower is the resource most frequently listed; often described as a *strong will* and *iron will*:

> (3237) A 33-year-old divorced man with no children: *The will to change my lifestyle (have already started). Have good conversational relationship with ex-wife*

> (3737) A 25-year-old married woman: *The will/motivation, support from friends*.

Fig. 1: Flowchart for goals and statements of strengths.

Like in these quotes, network was often mentioned in conjunction with willpower, most often family, but also work and GP:

> (2935) A 31-year-old woman with no children: '*Good family network, GP, the will*'.
>
> (3237) The 33-year-old divorced man: '*Willpower to take Antabuse and get help from my GP to improve my lifestyle*'.

In these quotes, the GP apparently is a part of the network that supports willpower.

In the following quote, the importance of external support is evident:

> (3701) A 38-year-old married women with two small children wanted weight loss and a better partner relationship. As strengths she mentioned: '*Will. I have great willpower if I get support from the ones who mean most to me.*

Tenacity was mentioned approximately half as often as will and almost always unrelated to network or other external support, e.g.:

> (2531) A 28-year-old unmarried man: *'Tenacious. Capable of regaining driving license*'.
>
> (2625) A 31-year-old divorced woman living with one child: '*I'm tenacious, I can take care of myself*'.
>
> (0809) A 42-year-old divorced woman with three children: '*Tenacity, reach goals*'.

Personal constitution was sometimes *combined* as in this example:

> (3507) A 23-year-old married woman with two children: '*Will, tenacity and a strong character*'

Network

Network was stated about half as often as willpower and often together with this.

Family was the most frequent network strength, e.g. backing and support. Some described how their family's medical history was a comfortable background since their family had experience with handling, e.g. mental problems, including anxiety and depression. '*There are several other cases in the family*'.

> (0113) A 22-year-old single woman wanted to become more satisfied with herself, and she stated: '*Support from home, backing.*'

(2935) A 31-year-old married man with two children wanted to improve psychologically by becoming better at showing his emotions. As strengths, he stated: '*Good family network, general practitioner, the will*'.

(3829) A 34-year-old woman wanted to stop smoking. As strengths she stated: '*Willpower and support from my family*'.

The family was also described as a basis for developing resources in general:

(3317) A 45-year-old divorced woman with three children whose goals were better use of her spare time and improvement of daily living for her family, stated: '*Awareness that a calm family life gives more resources*'.

Thus, family was used in different ways, such as source of moral support, knowledge base and source of ping-pong to improve psychologically, sometimes together with willpower and the GP.

Partner relationship was occasionally mentioned, e.g. as a space where the patients could discuss their problems and identify shared values, or as support in connection with dietary changes.

(1219) A 42-year-old married woman with two children who wanted better partner relationship and social network stated as strengths: '*Willpower, good relationship, common interests, talk about prioritizing*'.

Work was occasionally mentioned as a strength, most often stated neutrally as steady and good work, '*satisfied with job*'.

(1311) A 31-year-old married woman with two children whose goal was to change her work situation stated: '*Independent, trusted work, feel appreciated at work*'.

In this quote, work is described as a safe base which the patient mentioned as a resource in bringing about an improvement in her work situation.

Friends were rarely mentioned, and when so mostly in relation to support for changes related to exercise and smoking:

(0121) A 24-year-old single woman who wanted to do exercise and achieve weight loss mentioned: *I want to lose weight; my friends go there*'.

(1433) An unmarried 28-year-old man who wanted to stop smoking: '*Only a few of my friends smoke*'.

Thus, in some statements, friends were used to mirror own behaviour and were solicited as a source of trust in the patient's own ability to improve health behaviour.

Family was the most frequently mentioned network resource. Still, 'no-one to confide in within the family when problems arise' was one of the most frequent inclusion criteria for men as well as women.

Personal experience

Personal experience was stated as a resource half as often as network and was often combined with tenacity. The most frequent statements described something the patients had *previously achieved* or with which they had *experience*. Experience was described in several ways; they had handled the same problem previously, or they were confident that in new situations they would draw on their experience with other problems. The most common goal was weight loss. Several patients stated, e.g. that they had previously lost 5–10 kg and mentioned this as a strength: '*Like to exercise. Have previously lost 10 kg.*' Others described how previous weight loss through exercise or activity made them feel better, both physically and emotionally, e.g. by reducing pain in the back, knees and loin or by improving their mood.

(2707) A 43-year-old married woman who wanted to lose weight on a permanent basis wrote as strengths: '*Tenacious. I have previously successfully lost weight, and I feel better mentally when I weigh less*'.

Personal experience could include positive as well as negative experiences as a resource:

(0209) A 43-year-old married woman wanted to do exercise and reduce her use of alcohol: '*I feel very much unease by drinking too often, and want to feel better both mentally and physically*'.

Frequently, two behavioural changes and strengths were linked, thereby reinforcing the positive process:

(1117) A 40-year-old divorced man had as goals to reduce his consumption of hashish and use his network. His strengths were: '*Tenacity. Experience from giving up alcohol*'. He wanted to rebuild his previous network and wrote that the strengths he would use were: '*Many interests. Like to help/be there for others*'.

He would use his *constitution*: tenacity and his *experience*, both in relation to abuse and using his interests in social relations.

Combination of resources were seen in many statements (Figure 2).

Need to free up resources

Other things need to be handled first. Several patients stated that other things needed to be solved before they could reach a specific lifestyle goal. As an example of the complex nature of lifestyle changes, they stated a

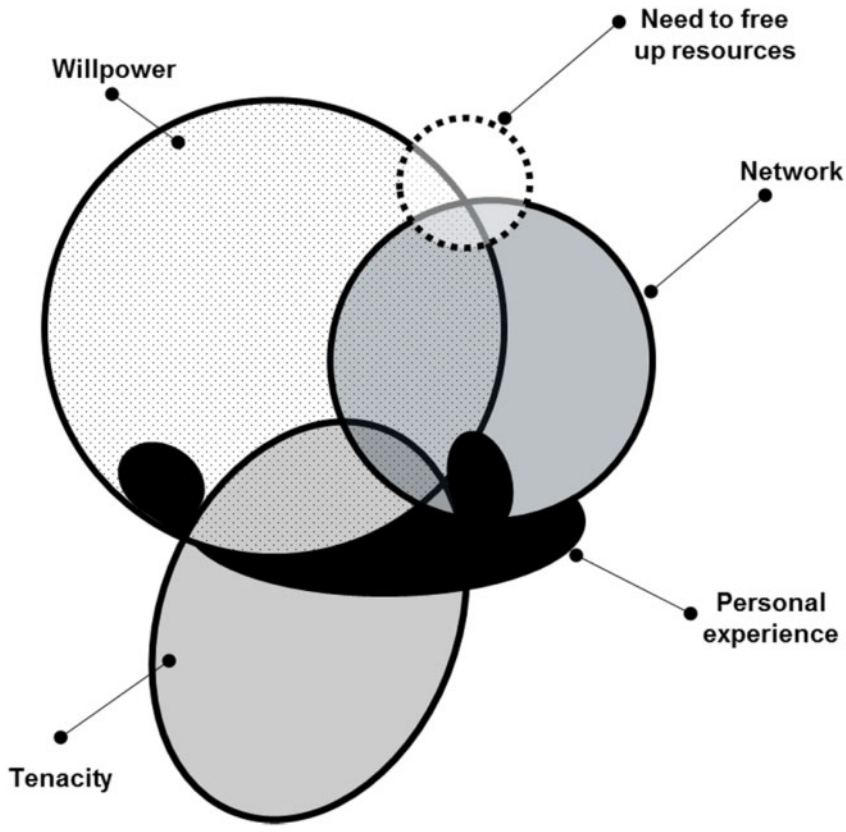


Fig. 2: Relation among resources.

need to build up resources by changing their mental condition before they could make a specific lifestyle change concerning, e.g., weight or substance abuse. This insight into their need to gradually build up and set free resources was primarily seen in the large group (21%) stating that improved mental well-being was one of their two goals, as seen in this statement:

> (1207) A 38-year-old married woman who wanted to improve her mental well-being and lose weight. As strengths she stated: '*Willpower. Have today noticed that it takes a load off my back to talk about this* (incest). *Understand the importance of seeing a psychologist. Good understanding of diet, but probably need to wait until after the psychologist.*'

She explained that she had benefitted from putting into words the fact that she has been exposed to incest. She now had the goal to get better mentally with the help of a psychologist. She had the will to lose weight and had a good dietary understanding. But setting her mental resources free was a prerequisite to achieving this goal.

For a participant who endured a poor mental and physical working environment, finding a new job was seen as a prerequisite to successfully overcoming substance abuse:

> (1321) A 28-year-old woman with one child whose goals were to get a new job and stop drinking alcohol: '*Quit job due to poor mental and physical working environment*'. As strengths she stated: '*Willpower and wish to change my life, stop drinking alcohol. I am receiving treatment. By changing the working situation, the reason for drinking beer/spirits is changed*'.

Besides primarily describing willpower and wishes, she also described her confidence in her being able to mobilize the resources needed to stop her substance abuse by changing her working situation.

DISCUSSION

Main findings

Screening revealed that the 20–44-year-old patients attending general practice had many psycho-social

problems. However, during the initial, structured, preventive consultation with their GP, they could mention several strengths with respect to self-selected goals for living conditions and lifestyle.

Almost all described *personal constitution*, most frequently *willpower* and *tenacity*. They also often described how constitution could be used, primarily by soliciting current or future support from their *network* or drawing on previous *personal experience*. Other patients described how major problems needed to be dealt with *to free up resources* to reach a lifestyle goal. Awareness of a *need to free up resources* was seen mainly in the large group for whom improved mental well-being was one of their two goals.

Strengths and weaknesses

The patients' statements are very dense as they were given only two lines to describe resources for each goal. People with many psycho-social problems often find it difficult to put their thoughts and considerations into words during healthcare encounters (Dixon-Woods *et al.*, 2006; Verlinde *et al.*, 2012). We therefore believe that they perceived the short form as manageable. Only 7% stated no strengths. Hence, it is considered a strength of the present study that insight was obtained into this vulnerable group of adults' own thoughts about their resources, and that statements had a high 'meaning density', even if the brevity of the answers hampers qualitative analysis compared with analysis of transcribed materials. The study design did not permit personal interview.

The GP was present throughout the entire 45–60 min. consultation, also when patients answered the final questionnaire. Regular meetings with the GPs revealed that they often needed to make the patients aware of any positive statements they had verbalized during the conversation; inversely, patients were immediately conscious of barriers to behavioural change. The GP hence played an important role in helping vulnerable patients focus on their potential personal resources by discussing ambivalence, strengths and barriers to achieving their goals. We do not know whether some statements were biased to please the GP. But the 1-year postal questionnaire showed fewer psycho-social problems, better SF-12 scores and enhanced self-efficacy (Freund and Lous, 2012; Soot *et al.*, 2018).

Discussion of results

The frequency with which vulnerable patients made statements about resources needed to obtain self-chosen goals was surprising. Vulnerable patients are usually considered unmotivated to change health behaviour (Hardcastle *et al.*, 2015). However, they were apparently aware of their resources at the consultation. The study cannot answer whether this was a new awareness or if it was just verbalized at the consultation. Still, the 1-year postal evaluation shows that the consultation revealed new thoughts and possibilities (Soot *et al.*, 2018).

A *positive constitution* was stated by almost all patients; most often in the form of *willpower* and *tenacity*. Personal constitution and ego identity are a pivotal part of general resistance resources (GRR) and fundamental to staying healthy or improving. But as seen in the present study, this is not always enough. Personal constitution was often stated together with other resources (Figure 2).

Willpower was most often combined with network, and tenacity most often with personal experience. A few stated both will and tenacity.

Network was frequently mentioned alone or together with willpower. However, at the initial screening, patients had often ticked off that they had no family or friends in whom to confide. *Network* is an important GRR for staying healthy and reduce mortality risk (Holt-Lunstad *et al.*, 2010). Having a social frame of reference, relatedness and security are essential to building identity, intrinsic motivation and self-esteem as well as to gathering the courage needed to evolve (Ryan and Deci, 2000); besides, these elements are also essential to psychological well-being, especially optimism, which has shown to reduce both disease and all-cause mortality (Kim *et al.*, 2017). In the present study, network was described as a source of knowledge, reflection, safety and support; hence, network is essential to SOC.

Personal experience was by some described as a strength to achieving set goals, most often alone or combined with tenacity. Positive personal experience builds confidence that you can accomplish the same or something similar at a later point in time, especially when you are met with trust, support and continuity (Bandura, 1977, 2004). It is hence an important prerequisite to developing self-efficacy both in general and, specifically, in relation to self-selected goals as shown in the present study (Ghazi *et al.*, 2018). The statements reflect that both positive and negative experience were used as resources. This confirms Antonovsky's theory, describing health as a movement on a continuum of ease and dis-ease. If you have the ability to assess and understand a situation, stressors will not produce permanent breakdown but in the longer term be salutogenic by strengthening SOC and psychological well-being (Mittelmark and Bull, 2013).

Statements indicating a 'need *to free up resources*' as '*other things need to be handled first*' was made by patients with a mental problem as their highest priority. This bears out that limited resources lead to limited possibilities. Vulnerable patients apparently have several personal situations that must be resolved and basic needs that must be met before their resources may be freed up for behavioural change (Tay and Diener, 2011).

Autonomy support was essential to the study design and was facilitated by the patients' self-completed questionnaire (Q1) which was used in the consultation. The importance of respect for autonomy, trust and support is in accordance with the self-determination theory (SDT), which describes factors that either facilitate or undermine intrinsic and extrinsic motivation (Ryan and Deci, 2000; Gillison *et al.*, 2019). SDT describes how acknowledgement of choice and feelings will enhance important intrinsic motivation because it gives people a stronger feeling of autonomy. Extrinsic pressure can reduce intrinsic motivation, as in risk-focused consultations. Thus, intrinsic motivation is reduced when the health professionals may take motivation for granted, even if the patient has essential unmet basic needs (Hardcastle *et al.*, 2015). The basic needs for competence, autonomy and relatedness must be met to support well-being, optimism and motivation (Farholm *et al.*, 2017).

The resources disclosed in the present study are in accordance with SOC, SDT and theory of self-efficacy. We find that the strengths stated bear testimony to optimism and faith in more positive well-being recently shown to lower the risk of disease and all-cause mortality (DuBois *et al.*, 2015; Kim *et al.*, 2017; Kubzansky *et al.*, 2018).

The present study population represents both deprived and non-deprived geographical areas. A study showed that patients in socioeconomically seriously deprived areas had more psycho-social and multimorbidity problems they wished to discuss; however, in these areas, the GPs had less time and were more stressed (Mercer *et al.*, 2007). Patients wanted relational continuity, genuine empathy and sufficient time in consultations. However, GPs' ability to enable patients' resources was related to the severity of deprivation and the GPs' stress, empathy and time. Empathy and trust are necessary to feel free and be confident in own self-efficacy. Development of trust and self-efficacy takes time and requires continuity (Mercer *et al.*, 2007). Vulnerable patients and their GPs may profit from external interventions in the form of 'social prescribing' to support patients' long-term self-efficacy. Social prescribing has been promoted in the UK, but good methods have so far not been developed (Bickerdike *et al.*, 2017). Attendance to external interventions require high, individualized quality and good communication to create trust and motivation. This was accomplished in a study within cardiac rehabilitation with social differentiation, where more equality in adherence and attendance was achieved (Meillier *et al.*, 2012). These studies may indicate that the complexity of person-centred consultations may be reduced by making interventions more targeted and focused on individual resources to build up self-efficacy 'seeing the big picture' instead of undermining self-efficacy by focusing on risk behaviour.

Recommendation for research and practice

The present study population of the vulnerable 30% of younger GP attenders is only rarely targeted by preventive offers. The psychometric properties of the SQ-33 have been assessed and 23 of the SQ-33 items, HSQ-23, were shown to possess adequate psychometric properties and responsiveness and can thus be used as an outcome measure in preventive intervention studies (Comins *et al.*, 2019).

The strengths outlined in this study reflect that resources to obtain self-selected goals for change can be verbalized when both the GP and the patient focus on the personal health balance. An important prerequisite for this is to create 'food for thoughts' within the context of a preventive person-centred consultation. Thus, both the framing and the time allocated to the consultation are important to allow both the patient and the GP to properly prepare for the consultation. For many years, health inequality has been rising. This situation may be ascribed in part to the 'inverse care law' and the healthcare system's focus on risk tracing with little regard for individual priorities, resources and barriers, thus ignoring the complexity of motivation (Starfield *et al.*, 2005; Hardcastle *et al.*, 2015; McLean *et al.*, 2015).

We are not aware of any studies with the same focus on structure, autonomy and resources, which we find essential in prevention targeting younger adults with fundamental psycho-social problems. The Danish patient-list system supports a long-term GP–patient relationship. This basis for trust, support and continuity has turned out to be essential for general health across socioeconomic differences (Starfield *et al.*, 2005). However, the healthcare system needs to support further interventions targeting vulnerable patients. Future studies should address whether the HSQ-23 successfully identifies

patients who will benefit from preventive health consultations. And future studies should improve methods in every-day consultations to help reveal psycho-socially vulnerable patients' resources.

CONCLUSION

Even psycho-socially vulnerable patients can verbalize confidence in their own constitution, network, personal experience and need of prioritizing when they are well prepared and met with trust and respect for their own wishes, and when GPs focus on patients' resources to reaching their goals. The education and the fee of GPs is so far not focused on person-centred salutogenic aspects of a consultation, but in this study the GPs received specific courses and fee to perform the preventive consultations to their vulnerable patients. Both the theoretical and empirical findings of the present study may support arguments for designing specific methods facilitating salutogenic aspects in preventive primary health consultations with vulnerable patients.

AUTHORS' CONTRIBUTIONS

K.S.F. designed the randomized study and data-collection tools, recruited the GPs, arranged the courses, implemented the study with the GPs. She wrote the article, read the statements and performed the qualitative analyses, initially together with T.R. A.D.G. discussed, revised and supplied the article. J.L. designed the data-collection tools for RCT. L.H. and J.L. discussed and revised the article. All authors read and approved the final manuscript.

ACKNOWLEDGEMENTS

We thank the 2056 initially screened patients in North Jutland County, especially the 209 patients who attended the health consultation and the 28 participating GPs for their enthusiastic work.

FUNDING

This study was supported by *The North Jutland Quality Development Fund* (§2 appointment 'Preventive health consultations in North Jutland County'); *The Health Insurance Foundation* (Helse Fonden) [2001 B027 and 2003 B084]; *The Research Foundation for General Practice* [1997–1999 FF-2-01-284]; *The Danish Heart Association* [1998]; *The Lundbeck Foundation* [1997 reg. no. 27989]; *The PLU Foundation* (for general practitioners) [2000–2013 no. 268, R310 A18224, R382 A27045]; *Institute of Public Health, University of Southern Denmark*.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests.

REFERENCES

Antonovsky, A. (1987) *Unraveling the Mystery of Health: How People Manage Stress and Stay Well*. Jossey-Bass, San Francisco.

Bandura, A. (1977) Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*, **84**, 191–215.

Bandura, A. (2004) Health promotion by social cognitive means. *Health Education & Behavior*, **31**, 143–164.

Bickerdike, L., Booth, A., Wilson, P. M., Farley, K. and Wright, K. (2017) Social prescribing: less rhetoric and more reality. A systematic review of the evidence. *BMJ Open*, **7**, e013384.

Comins, J. D., Freund, K. S., Christensen, K. B., Lous, J. and Brodersen, J. (2019) Validation of a health screening questionnaire for primary care using Rasch models. *Journal of Patient-Reported Outcomes*, **3**, 1–10.

Dixon-Woods, M., Cavers, D., Agarwal, S., Annandale, E., Arthur, A., Harvey, J. *et al*. (2006) Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. *BMC Medical Research Methodology*, **6**, 1–13.

DuBois, C. M., Lopez, O. V., Beale, E. E., Healy, B. C., Boehm, J. K. and Huffman, J. C. (2015) Relationships between positive psychological constructs and health outcomes in patients with cardiovascular disease: a systematic review. *International Journal of Cardiology*, **195**, 265–280.

Farholm, A., Halvari, H., Niemiec, C. P., Williams, G. C. and Deci, E. L. (2017) Changes in return to work among patients in vocational rehabilitation: a self-determination theory perspective. *Disability and Rehabilitation*, **39**, 2039–2046.

Ford, E. S., Zhao, G., Tsai, J. and Li, C. (2011) Low-risk lifestyle behaviors and all-cause mortality: findings from the National Health and Nutrition Examination Survey III Mortality Study. *American Journal of Public Health*, **101**, 1922–1929.

Freund, K. S. and Lous, J. (2002) [Potentially marginalized 20–44-years-olds in general practice. Who are they? The results of a questionnaire screening] Potentielt marginaliserede 20-44-årige i almen praksis. *Ugeskrift for Laeger*, **164**, 5367–5372.

Freund, K. S. and Lous, J. (2012) The effect of preventive consultations on young adults with psychosocial problems: a randomized trial. *Health Education Research*, **27**, 927–945.

Ghazi, C., Nyland, J., Whaley, R., Rogers, T., Wera, J. and Henzman, C. (2018) Social cognitive or learning theory use to improve self-efficacy in musculoskeletal rehabilitation: a systematic review and meta-analysis. *Physiotherapy Theory and Practice*, **34**, 495–504.

Gillison, F. B., Rouse, P., Standage, M., Sebire, S. J. and Ryan, R. M. (2019) A meta-analysis of techniques to promote motivation for health behaviour change from a self-determination theory perspective. *Health Psychology Review*, **13**, 110–130.

Grabovschi, C., Loignon, C. and Fortin, M. (2013) Mapping the concept of vulnerability related to health care disparities: a scoping review. *BMC Health Services Research*, **13**, 1–11.

Hardcastle, S. J., Hancox, J., Hattar, A., Maxwell-Smith, C., Thøgersen-Ntoumani, C. and Hagger, M. S. (2015) Motivating the unmotivated: how can health behavior be changed in those unwilling to change? *Frontiers in Psychology*, **6**, 1–4.

Hollnagel, H. and Malterud, K. (2000) From risk factors to health resources in medical practice. *Medicine, Health Care, and Philosophy*, **3**, 257–264.

Holt-Lunstad, J., Smith, T. B. and Layton, J. B. (2010) Social relationships and mortality risk: a meta-analytic review. *PLoS Medicine*, **7**, e1000316.

Kim, E. S., Hagan, K. A., Grodstein, F., DeMeo, D. L., De Vivo, I. and Kubzansky, L. D. (2017) Optimism and cause-specific mortality: a prospective cohort study. *American Journal of Epidemiology*, **185**, 21–29.

Kubzansky, L. D., Huffman, J. C., Boehm, J. K., Hernandez, R., Kim, E. S., Koga, H. K. *et al*. (2018) Positive psychological well-being and cardiovascular disease. *Journal of the American College of Cardiology*, **72**, 1382–1396.

Kvaavik, E., Batty, G. D., Ursin, G., Huxley, R. and Gale, C. R. (2010) Influence of individual and combined health behaviors on total and cause-specific mortality in men and women: the United Kingdom health and lifestyle survey. *Archives of Internal Medicine*, **170**, 711–718.

Lous, J. and Freund, K. S. (2016) Predictors of weight loss in young adults who are over-weight or obese and have psychosocial problems: a post hoc analysis. *BMC Family Practice*, **17**, 1–12.

Malterud, K. (2011) *[Qualitative Methods in Medical Science] Kvalitative Metoder i Medisinsk Forskning: En Innføring*, 3. utgave. Universitetsforlaget, Oslo, Norway.

Malterud, K. (2012) Systematic text condensation: a strategy for qualitative analysis. *Scandinavian Journal of Public Health*, **40**, 795–805.

McLean, G., Guthrie, B., Mercer, S. W. and Watt, G. C. M. (2015) General practice funding underpins the persistence of the inverse care law: cross-sectional study in Scotland. *British Journal of General Practice*, **65**, e799–e805.

Meillier, L. K., Nielsen, K. M., Larsen, F. B. and Larsen, M. L. (2012) Socially differentiated cardiac rehabilitation: can we improve referral, attendance and adherence among patients with first myocardial infarction? *Scandinavian Journal of Public Health*, **40**, 286–293.

Mercer, S. W., Cawston, P. G. and Bikker, A. P. (2007) Quality in general practice consultations; a qualitative study of the views of patients living in an area of high socio-economic deprivation in Scotland. *BMC Family Practice*, **8**, 22.

Mittelmark, M. B. and Bull, T. (2013) The salutogenic model of health in health promotion research. *Global Health Promotion*, **20**, 30–38.

Ryan, R. and Deci, E. (2000) Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, **55**, 68–78.

Ryan, R. M. and Deci, E. L. (2006) Self-regulation and the problem of human autonomy: does psychology need choice, self-determination, and will? *Journal of Personality*, **74**, 1557–1585.

Soot, L., Freund, K. S., Lous, J., Vass, M. and Hvas, L. (2018) How younger adults with psychosocial problems experienced person-centered health consultations. *Patient Experience Journal*, **5**, 116–122.

Starfield, B. (2011) Is patient-centered care the same as person-focused care? *The Permanente Journal*, **15**, 63–69.

Starfield, B., Shi, L. and Macinko, J. (2005) Contribution of primary care to health systems and health. *The Milbank Quarterly*, **83**, 457–502.

Sundhedsstyrelsen. (2011). *[Inequality in Health- Reasons and Efforts] Ulighed i Sundhed - Årsager Og Indsatser*. Sundhedsstyrelsen, Copenhagen, Denmark.

Tay, L. and Diener, E. (2011) Needs and subjective well-being around the world. *Journal of Personality and Social Psychology*, **101**, 354–365.

Tudor Hart, J. (1971) The inverse care law. *The Lancet*, **297**, 405–412.

Verlinde, E., De Laender, N., De Maesschalck, S., Deveugele, M., Willems, S., Field, K. *et al*. (2012) The social gradient in doctor-patient communication. *International Journal for Equity in Health*, **11**, 12.

WHO and Commission on Social Determinants of Health. (2008). Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health, Geneva, Switzerland.

ISSN (online): 2246-1302
ISBN (online): 978-87-7573-800-7

AALBORG UNIVERSITY PRESS