Norwegian University of Life Sciences
Faculty of Social Sciences
Department of Landscape Architecture and Spatial
Planning Section of Public Health Sciences

Master Thesis 2015
30 credits

Living with a Lifelong Disease - Patient Activation among Individuals Recently Diagnosed with Multiple Sclerosis

Siv-Lise Bendixen StÞrk

Foreword

The process of writing this master thesis has been both tedious and rewarding. Combining the research process with clinical practice has given valuable inputs to the master thesis, while the repeated literature searches have given helpful updates to the clinical work. Still, the divided attention has been challenging and sometimes tiresome. Thank you to all my friends, fellow students and co-workers, for helping me keep my spirits up.

Being able to follow a group of individuals through their first year with a potentially life-changing diagnosis has been a privilege. I am deeply thankful for their participation, for allowing us to take part in their process, and for teaching me about life and health while living with a lifelong disease. Thank you also to the Norwegian MS foundation, and Extrastiftelsen, for making this work possible through the funding of the clinical intervention project.

I am very grateful to my tutor at Ullevål, Elisabeth Gulowsen Celius, for inviting me to do this clinical work, and for guiding me through the process of clinical research and thesis writing. I am equally grateful to my tutor at NMBU, Grete Grindal Patil, for invaluable advice on both process and writing. Thank you both, this work has been made possible with your patience and guidance.

Living with a student mom and wife might at times be quite challenging. I am deeply grateful for your patience, and for all the support and back-up you have given me, Frode; you are my rock. Emma and Alexander; thank you for always reminding me what life really is about, I love you all.

Siv-Lise Bendixen Stærk
Oslo, May 12th 2015

Abstract (English)

Background: Multiple Sclerosis (MS) is a chronic, inflammatory disease affecting the central nervous system. By January 1st 2012 there were more than 10 000 persons with MS in Norway. Diagnosis is often given in the early thirties, making MS a lifelong chronic disease. Level of activation, the individual's ability to manage their own health and health care, is important for optimizing function and managing medical treatment. Patient activation measure is a tool to assess patient activation, and enable interventions to be targeted to the individual's activation level.

Aim of Thesis: This thesis aims to assess and describe patient activation at baseline among a Norwegian cohort of individuals recently diagnosed with MS, and to compare these results with existing data on patient activation.

Method: To assess available knowledge on patient activation, a limited literature search was conducted, and the results summarized in a narrative review. The thesis have further analysed baseline data from a two-year clinical research project conducted at the Neurological department, Ullevål, OUS, applying a cross-sectional study design. 28 patients responded to the baseline questionnaires, 77.5% women, mean age 32.3 years (SD 6.4).

Results: The literature search identified 27 articles describing and exploring PAM13 among general populations or populations with chronic conditions. Mean activation score in our cross-sectional study was 61.2 (SD 14.4), with the majority of participants scoring either at the highest (39.3%) or the lowest (21.4%) activation level. Activation score correlated with depression score and the physical dimension of the quality of life measure. Item endorsement of the PAM13 differed from the original rank, comparable to the results from previous assessments of neurological populations.

Conclusion: Our data show more diverse results on activation levels, compared to other studies. Our population is likely to include the majority of patients diagnosed with MS during the inclusion period, and is likely representative on gender, age and depression scores. The small number of participants, however, limits the statistical analysis of the material. The diversity in activation levels points in favour of individualized assessment and targeted care.

Sammendrag (norsk)

Bakgrunn: Multippel sklerose (MS) er en kronisk, inflammatorisk sykdom i sentral-nervesystemet. Per 1. januar 2012 var det registrert mer enn 10 000 mennesker med diagnosen i Norge. Diagnosen gis ofte tidlig i trettiårene, og er per i dag en livslang diagnose. Individets evne til å håndtere egen helse og sykdomsoppfølging vil være svært viktig for å optimalisere funksjon og medisinsk behandling. Pasientaktiveringsmål er et verktøy utviklet for å kartlegge kunnskap, ferdigheter og egeninnsats, og for å utforme tiltak og intervensjoner tilpasset individets aktiveringsnivå.

Oppgavens formål: Formålet med oppgaven er å kartlegge og beskrive pasientaktivering på baseline i en norsk kohort av personer nylig diagnostisert med MS, samt å sammenligne disse funnene med publiserte data på pasientaktivering.

Metode: Publiserte data ble kartlagt ved hjelp av et begrenset litteratursøk, og resultatene er oppsummert i et narrativt sammendrag. I tillegg ble det gjort en tverrsnittstudie av data samlet inn ved baseline i et toårig klinisk oppfølgingsprosjekt gjennomført ved Nevrologisk avdeling, Ullevål, OUS. Tverrsnittsundersøkelsen hadde 28 respondenter, hvorav 77.5% kvinner, gjennomsnittsalder 32.3 år (SD 6.4).

Resultater: Litteratursøket identifiserte 27 artikler som beskriver og utforsker PAM13 blant generelle befolkningsgrupper og ulike kroniske pasientgrupper. Data fra tverrsnittstudien viser en gjennomsnittlig aktiveringsskår på 61.2 (S 14.4), hvor flertallet av deltakere skåret enten på høyeste (39.3%) eller på laveste (21.4%) aktiveringsnivå. Aktiveringsskår korrelerte med depresjonsskår og med den fysiske dimensjonen av SF12. Enkelte av spørsmålene fra PAM13 var enklere eller vanskeligere å bekrefte i vår studie enn forventet rekkefølge, sammenlignbart med resultater fra tidligere studier på nevrologiske pasienter.

Konklusjon: Våre data viser større spredning på aktiveringsnivå, sammenlignet med andre studier. Studiepopulasjonen er sammenlignbar med MS-populasjonen for øvrig på depresjon, alder og kjønn, og inkluderer majoriteten av pasienter diagnostisert i inklusjonsperioden. Det lille antallet inkluderte gir dessverre begrensede muligheter for statistiske analyser. Den store spredningen på aktiveringsnivå er et argument for individualisert oppfølging.

Figures and tables

Table of contents

1 Introduction

Multiple Sclerosis (MS) is a chronic inflammatory disease affecting the central nervous system (Goodin 2014). MS is a common cause of non-traumatic neurological disability in young adults in Europe and the US – estimated to affect more than 2 million people worldwide (Dutta and Trapp 2011). By January 1st 2012 there were more than 10 000 persons living with MS in Norway (Berg-Hansen, Moen, Harbo, et al. 2014).

With an average age of onset of 30 years, the MS diagnosis is often given to young adults. There is as of today no cure for MS, and individuals diagnosed with the disease faces a lifetime with chronic neurologic disease. Over the recent years several new medications have been developed, hopefully affecting disease progression. Results so far indicate that early therapy might improve survival in MS (Goodin 2014), but little is yet known about the long-time effect on disease progression or functional loss. Disease progression will follow its own individual path, and prognosis might be good, or might not. This leaves the individual with a great amount of uncertainty for the future. Ability and willingness to manage one's health and health care will be important to optimize function and manage medical treatment.

Patient activation was introduced as a term to describe a person's ability to manage his or her health. Hibbard and colleagues (2004) found that patients being engaged in, and participating in, their own health care are likely to have better health outcomes. They developed the *Patient activation measure;* a tool to both investigate patient activation, and to enable interventions to be targeted to the individual's activation level. Several studies have explored patient activation level amongst various chronic conditions. As far as I have been able to establish there has only been conducted one study exploring activation among MS patients (Stepleman et al. 2010), and one assessing neurological patients (Packer et al. 2015).

The data analysed in this master-thesis were gathered among patients included in a clinical intervention project at the Neurological department at Oslo University hospital (OUS), Ullevål, financed by Extrastiftelsen. The Neurological department at OUS Ullevål is the largest department treating MS patients in Norway. More than 1200 patients will come by the department yearly for controls. Dedicated MS nurses are providing easy-access contact for the patients, clinically and by phone. Physical therapists, a social worker and an occupational

therapist are available through internal referral. The purpose of the clinical intervention project was to explore whether regular controls by a nurse and physical therapist would enhance newly diagnosed patients activation, knowledge and self-management with an emphasis on physical activity.

The aim of this thesis is to investigate patient activation in a Norwegian population of newly diagnosed MS patients, and to compare the results with existing data on patient activation. In order to do so, the method of this thesis is dual. Firstly, a limited literature search were conducted, summarized in a narrative review. Secondly, cross-sectional data on patient activation and several other parameters were gathered from the baseline survey of the clinical intervention project, and analysed for comparison.

1.1 Thesis disposition

In the next section thoughts on health, health behaviour, Multiple Sclerosis and patient activation as both concept and measure are presented. Further, aim of thesis and the methods applied in both the literature search and cross-sectional survey are presented in the third and fourth section. Results from both the literature review and cross-sectional study are presented in the fifth section. In the sixth section the results are discussed in relation to research questions and public health relevance; along with the strengths and limitations of the methods applied. Finally, the last section aims to conclude, summing the score and clinical impact of our findings.

Photo: «Off the Beaten Path» - Iceland Fields of Lyngdalsheiði © Christopher Schoenbohm – 2010
(Creative Commons Licence: https://creativecommons.org/licenses/by-nc/2.0/)

“He who has health has hope, and he who has hope has everything”

Old Arabic proverb

2 Background

2.1 Health

Health can be can be defined as *absence of disease*, referred to as a negative or biomedical definition, where health is defined from what it is not, rather than by what it is (Naidoo and Wills 2000). The term *disease* is used where there is a defined diagnosis, whereas *illness* describes the individual experience of disease. One might experience illness without having a diagnosis, and it is possible to have a disease without experiencing illness. Both situations demonstrates the shortages of the first definition; good health is more complex than not having a diagnosis. The word *condition* is often used in medical literature, referring to health status or understood as a generalized term for 'medical problem' (Oxford Dictionaries 2015).

The World Health Organization (1948) gives a broader definition of health, as *"a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity"*. This classifies as a positive definition – where health is defined by what it is, or should be. The Ottawa Charter (WHO 1987) argues that in order to reach such a state the individual (or group) must be able to realize aspirations, satisfy needs, and cope with or change their environment. However, by including the term *"complete state of (…) well-being"* one risks defining health as utopian and unreachable to most humans. Sociologist Aaron Antonovsky (1987) argues for health as a continuum, where individuals might be better or worse off on a scale from *poor* to *excellent* health, but not as easily classified in terms of 'healthy' or 'unhealthy'. This is in line with a wide definition of health, where different factors (determinants) might affect health in a positive or negative direction, on an individual or group level. Having good health, in this aspect, means being at the better half of the scale, but does not imply that one cannot experience health issues or have a chronic condition.

While the infectious, communicable diseases of the latter centuries are being successfully treated and prevented, the global disease-burden are shifting towards more chronic conditions and diseases. By 2012 the leading cause of premature (adult) deaths worldwide were ischemic heart disease, with stroke and chronic obstructive pulmonary disease (COPD) among the top ten (WHO 2014b). The World Health Organization uses the term *noncommunicable diseases*

when referring to non-infectious chronic diseases, and lists four main types of noncommunicable diseases: cardiovascular, cancers, chronic respiratory diseases and diabetes (WHO 2014a). These are all diseases that have a close link to lifestyle habits and health behaviour, where unhealthy choices might cause, or contribute to, both illness and disease. Some chronic conditions, however, stand out from this crowd of lifestyle diseases. Among these are the chronic, neurological diseases, where the link to health behaviour is less obvious. These are rare diseases when compared to the larger group of chronic diseases, yet have great implications for the life of the individual.

2.2 Health promotion and health behaviour

The World Health Organization (1987) defines *health promotion* as: *"the process of enabling people to increase control over, and to improve, their health",* arguing that health promotion moves beyond the focus of individual behaviour, towards social and environmental interventions. In order to influence their environment individuals need the confidence and capability to act. This process; wherein individuals (or groups) gain greater control over actions, decisions and situations is often defined as *empowerment.* In this approach the health promoter is more of a catalyst than an expert, initiating a process at an individual or group level (Naidoo and Wills 2000).

People living with chronic diseases must often follow complex treatment regimens, and play a vital role in managing their own health. They might need to alter behaviours; they must monitor their condition/symptoms, and they will have to make decisions on when to seek professional care. These health behaviours are frequently referred to as *self-management* in the literature. The Oxford dictionary defines self-management as *"management of or by oneself,- the taking of responsibility for one's own behaviour and well-being"*(Oxford Dictionaries 2015). Although some diseases cannot be cured, being able to increase and experience some degree of control over health and health management can influence the individual's quality of life. As the burden of chronic diseases are rising, the management of chronic illnesses account for an increasing proportion of health care costs. Thus, preventing disease from developing, and promoting health and health behaviour is vital to secure the optimal use of resources.

2.3 The Social Cognitive theory

There are several models describing and predicting health habits (e.g. the "Health Belief Model"), but social psychologist Albert Bandura argues that neither of these tell *how to change* health behaviours (Bandura 2004). Bandura developed *the social cognitive theory*, emphasising the social environment as having a central influence on behaviour. Both environment, behaviour and individual cognition influences one another, creating a three-way, reciprocal relation. According to Bandura self-management is vital to the management of chronic conditions, and by managing their health habits, people can live longer and healthier lives (Bandura 2004, 1998). Health habits are not changed by an act of will, he argues, successful self-management requires motivational and self-regulatory skills. Core determinants for behaviour change according to Bandura's social cognitive theory is *knowledge, perceived self-efficacy, outcome expectations, health goals* and *perceived facilitators and impediments.*

Knowledge of health benefits and risks are a precondition for behavioural change, yet having the knowledge necessary for wanting a change will not be sufficient if self-efficacy is low. *Perceived self-efficacy* refers to a person's beliefs in his or her capabilities to organize and execute the courses of action required to achieve change (Bandura 1998). Perceived self-efficacy will both influence health behaviour, and the other determinants. The effect might be self-enforcing, where having a stronger self-efficacy facilitates higher goals, and the expectation of good outcomes facilitates changing behaviour.

Bandura argues that raising self-efficacy is the most effective way to induce health behaviour and behavioural changes (Bandura 2004). Raising the individual or groups belief in their own capacity and ability to successfully alter behaviour is more effective than arousing fear or awareness of vulnerability. Further, four main sources for raising self-efficacy are listed;

> *mastery experiences* – experiencing enablement and success in altering behaviour
> *vicarious experiences* – seeing that others are able to follow through on health habits
> *social persuasion* – someone convincing you that you are in fact able to change
> *somatic and emotional state* – how the individual feels and experiences the situation

In summary, promoting health should involve the empowering of individuals (or groups) with a goal to raise self-efficacy and promote good health habits and self-management. Before introducing the term *patient activation* we will take the time to explore Multiple sclerosis; diagnosis, treatment and health management.

2.4 Multiple sclerosis

The crude prevalence of Multiple Sclerosis (MS) in Norway is 203/100 000, with a female-male ratio in Norway of 2.2:1 (Berg Hansen 2014). Based on this prevalence approximately 1300 patients with MS lives in the city of Oslo (population of 630 000 by 2013). The crude incidence of MS in Oslo is estimated to be 6.6 per 100.000 (Smestad et al. 2008).

MS is a chronic neurological disease damaging the myelin sheath (white matter) of the brain and spinal cord (Goodin 2014). Damage to the myelin cells and nerve axons affects the central nervous systems ability to communicate effectively with nerves in the body. This leads to a variety of possible symptoms depending on the location of the damage. Common symptoms at time of diagnosis are visual impairment, double vision, sensory symptoms, weakness and fatigue. As the disease progresses, any function supported by the central nervous system might be affected. Symptoms as pain, cognitive dysfunction, bowel and bladder symptoms, and fatigue are often listed as the most distressing symptoms by patients.

MS is sub classified in terms of disease-course, as *relapsing-remitting (RRMS)* where disease progression will come in acute episodes, with remission of symptoms in-between attacks, or as *primary-progressive (PPMS)* where loss of function develops gradually, without attacks (Goodin 2014). The RRMS might develop into a more progressive disease course, referred to as a *secondary-progressive MS (SPMS).* There is no cure, but disease-modifying drugs might modify and slow the progression of the disease. As of today such treatment is only available for the individuals with a relapsing-remitting MS (>80 % of MS patients at diagnosis). Medications to relieve spasticity, relieve pain and enhance gait performance are used to treat and diminish symptoms. Disease course and disease severity varies greatly among individuals, leading to severe functional loss among some individuals. Yet the majority stay ambulatory and in full or part-time work throughout their occupational years.

As of today, we do not yet have the knowledge required to prevent the disease from developing at an individual level. MS is thought to be caused by a complex interplay between genetic predispositions and environmental factors (Ramagopalan and Sadovnick 2011, Goodin 2014). Several environmental factors have been identified: low levels of vitamin D, smoking, and previous infection with Epstein Barr virus (EBV) are all associated with a higher risk of developing MS; but neither is sufficient to trigger the disease. Birthplace, birth month and childhood migration also affects the risk of developing the disease.

Some health behaviours can help manage and alleviate the severity of symptoms, and engaging patients in health behaviours and self-management of their health is thus an essential part of promoting health in MS. Monitoring symptoms and seeking professional help at the right time is a vital part of self-management. The team of MS-nurses, available by phone or clinical contact, ensures availability and easy access to professional care. Patient education through a multi-professional information seminar of 5 sessions is another vital part of the patient care program for newly diagnosed MS patients in the Neurological department at Ullevål. Information on disease characteristics, treatment options, research efforts, symptom management, social benefits and psychological/emotional reactions are provided in groups of 10-15 patients, with an emphasis on participant experiences and group dynamics. All newly diagnosed patients are invited and encouraged to participate in this seminar within the first year of diagnosis. The purpose is to provide essential and relevant knowledge about the disease and self-management, and the reported participant satisfaction is high.

MS is not considered a disease primarily caused by (unhealthy) lifestyle habits. Certain health habits (smoking) enhances the risk of developing MS, but altering behaviour will not be sufficient to prevent the disease from developing. Still, there are certain behaviours that might improve quality of life, alleviate symptoms and might better prognosis. Disease-modifying medications will hopefully slow down the disease progression, and correct self-management of medications are therefore important. Further; systematic reviews show that regular exercise/physical activity can reduce the effects of fatigue, increase strength and mobility, reduce symptoms of depression and increase physical and mental quality of life (Latimer-Cheung et al. 2013, Pilutti et al. 2013, Motl 2014).

Unfortunately, some symptoms might limit or affect health behaviours negatively. Loss of function and presence of fatigue and/or pain increases the risk of immobility and reduced physical activity, while low physical activity might in turn be detrimental to physical function (Motl et al. 2015). Hence, symptoms might leave patients at risk for negative spirals, where symptoms and negative effects reinforces the other. Studies show that individuals with MS tend to be less physically active than the general population (Motl et al. 2015). Individuals living with MS repeatedly score higher on depression and fatigue, and lower on health related quality of life (HRQOL) compared to the general population. A larger multicentre study, surveying 424 Norwegian MS-patients reported a significantly lower HRQOL as measured by SF36 among persons with MS, compared to national data (Grytten et al. 2012). HRQOL scores were related to motivation for disease modifying therapy, with participants scoring high on the physical dimension and low on the mental dimension of HRQOL being least motivated for drug therapy. Klevan et al. (2014) found significantly lower levels of mental and physical quality of life (as measured by SF36), among respondents with MS than among healthy controls. Participants with MS also had higher scores of depression, with mean depression score (BDI) of 10.8, compared to 4.7 among healthy controls. Finally the MS group scored significantly higher on fatigue, with 71% of MS patients reporting fatigue, compared to 27 % among the control group.

The management and treatment of MS require both good health service management and a high level of self-management by the individual. Perceived self-efficacy as introduced above is vital to develop and maintain health habits and good self-management behaviours. There are several measures assessing self-efficacy, but it has been argued that neither measure give a full assessment of the core determinants of the Social Cognitive Theory, and that new terms and definitions are necessary to fully describe and measure health behaviour. Amongst these critics are Hibbard et al. (2004) who introduces the term – and measure – *patient activation.*

2.5 Patient activation – development of a patient activation measure

Hibbard et al. (2004) found that US patients being engaged in, and participating in, their own health care are likely to have better health outcomes. They introduced the term *patient activation* to describe a person's ability to manage his or her health. Hibbard and colleagues

did an extensive job exploring activation as a concept, and developing the patient activation measure through several stages.

The first stage involved defining activation conceptually. Through literature reviews, six domains of engagement were identified:

1) Self-management of symptoms and problems
2) Engagement in activities to maintain function and reduce decline
3) Involvement in diagnostic choices and treatment
4) Collaboration with health care providers
5) Selecting health provider based on quality and performance
6) Being able to navigate the health care system

A panel of professional experts were consulted and asked to develop subdomains to these six. Focus groups of patients with chronic conditions were then asked to comment on these subdomains, rewording the domains and subdomains in layman's terms. This first stage led to a conceptual definition of patient activation as *belief* in the patient's role in self-management care, *knowledge* of how to manage one's health, and the *skills and behaviour* to perform the self-management.

In the second stage survey items within each domain were developed, resulting in a total of 80 items. These were explored using face-to-face interviews, exploring how the items were understood and rated. Further, a pilot study (telephone interview) among 100 respondents were performed; and finally psychometric analysis of the items. At the third stage items were refined in a survey, and tested on a larger group of patients with chronic illness, and lastly the measure were tested on a national probability sample. This tedious process led to the original 22 item *Patient Activation Measure* (PAM) and a definition of patient activation as: *"understanding one's role in the care process and having the knowledge, skill and confidence to manage one's health and health care"* (Hibbard et al. 2004).

In 2005 Hibbard and colleagues shortened the measure, leaving 13 items (PAM13), accounting for 92 % of the variation in the original PAM 22 (Hibbard et al. 2005). Each item have five answering options – '*strongly disagree'(1), 'disagree'(2), 'agree'(3), 'strongly agree'(4)* and '*not applicable'.* The raw score are calculated summarizing each of the scores, with the *'not applicable'* answers given the mean value of the other scores (Insignia Health

2011). Individuals scoring all items at either extreme end are excluded from analysis. The raw scores are further transformed to a theoretical 0-100 point scale score (using a standardized scoring table) giving a PAM score for further analysis. Based on large (American) population studies each item have a calibrated score, indicating how high (total) activation scores are (on average) needed to endorse the item. Based on these population data the items of the PAM13 are ordered from 1-13, with the first item on average requiring the lowest PAM score to agree. Figure 1 shows each item with its calibrated score.

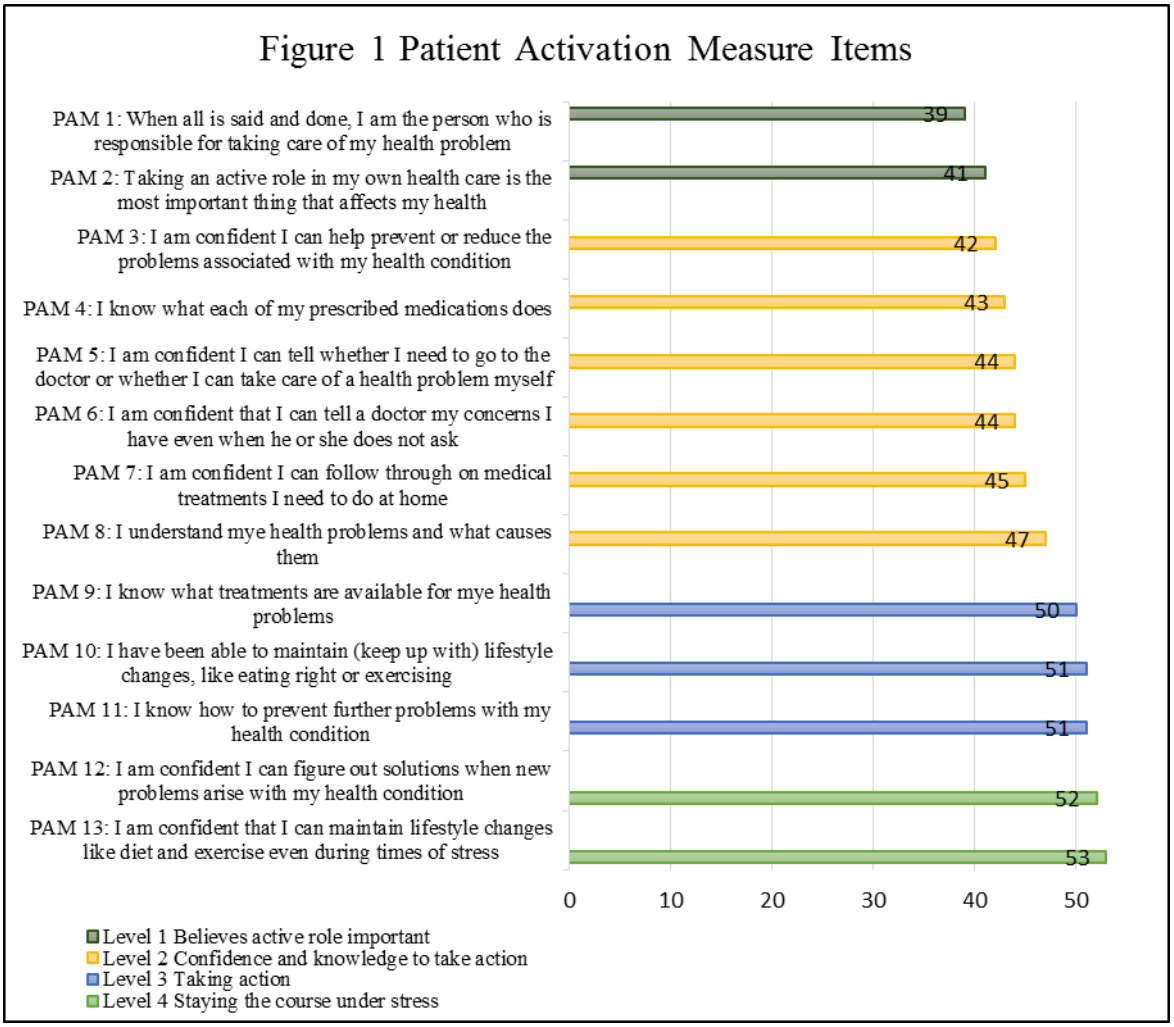


Figure 1 shows the PAM items and the score required to endorse each item. Redrawn from Hibbard et al (2005) – with permission

The scores are further divided into 4 activation levels, ranging from least to most activated. Individuals at the lowest activation level might still be passive recipients of care, not quite

grasping their own role in health management (Hibbard et al. 2005). At the next level the individual is likely to have more information, but might not yet have the necessary knowledge to make behavioural changes based on this information. At the third level the person has started to make changes, but lacks the confidence to follow through. At the fourth and highest activation level the individual has adopted new behaviours, but might still struggle to maintain the changes during stress.

Assessing activation level opts targeted interventions. Interventions should be targeted to support transitions from one level to the next. E.g. interventions to increase knowledge are recommended for individuals scoring at the lowest level of activation, while interventions to increase skills and self-confidence will be better suited at higher levels of activation (Hibbard and Tusler 2007).

3 Aim of thesis - Thesis questions

The aim of this thesis is to investigate patient activation among patients recently diagnosed with MS.

A limited literature search forms the basis of a narrative review of existing data on patient activation. Further, cross-sectional baseline data from the clinical project are used to describe patient activation and activation level among newly diagnosed Norwegian patients. Along with demographical data, data on depression, health related quality of life, physical activity and fatigue are included to give a more complete description of the study population.

Data from our population will be compared to data from previous investigations on chronic patients, neurological conditions and MS patients. It will also be of relevance to investigate the endorsement of each item, to see whether some items are easier or harder to endorse than estimated in other populations.

Four research questions have been investigated in this thesis; two for the literature review, one for the cross-sectional study, and one comparing the two:

1) What are the current data and knowledge on patient activation among patients with chronic conditions?
2) What are the current data and knowledge on patient activation among patients with neurological diseases in particular?
3) What describes our population in terms of patient activation, depression, physical activity level, health related quality of life, fatigue and demographical data?
4) How does the data from our cross-sectional study compare to the existing data on patient activation?

Being recently diagnosed with a lifelong disease will most likely influence perceived self-efficacy and self-management, and it would be of interest to investigate how activated these individuals are, with the underlying hypothesis that there will be no significant differences from other populations with chronic diseases.

4 Materials and methods

4.1 Study 1 – literature review

In order to explore the existing data and the theoretical foundation of the concept of patient activation, a limited literature search were conducted. The findings from this literature search are summarized in a narrative review. A narrative review attempts to describe results from different studies on a subject, and allows for comparison of studies of diverse methodologies, without making the quantitative syntheses of a meta-analysis (Shadish, Cook, and Campbell 2002).

4.1.1 Literature search procedure

A limited literature search were conducted, using the databases *PubMed* and *OVID Embase*. Initial searches were done in April 2013 and October 2014, and finally repeated in March 2015 to include newly published articles. Keywords used in the search were: (patient[title] AND activation[title]). A composition of 'patient activation' and 'multiple sclerosis' yielded no new articles. As the patient activation concept explored in this thesis were introduced by Hibbard et al. (2004) the searches were limited to articles published after January 1st 2004. The literature search process are summarized in Figure 2.

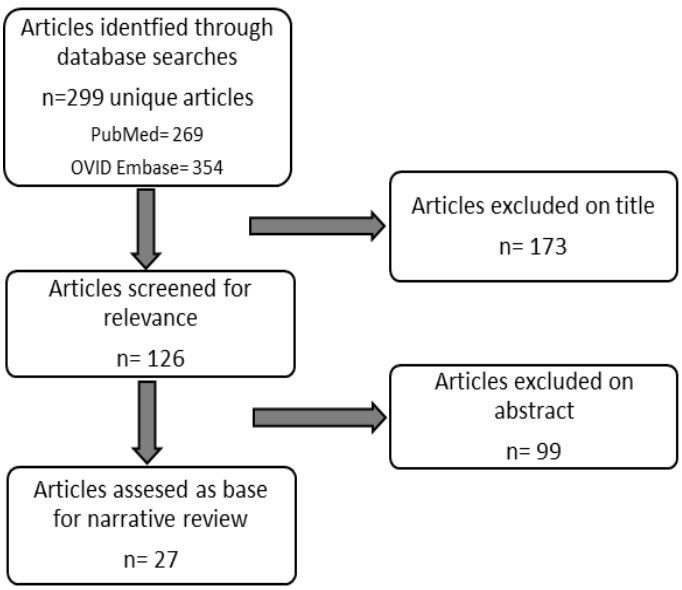


Figure 2. Literature search process

Conducting searches in databases containing similar articles yielded many duplicate results. The total number in Figure 2 gives the number of unique articles identified by the two searches. Inclusion criteria were journal articles exploring and describing patient activation as described by Hibbard et al. (2004) and measured by the PAM13. Among articles excluded on abstracts were

conference abstracts, pilot studies and editorials/letters. Studies assessing surgical patients, studies assessing only non-western patients, studies assessing psychiatric patients, and studies evaluating specific interventions to improve patient activation were excluded. Articles examining a single, non-neurological diagnosis were also excluded, as these might be too specific for comparison; while articles examining a population of more diverse chronic diagnoses were included. This left a total of 27 articles founding the basis of a narrative review.

The 27 included articles are diverse in methodology and assessment. Data on patient activation, activation level (if available), population characteristics (diseases, mean age, disease duration) and correlation data were gathered from each article for comparison. In order to not lose the diversity, main thematics (i.e. health behaviour, longitudinal development, health service quality) were gathered to form a basis for a broader discussion of the patient activation measure. An attempt was made to group the articles on basis of population characteristics and main article theme.

4.2 Study 2 – cross-sectional study

To investigate patient activation among newly diagnosed patients with MS, data from a clinical research project conducted at the Neurological department, Ullevål, OUS were used. The clinical project were financed by Exstrastiftelsen, and aimed to increase knowledge and endorse self-management, with a purpose of enabling patients to take an active role regarding their new diagnosis. All newly diagnosed patients were offered clinical follow-up by a physical therapist and a nurse, with a minimum of four consultations during the first year of diagnosis (in addition to regular controls by the neurologist). Self-report measures and clinical measures as gait endurance, gait speed and balance were assessed at baseline and after one year of follow-up. This thesis have only made use of the baseline data, applying a cross-sectional study design.

4.2.1 Participants and recruitment

Information about the project were administered to all neurologists at the department to ensure complete ascertainment of all newly diagnosed patients. All patients referred to follow-

up in the clinical intervention were assessed for inclusion in the cross-sectional survey. Patients not able to complete the Norwegian questionnaires due to language, and patients with severe psychiatric history were excluded. Medical journals of all referred participants were reviewed to ascertain that a diagnosis of MS was confirmed.

A total of 40 patients were referred to follow-up during the period from May 1st 2013 until June 30th 2014 (14 months). Two of the patients, one woman and one man, declined participation – expressing a wish not to dwell on the diagnosis, and to feeling too healthy to need a closer follow-up. Another four patients were excluded from the analysis; two were at the time diagnosed with Clinically Isolated Syndrome rather than MS; one participant were excluded due to language difficulties, and one due to extensive psychiatric history. This left 34 eligible participants with a confirmed MS diagnosis, accepting the extended clinical follow-up. Figure 3 illustrates the flow of patient inclusion.

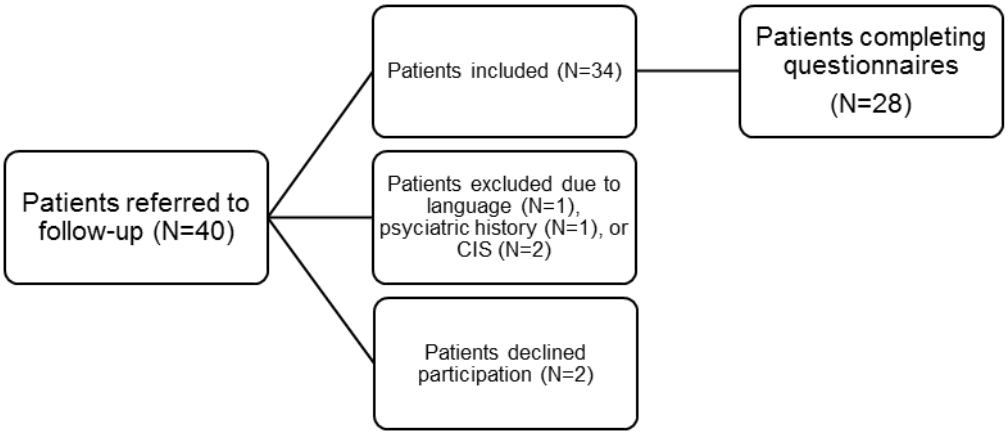


Figure 3 Flow chart of patient inclusion

4.2.2 Data collection

At inclusion, the participants were asked to complete a set of questionnaires, assessing activation, depression, quality of life, physical activity level and fatigue. In addition, demographic data and physical data (gait endurance, gait speed, and balance) were assessed. Data from participants were collected after the first consultation with the MS-nurse, before, or at the start of, the first consultation at the physical therapist. Patients that had given their consent to fill out the questionnaires, but did not return them at the first consultation, were

contacted by phone one additional time to remind them of the questionnaires. A total of 28 participants gave their written consent and returned the questionnaires.

4.2.3 Measuring instruments

Patient activation was measured using the Norwegian validated version of the *Patient Activation Measure (PAM13*) (Hibbard et al. 2005, Steinsbekk 2008). PAM13 is a 13 item, multiple choice measure (presented previously in Figure 1). The item responses are scored from 1-4, with 'not applicable' or missing items given the mean score of the other items. The raw score are transformed into a standardized activation score (0-100) from a scoring table, giving a continuous variable for further analysis and comparison (Insignia Health 2011). The standardized scores are further divided into four levels of activation; level 1: scores of 45.2 or below, level 2: scores of 47.4 to 52.9, level 3: scores of 56.4 to 66.0 and level 4: scores of 68.5 and a above. A higher score (and level) indicates higher patient activation. The PAM13 has been validated in both neurological (Packer et al. 2015) and MS populations (Stepleman et al. 2010, Packer et al. 2015).

Depression was measured using *Beck Depression Inventory II (BDI II)* - a 21-item instrument self-report measure assessing level of depression (Siqveland 2011). Response per item range from 0-3, with higher scores indicating higher severity of symptoms, and scored as a sum of all items. There were no missing items. The English version of the BDI-II has been validated in MS populations with good reliability (Moran and Mohr 2005), and the measure are being used in several studies including Norwegian MS-populations. The Norwegian version was translated in 2005 with rights registered to Pearsons Assessment. The Norwegian translated version is deemed to have good psychometric abilities among Norwegian adults (Siqveland 2011). However, despite extensive clinical application of the measure, there are no standardized cut-off scores validated for the Norwegian population. Further, the measure is only to be interpreted by a qualified psychiatrist or psychologist. Therefore, the measure was scored, not interpreted, and patients scoring 13 or higher were referred to further follow-up by their regular GP, or referred directly to psychological assessment.

Health related Quality of life (HRQOL) was assessed using the SF-12v2, with the two summary scales *mental health scale (MCS)* and *physical health scale (PCS).* The measure

contains 12 questions regarding physical, mental and social health. Scoring uses a preformed algorithm, with mean scores set at 50 with an SD of 10 (Ware 2002). There was one duplicate answer among the items, scored as mean value of the two reported answers. Higher scores represent better physical and mental HRQOL. SF-12v2 have been evaluated to have acceptable reliability and measurement stability in an MS population (Learmonth et al. 2014).

International Physical Activity Questionnaire (IPAQ-short form), was used to assess physical activity level. The measure contains 8 questions asking for activity data from the last week, assessing walking, moderate-intensity and vigorous-intensity activity, in addition to data on sedentary time (IPAQ Research Comittee 2005). Physical activity is measured as MET-minutes (metabolic equivalent) per week, and classified into high, moderate or low physical activity level. Unfortunately, the IPAQ short form has been criticized for overestimating physical activity level, and having low correlation with objective, physical activity measures (Lee et al. 2011).

Fatigue were assessed by *The Fatigue Scale for Motor and Cognitive Functions (FSMC)*. The measure was developed specifically to assess fatigue in MS-patients, and validated in an MS-cohort (Penner et al. 2009). The FSMC is multidimensional, scoring fatigue in terms of motor or cognitive symptoms. 20 statements are scored on a scale from '*not true at all' (1)* to *'completely true' (5),* with a possible score range from 20-100, low scores indicating little or no fatigue. There were a few missing items, scored given the mean score of the other items. The division between motor and cognitive symptoms allow for a differential assessment and a better understanding of potentially confounding variables and correlations with other measures, e.g. depression inventories (Penner et al. 2009). This division also allows for differentiated treatment options, which might be particularly useful as fatigue is a complex phenomenon.

Both gait endurance, gait speed and balance were assessed at baseline. Both gait endurance and gait speed are useful to evaluate function at a specific time for a specific person, and allow for longitudinal comparison. However, the data represent only a narrow assessment of motor function. A more thorough assessment of balance provide a better tool for comparison of physical function among individuals, and therefore, the *Balance Systems Evaluation Test*

(BESTest) was chosen for further analysis. The measure assesses balance in terms of biomechanical constraints, stability limits, anticipatory balance, reactive balance, sensory orientation and gait stability/dynamic balance (Horak, Wrisley, and Frank 2009). Each item is scored on a scale of 0-3, based on standardized clinical criteria, with a maximum total score of 108. The sum score is then transformed into a percentage score, giving a continuous variable with scores between 0 and 100, and good opportunity for comparison with other measures. The measure was developed to assess balance among neurological patients (Horak, Wrisley, and Frank 2009) and the scoring manual has been translated to Norwegian by C. Hamre and colleagues (2013), used with permission, not yet published.

4.2.4 Analysis and statistical methods

Data were reviewed for completeness and errors prior to statistical analysis. Analysis was performed using the SPSS statistical software (IBM SPSS Statistics 21). All standardized measures were scored according to their standard protocols.

Descriptive statistics were computed to provide information on the characteristics of the study subjects. Univariate analyses were performed to check the assumed normal distribution of the data on patient activation, and to explore the distribution of answers on PAM items. Reliability of PAM13 were analysed computing inter-item correlations and Cronbach's Alpha.

Bivariate and partial correlation analyses were conducted to explore relationships between the PAM13 and the other measures; using *Pearson's r* for continuous measures, and *Spearman rho* for ordinal and nominal measures. As far as our data allowed, Chi-square tests were conducted to compare our data with data from other published studies.

4.3 Ethics

The declaration of Helsinki was developed in 1964 by the World Medical Association, as a statement of ethical principles for medical research on human subjects (WMA 2015). The Norwegian *Act on Medical and Health research* from 2008 incorporates the principles from the Helsinki Declaration and further regulates the legal and ethical aspects of health research

(Lovdata 2008). Among the ethical aspects that are emphasized in both the declaration and research act are:

Informed consent: Before inclusion all participants were given oral and written information (Appendix 1) about the clinical intervention project and the use of data from the questionnaires. All participants gave written, informed consent.

Protection of privacy: All data have been treated confidentially, protecting the privacy of the participants. The analysis and storage of computed data have been done using secure research servers hosted at the premises of Oslo University Hospital, Ullevål.

Beneficence: All patients referred to the clinical intervention were offered follow-up, regardless of the exclusion criteria. All included participants received the same basic clinical follow-up whether responding to the questionnaires or not. If any patient were in need of further consultations by phone or in clinic, this was arranged. The participants had the benefit of more frequent hospital assessment, with the possible benefit of a more individualized care.

Role of the researcher: The thesis author participated in the clinical intervention as a physical therapist. Baseline data were collected before any interventions by the physical therapist were started.

The clinical project was approved by the Regional Committee for Research Ethics (Appendix 2) and the Review Board for Oslo University Hospital Ullevål.

5 Results

5.1 Results from the literature review

The term *patient activation* was used sporadically in articles before 2004, but not clearly defined. With their work from 2004, Hibbard and colleagues started the extensive process of exploring, defining and elaborating the concept of patient activation. The literature search revealed a variety of articles, including narrative and systematic reviews conducted by the authors developing the patient activation measure. The concept and measure have been further explored and validated by researchers in the US, Canada, Europe and Asia. There are several articles seeking to validate or evaluate different interventions aimed to increase patient activation. As the purpose of this thesis is to investigate and *describe* patient activation among a specific study population, aiming to describe patient activation have been selected specifically for further analysis.

A total of 27 articles were included to form a basis for a narrative review, these are presented in Table 1.

Table 1 Articles included in the narrative review.

Conceptual development	Describing general population	Language validations	Describing populations w/ chronic conditions	Narrative reviews	Exploring patient activation and health behaviour
Hibbard et al. (2004)	Hibbard & Cunningham (2008)	Steinsbekk (2008)	Stepleman et al. (2010)	Greene & Hibbard (2013)	Greene & Hibbard (2012)
Hibbard et al. (2005)	Fowles et al. (2009)	Maindal et al. (2009)	Alexander et al. (2011)	Greene & Hibbard (2015)	Harvey et al. (2012)
Hibbard et al. (2007)	Wong et al. (2011)**	Rademakers et al (2012)	Goodworth et al. (2014)		Kinney et al. (2015)
Hibbard and Tusler (2007)	Magnezi and Glasser (2014)*	Benk-Franz et al. (2013)	Rijken et al. (2014)		
Hibbard & Mahoney (2010)	Nijman et al. (2014)	Zill et al. (2013)	Magnezi et al. (2014)		
			Packer et al. (2015)		
			Hibbard et al. (2015)		

**also a language validation to Hebrew*
*** describing health consumers with chronic conditions vs no chronic condition*

5.1.1 General population data on patient activation

The patient activation measure was originally developed to measure activation among individuals living with chronic conditions/diseases, hence, the data on the general population – including individuals *without* disease – are scarce. However, the literature search revealed a few studies investigating more general population samples, not sampled on basis of health status. These data are presented in Table 2.

Table 2 Comparison of data on patient activation among general populations

Authors	N	Nationality	PAM *M* (SD)	PAM Chronic conditions	PAM No chronic conditions	Population characteristics
Hibbard & Cunningham (2008)	13500	USA		64.2		National household survey
Fowles et al. (2009)	625	USA	68.2 (15.4)	67.2	69.8	Employees
Wong et. Al (2011)	474	Canada		65.6	65.9	Health care consumers
Magnezi & Glasser (2014)	203	Israel	70.7 (15.4)	66.4	71.9	Household survey
Nijman et al (2014)	1432	Netherland	56.9			Health care consumer panel

These studies provide some insights to patient activation levels among the general population, including healthy individuals. By stratifying data on sub-groups with or without chronic conditions, they provide data for comparison of health characteristics within a larger population.

Hibbard and Cunningham (2008) analysed data from a nationally representative *Health tracking household survey* conducted in the U.S in 2007. Based on data from 13500 adults 18 years or older (mean age not given), with or without chronic conditions, they found that 21% of the population were at the two lowest levels of activation, while 41% is on the highest level. Unfortunately, mean patient activation score is only reported for the proportion of participants living with one or more chronic conditions (mean 64.2*)*, and not for the complete survey population.

Another American study investigated patient activation among 625 employees from two different industries, an airline and a health care system (Fowles et al. 2009). Mean patient activation score for all participants were 68.6 (SD 15.4). The data are further stratified into

employees with or without one or more of 10 chronic conditions, with employees with chronic conditions scoring lower on patient activation. Patient activation related significantly with educational level, where higher education were associated with higher PAM score. According to the authors, health care workers scored higher on activation than employees in the airline, despite similar health statuses (data not shown in article). Mean age in this study were 45 years, providing data on a younger population than the one studied in the initial studies conducted by Hibbard and colleagues. Fowles et al. (2009) concludes that the psychometric characteristics of the PAM13 remain robust when used in a population of "regular" employees.

Magnezi and Glasser (2014) have validated the PAM13 in a Hebrew-speaking Israeli population, conducting a random telephone survey of a representative sample of households. They found an average PAM-score of 70.7 (SD 15.4) – sampling a population of 203 individuals between the ages of 25 and 80, with the majority of participants being >55 years (mean age not reported). Roughly one quarter of the respondents listed at least one chronic condition, with respondents with chronic conditions scoring significantly lower than respondents without chronic conditions.

Dutch researchers Nijman et al. (2014) investigated patient activation levels among a representative panel of health care consumers, finding an average activation score of 56.9 among 1432 respondents with a mean age 55.9 years. Distribution on activation levels show that 48% of participants scored within the two lowest levels, while 22% scored within the highest level. Younger participants, and participants with a higher educational level scored higher on patient activation.

Canadian researchers Wong, Peterson, and Black (2011) did not find significant differences in mean PAM score between respondents with chronic conditions vs respondents without conditions. Their study assessed patient activation among respondents to a telephone survey among a nationally representative population of health care consumers (mean age 46 years).

5.1.2 Patient activation among populations with chronic conditions

As expected, the majority of data on patient activation have been assessed among populations with chronic conditions. Table 3 show a comparison of these data:

Table 3 Comparison of data on patient activation among populations w/chronic conditions

Authors	Nationality	N	*M age (years)*	Age (min-max)	PAM *M* (SD)	Population characteristics
Steinsbekk (2008)	Norway	31	-	-	66.8 (16.9)	Patients w/ Bechterev, hip replacement or fibromyalgia
Steinsbekk (2008)	Norway	57	-	-	49.3 (11.3)	Patients w/ heart fail., diabetes, osteopor, COPD or thyroid disease
Maindal et al. (2009)	Denmark	344	62.3	43-75	64.2	Patients w/ dysglyceamia*
Wong et al. (2011)	Canada	208**	50	19-90	65.6	Health consumers w/chronic conditions
Alexander et al. (2011)	USA	8140	52.9		64.1	Patients w/chronic conditions
Rademakers et al. (2012)	Netherland	1837	58.7	15-93	61.3	People w/ chronic illness and/or disability
Zill et al. (2013)**	Germany	4018	67.0	19-87	67.1	Patients w/ chronic illness
Brenk-Franz et al. (2013)**	Austria, Switzerland and Germany	508	54.7	18-89	68.3 (14.8)	Primary care visitors
Stepleman et al. (2010)	USA	199	46.2 (10.8)		63.2 (11.9)	Patients w/ multiple sclerosis
Rijken et al. (2014)	Netherland	751	63.3 (11.8)		60.6 (15.2)	National panel of patients w/ chronic diseases

**dysglyceamia: impaired fasting glucose, impaired glucose tolerance and Type II Diabetes*
*** stratified data on respondents w/chronic conditions*
**** two articles were published almost simultanously (sept/oct 2013) both validating PAM13 in the German language*

The majority of national validation studies have assessed populations with chronic diseases, and are included in this analysis. With the exception of one of the Norwegian populations, - though having very few participants, all average PAM scores are within the score-range of the third activation level, similar to the results from the American study of Hibbard and Cunningham (2008).

A few of the articles report statistics on activation levels in addition to the results shown in Table 3. These statistics are shown in Table 4 for comparison.

Table 4 Comparison of data on patient activation levels among people with chronic conditions

Authors	N	Nationality	*M* age (SD)	*M* PAM (SD)	Activation level (%)			
					1	2	3	4
Hibbard and Cunningham (2008)*		USA	-	64.2	8.6	17.3	33.9	40.1
Stepleman et al (2010)	199	USA	46.2 (10.8)	63.2 (11.9)	7.1	18.9	39.8	34.2
Rijken et al (2014)**	751	Netherland	63.3 (11.8)	60.6 (15.2)	18.4	18.6	32.2	30.8

**referring the stratified data from persons with self-reported chronic conditions*
***baseline data*

The results in Table 4 show some variations in activation level among the different study populations. Hibbard and Cunningham (2008) found that individuals with chronic conditions were more likely to have lower levels of activation with 26% of participants in the two lowest levels of activation (compared to 18% among the healthy respondents). Rijken et al. (2014) has reported a markedly higher rate of participants in the lowest activation level, with 18.4% at the lowest level, and a total of 37% at the two lowest levels, though still scoring higher than the Dutch study of health care consumers by Nijman et al. (2014) presented previously. The participants in Rijken et al. (2014) were old adults (mean age 63.3 years) and had a mean disease duration of 10.9 years, with half the patients having two or more chronic conditions. Unfortunately, there is no data on mean age or disease duration from Hibbard and Cunningham (2008) for comparison.

Stepleman et al. (2010) investigated patient activation amongst MS patients specifically. Distribution on activation levels were comparable to those Hibbard and Cunningham (2008) found among people with chronic conditions, with one exception; there were more participants at activation level 3 and fewer at activation level 4. The participants in Stepleman's study also had the lowest reported mean age, reflecting the early onset of MS.

Several studies have investigated the relationship between patient activation measure and other parameters, providing a broader understanding of patient activation among patients with chronic conditions.

Self-reported health and health status.

Self-reported health has been analysed in several studies, using the first item of the SF12/SF36 measure, where the respondent lists his or her general health along a scale as: poor – fair – good – very good or excellent. Wong, Peterson, and Black (2011) found that 74% of respondents listing chronic conditions reported their health to be 'good' or better, while 13% listed their health as 'excellent' despite chronic conditions. Alexander et al. (2012) found similar results, while both Maindal, Sokolowski, and Vedsted (2009) and Nijman et al. (2014) found that close to 85% reported their health to be 'good' or better. One study reports markedly lower self-reported health; Zill et al. (2013) found that merely 34.8% of respondents rated their health as 'good' or better, while 11.7% rated their health as 'poor'.

In comparison both Wong, Peterson, and Black (2011) and Fowles et al. (2009) found self-reported health among respondents without disease to be markedly better, with 39% and 18.2%, respectively, reporting their health to be 'excellent', and more than 90% scoring their health as 'good' or better.

The majority of studies analysing self-reported health find strong associations between PAM score and self-reported health, where patients reporting better health status scored higher on patient activation (Hibbard and Cunningham 2008, Fowles et al. 2009, Maindal, Sokolowski, and Vedsted 2009, Wong, Peterson, and Black 2011, Rademakers et al. 2012, Zill et al. 2013, Magnezi and Glasser 2014, Nijman et al. 2014).

Further, it has been suggested that patient activation correlates with age, education, depression and number of conditions. While a few studies report that initial differences are no longer significant when subjected to further analysis (Fowles et al. 2009, Brenk-Franz et al. 2013), the majority of studies report significant higher patient activation among those with younger age and higher education (and higher income) (Hibbard and Cunningham 2008, Stepleman et al. 2010, Alexander et al. 2012, Magnezi et al. 2014, Nijman et al. 2014, Packer et al. 2015).

Hibbard and Cunningham (2008) found differences between respondents with different conditions, with individuals with cancers scoring higher on patient activation (mean PAM 65.8), while respondents reporting depression were least activated (mean PAM 62.1).

Magnezi et al. (2014) found a similar correlation among primary care users in Israel, with lower activation scores among participants scoring high on depression. When adjusting for differences in health status, Hibbard and Cunningham (2008) found that individuals with multiple chronic conditions had a higher level of activation than individuals with only one condition. Alexander et al. (2012), however, specifically reports that they do not find the same correlation.

Patient activation in relation to health service and quality of care

In the general household survey analysed by Hibbard and Cunningham (2008) it is reported that respondents at the highest level of activation are more likely to report a regular source of care, while respondents at the lowest level report having unmet medical needs, not getting medication prescription due to costs and experiencing delayed care.

A few studies have investigated patient activation in relation to health care quality further. Alexander et al. (2012) examined whether patients relationship with their physician are associated with patient activation. They surveyed 8140 patients with chronic disease; assessing whether the nature of the patient-provider relationship would affect patient activation. They found patient activation to be higher among patients reporting high quality in interpersonal exchange, high degree of fairness (non-discrimination), and more out-of-office contact (letters, telephone) with their general physician (GP). Mean PAM score in their population were 64.1, with highest PAM scores among the chronically ill patients having a regular GP (65.6) compared to those without a general GP (61.6). Wong, Peterson, and Black (2011) have investigated similar parameters, finding higher patient activation scores among patients having a regular source of care, spending more time per consultation, and reporting higher whole-person care. In addition to the importance of the doctor-patient relation, there were significant higher PAM scores among patients reporting to have a nurse as part of their chronic disease management plan. Wong and colleagues (2011) conclude that a positive patient-provider relationship might positively influence a patients confidence and self-management behaviour.

Kinney et al. (2015) did a systematic review, reviewing articles assessing PAM in relation to hospital admissions, emergency room (ER) utilization, and medication adherence. They

conclude that among patients with chronic conditions, low activation score/level increases the risk of hospital admission and/or ER utilization, while data on medication adherence are inconclusive.

Data on health behaviour

Studies investigating health behaviours confirms the initial notion by Hibbard and colleagues (2004, 2005), that activated patients are more likely to perform self-management behaviour. Studies repeatedly show that higher activated individuals are more likely to have a healthy diet and exercise on a regular basis (Hibbard et al. 2007, Fowles et al. 2009, Harvey et al. 2012), have better information-seeking skills (Fowles et al. 2009, Harvey et al. 2012, Nijman et al. 2014), are more likely to perform preventive behaviours like immunizations or cancer screenings (Greene and Hibbard 2012), and are less likely to perform health damaging behaviour (i.e. smoking) (Greene et al. 2015).

Hibbard et al. (2007) found that a rise in patient activation correlated with an increase in a variety of self-management behaviours, even when the behaviour were not performed at baseline. This were further explored by Hibbard and Tusler (2007) who found that certain disease-specific behaviour correlated with activation levels. Self-management in the form of following medication treatment regimens and seeking medical advice by a doctor required the lowest levels of activation. More active self-management behaviours as exercising or keeping a glucose diary were rare at the two lowest activation levels.

5.1.3 Data on longitudinal development of patient activation

The longitudinal development of patient activation among individuals living with chronic conditions were investigated by Rijken et al. (2014). They found that the PAM score decreased significantly (from mean 60,6 to mean 56,6) in the timespan of 12-18 months. Self-rated health had an indirect positive effect on patient activation, with some individuals increasing in activation level. However, the general tendency of the study population were towards a decrease in activation. Rijken and colleagues (2014) conclude that patient activation among individuals with chronic conditions might either decrease, increase or remain at the same level; but at group-level the development in their population is towards lower activation levels.

The study conducted by Rijken and colleagues (2014) does not account for health services administered to the patients during the 18 month period. The development of patient activation in relation to interventions has previously been investigated by Hibbard et al. (2007). The participants were adults between the ages of 50 and 70, with at least one chronic condition, and were randomized into an intervention group (Chronic Disease Self Management Program[1]) and a control group. After 6 weeks of intervention the intervention group had a significant increase in activation, with a prolonged effect on patient activation after 6 months. The control group participants also experienced a rise in activation, and after 6 months the difference between the groups were no longer significant.

5.1.4 Patient activation among neurological patients

Stepleman et al. (2010) and Goodworth et al. (2014) both describe patient activation among a study population of 199 MS patients with a mean disease duration of 8.3 years (SD 6.8). Stepleman and colleagues (2010) deem the PAM13 to be a valid measure to assess activation among MS-patients. They found a mean activation score of 63.2, with patients with a relapsing-remitting MS scoring higher than patients with primary- progressive MS. They did not find any association between activation level and self-management of medications. Goodworth et al. (2014) explored the results further, finding that patient activation among MS patients was significantly related to depression, educational attainment and self-efficacy. Higher scores of patient activation were also associated with higher reported quality of life, though not significantly.

A Canadian study conducted by Packer et al. (2015) has assessed activation among persons living with neurological conditions – including individuals with MS. They conclude that the PAM13 is a reliable and valid instrument to survey neurological patients, but report some scaling problems that might give measurement error and bias for those with low levels of activation. Specifically the item order listed in the development of PAM13 (as visualized in

[1] Chronic Disease Self-Management Program: a 2,5 hour workshop once a week for 6 weeks, addressing topics as: dealing w/frustration, fatigue and pain; appropriate exercise techniques; medication management; communication; nutrition; assessing/evaluate new treatment options.

Figure 1) did not apply to the neurological population. Packer and colleagues found that items # 6 and 7 – concerning confidence in the patient role, were markedly easier endorsed, while statement #3 "I am confident I can help prevent or reduce the problems associated with my health condition" were harder to endorse. Stepleman et al. (2010) have not addressed this issue, but in presenting their data, it is apparent that the order of items among the MS-patients are similar to those found by Packer and colleagues.

5.2 Results from the cross-sectional study

5.2.1 Participant characteristics

The aim of this thesis was to assess activation amongst a population of newly diagnosed MS patients. Mean disease-duration in our population were 30 days, meeting the intention of investigating those newly diagnosed. A total of 38 patients with a confirmed MS-diagnosis were referred to follow-up in the clinical intervention project. Previous incidence studies in Oslo has estimated an incidence of 6.6, giving approximately 41-42 new patients per year. Our inclusion period spanned 14 months, hence 38 patients is likely to be the majority of newly diagnosed patients in this period. Table 5 show the descriptive statistics of our study population.

The study population included 28 adults between the ages of 22 and 46. Mean age at inclusion was 32.3 years (SD 6.4) with a median age of 32. Mean age when including all 38 referred patients were 34.1 years (SD 8.3), while the median age were the same (32 years). There were 82.1 % women in the group completing questionnaires, compared to 76.3 among the 38 referred patients (data not shown), giving a higher female response rate. The total response rate among the referred patients were 73.6% (28 of 38).

Table 5. Demographic data of the study population (N=28)

	M (SD)	*Min/Max*	*N*	*%*
Total				
Female/male			23/5	82.1/17.9
Age (years)	32.3 (6.4)	22/46		
Time from referral to diagnosis (days)	148 (192)	2/979		
Time from diagnosis to inclusion (days)	32 (26)	0/129		
Marital status				
Single			13	46.4
Married or living with partner			15	53.6
Education				
High school			7	25
College			8	28.6
University			13	46.4
Employment status				
Full time			12	42.9
Part time work/sick leave			6	21.4
Sick leave, full time			7	25
Student			3	10.7
Other chronic illnesses*			9	32.1
other autoimmune diseases			7	25.0

**inflammatory bowel disease (n=1), diabetes type 1 (n=1), asthma (n=3), spondyloarthritis (n=1), thyroid disease (n=1), tremor (n=1), PTSD (n=1)*

Mean time from referral to diagnosis among the study participants were 147.7 days (21.1 weeks), with an SD of 191.5. A standard deviation greater than the mean value indicates outliers in the material. Two patients had an extended period of time from referral to definitive MS diagnosis; one relapsing remitting MS (>970 days) and one primary progressive MS (>450. If removing these to patients from analysis (N=26) mean time from referral to diagnosis were 102.7 days (14.7 weeks) with and SD of 72.6. Five participants (17.8%) were diagnosed within 2 weeks from referral. Even when excluding the two outliers time from referral to diagnosis varied greatly, from days to months, reflecting the variation in symptoms and symptom severity experienced by MS patients. Confirmation of diagnosis requires evidence of a repeated history of inflammatory episodes (as confirmed by MRI scans) (Goodin 2014), and it may therefore take several months of medical monitoring to confirm the diagnosis.

The majority of participants (64.3 %) were in part time or full time work, while 25% were on full-time sick leave. None of the participants listed themselves as "unemployed". A third of the participants had more than one chronic diagnosis, the majority of these a second autoimmune disease. Number of participants are too low to perform any sub-group analysis on these data.

5.2.2 Measure statistics

Patient activation measure scores in the study population ranged from 34.7 to 82.8, giving a mean of 61.2 (SD 14.4). A summary of measure statistics are presented in Table 6. The first item of the SF12 is analysed as part of the SF12 scoring, but is also presented as a single-item in the table, to present data for comparison with previous studies.

Table 6. Measure statistics (N=28)

	N	*M* (SD)	%	**min/max**
Patient Activation (PAM)	28	61.2 (14.4)	100	34.7/82.8
Activation level 1	6		21.4	
Activation level 2	3		10.7	
Activation level 3	8		28.6	
Activation level 4	11		39.3	
Depression (BDI II)	28	10.7 (7.9)		0/33
Health related Quality of Life				
PCS		46.2 (12.3)		
MCS		41.1 (10.4)		
Self-reported Health	28		100	
Poor	2		7.1	
Fair	5		17.9	
Good	13		46.4	
Very good	7		25.0	
Ecellent	1		3.6	
Physical activity level				
High	*7*		25	
Moderate	*13*		46.4	
Low	*8*		28.6	
Fatigue (FSMC)	27	50.6 (21.4)		20/93
Balance (BESTest - %score)	26	96.9 (3.5)		87/100

Cronbach's alpha for the PAM13 was 0.85, indicating strong internal consistency. The data on patient activation were not normally distributed, with more than 60% of the participants scoring either at the highest or lowest activation levels. While 21.4% scored at the lowest

activation level, 39.3% scored at the highest activation level. A total of 67.9% of patients scored at the two highest levels.

Average depression score in our study population were 10.7, with a median of 8. Three participants scored within the range of moderate or severe depression with a BDI II score of 20 or above, defined by American cut-off values (Beck 1996).

Health related quality of life (HRQOL) were measured using the SF12v2. Mean values for PCS and MCS where 46.2 and 41.1 respectively. This is below the general population based standard mean of 50. Standard deviation for PCS were also higher than the standardized SD of 10, giving a wider range of scores.

Self-reported health, as measured by the first item of the SF12v2 measure, were reported to be 'good' or better by 75% of our respondents, with only one respondent (3.6%) reporting to have 'excellent' health.

The majority of the participants (71.4 %), had a moderate or high level of physical activity, meeting the recommended minimal daily physical activity goals set by WHO. There were no differences in activity level between the group of participants on part or fulltime sick leave compared to the participants in fulltime work, hence, sick-leave-status did not affect physical activity level.

The fatigue score varied markedly between the participants, from the lowest possible score of 20 till 93, close to the maximum possible score. Mean score were 50.6, with a median score of 53, and more than half the patients had scores within the moderate to severe range. Average scores of motor and cognitive fatigue were similar, yet some participants rated significantly higher on questions of cognitive fatigue symptoms compared to motor fatigue symptoms.

The majority of participants scored close to max score on the Balance Evaluation Systems Test (BEST). A very few participants (n=4) scored markedly lower, with visually impaired balance in gait.

5.2.3 Correlations

The Spearman rho were used to investigate relationships between the PAM and demographic data, results shown in Table 7.

Table 7. Correlations between PAM and demographic variables

	Spearman rho
Sex (male/female)	.035
Age (years)	-.317
Education (low, middle, high)	.357
Comorbidity (yes/no)	-.285
Time referral - diagnosis (days)	-.204

There were no significant correlations in these data (P>0.05). Younger participants scored higher on activation, but not at a significant level. Higher education gave higher PAM scores, but not significantly. Both comorbidity - having another chronic diagnosis, and time (days) from referral to diagnosis gave slightly lower PAM scores, but not at a significant level.

Correlations between the continuous measures were calculated using Persons r, results presented in Table 8.

Table 8. Correlation matrix of continuous variables (Pearsons r)

	2	3	4	5	6	7	8
1. Patient activation measure	-.396*	.388*	.367	.488**	-.320	-.240	.005
2. Becks depression inventory		-.451*	-.789**	-.538**	.598**	.546**	-.049
3. Physical HRQOL (PCS)			.243	.804**	-.645**	-.458*	.636**
4. Mental HRQOL (MCS				.284	-.506**	-.578**	-.150
5. Self-reported Health					-.652**	-.447*	.501*
6. Motor Fatigue (FSMC)						.859**	-.459*
7. Cognitive Fatigue (FSMC)							-.343
8. Balance (% of max)							

* Correlation is significant at the .05 level (two-tailed)
** Correlation is significant at the .01 level (two-tailed).

The patient activations measure correlates with two of the other measures. Patients scoring high on depression (BDI II) scored significantly lower on patient activation measure. Patients scoring high on patient activation measure also scored high on physical health related quality of life. In addition, there was a highly significant correlation between PAM and self-reported

health. However, when controlling for depression in a partial correlation analysis, the association between PAM and self-reported health is still positive (P=.356), but no longer significant.

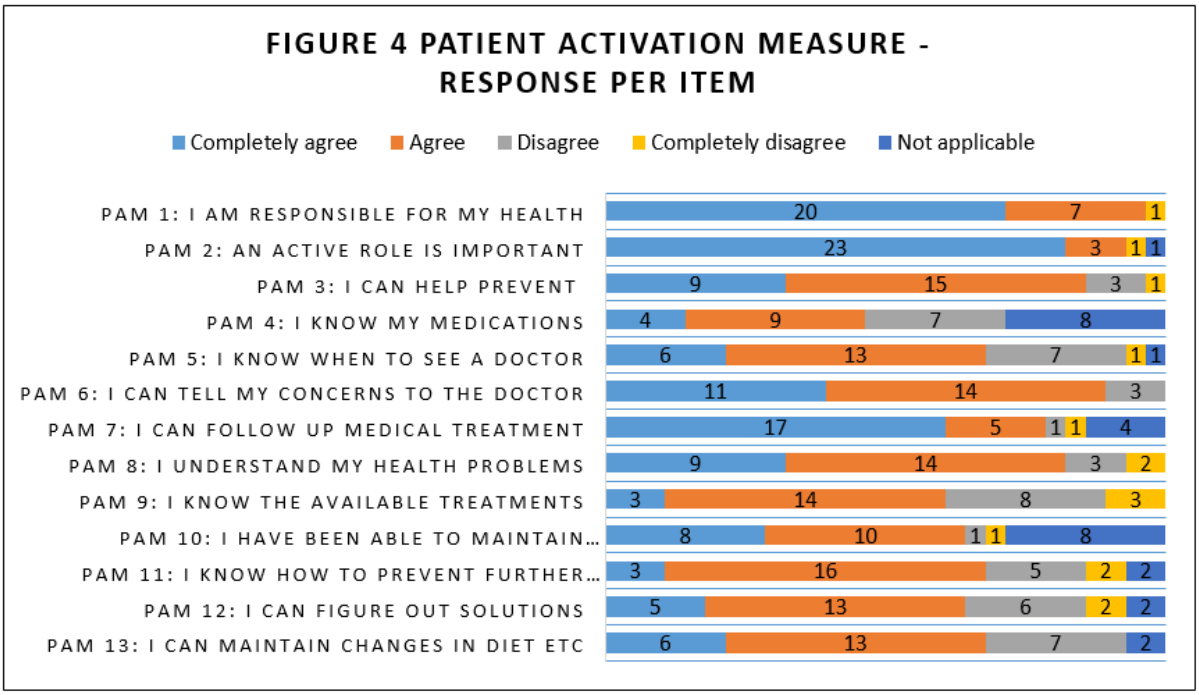
There were several correlations between the other measures. There was a highly significant correlation between high scores on fatigue (both motor and cognitive) and high scores on depression. High depression scores were also correlated to low scores on HRQOL, both mental (.01 level) and physical (.05 level). In addition, and in accordance with this, both physical and mental HRQOL were significantly related to fatigue scores, with those scoring high on fatigue scoring low on HRQOL.

Good balance function were related to high scores on physical HRQOL (.01 level) and self-reported health (.05 level), while high levels of motor fatigue were associated with lower balance. In addition physical activity level (not shown in table) correlated with high physical HRQOL (Spearman Rho .410, sign at a .05 level), and self-reported health (Spearman Rho .422, sign at a .05 level).

A third of our study participants had another known chronic diagnosis at the time of diagnosis, with the majority of these being autoimmune diseases (as listed in Table 5). Mean PAM score were slightly lower in the sub-group with pre-existing chronic conditions, with a mean activation score of 56.1, but the correlation between PAM score and comorbidity were not significant (P=-289). In addition this group scored lower on self-rated health, though not significantly (Rho= -.343). The limited number of participant did not allow for further analysis.

5.2.4 Distribution of answers on the Patient Activation Measure

In addition to investigating the activation levels and mean score, it might be of interest to see whether the distribution of answers differs among the items of the PAM13. Distribution of item answers are shown in Figure 4 below.



Answers were unevenly distributed among the items. The ‘strongly disagree’ option was very rare, with the majority of individual answers being within the ‘agree’ spectre. Some items show more differentiated answers, where item #9 *“I know what treatments are available for my health problems”* received both the highest number of ‘strongly disagree’ answers, and the lowest number of ‘strongly agree’ (10.7% of participants for both answers). Only 53.4% agreed to item #4 *“I know what each of my prescribed medications does”,* while 25% disagreed. Both items describe information and knowledge on treatments/medication.

There were several responses in the ‘not applicable’ category, but none of the participants had more than 4 ‘not applicable’ responses. ‘Not applicable’ answers ranged from none (items#1, 3, 6, 8 and 13) to 28.6% (items#4 and 10). Neither of the participants indicating ‘not applicable’ on item#4 (*knowledge of medication)* were receiving MS specific, disease-modifying drugs. The other item scoring high on ‘not applicable’ were item#10 (maintaining lifestyle changes).

As the items of the PAM13 are ordered in terms of which items are easier to endorse, it would be of interest to see which items are easiest to endorse. This requires a tedious process of acquiring calibrated item scores, applying a Rasch analysis, and would be beyond the scope of this master thesis. Item mean scores might, however, give an indication as to which items are easiest to endorse. Mean item scores are presented in Table 9, included the adjusted item order based on these results.

Table 9. PAM item statistics w/adjusted item rank

	M (SD)	rank (1-13)
PAM 1	3.65 (0.68)	2
PAM 2	3.78 (0.52)	1
PAM 3	3.14 (0.76)	6
PAM 4	2.92 (0.67)	9
PAM 5	2.91 (0.80)	10
PAM 6	3.28 (0.66)	4
PAM 7	3.51 (0.75)	3
PAM 8	3.07 (0.86)	7
PAM 9	2.61 (0.83)	13
PAM 10	3.22 (0.69)	5
PAM 11	2.78 (0.74)	12
PAM 12	2.81 (0.82)	11
PAM 13	2.98 (0.70)	8

This ranking confirms that items 4 and 5 are markedly harder to endorse in our population than expected given the original item-order from Hibbard et al. (2005), while items 6, 7 and 10 are easier endorsed.

6 Discussion

The aim of this thesis were to assess and describe patient activation among a population of newly diagnosed patients with Multiple Sclerosis, and to compare these findings with the existing knowledge on patient activation. Four research questions were asked, two addressing the literature review, one addressing the cross-sectional data, and the last asking how the data from our cross-sectional study compare to the existing data on patient activation.

Research questions 1 and 2: «What are the current data and knowledge on patient activation among patients with chronic conditions in general, and patients with neurological diseases in particular?»

Although some efforts have been made to describe populations including healthy individuals; the majority of data analysed in the literature review describe individuals living with one or more chronic conditions, with a mean age >50. The investigations of patient activation in relation to health behaviours indicate that individuals with a high PAM score are more likely to obtain preventive care (health screenings, immunization), are more likely to be exercising, consuming a healthy diet, monitoring their condition and adhere to treatment plans, and more likely to actively seek health information (Hibbard et al. 2007, Fowles et al. 2009, Greene and Hibbard 2012, Harvey et al. 2012, Nijman et al. 2014, Greene et al. 2015). Regular sources of care, and good quality of patient-provider relationships are associated with higher activation scores (Hibbard and Cunningham 2008, Wong, Peterson, and Black 2011, Alexander et al. 2012). Age, education and self-reported health are consistently found to be positively associated with patient activation, while some studies show a negative association between PAM scores and depression (Hibbard and Cunningham 2008, Magnezi and Glasser 2014). There are small differences in mean PAM scores between studies of populations with chronic conditions, with the majority of reported mean PAM scores within the third activation level range. Distribution of participants on activation levels are reported for some studies, the results indicating some diversity of activation levels between different populations.

Data on patient activation in neurological chronic conditions are scarce. Only two study populations have been investigated, one Canadian population of various neurological conditions, and one US-population of Multiple Sclerosis (described in two articles). MS

patients with a relapsing-remitting disease-course score higher on patient activation, and both depression and educational level are associated with PAM scores (Stepleman et al. 2010, Goodworth et al. 2014). Mean PAM score is similar to other populations with chronic conditions, while fewer patients with MS scores at the highest activation level (Stepleman et al. 2010). Although the PAM13 is deemed a valid measure for both populations, there are some differences in the scoring of items that might cause scaling issues (Packer et al. 2015).

The literature search revealed that patient activation measure is widely used for longitudinal follow up of cohorts of people with chronic conditions, and for evaluation of interventions. The wide majority of articles report Cronbach Alpha scores reflecting high internal consistency of the measure. The use of the measure may indicate a paradigm shift in patient education, from focusing on compliance to recognizing that patients manage their own health, making decisions on their own (Hibbard and Greene 2013).

Research question 3: «What describes our population in terms of patient activation, depression, physical activity level, health related quality of life, fatigue and demographical data?»

Our study population consisted of 28 individuals, with a mean disease-duration of 30 days, and mean age of 32.2 years. Average age at onset were consistent with other clinical studies in Oslo (Berg-Hansen et al. 2013, Nygaard et al. 2014), and while the female response rate were higher, the female/male ratio in the referred population (N=38) were comparable to epidemiological data from Oslo and Norway (Berg-Hansen, Moen, Harbo, et al. 2014, Berg-Hansen, Moen, Sandvik, et al. 2014). The data on educational level is similar to a recent study conducted among MS patients in Oslo with a mean disease duration of 2 years (Nygaard et al. 2014), but our study population had a higher number of participants on full-time sick-leave at inclusion (25.0%). This might be explained by the relatively short time since diagnosis, as the diagnosis is often given in relation to a clinical attack with increased symptoms and reduced function.

Mean activation score were 61.2 (SD 14.4) with scores ranging from 34.7 to 82.8. In other words the disparity of answers were great, and while some of our patients were highly

activated, the results indicate that others still lack the basic knowledge required to successfully manage their new diagnosis. This is further reflected in our data on activation levels, where the majority of respondents scored either within the highest or lowest level of activation. More than one in five participants in our study scored within the lowest level of activation, indicating individuals lacking information and knowledge to manage their own health, and at risk of being passive health care recipients.

According to Bandura's Social Cognitive theory, knowledge is a precondition for behavioural change. Without knowledge of the disease, of health risks and the potential benefits of altered health behaviour, the individual lacks the necessary tools to choose good health habits (Bandura 2004). Hibbard and Mahoney (2010) found that individuals at lower levels of activation are frequently reporting to be overwhelmed. Interventions to increase knowledge are recommended for individuals scoring at the lowest level of activation, while interventions to increase skills and self-confidence will be better suited at higher levels of activation. Knowledge of activation level opts for targeted interventions and individualized care. The great disparity in our small population emphasize the importance of such individualized care.

Mean depression score in our population (as measured by BDI II) were 10.7 (SD 7.9). Both Nygaard et al. (2014), Landro, Celius, and Sletvold (2004) and Klevan et al. (2014) have assessed BDI amongst Norwegian MS patients compared to matched healthy controls, finding higher BDI scores for MS-patients (means 8.4, 10.1 and 10.8) than for controls (means 3.9, 3.9 and 4.7). Hence, mean depression scores in our population are comparable to findings in previous studies of Norwegian MS populations. Patient activation score had a negative correlation with depression, with patients scoring high on BDI II scoring lower on the PAM13. The positive correlation between PAM score and self-reported health were no longer significant when controlled for depression scores.

Scores on health related quality of life (HRQOL) were below the general population norm of 50 (SD 10), with higher standard deviations for both the physical (PCS) and the mental dimension (MCS), indicating a wider variation for responses. Respondents scoring high on fatigue or depression scored lower on HRQOL, while patient activation were positively correlated to the physical dimension of SF12. HRQOL among Norwegian MS patients have

recently been investigated by both Grytten et al. (2012) and Klevan et al. (2014), both reporting lower HRQOL scores among MS patients than among healthy controls.

There was a positive correlation between patient activation and physical activity level. Three quarters of our participants scored either at a moderate or high physical activity level, meeting the recommended activity level of 30 minutes moderate to high activity >5 days a week. On the other hand, one fourth did *not* meet the minimum recommended physical activity level, despite being young adults with good physical function. Physical activity level were not associated with work status/sick leave, but respondents scoring high on self-reported health and the physical dimension of HRQOL were significantly more active. More than half the respondents scored at a moderate or severe level of fatigue. There was a negative association between physical activity level and fatigue, though not on a significant level (Spearman rho -.097). This may represent a negative trend, where fatigue might lead to inactivity, and low activity might reinforce fatigue. Knowing that physical activity is likely to have a positive impact on several of the symptoms experienced by MS-patients (Latimer-Cheung et al. 2013, Pilutti et al. 2013, Motl 2014), including fatigue; working to increase physical activity level among the least active will be of public health relevance.

Research question 4: «How does the data from our cross-sectional study compare to the existing data on patient activation?»

Mean age in our study population is markedly lower than any of the reported data on patient activation presented in the review. In addition, previous studies on patients with chronic conditions have focused primarily on populations of patients with longer disease durations; hence, there are little information specifically on patient activation among patients recently diagnosed with a chronic disease. There are several mechanisms that might affect PAM score positively or negatively among newly diagnosed MS-patients. The time leading from first symptom to a definite diagnosis vary greatly among the individuals. Some patients experience a sudden onset of symptoms, are hospitalized, and receives a definite diagnosis within days, having had limited time to prepare themselves. They experience going from healthy young adults to chronic patients with intermittent impairments within days, – often an emotionally painful transition. Others might be referred to outpatient neurological consultations, due to

more diffuse, less severe symptoms; and spend weeks or months waiting for assessment and test results, gradually being prepared for the prospect of an MS diagnosis. At the time of diagnosis, some patients feel healthy, finding the diagnosis surrealistic, while others have experienced illness over some time, with the diagnosis giving some credit to their experiences. In both cases the individual faces the uncertainty of living with a life-long, neurological disease.

The majority of participants in our study – 75% - lists their health to be 'good' or better. This is comparable to data given in the majority of studies investigating populations with chronic conditions, and markedly lower than populations without chronic conditions. Self-reported health is reported to be positively associated with PAM score in the majority of studies on chronic conditions presented in the narrative review. Our data show a positive correlation between PAM score and self-reported health, however, the correlations is no longer significant when controlling for depression. There was a significantly negative correlation between high depression scores and patient activation in our population. This is in line with the data presented by both Magnezi et al. (2014), Hibbard and Cunningham (2008) and Stepleman et al. (2010).

A few of the studies have reported data on activation levels. Table 10 shows the data from Table 4, adding the activation level scores from our study:

Table 10 Comparison of data on patient activation levels among people with chronic conditions - including data from our study

Authors	N	Nationality	*M age (years)*	*M* (SD)	Activation level			
					1	2	3	4
Hibbard and Cunningham (2008)*		USA	-	64.2	8.6%	17.3%	33.9%	40.1%
Stepleman et al (2010)	199	USA	46.2 (10.8)	63.2 (11.9)	7.1%	18.9%	39.8%	34.2%
Rijken et al (2014)**	751	Netherland	63.3 (11.8)	60.6 (15.2)	18.4%	18.6%	32.2%	30.8%
Our study	28	Norway	32.3 (6.4)	61.2 (14.4)	21.4%	10.7%	28.6%	39.3%

**referring the stratified data from persons with self-reported chronic conditions*
***baseline data*

While the proportion of participants on level 4 are similar to the results from Hibbard and Cunningham (2008), the amount of participants on levels 2 and 1 differ markedly. To

compare our data with each of the studies above, a Chi-square test for goodness of fit were conducted. The results of this test showed no significant differences compared to Hibbard and Cunningham (2008) (p=.098) or Rijken et al. (2014) (p=.605) both studies investigating populations with various chronic conditions. The best goodness of fit were with the Dutch study, assessing various non-neurological chronical conditions. Compared to Stepleman et al. (2010), who assessed MS patients, the differences were significant at a .05 level (p=0.017). The majority of respondents in the Stepleman cohort scored within activation level 3, with a total of 74% scoring within the two highest activation levels, compared to 67.9% in our data. Comparing the two studies further, mean activation score in our study were 2 points lower, probably not of significance. The standard deviations were greater in our scores (14.4 compared to 11.9), indicating a wider variation of scores. In conclusion, participants in Steplemans study scored on average slightly higher on PAM, with slightly less variation; and while more participants scored within the two highest levels of activation, fewer scored in the highest activation level.

The participants in the Stepleman study had an average disease duration of 8.3 years. Mean age at assessment were 46 years, and only 37% of the patients were in full or part time work. Thus, the participants in the study were older, had a longer disease duration and a higher probability to be out of work (disability and/or unemployment) than the population in our study. It is likely that general health, disability or other factors might influence patient activation scores. It is also likely, given the results reported by both Rijken et al. (2014) and Hibbard et al. (2007), that patient activation might change during a person's life and disease course. Living with disease might give experience and knowledge increasing patient activation, while progressive illness might in turn cause a decrease in activation. It is possible that both these factors are in work in Steplemans study population; having lived longer with the disease a higher proportion of respondents are "taking action", while possibly experiencing health deterioration despite their efforts "staying the course under stress" might prove harder. This possibility is discussed by both Rijken et al. (2014) and Hibbard and Mahoney (2010). While knowledge and skills of self-management may have developed during the course of illness, raising the individual's patient activation; the skills might be experienced as insufficient when confronted with new complications or disease deterioration. This discussion is closely linked to the perceived self-efficacy introduced in the Social

Cognitive Theory (SCT). Perceived self-efficacy is one of the core determinants of behavioural change according to the SCT, and one of the sources raising self-efficacy is *master experiences*. While experiencing successes in self-management and adjustments of health behaviour most likely would increase perceived self-efficacy, building self-confidence and positive emotions; experiencing failures might result in discouragement and disempowerment. Experiencing disease progression, despite doing 'everything right', might have a severe impact on the confidence in one's own capabilities.

Stepleman et al. (2010) suggests that the unpredictable nature of MS might alter how MS patients views his/her role, and therefore might affect activation level. In addition to knowledge and perceived self-efficacy, the SCT lists *health goals, outcome expectations* and *perceived impediments (facilitators)* as determinants for behaviour change. The unpredictability of MS might affect either of these three. Nobody knows for certain what the future holds, but MS patients have reason to suspect that the future holds episodes of increased symptom severity and functional loss. This will likely affect what outcomes the individual expects. The unpredictability in itself, and the experiences of illness during attacks, might be severe impediments, affecting motivation and perceived self-efficacy negatively. The uncertainty, and the feeling of not being able to control or significantly affect one's own health, might in turn make it harder to set health goals. This might be reflected by item # 3 *("I am confident I can help prevent or reduce problems associated with my health")* being markedly harder to endorse in our data.

The items of the PAM13 are ranked in order of the calibrated activation score needed for endorsement, hence, the first item requires a lower activation score for the individual to "strongly agree" than item #13. Results from the studies of Stepleman et al. (2010) and Packer et al. (2015) have shown that endorsement of each item might vary among persons with MS and neurological conditions. If patient activation is intended to be used to target interventions more specifically, information on which items are easier/harder would be of advantage when planning the intervention and follow-up of the individual patients. Mean item scores (previously presented in table 9) are shown in Table 11, alongside mean scores from Packer et al. (2015) and calibrated item scores reported by Stepleman et al. (2010), including adjusted rank score for each population.

Table 11 Comparison of adjusted PAM item rank

	Item order our data		Item order Packer et al. (2015)		Item order Stepleman et al. (2010)	
Original item order PAM13	*M* (SD)	Adjusted rank	*M* (SD)	Adjusted rank	Calibrated score	Adjusted rank
PAM 1	3.65 (0.68)	2	3.48 (0.70)	1	46.48	7
PAM 2	3.78 (0.52)	1	3.48 (0.66)	2	45.00	6
PAM 3	3.14 (0.76)	6	3.34 (0.63)	4	39.13	2
PAM 4	2.92 (0.67)	9	3.16 (0.75)	7	38.98	1
PAM 5	2.91 (0.80)	10	3.23 (0.70)	6	41.73	4
PAM 6	3.28 (0.66)	4	3.27 (3.23)	5	46.64	8
PAM 7	3.51 (0.75)	3	3.08 (0.73)	8	51.13	9
PAM 8	3.07 (0.86)	7	2.96 (0.79)	9	43.33	5
PAM 9	2.61 (0.83)	13	3.38 (0.64)	3	39.47	3
PAM 10	3.22 (0.69)	5	2.76 (0.81)	11	58.55	11
PAM 11	2.78 (0.74)	12	2.88 (0.68)	10	58.65	12
PAM 12	2.81 (0.82)	11	2.71 (0.71)	12	58.13	10
PAM 13	2.98 (0.70)	8	2.62 (0.76)	13	59.94	13

Like Packer et al. (2015) and Stepleman et al. (2010), we found that certain items were harder to endorse than others, though not necessarily the same items. While Stepleman and colleagues found items # 1 and 2 to be harder than suspected, these remain at the same difficulty level in our study and the study of Packer and colleagues. And, while item # 3 were harder to endorse among our population, both the other studies found this item to be within the expected range. Further, both Packer et al. (2015) and Stepleman et al. (2010) found item # 10 *"I have been able to maintain lifestyle changes, like eating right or exercising*" to be among the three hardest items, while, in our data, the measure scored among top five, although being one of two items receiving the most "not applicable" responses.

Items # 6 and 7, 'asking questions/accessing information' and 'following through on medical treatment', were markedly easier to endorse in our material, though not in the other two studies. Interestingly, items # 6 and 7 are also easier endorsed in several of the other European studies; both Zill et al. (2013) and Rademakers et al. (2012) found both items to be among the top three, while Maindal, Sokolowski, and Vedsted (2009) report means for these items among the top five. Brenk-Franz et al. (2013) found item #6 to be among top 5, while item #7 were harder than expected. Differences in European vs studies from USA might in part be explained by different health care systems, and cultural differences. A deeper comparison of items between studies will be required to explore this further.

In our data, item #5 – 'knowing when to see a doctor' – were harder than expected. My clinical experience, treating and educating the patient group, is that "when to contact the hospital" are among frequently asked questions, especially among newly diagnosed patients. The individual faces the possibility of a sudden disease attack, and needs information on when to call the hospital and when to call the GP. This information is emphasized in both written patient information brochures, and the patient education programme. The possibility of easy-access telephonic contact with the team of MS-nurses is a vital part of patient management. One-year data might help shed light on whether this item is easier endorsed after living with the disease for a longer period.

Item # 9 *"I know what treatments are available for my health problems"* where the hardest item to endorse among our respondents, with 11 of 28 respondents answering within the 'disagree' options. This is likely to reflect a genuine lack of information/knowledge on available treatments. The treatment options for relapsing-remitting MS are diverse, and getting the general overview is a challenge. Information on medications are emphasized in both written material and the patient education programme, and subject to discussion at the controls by the neurologist. However, getting to know the different treatment options and their effects and side-effects takes time. Knowing that this is an item with great disparity in answers confirms and strengthens the notion that this is relevant and important information to include in both individual contacts and the general educational material.

Although the measure was originally developed to assess activation among chronic patients, data on the general citizen would give a valuable foundation for comparison. While developed using a broad basis of people with a variety of chronic conditions, the measure might be representative for most chronic conditions, but it may still fail to describe patients with less common chronic conditions. Packer et al. (2015) addresses this issue. Building a measure on a basis of an "average" chronic patient risks making the measure less relevant for the rarer conditions. Neurological diseases are rare, compared to heart failure, diabetes or COPD, but still have severe impacts on the individual's quality of life. Having norm-data based on the average citizen, with or without disease, might give a better ground for comparison, than normative data based on the average diabetic or obese patient. Packer and colleagues challenges this norm-data, suggesting that it might lead to neurological patients being scored

at a lower than actual activation level. As interventions should be targeted to the specific activation level, this might lead to less well-suited interventions for this patient group (Packer et al. 2015). Disease-specific adjustments might be necessary to fully assess patient activation among some chronic diseases.

The patient activation measure was developed using American population samples. A survey among a national sample reveals that activation levels vary considerably in the U.S population (Hibbard and Cunningham 2008). Less than half the adult general population are at the highest level of activation. Low levels of patient activation are associated with low income, less education, no insurance and poor self-reported health. Across the American studies it is evident that a high number of individuals with chronic conditions are unemployed. The American and the Norwegian societies differ severely in regards to health-benefits, health-service availability and social benefits. Health services in Norway are free (after a max yearly fee of approximately 340 USD) and easily available. All registered inhabitants are entitled to a regular, general physician (GP), with the regular GP being the main patient coordinator. Both availability of services and patient-provider relationships and regularity has been associated with higher patient activation (Wong, Peterson, and Black 2011, Alexander et al. 2012). In addition unemployment-rates are low in general. If an individual is unable to remain in full time employment all registered inhabitants are entitled to social benefits, ensuring their income. This provides social security, diminishing the possible negative social consequences of disease, and might also affect levels of activation in the general Norwegian population. Unfortunately, there are no data on patient activation among the general Norwegian population to make such a comparison. However, the Chi-square analysis referred previously does not show significant differences between our data and the data from Hibbard and Cunningham (2008).

6.1 Methodological discussion

6.1.1 Narrative review

A narrative review allows for comparison of studies of diverse methodologies and data sources, yet have some important limitations (Shadish, Cook, and Campbell 2002). The

process of reducing 299 possible relevant literature hits to a reasonable amount of articles for a deeper, narrative analysis is a tedious and time-consuming process. As the selection of articles in this case is done by the thesis author alone, it also leaves a risk of a selection bias, where articles confirming expectations might be easier included. Predefined inclusion and exclusion criteria were imposed to prevent this. Further, the narrative review relies on limited information to make comparison of diverse articles possible, and might lose perspective of moderating variables. A large number of relevant articles, in this case 27 articles, also increases the risk of losing overview, and the risk of not reporting relevant completing data.

On the other hand, a narrative review might provide a solid foundation for hypothesis generation and theory development. Describing the current knowledge of a concept or phenomenon sums the score, and provides a foundation for further investigation and analysis. In the case of this thesis, the literature search where repeated at several stages. Of the 27 articles reviewed in the final narrative review, 11 articles were not yet published at the time of the first literature search. Repeating the search has made the narrative review process more complex, yet also provided supplementing data, strengthening and widening the theoretical basis for analysis.

6.1.2 Cross-sectional study

Shadish, Cook, and Campbell (2002) defines validity as *"the approximate truth of an inference"*, emphasizing that validity is the property of the inferences made, not the method itself. Four categories of validity are described; *Construct validity* – referring to inferences related to the measure – does the measure successfully investigate the concept it addresses? *Internal validity* refers to inferences of causal relationships – does the method applied allow for causal inferences? *Statistical validity* refers to inferences made about correlations, and whether statistics are used appropriately. Finally, *external validity* addresses whether the inferences made will be valid if applied to other persons or settings.

Construct validity: The patient activation measure was developed to assess knowledge, skills and self-confidence to manage health and health behaviour among individuals living with chronic conditions. The measure has been widely explored among a variety for chronic conditions, with high internal consistency and good validity when compared to other

measures and health characteristic. Cronbach's alpha for the PAM13 in our study was 0.85, indicating strong internal consistency.

However, some concerns have been expressed on construct validity among patients with progressive neurological disease. As both Packer et al. (2015), Stepleman et al. (2010) and our own data show, some items are easier endorsed among patients with neurological disease, while others are harder to endorse than proposed when developing the construct. This might give scaling issues, and make the measure less specific for neurological patients. The link between health behaviour and disease progression are much weaker in the case of Multiple Sclerosis, and a measure relying too heavily on health behaviour might not fully describe patient activation in this population.

Internal validity: The cross-sectional design does not allow for causal inferences, and the aim of the cross-sectional study were to describe a population of newly diagnosed individuals with MS. The population sample used in this study is a convenience sample, assessing for inclusion all patients within the target-group getting their treatment at a specific hospital department. There were few exclusion criteria, with an intention to survey an MS-population as complete as possible. Certainty of diagnosis were required from the patient medical journal to ensure comparable data, and participants not able to fill out forms due to language were excluded. We also excluded any participants with extensive psychiatric history, expecting a history of such to influence several of our measures. Demographic characteristics are similar to previous MS populations investigated, and data on depression comparable. All data analysed in this thesis were gathered at baseline, to ensure as little effect of the clinical intervention as possible.

When conducting a survey administering self-report measures, a self-selection bias must be considered. There were to possible occasions for self-selection. Firstly choosing whether to participate in the clinical intervention, and secondly whether to fill out and return the questionnaires administered. Two patients declined participation at the first contact. The response-rate were higher among female participants, while mean age were comparable between groups. As patients not returning the questionnaires, neither did return a written

consent, we have not been able to assess further demographic data on patients not choosing to participate at either occasion, and hence, we have not been able to compare the groups further.

Statistical validity: Given a population of about 1300 MS patients in Oslo, a representative population survey among MS-patients would require approximately 300 participants. However, the purpose of this study were not to assess patient activation among MS-patients in general, but among *newly diagnosed* patients. With a mean disease duration of 30 days, this criteria seems to be met. A total of 38 patients with a confirmed MS diagnosis were referred to extended clinical follow-up during the 14 months of inclusion. A citywide incidence of 6.6 would give approximately 41-42 new patients per year (based on a population of 630 000 by January 1st 2013). Hence, 38 patients is likely to be the vast majority of newly diagnosed patients at the department during this time span. The response-rate at baseline were 77.8% with 28 respondents returning questionnaires for analysis.

Although our sample of participants are relatively complete, the low number of respondents gives some statistical challenges. A multiple regression has not been possible, as this requires a substantially larger population. A low number of participants also gives lower statistical powers, and an increasing risk of not getting significant results (wash-out effect).

External validity: The clinical intervention investigated a convenience sample, a population selected on basis of medical service provider (the Neurological department at Ullevål) and limited to a defined time period (14 months). Using a small convenience sample, without any kind of randomization or control groups, severely limits the representativeness of the population. Further, applying a cross-sectional method does not allow for conclusions of cause and effect. However, as the purpose was to describe this specific population, these concerns have not impaired our study.

As far as I have been able to establish this is the first study assessing patient activation among a population this young. It is also the first to assess activation among individuals recently diagnosed with chronic disease. Hence, our data, though limited by sample size and specificity, might give a valuable contribution to the cumulative data on patient activation.

7 Concluding remarks

In conclusion our cross-sectional study found data similar to previous studies on patient activation among individual with chronic conditions. Though the low number of participants give some statistical challenges, our population is likely to be representative for Norwegian newly diagnosed patients with MS. While mean activation scores are similar to previous findings among people with chronic disease, the data on activation level were skewed, with the majority of participants scoring either at the highest or lowest activation level.

The data analysed in the literature review indicates that individuals scoring high on patient activation are more likely to perform a variety of self-management behaviours. Good quality of the patient-provider relationship, in addition to regular and available sources of care, are associated with higher activation scores. Very few studies have been done assessing neurological patients, the results of these indicating that some items are easier or harder endorsed than proposed in the original conceptual development of PAM13. Our own data also show some discrepancies in item rank, indicating that some items are easier or harder to endorse than expected. The altered distribution of item means, and the distribution on patient activation levels strengthens the inference that care and health management should be individualized.

In the introductional chapters of this thesis, the WHO definition of health as a complete state of well-being were briefly discussed. Although being young adults, recently diagnosed with a life-long neurological disease, the majority of patients in our cohort rates their own health as ‘good’ or better. The majority of studies find self-reported health to be of importance, with good self-reported health being associated with higher PAM. The study methodologies do not allow causal inferences, hence the directionality of this association is not known. In our study the link between activation and self-reported health were no longer significant if controlling for depression. Experiencing good health might result in higher activation scores, and being highly activated might affect health status or more importantly how the individual experiences his or her health.

The patient activation measure can provide relevant and essential information for health promotion at an individual and group level. But, if the PAM is to be used as a tool in

Norwegian health services, knowledge of patient activation in the general Norwegian population will be of great interest and importance. There are several national and regional health surveys conducted every decade, and the PAM13 might be a measure of interest to include in such surveys. The measure has been translated to Norwegian and validated by Steinsbekk (2008), and recommended as a tool to plan and evaluate patient educational programs. The measure is being used to this purpose in some institutions, but on small patient populations, and not yet published.

Changing behaviour in order to improve health is an essential tool in health promotion and disease prevention. While the majority of chronic diseases to a large extent can be linked to health behaviour, neurological progressive diseases such as MS have a less obvious link to behaviour. A complex interplay between genetic dispositions and a number of environmental factors are commonly regarded as the probable cause of MS (Ramagopalan and Sadovnick 2011, Goodin 2014). Thus, a measure emphasizing behaviour and behavioural change might not be the perfect measure to assess these patients. On the other hand, while MS is not caused by bad health habits, self-management and self-efficacy remains a fundament for disease management – and measuring and increasing activation is likely still a valid strategy. Having the knowledge, skills and confidence to make the best of the situation will still be vital, and might give the possibility of experiencing good health, although living with a lifelong disease.

References

Alexander, J. A., L. R. Hearld, J. N. Mittler, and J. Harvey. 2012. "Patient-physician role relationships and patient activation among individuals with chronic illness." *Health Services Research* 47 (3 PART 1):1201-1223. doi: 10.1111/j.1475-6773.2011.01354.x.

Antonovsky, Aaron. 1987. *Unraveling the mystery of health: how people manage stress and stay well, A Joint publication in the Jossey-Bass social and behavioral science series and the Jossey-Bass health series*. San Francisco: Jossey-Bass.

Bandura, A. 1998. "Health promotion from the perspective of social cognitive theory." *Psychology & Health* 13:623-649. doi: 10.1080/08870449808407422.

Bandura, A. 2004. "Health promotion by social cognitive means." *Health Educ Behav* 31 (2):143-64. doi: 10.1177/1090198104263660.

Beck, AT; Steer, RA; Brown, GK. 1996. BDI II, Beck depression inventory manual. San Antonio, TX.

Berg-Hansen, P., S. M. Moen, H. F. Harbo, and E. G. Celius. 2014. "High prevalence and no latitude gradient of multiple sclerosis in Norway." *Multiple Sclerosis Journal* 20 (13):1780-2. doi: 10.1177/1352458514525871.

Berg-Hansen, P., S. M. Moen, L. Sandvik, H. F. Harbo, I. J. Bakken, C. Stoltenberg, and E. G. Celius. 2014. "Prevalence of multiple sclerosis among immigrants in Norway." *Multiple Sclerosis Journal*:1-8. doi: 10.1177/1352458514554055.

Berg-Hansen, P., C. Smestad, L. Sandvik, H. F. Harbo, and E. G. Celius. 2013. "Increased disease severity in non-Western immigrants with multiple sclerosis in Oslo, Norway." *European Journal of Neurology* 20 (12):1546-52. doi: 10.1111/ene.12227.

Brenk-Franz, K., J. H. Hibbard, W. J. Herrmann, T. Freund, J. Szecsenyi, S. Djalali, C. Steurer-Stey, A. Sonnichsen, F. Tiesler, M. Storch, N. Schneider, and J. Gensichen. 2013. "Validation of the German version of the patient activation measure 13 (PAM13-D) in an international multicentre study of primary care patients." *PLoS One* 8 (9):e74786. doi: 10.1371/journal.pone.0074786.

Comittee, IPAQ Research. 2005. Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ).

Dutta, R., and B. D. Trapp. 2011. "Mechanisms of neuronal dysfunction and degeneration in multiple sclerosis." *Progress in Neurobiology* 93 (1):1-12. doi: 10.1016/j.pneurobio.2010.09.005.

Fowles, J. B., P. Terry, M. Xi, J. Hibbard, C. T. Bloom, and L. Harvey. 2009. "Measuring self-management of patients' and employees' health: further validation of the Patient Activation Measure (PAM) based on its relation to employee characteristics." *Patient Education and Counseling* 77 (1):116-22. doi: 10.1016/j.pec.2009.02.018.

Goodin, Douglas S. 2014. "The epidemiology of multiple sclerosis: insights to disease pathogenesis." *Handbook of clinical neurology* 122:231. doi: 10.1016/B978-0-444-52001-2.00010-8.

Goodworth, M. C., L. Stepleman, J. Hibbard, L. Johns, D. Wright, M. D. Hughes, and M. J. Williams. 2014. "Variables associated with patient activation in persons with multiple sclerosis." *Journal of Health Psychology*:1-11. doi: 10.1177/1359105314522085.

Greene, J., and J. H. Hibbard. 2012. "Why does patient activation matter? An examination of the relationships between patient activation and health-related outcomes." *Journal of General Internal Medicine* 27 (5):520-526.

Greene, J., J. H. Hibbard, R. Sacks, V. Overton, and C. D. Parrotta. 2015. "When patient activation levels change, health outcomes and costs change, too." *Health Affairs (Millwood)* 34 (3):431-7. doi: 10.1377/hlthaff.2014.0452.

Grytten, N., J. H. Aarseth, K. Espeset, G. Berg Johnsen, R. Wehus, C. Lund, T. Riise, and R. Haugstad. 2012. "Health-related quality of life and disease-modifying treatment behaviour in relapsing-remitting multiple sclerosis--a multicentre cohort study." *Acta Neurolologica Scandinavica. Supplementum* (195):51-7. doi: 10.1111/ane.12033.

Harvey, L., J. B. Fowles, M. Xi, and P. Terry. 2012. "When activation changes, what else changes? The relationship between change in patient activation measure (PAM) and employees' health status and health behaviors." *Patient Education and Counseling* 88 (2):338-343.

Health, Insignia. 2011. Patient Activation Measure (PAM) 13 - License materials. Insignia Health, LLC.

Hibbard, J. H., and P. J. Cunningham. 2008. "How engaged are consumers in their health and health care, and why does it matter?" *Research Brief* (8):1-9.

Hibbard, J. H., and J. Greene. 2013. "What the evidence shows about patient activation: Better health outcomes and care experiences; fewer data on costs." *Health Affairs* 32 (2):207-214.

Hibbard, J. H., and E. Mahoney. 2010. "Toward a theory of patient and consumer activation." *Patient Education and Counseling* 78 (3):377-381.

Hibbard, J. H., E. R. Mahoney, R. Stock, and M. Tusler. 2007. "Do increases in patient activation result in improved self-management behaviors?" *Health Services Research* 42 (4):1443-1463.

Hibbard, J. H., E. R. Mahoney, J. Stockard, and M. Tusler. 2005. "Development and testing of a short form of the patient activation measure." *Health Services Research* 40 (6 I):1918-1930.

Hibbard, J. H., J. Stockard, E. R. Mahoney, and M. Tusler. 2004. "Development of the patient activation measure (PAM): Conceptualizing and measuring activation in patients and consumers." *Health Services Research* 39 (4 I):1005-1026.

Hibbard, J. H., and M. Tusler. 2007. "Assessing activation stage and employing a "next steps" approach to supporting patient self-management." *Journal of Ambulatory Care Management* 30 (1):2-8.

Horak, F. B., D. M. Wrisley, and J. Frank. 2009. "The Balance Evaluation Systems Test (BESTest) to differentiate balance deficits." *Physical Therapy* 89 (5):484-98. doi: 10.2522/ptj.20080071.

Kinney, R. L., S. C. Lemon, S. D. Person, S. L. Pagoto, and J. S. Saczynski. 2015. "The association between patient activation and medication adherence, hospitalization, and emergency room utilization in patients with chronic illnesses: A systematic review." *Patient Education and Counseling* 98 (5):545-552. doi: 10.1016/j.pec.2015.02.005.

Klevan, G., C. O. Jacobsen, J. H. Aarseth, K. M. Myhr, H. Nyland, S. Glad, K. Lode, N. Figved, J. P. Larsen, and E. Farbu. 2014. "Health related quality of life in patients recently diagnosed with multiple sclerosis." *Acta Neurolologica Scandinavica* 129 (1):21-6. doi: 10.1111/ane.12142.

Landro, N. I., E. G. Celius, and H. Sletvold. 2004. "Depressive symptoms account for deficient information processing speed but not for impaired working memory in early phase multiple sclerosis (MS)." *Journal of the Neurological Sciences* 217 (2):211-6.

Latimer-Cheung, A. E., L. A. Pilutti, A. L. Hicks, K. A. Martin Ginis, A. M. Fenuta, K. A. MacKibbon, and R. W. Motl. 2013. "Effects of exercise training on fitness, mobility, fatigue, and health-related quality of life among adults with multiple sclerosis: a systematic review to inform guideline development." *Archives of Physical Medicine and Rehabilitation* 94 (9):1800-1828 e3. doi: 10.1016/j.apmr.2013.04.020.

Learmonth, Y. C., E. A. Hubbard, E. McAuley, and R. W. Motl. 2014. "Psychometric properties of quality of life and health-related quality of life assessments in people with multiple sclerosis." *Quality of Life Research* 23 (7):2015-23. doi: 10.1007/s11136-014-0639-2.

Lee, P. H., D. J. Macfarlane, T. H. Lam, and S. M. Stewart. 2011. "Validity of the International Physical Activity Questionnaire Short Form (IPAQ-SF): a systematic review." *International Journal of Behavioural Nutrition and Physical Activity* 8:115. doi: 10.1186/1479-5868-8-115.

Lovdata. 2008. "Act on medical and health research (The health research act)

". Lovdata Accessed January 8th. https://lovdata.no/dokument/NL/lov/2008-06-20-44 English version: http://www.ub.uio.no/ujur/ulovdata/lov-20080620-044-eng.pdf.

Magnezi, R., and S. Glasser. 2014. "Psychometric properties of the hebrew translation of the patient activation measure (PAM-13)." *PLoS One* 9 (11):e113391. doi: 10.1371/journal.pone.0113391.

Magnezi, R., S. Glasser, H. Shalev, A. Sheiber, and H. Reuveni. 2014. "Patient activation, depression and quality of life." *Patient Education and Counseling* 94 (3):432-437.

Maindal, H. T., I. Sokolowski, and P. Vedsted. 2009. "Translation, adaptation and validation of the American short form patient activation measure (PAM13) in a danish version." *BMC Public Health* 9 (209).

Moran, P. J., and D. C. Mohr. 2005. "The validity of Beck Depression Inventory and Hamilton Rating Scale for Depression items in the assessment of depression among patients with multiple sclerosis." *Journal of Behavioral Medicine* 28 (1):35-41.

Motl, R. W. 2014. "Lifestyle physical activity in persons with multiple sclerosis: the new kid on the MS block." *Multiple Sclerosis Journal* 20 (8):1025-1029. doi: 10.1177/1352458514525873.

Motl, R. W., E. McAuley, B. M. Sandroff, and E. A. Hubbard. 2015. "Descriptive epidemiology of physical activity rates in multiple sclerosis." *Acta Neurologica Scandinavica*. doi: 10.1111/ane.12352.

Naidoo, Jennie, and Jane Wills. 2000. *Health promotion: foundations for practice*. 2nd ed. ed. London: Baillière Tindall Royal College of Nursing.

Nijman, Jessica, Michelle Hendriks, Anne Brabers, Judith de Jong, and Jany Rademakers. 2014. "Patient Activation and Health Literacy as Predictors of Health Information Use in a General Sample of Dutch Health Care Consumers." *Journal of Health Communication* 19 (8):955-969. doi: 10.1080/10810730.2013.837561.

Nygaard, G. O., K. B. Walhovd, P. Sowa, J. L. Chepkoech, A. Bjornerud, P. Due-Tonnessen, N. I. Landro, S. Damangir, G. Spulber, A. B. Storsve, M. K. Beyer, A. M. Fjell, E. G. Celius, and H. F. Harbo. 2014. "Cortical thickness and surface area relate to specific symptoms in early relapsing-remitting multiple sclerosis." *Mult Scler*. doi: 10.1177/1352458514543811.

Organization, World Health. 1948. World Health Organization Accessed 0210. http://www.who.int/about/definition/en/print.html.

Organization, World Health. 1987. "The Ottawa Charter for Health Promotion." http://www.who.int/healthpromotion/conferences/previous/ottawa/en/.
Oxford Dictionaries, dictionary. 2015. "Oxford Dictionaries, UK English." Oxford University Press Accessed March 15th. http://www.oxforddictionaries.com/definition/english/self-management.
Packer, T. L., G. Kephart, S. Ghahari, A. Audulv, J. Versnel, and G. Warner. 2015. "The Patient Activation Measure: a validation study in a neurological population." *Quality of Life Research*. doi: 10.1007/s11136-014-0908-0.
Penner, I. K., C. Raselli, M. Stocklin, K. Opwis, L. Kappos, and P. Calabrese. 2009. "The Fatigue Scale for Motor and Cognitive Functions (FSMC): validation of a new instrument to assess multiple sclerosis-related fatigue." *Multiple Sclerosis Journal* 15 (12):1509-17. doi: 10.1177/1352458509348519.
Pilutti, L. A., T. A. Greenlee, R. W. Motl, M. S. Nickrent, and S. J. Petruzzello. 2013. "Effects of exercise training on fatigue in multiple sclerosis: a meta-analysis." *Psychosomatic Medicine* 75 (6):575-80. doi: 10.1097/PSY.0b013e31829b4525.
Rademakers, J., J. Nijman, L. van der Hoek, M. Heijmans, and M. Rijken. 2012. "Measuring patient activation in The Netherlands: translation and validation of the American short form Patient Activation Measure (PAM13)." *BMC Public Health* 12:577. doi: 10.1186/1471-2458-12-577.
Ramagopalan, Sreeram V., and A. Dessa Sadovnick. 2011. "Epidemiology of Multiple Sclerosis." *Neurologic Clinics* 29 (2):207-217. doi: http://dx.doi.org/10.1016/j.ncl.2010.12.010.
Rijken, M., M. Heijmans, D. Jansen, and J. Rademakers. 2014. "Developments in patient activation of people with chronic illness and the impact of changes in self-reported health: Results of a nationwide longitudinal study in The Netherlands." *Patient Education and Counseling* 97 (3):383-390.
Shadish, William R., Thomas D. Cook, and Donald T. Campbell. 2002. *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.
Siqveland, J. & Kornør, H. . 2011. Måleegenskaper ved den norske versjonen av Beck Depression Inventory 2. utgave (BDI II). *PsykTestBARN, 1:5*.
Smestad, C., L. Sandvik, T. Holmoy, H. F. Harbo, and E. G. Celius. 2008. "Marked differences in prevalence of multiple sclerosis between ethnic groups in Oslo, Norway." *Journal of Neurology* 255 (1):49-55. doi: 10.1007/s00415-007-0659-8.
Steinsbekk, A. 2008. "Patient Activation Measure. [Norwegian]

Maling av effekt av pasientopplaering." *Tidsskrift for den Norske laegeforening* 128 (20):2316-2318.
Stepleman, L., M. C. Rutter, J. Hibbard, L. Johns, D. Wright, and M. Hughes. 2010. "Validation of the patient activation measure in a multiple sclerosis clinic sample and implications for care." *Disability and rehabilitation* 32 (19):1558-1567.
Ware, J.E. Jr; Kosinski, M.; Turner-Bowker, D.M; Gandek, B. 2002. How to score the version 2 of the SF-12 Health Survey.
WHO, The World Health Organization. 1987. "The Ottawa charter for Health Promotion." Accessed January 21st. http://www.who.int/healthpromotion/conferences/previous/ottawa/en/.

WHO, The World Health Organization. 2014a. Global status report on noncommunicable diseases 2014. Switzerland: World Health Organization.
WHO, The World Health Organization. 2014b. World Health Statistics 2014. World Health Organization.
WMA, The World Medical Association. 2015. "The Helsinki Declaration." The World Medical Association Accessed January 8th. http://www.wma.net/en/30publications/10policies/b3/.
Wong, S. T., S. Peterson, and C. Black. 2011. "Patient activation in primary healthcare: A comparison between healthier individuals and those with a chronic illness." *Medical Care* 49 (5):469-479.
Zill, J. M., S. Dwinger, L. Kriston, A. Rohenkohl, M. Harter, and J. Dirmaier. 2013. "Psychometric evaluation of the German version of the Patient Activation Measure (PAM13)." *BMC Public Health* 13:1027. doi: 10.1186/1471-2458-13-1027.

Oslo universitetssykehus

Forespørsel om deltakelse i forskningsprosjektet

"Tidlig oppfølging av nydiagnostiserte MS-pasienter. Effekt av systematisk fysisk aktivitet på sykdomsutvikling og kognitiv funksjon – et samarbeid mellom primær- og spesialisthelsetjeneste."

Bakgrunn

Dette er et spørsmål til deg om å delta i en forskningsstudie for å studere effekt av systematisk fysisk aktivitet på sykdomsutvikling og kognitiv funksjon ved MS. Som nydiagnostisert pasient ved avdelingen får du tilbud om mer systematisk oppfølging av fysioterapeut, sykepleier og lege enn vi har hatt tidligere, og vi spør med dette om å få gjøre noen tester og be deg fylle ut noen spørreskjema for å evaluere nytten av tiltaket.

Hva innebærer studien?

Du vil bli kalt inn til 4 kontroller hos sykepleier og fysioterapeut i løpet av det første året etter diagnose, i tillegg tilbys du å ta kontakt i mellomtiden dersom du trenger det. Vi bistår i å formidle kontakt til treningsmuligheter i primærhelsetjenesten og utarbeider informasjon til din fastlege og andre behandlere.

Ved kontrollene ber vi deg gjøre noen gangtester, test av utholdenhet og balanse og en test av kognitiv funksjon. Videre ber vi deg fylle ut spørreskjema om arbeidskapasitet, depresjon, fatigue, livskvalitet. Data fra testene og spørreskjemaene lagres med kode og analyseres samlet for evaluering av prosjektet. Fremkommer det imidlertid med testing eller besvarelse av spørreskjema at du har spesielle problemer vil vi igangsette tiltak/behandling.

Mulige fordeler og ulemper

Du vil ikke ha noen spesielle fordeler av studien, men erfaringer fra studien vil senere kunne hjelpe andre med samme diagnose.

Hva skjer med prøvene og informasjonen om deg

Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Alle opplysningene vil bli behandlet uten navn og fødselsnummer/direkte gjenkjennende opplysninger. En kode knytter deg til dine opplysninger og prøver gjennom en navneliste. Det er kun autorisert personell knyttet til prosjektet som har adgang til navnelisten og som kan finne tilbake til deg. Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres. Hvis du sier ja til å delta i studien, har du rett til å få innsyn i hvilke opplysninger som er registrert om deg. Du har videre rett til å få korrigert eventuelle feil i de opplysningene vi har registrert. Dersom du trekker deg fra studien, kan du kreve å få slettet innsamlede opplysninger. Opplysningene blir senest slettet 2024.

Frivillig deltakelse

Det er frivillig å delta i studien. Dersom du ikke ønsker å delta, trenger du ikke å oppgi noen grunn, og det får ingen konsekvenser for den videre behandlingen du får ved sykehuset.

Dersom du ønsker å delta, undertegner du samtykkeerklæringen på neste side. Om du nå sier ja til å delta, kan du senere trekke tilbake ditt samtykke uten at det påvirker din øvrige behandling på sykehuset. Dersom du senere ønsker å trekke deg, kan du kontakte seksjonsoverlege dr.med. Elisabeth Gulowsen Celius, Nevrologisk poliklinikk, Ullevål. Tlf: 22118633.

Oslo universitetssykehus

Samtykke for deltakelse i studien

Jeg er villig til å delta i studien

(Signert av prosjektdeltaker, dato)

Bekreftelse på at informasjon er gitt deltakeren i studien

Jeg bekrefter å ha gitt informasjon om studien

(Signert, rolle i studien, dato)

REK
REGIONALE KOMITEER FOR MEDISINSK OG HELSEFAGLIG FORSKNINGSETIKK

Region:	Saksbehandler:	Telefon:	Vår dato:	Vår referanse:
REK sør-øst	Hege Holde Andersson	22845514	11.10.2013	2013/791/REK sør-øst B
			Deres dato:	**Deres referanse:**
			03.09.2013	

Vår referanse må oppgis ved alle henvendelser

Til Elisabeth Gulowsen Celius

2013/791 Tidlig oppfølging av nydiagnostiserte MS-pasienter

Forskningsansvarlig: Oslo Universitetssykehus
Prosjektleder: Elisabeth Gulowsen Celius

Vi viser til søknad om forhåndsgodkjenning av ovennevnte forskningsprosjekt. Søknaden ble behandlet av Regional komité for medisinsk og helsefaglig forskningsetikk (REK sør-øst) i møtet 18.09.2013. Vurderingen er gjort med hjemmel i helseforskningsloven (hfl.) § 10, jf. forskningsetikklovens § 4.

Prosjektomtale
Multippel sklerose(MS) er en kronisk nevrologisk sykdom som ofte affiserer unge mennesker i alderen 20-40 år. Personer med MS får ofte en nedsatt livskvalitet og mange blir uføretrygdet tidlig. Prosjektet det søkes om vil undersøke nærmere om fysisk aktivitet og medikamentell behandling, med en gang en diagnose er fastsatt, kan forsinke en fysisk og psykisk svekkelse. Det er vist i tidligere undersøkelser at fysisk aktivitet også påvirker depresjon og kognitiv svikt, som gjerne er følgetilstander til sykdommen. Oslo Universitetssykehus ønsker å etablere et treningstilbud/oppfølging for nydiagnostiserte pasienter. Formålet med undersøkelsen er å finne nye opplysninger om hvordan bedre oppfølging og fysisk aktivitet kan påvirke arbeidskapasitet, livskvalitet og tretthet. Det vil tilbys tester som viser kognitiv – og fysisk funksjon og utholdenhet. Målet med prosjektet er å videreformidle erfaringer slik at det utvikles et tilbud i samarbeid mellom spesialisthelsetjenesten og primærhelsetjenesten. Det skal inkluderes 40-60 nydiagnostiserte personer i studien som er samtykkebasert.

Saksgang

Komiteen behandlet prosjektet første gang i sitt møte 15.05.2013. I brev 10.06.2013 ble prosjektleder informert om at vedtak i saken var utsatt, og at komiteen ville ta stilling til prosjektet etter mottatt svar.

Merknadene i vedtaksbrevet av 10.06.2013 var primært knyttet til studiens design. Komiteen ba prosjektleder vurdere om det vil være mer hensiktsmessig å gjennomføre studien som en randomisert studie. I tillegg ba komiteen om at forskningsprotokollen ble revidert og at det ble gjort en styrkeberegning.

Tilbakemelding fra prosjektleder

Prosjektleder tilbakemelding ble mottatt 03.09.2013. I tilbakemeldingen skriver prosjektleder at man ikke har valgt en inklusjon med randomisering da dette oppleves som uetisk. Man kan gå ut fra at mer omfattende / systematisk oppfølging av pasientene vil oppleves som en fordel. Det ville derfor være

urimelig ikke å tilby alle ny diagnostiserte det man til enhver tid tror er den beste oppfølging. Som kontrollgruppe har man valgt å bruke de som siste året fikk en MS-diagnose.

Komiteens vurdering

Komiteen mener prosjektleder har svart tilfredsstillende på komiteens merknader.

Komiteen mener prosjektleder har gitt en god redegjørelse for hvorfor man har valgt å gjennomføre studien med valgte design. Slik prosjektet nå fremstår, har komiteen ingen innvendinger til at det gjennomføres.

Vedtak

Komiteen godkjenner prosjektet i henhold til helseforskningsloven § 9 og § 33

Godkjenningen er gitt under forutsetning av at prosjektet gjennomføres slik det er beskrevet i søknaden.

Tillatelsen gjelder til 30.04.2015. Av dokumentasjonshensyn skal opplysningene likevel bevares inntil 30.04.2019. Opplysningene skal lagres avidentifisert, dvs. atskilt i en nøkkel- og en opplysningsfil. Opplysningene skal deretter slettes eller anonymiseres, senest innen et halvt år fra denne dato.

Forskningsprosjektets data skal oppbevares forsvarlig, se personopplysningsforskriften kapittel 2, og Helsedirektoratets veileder "*Personvern og informasjonssikkerhet i forskningsprosjekter innenfor helse- og omsorgssektoren*"

Klageadgang

Du kan klage på komiteens vedtak, jf. forvaltningslovens § 28 flg. Klagen sendes til REK sør-øst B. Klagefristen er tre uker fra du mottar dette brevet. Dersom vedtaket opprettholdes av REK sør-øst B, sendes klagen videre til Den nasjonale forskningsetiske komité for medisin og helsefag for endelig vurdering.

Komiteens avgjørelse var enstemmig.

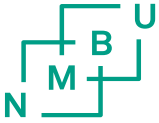
Sluttmelding og søknad om prosjektendring
Prosjektleder skal sende sluttmelding til REK sør-øst på eget skjema senest 31.10.2015, jf. hfl. § 12. Prosjektleder skal sende søknad om prosjektendring til REK sør-øst dersom det skal gjøres vesentlige endringer i forhold til de opplysninger som er gitt i søknaden, jf. hfl. § 11.

Med vennlig hilsen

Grete Dyb
førsteamanuensis dr. med.
leder REK sør-øst B

Hege Holde Andersson
Komitésekretær

Kopi til:
Oslo Universitetssykehus ved øverste administrative ledelse
Espen Dietrichs v/OUS



Norwegian University
of Life Sciences

Postboks 5003
NO-1432 Ås, Norway
+47 67 23 00 00
www.nmbu.no