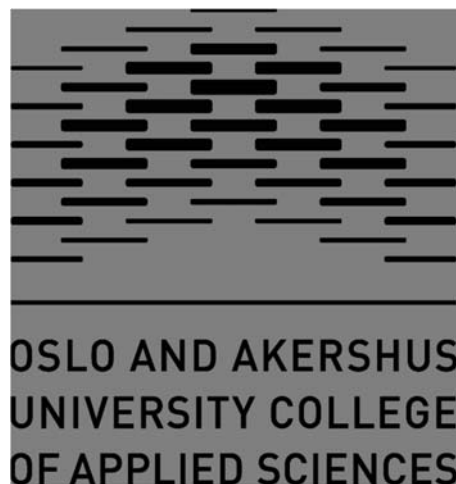


Psychosocial aspects of adults with Marfan Syndrome. A cross sectional study of challenges related to work, satisfaction with life, chronic pain and fatigue

Gry Velvin



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Department of Social Work, Child Welfare and Social Policy
Faculty of Social Sciences
Oslo and Akershus University College of Applied Sciences

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Summary

Background: This study is initiated in co-operation with the user-organization and deals with psychosocial issues concerning patients with Marfan syndrome (MFS). MFS is a severe, potentially life-threatening, genetic, connective tissue disorder that commonly affects the following organ systems: aorta, ocular (eye), skeletal, dural sac, lungs and skin. There is no medical cure but improvement in medical management and surgery has resulted in increased life expectancy. The psychosocial aspects of the diagnosis have received little attention. Increased knowledge is important for developing new rehabilitation programs and services to improve the quality of life of people with MFS, as well as other patient groups. The meta-theoretical perspective of this study is based on critical realism, and different models and theories within social work and health science are combined to provide better understanding and explaining of the results of the study.

Purpose: To systematically review and present the knowledge bases with regard to psychosocial aspects [Paper I] and chronic pain [Paper II] of patients with Marfan syndrome. A further aim was to investigate psychosocial aspects and perceived health problems of adults registered with verified Marfan diagnosis, mainly focusing on work participation, satisfaction with life (SWL), chronic pain and fatigue [Paper III- VI].

Materials and Methods: A mixed-method systematic review of the literature pertaining to the psychosocial aspects of Marfan syndrome [Paper I] and a systematic review of chronic pain in Marfan syndrome [Paper II] were carried out.

A cross-sectional postal survey [Paper III-VI] was conducted. A questionnaire was designed, including questions about demographic contact with health and social services, MFS-related health problems, satisfaction with life, chronic pain and fatigue. The questionnaire was subsequently evaluated in focus groups discussion and pilot study. All the patients (≥ 20 years of age) registered at TRS with verified diagnosis ($n=117$) were invited to participate (62% response rate).

Paper III: Multiple logistic regression analysis was used to investigate work participation and associated factors.

Paper IV: Hierarchical multiple regression analysis was performed to examine the association between the dependent satisfaction with life scale (SWLS) and relevant independent variables.

Paper V: Multiple logistic regression analysis was used to examine the association between chronic pain and associated factors.

Paper VI: Multiple linear regression analysis was used to study the association between fatigue and associated factors.

Results: The review [Paper I] revealed that studies regarding the psychosocial aspects of MFS are limited in size and quality. Despite these limitations, all identified studies indicate that MFS has significant impact on the psychosocial aspects of people`s lives, decreased quality of life, challenges in education, work and family life, depression and anxiety. Some studies also indicate that the subjective perception of discomfort does not necessarily match the medical severity of the disease. The review of chronic pain [Paper II] showed that few studies have examined chronic pain in patients with MFS. Despite the fact that knowledge is limited, the studies indicate that the prevalence of chronic pain in MFS is significantly higher than for the general population, and that chronic pain has a negative impact on people`s lives.

The results from the cross-sectional part of this research project showed that most young adults with MFS worked full time despite comprehensive health problems, but they tended to retire earlier than did the general Norwegian population (GNP). Only severe fatigue, lower educational level and higher age were significantly associated with decreased work participation in the regression analyses. The mean score of SWLS in our study group was lower than that of the GNP, but similar or higher when compared to other patient groups. Aortic dissection and severe fatigue were significantly associated with decreased SWLS in the hierarchical multiple regression analysis. The prevalence of chronic pain and fatigue in adults with MFS was high. Many reported that the chronic pain had occurred at a young age.

Conclusion: This research project indicates that people with MFS may experience psychosocial challenges due to the diagnosis and that perceived health problems such as chronic pain and fatigue are common. Despite comprehensive health problems, it seems that many people with MFS cope well with the diagnosis. Severe fatigue was the health problem having the highest significant association with lower work participation, decreased SWLS and chronic pain. This confirms the view that fatigue is a major issue for this patient group, but the associations are complex. This research project highlights that medical social work plays an important role in the field of chronic illness and disability, and biopsycosocial approach is recommended. Studies of rare diagnoses are challenging due to small sample sizes and recruiting challenges. International collaborative studies, using the same study design and validated tools, and only including people with verified diagnosis are recommended. This may contribute to a deeper and broader understanding of the psychosocial aspects of the MFS, also across diverse cultures and ethnic groups.

Norwegian summary

Bakgrunn: Denne studien som er initiert i samarbeid med brukerforeningen omhandler psykososiale forhold ved diagnosen Marfan syndrom (MFS). MFS er en alvorlig potensiell livstruende genetisk bindevevstilstand som ofte påvirker aorta/hjerte, syn (øye), skjelett, lunger og hud. Det finnes ingen helbredende behandling, men behandling med β -blokkere eller annen blodtrykksmedisin og operasjon med innsettelse av kunstig hovedpulsåre har ført til økt livslengde. De psykososiale følgene av diagnosen har hatt lite oppmerksomhet. Økt kunnskap er viktig for å kunne utvikle bedre rehabilitering og tilpassede tjenester som kan bidra til å øke livskvalitet for mennesker med MFS, så vel som andre pasientgrupper. Studien tar utgangspunkt i et meta-teoretisk perspektiv basert på kritisk realisme. Ulike modeller og teorier innenfor sosialt arbeid og helsevitenskap er kombinert for å gi økt forståelse og innsikt i de problemstillingene som diskuteres ut fra resultatene fra studien.

Hensikt: Å få systematisk oversikt over relevant forskning som omhandler psykososiale forhold ved MFS [Artikkel I] og kronisk smerte ved MFS [Artikkel II]. Deretter, undersøke psykososiale aspekt og opplevde helseplager for voksne personer med bekreftet Marfan diagnose, med fokus på arbeidsdeltakelse, fornøydhets med livet, kronisk smerte og fatigue [Artikkel III-VI].

Materiale og metode: Systematiske søk, kvalitetsvurdering og oppsummering av relevant forskning ble foretatt [Artikkel I, II]. Tversnittstudie med spørreskjema som inkluderte spørsmål knyttet til demografiske forhold, kontakt med helse- og sosial service, MFS-relaterte helseforhold, fornøydhets med livet, kronisk smerte og fatigue ble gjennomført [Artikkel III, IV, V, VI]. Alle pasienter (≥ 20 år) som var registret med verifisert MFS diagnose ($n=117$) ble invitert til å delta, 62 % deltok.

Artikkel III – Multippel logistisk regresjonsanalyse ble brukt til å identifisere faktorer som har sammenheng med arbeidsdeltakelse.

Artikkel IV- Hierarkisk regresjonsanalyse ble brukt for å undersøke sammenheng mellom SWLS og relevante uavhengig variabler.

Artikkel V-. Multippel logistisk regresjonsanalyse ble benyttet for å undersøke sammenheng mellom kronisk smerte og andre faktorer.

Artikkel VI – Multippel lineær regresjonsanalyse ble brukt for å studere sammenheng mellom fatigue og andre relevante faktorer

Resultater: Den systematiske kunnskapsoppsummering om psykososiale forhold ved MFS [Artikkel 1] viste at studier som omhandler dette temaet er begrenset både i antall og kvalitet. Til tross for disse begrensningene, indikerte studiene at MFS har stor innvirkning på

psykososiale forhold som for eksempel lavere livskvalitet, utfordringer i utdanning, arbeid og familie liv og psykologiske forhold. Noen studier vektla også at folks subjektiv opplevelse av ubehag ikke nødvendigvis samsvarer med den medisinske alvorlighetsgraden av diagnosen. Den systematiske kunnskapsoppsummeringen av kroniske smerter [Artikkel II] viste at få studier har undersøkt kronisk smerte ved MFS. Til tross for begrenset kunnskap, viste studiene at prevalensen av kroniske smerter hos personer med MFS er signifikant høyere enn blant den generelle befolkningen og indikerer at kronisk smerter har negativ innvirkning på dagliglivet. Resultatene fra tverrsnittstudien tyder på at de fleste unge voksne med MFS arbeider full tid til tross for omfattende helseplager, men at mange blir uføretrygdet tidligere enn befolkningen generelt. Kun alvorlig fatigue, lavere utdanningsnivå og høyere alder hadde signifikant sammenheng med nedsatt arbeidsdeltakelse, ikke MFS relaterte helseproblemer eller kronisk smerte. Gjennomsnittskåren for SWLS i studiegruppen var lavere enn for generelle norske befolkningen, men tilsvarende eller høyere sammenlignet med andre pasientgrupper. Kun aorta disseksjon og alvorlig fatigue hadde signifikant sammenheng med lavere SWLS. Både prevalens av kronisk smerter og fatigue var signifikant høyere i studiegruppen enn blant befolkningen generelt, men tilsvarende eller lavere enn for andre tilsvarende pasientgrupper. Mange beskrev at både kroniske smerter og fatigue begrenset dagliglivet, og smerter hadde signifikant sammenheng med fatigue.

Konklusjon: Resultatene fra studien tyder på at mennesker med MFS opplever psykososiale utfordringer knyttet til diagnosen, og at helseplager som kronisk smerte og fatigue er utbredt. Til tross for at mange har omfattende helseplager ser det ut til at de mange mestrer å leve godt med diagnosen. Mye tyder på at fatigue er det helseproblemet som i størst grad er assosiert med lavere arbeidsdeltakelse og nedsatt fornøydhetsnivå med livet. Dette bekrefter at fatigue er et utbredt problem for pasientgruppen, men at sammenhengen er kompleks. Studien bekrefter at medisinsk sosialt arbeid er viktig i arbeidet med kronisk syke og funksjonshemmede, og en biopsykososial tilnærming vil være hensiktsmessig. Studier av sjeldne diagnoser er utfordrende på grunn av liten populasjon og rekrutteringsutfordringer. Internasjonale samarbeidsprosjekter som benytter samme studie design, validerte instrumenter og inkluderer personer med verifisert diagnoser vil være en fordel. Dette, kombinert med kvalitative studier vil bidra til en bredere og dypere forståelse av de psykososiale aspektene ved MFS og andre tilsvarende diagnosegrupper i ulike kulturer og etniske grupper.

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LIST OF PUBLICATIONS

Paper I

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.
Systematic review of the psychosocial aspects of living with Marfan syndrome.
Journal of Clinical Genetics 2015; 87 (2): 109–116

Paper II

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.
Systematic review of chronic pain in persons with Marfan syndrome.
Journal of Clinical Genetics 2016; 89 (6): 647-659

Paper III

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.
Work Participation in Adults with Marfan syndrome: Demographic Characteristics,
MFS Related Health Symptoms, Chronic Pain, and Fatigue.
American Journal of Medical Genetic 2015; 167A (12):3082-3090

Paper IV

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.
Satisfaction with life in adults with Marfan syndrome (MFS): associations with health-
related consequences of MFS, pain, fatigue, and demographic factors.
Journal of Quality of Life Research 2016; 25(7):1779-1790

Paper V

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.
Chronic pain in Adults with Marfan syndrome (MFS): Occurrence and associations to
demographic aspects, MFS related health symptoms and fatigue.
Submitted to Journal of Rare Disorders

Paper VI

Bathen T, Velvin G, Rand-Hendriksen S, Robinson HS.
Fatigue in Adults with Marfan syndrome, Occurrence and Associations to Pain and
Other Factors.
American Journal of Medical Genetic 2014; 164A (8):1931-9.

ABBREVIATIONS

Abbreviation	Terms
AAP	Arbeidsavklaringspenger (work-rehabilitation pension)
CI	Confidence Interval
BJHS	Benign Joint Hypermobility Syndrome
BPS	Biopsychosocial Model
CR	Critical Realism
CVD	Cardiovascular Disease
EDS-HT/JHS	Ehlers-Danlos Syndrome-Hypermobility Type/Joint Hypermobility Syndrome
ES	Effect Size
FBN1	Fibrillin 1. The human gene for fibrillin 1
Fig	Figure
FFO	Fellesorganisasjonen til funksjonshemmede (The Norwegian Federation of Organizations of Disabled People (FFO))
FSS	Fatigue Severity Scale
HRQOL	Health-related Quality of Life
ICD	International Classification of Disease
ICF	International Classification of Functioning, Disability and Health
ICIDH	International Classification of Impairment, Disability and Handicaps
LDS	Loeys-Dietz Syndrome
MFS	Marfan Syndrome
MS	Multiple sclerosis
MSW	Medical Social Worker
n	numbers/sample size
NAV	Norwegian Work and Welfare service
NKSD	National Resource Centre for Rare Diagnoses
OR	Odds Ratio
QOL	Quality of Life
RA	Rheumatoid Arthritis
RCT	Randomized Controlled Trials
REK	Regional Ethical Committee (for medical and health research)
SD	Standard Deviation
SF-36	The Short Form 36 Health Survey
SNQ	Standardized Nordic Questionnaire
SPSS	Statistical Package for the Social Science
SSB	Statistisk Sentralbyrå
SunRH	Sunnaas Rehabilitation Hospital
SWL	Satisfaction with Life
SWLS	Satisfaction with Life Scale
TRS	TRS, National Resource Centre (for rare disorders)
WHO	World Health Organization

1. INTRODUCTION

Disabled are nothing that we are, not a characteristic of the individual, but an attitude and physical barriers preventing people with impairment from participating on the same level as others in our society. Disability is an interaction between the individual and the society, and is something that we become as a result of society's lack of adaptations for diversity (FFO in Norway¹).

1.1. Background and choice of theme

«My health is good, but I have many health complains. I try to live my life as good as I can, and let the Marfan syndrome lives its own life»

In the clinical work at TRS National Resource Centre for Rare Disorders we often meet people with Marfan syndrome with comprehensive health problems who are trying to live good lives despite having a severe potential life threatening disease. Marfan syndrome (MFS) is a rare genetic connective tissue disorder that may affect many different organ systems. Aortic rupture can cause sudden death, lens luxation can lead to visual impairment and skeletal abnormalities may result in a particular appearance, chronic pain, fatigue and reduced physical capacity. The stories varies, some people grow up in Marfan-affected families; while others are diagnosed after an acute aortic surgery in adulthood. People of all ages describe psychosocial challenges in education, work, family planning and dealing with the health and social services. Some people with MFS experience major psychological challenges as they confront living with an expanded aorta or after aortic surgery. Beta-blockers and physical restrictions are often prescribed to patients with MFS with the aim of reducing the risk of aortic dissection. These treatments may cause frustration, inactivity, increased body mass index and can limit their choice of careers. Many individuals also report visual problems, chronic pain and fatigue and some experience that these symptoms are not understood or emphasized by the professionals in health and social services, or by their relatives. Despite all these challenges, our impression is that many with MFS seem to cope well with the diagnosis.

As a medical social worker in a multidisciplinary team at TRS, one of the main tasks is to provide psychosocial support, to assess the strengths and resilience of the patients, and support the family and social system. Many people with MFS are in need of advice and counselling; they need help to find ways of dealing with the diagnosis in their daily lives. In

¹ FFO 24.06.2016.

the clinical work we experience that different diagnoses may cause different challenges, and having Marfan syndrome may cause particular psychosocial challenges. Few studies have investigated the psychosocial challenges of living with MFS, including education, work, satisfaction with life, perceived health problems, contact with health-and social services and how they manage to live with the diagnosis. The Marfan Association in Norway is concerned with the psychosocial aspects of the diagnosis and has emphasized the need for more research particular on issues such as education, work participation, quality of life, chronic pain, fatigue and monitoring from social-and health services. The advice and counselling given by TRS Resource Centre for Rare Disorder is mostly based on clinical experiences and more knowledge is important for developing more evidence-based knowledge and counselling.

The idea of undertaking this study was based on my clinical experiences from the work at TRS, developed in co-operation with the Marfan Association in Norway and the Faculty of Social Sciences at Oslo and Akershus University College of Applied Sciences in Norway. The purpose was to gain more knowledge about the psychosocial aspects of living with Marfan syndrome.

Structure of the dissertation

This dissertation consists of two parts. Part 1 consists of 7 chapters. In chapter 1 the TRS National Research Centre is introduced; then Marfan syndrome is described, and finally, the aims and the research questions of this research project are presented. Chapter 2 is devoted to locating social work in health and disability studies and previous research related to the current issues. Then conceptualizing and elaborating the main terms of reference. The theoretically oriented chapter 3 presents the meta-theoretical perspective and a set of middle range theories that are used as frameworks for better understanding and explaining the results of the study. Thereafter, the “methodology and material” chapter 4 consist of descriptions of the design, user participation, the study sample, the methodology used in the different parts of the study and ethical considerations. In chapter 5, a short presentation of the main results is presented. Further, in chapter 6 on the discussion of the findings, the methodological considerations of the review studies and the cross-sectional studies are presented. Then a more comprehensive discussion about the main results from each of the issues focused in study is elaborated. At last, in chapter 7 a conclusion with implications for medical social work, and for the health and social services institutions are outlined, along with suggested avenues for further research.

Part II: Consist of the six articles included in the research project.

1.2. TRS-National Resource Centre for Rare Disorders

The research project was initiated and conducted at TRS National Resource Centre for Rare Disorders located at Sunnaas Rehabilitation Hospital in Norway. TRS is one of nine centers, organized as the Norwegian National Advisory Unit on Rare Disorders [NKSD 2016]. The originally name of the center was “Trenings-og rådgivingscenter” (training and counseling center) abbreviated as TRS. The main mandate of TRS is to gain and disseminate knowledge, about the different diseases, including the diagnosis of Marfan syndrome (MFS), by research and clinical work. Further, the center provides guidance and information to individuals who have been diagnosed with MFS, as well as to their families and professionals giving services to the patients and their families at different levels of health and social services. Individuals with pertinent diagnoses may register as users and gain access to services, the multi-disciplinary outpatient clinic, courses, and monitoring in cooperation with local health-and social services. The center is supposed to be a supplement to the regular services. In addition TRS has a responsibility to detect and monitor the ordinary health-and social services for people with rare disorders, and report to the authorities if the services are inadequate or not appropriate. The co-operation with the User-Associations is an important part of the existence and development of TRS, and collaborating meeting are conducted regularly. Most scientific projects emanate from the clinical work and are planned in collaboration with the relevant user associations.

1.3. Challenges in research on rare disorders

There are several challenges of doing research on rare disorders, and in this study four different challenges will be outlined. The first challenge is to identify and find the persons who actually have the MFS diagnosis. The diagnosis of MFS cannot be determined by a single test, but the diagnostic process implies the use of a set of medical criteria. The diagnostic processes of hereditary connective tissue disorders such as MFS are complex: due to that many conditions are similar and resemble each other symptomatically. Despite these similarities, different conditions have different courses, different challenges and different treatment regimens. The developments of genetic research and DNA examinations have made it possible to distinguish these similar but distinct conditions [Rand-Hendriksen, 2010, Rand-Hendriksen et al., 2010]. Hence, it is important that the participants in a research project have clinically verified diagnosis, including DNA examinations.

Another challenge is that the disease is rare. This will influence the size of the population and sample groups in studies. In Norway, Sweden and Finland the definition of a rare disease is when the prevalence is less than 100 known individuals of one million inhabitants. In Denmark and Iceland, the definition is less than 200 cases out of one million inhabitants. The European Union (EU) definition is 500 per one million inhabitants. According to the EU there are between 6,000 and 8,000 rare genetic diseases. Combined with rare non-genetic conditions, rare diseases affect approximately 6 to 10% of the population in Europe [Kole & Faurisson, 2009].

The third challenge worth mentioning is that research on rare disorders has received little attention, due to lack of marked interest. There have been several debates about the profitability, cost and whether it is economically justifiable to conduct research on rare disorders. It seems likely that research on rare disorders has not been given priority when it comes to allocating research funding. The research is characterized by scarce and scattered research resources and experience [Nortvedt, 2016]. During recent decades, research on rare diseases has been the object of increased interest, primarily concerning the genetic, medical and physical aspects. However, the psychosocial aspects of rare diseases have received little attention [Anderson, Elliot & Zurynski, 2013; Bo Hansen & Ege, 2007; Grue, 2008; Grut, Kvam & Lippestad, 2008; Grut & Kvam, 2013].

Last, but not at least, the rarity of the disease may imply particular challenges for people with rare diseases and their families, due to the lack of research and knowledge. Two studies from Norway [Grue, 2008; Grut et al., 2008, Grut & Kvam 2013] show that people with rare diseases often experience barriers when trying to access health and social services related to the fact that the disorder is labeled “rare”. These studies found that service-providers within a wide range of sectors and services lacked knowledge about the disease, and many seem to be reluctant to get involved in situations where the diagnoses are unknown to them. Furthermore, service-providers seem reluctant to accept information offered to them by the users, and they often hesitate to take the initiative to seek information on their own [Grut et al., 2013]. According to Grut & Kvam [2013], persons with symptoms that fluctuate, appear periodically and are only partly visible may encounter particular problems because professionals tend to interpret the condition to be less impairing than what the persons themselves experienced. Many felt misunderstood, rejected or met with suspicion. Some also experienced that their applications for economic and social support were denied by professionals at the Norwegian work-and-welfare service (NAV), since the NAV staff often lacks knowledge of, or is unfamiliar with, rare diseases [Grut et al., 2008]. These studies

underline the importance of acquiring and disseminating knowledge of the different aspects of living with different diseases, as every disease possesses unique psychosocial and developmental challenges.

According to the recommendations from the European Commission Expert Group on Rare Diseases [EUROPLAN, 2016] “failure to meet the serious unmet social needs for people with a Rare Disorder and their families affects people`s dignity, autonomy and other fundamental human rights”. EUROPLAN final report on 15 EUROPLAN National Conference 2010-2011 recommends that “for people living with rare, chronic and debilitating disease, care should not only be restricted to medical and paramedical aspects, but should also take into account social inclusion and psychological and educational development” and recognizes that “social services are instrumental to the empowerment of people with Rare Disorder and to improve their well-being and health [EUROPLAN, 2016].

1.4. Marfan syndrome

Marfan syndrome (MFS) is a severe, life-threatening, autosomal-dominant, connective tissue disease with multi-organ involvement, caused by mutations in the fibrillin 1 gene [Von Kodolitsch et al., 2015]. In the 1970s the mean age of death for people suffering for the disease was 32 years, but the evolution of aortic surgery has increased the life-expectancy considerably [Von Kodolitsch et al., 2015]. Today, affected people can have next to normal life expectancy after receiving appropriate interventions, such as administration of beta-blockers, restricted physical activities, and aortic surgery [Gray et al., 1998; Von Kodolitsch et al., 2015]. The prevalence of MFS is poorly described and varies from 1.5 to 17.2 individuals per 100,000 (0.15–1,72 per 10,000) in the general population [Chiu, Wu, Chen, Kao, & Huang, 2014; Fuchs, 1997; Gray et al., 1994; Lynas, 1958; Sun et al., 1990; Von Kodolitsch et al., 2015]. MFS occurs equally in men and women and across all ethnic groups [De Paepe, Devereux, Dietz, Hennekam & Pyeritz, 1996; Pyeritz, 1996].

Diagnosis is confirmed by using diagnostic criteria: the Ghent 1 criteria from 1996 [De Paepe et al., 1996] and the Ghent 2 criteria from 2010 [Loeys et al., 2010]. The clinical symptoms of MFS vary within and among families, and often evolve with age [Loeys et al., 2010]. Some people are diagnosed in childhood, but many patients get the diagnosis as adults.

MFS may affect many different organ systems including the cardiovascular system, the skeletal system, the ocular system, the dural sac, the lungs as well as the skin and the integument [De Paepe et al., 1996; Loeys et al., 2010]. The most serious complications are

related to the cardiovascular system, with risk of dilation and dissection of the ascending aorta and other larger blood vessels [Loeys et al., 2010]. Life-threatening complications can require emergency intervention without prior warning, with increased risk of subsequent morbidity and potential loss of physical functioning [Connors, Richmond, Fisher, Sharpe, & Juraskova, 2012]. Lens dislocation with a risk for retinal detachment may cause visual problems [Drolsum, Rand-Hendriksen, Paus, Geiran & Semb, 2015; Maumenee, 1981]. During and after pregnancy, there is an increased risk for aortic dilatation and dissection for women with MFS [Peters, Kong, Horne, Francomano & Biesecker, 2001a; Peters, Kong, Hanslo, Francomano & Biesecker, 2002]. The autosomal-dominant mode of inheritance (each child has a 50 % chance of inheriting the disease from the affected parent) can cause anxiety about pregnancy for the patient`s own health and the health of their children [Peters et al., 2001a, 2002].

People with MFS are often characterized by long arms, legs, hands and feet, hypermobile joints, chest deformities and scoliosis that may cause a Marfanoid appearance [De Paepe et al., 1996; Stheneur et al., 2014]. While some may have a Marfanoid appearance, the impairment may not be visible to other people. Some studies indicate that patients have been bullied, teased, and stigmatized in school and at work due to their Marfanoid phenotypical appearance [Peters et al., 2005; Van Tongerloo & De Paepe, 1998]. Children and adolescents with Marfan experience earlier and longer peak skeletal growth [Stheneur et al., 2014]. Many become taller than their peers during early adolescence [Jones et al., 2007; Pyeritz, 2007] and this may result in being treated as older than their actual age [Peters et al., 2001a, Peters, Horne, Kong, Francomano & Biesecker 2001b; Rand-Hendriksen et al., 2010a]. Chronic pain, fatigue and reduced physical endurance are reported to be problems for adults with MFS [Hasan, Poloniecki & Child, 2007; Peters et al., 2001b, 2002, 2005; Rand-Hendriksen et al., 2010a].

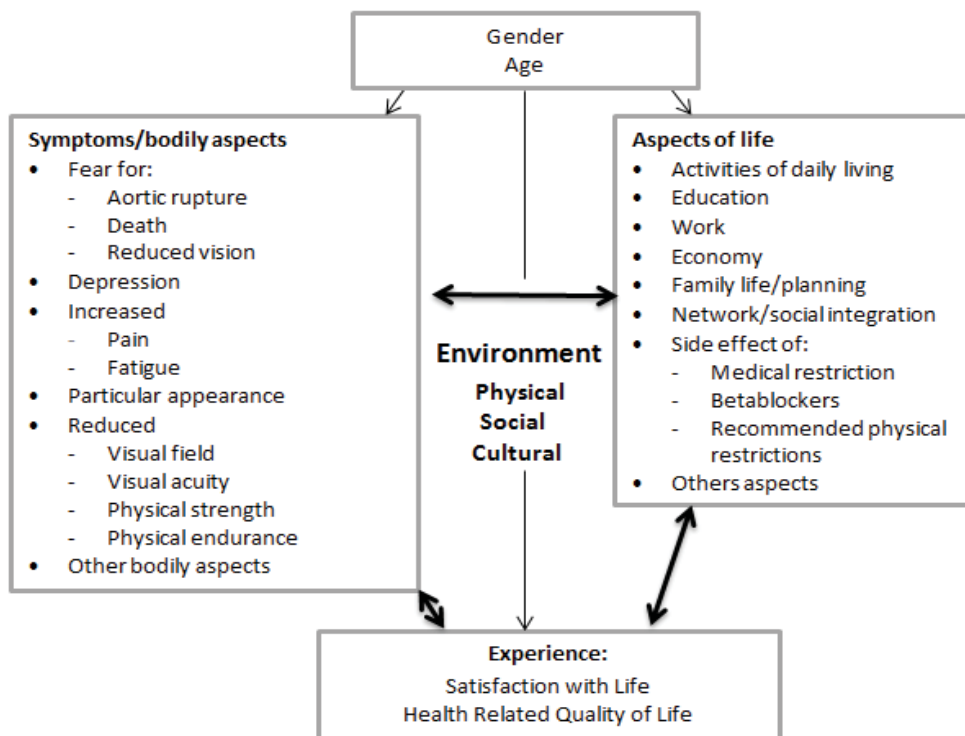
Because MFS may affect different organ systems, several medical specialists are involved in diagnostics and treatment: Cardiologists, ophthalmologists (eye-specialist), radiologists, geneticists and orthopedists. The treatments are mainly focused on monitoring and preventing the development of severe symptoms such as aorta dilation and ophthalmic complications. Depending on the symptoms, most people have regular monitoring of aorta and some have regular monitoring of their eyes. To prevent aorta dilatation and aortic dissection many are advised to use blood pressure medicine, from a young age. Based on the same logic; to reduce the risk of aortic dissection and lens dislocation, many patients are advised to refrain from contact sports and to limit their physical exertion [Von Kodolitsch et

al., 2015; Loeys et al., 2010; Rand-Hendriksen et al., 2010a]. In addition, many people with MFS are in need of psychosocial counseling with an interdisciplinary team consisting of social workers, psychologists, occupational therapists and physical therapists.

Studies report that adults with MFS may experience significant physical limitations that interfere with everyday life and impose a burden on school attendance, work opportunities, and social interaction [De Bie, De Paepe, Delvaux, Davis & Hennekam, 2004; Peters et al., 2001a, 2001b, 2002, 2005]. This indicates that there are risk factors associated to having MFS such as increased health problems and psychosocial challenges. Former studies have shown that having a lifelong, potentially disabling and life-threatening disease may cause specific challenges in daily life and cause decreased quality of life and psychological distress [De Bie et al., 2004; Peters et al., 2001a, 2001b, 2002, 2005; Rand-Hendriksen et al., 2010]. However, many individuals with MFS seem to cope well with the diagnosis [De Bie et al., 2004; Fusar-Poli et al., 2008; Peters et al., 2005; Van Tongerloo & De Paepe, 1998].

Figure 1 shows a preliminary conceptual model of the interaction between health-related factors and other life aspects of living of having MFS. The model served as a mean for preparing priori hypotheses for this research project.

Fig. 1 Interaction between health-related factors and life aspects of living with Marfan syndrom (MFS)



1.5. The aims of this thesis

The overall aims of this study were to gain more knowledge about different aspects of living with MFS as well as about the challenges faced by adults with MFS in Norway.

To gain this knowledge the following goals were compiled:

1. To review the research literature pertaining to the psychosocial aspects of MFS
2. To review the research literature on the perceived health problems such as chronic pain and fatigue in people with MFS
3. To explore the challenges related to daily life, such as work participation and satisfaction with life in adults with MFS.
4. To study perceived health symptoms such as chronic pain and fatigue in adults with MFS

The specific research questions were:

- What does the literature reveal about the psychosocial aspect of MFS? (Paper I)
- Do people with MFS experience particular psychosocial aspects due to their diagnosis? What kind of psychosocial challenges do people with MFS experience? What do people with MFS describe as psychosocial challenges? (Paper I)
- What does the literature reveal about chronic pain in patients with MFS? (Paper II)
- Do people with MFS experience particular challenges regarding work? (Paper III)
- Where on the Satisfaction with Life scale (SWLS) is the study population located in comparison with the general population and other patient groups, and which factors are associated with SWL? (Paper IV)
- Do people with MFS report a higher prevalence of chronic pain than the general population? (Paper V)
- Does chronic pain influence the way people function in daily life and if so, how? (Paper V)
- What is the degree of fatigue in the study group compared to that experienced by the general population and other patient groups? (Paper VI)
- Does fatigue influence daily life and what factors are associated with severe fatigue in the study population? (Paper VI).

As noted, the main purpose was to gain a more detailed and broader knowledge about different aspects of living with MFS. Such information will be useful in future when it comes to advising people living with the diagnosis, their relatives, welfare system, and the international society of MFS. Moreover, increased knowledge can serve the basis for further

research. This knowledge may also be important for developing psychological and psychosocial interventions and rehabilitation programs for people with MFS. Beyond this, some results may be transferable and beneficial to people with other genetic connective tissue disorders that have aortic pathology, such as Vascular EDS, Loeys-Dietz syndromes and similar diagnoses.

2. FORMER RESEARCH AND MAIN TERMS

2.1. Social work in health and disability research

An essential task for social workers working in the field of health and disability is the integration of the health and disability framework into the foundation of social work practice. As Mackelprang & Salsgiver [1999] noted, values and beliefs concerning health and disability impact the way one works as a professional in the social and health services and as a researcher. To understand this, it is necessary to grasp the distinction between the physical impairment, and the social situation called “disability” experienced by people with such impairment. In 1980 the World Health Organisation (WHO) attempted some clarifications of disability (ICIDH). “Impairment” is any loss of abnormality of physiological, psychological or anatomical structure or function. “Disability”, on the other hand, is any restriction or inability of an individual to take part in activity within the range considered normal for human beings [WHO, 2001, 2002]. Disability is a complex phenomenon reflecting the interaction between features of a person’s body and features of the society which he or she lives” [WHO, 2016]. Disability is the result of negative interaction that takes place between a person with impairment and her or his social environment [Barrow, 2006]. However, this binary of impairment and disability is contested by Shakespeare [2006], who argues that it is often difficult to determine when impairment ends and disability starts. Long term illnesses such as Marfan syndrome may have clear parallels with a lived experience of disability, but in many ways they do not fit the standardized categories of disability. It seems that people with MFS are usually not physically disabled or handicapped in the general sense of these terms. The condition is rarely visible, and some symptoms such as chronic pain, fatigue and aortic problems have the potential to vary in intensity over time. Furthermore, it does not seem that, generally, those living with the condition experience physical barriers in terms of social integration, independent living, and family life [De Bie et al., 2004; Peters et al., 2001, 2002]. Mobility and cognitive ability seem unaffected [De Bie et al., 2004], and the condition seems to be more of a “different” rather than the “classical” disability. Despite this, most people with MFS have comprehensive health problems that may result in periodic or chronic disability. The Norwegian Marfan -Association is a member of the FFO, which is a National umbrella Organization for 75 disability-User Associations, but at the individual level people rarely identify themselves with being disabled. However, little attention has been paid within disability studies and disability-related policies and legislations to the fact that many people

experience fluctuations in impairment and episodes of wellness in the dilemma they face [Boyd, 2012; Lingson, 2008]. Terms such as “fluctuating” or “recurring condition” are increasingly used to conceptualize the liminal state between disability and non-disability [Jackson, 2005].

“Studies of the definition of disability are often seen as vague, malleable and interchangeable” [Oliver & Barnes, 1998:14]. Indeed, the relationship between chronic illness and disability has been long debated [Bury, 1991], with little consensus as to conceptual/actual boundaries between, and shared/divisive terminology. Studies with the two dimensions have often been described as “medical sociology” (sociology of chronic illness) versus disability studies [Thomas, 2007]. Thomas [2007] suggests that despite the continued bifurcation between the two areas, considerable potential for cross-pollination of ideas exists.

Similar to social work theories, the framework for conceptualizing disability falls into two broad general categories [Hall & Wilton, 2011; Hutchinson & Oltedal, 2014]. One group of models focuses on the individual view of disability (medical model of disability) in terms of individual differences, deficit or lack. This is in many ways similar to the individual case-work tradition in social work focusing on the client’s individual problem. From the traditional view within the individual paradigm of the medical model the most appropriate policy responses will be either to compensate disabled people for their perceived loss, to help them adjust through rehabilitation, or to provide alternative, less-valued social roles through segregated institutions [Hall & Wilton, 2011]. Critics argue that the individual view of disability is simplistic and incorrectly assumes that all illness has a single cause (disease) and that treating the disease will restore health; thus, it fails to take into account the personal and social dimensions of sickness and disability [Wade & Halligan, 2004]. The medical model has also been criticized for being dualist, following the Cartesian separation of mind and body and focusing on the soma; reductionist, assuming that complex biological phenomena can ultimately be reduced to simple physiochemical terms; and deterministic, claiming that the disease and therefore the illness are outside an individual’s control [Waddell, 2010]. The main weakness of the medical model is that it does not include the patient or his or her unique attributes and subjective experiences [Engel, 1980].

The other groups focus on society as the cause of the disability. According to Thomas [2012:218] “the social model of disability is not about disabled people themselves, nor their experiences of impairment or the use of agency; it is about the societal system, structures and practices that do not take account of people with impairment”. This de-medicalizing strategy is taken in two ways. Firstly, disability studies tries to re-interpret

disability as a political category. Disabled people are not defined mainly as a client category in the welfare state, but as a suppressed group [Malterud & Solvang, 2005]. Secondly, the field of disability studies point at the power of identification with otherness of being disabled. Being different is preferred to integration [Oliver, 1990]. According to the social model, management of disability requires social restructuring, and it is the collective responsibility of society at large. Disability, therefore, becomes a political rather than a medical issue [Priestley, Waddington & Bessozi, 2010].

Although the social model of disability was formulated elsewhere, social work has become closely identified with it particular when using conflict theories [Hertz & Johansen, 2011], and for many social workers, a commitment to it has become an integral part of their overall commitment to human rights, anti-discrimination practice and empowerment. There has been a body of social work research which sought to be explicit and emancipatory in the way in which it has dealt with health and disability issues, and the relationship between professional researchers and persons with disabilities [Butler & Puch, 2004].

According to Waddell [2010], both the medical and the social models fail to allow adequately for personal and psychological factors, and both imply that the disabled person is a passive victim and bears little responsibility for his or her. The main critique of the social model similar to the theory of critical social work has been directed at the explicit political ideology behind the theory, knowledge and action. Critical model can also become paternalistic “social worker knows the best” on behalf of the oppressed groups. The social movements, particular disability organizations have challenges social work`s focus on volunteer work and self-help groups by emphasizing experiences from lived life as especially important. Focusing solely on the societal framework for conceptualizing disability might actually limit people with disability in achieving their goals and potential [Rothman, 2010]. As Aguilar [1997] pointed out, a holistic view of health is critical for the enhancement of social work in health settings.

The person-in-environment framework in social work may serve as a conceptual bridge between the individual and societal model, focusing on the interaction between person and environment [Rothman, 2010; Saleeby, 1992]. Contextualizing the human in relation to their environment and emphasize that an individual can only be adequately understood in consideration the individual`s environment (social, political, temporal, spiritual, economic and physical) [Hutchinson & Oltedal, 2014]. The strengths perspective in social work [Rothman, 2010] is a continuation of this. It focuses on the application of individual and social strengths that can be utilized to create positive change for both the individual and society, and considers

abilities, resources, resilience, structures and institutions [Borst, 2009]. With regard to disability, the strengths perspective takes the view that disability is a source for growth as well as a source of impairment [Hiranandani, 2005]. Based on a more critical perspective, but closely related to the strength perspective are the foundational social work concept of empowerment and advocacy. It is often the tasks for social workers to assist individuals to develop a strong sense of identity, to facilitate the development of advocacy groups by encourage empowerment and facilitate access to societal goods. Raske [2005] suggested that both the strengths and empowerment framework are especially good social work practice models for working with people with impairment and disability.

2.2. Studies in social work and health

The huge amount of studies on disability and health in social work are mainly focused on either how social factors determents health problems or how the health problems influence psychosocial function and disability. Several studies have investigated the socially created inequalities caused by health, both at the population and individual level [Graham 2004] and these studies report a variety of health influences [Buijs & Olson, 2001; Courtwright, 2008; Craigh, Bejan & Muskat, 2013a; Fraser & Galinsky, 1997]. The most frequently cited social determinations of health are income distribution, early life experience, diversity and communication with health care services [Craigh et al., 2013a]. Studies shows that lower economical strata, unemployment, lower educational level, poor working conditions, social exclusions and social marginalization are significantly associated with the experience of adverse health outcome, higher rates of mortality and morbidity [Cockerham, 2014; Craig, & Muskat, 2013b]. Persons at the bottom of society are less able to control their lives, have fewer resources to cope with stress, live in more unhealthy situations, and cope with powerful constraints in choosing a healthy way of life [Cockerham, 2014]. Factors that may have negative influence on the outcome are often referred as “risk factors” while factors that may prevent these risk factors are often referred to as “protective factors” [Craigh et al., 2013a,2013b; Fiscella & Williams, 2004; Fraser, Jenson & Lewis,1993]. Availability and access to health services has been found to significantly reduce people`s mortality and may serve as a protective factor [Bloom, 2001]. However, social determinations of health have been inconsistently reported in the literature as they dually refer to the social factors determining health, but also to the processes and mechanisms contributing to their unequal distribution [Graham, 2004].

Other studies have investigated how health problems influence psychosocial function. Having impairments may involve a risk of health problems which in turn can cause challenges in psychosocial functioning and disability. Several studies of other diagnoses as HIV/Aids [Remien & Rabkin 2001; Remien & Mellins, 2007], Poststroke [Bergersen, Frøslie, Sunnerhagen & Schanke, 2010], Polio [Schanke et al., 2002], Klinefelter syndrome [Herlihy et al., 2011] and Duchene muscular dystrophy [Bushby et al., 2009] indicates that many people with diseases experience decreased quality of life, lower income, less integration in social activities, challenges in education and work and daily function.

Studies have also identified the mutual reinforcing [Frohlich, Ross & Richmond, 2006] and intersecting mechanisms [Hankivsky & Christoffersen, 2008] between bad health and social problems, both at the micro and macro levels. This indicates that the interplay between health and social aspects are complex and the causes are rarely linear.

2.3. Studies on rare disorders

Rare disorders are an important public health issue, both a medical and social issue. They are called health orphans, because rare diseases have been neglected for many years [Schieppati, Henter, Daina & Apena, 2008]. Research indicate that rare disorders are severe disabling, resulting in reduced quality of life, and affect an individual's potential for education and earning capacity [Schieppati et al., 2008]. In a study of Schieppati et al., [2008] patients with rare diseases had the worst experiences on terms of loss of social and economic opportunities and medical care, when compared with other not rare, but chronic diseases. Studies of people with rare disorders in Norway show that many people with disorder as osteogenesis imperfecta [Wekre, 2012], adults with short stature [Johansen, 2007] and congenital unilateral upper limb deficiencies (UULD) [Johansen, Østlie, Andersen & Rand-Hendriksen, 2016] experience decreased quality of life, challenges in work participation, higher degree of chronic pain and comprehensive health problems. Many experience barriers when trying to access health and social services related to the fact that the disorder is labeled "rare" [Grue 2008; Grut et al., 2008, 2013].

2.4. Former research on psychosocial aspect of Marfan syndrome

Although there are several studies on disability and health in social work and there are a well-known relationship between rare-diseases and psychosocial aspects, as shown above, the

research on psychosocial aspects of MFS was limited. Even though a thorough search for systematic reviews was conducted and experts within the field were contacted, it was still not possible to find, in the literature, systematic reviews exploring the psychosocial aspects of MFS in relation to work participation, family-life, quality of life and other aspects such as perceived health symptoms as chronic pain and fatigue.

After searching through relevant databases only four papers were identified dealing partly with work participation in people with MFS [De Bie et al., 2004; Peters et al., 2005; Fusar-Poli et al., 2008; Van Tongerloo et al., 1998]. All the papers indicated that education and work are challenging for people with MFS. It was found that approximately 60% of MFS-affected people were working full- or part-time [De Bie et al., 2004; Fusar-Poli et al., 2008; Peters et al., 2005], many had partners, and approximately half of the adult participants with MFS had children [De Bie et al., 2004; Peters et al., 2002].

When reviewing the literature, only five studies were identified addressing HRQoL in persons with MFS, and all found Van Tongerloo & De Paepe, 1998]. One large study with participants from seven European countries [De Bie et al., 2004] indicated that the average level of education among MFS-affected persons was high, but that their work participation decreased earlier than that of the general population. However, none of the studies identified factors that influenced work participation in persons with MFS, and no studies had used multiple regression analyses.

Only three papers [De Bie et al., 2004; Peters et al., 2002; Van Tongerloo & De Paepe, 1998] were found dealing with family-life in adults with MFS. These studies indicated that MFS had a negative influence on people's sexual relationship due to their body image [de Bie et al., 2004; Peters et al., 2005], that many are concerned of the risk that the offspring might inherit the genetic variant associated with MFS [Peters et al., 2002]. Despite these negative aspects, studies also indicated that most people with MFS live normal family life, many are married or have lower HRQoL when compared to the general population [Foran, Pyeritz, Dietz, & Sponseller, 2005; Fusar-Poli et al., 2008; Peters et al., 2002; Rand-Hendriksen et al., 2010; Verbraecken, Declerck, Van De Heyning, De Backer & Wouters, 2001]. Lower HRQoL findings have been associated with sleep complaints [Verbraecken et al., 2001], dural ectasia [Foran et al., 2005], being older [Rand-Hendriksen et al., 2010] being male [Fusar-Poli et al., 2008] and worrying about personal health and the risk of MFS affecting reproductive decision-making [Peters et al., 2002]. As far as known, prior to this current research project, there were no studies focused on satisfaction with life among persons with MFS.

Among all psychosocial aspects, pain was the issue with most focus. However, only one paper was dealing mainly with pain, the other only dealt partly with pain in MFS. Despite reported variations in the frequency, extent and type of pain in patients with MFS in the different studies, the results indicate that chronic pain in MFS is more prevalent than it is for the general population [Peters et al., 2001a; Nelson, Walega & McCarthy, 2015]. Further, the prevalence of fatigue in the MFS population is high [Percheron et al., 2007; Peters et al., 2001a; Rand-Hendriksen, Sørensen, Holmstrøm, Andersson & Finse, 2007; van Dijk, Boer, Mulder, van Monfrans & Wieling, 2008] and significantly correlated with orthostatic intolerance [van Dijk et al., 2008], and psychological distress (in women) [Rand-Hendriksen et al., 2007], as well as it heightens the perception of the severity of their condition [Peters et al., 2001a, 2001b]. None of the identified studies dealing with chronic pain in MFS or fatigue however, have used multiple regression analysis to investigate possible multifactor associations in relation to chronic pain and demographic variables, as well as specific MFS-related health problems and fatigue in MFS patients.

Even though a thorough search for systematic reviews was conducted and experts within the field were contacted, it was still not possible to find, in the literature, systematic reviews exploring the psychosocial aspects of MFS in relation to for example work participation, family-life, quality of life and other aspects such as perceived health symptoms as chronic pain and fatigue.

The study rational

To sum up, prior to the research that is reported here, studies of psychosocial aspects of MFS were limited in term of size and content. Little examinations of associations between different aspects of MFS were done, as well as no systematic reviews on the psychosocial aspects nor of chronic pain and fatigue in MFS were patients identified. There remained a need for more research on psychosocial aspects of MFS, and gaining overviews and summaries of the findings of relevant studies.

As mentioned earlier, psychosocial aspects of a diagnosis is central for research in social work. Based on clinical experiences, pertinent literature and literature of other patient groups we assumed that, perceived health problems, as chronic pain and fatigue, are associated with work participation and satisfaction with life in persons affected with MFS, as well as demographic factors such as family life and contact with health- and social services,

2.5. Conceptualizing of the main terms

2.5.1. Systematic review of literature

Systematic reviews play a crucial role in summarizing and synthesizing the knowledge pertaining to particular topics [Dijkers, 2009; Wright, Brand, Dunn & Spindler, 2007]. Social and health policies, health care providers, social services workers, consumers and researchers are deluged with an unmanageable amount of information, including data from social and health research. The growing literature on medical and social scientific research makes reviews indispensable. In the past decade, numerous changes in research methodology pertaining to reviewing of the literature have occurred [Denyer & Trandfield, 2012; Higgins & Green, 2011]. These changes necessitate that the authors of review articles familiar with current standards in the publication process. A review earns the adjective “systematic” if it is based on a clearly formulated question, identifies relevant studies, appraises their quality, summarizes the evidence and interprets the findings by use of explicit methodology [Khan, Kunz, Kleijnen & Antes, 2003]. A systematic review includes a detailed and comprehensive plan and search strategy derived a priori, with the goal of reducing bias by identifying, appraising and synthesizing all relevant studies on particular topics. There are different ways of doing systematic reviews. Some include meta-analyses of components and the use of statistical techniques [Higgins & Green, 2011; Khan, Kunz, Kleijnen & Antes, 2003] when doing reviews, while others may use mixed-method systematic reviews when examining both quantitative and qualitative research [Harden, 2010; Higgins & Green, 2011].

2.5.2. Work participation

The World Health Organization (WHO) International Classification of Functioning, Disability and Health (ICF) define participation as “involvement in life situations” [WHO, 2001, 2002]. Participation represents the societal perspective of functioning. One of the most important participant activities in adults in general is the involvement in productive work. Most societies expect people to work, and being employed is deemed to be a key indicator of personal identity and community integration in Western societies [Lidal, 2010]. Participation in work seems to be strongly related to better health and well-being and a higher degree of participation in social activities [Boman, Kjellberg, Danermark & Boman, 2015; Harder, Rash & Nelson, 2012; Lidal 2010; NSD, 2011, 2015]. Studies of people with physical disability indicate that people who work tend to experience less severe disability, less pain, less work-related fear avoidance and less job strain. Working and engaging in physical activity are

strong incentives that can lead to further participation in work and society [Harder et al., 2012; Hogan, Kyaw-Myint, Harris & Denronden, 2012].

To examine and compare work participation outcomes in people with MFS requires a careful approach, especially concerning the definition of “work-participation” or employment status. The prerequisites for obtaining a job, remaining in work, and ending work differ internationally and are influenced by the social policies of each country, including the disability compensation system, as well as the level of (un)employment. This underscores difficulties in comparing results within and between countries, because populations vary internally with respect to demographic characteristics as well as the levels and types of disability and differences in social policy.

2.5.3. Satisfaction with Life

An important aspect of social work is to help the patients increase the quality of life, and identify aspects of their life that may influence their life satisfaction. In the beginning of 1960`s life satisfaction and people`s well-being became a big topic of discussion in research. Life satisfaction and people`s well-being were originally thought to be measured objectively and externally, but it has become evident that these concepts gain greater precision when they are measured subjectively rather than objectively [Positive Psychology Program 2016].

The structure of subjective well-being has been conceptualized as consisting of two major components; the emotional/affective and the judgmental/cognitive [Diener, Emmons, Larson & Griffin, 1985]. The judgmental/cognitive component has been conceptualized as “satisfaction with life” (SWL) and represent a self-evaluative judgment of one`s life; based on positive psychology and the philosophy that quality of life should be assessed by subjective perception [Diener, Osihi & Lucas, 2003; Pavot, Diener, Colvin & Sandvik, 1991; Pavot & Diener, 2008; Strine et al., 2009]. The concept of satisfaction with life is complex involving a judgmental process, in which individuals assess the quality of their lives resulting from the evaluation of various areas of everyday living and life in general. Although, there may be some agreement about the components of what is the “good life”, such as health and relationships, people are likely to assign different weights to these components [Diener, Inglehart & Tail, 2013]. Therefore, SWL studies emphasize an individual`s global judgment rather than satisfaction with specific domains, allowing respondents to weight domains of their life in terms of their own values, in arriving at an overall or global judgment of their level of satisfaction with life. At the same time, it should be recognized that assessing

respondents' satisfaction with common domains also provides useful additional information [Pavot & Diener 1993].

Studies of the general population show that several factors influence the experience of satisfaction with life. These include health, family situation, work participation, financial situation [Bowling, 1995; Bowling & Winsdor 2001; Tesch-Romer, Motel-Klingebiel & Kondratowitz, 2003], relationships, autonomy, purpose in life, and personal growth [Diener et al. 1985, 2013; Loewe, Bagherzadeh, Araya-Castillo, Thieme & Bastista-Fouquet, 2014].

The concept of satisfaction with life is related to the concept of Health Related Quality of Life (HRQoL), which mainly focuses on the quality-of-life consequences of health status. This concept includes domains related to physical, mental, emotional, and social functioning. Whereas the items in many HRQoL are based in how people relate to their health and measure physical, as well as mental HRQoL. SWL measures are based in how people feel healthy or satisfied. Individuals who report a low quality of life due to a chronic disease leading to, or verging on disability, may at the same time also report high satisfaction with life because they cope with their lives, are well-educated, able to work, and/or are socially active [Bowling et al., 2001; Pavot & Diener, 2008].

2.5.4. Chronic pain

Chronic pain is a multifaceted concept that covers both physiological and psychosocial aspects [Chapman & Gavrin, 1999; Chapman, Tuckett & Song, 2008], and its definition is still unclear [Geertzen, Van Wilgen, Schrier & Dijkstra, 2006]. One common definition is “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage, lasting more than 12 weeks” [Chapman & Gavrin, 1999:1]. Another definition is “pain without apparent biological value that has persisted beyond the normal tissue healing time” [International Association of Pain 1986, 2015]. In a massive European study one finds that the prevalence of chronic pain in Norway (30%) is one of the highest in Europe, where the average level of chronic pain in European adults is 19% [Breivik, Collett, Venafriidda, Cohen & Gallacher, 2006]. Currently, there are no reasonable explanations for why the prevalence of chronic pain in Norway is so high; nor is it clear why there is a much higher rate compared with neighboring countries to the east and south where the prevalence of chronic pain ranges from 16 % to 19 % [Breivik et al., 2006]. The prevalence of chronic pain in Norway also varies in different studies [NIPH, 2015]. The results of the extensive Hunt Survey, from Nord-Trøndelag showed that 45 % of the general population suffers from musculoskeletal pain [Svebak, Hagen & Zwart, 2006]. The main

reason for the variations observed in the results from the studies of Breivik et al., [2006] and Svebak et al., [2006] might arise from different definitions of chronic pain, and the use of different measurements, methods and sample groups. Despite the discrepancies in these studies, both indicate a high incidence of chronic pain in Norway.

In the general population, chronic pain is associated with being female, being older, having less education, receiving a disability pension, suffering from psychological distress, being prone to chronic illness and low physical activity [Breivik et al., 2006; Ojala et al., 2015; Sveback et al., 2006]. Studies indicate that chronic pain interferes with coping, optimal participation, sexuality, work capacity, social relations and economy [Blyth, 2008; Latham & Davis, 1994; Ojala et al., 2015; Sofaer & Walker, 1994; Trilok et al., 1998]. Studies among other patient groups and the general population emphasize that chronic pain tends to create a cluster of problems such as chronic fatigue, sleep disturbance, withdrawal from activity, reduced sexual activity, compromised immune function and mood disorders [Blyth, 2008; Ojala et al., 2015; Trilok et al., 1998]. Further, chronic pain is one of the main causes for sick-leave and disability pensions in Norway [NIPH, 2015]. In the HUNT-survey by Svebak et al., [2006], one out of every four people reported sick leave during the year preceding the study, due to chronic pain. The study by Svebak et al., [2006] demonstrated that chronic pain is an important reason for work disability and reduced leisure activity.

2.5.5. Fatigue

Fatigue is a multifaceted concept covering physiological and psychological features of human life. There appears to be no consensus in terms of defining fatigue. It is often described as an “overwhelming sense of tiredness, lack of energy and feeling of exhaustion, mental, physical or both” [Dittner, Wessely & Brown, 2004]. Another commonly used definition is “a subjective lack of physical and/or mental energy that is perceived by the individual to interfere with usual and desired activities” [Loge, Ekeberg & Kaasa, 1998]. A model conceptualizing fatigue suggests three different segments of fatigue: *Tiredness*, *Fatigue*, and *Exhaustion* [Olson, 2007]. *Tiredness* is characterized by forgetfulness, impatience, gradual weakening of muscles and sleepiness improved after rest. *Fatigue* is characterized by concentration problems, anxiety, gradually reduced endurance unrelated to energy consumption, increased sensitivity, nausea and diarrhea, and limited activity levels for activities regarded as important. *Exhaustion* is characterized by confusion that resembles delirium, emotional numbness, sudden loss of energy, difficulty staying awake, difficulty controlling body functions and social withdrawal [Olson, 2007].

Fatigue is a relatively common problem in the general population, but estimates of its prevalence vary from 7 % to 42 % [Lewis & Wesley, 1992]. Approximately 22 % [Loge et al., 1998] to 23 % [Lerdal, Wahl, Rustøen, Hanestad & Moum, 2005] of the general Norwegian population report substantial fatigue lasting more than six months. Fatigue is also reported as a common symptom of other diseases, and has a negative impact on people`s ability to function in daily life [Dittner et al., 2004; Lerdal et al., 2005; Lerdal, 2009; Pawlikowska et al., 1994; Rhodes , Watson & Hanson,1988].

3. THEORETICAL FRAMEWORK

3.1. Meta-theoretical framework- critical realism

Although method and design are important, it is also important to reflect on the assumptions about reality, particularly as these pertain to methodology [Clark, Lissel & Davis, 2008]. The ontology and epistemology that are chosen may be guidelines when approaching the real world in order to do science [Bhaskar & Danermark, 2006]. The branch of philosophy that has inspired this thesis is critical realism due to that this research project was interdisciplinary, included user-participations and focus group as part of the pilot study and preparation for the main study with quantitative approach and systematic reviews. Critical realism is very inclusive in terms of methods, is intrinsically supporting of interdisciplinarity and enables the possibility of integrating different perspectives and theories [Clark et al., 2008; Danermark, Ekstrøm, Jackobsen & Karlsson, 2005].

Critical realism is, by philosophical standards, a relatively new approach to ontological, epistemological and axiological issues [Easton, 2010]. In some ways it is diametrically opposed to positivism and social constructivism, but it also seeks to include and transcend the contradictions between these different views. It shares the perspective with empiricism that there is a reality independent of our thinking about it, a reality that science can study, in contrast to some forms of constructivism, who hold that there is no external reality; “we`re each making it all” [Houston, 2005:9]. According to critical realism, the bodily dysfunction for example produces impairment, but influence disability and is not merely a social construction. Although disability is a complex phenomenon which is in part caused by socio-cultural attitudes, reducing it to just these set of structures ignores the important bio-physical element which cause the physical impairment [Owens, 2011]. For example, the physical impairment as aorta dissection and visual problems, skeletal problems, experienced by people with MFS in our study are not merely a part of their narrative or a function of their cultural beliefs about them, but are realities that have impact on their daily function, whether or not this is acknowledged.

In accordance with social constructivism, critical realisms claims that our perceptions is influenced by circumstances beyond the real², “our knowledge of the reality is filtered by

² Social constructivism is a huge field, much more extensive than can be equated with the extreme form of post-modernism, so it may be important to nuance this. The life challenges of Marfan sufferers have bodily, physiological reality that is beyond “society”, but this is understood or misunderstood by socially constructed communities of practioners and researchers and policymakers. The challenge is to take account of both aspects, to both the medical and the social context in which the medical reality is lodged

language, meaning-making and social context” [Craig & Bigby, 2015:312], but not so far that our perception of reality is all socially determined. Taking the middle ground, critical realism views physical and social entities as having an independent existence, irrespective of human knowledge or understanding [Clark et al., 2008]. Since a real world exists critical realism holds that some theories approximate reality better than others and that there are rational ways to assess claims to knowledge [Bygestad & Munkvold, 2011a, 2011b].

In critical realism, reality is stratified into three domains (levels of understanding). These include the empirical (fallible human perception and experiences, including science), the actual (events and actions that are more likely to be observed) and the real (underlying power, tendencies, those mechanisms that are productive of different events and other surface phenomena) [Alvesson, 2009; Bhaskar, 1998]. According to critical realism the task of science is to explore the realm of *the real* (mechanism) and how it relates to the other domains.

In this study, we have conducted descriptive research, and according to critical realism descriptive research can sometimes reveal patterns of behavior and social outcome. These patterns invite effort to find causal relationships or social mechanisms that could explain the empirical findings, but we can hardly draw any conclusions of causal nature from our analyses. Thus, it can provide vital descriptive information, which may be useful as support in discussions about causal power [Danermark et al., 2005]. According to Sayer [1992, 2000, 2004], the best explanations are those identified as having the greatest explanatory power. From the viewpoint of critical realism, mechanisms are viewed as features of something that have the potential power to effect a change. The causality is rarely linear, but more viewed as a product of many factors coming together in certain combinations and given the right circumstances or context to causally generate new events. To explain and understand why phenomena occur, research therefore needs to go beyond the surface of observable factors (the actual) to explore what happens underneath (the real). To ask for the cause of something is to say “what makes it happen; what “produces”, “creates”, “enables” or “leads” it [Sayer, 1992:104]. Sayer [1992:104] also argues “particular interpretations can only be justified in terms of their compatibility with our most reliable beliefs”. Put in another way, interpretations rely on assumptions, which together with other assumptions create a system of thinking about the world that we find acceptable [Easton, 2010]. Researchers have to be open to the fact that their explanations must be not only being acceptable to the scientific and wider community, but also changeable.

In general, there are many factors that may influence the lives of people with MFS. At the biological level, finding the correct diagnosis of MFS is important. Knowledge of organ pathology is necessary for monitoring, surgery and medical services. Findings from research focused on other hereditary diseases have shown that psychological mechanisms such as stress, anxiety and depression are involved when persons are living with severe life-threatening diseases, especially diseases that can be inherited by their children [Geirdal, Dheyauldeen, Harildstad & Heimdal, 2013]. Having chronic pain and fatigue may also cause negative impact on people's psychological wellbeing and their functioning in everyday life. At the social level, there are several mechanisms connected to living with a severe potentially disabling disease [Danermark, 2001]. Inevitably, this is a complex task because of the range and combined effects of these mechanisms. Some will operate at the individual level, personal level, whilst others are at the societal level. Furthermore, people also have the capacity to transform their situation. In other words, the effects of these mechanisms will be mediated through people's day-to-day actions. This is the main reason for that we must abandon any ideas that social work can predict events. Our formulation will necessarily be tentative, probabilistic, cautions and refused over time [Houston, 2001, 2005]

Critical realism emphasizes that mechanisms function at different levels, and only by examining the different levels, mechanisms and contexts, can a well-rounded and comprehensive view of psychosocial aspects of MFS as a phenomenon be laid out. In medical social work also the biological and physiological levels plays an important role, in addition to the others. By identifying structures and mechanisms, it is possible to critically analyze and illuminate how they work and how they can be changed [Bhaskar & Danermark, 2006; Danermark & Gellerstedt, 2004]. Critical realism thereby may have a creative and emancipatory function, which is always an important goal of social work [IFSW 2016].

Following a model based on Danermark & Gellerstedt [2004], we have tried to illustrate some relevant analytical levels in research pertaining to Marfan syndrome in the context of work participation (Table 1).

Table 1 Analytical levels in Marfan syndrome research

<i>Levels</i>	<i>Examples of mechanisms</i>	<i>Examples of context</i>	<i>Examples from a particular context: a specific work site</i>	<i>Examples of negative outcomes</i>
<i>Culture</i>	<i>Negative evaluation of characteristics</i>	<i>Law, institutional Structures</i>	<i>Employment procedures</i>	<i>Exclusion, denigration</i>
<i>Socio-economic</i>	<i>Profit, exploitation</i>	<i>Labor market</i>	<i>Organization of work task</i>	<i>Unemployment Early retirement</i>
<i>Psychosocial</i>	<i>Relation-to-self</i>	<i>Social interaction</i>	<i>Relation in work team</i>	<i>Lack of self-esteem</i>
<i>Psychological</i>	<i>Feeling of pride, shame, anxiety</i>	<i>Perform heavy physical or sedentary tasks</i>	<i>Requirement of efficiency, regularity and continuity</i>	<i>Withdrawal or additional work on leisure time</i>
<i>Biological</i>	<i>Genetic factors</i>	<i>Physically or psychologically demanding surroundings</i>	<i>Heavy work, intense work session Recurring absence from work due to surgery, fatigue.</i>	<i>Aorta dilation/dissection. Visual problems Musculoskeletal problems</i>

3.2. Middle range theories

Theorizing is an integral part of the research process and theories may serve as a guiding framework for interpretations [Danermark et al., 2005]. In line with the ontological and epistemological perspective, as mentioned above, some theories approximate reality better than others. Combining multiple theories generally yields a more complete picture of complex empirical phenomena [Modell, 2015; Zahirul, Mark, Covaleski & Gooneratne, 2015]. The limitations of a particular theory could be addressed by bringing insights from another theory. This implies the need for theoretical pluralism rather than choosing a single theory [Modell, 2015; Zahirul et al., 2015]. In this research project, in addition to three foundational social work frameworks mention earlier (person-in-environment, strengths- and empowerment perspective), the “bio-psycho-social-cultural model”, the symptom management theory and the shifting model of illness are relevant to promote a broader and deeper understanding of the outcomes from this study.

3.2.1. The biopsychosocial theory and model

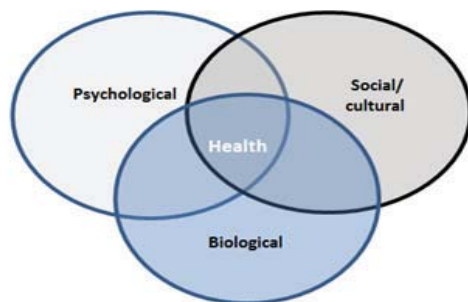


Fig. 2 show how biological, psychological, and socio/cultural factors overlap to determine overall health.

As mention above both the medical and the social models of disability reflect a particular perspective on sickness and disability; all have validity, but each provides only a partial view of human illness [Waddall, 2010; Waddal et al., 2008]. Tom Shakespeare [2006, 2013] argues that the social model theory has reached a dead end. He emphasises that the dichotomies involve a dangerous polarization of a medical model versus a social model of impairment versus disability and ability and versus disabled people non-disabled people [Shakespeare, 2013]. Neither of these models explains how individuals behave differently with similar health problems, health care, social, and work contexts [Waddell, 2010].

A third model is he biopsychosocial model of disability, developed and introduced by Engel [Engel, 1977, 1980]. The biopsychosocial model (BPS-model) may serve as a complementary theory for understanding of “the person-in-the-environment and how the different levels according to critical realism interact in a context of multiplicity of mechanisms. Engel used the system theory of Bertalanffy [1969] as an organizing framework for the BPS-model. Bertalanffy [1969] emphasizes that modern science must think in terms of systems of elements that are in mutual interaction, and that the one-way causality approach has proven to be insufficient. Weiss [1977] argued that system theory is best understood as the logical ordering of nature into more and more complex systems.

Each level or system of an organism (e.g. genes, cells, tissues, organs, nervous system, person, family, community and culture) is part of a more complex unit.

Here, biological functioning, psychological functioning, and sociocultural functioning are related. Engel, [1977, 1980] argued that the biomedical aspect is important, but how people perceive and communicate



Fig 3: <https://www.urmc.rochester.edu/medialibraries/urmcmedia/education/md/documents/biopsychosocial-model-approach.pdf>

their symptoms is influenced by psychological and social/cultural factors. This is in accordance with critical realisms which emphasize that disability is neither the sole product of the impaired body (personal tragedy) nor a social oppressive society. “Disability is best seen as a dynamic, dialectically unfolding process between body and society, located within a temporal frame of references (both historical and biographical)” [Williams, 1999:813]. Thus, in trying to understand and treat patients effectively, it is important to deal with all these aspects of people`s lives in addition to the biological variables. In addition, psychological and social factors may be decisive for understanding how persons with “biochemical abnormality” view themselves and their lives.

This is clearly recognizable in the case of genetic diseases such as MFS. The genetic defection is congenital, but, over time, the symptoms may develop in diverse ways. For example, following acute aortic surgery the medical condition of MFS might be stabilized, but there is a persistent risk of further aorta dilatation and other medical complications. The implications of this for the person with MFS, are that the patient must comply with physical restrictions on their daily lives, as well as regimes of medication. Many also experience changes in identity and roles within their family and work lives. For those diagnoses with an inherited diagnosis like MFS, this can cause additional psychological stress because the person with MFS may be worried about their own and their family members health. Such situations clearly involve major biological, psychological and social-cultural consequences.

Similarly, and like the field of critical realism, the biopsychosocial model relies upon the concepts of transaction and reciprocal causality [Borrell-Carrió, Suchman & Epstein, 2004; Lesser & Pope, 2011]. The term transaction refers to a process of acting and reacting between systems; as a constant inter-systemic exchange where each system shapes and influence other systems over time. This process of mutual influence is referred to as reciprocal causality, and the relationship between any two systems also includes the person and his/hers environment [Lesser & Pope, 2011]. This is similar to the framework of “the person-in-the-environment” in psychosocial perspective in social work [Hollis & Woods, 1981; Hutchinson & Oltedal, 2014]. In medical social work the client`s physical health is important and ought not to be neglected in social studies [Hollis & Woods, 1981:372]. The biopsychosocial perspective should therefore be a foundation for social work theory and practice [Garland, 2009].

This research project is interdisciplinary and communication between, and integration across, disciplines was necessary. Using the BPS-model might serve as a means for creating a bridge between the social and biological sciences. Interdisciplinary research may also serve as an attempt to understand complex, recursive and emergent properties of mechanisms and to find interrelated reciprocal and proximal causes that might be involved. There are great challenges of using a complexity theory as the BPS-model in an open system as in our study, unlike in a controlled laboratory system; it is impossible to know all the contributing factors involved in particular social-and health outcomes. Due to the complexity of the model and the requirement for a large data set with multiple variables, empirical testing will be difficult. Only some of the black boxes of the phenomena that are studied can be illuminated.

3.2.2. The Revised Symptom Management Model

The Symptom Management (TSM) model [Dodd et al., 2001; Larson et al., 1994] may serve as further expansion of critical realism and the biopsychosocial model. This model gives deeper understanding of how the perceived symptoms may interact with other aspects of people`s lives. The model frames symptom experiences. Having MFS may involve a number of symptoms for individuals and their families. Symptoms not only create distress, but also disrupt social functioning. The TSM model allows the researcher to have an expansive view of the multitude of symptom-related variables and it also provides the researcher with possibilities for understanding different symptoms such as chronic pain and fatigue and their consequences for daily life.

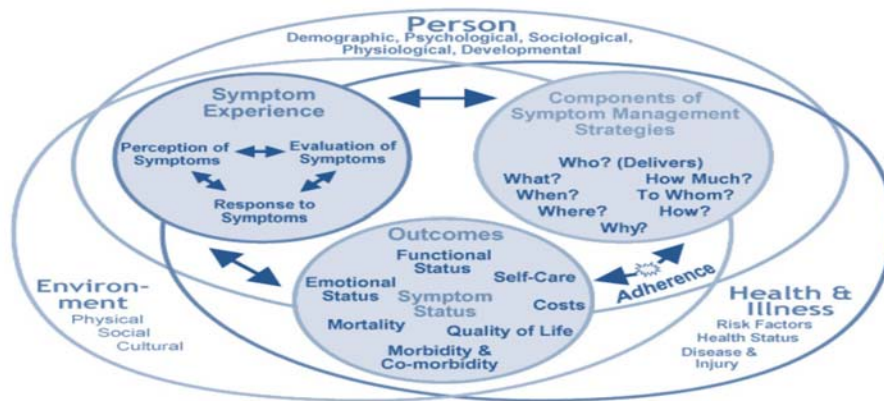


Figure 4. *The Revised Symptom Management Model (Larson et al., 1994; Dodd et al., 2001; Research Centre for Symptom Management 2006)*

As shown in Figure 4, three dimensions underlie the theory's foundation: the symptom experience, symptom management strategies and symptom outcome. Symptom experiences includes three inter-related concepts, namely the patient's perception of the symptom, personal evaluation and responses [Dodd et al., 2001; Humphreys et al., 2008]. This also includes intrinsic contextual concepts that underlie the symptom experience, such as personal, health-related and environmental factors. It emphasizes that these contextual variables influence the dynamic process of the symptom experience, its management strategies and outcome. The theory also shows how symptoms may be interrelated, interactive or contribute to the development of other symptoms expressed through psychological, behavioural and social cultural means [Brant, Beck & Miakowski, 2010]. In this study, two of the dimensions of the symptom management model are of interest: Symptom experiences: How do people experience chronic pain and fatigue; and what is the prevalence of these symptoms in the study group? Outcomes are the consequences of chronic pain and fatigue in daily life. In this study we chose education, work participation and satisfaction with life as relevant aspects of the outcome dimension. Demographical factors as gender, age, family status are part of the person domain.

3.2.3. The Shifting Perspective Model of Chronic Illness

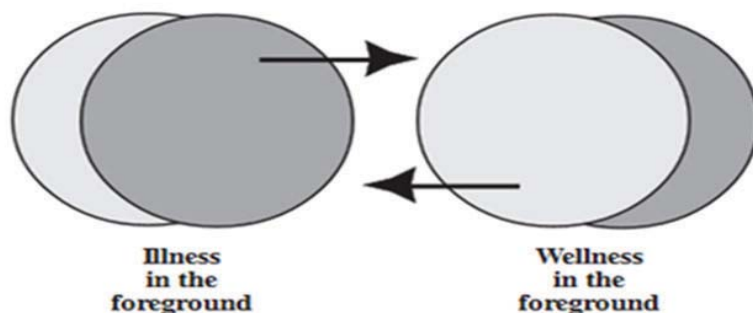


Fig. 5 The Shifting Perspective Model of Chronic illness

Both critical realism, BPS-model and the symptom management model emphasize how different levels and mechanisms interact in association to having a disease, but none of these perspectives take in account that living with a disease (chronic illness) is an on-going continually shifting process in which people experience a complex dialectic between themselves and the world. In Figure 5, perspectives of chronic illness are illustrated in the schematic representation of Shifting Perspective Model as illness in the foreground or wellness in the foreground of Paterson [2001]. This model emphasizes that living with a chronic illness is a continuous and shifting process in which the perspectives of the patients and their relatives perspectives constantly alternates between having the disease in focus and having the healthy life in forefront in order to make sense of one`s world at the time [Paterson, 2001]. It is like living in a dual world of sick and well; for the researcher it is important to take in account that in some periods the disease constitutes only a small part of people`s lives and in other periods it is in the forefront. People with MFS diagnosis, will probably after receiving the diagnosis or after an aortic surgery become overwhelmed by the disease. In other periods, the healthy life will be in focus. The model also identifies the fluctuating nature of perceived health symptoms as chronic pain and fatigue. It provides a frame for better understanding of how the changing nature of the perceived symptoms can make it difficult to compete and participate in a labour-market that requires continuity and reliability. According to this model there are many factors in people`s lives and surroundings that are competing for attention. A shift in the perspective of illness is not necessary caused by changes in the illness; additional factors such as social context and life events also influence the perspective of chronic illness. Losing a job, a divorce or family problems are factors that can also contribute to the changes of people`s perspective on illness. This model emphasize that the “perspective of illness” is complex and it may be viewed as a product of

many factors coming together in a certain combination; given the right circumstances, the person`s perspective of illness may change. By using this model, it is possible to reframe different aspects of the illness, which in turn can contribute to better understanding of the psychosocial challenges of having a disease and how they manage to live with the disease.

4. METHODOLOGY

The papers incorporated into this thesis used the following methods:

1. Two papers followed a systematic review approach. The first paper reviewed pertinent studies of the psychosocial aspects of living with MFS [Paper I] and the other paper reviewed pertinent studies of chronic pain in MFS [Paper II].
2. Four papers (Papers III-VI) had a cross sectional quantitative design that investigated work participation, satisfaction with life, chronic pain and fatigue in adults with MFS. A pilot study using focus groups was conducted prior to the cross sectional part of the research project.

4.1 Systematic reviews (Papers I-II)

The two systematic reviews were conducted using the recommendations for systematic reviews [Center for Reviews and Disseminations, 2009; Mertens, 2011; Nordic Campbell Center, 2014], PRISMA 27 checklist for systematic reviews [2015] and quality assessments different type of studies [Curtin & Fossey, 2007; Fowkes & Fulton, 1991; Greenhalgh, 1997a, 1997b; Hennekens & Buring, 1997; Pluye, Gagnon, Griffiths & Johnson-Lafleur, 2009; Pluye, 2013; Scharalda, Leonard & Jack, 2010].

In Paper I, a preliminary conceptual model was prepared to illustrate how health related factors may interact in with other life aspect of patients with MFS (Fig. 1). In Paper II a similar preliminary conceptual model was created to illustrate how different bodily aspects and psychosocial aspects may be associated with chronic pain in people with MFS (Fig.10). For both papers systematic searches were conducted using the available medical, psychological, pedagogical and social databases and other sources. In Paper I, the key term Marfan Syndrome was cross-indexed with function, daily life, quality of life, family life, sexuality, fatigue, employment, vocational, education, psychological distress, depression, anxiety, etc. In Paper II the key terms Marfan Syndrome and pain were cross-indexed with different types of pain, other medical/physical aspects of MFS and demographic characteristics.

Only peer-reviewed papers that were published in English, German or the Scandinavian languages were included. No articles were excluded on the basis of age, gender or ethnicity. Studies that included individuals with other genetic connective tissue disorders, such as Ehlers–Danlos Syndrome and Loeys–Dietz Syndrome and other aortic disorders were

excluded whenever the sub sample of MFS could not be identified. Unpublished data were not included. Case-report studies with three or fewer participants [Paper I] and five or fewer participants [Paper II] were excluded, respectively. Relevant references were checked for duplications and adherence to the above-mentioned inclusion criteria. Articles that seemed relevant were read more thoroughly to assess their suitability for inclusion into the review.

Each of the papers that met the inclusion criteria was critically appraised (CRD, 2009; Jack et al., 2010; Pluye et al., 2009; Scharalda et al., 2010), using seven³ standardized criteria for the quantitative studies (Jack et al., 2010). In Paper I, six standardized criteria for the qualitative studies (Scharalda et al., 2010) were included, due to that a mixed-method systematic review approach was used. In Paper II, the reviewed papers were categorized into three different categories: (1) mainly dealing with pain, (2) partly dealing with pain and (3) minor focus on pain; depending on how much the papers addressed pain in patients with MFS. This was done because the main purpose of most of the included studies was to investigate aspects of MFS other than pain. In addition, we included a question about “how much the results from the study contributed new knowledge about chronic pain in MFS (see Table 3).

In Paper I, two reviewers, in cooperation with a librarian conducted the searches. In Paper II, all four authors were involved in the searches. Two reviewers independently reviewed the abstracts and articles, and the third and fourth reviewer assessed and verified the articles inclusion or exclusion based on the eligibility criteria. A thematic analysis was conducted in order to structure and depict all the variables involved in the reviewed studies [Mertens, 2011; Pluye et al., 2009]. Using a matrix, the key features were summarized of the large body of data and the relationship among variables, different levels and groups of variables (main-/sub-variables), were organized. The results were reviewed and compared across the included studies to reveal and discuss the degree of concordance and discrepancy between the findings. Finally, the content of the results of the articles, both in Paper I and Paper II, were synthesized in five categories.

³ Question 5 dealing with “blindness” was omitted. The reason was that no articles with intervention studies were identified as relevant for inclusion in the review.

4.2. Cross-sectional design (Paper III-VI)

The cross-sectional part of the research project aimed to examine work participation, satisfaction with life, chronic pain and fatigue in adults with MFS.

4.2.1. User-participation

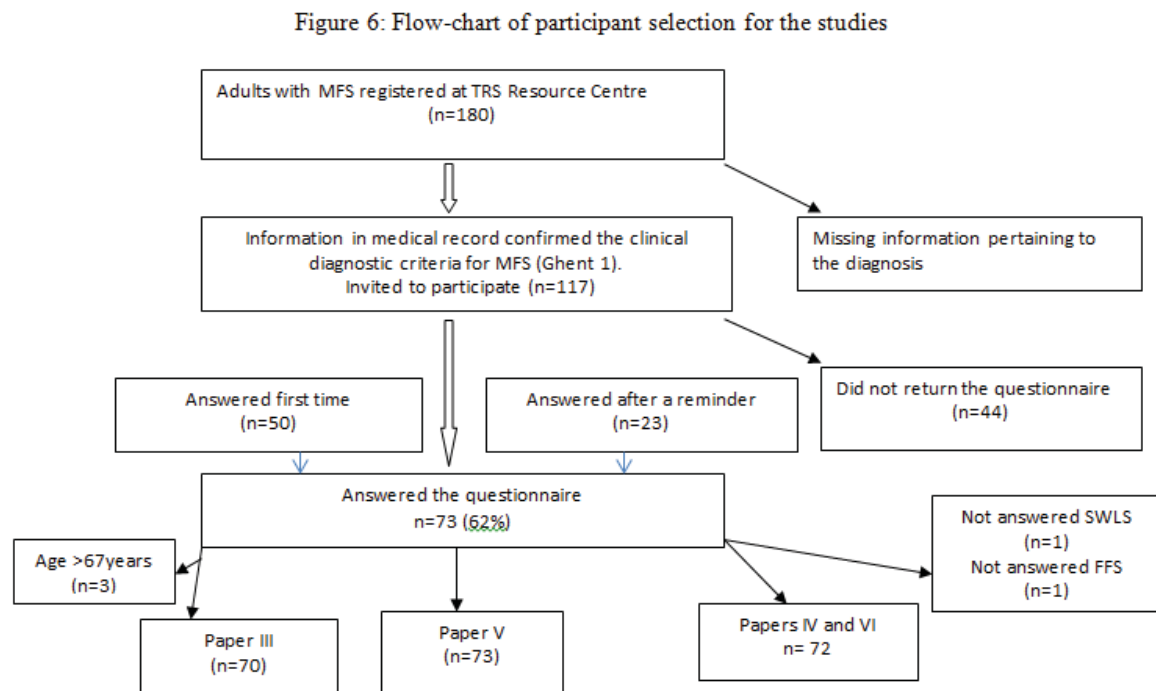
The cross sectional part of the project was developed in collaboration with the Marfan Association of Norway. The issues and relevance of the study had been discussed in meetings and emails with the leaders of this association. A reference group with five adults afflicted with MFS was established for a more systematic and regular cooperation. The reference group was involved in the discussions about the relevance of the study, the content of the questionnaire, the selection of standardized assessment tools and dissemination of some of the results. Three meetings and several email exchanges were conducted.

4.2.2. Focus group discussion and pilot study

The relevance, content, and purpose of the study were discussed in two focus group interviews. The participants consisted of nine adults with MFS and three adult relatives (different ages and genders). The members of the focus group tested individually a draft questionnaire, and then discussed the questionnaire in the focus group. They gave feedback on their experiences; they completed the questionnaire, addressed the rationale and relevance of the issues, and the design and formulation of the questions. Feedback and proposed amendments were considered when the final version of the questionnaire was completed.

4.2.3. Study population

The selection process for the participants of the cross-sectional part of the study is illustrated in a flow-chart of Figure 6.



In 2010 all the medical records of patients registered with MFS at TRS National Resource Centre for Rare Disorders in Norway, aged 20 years and above (n=180) were examined (see Fig. 6). Patients fulfilling the Ghent 1 criteria (the available criteria at that time) (n=117) were invited to participate using a written invitation that included the questionnaire and an unsigned Informed Consent form. The major diagnostic signs of Ghent 1 involve the cardiovascular, ocular and skeletal systems, as well as the dura mater, family history and genetics (*FBN1* mutation). The diagnostic procedures are described in a former study [Rand-Hendriksen, 2010b]. After 6 weeks, patients who had not responded received a reminder with a new copy of the questionnaire. Seventy-three people returned the questionnaires along with a signed informed consent form (response rate of 62%). For Paper III, only participants between 20 to 67 years old were included (n=70), because the normal working age in Norway is between 20 and 67 years. For Papers IV and VI (n=72), one person was omitted, due to missing information on key instruments (see Table 2). For Paper V, all participants (n=73) were included.

4.2.4. Variables and questionnaires used in the survey

A study-specific questionnaire (including questions about demographic characteristics, SWL, contact with health and social services, MFS-related health problems, chronic pain, fatigue), was designed. No standardized measurement about MFS-related health problems was found, so questions about these issues were prepared on the basis of clinical experience and research knowledge [Rand-Hendriksen et al., 2010, Rand-Hendriksen, 2010]. Demographical questions (age, gender, education, married/partner, children, contact with health-and social services etc.) were based on similar studies of other rare disorders [Johansen, 2007; Wekre, 2012], other questions were taken from the Norwegian Hunt Survey [Hunt, 2010] and the Norwegian Labor Force Study [2010].

Work participation

Questions from the Norwegian Labor Force Study [2010] were used to measure work participation, including questions about present employment status (whether the respondent was a student, working full time, working part time (%), on a disability pension (%), a rehabilitation pension/AAP, homeworking, or in another category (describe)); occupation (respondent's profession [describe]), and age of withdrawal from work. In addition, several questions about work challenges and adaptations were included (see questionnaire - questions 8.3-8.9 and 9.6-9.10). Work participation was categorized as follows: employed (paid work), student, rehabilitation pension, and disability pension. The variables were dichotomized into two groups (see Chapter 4.2.5). To obtain information about the study group, different experiences of education and work participation were elicited by forming specific questions for people who were working, retired and studying. For people who were working, there were ten separate questions regarding their current work situation. Questions were posed concerning occupation, type of work, accommodations or need for special accommodations in the work place, the influence of MFS-related health problems in work participation, recognition of their health problems at the work place, etc. For participants who were retired (not working or students), ten separate questions were used to obtain information about their previous work situation. Questions dealt with their previous occupations, the influence of the MFS-health problems on their previous work participation, their experiences with accommodations at the work place, their desires about returning to the job again, etc. Eight questions were directed to students, about their educational situation such as type of education, vocational counseling, accommodations in the study situation, sick-leave due to MFS-related health problems, etc.

Satisfaction with Life

Satisfaction with life was appraised with Satisfaction with Life Scale (SWLS) [Diener et al., 1985; Pavot & Diener, 2008], a five-item questionnaire for self-rated assessment of subjective well-being [Pavot & Diener, 1993]. Each item is answered using a Likert scale ranging from “strongly disagree” to “strongly agree” with corresponding scores ranging from 1–7. The total sum score ranged from 5–35. Total scores are categorized as: Extremely satisfied (30–35), highly satisfied (25–29), on average satisfied (20–24), slightly satisfied (15–19), dissatisfied (10–14), and extremely dissatisfied (5–9) [Pavot & Diener, 1993]. To evaluate the level of satisfaction with life among MFS patients, the mean SWLS scores for the study group were compared with the previously reported mean SWLS scores from a study of the general Norwegian population [NSD- EU-SILC., 2009; Bang Nes & Clench-Aas, 2011] and the mean SWLS scores from previous published studies of patient groups with other chronic diseases such as multiple sclerosis (MS) [Lucas-Carrasco, Sastre-Garriga, Galàn, Den Oudsten & Power, 2014a], Tourette Syndrome [Sætre, 2007], systemic lupus erythematosus (SLE) [Kulczycka, Sysa-Jedrzcjowska & Robak, 2010], psychiatric disorder defined by DSM-IV [Meyer, Rumph, Hapke & John, 2004], and Parkinson’s disease [Lucas-Carrasco, Den Oudsten, Eser & power, 2014b]. The study of the Tourette Syndrome population included the Norwegian population, the other studies used participants from different European countries. The psychometric properties of the SWLS have been examined in different clinical and nonclinical samples. The scale is reliable, has high internal consistency, and is capable of discriminating between groups with presumed different subjective well-being levels [Pavot et al., 1991; Vassar, 2008; Viren & Chamorro-Premuzic, 2009]; it is suitable for cross-cultural use [Loewe et al., 2014; Luca-Carrasco & Salvador-Carulla, 2012; Pavot et al., 1991] and is validated for Norwegian culture translation [Clench-Aas, Bang-Nes, Dalgard & Aarø, 2011].

Chronic pain

Chronic pain was assessed with the validated Standardized Nordic Questionnaire (SNQ) [Kuorinka et al., 1987; Svebak et al., 2006] which measures the presence, location and impact of musculoskeletal chronic pain. The SNQ asks respondents to report the presence of chronic pain (“During the last year, have you continuously suffered from pain or stiffness in the muscles and joints for at least 3 months?” “Yes/no”). The SNQ also includes a pain drawing and participants were asked to mark where they have pain, giving data on the impacted anatomic sites and location of experienced pain. It also asked about the influence of chronic pain on daily life and at what age they experienced that chronic pain occurred. The SNQ is found valid and reliable in different

patient groups, and is frequently used in pain studies [Kuorinka et al., 1987; Svebak et al., 2006]. The prevalence of chronic pain in the study groups was compared to the general Norwegian population and other studies of MFS. Based on previous research of chronic pain and research of MFS, it is hypothesized that several aspects such as MFS-related health problems and demographical factors may be associated with chronic pain in people with MFS (Figure 10).

Fatigue

Fatigue was assessed with the Fatigue Severity Scale (FSS). This is a nine-item questionnaire developed to measure the impact of fatigue on daily functioning [Krupp, LaRocca, Muir-Nash & Steinberg, 1989]. Each item is scored on a seven-point Likert scale with a range from 1 (completely disagree) to 7 (completely agree). The FSS is widely used and has been found valid and reliable in different patient groups [Whitehead, 2009]. To assess how fatigue affects MFS patients in their daily lives, we analyzed the distribution of scores for each single item. To assess the level of fatigue we calculated a FSS mean score of all nine items for each respondent, ranging from 1.0 (no fatigue) to 7.0 (maximum fatigue). Minimal clinically important difference (MCID) for FSS mean scores have not been published for MFS patients, but are reported to be 0.4 points for patients with systemic lupus erythematosus (SLE) [Goligher et al., 2008] and 0.7 points for patients with Rheumatoid Arthritis (RA) [Pouchot et al., 2008]. To assess the prevalence of “severe fatigue” versus “no fatigue,” the following cut-off values were used: no-fatigue = FSS mean score ≤ 4 ; severe fatigue = FSS mean score ≥ 5 ; and borderline fatigue = FSS mean score >4 and <5 [Lerdal et al., 2005; Roelcke et al., 1997]. To evaluate the impact of fatigue, we compared FSS mean scores in this group with results from previous studies: (1) the general Norwegian population [Lerdal et al., 2005], (2) Marfan patients [Percheron et al., 2007; Rand-Hendriksen et al., 2007], studies of patient groups with; musculoskeletal pain such as RA [Mancuso, Rincon, Sayles & Paget, 2006], Ehlers–Danlos Syndrome hypermobility type/joint hypermobility Syndrome (EDS-HT/JHS) [Celletti, Castori, La Torre & Camerota, 2013] and late onset Pompe disease [Hagemans et al., 2007].

4.2.5. Statistical analyses

Descriptive statistics (including frequencies, percentages, median, ranges, mean and standard deviations [SD]) were used to characterize the study sample(s). Due to the small sample size, the primary statistical analyses were corroborated with alternative statistical analyses to ensure the robustness of the results [Parker, Ashcroft, Wilkie & Kent, 2004; Pallant, 2010]. Non-parametric tests were used when appropriate due to skewed distribution. Groups were

compared using the independent samples t-test; Spearman`s rank order correlations were applied to compare categorical variables, and Mann Whitney U-test was performed when appropriate on continuous variables.

In Papers III and V: In addition to descriptive statistics, Spearman`s rank order correlation and the Mann Whitney U-test were used to compare variables in the univariate regression analyses, and variables were entered simultaneously in to a multiple logistic regression analysis. The strength of the association was expressed as an odds ratio (ORs) with 95% confidence intervals (95% CI). The algorithms in Statistical Packages for the Social Science (SPSS) version 18 - 21 were used. The level of statistical significance was set at $p \leq 0.05$.

In paper IV: Cronbach`s α was calculated to examine the internal consistency of the SWLS. A one-sample t-test was used to compare to other patient groups. Independent variables that were significantly correlated with SWLS in the bivariate analysis (Pearson`s r , $p < 0.05$), adjusted with Bonferroni correction to key groups (to avoid type 1 errors), were included in a three level, hierarchical multiple regression analysis, along with gender and age. The strength of associations in regression analyses was given as R^2 , R^2 -changes, and standardized β value and the ANOVA test for significance.

In Paper VI: Students` t-tests were used to compare the sample`s mean fatigue score to those reported for the general population, other Marfan samples and other patient groups. Associations between independent variables and the dependent variable (mean fatigue) were examined with Pearson`s correlation coefficients and Independent samples t-tests. Independent variables showing a significant relationship with the dependent variable were entered into a multiple linear regression model. The best subsets of independent variables were selected by excluding variables with the least contribution to the model (i.e., those with the largest P-values).

Dichotomizing of variables

For some of the analytic assessments demographic variables were grouped into fewer categories.

1. Age was dichotomized into $\leq 39 / \geq 40$ years in Paper III.
2. Work participation was dichotomized into two groups: (1) "Work disability" (receiving disability pension/ rehabilitation pension) and (2) "Working" (employees/students)
3. Marital status was dichotomized into married/cohabitant versus single.

4. Educational level was dichotomized into lower (≤ 13 years) and higher educational level (>13 years).

4.2.6. Non-respondents

Thirty-eight percent of the invited individuals chose not to participate. The response rate is important when judging the representativeness of the study sample. The non-respondents ($n=44$) were not significantly different from respondents regarding gender (women, 67/57%), or age (mean= 41.4/42.2, range 20–76/20-71), but information about the other characteristics of the non-respondents were unavailable.

4.2.7. Ethical aspects

The research project was approved by the Data Protection Officer at Oslo University Hospital and the Regional Ethics Committee for Medical and Health Research Ethics in eastern Norway (REK). All participants received written information according to REK guidelines and the information emphasized that participation was voluntary. People who chose to participate, returned signed consent forms in the pre-postage paid envelope, and were informed that they could withdraw from the study at any time without any implications on further contact and monitoring from TRS Resource Centre. Participations did not inflict any harm to the participants except for possible psychological strain from answering the questionnaire. It was ensured that persons in need of health-and social services detected in connection with the study should be assigned the relevant institution.

Storage and handling of data processing were done according to the guideline from REK and in accordance with the formal rules for handling sensitive data. All data were de-identified. Analysis of the data was conducted with de-identified data. Confidential or personal information obtained for the study would not be used for any purposes other than those specified in this protocol. Despite the small sample group, it is relatively large when compared to other studies on rare disorders. The ethical challenges concerning studies on very small groups which are typically for research on rare disorders were not so relevant. Despite this, it was important to handle the data cautiously. In addition, this cross-sectional study is quantitative, so the problems of de-identification and anonymity are easier to handle with group data, than if the study had included qualitative in-depth interviews. Several discussions were conducted in the research group about how to handle the cooperation with the User Association and the reference group. It was important to be aware of possible ethical

challenges regarding this cooperation. The reference group had no access to recognizable information about the participants in the study.

My dual role of being both a clinician and researcher in relation to the same population, as a “double agent” [Yanos & Ziedois, 2006], may imply ethical and methodological implications. As a patient-oriented clinician researcher I can serve as an effective “bridge” between the research and the practice community and can facilitate both the development of clinically relevant research and dissemination of evidence-based treatment into routine clinical services [ibid]. However, consideration must be taken to address the potential for ethical - and role conflicts. The study was quantitative and this implies a larger distance to the study-subjects than if we had conducted a qualitative study. All data material was treated anonymous and the participants in the study were not identifiable, and this was also conveyed to the participating patients. My clinical experiences may have influenced the analysis of the material, but when using advanced statistical analysis as regression analyses, the technical procedures and the computer determined most of the results. Another ethical aspect is that my clinical experiences may have interfered with the interpretations of the outcomes. In this study it was emphasized that the clinical experiences is an important part of the framework for understanding the outcome, but that the main interpretations are based on theoretical frameworks. Our clinical experiences may verify, contrast or deepen how the results can be interpreted within the different selected theoretical frameworks. There will always be bias and ethical challenges when being a “double agent” in clinical research, but it is important to be aware of these challenges. Throughout the whole research process, ethical and methodological reflections was conducted, and discussed in the interdisciplinary research group.

5. MAIN RESULTS (SUMMARY OF THE MAIN FINDINGS FROM THE PAPERS)

The main results from each paper will be summarized sequentially.

5.1. Paper I: Systematic review of psychosocial aspects of MFS

Fig. 7: Flow chat for presenting the result of the search strategy.

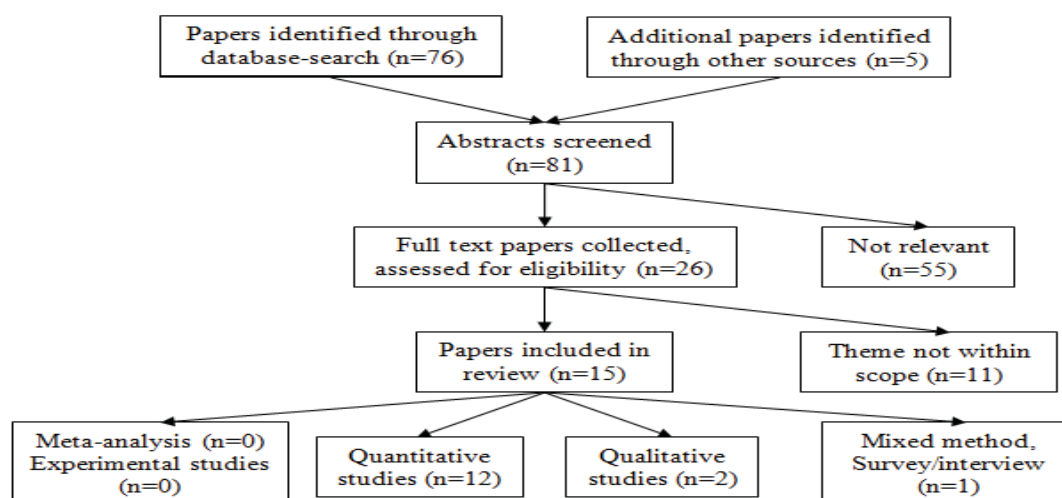


Figure 7 shows that of the 81 search results, only 15 papers with a total of 1,355 patients satisfied our eligibility criteria exploring the psychosocial aspects of MFS. One of the papers included in the review was Paper VI, which is omitted from Table 1. All studies were cross-sectional, no intervention, randomized controlled trials or longitudinal studies were found. Twelve papers (4 from the same study) used a quantitative approach; 2 papers (from the same study) used qualitative methods and one used mixed-methods. Most of the included studies had small sample sizes, low response rates, and/or participants without verified diagnosis.

The results indicate that individuals with MFS may experience a significant impact of the diagnosis on the psychosocial aspects of their lives. The studies of people with MFS revealed that many experienced decreased quality of life, challenges in the transition from adolescence to adulthood, challenges in education and work, high prevalence of depression and anxiety; moreover, the diagnosis had negative influence on sexuality and family life. Feeling different from their peers, feeling less physically attractive due to their phenotypic appearance, and dealing with physical limitations were aspects of the diagnosis that seemed to be particularly challenging, both for adolescents and adults. The risk of severe morbidity,

early mortality and offspring inheriting the genetic variant associated with MFS were aspects of the diagnosis were reported as psychologically distressing. However, the studies indicated that most MFS patients were able to manage these difficulties. Several papers indicated that the subjective perception of MFS may have a substantial impact on experienced psychosocial adjustment, educational choices, ability to work, family life, adherence to medical management and their experiences of the severity of the diagnosis. The results showed that the research regarding the psychosocial aspects of MFS is limited in size and quality (Table 2). Table 2 shows an overview of the methods, materials and results from the identified papers examining the psychosocial aspects of MFS. This table (2) consists of only 14 included articles, since Paper VI [Bathen, Velvin, Rand-Hendriksen & Robinson, 2014] is omitted from this table. In the published article, Paper I [Velvin, Bathen, Rand-Hendriksen & Østertun Geirdal, 2015a], Paper VI [Bathen et al., 2014] was included as one of the articles that were reviewed.

Table 2. Overview of Reviewed Papers, Paper I

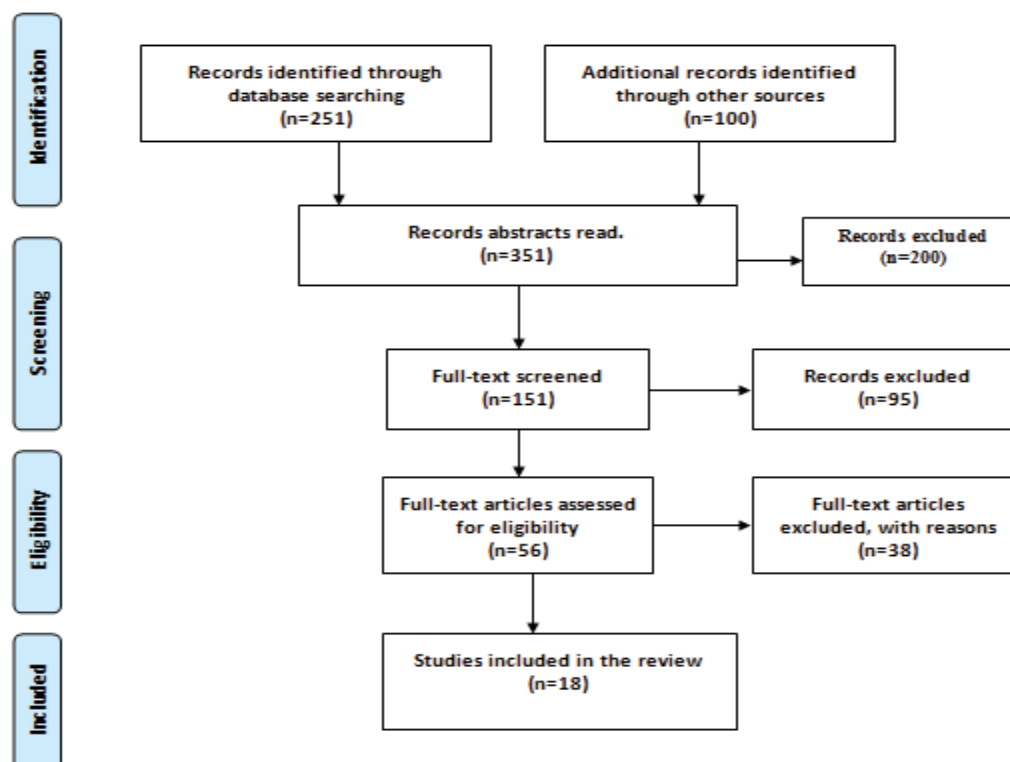
Authors (publication year) (ref. no)	Title	Methods, tools	Material: - Number (age) Recruited from Diagnoses Country	Results
<i>Quality of Life (HRQoL)</i>				
Verbraecken et al. (2002) (37)	<i>Evaluation of sleep apnea in patients with EDS and MFS</i>	Quantitative -SF-36 -Epworth Sleepiness Scale	N=15 (≥15 year) R=MFS organization. D=Self-reported C=Belgium	-Lower score on physical function - Lower general health perception, which correlated with sleep disturbance Mental scores - normal
Foran et al. (2005) (39)	<i>Characterization of the symptoms associated with dural ectasia in Marfan patients</i>	Quantitative -SF-36	N=22 (9-55 years) R=Hospital D=Ghent 1 C=USA	-Physical summary scores were significantly lower for people with MFS and dural ectasia than those of the general population Mental score - normal
Fusar-Poli et al. (2008) (31)	<i>Determinants of quality of life in MFS</i>	-Quantitative - SF-36 -Karnofsky Index -Interview	N=36 (age?) R=Marfan clinic D=Not described C=Italy	-Lower QoL on mental domain, vitality and general health -Significant relationship between MFS, psychosocial adjustment and mental quality of life -60 % worked full/part-time
Rand-Hendriksen et al. (2010) (6)	<i>Health-related quality of life in Marfan syndrome: A cross-sectional study of Short Form 36.</i>	Quantitative -SF-36	N=84 (20-69 years) R=Medical clinic D=Ghent 1 C=Norway	-Significantly decreased HRQoL on all subscales -Lowest scores on physical health, vitality, social function, bodily pain and general health -No significant correlation between decreased HRQoL and fulfilling the number of major criteria of MFS diagnosis
Peters et al. (2002) (7)	<i>Living with MFS III, quality of life and reproductive planning</i>	Quantitative -Ferrara & Powers QOL index. Cardiac version III	N=174 (≥18 years) R=MFS organization. D=Self-reported C=USA	-Psychological/spiritual scores were significantly lower, particularly regarding reproductive decision making - MFS influenced family life and 60 % reported lack of sex drive due to having MFS, but most lived normal family life, 53 % were married.

Psychosocial aspect of MFS⁴				
Peters et al. (2005) (10)	<i>Living with MFS and coping with stigma</i>	- The Rosenberg Self-Esteem Scale. - The Center for Epidemiological Studies Depression Scale .-The family Environment Scale	N=174 (≥18 years) R=MFS organization D=Self-reported C=USA	-64 % worked full/part time -44 % reported significant levels of depression -32 % felt discriminated, which significantly correlated with having depressive symptoms, low self-esteem, and negative assumptions.
Peters et al. (2001) (3)	<i>Living with MFS. Perceptions of the condition</i>	-The Dyad Adjustment Scale -The Illness Perception Questionnaire		-97 % identify disadvantages of having MFS -83 % reported that MFS had significant adverse consequences -25 % identify some advantages to having MFS (a slender figure, appreciation of life)
Peters et al. (2001) (30)	<i>Living with MFS II, medication adherence and physical modification</i>			-80 % have modified physical activity -Many young adults reported difficulty complying with physical limitations and medication regime.
De Bie et al. (2004) (36)	<i>Marfan Syndrome in Europe. A questionnaire study on patients' perceptions</i>	Quantitative Self-design questionnaire	N=632 (≥ 25 years) ⁵ R=MFS organization/ clinic D=Self-reported C=7 European countries	-90 % reported that MFS had negative influence of sexual relationship/body image. -53 % had pregnancies, 60 % were married -60 % worked full/part time -MFS limited educational (31%) and work (24%) possibilities -Subjective severity is not in accordance with phenotypic severity.
Rand-Hendriksen et al. (2007) (40)	<i>Fatigue, cognitive function and psychological distress in MFS, a pilot study</i>	Quantitative: Fatigue instruments -Battery of neuropsychological tests.	N =16 (18-30 years) R=Clinic D= Ghent 1 C= Norway	-Correlation between fatigue, psychological distress and other psychological variables - Self-reported fatigue for women is a part of distress complex, rather than physical consequences.
Schneider et al. (1990) (32)	<i>Marfan Syndrome in adolescents and young adults. Psychosocial functioning and knowledge</i>	Quantitative: -Offer Self-Image Questionnaire - Self-develop instrument	N=22 (11-24 years) R=Medical clinic D=Not specified C=USA	-Adapted well psychosocially and scored within the normal range. -Felt less physically attractive. -They believed that they would have better lives without MFS -50 % limited their activities less than recommended
Van Tongerloo and De Paepe (1998) (33)	<i>Psychosocial adaption in adolescents and young adult with MFS: An exploratory study</i>	Quantitative: -Trait Anxiety Inventory -Beck Depression Inventory -Utrecht coping List Qualitative interviews	N=17 (16-35 years) R=Hospital D=Ghent 1 C=Belgium	-65 % learned to accept their illness -65 % were teased/bullied due to their appearance -53 % have low self-esteem due to their appearance Most patients are socially introverts -Depression was within the minimum/mild range -Patients reported significant physical limitation
Giarelli et al. (2008) (34)	<i>Adolescents' transition to self-management of a chronic genetic disorder</i>	Qualitative -Self-administered questionnaire	N=40 ≤ 35 years R=Clinic/ MFS organization D=Self-reported C=USA	- Difficult to comply with physical limitations and medications. -Important to "fit in;" be in shape; and be suited, adapted and acceptable.
Giarelli et al (2008) (35)	<i>Attitudes antecedent to transition to self-management of a chronic genetic disorder</i>	-Semi structured telephone interviews		-Information and knowledge about diagnosis are important - Knowledge of the diagnosis and psychosocial support helps for better transition to adulthood -A systematic approach to help adolescent transition is needed.

⁴ In this overview, one article has been omitted (Paper VI) that was included in the review article (Paper I).
Total respondents = 857 (≥13 years)

5.2. Paper II: Systematic review of chronic pain in MFS

Fig. 8: Flow-chart presenting the results of the search strategy



A systematic search in medical and other databases resulted in 351 references, but only 18 papers with a total of 2,442 patients satisfied the inclusion criteria [see Paper II]. One of these papers was Paper VI [Bathen et al., 2014]. All studies were cross-sectional and quantitative; no randomized controlled trials (RCT) or intervention studies were found. Overall, most studies had small sample sizes, low response rates, selected groups, inadequate description of the inclusion criteria and inadequate description of the participants and diversity with regard to the purposes of the studies (see Table II). The main purpose of nearly all the included papers except one, was to measure aspects of MFS other than chronic pain. Only one study dealt mainly with pain, six dealt partly with pain, and eleven papers had a minor focus on pain in patients with MFS (see Table 3).

Table 3 Critical appraisal of reviewed papers

Studies	1. Study design*	2. Rep sample**	3. Control groups**	4. Pain measurement Validity*	5. Drop out/ missing data**	6. Credibility*	7. Contribution to chronic pain knowledge*
I. Mainly dealing with pain							
Nelson et al 2015	Good	In question	No	Good	Yes	Good	Good ‡
II. Partly dealing with pain							
Bathen et al 2014 [Paper VI]	Good	In question	No	Good	Yes	Good	Fair
Hasan et al. 2007	Good	In question	Yes	Poor	No	Fair	Good
Peters et al 2001	Good	No	No	Good	No	Good	Good
Grahame et al 1995	Fair	In question	No	Fair	No	Fair	Fair
Verbraecken et al 2002	Poor	No	Yes	Good	No	Poor	Fair
Vis et al 2009	Very good	In question	yes	Good	Yes	Good	Good
III. Minor focus on pain							
Rand-Hendriksen et al 2010	Good	In question	Yes	Good	Yes	Good	Fair
Mesfin et al 2013	Fair	No	No	Good	Yes	Good	Fair
Ahn et al 2000	Good	No	Yes	Good	No	Fair	Fair
Foran et al 2005	Fair	No	No	Good	No	Fair	Fair
Fusar Poli et al 2008	Fair	No	No	Good	No	Good	Fair
Hobbs et al 1997	Good	No	Yes	Fair	Yes	Good	Fair
Sponseller et al 1995	Fair	No	Yes	Good	No	Fair	Fair
Sponseller et al 2006	Poor	In question	No	Fair	No	Good	Fair
Knudsen et al 2006	Fair	No	No	Fair	Yes	Fair	Fair
Koppen et al 2012	Good	In question	Yes	Poor	Yes	Good	Fair
Malmiviaara et al 1993	Poor	No	No	Fair	No	Fair	Poor

1. Is the study design identified?
2. Is the study sample representative?
3. Is there an adequate control group?
4. Is the validity for measurement acceptable?
5. Is the study complete with regard to dropout/missing data?
6. To what extent are study results influenced by factors that negatively impact their credibility? (e.g. confounding factors)
7. Does the study contribute to knowledge about pain in Marfan Syndrome?

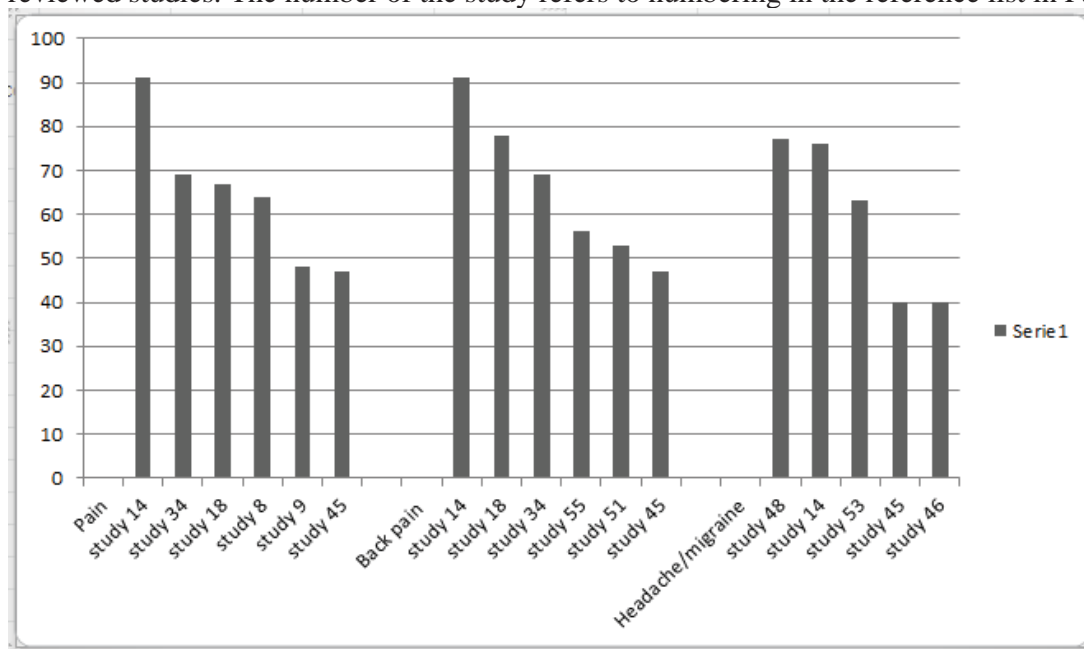
Scoring criteria: *Very good, Good, Fair or Poor. ** No, Yes or "In question"

‡ Good - in measuring chronic pain, but very good in measuring pain.

The results indicate that the prevalence of pain in people with MFS is significantly higher than those in the general population, but variations in the results from the different studies were high. The prevalence of back pain, headache and migraine is high, but also here the results vary. Figure 9 from Paper II shows some of the variations in the incidence of bodily pain in the different studies (see Figure 9). The causes of pain in patients with MFS is unknown, although back pain might be anticipated given that scoliosis, dural ectasia or vertebral body or sacral erosions are common in patients with Marfan Syndrome. Studies

indicate that pain influences sleep quality, physical activities and social functioning, and might lead to fatigue and decreased quality of life. Pain was also found significantly associated with more negative views of the ability to control the symptoms of the diagnosis. The results indicate that pain interfered with daily life and physical activities, which affected social function and decreased quality of life. Only one of the included studies examined chronic pain care in people with MFS and this study indicated that people with MFS are less satisfied with their chronic care than people in the general population and other patient groups. Few treatment programs are developed for treatment of chronic pain in individuals with MFS. The discrepancy between studies might derive from methodological factors such as inclusion criteria, disease characteristics, use of different measurements and different objectives with the studies. Drawing general conclusions from the review is difficult primarily because the studies used a variety of methods and the methodology was not always adequately described. Further, research is required to gain more knowledge about chronic pain in people with MFS and to develop effective evidence-based rehabilitation programs for individuals with MFS and chronic pain.

Figure 9 illustrates how the prevalence of some types of pain (%) differs in some of the reviewed studies. The number of the study refers to numbering in the reference list in Paper II.



5.3 The characteristics of the participants in the Cross-sectional study, Paper III-VI

Table 4 shows the characteristics of the participants in the cross-sectional part of study.

Table 4: Characteristics of the study group (N=73)

	Mean (SD)	(Range)
Socio-demographic features		
Age in years	44.2 (13.1)	(20-71)
Age at diagnosis (n=67)*	23.1 (14.9)	(1-56)
	n	(%)
Women	42	(57)
Living with an adult partner	42	(58)
Having their own children	38	(52)
Educational level (highest finished education) >13 years	39	(54)
Employment status (employed or in higher education)	41	(57)
Contact with health and social services		
General practitioners (last 12 months)	64	(88)
Aorta monitoring (1-2 times annually)	72	(98)
Visual monitoring (from every 6 months to every 5 years)	50	(69)
Skeletal/muscle monitoring	13	(18)
Physiotherapist (last 12 months)	31	(41)
Social service/NAV (last 12 months)	24	(40)
Occupational therapist (last 12 months)	12	(16)
Psychologist (last 12 months)	6	(8)
Marfan related health problems		
Dilated aorta	65	(89)
Aorta dissection	25	(34)
Operation aorta/other blood vessels	42	(57)
Visual impairment due to lens dislocation/retinal detachment	25	(34)
Scoliosis	43	(58)
Scoliosis surgery	10	(14)
Advised physical restrictions	49	(67)
Blood pressure medicine	49	(67)
Fatigue \geq 5	30	(41)
Chronic pain	47	(64)

*Five people did not remember the age of when they were diagnosed.

5.4. Paper III

Fifty-nine percent of the participants were employed or enrolled as students, which is lower than the observed rate in the General Norwegian Population (GNP), but higher than the rate observed in the Norwegian population of those with disabilities. The average educational level was high; many were married and had children. Most young adults worked full-time

despite extensive health problems; however, the average age for leaving work was low. Few people had received any work adaptations prior to retiring from work. In the logistic regression, only low education level ($\beta=9.824, p=0.001$); older age ($\beta=0.931, p=0.013$) and severe fatigue ($\beta=0.550, p=0.023$) were significantly associated with lower work participation, not MFS-related health problems or chronic pain. Fatigue appears to be the most challenging health problem to deal with in work, but the covariance is complex.

5.5. Paper IV

The SWLS mean score in the study group was significantly lower than reported in the general Norwegian population ($p < 0.000$). On the other hand the SWLS mean score in adults with MFS was similar to the results reported in patients with Parkinson's disease and Tourette's syndrome, but significantly higher than that reported for patients with multiple sclerosis, systemic lupus erythematosus, and psychiatric disorders.

In the hierarchical multiple linear analyses, only fatigue ($p=0.002$), aortic dissection ($p=0.029$) and having regular contact with a psychologist ($p=0.002$) showed significantly unique contributions to the SWLS score. The demographic variables alone explained 15.9 % of the variance (R^2 change) in the model, while use of health and social services explained 13.8 % of the variance. After entering aortic dissection and fatigue in step 3, the total variance explained by the model as a whole was 45.2 %, with an $F(7.63)$ of 7.42 and a p value of <0.001 . The F values of the ANOVA test of significance of the final regression model confirmed that this combination of independent variables significantly predicted SWLS (Table 6 in Article IV).

5.6. Paper V

The prevalence of chronic pain in patients with MFS is high (64%) when compared to the GNP (45 %). In the MFS study population; we identified the following frequent locations of pain: lower back (42 %), shoulders (37 %), neck (34 %) and ankles/feet (25%). Several participants reported that chronic pain occurred at a young age, before the age of 19 and that it interfered with their daily functioning. In the multiple logistic regression analysis that included demographic variables like work participation, age, gender and MFS-related health problems only severe fatigue ($p=0.006$) was significantly associated with chronic pain. The logistic regression model for chronic pain explained approximately 16.7% to 22.0 % of the variance of included factors, which implies that there are other variables than those included in the model which contribute to chronic pain in adults with MFS. The multiple logistic regression model containing all predictors was

statistically significant with $X^2(3, N=73) = 25,10, p < 0.001$, indicating that the model was able to distinguish between respondents who reported chronic pain and those without chronic pain (Table 4 in Paper V).

5.7. Paper VI

Participants reported significantly higher mean FSS scores and prevalence of severe fatigue (42 %) when compared to the GNP (23 %) and patients with (RA) (30%), but lower than those with other chronic conditions. In the linear multiple regression analyses, only chronic pain ($p=0.005$) and receiving a disability pension ($p=0.009$) were variables significantly associated with higher fatigue. No significant associations between fatigue scores and Marfan-related health problems (i.e., aortic dilatation, aortic dissection, aortic surgery, and visual impairment due to lens dislocation or retinal detachment) or use of blood pressure medicine were found (Table V in Article VI). The final multivariable model explained 24% of the variance in fatigue scores, indicating that other factors than those included in the regression analyses may influence fatigue (see Table 5 in Paper VI).

6. GENERAL DISCUSSION

The discussion section of this thesis focuses on the following issues:

- The methods used in systematic reviews (Papers I-II).
- Aspects of the methods used in Papers III-VI are considered, including the design, the data material, the outcome measures including the questionnaires and the statistical procedures. Study limitations, possible sources of bias, as well as strengths are elucidated.
- An elaboration of the main results (I-VI).

6.1. Methodological consideration

6.1.1. Methodological considerations of the review studies [Papers I-II]

It can be debated whether or not the review papers included in this thesis are “systematic reviews.” According to the Cochrane Handbook of systematic review [Higgins & Green, 2011]: A systematic review seeks to collate all evidence that fits pre-specific eligibility criteria in order to address a specific research question. By using explicit systematic methods to minimize bias, findings, from which conclusions can be drawn and decisions made, are more reliable” [Higgins & Green, 2011]. In Paper I, a mixed-method systematic review was used and in Paper II, a systematic review.

The pre-defined eligibility inclusion and exclusion criteria were elaborated and described in the method section, both of Paper I and Paper II to clarify the objective of these studies. Despite this, there will always be a risk of misinterpretation through the operationalization process of the concepts. The research group was interdisciplinary and the objectives, the eligibility criteria and the operationalization of key-concepts in both Paper I and Paper II were thoroughly discussed. The use of an interdisciplinary approach appears to have been beneficial or obtaining a broader understanding and clearer conceptualization of the key-concepts.

In order to achieve a high degree of reproducibility and make it possible for the readers to obtain as precise information as possible, a detailed description of the studies’ objectives, inclusion/exclusion criteria and the search methods were included in Papers I and II. The selection process for the reviewed articles, the standardized criteria for critically appraising the papers and the process of summarizing and synthesizing the results from the different studies were included, as well. Despite having conducted systematic searches in relevant databases, examining pertinent reference lists and questioning and consulting experts

in field, the studies' databases remain incomplete; there is no guarantee that all relevant articles are included in the reviews. In Paper I, it was found to be appropriate to use a mixed method, despite the fact that only two of the reviewed articles were using a qualitative approach. One article used a mixed-method approach and was critically appraised by both the standardized criteria for the quantitative studies and qualitative studies. The standardized criteria for critically appraising quantitative and qualitative studies are very different and it was a challenge to combine these criteria. Although, the literature of these criteria is comprehensive, those involved in the research had several discussion of how these criteria could be interpreted and applied. In Paper II, no qualitative articles were identified, so only the standardized criteria for critically appraising quantitative studies were used. There might be a weakness in this paper, in so far as the article was analyzed into three categories, depending on how much each category dealt with pain; in addition, an extra question was added about how much the article contributed to knowledge of chronic pain in people with MFS. There is no validated or standardized way of doing this, but in this study it was found appropriate because most of the identified studies dealt with aspects of MFS other than chronic pain.

The aim was to present the definition of the issues reviewed, to clarify the goals and main issues of each of the studies included, as well as presenting the measurements and describing their selected materials (MFS-population, demographics, characteristics and country) to give the reader as much as information as possible. Emphasis was placed upon clarifying how the papers had been considered in accordance to the eligibility criteria; nonetheless, the lack of evidence presented regarding the evaluation of the methods used for each assessed publication constituted a weakness. Due to the subjective elements of these processes, the critical appraisal of each article was thoroughly discussed. Disagreements were resolved through professional arguments.

The approach for summarizing and interpreting the results was similar to that used for narrative reviews [Cook, Mulrow & Haynes, 1997]. Thematic analyses and matrices for systematically synthesizing the results from the different studies were used. The first author did preliminary analyzes of included papers and proposals for relevant themes and wrote draft articles before they were discussed in the interdisciplinary research group. A strength in this process was the use of an interdisciplinary approach, particularly when finally integrating, synthesizing and summarizing the conclusions (comparing, contrasting, building on, or embedding with the others) [Alton-Lee, 2004; Hemingway & Brereton, 2009; Ryan, Kaufman & Hill, 2009]. The summarizing of results from the different studies included a selection

process of what the reviewers emphasized as the most interesting and important results. This involved a possibility for misinterpreting or omitting relevant or important information.

There is no guarantee that the reviews cover all the relevant research pertaining to the psychosocial aspects of MFS [Paper I] and chronic pain in MFS [Paper II]. Because databases are incomplete, searches in all relevant databases and open search in Google Scholar were conducted. Despite this, after a new, broad search in the most relevant databases in February 2016, one study [Schoormans et al., 2012] was identified that could have been including in Paper I. No other relevant studies have been identified since, nor omitted from the reviews.

6.1.2. Methodological considerations of the cross-sectional studies

Study design

A cross-sectional quantitative design was chosen to use for a predetermined population at one point of time to obtain an overview of the psychosocial aspects associated with being afflicted by MFS. With this design, it was possible to gather a relatively large amount of information with moderate resources [Altman, 1997]. However, a cross-sectional design gives a temporally limited glimpse of the participants' situations, and it is not possible to know if the findings would have been different if the measurement had been collected longitudinally. A weakness worth mentioning is the possible lack of stability of outcomes in cross-sectional studies compared with longitudinal studies [Altman, 1997]. A cross-sectional design does not allow for linear causal interpretations and it is difficult to draw clear inferences concerning causality [Altman, 1997]. Cross-sectional design provides no direction of causality, but it gives the opportunity to formulate hypotheses that could be tested by using longitudinal design. Studying reciprocal associations is challenging and great care is needed to interpret the results accurately from cross-sectional data. For example, in Paper III, it is impossible to conclude that decreased work participation is caused by severe fatigue; it may be the inverse: decreased work participation may have increased the degree of fatigue. The causality may be reciprocal, or several mechanisms may be involved for producing a particular outcome [Easton, 2010; Sayer, 1992]. Critical realism emphasize that quantitative methods alone cannot answer questions of causal association on the other hand it can point out important empirical manifestations of mechanisms [Danermark et al., 2005].

An advantage of this study design is the use of the focus groups as a prior pilot study because the quality of the questionnaire and the relevance of the questions in the

questionnaire have been tested, evaluated and refined in cooperation with the users in the focus groups. It might have been beneficial to include qualitative methods such as individual interviews. The strength of qualitative methods is that they are open-ended. This could have helped to illuminate complex concepts and relationships that are unlikely to be captured through predetermined response categories used by quantitative measurers [Mingers , 2001]. Qualitative interviews required a lot of resources and the data gathered would have been comprehensive. Due to a lack of resources, it was decided that two systematic reviews and a cross-sectional study using quantitative questionnaire would yield enough material for this study. It is assumed that if qualitative interviews had been included, the total body of material would have been too large.

The material, validity and possible biases

The selected sample and the sample size are of importance when assessing the validity of the study. To date, the prevalence of MFS is poorly described. Estimates vary from 1.5/100.000 [Lynas 1958] into 17.2/100.000 [Sun et al., 1990]. A recent published study [Groth et al., 2015] from Denmark indicates that the prevalence in Denmark is 6.5/100.000. The prevalence of MFS in Norway is still unknown [Rand-Hendriksen, 2010]. A total of seventy-three persons with verified diagnosis (Ghent 1) were included in the cross-sectional part of the study. Until now, besides the registrations in different hospitals, the only Norwegian source for identifying individuals with MFS has been the TRS database. There may be several unrecorded cases, because many are not diagnosed until adulthood and many will never be diagnosed. Thus, the representativeness of our study sample is unknown. Compared with reported prevalence in Scotland [Gray et al., 1998] and in Denmark [Fuchs, 1997, Groth et al., 2015], it is likely that the majority of adults with verified MFS living in Norway have been reached in this study. The age and gender representation (mean age 42 years and 57% women) is comparable to those in the study by De Bie et al., [2004] (mean age 39 years and 53 % women) and the study of Peters et al., [2001a, 2001b] (mean age 40 years and 58 % women). There is a small skewed selection due to gender, and the explanation might be that men are more reluctant to seek medical services than women [Rand-Hendriksen et al., 2010].

The variation in symptoms and organ pathology in people with MFS is great, so there might be a variation between the respondents and non-respondents. Among the participants, about 90 % of them report dilated aorta, which is a higher proportion than in some other studies. In a study by Hwa et al., [1993], the prevalence of dilated aorta was 73 %. This might be a source of biases, due to the fact that people with dilated aorta perceive their condition as

more severe and therefore choose to participate [Peters et al., 2001a, 2001b, 2005]. In contrast to this, Altman [1997] claims that it is common with “volunteer bias”, which implies that those with the poorest health choose not to participate. Moreover, our collaboration with the Marfan Association in Norway may have led to a predominance of members from the association being recruited and thereby people who “identify with MFS”.

Volunteer bias may have influenced the results of this the cross-sectional part of the study. The response rate of 62 % is satisfactory. The non-participants were not different from the participants with regards to age and gender, but there may be a potential source of bias when estimating work participation, satisfaction with life, perceived health problems, etc. Peters et al., [2001a, 2001b] argue that in their study population there is an inherent bias in the self-selection of those who are well educated, primarily Caucasian, and motivated to participate in research, and that people occupied with work and social activities may be too busy to participate. Further comparison was not possible due to a lack of information about other factors (see Section 4.2.6). For all these reasons the results may not be generalizable for adults with MFS.

In conclusion, the above mentioned discussion indicates that the external validity of this cross-sectional study and thus the generalizability of the results, to some degree may be affected. However, the study population was relatively large for the Norwegian population, when compared to studies on other rare patient groups [Rare Disease Clinical Research Network, 2015]. Thus, this Norwegian study on adults with MFS probably reflects the national population quite well, whereas other study groups of MFS patients are mostly recruited from specialized medical clinics or the user associations [Papers I-II].

Outcome measures

The main questionnaire

A study-specific questionnaire about demographic-and MFS-related variables was developed because no complete standard validated instrument existed for our patient group. The questionnaire included questions about demographic aspects and these questions were based on previous studies of rare disorders [Johansen, 2007; Lande-Wekre, 2012]. Questions about Marfan-related health problems were designed by the interdisciplinary research group. There are always risks of biases in self-produced questionnaires, but the reliability and validity of the questions may have been strengthened by the use of a pilot study and the focus group discussions. Another possible weakness was the use of self-reporting questionnaires, because biases can occur if the participants perceive the questions differently. An example of this was,

when people were asked if they had dilated aorta, their answers were dependent on results from medical examinations (either echocardiography or radiological investigation (CR scan or MRI scan)) and thereby dependent on what information the participants received from their doctors as well as what they may have perceived in response to the professional explanations regarding these cardiac examinations. Retrospective questions about when they received the diagnosis could also be a source of bias.

Questions on work participation

In addition to several study-specific questions about work, cluster questions from the “Norwegian Labor Force Survey in Norway” [2010] were used to measure work participation in this study. These questions regarding work participation had some weaknesses. They are not developed as a standard instrument and have not been tested for validity and reliability. There is no documentation on their applicability. Self-reporting questionnaires always have the risk of participants misunderstanding or incorrectly answering the questions. However, to assess the reproducibility of the questionnaire, these questions were tested in the pilot study and discussed in the focus groups. The members of the focus groups found these questions relevant and no misunderstandings about these questions were expressed. The impression was that the questions about work and education were understandable and valid. Another weakness might have been that a part of the main questionnaire was divided in three sections to obtain particular information regarding educational and work related issues from three different groups: those who were working, those who were retired and those who were studying. A few persons (n=3) who were retired had misunderstood this and had answered all the questions in all three sections. For these persons, only the questions for people who were retired were relevant to include in the data material.

The conceptual understanding of the term “work participation” also needs to be discussed. A clear definition is important, especially when comparing our data with the results from other studies. In this study “work participation” was defined as the opposite of “work disability”. All people who did not possess documented decreased-work capacity due to health problems were included in the category “working”. People who had disability/rehabilitation pensions were defined as people with “work disabilities” although they worked part-time, because those who are approved for receiving disability pensions must have medical documentation that their state of health has caused them to suffer from limited work capacity. Only two participants combined part-time work with disability pension. Students were included in the “work” group, because they did not have documented reduced work

capacity due to health problems. There are different ways to categorize these participants. In a study by Lidal [2010], “workers” were defined as people who were working, including those with graded disability pension if they worked part-time. In the same study [Lidal 2010], students and homeworkers were defined as “not working”. In our study, it was most appropriate to group those who had been granted a disability pension with those who received a rehabilitation pension (AAP), because the individuals in both groups probably have health problems that limit their work capacity. Receiving a disability pension or a rehabilitation pension (AAP) in Norway presupposes a documented reduction in work capacity of 50% or more caused by illness, impairment or injury that has lasted longer than one year. There are some exceptions for people with special insurance, but this was not the case for any of the participants in our study.

Satisfaction with Life Scale (SWLS)

Several validated questionnaires have been developed for measuring life satisfaction. In this study, the five items Satisfaction with Life Scale (SWLS) was used. SWLS emphasizes the subjective perceptions of the participants; it deals with a more global approach than HRQoL. SWLS has not been used for analyzing an MFS population before. On the other hand, one benefit was the existence of normative data from the Norwegians study of NSD-EU-SILC and the mean scores from previous studies of other comparable patient groups of SWLS [Paper IV]. The mean scores in our study group were compared with the mean score in the GNP and the mean score of five other diseases (MS, Tourette Syndrome, SLE, Parkinson and psychiatric disorder) [Paper IV].

In our study group, the internal consistency reliability [Patton, 2010] for SWLS was represented by a Cronbach`s alpha of 0.93, and the mean inter-item correlation was 0.72, which was satisfactory. This indicates that SWLS is a reliable instrument and that scores on similar items were relevant to our study group. The use of SWLS also has several limitations. It is a self-reported instrument; it does not measure all aspects of SWL; it is intended to measure the cognitive rather than the affective component of SWL and cannot automatically be used to measure emotional well-being [Pavot & Diener, 1993]. A weakness may be the lack of an instrument with an affective focus, which might have enabled a broader construct of the global SWL.

There may be several limitations and uncertainties when comparing the SWLS-mean score of our study group with the mean score of other patient groups from previous studies. For example, we had no access to the original data and limited information about the

demographic and clinical data of the participants in the comparing studies. There are also several aspects that might influence people's SWL. Even all the studies had European populations, and one used an exclusively Norwegian population, the comparable studies were conducted in different countries at different times. The differences in SWLS mean-scores between the patient groups must therefore be interpreted with caution due to methodological and cultural differences, as well as due to the nature of the disease itself.

Standardized Nordic Questionnaire (SNQ)

The Nordic Questionnaire (SNQ) was used to measure chronic pain in the study groups. Chronic pain is a difficult outcome to measure due to its multifaceted and subjective nature [see Papers II and V]. Currently, there exists no valid and reliable method for objectively quantifying an individual's experience of pain. Therefore, self-reporting measures are mostly used to determine the impact of pain on respondents. Despite the challenges that pain measurement presents, a number of tools and approaches can be employed to collect useful chronic pain estimates. SNQ was chosen since it had been developed for the Nordic countries; it has been used in the huge Norwegian Hunt survey, and has been recommended for use in cross-sectional studies [Kuorinka et al., 1987]. In addition, it was designed to find out whether "musculoskeletal troubles occur in a given population, and so, in what parts of the body" [Kuorinka et al., 1987:234]. Paper V employed all the questions from the SNQ including the chronic pain drawing [Kuorinka et al., 1987; Svebak et al., 2006]. This yielded information about the prevalence of chronic pain in the groups studied, as well as the bodily location of pain and how chronic pain influences people's daily lives. The results from our study were compared with the findings of the Hunt study of the GNP.

There are several limitations to using the SNQ. The experiences of the persons who fill out the questionnaire may affect the results. More serious musculoskeletal disorders are prone to be remembered more distinctly than are older and less serious ones. The social environment and the actual situation in which the questionnaire was filled out may also affect the results [Kuorinka et al., 1987]. In Paper V, 61 % of the sample group reported that they remembered when their chronic pain occurred, and many remembered that it occurred in early childhood. Such retrospective questions about chronic pain are associated with biases and the results must be interpreted with caution. Despite such possible biases, the results have documented people's experiences of recalling when the chronic pain occurred.

Fatigue Severity Scale (FSS)

Similar to chronic pain, the concept of fatigue is difficult to define; it is a subjective experience and hence difficult to measure. A large number of instruments have been developed to measure fatigue. For measuring fatigue in people with chronic illnesses, the Fatigue Severity Scale (FSS) is one of the most frequently used inventories [Lerdal, 2009]. FSS is a short instrument, has demonstrated good psychometric properties and has been found to be both valid and reliable in different patient groups [Whitehead, 2009]. FSS is meant to measure the impact of fatigue on a person's life, and is used in the analysis of several other patient groups. These were the key reasons why this instrument was selected for use in this study. There are several challenges associated to evaluating the impact of fatigue and comparing the mean score of our study groups with those from the general populations, and from those of other studies of MFS and other patient groups. Comparing the FSS mean score from one study with those in other studies, may imply uncertainty arising from cultural, methodological or temporal differences. The differences in the FSS score between this study group and the GNP and comparable patient groups must therefore be interpreted with caution. Despite the uncertainty regarding the comparison, the differences in the FSS score between the study group and the comparable groups are reasonable and understandable in terms of the symptoms and literature associated with the different diagnoses [see Paper VI].

Statistical considerations

All statistical analyses were conducted by the main author, in guidance by the last author. Then draft articles were prepared by the first author for discussion and further work in the interdisciplinary research group. Multiple regression analyses were used in all the papers; and for each paper the most appropriate analyses were employed. The procedures of regression analysis can be considered to be an example of the positivistic empirical approach, and there is no consensus among critical realism researchers regarding the usefulness of regression analysis for the social sciences. On the other hand in line with critical realism, regression analysis can also be seen as an activity of trying to show if some phenomena can be explained by specific mechanisms [Ron, 2002]. "Even though mechanisms cannot be reduced to their empirical manifestations, statistical methods are sometimes sufficient to bring evidence that an otherwise hidden mechanism was involved in producing the event question" [Ron, 2002:136].

To use multiple regression analysis several prerequisites must be met: The number of variables in relation to sample size, normal distribution of the data and linearity of the residuals and multicollinearity [Altman, 1997]. These factors were considered in the cross-sectional part of the study [Paper III-IV]. Altman [1997] recommends no more than one explanatory variable per

10 participants [Papers III-VI]. Due to the relatively small sample size, the primary statistical analyses were corroborated with alternative statistical analyses to ensure the robustness of the results [Parker et al., 2004]. In Papers III and V, multiple logistic regression analyses were used, due to the fact that the dependent (outcome) variable was dichotomous, and the independent variables were categorical or continuous. In Paper IV, hierarchical multiple regression analyses were used; these were based on clinical and theoretically decisions for how the predictors should be entered in the analyses. First the demographic variables were entered, then the use of health and social services and finally the health problems were entered to distinguish the degree to which these different groups of variables explained the variance (R² change) in the model. In this paper [Paper IV], a modified version of Bonferroni correction with key groups (BC) was used to avoid Type 1 error [MacDonald, 2015; Perneger, 1998]. In Paper VI, the Fatigue Severity Scale was treated as a continuous variable and multiple linear analyses were used to study the association between the outcome variable and the independent variables.

In the statistical analyses for all the papers, the variables that could reasonable be confounders were adjusted, but it is not possible to completely rule out the influence of other variables that were not included in this study. The statistical analyses applied were considered appropriate for the different papers because of the research questions [Pallant, 2010].

6.1.3. Limitations

There are several limitations to the cross-sectional part of the study: representativeness, use of the self-reported questionnaire, and the validity of the statistical analyses. The response rate of 62% is fair, but the number of MFS patients in Norway is unknown, so the representativeness of the study population is therefore unknown. One limitation due to differences in methodology and culture is having compared work participation, the mean SWLS score, chronic pain and FSS-score of the study population with the GNP and other patient groups without having access to the original data from groups in these other studies. Also, the available clinical and socio-demographic data were also limited for these samples, and additional detail regarding potentially confounding variables may have facilitated interpretation of the results. One possible strategy could have been to match groups regarding age and gender. The use of a study specific questionnaire may also be a limitation. However, this was necessary, since no validated instruments existed. The use of validated instruments and multiple logistic regression analysis are strong points in this study, while the relatively small sample size may reduce the statistical power for several analyses and the use of subgroups. However, all primary statistical analyses were paired with an alternative statistical analysis to ensure the robustness of the results. The questionnaire used in this study was huge with

approximately 150 questions. It was necessary to select certain issues for examination; selection implies that several issues were subsequently omitted. One limitation is the lack of questions and validated measurements about psychological aspects, such as depression, anxiety and coping. In addition, questions about social relationships and social networks may also be of great relevance.

6.2. General discussion of the main results

6.2.1. Psychosocial aspects of MFS

The results indicate that MFS has great impact on people and is reflected in their psychosocial experiences and their functioning in daily life. In accordance with the biopsychosocial model [Engel, 1977, 1980] there are several aspects of the diagnosis that might influence people's lives [Papers I-VI]. Overall, the reviewed studies in Paper I showed reduced HRQoL and this may reflect the total burden of having a lifelong, potentially disabling and life-shortening disease. These results confirm our clinical experiences and strengthen the results obtained from the cross sectional part of the study [Papers III-VI] about the interaction between health-related factors and other aspects of life for people with MFS. Here, biological, psychological and sociocultural functioning is related conceptually within the notion of reciprocal causality [Bhaskar & Danermark, 2006; Engel, 1977]. This implies that the biological aspects of the diagnosis are not necessarily the cause of the outcome, because the causality is complex.

In the review of the psychosocial aspects of having MFS [Paper I], one finds that several studies indicate the subjective perception of MFS may have a substantial impact on experienced psychosocial adjustment, educational choices, ability to work, family life and adherence to medical management recommendations [De Bie et al., 2004; Peters et al., 2001a, 2001b, 2002, 2005; Rand-Hendriksen et al., 2007, 2010]. According to the symptom management model, a symptom is defined as a subjective experience reflecting changes in the biopsychosocial functioning, sensations, or cognition of an individual [Dodd et al., 2001]. In contrast, a medical sign is defined as any abnormality indicative of disease that is detectable by the individual or by others. At the biological level, both signs and symptoms are important cues that bring problems to the attention of patients and clinicians at the social level. The absences of signs or symptoms, however, do not necessarily imply the optimal health and well-being of an individual [Paterson, 2001]. In the cross-sectional part of the study, neither cardiovascular health problems nor visual problems were associated with lower work participation [Paper III], chronic pain [Paper V], or fatigue [Paper VI]. This indicates that at

the respondent`s subjective perception of the severity do not necessarily match the medical severity of the diagnosis [De Bie et al., 2004; Peters et al., 2001a, 2001b]. Psychological responses may counteract the understanding of the biological mechanisms. The physical severity of the diagnosis can be discussed [Rand-Hendriksen et al., 2010]; but in most papers, severity appears to be mainly associated with the disease`s cardiovascular manifestations [De Bie et al., 2004]. In our study group, this may indicate that the cardiovascular manifestations may be underestimated by the participants as long as they experience no subjective complaints. The differences between the objective severity and the subjective severity of the disease illustrate that the participants may perceive the disorder differently than the professionals [De Bie et al., 2004]. This has been described for other medical conditions, as well [Buetow, Henshaw & Cha, 2012; Grigoni et al., 2003], and several studies emphasize the importance of acknowledge of the patients experiences, their perception of reality, especially when these are different from the medical professionals [Malterud & Solvang, 2005]. According to the person-in environment” perspective in social work, the experiences of the subjective complaints may involve physical limitations, and experiences of disability are mostly associated to commitments from environment and larger society. Due to that, the experiences and understanding of health are unique for the individuals in the particular context of environment; social workers and other professionals should give attention to these particularities. It may be important to assist persons to fully integrate their experiences of the disability and the acceptance of their physical function, and help people to understand the way in which this impact and is impacted by their situation and larger psycho-social culture [Rothman, 2010].

6.2.2. Work participation by adults with MFS

In the study group, the average level of education was high. Most young people in the study group worked full time and had families and children despite their expansive health problems, but the average age for leaving work were lower than found among the general Norwegian population. Few had received any adaptations of work load or working conditions prior to retiring from work. In our society work and education play an important role, with many norms and values connected to it. According to a critical realism perspective, wage-labor is highly structured in a social sense and has very tangible effects. It makes us inclined to reason in certain set ways, to behave and perform certain set activities; we want a job, we look for a job, we get education and we work. Each time a person conforms to this procedure, the mechanisms that reproduce the wage labor structure are triggered, which in turn generates

new actions of the same kind [Danermark et al., 2005]. For various reasons, people can choose or be forced to choose alternative actions. People who do not work are highly vulnerable to social exclusion and financial problems [ibid]. According to the critical realism approach, there may be different mechanisms in the cultural realm which affect disabled people, depending specifically on the type of impairment they have. The physical limitations caused by MFS may not be visible and studies of other patient groups with invisible diseases indicate that many patients push themselves to their limits to manage full-time work and to maintain a normal life and man may try to pass as non-disabled or to hide their disability [Fitzgerald & Paterson, 1995; Fitzgerald, 2000; Goffmann, 1963, 1990; Maynard & Roller, 1991; Reeve & Gottselig, 2011; Valeras, 2010]. At the psychological level, according to the shifting model of chronic illness [Paterson, 2001], many young people with MFS may perceive themselves as healthy even when having compressive health problems. This might also be socially driven; the youth strive to become a member in good standing of the peer group. This is in line with former research; some researchers claim that because people suffer from chronic illnesses for many years, their tendency is to place “healthy life in the foreground and the illness in the background” [Loomis & Conco, 1991, p.170]. In the clinic, people with MFS often describe their health as good, despite possessing significantly impaired physical function. This renders difficult the acceptance and expression of one`s needs and might be an explanation for why few received any kind of work adjustments and accommodations before retiring.

For people without a chronic illness, living life as normally as possible means the flexibility to be spontaneous with one`s activities and behavior. People with chronic illnesses such as MFS may from necessity be forced to plan and anticipate even minor activities of daily life; spontaneity must be curtailed so they can participate in the experiences that they value [Paterson, 2001]. According to the symptom management model [Dodd et al., 2001], symptoms may have different outcomes depending on people`s experiences and their symptom management. In the study group [Paper III], the only health problem that was significantly associated with decreased work participation was severe fatigue, not MFS-related health problems of chronic pain. The nature of fatigue may make symptom management particularly difficult to achieve. At the biological and social levels, the unpredictable and shifting nature of fatigue can make participation and competition in the labour market particularly difficult since the labour market demands continuity and reliability. They are sometimes ill, sometimes able, and sometimes disabled [Paterson, 2001]. They are neither completely well nor sick, which puts them between the status of sick and the well

[Jackson, 2005]. In addition, fatigue is a potentially disabling condition that impairs how people accomplish tasks and may impair concentration. Studies of fatigue in the work force, both in the USA and Europe, suggest that it is particularly difficult to establish appropriate adaptations for people with fatigue in the work place [Harder et al., 2012; Ricci, Chee, Lorandean & Bergern, 2007]. Little attention has been paid within health- and social politics and disability studies to the fact that many people experience fluctuations in impairment or episodes of wellness and the dilemma they face (Boyd, 2012; Lingson, 2008). Cohen & Napolitano[2007] claims that the controversy surrounding episodic disabilities derived from the legacy of the medical model of discourse that sustains biologically driven representations of bodies as either “ill” or “well”, either “able” (employable) or “disabled” (unemployable).

An important aspect of social medical work is to help people to deal with their diagnoses and symptoms, and promote appropriate coping strategies. According to the results from the study and from clinical experience, adults with MFS in need of work-related rehabilitation programs may be appropriately divided into three groups. The first group is young people in need of educational advice or career choices. The second group is people in need of professional or occupational readjustment, after having an aorta dilatation, aorta dissection or surgery. Work tasks may need to be adjusted to what become recommended and possibly new physical limitations. The third group is people with increasing chronic pain and fatigue that lead to a gradual loss of work capacity. A greater focus on vocational guidance early in life, use of adaptations in work situations, psychosocial support, and strategies to deal with fatigue and health problems of the diagnosis may support people with MFS and allow them to cope with the perceived symptoms of the diagnosis. A perspective shift from a “victim of circumstances to a creator of circumstances” is important [Paterson, 2001]. There are many ways of helping people achieve this perspective. These include helping people learn as much as they can about the disease, creating supportive environments, assisting them to develop personal skills such as negotiating, identifying the body`s unique pattern of response, and sharing knowledge with others [ibid]. In line with the shifting model of illness [Paterson, 2001], the person must recognize the disease as a fact of life; while at the same time reject the subjective limitations and significance of it. The shifting perspective model of illness [Paterson, 2001] emphasizes that a major paradox is that people who try to maintain the “wellness in foreground perspective” often are forced to assume an “illness in foreground” perspective when applying for services from the health and social services and accommodations from the employers. In most setting resources, benefits and legal access from the health-and social services necessitate the use of the medical model with focus on

deficit, impairment and disability. Accessibility necessitates some form of criteria for those who have a legitimated claim to them. Recommendation and utilizing the medical model might be challenging for some people with MFS, due to the focus on problem and differences, and it is often paternalistic stance in regard to disability. People have to justify their needs by emphasizing their limitations, symptoms and disabilities. Consequently, the focus and admission of such limitations may force people who still wish to work, to choose disability pension. A possible approach, using a strengths and empowerment perspective may assist people with MFS not to view the losses and limitations as negatives, but rather to view these as opportunities for new occupation or work possibilities. If one needs adaptations in the work place, it will be necessary to provide information about the disease and the patient`s needs to others and at the same time permit the patient`s to maintain the “healthy perspective in forefront”. Social workers can assist the person to accept this as one part, not the major, dominant part of identity and self, reducing anxiety and frustrations over these procedures for both client and professions.

6.2.3. Satisfaction with life in adults with Marfan Syndrome

The result from Paper IV confirms others studies [Kulczycka et al., 2010; Lucas-Carrasco et al., 2014; Meyer et al., 2004; Sætre, 2007] that people with chronic diseases have lower satisfaction with life than the general population. This may indicate that chronic diseases may influence people`s satisfaction with life. According to Pavot & Diener [1993], satisfaction with life refers to an assessment process in which one compares how their current quality of life is compared with an ideal image of how their life should have been. The extent to which there is a correspondence between the real and the ideal life determines how satisfied one is with life [ibid]. According to the symptom management model, symptoms not only create distress, but also disrupt social functioning [Dodd et al., 2001], and this may decrease people`s satisfaction with life. The symptoms of MFS may create both distress and disrupt social functioning.

Interestingly, there was no significant correlation between satisfaction with life and work participation in Paper IV, yet associations or correlations have been found in several other studies [Bang-Nes & Clench-Aas, 2011; Clench-Aas et al., 2011; Lidal, 2010; Pavot & Diener, 2008]. Being employed is associated with better self-esteem and a greater sense of well-being [NSD 2011, 2015; Bang-Nes & Clench-Aas, 2011; Lidal 2010]. As mentioned above, when discussing work participation by people with MFS it seems that many young people strive hard to maintain a full-time job; and after years of struggling, some may feel

relief upon early retirement. At the psychosocial level it might be that these people seek to establish consensus about their self-identity, an identity shaped by several factors: the disease itself, the construction of the illness by others and the experiences they acquire from their actual life experiences [Fife, 1994]. This, according to “the shifting model”, is not a distortion of reality, but rather a revision of what is possible and normal according to their situation [Paterson, 2001]. This may go some distance in explaining why researchers and patients have not come to grips with the unique contribution that work experience actually makes to the patients’ degree of SWLS.

The only variables that were significantly associated with lower satisfaction with life [Paper IV] were severe fatigue, aorta dissection, and regular contact with a psychologist. One interpretation might be that the person who is regularly monitored by a psychologist indicates a person facing the most psychosocial challenges, and hence suffering from a decreased satisfaction with life (SWL). As the revised symptom management model emphasizes, symptoms continuously change. In this study, it is not possible to capture the fluctuating nature of the participant’s perceived health symptoms. Psychological distress may vary, and the group that received psychological support in this study was small, so there might a spurious association. Therefore, this result must be interpreted with caution.

Aortic dissection might imply emergency or later high-risk surgery, intensive medical treatment, and medical recommendations of comprehensive curtailment of physical activity. The psychological aspect of symptom management of aorta dissection and aorta surgery may be challenging. After receiving diagnostic information about having a dissection, people with MFS frequently become overwhelmed by the disease. This, partly in contrast to a study by Ghanti et al., [2016], that found that patients with MFS had slightly better mental component scores than the general population shortly after undergoing thoracoabdominal aortic surgery, but lower physical component scores. One psychological explanation may be that shortly after having life threatening surgery; patients may experience a period of post-traumatic thriving [Ghanti et al., 2016; Mueller et al., 2016]. Another possible explanation is that people appreciate and value their lives differently short after surviving a life threatening surgery. Some may try to adapt, or at least try to reconcile their strong desire to be normal with the new behavioral requirements facing them. In this light, reporting higher HRQoL shortly after a severe aortic surgery makes sense. Nonetheless, the study of Ghanti et al., [2016] did not measure the long-term effect of aortic surgery or aortic dissection. In a study of genetic aorta disorders [Connors, Richmond, Fisher, Sharpe & Juraskova, 2015], including patients with MFS, they found that the side-effects of surgery and medications caused the

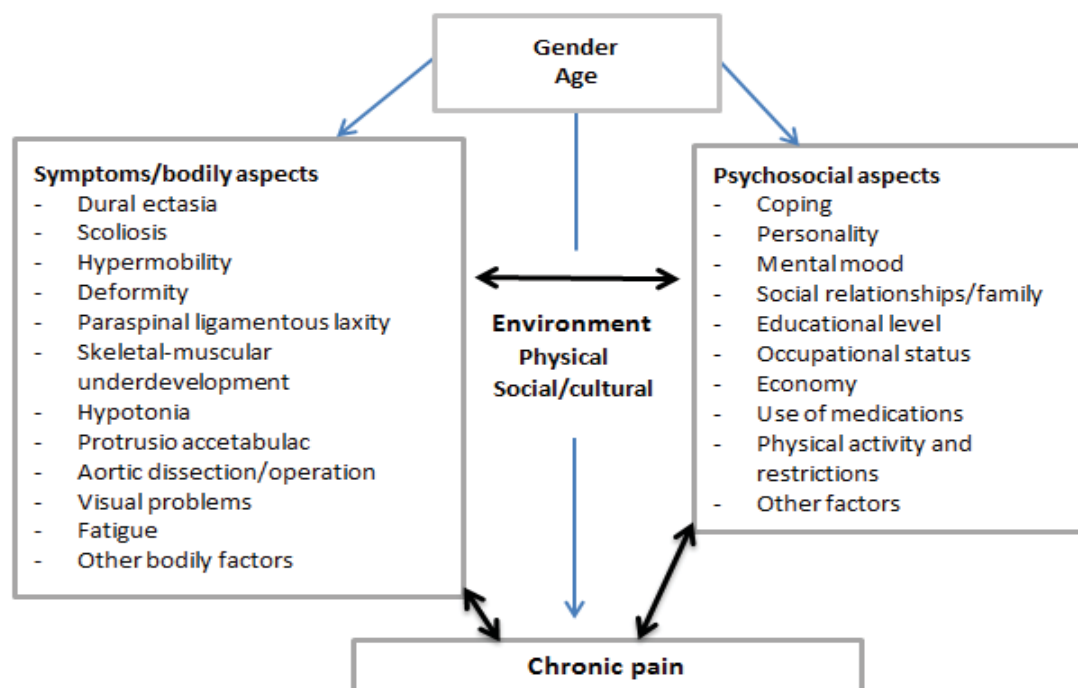
patients an ongoing feeling of loss of bodily control not to mention a feeling of losing one's integration between self and body. The patient's post-surgical condition tended to threaten their view of self and their interactions with the world. Psychological phenomena such as fear of the unknown were activated. These were often described as confusion and accompanied by a sense of helplessness and anxiety [Connors et al., 2015]. It is difficult to have the "healthy perspective in the forefront" when one must live with an aortic dissection that may, at short notice, cause great distress. This may be a reasonable and understandable explanation for why aortic dissection in our study groups was significantly associated with decreased SWL.

The variable with the highest explanatory power in relation to satisfaction with life was fatigue. This might indicate that severe fatigue is a potentially disabling condition, a condition which impairs people's ability to accomplish and perform desired activities, similar to the results in Paper III. It is reasonable to assume that the unpredictable and inexplicable nature of fatigue makes enormous the gap between the current quality of life and the ideal life. The feeling of insufficiency may be overwhelming and the discrepancy between the expectations and the reality may become massive. Human health is intricately tied to the dreams, hopes, attitudes, values, beliefs and understanding of individuals. Health for all people dynamically shift back and forth on a continuum from low to high and high to low in various domain and in overall quality. People are influenced by social conditions while they create their meaning of health and health promotion. To enhance functioning, enable a personal meaningful life quality and support a positive sense of self, social workers can try to utilize skills and resources of many kinds: Internal client resources as well as external support network and community and government resources [Rothman, 2010]. It appears that a greater focus on the psychosocial support, as well as devising strategies to cope with fatigue, aortic dissection and psychological distress should be part of the clinical work involving patients with MFS. The social workers as part of an interdisciplinary team [Emmer, 2003] might aid the process by facilitating recognition and appropriate application of strengths to identifying the needs and concern of the patients.

6.2.4. Chronic pain in adults with Marfan Syndrome

Based on the biopsychosocial model [Engel 1977, 1980] and "The Revised Symptom Management Model" [Dodd et al., 2001] we have tried to illustrate the possible associations among chronic pain and other factors related to having MFS (Figure 10).

Fig. 10 Chronic pain and associated factors in adults with Marfan syndrom (MFS)



The experience of symptoms of chronic pain is a dynamic process involving an individual's perceptions and evaluations of, and response to, the symptoms, as underscored by Humphrey et al., [2008]. The results from Paper V confirm that the prevalence of chronic pain in people with MFS is higher than that found in the general population. Furthermore, the pain affects several anatomic sites and many adults with MFS reported that the chronic pain places definite limits on their daily activities. These results are in line with other studies of chronic pain in patients with MFS [Paper II]. Overall, pain problems associated with MFS are complex and varied, and the origins of these pains are likely quite diverse [Paper II].

No significant association between chronic pain and work participation or other demographic variables was found in the logistic regression analyses in our study sample, in contrast to several other studies of other patient groups [Chapman et al., 2008; Issa et al., 2012; Rustøen et al., 2004; Toye et al., 2015]. The lack of correlation between variables of chronic pain and work participation by members of the study group may indicate that people with MFS have found ways to cope with their chronic pain. There are several possible explanations for this. According to the symptom management model [Dodd et al., 2001], the experiencing of symptoms includes three inter-related concepts: the symptom (chronic pain), the personal evaluation and the responses [Dodd et al., 2001; Humphreys et al., 2008]. In the study group, many reported that chronic pain occurred at a young age and in the clinic we often meet people who are leading active

lives despite chronic pain. This indicates that some may have learned to tune out their bodies and have learned to ignore the symptoms of pain.

In our study group (Paper IV) most people reported that they received regular monitoring from the health services and this usually implies access to information and knowledge about their health condition. From a medical social work's point of view it is important that patients of chronic diseases experience being taken seriously, seen, examined, consulted and recognized can be important for reducing the anxiety and fear associated with chronic pain as underscored by researcher, as well [Geertzen et al., 2006; Steinhaug, 2007; Werner & Malterud, 2003, 2005]. Psychosocial support may help to cope with a life-threatening condition such as MFS, particularly if procedures are initiated that make it possible to reduce the chronic pain such that it becomes a secondary concern. This can be specifically effective if people receive timely information that their pain is not associated directly with medical severity. In addition, it is likely that most participants in the cross sectional study [Papers III-VI] are members of the Marfan Association of Norway. Participation in the Association's programs and meetings may imply knowledge about the diagnosis and development of social networks. Connors et al., [2015] strongly support the view that, for those suffering from a genetic aorta disorder, a social network is essential to the development of adaptive coping strategies and adjustment to life. As social workers, we can try to help the person to avoid adjusting to the disease as a personal disaster, but rather help the client to locate their personal and environmental resources. According to the shifting perspective model of illness, actively facing the illness and sharing common experiences with significant others, are important factors for being able to cope better with the disease and chronic pain [Paterson 2001]. This is similar to what is found in studies of people with MFS [Giarelli, Bernhardt, Mack & Pyeritz, 2008; Peters et al., 2001a, 2001b, 2005].

The only variable that was significantly correlated with chronic pain in the study group was severe fatigue, not MFS related health problems. Both pain and fatigue are symptoms that may be related to the underlying disease. The co-occurrence of pain and fatigue is in line with studies of other patient groups in which it has been found that more fatigue is strongly correlated with more pain or vice versa [Craig et al., 2013; Huyser et al., 1998; Polland et al., 2006; van Dartel et al., 2013]. According to the symptom management model [Dodd et al., 2001], symptoms may be interrelated, interactive, or contribute to the development of other symptoms through psychological, behavioural and social/cultural factors [Brant & Miaskowski, 2010]. It could be hypothesized that pain leads to fatigue due to the energy consumed by prolonged pain suppression and the long term need to control one's pain. Also, fatigue can lead to inactivity, resulting in more pain and a decreased ability to deal with it. These hypotheses suggest that effective treatment of

one of these symptoms may result in relief of other symptoms; conversely, treatment of one symptom may exacerbate another.

In our study we did not ask the participants about their experiences with chronic pain treatment. Only one study is identified as having examined this issue [Nelson et al., 2015]. This study indicates that people with MFS are significantly less satisfied with their chronic pain care than other groups with chronic pain, and that there is a lack of knowledge regarding appropriate treatment of pain in people with MFS [ibid]. This is consistent with our clinical observations. Based on the results from this study, previous research and clinical experiences we recommend that social workers in cooperation with other health professionals systematically identify the chronic pain symptoms in people with MFS, and attempt to investigate the causes of the pain. The patient must experience that their chronic pain is recognized by the professionals and taken seriously as a fact of life [Steinhaug, 2007; Werner & Malterud, 2005]; at the same time, social workers can help the patients to reject the limitations and significance of pain, which is underscored by Paterson et al., [2001]. Adequate therapies and appropriate intervention methods might improve not only people's ability to cope with chronic pain, but also their quality of life, as well. In this manner, the social worker can be able to assist the patients in developing a self-concept where all the dimension of the personhood is important. Due to that, chronic pain is one of the main causes for sick leave in Norway and few evidence-based rehabilitation programs have been developed. There is also a need for more social and health policy commitment regarding the societal challenges related to chronic pain.

6.2.5. Fatigue in patients with Marfan Syndrome

The prevalence of fatigue was significantly higher in the study population than in the general population, which is consistent with other studies of fatigue in MFS patients [Paper VI]. Fatigue viewed within the symptom management model can be examined in terms of how it is experienced, what sort of strategies are generally used by people dealing with fatigue and what kinds of outcomes are key to understanding the experience of fatigue. In our research project, fatigue was the variable that had the greatest significant association with lower decreased work participation, lower satisfaction with life and increased chronic pain. This may indicate that fatigue may be perceived as the most disabling symptom of MFS, and that fatigue is more difficult to deal with in daily life than chronic pain. In the symptoms management model, it is assumed that contextual variables such as personal, health-related and environmental factors influence the dynamic process of symptom experience, management strategies and outcome [Dodd et al., 2001]. It could be the case that symptoms of fatigue are either trivialized, rejected or treated as a contested illness more than the

symptoms of chronic pain. This view is supported by clinical experience and previous research into the details of other diseases [Koornstra et al., 2014; Skerman, 2010]. The unclear causes and commonality of fatigue may be factors that make it particularly difficult to communicate and explain to others; thus few workplace accommodation and treatment programs are available (Paper III). In addition, it might be more difficult “to tune out the body” and ignore the fatigue, than it is to tune out the chronic pain. In studies of cancer, fatigue is experienced as the most distressing effect of cancer, and can have a major effect on a person’s quality of life [Skerman, 2010; Koornstra et al., 2014]. Even though fatigue is a very distressing symptom of several diseases health services have not paid much attention to it, nor do caregivers tend to report it [Skerman, 2010; Prince, 2016].

In the welfare society, societal structures are designed to support and assist members of society to live meaningful lives. It is undeniable that some of these structures and mechanisms limit, disempower and devalue people with fatigue, rather than supporting them [Rothman, 2010]. It will be essential to understand the function of physical and medical aspects of fatigue in a societal context. A task for social workers may be to reveal how structural and institutions factors may counteract and inhibits people’s possibilities for improvement of fatigue.

Since people with Marfan syndrome often experience episodic disabilities with symptoms as severe fatigue and chronic pain they may feel that they are neither always sick nor always well, because the move between periods of health and illness, they can have difficulties fitting into the standardized categories of disabled or able persons. Stone [2005:294], claims that “the hegemony of dualistic thinking means that there is a problematic divide between disabled and able”. Stone [1995], also argues that people have difficulties imagining that someone who appears able-bodied may nevertheless have disabilities and commonly believe such disabilities are not “real”. Humphrey [2008] indicates that there is an embedded cultural skepticism and marginalization surrounding individual with less-tangible, fluctuating disabilities as fatigue and chronic pain. Boyd [2012], argues that the idea of disability as a procedural phenomenon is central to trying to build a shared conceptualization of the fluctuating or recurring symptoms That an impairment is an ongoing, dynamic part of an individual’s identity, that tend to vary [Boyd, 2012]. To conceptualize the often-intangible lived experiences of people with MFS, it will be important to bring both a medical and social consideration of disability together [Boyd, 2012]. Central to the research and the model for developing measurement will be a focus on the individual as well as the social and cultural environment and its responsibilities, and the opportunity to consider mental and physical well-being in the context of flexible inclusion. To meet these problems, it will be important to consider the symptoms, the impairments, and the difficulties carrying out day-to-day activities and the contextual factors, that is, the social and environmental, and the intrinsic, personal attitudes about how the

disability is experienced, and also the triggers that cause significant episodes of disability (Boyd, 2012).

From the standpoint of critical realism, an explanation may be that different mechanisms working at different levels maintain and reinforce the challenges of living with fatigue in our society. From a socio-economic perspective, the population is expected to be productive, to work and “pull their weight” in society; at the rationality of the mainstream culture, at least in Europe, the recognition of illness is based on objective medical signs; from the sociological perspective the social relationships- the sense of belonging to society and having an identity there- are based on mutuality and a sense of reciprocity, while from the point of view of psychology, “satisfaction with life” is based on the relation between the current, experiential quality of life and the ideal. People might be exhausted for a combination of reasons: the lack of productivity in the socio-economic dimension; the lack of recognition from the society in the culture dimension; the lack of understanding from the surroundings in the psychosocial dimension and the feeling of inadequacy in the psychological dimension. This in turn can affect the biological aspect of one’s life; people’s fatigue may increase as the non-corporeal factors impinge on the body and its functioning. The challenge is to devise ways to transcend these mutual reinforcing mechanisms and improve conditions such that the patient can better manage fatigue.

At the individual level, more focus on the experiences, symptoms, causes, coping strategies and treatments of fatigue in individuals with MFS [Paper VI] and other diagnoses are needed [Garssen et al., 2004]. Since, fatigue is a multifaceted concept covering physiological, psychological and social aspects a holistic approach will be required. The symptoms of fatigue may be interrelated and interactive in a dynamic process of symptom experiences, management strategies and outcomes in relation to the environment of the patient.

Social workers may help people with fatigue to avoid the internalizing of society negative stereotypes of being “less normal” or “less capable” than others, by utilizes the individual definition of the problems and need. People need to be viewed as a person, not as a diagnosis, but at the same time, the “bio” as a part of the bio-psycho-social must not be omitted as underscored by Rothman [2010]. Focusing on the application of individual and societal strength can utilize creation of positive change on both individual and society.

To understand and explain behavior is inevitably a complex task, because of the range and combined effects of the different mechanisms. The combination of multiple theories in this study yield a more complete picture of the complex phenomenon studied. Use of the “person-in-environment, and biopsychosocial model in combination with the symptom management model and

the shifting perspective model of chronic illness have shown to be appropriate for research in medical social work.

7. CONCLUSIONS AND IMPLICATIONS

7.1. Conclusions

In line with the reviews [Papers I-II], the cross-sectional part of this study confirms that people with MFS experience particular psychosocial challenges due to living with the diagnosis of MFS. Still, it is important to emphasize that most people with MFS [Papers III-VI] seems to cope well with the diagnosis, despite comprehensive health problems. Most young people with MFS were working full time, and had families and children. However, they leave the workforce earlier than the general population. They have less satisfaction with life compared to the general population; moreover, the prevalence of perceived health problems such as chronic pain and fatigue were significantly higher in the study group than in the general population. These findings suggest there is room for improvements, and require better explanations of pain and fatigue. This information is useful when designing methods for managing pain and fatigue, as well as for devising better work accommodations and rehabilitation programs for people with MFS. Paper III-VI shed light on some important aspects concerning work participation, including risk factors for early retirement.

However, the premises for obtaining and maintaining work by people with disabilities, such as MFS, vary from country to country. The potential influence of the different welfare systems in different countries also needs to be considered, particularly since variations between social and health services place different demands on individuals living with chronic disease. The health problem that seems to have most negative impact on work participation and SWL was severe fatigue, not MFS-related health problems, such as aortic dissection, visual problems, nor chronic pain. Work participation did not correlate significantly with a higher level of SWL, but severe fatigue was the most significant variable associated with lower SWL. This affirms the view that fatigue is a major issue for this patient group.

In summary this thesis elucidates some of the complexities involving the psychosocial aspects of a diagnosis, but also provides suggestions for possible improvement of people with MFS and disease-related patient groups. MFS is a lifelong condition that requires rehabilitation in different periods. The patients are vulnerable to loss of function and it is important to maintain their levels of functioning. Rehabilitation may provide a “nudge” to get started, to find suitable activities and to provide optimal levels of training. By pinpointing the challenges in the work place and by preparing young people with MFS for their future, it may be possible to improve the work life and overall life satisfaction for those suffering from MFS [*Connective Tissue*, winter 2016].

7.2. Implications for medical social work

This research project verified that medical social work can play an important role in the field of chronic illness and disability. The phenomenon studied in this research project is complex and illustrates that both the “person-in-environment” combined with the biopsychosocial perspective is an important approach to acquiring a deeper understanding of the psychosocial aspects of living with a chronic disease. It illuminates the fact that humans are complex entities, interconnected individuals in dynamic interaction with their families, next of kin, working environment, societal institutions and general environment. Large system functioning depends on a holistic integration of biological, psychological and sociocultural factors. Helping people to manage their symptoms in interaction with their surroundings is assisted when social workers and policy-makers adopt a biopsychosocial approach.

Having a disease such as MFS may be a continuous and shifting process in which the patients and their relatives constantly alternate between having the disease in focus and having the “healthy life” in the forefront. People’s identity is dynamic in an ever-changing context, and the experiences of having a disability is also dynamic and changes with context and circumstances. From the perspective of a medical social worker, psychosocial support for those afflicted by MFS comprises psychological intervention and empowerment strategies combined with providing information to the patients about possible measures and services. When, psychologically speaking, people have “wellness in the foreground, they envision opportunities and possibilities for themselves despite having a chronic disease. Helping the person to find psychological, practical and economic possibilities for improving their situation, enables a cohesive change in people’s lives. Social workers must also be aware of the balance between power and control and the role of expediency in supporting patient-determination, empowerment and self-advocacy [Rothman, 2010]. The individual medical model of disability may be oppressive [Houston, 2005; Thomas, 2012], but remain central to planning, delivering and reimbursing services for people with diseases and disability. The diagnosis or disease might be required to receive reimbursement for services and access for resources. Rather than distancing oneself from the bio, social workers must pursue reclaiming the “bio” dimension as an essential part of every individual. Omitting the physical aspects that affect and impact function would be an incomplete and self-defeating approach. At the same time, social workers as profession are in front lines of many of the societal challenges, and thus have the possibility of revealing social structures that limit, disempower and devalue people both with and without disability.

The research indicates that for researchers and clinicians in medical social work, it is important to illuminate and counteract social attitudes and barriers that prevent people with impairment from participating on the same level as others in society. Pursuing descriptive research by following principles of critical realism, it should be possible to reveal patterns of behavior and social outcome. By identifying structures and mechanisms, it is possible to critically analyze and illuminate how they work and how they can be changed. Therefore, research may also have a creative and emancipatory function, which is an important goal for social work [IFSW 2016]. More focus on the social barriers and challenges met by people with impairment may prevent people from becoming disabled and should help to diminish society's lack of respect for diversity in ways of living.

7.3. Implications for social and health politics.

People, who grow up with a severe disease that influences several aspects of their lives, often find that they have to use more energy to maintain a socially acceptable “normal life”. It seems that work adaptations and work accommodations made for people with chronic pain and fatigue are either limited or non-existent. In clinic work we often meet people with comprehensive health problems such as MFS who tell us that they have had to use their right to take sick leave in some periods in order not to lose their full-time jobs. According to the regulations of the Norwegian Welfare System, people's work capacity must decrease by at least 50 % for them to be granted a disability pension or rehabilitation benefits (AAP)⁶. People whose work capacity due to comprehensive health problems is deemed to be less than 50 % will not be fully financially compensated for their reduced income. It may be that the Norwegian Welfare System does not fully address the needs of people with congenital diseases. More flexible welfare programs would appear to be appropriate for some groups in order to maintain work participation. Periodic disabilities that are usually unseen, and may share the symptoms of fatigue and chronic pain have traditionally not received official recognition as other forms of chronic disability. Employers may not be aware of the need for accommodation. Lack of accommodation can result in lower rates of employment and increased work-related absences among disabled employees [Reeve & Gottselig, 2011]. In addition, the continuous shifting process in the individual's consciousness, from being sick to bringing to the fore a sense of having a healthy life, is challenging for many people with diseases such as MFS. As mentioned above, the continually changing nature and condition of a

⁶ There are some exceptions when applicants have private insurance.

disease can make its sufferers face particularly difficult challenges when it comes to competing and participating in a labor-market that requires continuity and reliability.

There is a need to recognize the potential for variation among different groups of disabled people. Furthermore, the intensity of the affliction may well change over time in some people; thus every individual situation must be considered carefully. It will be beneficial for both the individual and society if people have the possibility to utilize their work capacity, despite the shifting nature of their illness. In conclusion, one should emphasize that it is neither possible nor desirable that absolutely everyone with health problems should be employed in paid work. Some may have health problems that do not allow them to work, while others may experience that their health problems are exacerbated by working. In such cases, it is important that the disability pension and the welfare system are flexible and generous enough for a decent life. But, for those who can and will work, health problems should not limit their wishes. How this should be facilitated is open to discussion and there are no definitive answers. However, the authorities and the health and social services authorities must increase the respect for diversity by equalizing and facilitating active participation for and by all people in society.

7.4. Further research

Using a critical realist model, this study has enabled the possibility of incorporating different levels of reality in the analyses, but it is important to bear in mind that the various realms of reality are interrelated and entwined, and features of each may either support or counteract one another. The outcome in a specific context consists of a very complex interplay between aspects and mechanisms, and in a research project it is not possible to grasp all levels of people`s lives [Danermark et al., 2001, 2005]. According to the critical realism approach, there are no correct explanations of how these mechanisms work, but some explanations may be more reasonable than others. More research and further investigations into the specific nature of the psychosocial aspects of MFS are needed.

Our research project has shown that having MFS may influence people`s work participation, but that the correlations between MFS and work are complex. This study also verified that most people with MFS manage to live well with the diagnosis despite comprehensive health problems. Coping strategies, other psychological aspects, physical activities, work-related factors and work-place accommodation are important factors among other groups of participants [Achtenberg, Wind, Fring & Dresen, 2012; Harder et al., 2012;

Hogan et al., 2012]. More knowledge about chronic pain and fatigue in patients with MFS, and how to improve people`s life satisfaction are also needed. We suggest a mixed-method approach, which combines quantitative and qualitative methods on a larger group of patients with verified diagnosis. This may give a broader and deeper understanding of how people with MFS experience work participation, how they consider education and how they cope with MFS-related health problems, chronic pain, and fatigue. The assessment of the psychosocial factors for patients with MFS should also be further explored in other cultures and geographical regions, including Eastern Europe, South America, Asia, Africa, and Australia. It is a particular challenge to conduct studies on rare diagnoses due to the small the sample sizes. International collaborative studies, using the same study design and validated tools, and including only people with verified diagnosis, are recommended. This might contribute to a better understanding of the psychosocial aspect of MFS, across diverse cultural differences.

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Appendices

- Information letter to participate in this research project.
- Declaration of consent
- Recommendation from the Regional Ethic Committee for Medical and Health research in eastern Norway (REK)
- The questionnaire



Til deg som har Marfans syndrom

Forespørsel om deltagelse i forskningsprosjekt;

**”Å leve med Marfans syndrom.
Utfordringer i utdanning, arbeid og hverdagsliv”**

- en spørreskjemaundersøkelse

Dette er et spørsmål til deg om å delta i en forskningsstudie for å undersøke hvilke erfaringer og utfordringer personer med diagnosen Marfans syndrom opplever i utdanning, arbeid og hverdagsliv. TRS Sunnaas sykehus er ansvarlig for studien.

En av TRS sine oppgaver er å medvirke til at personer med Marfans syndrom skal få best mulig tilbud og at tiltak settes inn på rett tidspunkt. TRS skal blant annet gi råd og veiledning i forhold til valg av utdanning, å kunne bli i arbeid og å trappe ned i arbeidslivet.

Det finnes lite systematisk kunnskap på dette området og vi må derfor i stor grad støtte oss på klinisk erfaring. TRS vil derfor i samarbeid med Marfanforeningen gjennomføre en studie av disse problemstillingene.

Vi håper du har mulighet til å svare på vedlagte spørreskjema, det tar ca 45 minutter å fylle det ut. Du finner mer informasjon om studien og om hvordan du samtykker til å delta på neste side.

Dersom du har spørsmål om studien kan du ringe en av oss. Hvis du har behov for å snakke med noen etter å ha fylt ut skjemaet kan du også henvende deg til oss eller andre på TRS.

Med vennlig hilsen

Gry Velvin
Tlf: 66969330

Trine Bathen
Tlf 66969354

Hensikt

Hensikten med studien er å få mer systematisk kunnskap om livssituasjonen for personer med Marfans syndrom og mer forståelse av de utfordringer personer med Marfans syndrom møter i utdanning, arbeid og hverdagsliv. Denne kunnskapen mener vi kan være nyttig både for personer med Marfans syndrom, deres pårørende og fagfolk på ulike nivåer.

Hva innebærer studien?

Hvis du ønsker å delta i studien, må du fylle ut spørreskjemaet og returnere dette sammen med samtykkeskjemaet bakerst i dette informasjonsskrivet, i vedlagte frankerte konvolutt.

Du må svare på spørsmål som omhandler diagnosen, selvopplevde helseplager, livskvalitet, utdanning, arbeid og hverdagsliv. Noen spørsmål er utviklet på TRS, mens andre er tatt fra standardiserte spørreundersøkelser brukt på andre diagnosegrupper og befolkningen generelt.

Forløpstudie

Det er planlagt å gjenta spørreskjemaundersøkelsen på et senere tidspunkt for å kunne følge endringer i livsløpet. Hvis du er aktuell som deltaker for en senere studie vil du få ny forespørsel om å delta i en slik studie.

Mulige fordeler og ulemper

En mulig ulempe ved å delta er at du må sette av litt tid for å kunne svare på alle spørsmålene. For noen kan enkelte spørsmål kanskje oppleves litt vanskelig å svare på.

Du vil ikke ha noen spesielle fordeler av studien, men vi håper at resultatene fra studien vil kunne være til hjelp for personer med diagnosen Marfans syndrom.

Hva skjer med informasjonen om deg?

Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Alle opplysningene vil bli behandlet uten (direkte gjenkjennende opplysninger som) navn og fødselsnummer.. 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.

Deltakelse er frivillig og det er lov å ombestemme seg og

Deltakelse i studien er frivillig. Du vil få din oppfølging av TRS som vanlig, uavhengig av om du velger å delta eller ikke. Dersom du ikke ønsker å delta trenger du ikke oppgi noen grunn og det får ingen konsekvenser for deg. Du kan også når som helst trekke ditt samtykke til å delta i studien uten at det medfører noen ulemper for deg. Velger du å delta 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. Trekker du deg fra studien, kan du kreve å få slettet innsamlede opplysninger. Opplysningene vil bli slettet innen 2020.

Samtykke

Dersom du ønsker å delta, undertegner du vedlagt svarskjema og samtykkeerklæring og sender denne sammen med det besvarte spørreskjemaet i vedlagt konvolutt.

Ta gjerne kontakt med en av oss dersom du lurer på noe eller trenger mer informasjon om prosjektet.

Med vennlig hilsen

Gry Velvin
Prosjektleder
Seniorrådgiver, Sosionom/cand.polit

Trine Bathen
Prosjektmedarbeider
Ergoterapispesialist, masterstudent

Svend Rand-Hendriksen
Prosjektveileder
Seniorrådgiver Overlege Phd, postdoc.

Lena Haugen
Prosjektansvarlig
Enhetsleder TRS



Svarslipp og samtykkeerklæring til prosjektet

”Å leve med Marfans syndrom. Utfordringer i utdanning, arbeid og hverdagsliv”

- en spørreskjemaundersøkelse

Etternavn, mellomnavn, fornavn _____

Fødselsdato: Dag Måned År

Jeg ønsker å delta:

Jeg trenger mer informasjon, vennligst ta kontakt med meg:

Jeg kan nåes på følgende telefonnummer: _____

Jeg er klar over at jeg til enhver tid kan trekke meg fra undersøkelsen, og kan forlange opplysninger om meg slettet fra databasen på TRS.

Dato: _____ Sted: _____

Underskrift: _____



UNIVERSITETET I OSLO

DET MEDISINSKE FAKULTET

Overlege Svend Rand-Hendriksen
Sunnaas TRS kompetansesenter
Steinveien 3
1450 Nesoddtangen

**Regional komité for medisinsk og helsefaglig
forskningsetikk Sør-Øst A (REK Sør-Øst A)**
Postboks 1130 Blindern
NO-0318 Oslo

Telefon: 22 84 46 66

Dato: 02.02.2011

E-post: post@helseforskning.etikkom.no

Deres ref.:

Nettadresse: <http://helseforskning.etikkom.no>

Vår ref.: 2010/3322a

2010/3322a Å leve med Marfans syndrom- Utdanning, arbeid og hverdagsliv, en tverrsnittsstudie.

Vi viser til søknad om forhåndsgodkjenning av ovennevnte forskningsprosjekt. Søknaden ble behandlet av Regional forskningsetisk komité for medisinsk og helsefaglig forskningsetikk i møtet 13. januar 2011. Søknaden er vurdert i henhold til lov av 20. juni 2008 nr. 44, om medisinsk og helsefaglig forskning (helseforskningsloven) kapittel 3, med tilhørende forskrift om organisering av medisinsk og helsefaglig forskning av 1. juli 2009 nr 0955.

Prosjektleder: post doc/overlege Svend Rand-Hendriksen

Forskningsansvarlig: Sunnaas sykehus HF

Søknaden gjelder en tverrsnittstudie av alle voksne brukere ved TRS (Trenings- og rådgivningscenter) kompetansesenter med bekreftet Marfans syndrom. Studien skal gjennomføres som en kvantitativ kartleggingsstudie med spørreskjema. Gjennom undersøkelsen tar en sikte på å få oversikt over når symptomer oppstår, alvorlighetsgrad av symptomer og utfordringer i dagliglivet i tilknytning til utdanning og arbeid. Målsetninger er å kunne beskrive gruppens behov, utvikle bedre og mer effektive rehabiliteringstiltak og tilrettelegge for deltakelse i arbeidsliv og samfunnsliv. Hovedspørsmålene er om helserelatert livskvalitet er annerledes for personer med Marfans syndrom enn andre og om det er en sammenheng mellom helserelatert livskvalitet og deltakelse i arbeid/utdanning. Det er gjennomført en pilotstudie, samt validering av spørreskjemaene.

Komiteen har vurdert prosjektet og har ingen innvendinger til prosjektopplegget bortsett fra at det må gjøres noen endringer i informasjonsskrivet.

- "Forespørsel om deltagelse i forskningsprosjekt" (og evt. prosjektets tittel) bør være hovedoverskrift på informasjonsskrivet og ikke invitasjon til å delta osv.
- Det bør opplyses om at det er en spørreskjemaundersøkelse på første side.
- Det må anslås hvor lang tid det tar å fylle ut spørreskjemaene.
- Utformingen av forespørselen og informasjonsskriv skal være nøytral i sin form. Derfor virker setningen "Verdien av studien vil bli større jo flere som deltar..." uheldig.
- Nei-alternativet i samtykkeerklæringen bes strøket, da man ikke skal behøve å aktivt tilkjennegi at man ikke ønsker å delta i studien

Vedtak:

Prosjektet godkjennes under forutsetning av at informasjonsskriv med samtykkeerklæring blir endret i samsvar med det som er nevnt ovenfor.

Godkjenningen gjelder til 31.12.2020.

Godkjenningen er gitt under forutsetning av at prosjektet gjennomføres slik det er beskrevet i søknaden og i samsvar med de bestemmelser som følger av helseforskningsloven med forskrifter.

Dersom det skal gjøres endringer i prosjektet i forhold til de opplysninger som er gitt i søknaden, må prosjektleder sende endringsmelding til REK.

Forskningsprosjektets data skal oppbevares forsvarlig, se personopplysningsforskriften kapittel 2, og Helsedirektoratets veileder for «Personvern og informasjonssikkerhet i forskningsprosjekter innenfor helse- og omsorgssektoren». Personidentifiserbare data slettes straks det ikke lenger er behov for dem og senest ved prosjektets avslutning.

Prosjektet skal sende sluttmelding på eget skjema, se helseforskningsloven § 12, senest et halvt år etter prosjektslutt.

Komiteens vedtak kan påklages til Den nasjonale forskningsetiske komité for medisin og helsefag, jfr. helseforskningsloven § 10, 3 ledd og forvaltningsloven § 28. En eventuell klage sendes til REK sørøst A. Klagefristen er tre uker fra mottak av dette brevet, jfr. forvaltningsloven § 29.

Vennligst oppgi vårt saksnummer/referansennummer i korrespondansen.

Med vennlig hilsen

Gunnar Nicolaysen (sign)
Professor
Leder

Jørgen Hardang
Komitésekretær



Spørreskjema til prosjektet: "Å leve med Marfans syndrom, utfordringer i utdanning, arbeid og hverdagsliv"

I dette spørreskjemaet stiller vi en del spørsmål om hvilke erfaringer og utfordringer dere med diagnosen Marfans syndrom har opplevd i ulike sammenhenger.

De fleste spørsmålene har avkrysningsbokser. Sett kryss i den eller de rutene som passer best. Noen spørsmål har i tillegg kommentarfelt; skriv utfyllende opplysninger der, skriv også hvis svaralternativene ikke passer. Dersom du har kommentarer til spørreskjemaet, er det plass til disse på siste side.

Spørsmålene har vi valgt på bakgrunn av litteratursøk, erfaring med problemstillinger i klinikken og etter innspill fra Marfan foreningen. Noen spørsmål er laget spesielt til denne studien, andre spørsmål er lånt fra tilsvarende studier (TRS studie i forhold til kortvokste, helseundersøkelsen i Nord-Trøndelag (HUNT) og arbeidskraftundersøkelsen).

Bakerst i spørreskjemaet (side 16-22) har vi tatt inn noen internasjonale standardiserte spørreskjemaer. Disse har vært brukt til beskrivelse av personer med andre diagnoser og befolkningen generelt. Dette gjelder områder som: tretthet (fatigue), tilfredshet med livet og helserelatert livskvalitet. De standardiserte skjemaene kan vi i liten grad endre på, derfor kan noen spørsmål passe dårlig for noen. Prøv å svare så godt du kan.

Spørreskjemaet er omfattende, men vi håper likevel at du har anledning til å svare på alle spørsmålene.

På forhånd takk for hjelpen
Mvh

Gry Velvin
Sosionom

Trine Bathen
Ergoterapeut

Spørreskjemaet returneres i vedlagt konvolutt til:
TRS kompetansesenter for sjeldne diagnoser, Sunnaas sykehus HF, 1450 Nesoddtangen

1. Bakgrunnsopplysninger, besvares av alle

1.01 Fødselsår _____

1.02 Kjønn Kvinne
 Mann

1.03 Hvor gammel var du da du fikk diagnosen Marfans syndrom
Alder: Vet ikke

1.04 Har du andre diagnoser? Nei Ja

Hvis ja, beskriv

.....
.....

1.05 Sivilstatus Ugift
 Gift/samboer
 Enke/ enkemann
 Separert/skilt

1.06 Hvem bor du sammen med? Bor alene
 Foreldre
 Søsken
 Ektefelle/samboer
 Egne barn
 venner
 Andre:

1.07 Har du egne barn? Nei Ja

Hvis ja, hvor mange?

1.08 Hvis ja, har noen av barna diagnosen Marfans syndrom? Nei Ja

Hvis ja, hvor mange har diagnosen?

.....

1.09 Er det andre med diagnosen Marfans syndrom i familien? Mor
 Far
 Søsken
 Andre.....

2. Spørsmål om helseproblemer/ plager, besvares av alle

Under finner du spørsmål om helseplager som følge av Marfans syndrom. Vi vil gjerne vite hvilke følger av Marfans syndrom du har fått påvist og hvilke helseplager du opplever.

2.01 Hjerte – kar systemet:

Har du fått påvist utvidet aorta? Nei Ja Vet ikke
 Har du fått påvist aortadisseksjon? Nei Ja Vet ikke
 Har du gjennomgått operasjon i aorta/
 andre blodårer? Nei Ja Vet ikke

Evt andre operasjoner i
 hjerte/karsystemet?

Bruker du blodtrykkssenkende
 medisiner (betablokkere?) Nei Ja Vet ikke

Hvis ja, ca. hvor gammel var du da du
 begynte du med blodtrykkssenkende
 medisiner?

Har du fått begrensninger/ anbefalinger
 i forhold til hvor mye du skal anstrenge
 deg fysisk? Nei Ja Vet ikke

Hvis ja, beskriv

2.02 Øyne og syn:

Har du fått påvist løse linser? Nei Ja Vet ikke
 Har du fjernet linsene? Nei Ja Vet ikke
 Har du fått påvist netthinneløsning? Nei Ja Vet ikke

Har du synsvansker som følge av
 dette? Nei Ja

Hvis ja, beskriv:

Besvares av alle

Muskel – skjelettapparatet:

2.03 Er du myk/ ekstra bevegelig (hypermobil) i noen ledd i kroppen?

Håndledd	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere
Fingerledd	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere
Albuer	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere
Skuldre	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere
Nakke	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere
Rygg	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere
Hofte	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere
Knær	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere
Ankel/ føtter	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> Var tidligere

2.04 Er du spesielt stiv (nedsatt bevegelighet) i noen ledd i kroppen?

Håndledd	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder
Fingerledd	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder
Albuer	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder
Nakke	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder
Skuldre	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder
Rygg	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder
Hofte	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder
Knær	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder
Ankel/føtter	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja	<input type="checkbox"/> forverret med alder

2.05 Har du skjevhet i ryggen (scoliose)? Nei Ja

Hvis ja, er du operert for det? Nei Ja

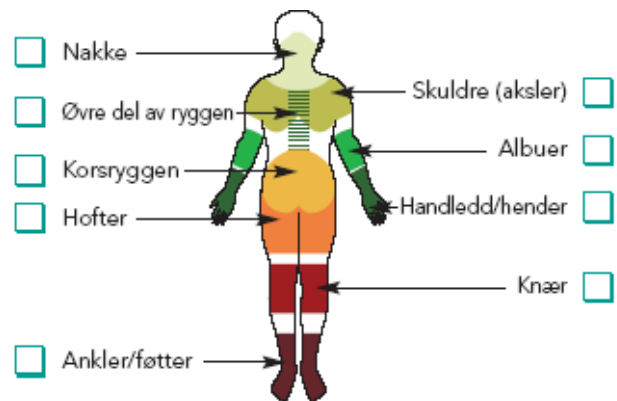
Besvares av alle

Spørsmål om muskel - skjelett smerter

- 2.06 Har du i løpet av det siste året vært plaget av kroniske smerter og/eller stivhet i muskler og ledd som har vart i minst 3 måneder sammenhengende? Nei Ja

Hvis ja:

Hvor har du hatt disse plagene? (sett ett eller flere kryss)



Har plagene hindret deg i å utføre daglige aktiviteter?

- Husarbeid Nei Ja
- Arbeid Nei Ja
- Fritid Nei Ja

Husker du når smertene oppsto? Nei Ja

Hvis ja, ca tidspunkt?

- Ja, i barnealder (0-12 år)
- Ja, i ungdomsalder (13 – 18 år)
- Ja, i ung voksenalder (19 år – 35 år)
- Ja, i voksenalder (36 år og eldre)

.....

- 2.07 Har du i løpet av det siste året vært plaget av annen type smerte i kroppen som har vart i ca 3 måneder? Nei Ja

Hvis ja; beskriv

.....

.....

Besvares av alle

2.08 Opplevd belastning

Tenker du at det å ha Marfans syndrom eller Marfan relaterte symptomer – har vært belastende i forskjellige livsfaser?

Ingen belastning Noe Belastning Stor belastning Ikke aktuelt

Kryss av for det du synes passer, slik du husker det

	Ingen belastning	Noe Belastning	Stor belastning	Ikke aktuelt
a. Da jeg begynte på skolen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. De siste årene i barneskolen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I tenårene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Som ung, endelig voksen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Under utdanning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Ved etablering i arbeidslivet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Etter flere år i arbeidslivet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Ved graviditet og fødsel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Som småbarnsforeldre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Da jeg ble uføretrygdet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Spørsmål om utdanning og arbeid, besvares av alle

- 3.01 Hva er din høyest fullførte utdanning?
- Grunnskole/ niårig skole (folkeskole/framhaldsskole)
- Videregående skole yrkesfag/fagbrev
- Videregående skole allmenfag/ studiespesialiserende
- Høyskole/universitet inntil 4 år
Hvilken utdanning.....
- Høyskole/universitet mer enn 4 år
Hvilken utdanning.....
- Annet
.....

- 3.02 Har du noen gang avbrutt skolegang/utdanning? Nei Ja

Hvis ja, hvilken og hvorfor?

.....

.....

- 3.03 Har du noen gang fått individuell yrkesveiledning / hjelp til å velge yrke? Nei Ja
- Hvis ja, beskriv

.....

.....

Besvares av alle

- 3.04 Hva gjør du på dagtid nå?
- Under utdanning
 - Under omskolering/attføring
 - I arbeid, heltid
 - I arbeid, deltid, stillingsprosent.....
 - Uføretrygd, aktiv i foreningsarbeid/frivillig arbeid
 - Uføretrygd, ikke aktiv i foreningsarbeid/frivillig arbeid
 - Hjemmearbeidende
 - Annet
-

4. Spørsmål om daglige gjøremål og tilrettelegging i hverdagen, besvares av alle

4.01 Får du hjelp til daglige gjøremål?

Kryss av for det svaralternativet du synes passer

	Aldri	Nesten aldri	Noen ganger	Ofte	Alltid
Til egenomsorg; daglig hygiene og påkledning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Til matlaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Til lettere husarbeid; rydde og tørke støv	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Til tyngre husarbeid; gulvvask og støvsuging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Til vask av klær	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Til handling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Til ute arbeid; klippe gress og måke snø	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.02 Hvis du mottar hjelp, hvem hjelper deg? (Familie/ venner, privat rengjøringshjelp, hjemmehjelp, hjemmesykepleie, personlig assistent, andre)

Beskriv:

.....

Besvares av alle

- 4.03 Bruker du noen tekniske hjelpemidler hjemme?
- Nei, ingen
 Arbeidsstol
 Hjelpemidler til matlaging
 Hjelpemidler til hygiene/ påkledning
 Synshjelpemidler (f.eks tilpasset datautstyr)
 Hjelpemidler for å bevege deg rundt (krykker, rullestol...)
 Annet;

- 4.04 Bruker du noen ortopediske hjelpemidler?
- Nei, ingen
 Fotsenger/ innleggssåler
 Ortopedisk fottøy
 Støtteortoser/ skinner for ankler /knær
 Støtteortoser/ skinner for håndledd
 Fingerortoser/ringer
 Korsett for ryggen
 Annet;

- 4.05 Opplever du spesielle utfordringer med å finne passende klær og sko?
- Nei Ja
- Hvis ja, har du funnet løsninger du kan gi råd om til andre?
- Beskriv.....
-

- 4.06 Bruker du offentlige kommunikasjonsmidler?
- Aldri Noen ganger Ofte
- Har du vansker med å bruke offentlige kommunikasjonsmidler på grunn av forhold knyttet til Marfan diagnosen?
- Nei Ja

Hvis ja, kommenter gjerne.....

.....

- 4.07 Kjører du bil selv?
- Nei Ja

- 4.08 Har du noen gang fått støtte til bil gjennom folketrygden?
- Nei Ja

Hvis ja, til hva:

- Til anskaffelse
 Til tilpasning
 Til førerkortopplæring

Kommentar:

.....

.....

Besvares av alle

4.09 Har du parkeringstillatelse for funksjonhemmede? Nei Ja

4.10 Har du TT kort? Nei Ja Har hatt tidligere

5. Spørsmål om oppfølging av din diagnose og hvilke kontakter du har med hjelpeapparatet, besvares av alle

5.01 Har du medisinske oppfølging/kontroller knyttet til diagnosen? Nei Ja

Hvis ja: Hva følges opp?

Hvor ofte?

- Aorta (hjerte/kar systemet)
 Øyne/ syn
 Skjelett
 Nakke/skuldre
 Rygg
 Hofter/knær
 Ankler/føtter
 Armer/hender
 Annet, hva

.....

5.02 Er fastlegen involvert i oppfølgingen av diagnosen Nei I blant Ja, regelmessig

5.03 Har du hatt kontakt med hjelpeapparatet i kommunen de siste 12 månedene?

Fastlege	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja
Ergoterapeut	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja
Fysioterapeut	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja
Psykolog	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja
Hjemmehjelp	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja
Psykiatrisk sykepleier	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja
NAV	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja
Andre:.....	<input type="checkbox"/> Nei	<input type="checkbox"/> Ja

5.04 Har du en kontaktperson/koordinator i kommunen? Nei Ja

5.05 Har du individuell plan? Nei Ja

Besvares av alle

5.06 Mottar du /har du mottatt ytelser fra NAV? Nei Ja

Hvis ja hvilke(n)?

Grunnstønnad, hvilken sats:..... Har Har hatt

Hjelpetønnad Har Har hatt

NAV dekker arbeidsgiverperioden ved sykemelding Har Har hatt

Arbeidsavklaringspenger (tidligere rehabiliteringspenger/attføring og tidsbegrenset utføretrygd) Har Har hatt

TULT – Tidsubegrenset lønns-tilskudd eller tidsbegrenset lønns-tilskudd Har Har hatt

Gradert uføretrygd Har Har hatt

Hel uførepensjon Har Har hatt

Tilleggspensjon som for eksempel ung ufør Har Har hatt

Økonomisk sosialhjelp Har Har hatt

Omsorgslønn til familiemedlem Har Har hatt

Støttekontakt Har Har hatt

Andre ytelser – beskriv Har Har hatt

6.0 Spørsmål om økonomi, besvares av alle

6.01 Hvordan vil du beskrive din økonomiske situasjon? Ikke god Middels God

6.02 Opplever du at diagnosen har påvirket din økonomi?

- ifht redusert arbeidsevne og inntektsmulighet
- ifht økte utgifter

Nei Ja Vet ikke
 Nei Ja Vet ikke

Beskriv:

.....

7.0 Besvares kun av de som er under utdanning

- 7.01 Hva slags utdanning holder du på med? Videregående skole
Studieretning.....
- Høyskole
Hvilken utdanning.....
- Universitet
Hvilken utdanning.....
- Annet
- 7.02 Har du søkt opptak og kommet inn på utdanning på særskilte vilkår? Nei Ja
- 7.03 Hvilket yrke sikter du deg inn på?
-
-
- 7.04 Har du hatt kontakt med rådgiver/konsulent for funksjonshemmede på utdanningsstedet ? Nei Ja
- 7.05 Har du tilrettelegging i utdanningssituasjonen? Tilpasset stol/bord
 Tilpasset PC
 Hjelpemidler ifht nedsatt syn
 Lærebøker på lydbok
 Ekstra tid på prøver/eksamener
 Annet
- 7.06 Mener du å ha behov for tilrettelegging ut over det du har? Nei Ja
Evt hva?
-
- 7.07 Har du pga forhold relatert til Marfan diagnosen vært nødt til å bruk lengre tid på utdanning? Nei Ja
- 7.08 Har du jobb ved siden av utdanningen? Nei Ja
- Hvis ja, hva slags type jobb
- Opplever du at forhold ved Marfan diagnosen gjør det vanskelig å kombinere jobb og studier? Nei Ja

8. 0 Besvares kun av de som er i arbeid

8.01 Hvilket yrke har du?

.....

- 8.02 Hvordan vil du beskrive ditt arbeid? (velg en kategori)
- For det meste stillesittende arbeid (f. eks. skrivebordsarbeid)
- Arbeid som krever at du går/står mye (f. eks. ekspeditørarbeid, lett industri, undervisning)
- Arbeid hvor du går/løfter mye (f. eks. postbud, pleier, bygningsarbeid)
- Tungt kroppsarbeid (f. eks. skogsarbeid, tungt jordbruksarbeid, tungt bygningsarbeid)

Under følger spørsmål om ulik type tilpasning av arbeidssituasjonen:

8.03 Er din arbeidssituasjon tilpasset din funksjonshemning/ helseplager i form av endringer/reduksjon i arbeidstiden? Nei Ja

Er det behov for noen flere endringer i arbeidstiden? Nei Ja

.....

8.04 Er din arbeidssituasjon tilpasset din funksjonshemning/ helseplager i form av endringer i arbeidsoppgavene? Nei Ja

Er det behov for noen flere endringer i arbeidsoppgavene? Nei Ja

.....

8.05 Er arbeidsplassen din tilrettelagt med fysiske hjelpemidler? Nei Ja

Hvis ja, beskriv.

Er det behov for noen mer tilrettelegging? Nei Ja

Hvis ja, beskriv.

Besvares kun av de som er i arbeid

8.06 Opplever du forståelse for din diagnose på arbeidsplassen? Nei Ja

Beskriv:

.....

8.07 Har helseplagene/diagnosen Marfans syndrom noen gang hatt betydning for skifte av arbeid/yrke? Nei Ja

Hvis ja var hva var det ved jobben som gjorde at du måtte skifte yrke?

Jobben ble for slitsom fysisk
 Jobben ble for slitsom psykisk

Beskriv

.....

8.08 Medfører helseplagene begrensninger ifht hva slags type arbeidsoppgaver du kan utføre? Nei Ja

Hvis ja, på hvilken måte, beskriv

.....

8.09 Begrenser helseplagene/funksjonshemningen din hvor MYE du kan arbeide, det vil si din daglige eller ukentlige arbeidstid? Nei Ja

Beskriv

.....

9.0 Besvares kun av de som verken er under utdanning eller arbeid

9.01 Har du vært yrkesaktiv tidligere? Nei Ja

9.02 Er du arbeidsledig og søker jobb? Nei Ja

9.03 Er du hjemmeværende med barn?
(fødselspermisjon eller ikke) Nei Ja

9.04 Hvis du har vært i arbeid tidligere –
hvordan vil du beskrive ditt arbeid?
(velg en kategori)

For det meste stillesittende arbeid
(f.eks skrivebordsarbeid)

Arbeid som krever at du går/ står mye
(f.eks ekspeditørarbeid, lett industri,
undervisning)

Arbeid hvor du går/løfter mye (f.eks
postbud, pleier, bygningsarbeid)

Tungt kroppsarbeid (f.eks skogsarbeid,
tungt jordbruksarbeid, tungt bygningsarbeid)

9.05 Hvis du har vært i arbeid tidligere;

- Hvor gammel var du da du begynte å jobbe? Alder:
- Ca. hvor lenge var du i jobb (totalt) Antall år:.....
- Hvor gammel var du da du sluttet? Alder:

9.06 Hvis du har vært i jobb tidligere, var helseplagene/ diagnosen Marfans syndrom medvirkende til at du sluttet å jobbe? Nei Ja

Hvis ja, hva var det ved jobben som gjorde at du måtte slutte?

Jobben ble for slitsom fysisk
 Jobben ble for slitsom psykisk

Beskriv

.....
.....
.....

Besvares kun av de som verken er under utdanning eller arbeid

9.07 Hvis du har vært i arbeid tidligere, ble det satt i gang noen tiltak for at du skulle kunne fortsette i arbeid?

Nei Ja

Hvis ja– hvilke tiltak ble forsøkt?

Fysisk tilrettelegging av arbeidsplassen

Nedsatt arbeidstid

Bedriftsintern attføring

Attføring/omskolering

Annet:.....

.....

9.08 Kunne du ha fortsatt i jobben din hvis din arbeidssituasjon i større grad var blitt tilpasset funksjonshemmingen/helseplagene?

Nei Ja Vet ikke

Hvis ja, hvilke tilpasninger sikter du da til?

Endringer i arbeidsoppgaver

Endringer i arbeidstid

Transport til/fra arbeidsplass

Fysisk tilrettelegging – hjelpemidler

Annen tilrettelegging

.....

9.09 Kunne du ha påtatt deg et inntektsgivende arbeid hvis arbeidssituasjonen ble tilpasset funksjonshemmingen/helseplagene?

Nei Ja Vet ikke

Hvis ja hvilke tilpasninger sikter du da i første rekke til?

Endringer i arbeidsoppgaver

Endringer i arbeidstid

Transport til/fra arbeidsplass

Fysisk tilrettelegging – hjelpemidler

Annen tilrettelegging

.....

9.10 Ønsker du å gå tilbake i lønnet arbeid? (helt eller delvis)

Nei Ja Vet ikke

Beskriv:

.....

.....

På de neste sidene finner du standardiserte spørreskjemaer
– brukt på andre diagnosegrupper og den generelle befolkning.

Besvares av alle

10. Spørsmål om Tilfredshet med livet (Satisfaction With Life Scale)

10.1 Nedenfor står fem utsagn om tilfredshet med livet som et hele.
Vis hvor godt eller dårlig hver av de fem påstandene stemmer for deg og ditt liv ved å krysse av i den ruta som du synes passer best for deg .
(sett ett kryss for hvert spørsmål)

	Stemmer dårlig						Stemmer perfekt
	1	2	3	4	5	6	7
På de fleste måter er livet mitt nær idealet mitt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mine livsforhold er utmerket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er tilfreds med livet mitt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Så langt har jeg fått de betydningsfulle tingene jeg ønsker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hvis jeg kunne leve på nytt, ville jeg nesten ikke endre noe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Spørsmål om Tretthet - Fatigue (Fatigue Severity Scale), besvares av alle

- 11.1 Nedenfor står 9 utsagn om tretthet; det å være sliten, uopplagt og ha mangel på overskudd. Velg et tall fra 1 til 7 som angir i hvor stor grad du er enig med hvert enkelt utsagn, der 1 angir at du er helt uenig og 7 at du er helt enig. (sett kryss i en rute for hvert utsagn)

	Helt uenig						Helt enig
	1	2	3	4	5	6	7
Min motivasjon er lavere når jeg er sliten og uopplagt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fysisk aktivitet gjør meg sliten og uopplagt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg blir fort sliten og uopplagt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det at jeg er sliten og uopplagt, virker inn på hvordan jeg fungerer fysisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det at jeg er sliten og uopplagt, skaper ofte vanskeligheter for meg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det at jeg er sliten og uopplagt, hindrer meg i å opprettholde min fysiske funksjonsdyktighet over tid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det at jeg er sliten og uopplagt, virker inn på evnen til å utføre visse oppgaver og plikter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det at jeg er sliten og uopplagt, er ett av de tre symptomene som hemmer meg mest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det at jeg er sliten og uopplagt, virker inn på mitt arbeid, mitt familieliv eller min omgang med venner og kjente	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Spørsmål om Tretthet – Fatigue (Fatigue Questionnaire)

Vi vil gjerne vite om du har følt deg sliten, svak eller i mangel av overskudd *den siste måneden*. Vennligst besvar ALLE spørsmålene ved å markere det svaret du synes passer best for deg. Vi ønsker at du besvarer alle spørsmålene selv om du ikke har hatt slike problemer. Vi spør om hvordan du har følt deg i det siste og *ikke* om hvordan du følte det for lenge siden. Hvis du har følt deg sliten lenge, ber vi om at du sammenlikner deg med hvordan du følte deg sist du var bra.

(Sett ring rundt ett av utsagnene på hver linje)

Har du problemer med at du føler deg sliten?	Mindre enn vanlig	Ikke mer enn vanlig	Mer enn vanlig	Mye mer enn vanlig
Trenger du mer hvile?	Nei, mindre enn vanlig	Ikke mer enn vanlig	Mer enn vanlig	Mye mer enn vanlig
Føler du deg søvnnig eller døsig?	Mindre enn vanlig	Ikke mer enn vanlig	Mer enn vanlig	Mye mer enn vanlig
Har du problemer med å komme i gang med ting?	Mindre enn vanlig	Ikke mer enn vanlig	Mer enn vanlig	Mye mer enn vanlig
Mangler du overskudd?	Ikke i det hele tatt	Ikke mer enn vanlig	Mer enn vanlig	Mye mer enn vanlig
Har du redusert styrke i musklene dine?	Ikke i det hele tatt	Ikke mer enn vanlig	Mer enn vanlig	Mye mer enn vanlig
Føler du deg svak?	Mindre enn vanlig	Som vanlig	Mer enn vanlig	Mye mer enn vanlig
Har du vansker med å konsentrere deg?	Mindre enn vanlig	Som vanlig	Mer enn vanlig	Mye mer enn vanlig
Forsnakker du deg i samtaler?	Mindre enn vanlig	Ikke mer enn vanlig	Mer enn vanlig	Mye mer enn vanlig
Er det vanskeligere å finne det rette ordet?	Mindre enn vanlig	Ikke mer enn vanlig	Mer enn vanlig	Mye mer enn vanlig
Hvordan er hukommelsen din?	Bedre enn vanlig	Ikke verre enn vanlig	Verre enn vanlig	Mye verre enn vanlig

Hvis du føler deg sliten for tiden, omtrent hvor lenge har det vart? (ett kryss)

- Mindre enn en uke
- Mindre enn tre måneder
- Mellom tre måneder og seks måneder
- Seks måneder eller mer

Hvis du føler deg sliten for tiden, omtrent hvor mye av tiden kjenner du det? (ett kryss)

- 25% av tiden
- 50% av tiden
- 75% av tiden
- Hele tiden

SF-36 SPØRRESKJEMA OM HELSE,

INTRODUKSJON: Dette spørreskjemaet handler om hvordan du ser på din egen helse. Disse opplysningene vil hjelpe oss til å få hvite hvordan du har det og hvordan du er i stand til å utføre dine daglige gjøremål.

Hvert spørsmål skal besvares ved å sette kryss (x) i den boksen som passer best for deg. Hvis du er usikker på hva du skal svare, vennligst svar likevel så godt du kan.

1. Stort sett vil du si din helse er

Utmerket	Meget god	God	Nokså god	Dårlig
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Sammenlignet med for ett år siden, hvordan vil du si at din helse stort sett er nå?

Mye bedre nå enn for ett år siden	Litt bedre nå enn for ett år siden	Omtrent det samme nå som for ett år siden	Litt dårligere nå enn for ett år siden	Mye dårligere nå enn for ett år siden
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. De neste spørsmålene handler om aktiviteter som du kanskje utfører i løpet av en vanlig dag. Er din helse slik at den begrenser deg i å utføre disse aktivitetene nå? Hvis ja, hvor mye?

	Ja, begrenser meg mye	Ja, begrenser meg litt	Nei, begrenser meg ikke i det hele tatt
a. Anstrengende aktiviteter som å løpe, løfte tunge gjenstander, delta i anstrengende idrett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Moderate aktiviteter som å flytte et bord, støvsuge, gå en tur eller drive med hagearbeid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Løfte eller bære en handlekurv	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Gå opp trappen flere etasjer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Gå opp trappen en etasje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Bøye deg eller sitte på huk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Gå mer enn to kilometer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Ja, begrenser meg mye	Ja, begrenser meg litt	Nei, begrenser meg ikke i det hele tatt
h. Gå noen hundre meter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Gå hundre meter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Vaske eller kle på deg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. I løpet av de siste 4 ukene, hvor ofte har du hatt noen av følgende problemer i ditt arbeid eller i andre av dine daglige gjøremål på grunn av din fysiske helse?

	Hele tiden	Mye av tiden	En del av tiden	Litt av tiden	Ikke i det hele tatt
a. Du har måttet redusere tiden du har brukt på arbeid eller andre gjøremål	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Du har utrettet mindre enn du hadde ønsket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Du har vært hindret i å utføre visse typer arbeid eller gjøremål	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Du har hatt problemer med å gjennomføre arbeidet eller andre gjøremål (for eksempel fordi det krevde ekstra anstrengelser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. I løpet av de siste 4 ukene, hvor ofte har du hatt noen av følgende problemer i ditt arbeid eller andre av dine daglige gjøremål på grunn av følelsesmessige problemer (som for eksempel å være deprimert eller engstelig)?

	Hele tiden	Mye av tiden	En del av tiden	Litt av tiden	Ikke i det hele tatt
a. Du har måttet redusere tiden du har brukt på arbeid eller andre gjøremål	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Du har utrettet mindre enn du hadde ønsket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Du har utført arbeidet eller andre gjøremål mindre grundig enn vanlig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. I løpet av de siste 4 ukene, i hvilken grad har din fysiske helse eller følelsesmessige problemer hatt innvirkning på din vanlige sosiale omgang med familie, venner naboer eller foreninger?

Ikke i det hele tatt	Litt	En del	Mye	Svært mye
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Hvor sterke kroppslige smerter har du hatt i løpet de siste 4 uker?

Ingen	Meget svake	Svake	Moderate	Sterke	Meget sterke
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. I løpet av de siste 4 ukene, hvor mye har smertene påvirket ditt vanlige arbeid (gjelder både arbeid utenfor hjemmet og husarbeid)?

Ikke i det hele tatt	Litt	En del	Mye	Svært mye
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. De neste spørsmålene handler om hvordan du har følt deg og hvordan du har hatt det de siste 4 ukene. For hvert spørsmål, vennligst velg det svaralternativet som best beskriver hvordan du har hatt det. Hvor ofte i løpet av de siste 4 ukene har du?

	Hele tiden	Mye av tiden	En del av tiden	Litt av tiden	Ikke i det hele tatt
a. Følt deg full av liv?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Følt deg veldig nervøs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Vært så langt nede at ingenting har kunnet muntre deg opp?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Følt deg rolig og harmonisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Hatt mye overskudd?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Følt deg nedfor og deprimert?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Følt deg sliten?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Følt deg glad?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Følt deg trett?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. I løpet av de 4 siste ukene, hvor mye av tiden har din fysiske helse eller følelsesmessige problemer påvirket din sosiale omgang (som det å besøke venner, slektninger osv.)?

Hele tiden	Mye av tiden	En del av tiden	Litt av tiden	Ikke i det hele tatt
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Hvor RIKTIG eller GAL er hver av de følgende påstander for deg?

	Helt riktig	Delvis riktig	Vet ikke	Delvis gal	Helt gal
a. Det virker som om jeg blir syk litt lettere enn andre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Jeg er like frisk som de fleste jeg kjenner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Jeg tror helsen min vil forverres	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Jeg har utmerket helse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Vennligst kontroller at du har besvart alle spørsmålene

Paper I

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.

Systematic review of the psychosocial aspects of living with Marfan syndrome.

Journal of Clinical Genetics 2015; 87 (2): 109–116

Paper II

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.

Systematic review of chronic pain in persons with Marfan syndrome.

Journal of Clinical Genetics 2016; 89 (6): 647-659

Paper III

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.

Work Participation in Adults with Marfan syndrome: Demographic Characteristics,
MFS Related Health Symptoms, Chronic Pain, and Fatigue.

American Journal of Medical Genetic 2015; 167A (12):3082-3090

Paper IV

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.

Satisfaction with life in adults with Marfan syndrome (MFS): associations with health-related consequences of MFS, pain, fatigue, and demographic factors.

Journal of Quality of Life Research 2016; 25(7):1779-1790

Paper V

Velvin G, Bathen T, Rand-Hendriksen S, Østertun Geirdal A.

Chronic pain in Adults with Marfan syndrome (MFS): Occurrence and associations to demographic aspects, MFS related health symptoms and fatigue.

Submitted to Journal of Rare Disorders

Paper VI

Bathen T, Velvin G, Rand-Hendriksen S, Robinson HS.

Fatigue in Adults with Marfan syndrome, Occurrence and Associations to Pain and Other Factors.

American Journal of Medical Genetic 2014; 164A (8):1931-9.

Errata list from Gry Velvin

- Page 6, line 18 change the word- introduces to introduced
- Page 7, line 19 change the words -user association to User-Association
- Page 10, line 17-change the words -Mafanoid phonotypical to Marfanoid phenotypic
- Page 11, line 15- remove the words - of living
- Page 11, line 16 change the word - priori to a priori.
- Page 14 line change the word - of to or.
- Page 16, line 17 add one word in the end of the sentence- for her or his life.
- Page 19, line 13 and 14- remove this line down to line 28 “When reviewing the literature, only five studies were identified addressing HRQoL in persons with MFS and all found” and add to this sentence “ and all found lower HRQoL compared to the general population [Foran, Pyeritz, Dietz, & Sponseller, 2005; Fusar-Poli et al., 2008; Peters et al., 2002; Rand-Hendriksen et al.,2010; Verbraecken, Declerck, Van De heyning, De Backer & Wouters, 2011]” Remove this last sentence from line 26.
- Page 19, line 26 add to the ending of the sentence- many are married and have children
- Page 20, remove line 15 to 20 – from “Even though ... as chronic pain and fatigue”
- Page 20 , last sentence and end of the sentence, change - comma to dot (, to .).
- Page 28 line 18 change the word – well-rounded to well-grounded
- Page 30 line 9 change the word he to the
- page 70 line include , so there might a to so there might be a...
- Page 72 – last sentence- change the word leading to living
- Page 79 line 18 change -“wellness to “wellness”
- Page 81 line 24 include a word in the sentence- there are no single correct explanation