Effects of an intervention and an organisational implementation for identification and treatment of common mental disorders in primary healthcare

Christine Sandheimer

School of Public Health and
Community Medicine,
Institute of Medicine at
Sahlgrenska Academy
University of Gothenburg

Gothenburg, Sweden, 2021

UNIVERSITY OF
GOTHENBURG

Cover illustration by Bozena Fulawka, Mostphotos

Effects of an intervention and an organisational implementation for identification and treatment of common mental disorders in primary healthcare

Christine.sandheimer@gu.se

ISBN 978-91-8009-388-0 (TRYCK)
ISBN 978-91-8009-389-7 (PDF)
http://hdl.handle.net/2077/68055

Printed in Borås, Sweden 2021
Stema Specialtryck AB

SVANENMÄRKET
Trycksak
3041 0234

“Research is to see what everybody else has seen,
and to think what nobody else has thought”
Albert Szent-Györgyi

Abstract

Aim: This thesis aimed to evaluate the effects of one intervention and one organisational implementation for identification and treatment of common mental disorders (CMDs) in the primary healthcare in Region Västra Götaland, in south-west of Sweden. Paper I aimed to evaluate the use of a work stress questionnaire in combination with feedback from the physician and its effects on further healthcare use and treatment. Paper II aimed at evaluating the impact of the care manager organisation on adequate antidepressant medication users. Paper III aimed at evaluating the impact of the care manager organisation on healthcare contacts and extent of psychotherapy among both female and male patients with CMD. All three papers compared the enhanced care efforts with usual care and treatment. Moreover, the three papers also evaluated whether the care efforts led to care more in accordance with clinical treatment guidelines.

Methods: Paper I (271 patients) was a randomised controlled trial (RCT) with a register-based follow-up of healthcare measures from the healthcare database VEGA. Paper II (190 primary healthcare centres 'PHCCs') and paper III (215 PHCCs) were register-based studies with data on PHCC level obtained from VEGA and from the regional pharmaceutical database Digitalis (only paper II).

Results: Paper I showed that intervention participants with high perceived stress had more visits to psychotherapists (20% vs 7%, $p < 0.05$), received more CBT (16% vs 10%), and had more collaborative care (23% vs 11 %, $p < 0.05$), compared to controls with high stress. Paper II showed that PHCCs with a care manager organisation had a lower proportion of inadequate medication users compared to PHCCs without the organisation during follow-up (-6%, $p < 0.02$). PHCC that shifted to a care manager organisation from mid-2016 had a significantly lower proportion of inadequate medication users over time ($p < 0.01$). Paper III showed that PHCCs with a care manager organisation had more visits to a nurse ($p < 0.001$) and fewer patients with psychotherapy of short duration compared to PHCCs without the organisation. PHCCs with usual care had a significantly lower proportion of visits to psychotherapists compared to the PHCCs with the care manager organisation.

Conclusions: All three papers showed that enhanced care efforts in primary healthcare for patients with CMD had positive effects on the received care including healthcare contacts, antidepressant medication and psychological treatment. Furthermore, these efforts made the received treatment more in line with established treatment guidelines.

Keywords: antidepressants, CBT, collaborative care, health services research, intervention, implementation, mental disorders, mental ill-health, primary care, psychological treatment

Sammanfattning på svenska

Denna avhandling utvärderade effekter av en vårdinsats och en organisatorisk förändring i primärvården vilka syftade till att förbättra omhändertagandet av patienter med vanliga psykiska sjukdomar såsom depression, ångest och stress.

Den första studien handlar om att utvärdera användningen av en enkät utvecklad för att identifiera arbetsrelaterad stress. Syftet var att undersöka om denna enkät i kombination med återkoppling från läkare bidrar till skillnader i hälso- och sjukvårdsanvändning jämfört med sedvanlig behandling.
Arbetsrelaterad stress (dvs stress som i huvudsak är kopplat till ens arbetssituation) är ett ökande bekymmer i samhället idag. Sjukskrivning i en psykiatrisk diagnos står för merparten av alla nya sjukfall och över 40% av alla pågående sjukskrivningar är i en psykiatrisk diagnos (diagnoserna *anpassningsstörningar* och *reaktion på svår stress* som de två vanligaste). Majoriteten av personer med symtom på stress söker vård för sina besvär – både fysiska och psykiska – på sin vårdcentral. Forskning har visat att så många som hälften av alla fall kan missas i primärvården och de fall som upptäcks får inte alltid vård som är förenlig med medicinska riktlinjer. Primärvårdsläkare har i vissa fall bristande insikt i patientens arbetssituation och ställer, i många fall, inga frågor om arbetet. Det är därför av intresse att studera om en lätt-administrerad enkät kan vara ett stöd i identifiering och diagnostisering av stress kopplat till arbetssituationen.

Resultaten från studie I visade att de deltagande patienter som rapporterade hög stress och som fick återkoppling på arbetsstress-enkäten från läkaren i högre grad fick rehabiliterande vårdåtgärder såsom besök till psykoterapeut och till arbets- och fysioterapeut, kognitiv beteendeterapi, och samarbetsvård (collaborative care) jämfört med patienter med hög rapporterad stress som fick sedvanlig behandling (ingen enkät om arbetsstress ingick i läkarbesöket).

Studie II och III handlar om att utvärdera effekterna av införandet av en vårdsamordnarorganisation för patienter med psykisk ohälsa i primärvården i Västra Götalandsregionen. Delstudie två studerar om denna nya vårdfunktion och organisation har lett till skillnader i antidepressiv läkemedelsanvändning jämfört med vårdcentraler utan organisationen. Ett ytterligare syfte är att undersöka om läkemedelsanvändningen efter införandet av organisationen är i linje med medicinska riktlinjer. Delstudie tre studerar om en vårdsamordnarorganisation på vårdcentralen lett till skillnader i hälso- och sjukvårdsanvändningen och psykologisk behandling jämfört med vårdcentraler utan organisationen. Även i denna studie studerar vi om den psykologiska behandlingen är i linje med medicinska riktlinjer. I delstudie tre studerar vi också om man kan se några skillnader i utfall mellan könen.

Primärvården har det senaste decenniet sett ett ökat inflöde av patienter med symtom på vanliga psykiska sjukdomar. Omhändertagandet av dessa individer har varit bristfälligt då primärvården saknat de resurser som krävs för att tillgodose den vård som dessa patienter behöver. Enligt Socialstyrelsen är den bästa vården för individer med vanliga psykiska sjukdomar vård som sätts in tidigt, som har kontinuitet och där en vårdgivare har huvudansvaret för patienten genom hela vårdkedjan.

En insats som visats kunna tillgodose den här typen av vård och som även är den enda insats som haft effekt både på symtomminskning, tidigare återgång i arbete samt färre återinsjuknanden, är vård som ges av en så kallad vårdsamordnare (en sjuksköterska som genomgått en särskild utbildning). Vårdsamordnare är en ny vårdfunktion i svensk primärvård och funktionen med dess organisation behöver därför utvärderas för att se om samma positiva kliniska effekter som uppvisats i brittiska och amerikanska studier även gäller för en svensk hälso- och sjukvårdskontext.

Resultatet från studie II visade att vårdcentraler med en vårdsamordnarorganisation hade en större andel patienter med en antidepressiv läkemedelsanvändning som varade i minst sex månader – vilket är i linje med medicinska riktlinjer – jämfört med övriga vårdcentralsgrupper. Ett ytterligare fynd visade att offentliga vårdcentraler, som i större utsträckning infört en vårdsamordnarorganisation från början, hade lägre andel patienter med en för kort antidepressiv läkemedelsanvändning jämfört med vårdcentraler med sedvanlig vård som i huvudsak var privata. De vårdcentraler som skiftade från att inte ha en vårdsamordnarorganisation från början till att införa organisationen från mitten av 2016, visade störst övergång till adekvat, längre, läkemedelsanvändning.

Resultatet från studie III visade att vårdcentraler med en vårdsamordnarorganisation hade en ökad andel besök till sjuksköterska under både första och andra året efter implementeringen. Denna ökning påverkade inte andelen läkarbesök som var lika stor under båda tidsperioderna och mellan båda vårdcentralsgrupper. Besöken till sjuksköterska ökade mer hos den manliga patientgruppen jämfört med den kvinnliga. Vårdcentraler med sedvanlig vård hade i högre utsträckning fler patienter med en kort psykoterapibehandling (mindre än fem besök) vilket inte är fullt i linje med medicinska riktlinjer. Dessa vårdcentraler hade även en signifikant ökning över tid av andel patienter med kort behandling.

Slutsatserna från studie II och III är att en vårdsamordnarorganisation kan stötta patienterna till en mer adekvat läkemedelsanvändning och till en ökad tillgång till vårdbesök, samt att psykoterapibehandling vidmakthålls.

Tack

Jag vill härmed rikta ett varmt tack till alla som korsat min väg under mina doktorandstudier och till alla deltagande patienter och vårdcentraler. Utan ert engagemang hade inte studierna varit genomförbara. Ett särskilt tack vill jag rikta till följande personer:

Ingvar Karlberg, min tidigare handledare under masteruppsatsen och senare i MEDDIC-projektet. Ditt stöd både professionellt och privat har varit ovärderligt.

Bibbi Carlsson, min mentor. När doktorandtiden var som jobbigast fanns du där för mig. Våra luncher tillsammans med Ingvar har varit så uppskattade och när omständigheterna tillåter hoppas jag att traditionen kan fortsätta.

Karolina Andersson Sundell, min handledare i MEDDIC-projektet. Ditt stöd under alla år har varit så uppskattat.

Mina handledare Tove Hedenrud och Gunnel Hensing. Tack för alla givande diskussioner och för utförliga och mycket konstruktiva återkopplingar på allt jag skickat.

Cecilia Björkelund projektledare för de två sista delstudierna. Tusen tack för ditt engagemang, stöd och delaktighet i min forskarutbildning. Du har varit en klippa!

GendiQs forskargrupp med Gunnel, Monica, Jesper, Carin, Agneta, Chioma, Cornelia, Jenny, Paula, Sara, Anke, Hildur, Tommy samt Robin. Tack för ett fint kollegieskap och för givande forskningsdiskussioner.

Doktorandgruppen på gamla EPSO. Särskilt tack till Paula, Sara och Anke. Uppskattar den vänskap som vuxit fram under våra år tillsammans som doktorander. Även ett särskilt tack till mina före detta doktorandkompisar Sofia, Solveig och Ingrid.

Alla kollegor på Avdelningen för Samhällsmedicin och Folkhälsa och särskilt till alla er på gamla EPSO. Tack till Henric och Anders för ett uppskattat chef- och ledarskap.

Mina föräldrar Thord och Angela och mina syskon Ellinor och Johan med familjer. Tack för att ni i alla lägen funnits där för mig.

Morbror Agne och Monika och kusinerna Hanna och Elin med deras respektive Martin och Albin. Ni är som min andra familj och jag uppskattar er enormt. Även ett varmt tack till övriga släkten på västkusten och i England.

Min sambos familj med Hans och Annette, Gunnel och Kjell, och Malin och Sofie.

Göteborgsgänget med Cissi och Andreas, Johanna och Simon, Elin och Terje, samt alla övriga vänner i Göteborg, Stockholm och Norrbotten är jag oändligt tacksam för.

Middagsklubbens medlemmar med Cissi, Johanna, Emilia, Li och Caroline. Ni underbara kvinnor.

Min kära vän Jolin och övriga familjen Sewén. Till minne av Gunnar, en svampskogsexpert och mångsysslare utan dess like.

Det största tacket vill jag ge till min älskade Kristian, min fantastiska sambo och fästman. Du är den bästa partnern en kan önska sig. Allt du har gjort för mig under våra år tillsammans går inte att beskriva i ord. Du är oersättlig och jag älskar dig något så enormt.

List of papers

This thesis is based on the following studies, referred to in the text by their Roman numerals.

I. Sandheimer C., Hedenrud T., Hensing G., Holmgren K.
Effects of a work-stress intervention on healthcare use and treatment compared to treatment as usual. A randomised controlled trial in Swedish Primary Health Care
BMC Family Practice 2020; 21: 133.

II. Sandheimer C., Björkelund C., Hensing G., Mehlig K., Hedenrud T.
Implementation of a care manager organisation and its association with antidepressant medication patterns – a register-based study of primary care centres in Sweden
BMJ Open 2021 Mar 5;11(3):e044959.

III. Sandheimer C., Björkelund C., Hensing G., Hedenrud T.
Implementation of a care manager organisation and its association with healthcare contacts and psychotherapy – a register-based study of real-life outcomes at primary healthcare centres in Sweden
(Submitted)

Published study protocol related to study I:

Holmgren K., Sandheimer C., Mårdby A., Larsson M., Bültmann U., Hange D., Hensing G.
Early identification in primary health care of people at risk for sick leave due to work-related stress - Study protocol of a randomized controlled trial (RCT)
BMC Public Health 2016; 16: 1

Content

Abbreviations

CAU	Care as usual, or usual care
CBT	Cognitive Behavioural Therapy
CMD	Common mental disorder
CMO	Care manager organisation
DSM	Diagnostic and Statistical Manual of Mental Disorders
ICD-10	International Statistical Classification of Diseases and Related Health problems, version 10
PHCC	Primary healthcare centres
TAU	Treatment as usual
WSQ	The Work Stress Questionnaire

Preface

A researcher in the making

I started the education to become a researcher in the beginning of 2015. Little would I know that the road ahead was going to be both long and bumpy. My story, I would say, begins already the second year in my bachelor programme Public Health with Health Economics at the University of Gothenburg. At that point, I realised the intriguing effects of searching for new knowledge had on me and I set out to continue my education with the goal of becoming a public health scientist and researcher.

I sincerely believe that a researcher, as a profession, is a continuous development of both yourself as a person and of your skills. With that said, I look forward to continue my journey on the path of acquired knowledge and development.

Gothenburg, May 2021

Christine Sandheimer

Introduction

What this thesis is all about

The purpose of this PhD project was to evaluate the effects of one intervention and one organisational implementation in the Swedish primary healthcare with the focus on identification and treatment of common mental disorders (CMDs). A significant proportion of the population, both in Sweden and in other high-income countries, are affected by a CMD, including depression, anxiety syndromes and stress-related mental disorders. The majority of these individuals seek care in the primary healthcare as a first entry into the healthcare system. In Sweden, the primary healthcare faces major challenges in managing CMDs. There is a need for more and better knowledge about methods and practices that can offer early and adequate support for these patients. Moreover, new knowledge is also needed about organisational reforms in the primary healthcare aimed at developing the primary healthcare organisations in the direction of greater accessibility and continuity for patients with CMD.

The present thesis aimed to add new knowledge about effects of early inputs in primary healthcare for CMDs, by evaluating novel and previously unexplored efforts in the primary healthcare service in Region Västra Götaland. Our approach included three different research perspectives: (1) intervention, (2) implementation, and (3) impact.
In the first part, we studied the effects of a new method to identify and improve treatment for patients with signs of work-related stress, a significant and prevalent CMD in Sweden today. In the second part, we studied the effects of a new and unique organisational implementation for patients with diagnosed CMDs, namely the care manager organisation. All studies were conducted in the primary healthcare setting. One aim of the research in the present thesis is that it should be applicable in the setting where the research takes place, hence to close the gap between research and practice. This means meeting practical challenges, such as obstacles in implementing changes in the everyday routines. It is our firm belief that this enhances the quality of the research, and at the same time enhances the quality of the impact of said research.

Background

This section aims to give the reader a short but concise background about the main aspects in the thesis. I start by giving a description of the Swedish primary healthcare and continue with an introduction to the concept mental ill-health and CMD, what they encompass and their prevalence in the society today. Thereafter, a presentation of treatment guidelines is given as well as the healthcare measures available for primary healthcare patients with CMD, which forms the basis of this thesis.

Primary healthcare – the foundation of the healthcare system

Sweden has a tax-based healthcare system with universal coverage for the population. Since 1982, the full responsibility of financing and production of healthcare lie on the 21 regions. The financing comes from income-based taxes that ranges between 10-12% depending on region. The state has the normative power over the healthcare by establishing rules and regulations, but the content of healthcare and how it should be organised is up to each region to decide upon (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021). The policymakers responsible for organising the regional healthcare are publicly selected healthcare politicians together with officials. In practice, this means that the care can vary between regions even if the patient's need of care is the same. This fact often leads to unmotivated differences, in for example treatment and healthcare quality and further hinders national assessments of the healthcare in Sweden (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

The primary healthcare is the first line of care in Sweden and stand for approximately 17 % of the total healthcare expenditure. The Swedish primary healthcare is defined as "health and medical care activities where outpatient care is given without delimitation in terms of diseases, age or patient groups" (The Swedish Health and Medical Services Act 2017:30 [Hälso- Och Sjukvårdslagen 2017:30], 2017). The focus is on the individual's care needs and not on specific diseases – in contrast to specialised hospital care.

The primary healthcare organisation

The concept primary healthcare first appeared globally in the 1960s with the notion of decentralising the healthcare to medical centres outside the hospitals that should work with health promotion and prevention in the local community, in addition to treat common ailments (Karlberg, 2011). However, it was already in 1948 that a Swedish commission started with the aim to investigate how the organisation of outpatient care - which then was mainly conducted in privately driven care clinics - could be organised in healthcare centres financed by taxes and available for the whole population. The commission suggested that these healthcare centres should be staffed with two or more general practitioners (primary healthcare physicians) – similar to how the primary healthcare had been organised in Norway and the United Kingdom (Karlberg, 2011). Despite this investigation, it would take another 20 years – to 1968 – before the first primary healthcare centre was established in Skåne, in the most southern part of Sweden. Today, approximately 1200 primary healthcare centres are available throughout the country.

The main goal of the primary healthcare in Sweden is to deliver healthcare to everyone in the population. The healthcare should be available, accessible, acceptable, and of high quality. To achieve this goal, it is important that the primary healthcare organisation encompass a broad range of competences among the staff.

The staffing at the primary healthcare centres can look different depending on the local needs and prerequisites but usually includes several primary healthcare physicians and districts nurses that works together with psychotherapists (including counsellor and primary healthcare psychologists), physiotherapist, occupational therapists, assistant nurses, medical secretaries and medical laboratory scientists (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

A new healthcare guarantee was introduced in the primary healthcare sector in 2017 to increase the access to care and treatment. According to the guarantee the patient has a right to get in contact with the primary healthcare centre the same day and, if the health condition demands it, see a relevant care provider within 3 days (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

The research in the present thesis was exclusively based on the primary healthcare in the Region Västra Götaland. There are approximately 200 primary healthcare centres conducting healthcare activities in the region. with a small majority having public management compared to private (52% versus

48%) (Region Västra Götaland, 2020). Both publicly and privately driven primary healthcare centres are bound by contract to conform with regional rules and regulations in order to establish a centre in the region and to receive regional reimbursement. These rules aim to ensure high care quality and equal care regardless of management. Since 2009, the primary healthcare centres in Region Västra Götaland are also required to have psychotherapeutic competence in the organisation in order to meet the increased need of care for patients with mental ill-health (Region Västra Götaland, 2020).

Mental health and common mental disorders

> *Mental health is "a state of well-being whereby individuals recognize their abilities, are able to cope with the normal stresses of life, work productively and fruitfully, and make a contribution to her or his community."* – The World Health Organisation (WHO, 2013)

Today, no generally accepted or uniform definition of the absence of mental health exist. The concept mental ill-health rather exists on a continuum that moves from the individual's subjectively perceived feelings of discomfort, to a care provider's more objective diagnosing of a state of illness with symptoms conforming to a set of pre-defined diagnostic criteria found in international clinical diagnostic systems, like the International Statistical Classification of Diseases and Related Health Problems (ICD), and Diagnostic and Statistical Manual of Mental Disorders (DSM) (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

A state of mental ill-health that fulfils diagnostic criteria according to the ICD and DSM systems is often called a mental disorder. Common Mental Disorders (CMD) are those mental disorders that are prevalent among a significant part of the population. However, no distinguished definition of the concept CMD exists (Vingård, 2020). What the concept embodies differ in different contexts and countries, but usually include depression and different anxiety syndromes (Vingård, 2020). In Sweden, stress-related mental disorders (which include the diagnoses acute stress reaction, adjustment disorder, and exhaustion disorder) are also often included in the concept as these disorders are very prevalent in the population (Lidwall & The Swedish Social Insurance Agency [Försäkringskassan], 2020).

All three papers concerned either non-diagnosed or diagnosed CMDs, which are mainly treated in the primary healthcare. The first paper in the present thesis included participants with mental and/or physical complaints, which could be early signs of work-related stress. In papers II and III, we have focused on the ICD (version 10) diagnoses: depression (F32, F33), anxiety syndromes (F40, F41), and stress-related mental disorders (F43).

Depression

Depression is defined as a state of dejection, low mood and a loss of interest that have been ongoing for a minimum of two weeks (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020). To fulfil the criteria for diagnosis depression, the patient should not have any previous history of manic symptoms. Depression is diagnosed by using the diagnostic criteria according to ICD-10 (or DSM-IV). Self-assessment tests, such as the Montgomery Åsberg Depression Rating Scale-Self (MADRS-S), are often used to determine the level of severity and to follow the course of the depressive episode. Severe depression corresponds to 35 points or more on the MADRS-scale.

The life time prevalence (risk of getting the disorder at some point in life) for depression, in the general Swedish population, is estimated at 36% for women and 23 % for men (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020).

Anxiety syndromes

In the Swedish national treatment guidelines, a distinction between anxiety as a symptom and anxiety syndrome is emphasised (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020). Feelings of anxiety is a common symptom in all CMDs. Anxiety syndromes include several other disorders such as generalised anxiety disorder (GAD), panic disorder, different types of phobias, obsessive-compulsive disorder. Anxiety syndromes involve recurrent intense feelings of fear or worry, sometimes connected to certain situations or happenings and that affects the individual's functional level and leads to limitations in the everyday life. The test most commonly used in the primary healthcare to detect anxiety syndrome in primary healthcare patients is the Hospital Anxiety Depression Scale (HADS).

It is estimated that approximately 25 % of the Swedish population suffer from an anxiety syndrome during their lifetime, with 2 to 3 times higher risk for women. (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020).

Stress-related mental disorders

Stress-related mental disorders include the ICD (version 10) diagnoses acute stress reaction, adjustment disorders, and exhaustion disorder. Eighteen percent of all ongoing sick leave cases in Sweden concerns a stress-related mental disorder, and the diagnosis exhaustion disorder (F43.8) is reported to be an important cause behind the increase in new cases for this diagnostic group (Lidwall & The Swedish Social Insurance Agency [Försäkringskassan], 2020). Stress that is related to work and the working situation is a prevalent and increasing problem in the working population (Swedish Work Environment Authority, 2018). This is also reflected in the high number of sick leave cases in the disorder (Lidwall & The Swedish Social Insurance Agency [Försäkringskassan], 2020). Almost three out of ten workers report work-related complaints, the most common being too high job burden and indistinct or contradictory demands from the employer (Swedish Work Environment Authority, 2018). Stress and other psychosocial stressors were the most frequently reported work complaints among the ages 30-49 in 2017.

Despite this large number of persons affected and sick listed in a stress-related mental disorder, the evidence about effective treatments is still vague and ambiguous. Of this reason, no established national treatment guideline for this group exists today and the care given in the healthcare differ both within and between regions in Sweden (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

Prevalence and impact of common mental disorders

CMDs stand for a significant part of the global disease burden in high income countries (including most European countries, the United States and Canada, among others), affecting millions of people annually (GBD 2019 Diseases and Injuries Collaborators, 2020). It is estimated that almost 18 % of the working-age population (18 to 65 years) in these high-income countries experience a CMD during a 12-month period (Steel et al., 2014).

The economic burden of CMDs is substantial on both the societal level and the individual level in forms of direct costs, such as costs for healthcare visits, treatments and sickness benefits, and indirect costs, such as income and productivity losses (Christensen et al., 2020; Trautmann et al., 2016). The estimated total cost for CMDs in Europe alone is 600 billion euros annually (OECD, 2018). In Sweden, CMD diagnoses stand for approximately 90 % of all sick leave cases due to a psychiatric disorder (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020; Vingård, 2020).

Common mental disorders in the primary healthcare

The absolute majority of people with symptoms of CMD seek care and are treated in the primary healthcare (Sundquist et al., 2017). Approximately 70% of all patients with depression are treated in the primary healthcare, and 65 % of all antidepressants are prescribed in the primary healthcare (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020). Furthermore, a Swedish study showed that almost as many 60 % of primary healthcare patients, regardless of care-seeking cause, reported high-stress (Wiegner et al., 2015). Of these, almost two thirds expressed very high stress levels, with 50 % further fulfilling the criteria for exhaustion disorder. The same study also found that among the participants reporting very high stress levels, several individuals also reported symptoms of possible depression and anxiety.

Patients with CMD are also overrepresented when it comes to having multiple disorders simultaneously (i.e. comorbidity) (Toft et al., 2005; H.-U. Wittchen & Jacobi, 2005; H. U. Wittchen et al., 2011). Almost one third of the patients with CMD have at least two diagnoses (H.-U. Wittchen & Jacobi, 2005).

As the vast majority of patients with CMD suffer from comorbidity and have complex care needs, the primary healthcare is the recommended arena to treat these patients as the organisation has the possibility to treat the whole person and not just the single disease (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

However, as the primary healthcare often is characterised by time constraints, the treating physician may experience conflicting demands where the somatic health complaints (such as hypertension, fatigue or muscular pain) may be prioritised at the cost of the CMD (Adamsson & Bernhardsson, 2018; Nutting et al., 2000).

One of the objectives of the primary healthcare in Sweden is to work preventive, that is, to not only treat and cure diseases but also to prevent that health complaints develop to a disorder (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021). The primary healthcare is therefore obliged to also identify patients with milder symptoms of mental ill-health (sub-clinical state) as they risk shifting to a diagnosable CMD if left untreated. CMDs are an increasing public health issue and the primary healthcare is an important arena for both prevention and management of CMD because of easy access and close vicinity to the local community.

Treatment guidelines for common mental disorders

In Sweden, the national treatment guidelines are established by the National Board of Health and Welfare and emanate from empirical experience and evidence.

As of today, national treatment guidelines only exist for depression and anxiety syndrome, there is none for stress-related mental disorders (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020). As previously mentioned, the reason for the lack of national treatment guidelines for stress-related mental disorders is because of the low evidence of best practice for these conditions (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021). However, the Region Västra Götaland has its own set of regional treatment guidelines that are based on, but also complement, the national guidelines. For the treatment of CMD in the primary healthcare, the care providers in the region should follow the guidelines for depression, anxiety syndromes, and stress-related mental disorders (with a separate guideline for the diagnose exhaustion disorder). These regional medical guidelines (RMR) are available for everyone to read on the Region's website www.vgregion.se.

The goal of all treatment is to ensure that the patient regains health and full functional level, and to enable this, the care providers have access to clinical treatment guidelines that clearly state which treatment options that are best suited for the condition in question.

For depression and anxiety syndromes, the evidence-based treatments covered in the guidelines are listed as followed:

- High accessibility to an initial assessment and continuity (rank 1)
- Psychotherapy (such as cognitive behavioural therapy 'CBT', interpersonal therapy 'IPT' or psychodynamic therapy, among others) (rank 2)
- Antidepressant medication treatment (such as Selective Serotonin Reuptake Inhibitor (SSRI), Selective Norepinephrine Reuptake Inhibitor (SNRI), or Tricyclic Antidepressants (TCA)) (rank 3)
- A care manager for CMD, responsible for monitoring and follow-up of patients (rank 4)

Psychotherapy, which is of a more rehabilitative nature, is often recommended as first choice rather than pharmacological treatment in mild to moderate cases. The evidence of its effects is based on a treatment length of at least six sessions. For antidepressant medications it is recommended that the treatment lasts a minimum of six months. (Swedish Medical Products Agency

[Läkemedelsverket], 2016b; The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020). These recommendations also apply for stress-related mental disorders according to the RMR from Region Västra Götaland.

Care as usual/Treatment as usual

The care and treatment given in primary healthcare should always be based on empirical and evidence-based practices and knowledge. The usual care or treatment for patients with CMD can consists of several different components, such as visits to a physician, nurse, psychologist, or to a physiotherapist, or occupational therapist. The most common treatment option is psychotherapy either alone or in group, face-to-face or online. Psychotherapy treatment is often combined with treatment with antidepressant medications. Another treatment option is sickness certification, although this option is not recommended as a single or isolated measure.

How common mental disorders are tackled in the primary healthcare today

In Region Västra Götaland, the primary healthcare has the last decade seen a rapid increase in the reporting of a CMD: of all listed patients in the region, over 15 % had at least one CMD-diagnosis last year (Region Västra Götaland, 2020). However, despite the high frequency of patients with CMD in the regional primary healthcare, the access, the continuity and the deliverance of care have been shown to be inadequate and to not conform to the recommendations in clinical treatment guidelines (Barkil-Oteo, 2013; Sinnema et al., 2018).

In a comparison with ten other European countries, the Swedish primary healthcare showed large inadequacies regarding access to care (as measured in reported waiting times), continuity of care (as measured in having a regular healthcare contact), and collaborative and supportive care (as measured in reported perceived care among patients with complex and multiple care needs) (Vård- och omsorgsanalys, 2021).

Furthermore, as many as 65 % of Swedish patients with a perceived need of support for their mental health issues reported that they did not receive any counselling or other treatment from the healthcare. This issue has been confirmed in previous research which have shown that many patients with CMD go both unidentified and under-treated in the primary healthcare (Sinnema et al., 2018; Sundquist et al., 2017). Another Swedish population study, further showed that men were overrepresented regarding not perceiving the received care for their mental ill-health as sufficient (Olsson et al., 2021).

Although the primary healthcare should deliver treatments that are guideline-concordant, research have shown that only a minority of patients on antidepressants experience any effects of the treatment when given without support and follow-up (DeJesus et al., 2013). Moreover, the amount of received psychotherapy have also been shown to be insufficient (i.e. less than the recommended number of sessions in treatment guidelines) in the majority of cases (Katon, 2012).

There is a growing evidence of the effectiveness of a collaborative care approach in the care for patients with CMD (Archer et al., 2012). Complex interventions, such as a collaborative care approach with a care provider responsible for monitoring and follow-up of the patient, have been shown to have stronger effects on CMD outcomes compared to single measures of psychotherapy and antidepressant medications (S. M. Gilbody, 2003; Swedish Council on Health Technology Assessment ['SBU' Statens beredning för medicinsk utvärdering], 2012). In the Swedish national treatment guidelines, collaborative care with a specially trained care manager (often a nurse) is recommended for patients with CMD as this care function has showed to increase the accessibility, continuity and quality of care (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020).

Conducting research in the primary healthcare

The primary healthcare is a common arena for conducting research. It is important that evidence-based treatment guidelines for the primary healthcare are based on research conducted in the same context. This has not always been the case, especially regarding mental ill-health and CMD. Although the majority of individuals with CMD are found in the primary healthcare sector, most research on this group of patients, and on effective treatments for CMDs, have been conducted in the specialised hospital care (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

A commission with the task of evaluating the Swedish primary healthcare's care and care taking of patients with CMD emphasised the need of more research in a primary healthcare context (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

As of today, several barriers for conducting research in the primary healthcare exist. The major obstacle is often time constraints as the primary healthcare is characterised by a slim-lined organisation with low staffing and high job burden. The directors of the primary healthcare centres are not always keen to invite researcher into their organisation as it risks increasing the burden among their staff.

If we want to close the gap between research and practice, measures need to be taken to facilitate better possibilities of conducting research in the primary healthcare context. A suggestion made by the commission is increased state pressure on regional policymakers to incorporate aimed investments in the infrastructure of the healthcare organisation (The Swedish Ministry of Health and Social Affairs [Socialdepartementet], 2021).

The intervention and organisational implementation in focus

One primary healthcare intervention and one primary healthcare implementation formed the basis in the present thesis: (1) applicability of the work stress questionnaire (WSQ) in combination with physician feedback, and (2) evaluation of the implementation of a care manager organisation for patients with CMD, in the primary healthcare in Region Västra Götaland.

The Work Stress Questionnaire 'WSQ'

The WSQ was developed to identify both organisational and individual stressors in the working situation. The questionnaire is based on earlier research about stressors correlated with work, and from a qualitative study of women with experience of long-term sick leave (Kristina Holmgren & Ivanoff, 2004). The women described the progression from health to gradually losing control over the work situation and becoming sick listed. A combination of individual and organisational factors was stressed as especially important in the progression from healthy to sick (Kristina Holmgren & Ivanoff, 2004).

More details about the WSQ are covered in the method section of the present thesis.

After the development of the questionnaire, the WSQ was used in a primary healthcare study (Kristina Holmgren et al., 2013) and a population study (Kristina Holmgren, Dahlin-Ivanoff, et al., 2009) to investigate whether the questionnaire could predict future sick leave among those participants that scored high values on the WSQ at baseline. The results from the primary healthcare study showed that participants that reported high perceived stress because of indistinct organisation and conflicts, had twice as high sick leave compared to those participants without reported stress. The combination of indistinct organisation and conflicts with high commitment further increased the risk of future sick leave to four times the risk compared to non-stressed participants (Kristina Holmgren et al., 2013).

Based on the experiences received from these studies, we wanted to test the applicability of the WSQ as both a screening and diagnostic instrument to assess whether the questionnaire also could function as an aid for the physicians in their everyday practice (Kristina Holmgren et al., 2016).

The Care Manager Organisation

The care manager organisation is based on a collaborative care model with a specially trained nurse called a care manager. The care manager is responsible for following the patient through the care process in close collaboration with other healthcare professionals both within and outside the primary healthcare. The collaborative care model emanates from the idea behind the Chronic Care Model developed by Wagner and colleagues in 1995 (Wagner et al., 1996). The model is characterised by four key components:

1. *Interprofessional approach* involving several different competences in the care taking
2. *Structured care planning* engaging the patient in their treatment
3. *Systematic follow-up* with scheduled appointments
4. *Increased communication* between the care providers and between the primary healthcare and the specialised hospital care

The primary healthcare in Sweden has applied this model for several years when it comes to the care for patients with diabetes and chronic obstructive pulmonary disorder (COPD) and asthma (Björkelund & Västra Götalandsregionen Allmänmedicinskt Centrum, 2020). However, the adaption of the model for the care of patients with CMD is new (Björkelund et al., 2018). The implementation of a care manager organisation in Swedish primary healthcare started as an intervention study ("PRIM-CARE" – PRIMary care CARE manager) in 2014 with 23 primary healthcare centres in Region Västra Götaland (with 4 centres in Region Dalarna) (Björkelund et al., 2018). The results and experiences from the intervention study PRIM-CARE led to the establishment of a special university course (7.5 credits) for care managers with the first nurses graduated in January 2016. The course spans over 5 days with one additional day for examination. The manager of the primary healthcare centre is obliged to attend the first day of the course to ensure a smooth implementation of the function in the organisation. Since 2016 there has been a continuous implementation of a care manager organisation in the region's all primary healthcare centres and almost 180 centres have already implemented the organisation.

The decision to implement a care manager organisation in primary healthcare in Region Västra Götaland was based on an assessment report by the Swedish Council on Health Technology Assessment (SBU) in 2012 (Swedish Council on Health Technology Assessment ['SBU' Statens beredning för medicinsk utvärdering], 2012). SBU concluded in their report that a care manager had strong evidence for improved patient outcomes and overall care-quality for patients with depression. The effects of a care manager organisation should therefore be evaluated in the Swedish primary healthcare, as the prior studies were conducted in other healthcare systems that differ from that of Sweden (Swedish Council on Health Technology Assessment ['SBU' Statens beredning för medicinsk utvärdering], 2012). Since the first RCT-study was finished in the PRIM-CARE project, several research studies (based on this RCT) have been published that evaluate the implementation process of the care manager organisation, both qualitative (Hammarberg et al., 2019; Svenningsson et al., 2019; Wiegner et al., 2019) and quantitative (Augustsson et al., 2020; Holst et al., 2018). However, these studies investigated the effects of the care manager organisation on a patient and staff level only. In this thesis, the focus was instead to measure the impact of the organisational implementation on the regional level.

Aims

The overall aim of the present thesis was to evaluate effects of one intervention and one organisational implementation in the Swedish primary healthcare, which focused on improving the identification and treatment of patients with common mental disorders. Another aim of the thesis was to investigate whether the intervention and implementation in question positively affected the adherence to national and regional treatment guidelines.

The specific aims for each study are given below:

I. Evaluate whether physician's use of the Work Stress Questionnaire in the primary healthcare, in combination with feedback at consultation, affects further healthcare use among the participants and if there are any differences in healthcare treatment among participants that received the intervention compared to controls.

II. Evaluate whether the implementation of the care manager organisation in the primary healthcare in Region Västra Götaland is associated with a more adequate antidepressant medication pattern compared to primary healthcare centres without the organisation (i.e. usual care) one year after the implementation.

III. Evaluate whether the implementation of the care manager organisation in the primary healthcare in Region Västra Götaland affects number of healthcare contacts and the extent of psychotherapy compared to primary healthcare centres without the organisation (i.e. usual care). Furthermore, whether any differences in outcomes could be seen between female and male patients with CMD one and two years after the implementation.

Methods and materials

This section presents the specific methods used in the different studies. The first paper was an intervention study including participating patients. The second and third papers were register-based studies on primary healthcare centre level. The table below summarises the materials and methods in the different studies and gives a short overview of their respective design, data, outcome, participants and chosen analyses.

Overview of materials and methods in the studies

	I	II	III
Design	Randomised controlled trial with register-based follow-up	Ecological with aggregated register data	Ecological with aggregated register data
Data	Register data on patient level from the healthcare database VEGA	Register data on primary healthcare centre level from VEGA and Digitalis	Register data on primary healthcare centre level from VEGA
Outcome	Healthcare use and treatments	Proportion of antidepressant medication users with less than 6 months of medications (i.e. 1-179 DDD)	Mean number and proportion of visits to i) psychotherapists, ii) nurses, iii) physicians, and proportion of patients with psychotherapy of short vs. long duration
Participants	Primary healthcare patients in working age seeking care for mental and/or physical complaints without prior sick listing	Primary healthcare centres Aggregated patient group containing patients $\geq$18 years with a CMD diagnosis who sought care within the study period	Primary healthcare centres Aggregated patient group containing patients $\geq$18 years with a CMD diagnosis who sought care within the study period
Analysis	Non-parametrical Fisher exact test for group differences	Logarithmic linear regression (cross-sectional) and mixed-effects model (longitudinal). Kruskal Wallis test for descriptive group differences	Linear mixed-effects model for a cross-sectional and longitudinal analysis. Mann-Whitney U test for descriptive group differences

Study setting and study participants

All three papers in this thesis were based on the primary healthcare in Region Västra Götaland. The three studies focused on primary healthcare patients with either non-diagnosed or diagnosed CMD. In paper I, the focus was on symptoms that could be early signs of a work-related CMD. In papers II and III, only patients with a diagnosed CMD were included.

Research context

The studies were carried out as a part of the research programme New Ways – Mental Health at Work, at the School of Public Health and Community Medicine, University of Gothenburg. The research programme aims at conducting research that focus on identification, treatment and support of people with mental ill-health (including both non-diagnosed and diagnosed common mental disorders).

The first study was a part of the research project TIDAS (Tidig IDentifiering av Arbetsrelaterad Stress) – Health, Sick leave and Return to Work at the Institute of Neuroscience and Physiology. Studies II and III were part of the research project PRIM-CARE, a part of the research platform "Ways-of-life, stress and mental health in the primary care context" a collaboration between the School of Public Health and Community Medicine, University of Gothenburg, and Research and Development Primary Healthcare, Region Västra Götaland. Both TIDAS and PRIM-CARE are projects within the New Ways research programme.

NEW WAYS
Mental Health at Work

Register data and databases

To assess effects of interventions conducted in the primary healthcare, register data are often used as measurement and follow-up. Sweden has several national and regional databases containing register data about, among other things, healthcare use and treatment, living conditions, causes of death, prescribed and dispensed medications. Data from these registers can be merged together in research by linking the personal identification number that each inhabitant in Sweden have (Ludvigsson et al., 2009). This linkage possibility makes our registers unique in an international context.

In this thesis two databases were used for the collection of register data: VEGA and Digitalis.

VEGA

The department Data and Analysis at the Region Västra Götaland manages the healthcare database VEGA. The database contains information about healthcare contacts and treatment measures among the population in the region. VEGA collects information about healthcare that are consumed at hospitals and in primary healthcare, both within as outside of the region by the region's inhabitants. The database also collects information about healthcare production from hospitals and primary care, both outpatient and inpatient care (i.e. what the healthcare providers have produced in forms of healthcare measures, diagnoses, and visits etc.). VEGA is updated on a monthly basis and aims to be a tool for constant assessment and follow-up of the region's healthcare.

DIGITALIS

The regional pharmaceutical database Digitalis, also managed by Region Västra Götaland, receives its information from the Swedish eHealth Agency. The Agency also supports the national pharmaceutical database (the Swedish Prescribed Drug Register) with information that allows for a comparison of data. The Swedish eHealth Agency collects all information about prescribed and collected (dispensed) medications at pharmacies and then sends this information to Digitalis and the Swedish Prescribed Drug Register.

Digitalis is a separate database from VEGA and encompasses information about what the region produces (in forms of what medications the healthcare prescribes) and what the population consumes (in forms of dispensed medications by the region's inhabitants). Digitalis collects information about medications dispensed both within and outside the region, the data is connected to the region's all prescribers and to the personal identification number (PIN) for all inhabitants registered in the region.

Study I

Study I was a randomised controlled trial (RCT) aimed at assessing the effects of using the WSQ with feedback on the result from the physician on further healthcare use and treatment. The design of the study emanated from the CONSORT guidelines for RCT studies (CONSORT, 2010). Both private and public primary healthcare centres in Region Västra Götaland participated in the study. The recruitment process took place from May 2015 until November

2015. The recruitment ended when the number of participating primary healthcare centres was considered enough to achieve the pre-stated goal of number of recruited patients (i.e. at least 135 participants in each group). All participating primary healthcare centres were reimbursed for each patient recruited to the study, regardless of whether the patient received the intervention or got treatment as usual.

The WSQ

The WSQ includes 21 questions divided into four categories with the objective to identify stress in relation to:

1. Influence over work situation (4 questions)
2. Indistinct organisation and conflicts (7 questions)
3. High work commitment (7 questions)
4. Work interference with leisure time (3 questions)

Each item contains a four-point Likert scale ranging from "not at all stressful", "less stressful", "stressful", to "very stressful". Validation of the questionnaire, that is, if the WSQ measures what it aims to measure, was done using focus group interviews with women resulting in a good face validity (Kristina Holmgren, Hensing, et al., 2009). Reliability (the trustworthiness) of the WSQ was assessed with a test-retest. The test-retest assessment of the questionnaire aimed to measure the consistency of the results; a female population answered the WSQ twice with two weeks between the first and second occasion with minor adjustments of the questionnaire as a result (Kristina Holmgren, Hensing, et al., 2009). As the first tests of validity and reliability were conducted with a female population only, another study was conducted in 2017 with a male population, resulting in satisfying face validity and reliability also among men (Frantz & Holmgren, 2019).

Participants

The participants in study I consisted of primary healthcare patients seeking care for both somatic and/or mental health complaints at their primary healthcare centre at the time for data collection. Myself and two other research assistants on site were responsible for the recruitment of participants and included or excluded patients based on pre-defined inclusion and exclusion criteria (Table 1).

Table 1. Inclusion and Exclusion criteria in study I

Inclusion criteria	**Exclusion criteria**
Patients seeking care for: ⇒ Depression ⇒ Anxiety ⇒ Musculoskeletal disorders ⇒ Gastrointestinal ⇒ Cardiovascular conditions ⇒ Other symptoms potentially related to mental stress	Patients with: ⇒ ≥7 days sickness absence last month ⇒ Sickness or activity benefits ⇒ Ongoing pregnancy (due to risk of pregnancy-related healthcare contacts) Patients seeking care for: ⇒ Psychiatric conditions (e.g. schizophrenia, bipolar disorders) ⇒ Diabetes ⇒ Urinary tract infections (UTI) ⇒ Infections (cold, sore throat) ⇒ Fractures ⇒ Lumps and spots ⇒ Allergy ⇒ Prolonging of sick leave ⇒ Medical check-ups ⇒ Chronic obstructive pulmonary disease (COPD)

Procedure

As a first step, primary healthcare centres in the Region Västra Götaland were identified and subsequently asked to participate in the study. A total of 51 primary healthcare centres were asked and seven accepted participation. Motives for not being interested in participation were not having the time, already involved in another research project, or because of reorganisational issues such as change of medical record system or change of leadership. A few primary healthcare centres were excluded because of their application of a primary healthcare triage. The triage system organises the care so that the patient first gets in contact with a nurse which then assesses the needs of the patient and triages the patient to a suitable healthcare provider. This organisation did not comply with the intervention procedure of the RCT and these primary healthcare centres were thus not eligible for participation.

After accepting participation, the research team, consisting of myself and the project leader, received a list of all employed physicians for later randomisation. A decision to randomise on the physician level (i.e. both control and intervention physicians would be present at the same primary healthcare centre) was taken in order to avoid variations among the study population between different centres. The randomisation was done by writing the names of the physicians on pieces of paper and putting them in a container. Colleagues of the members of the research team drew one piece of paper at a time and reported the name of the physician that was drawn. The physicians were alternately randomised to either intervention or control group. This procedure was conducted for each participating primary healthcare centre. Me and the project leader then visited the primary healthcare centre and introduced the study to the whole staff and informed them which physicians that were selected to conduct the intervention. For each participant recruited, the primary healthcare centres received 1100 SEK (approximately €100).

Intervention

Together with the project leader, I conducted brief training sessions with all physicians randomised to the intervention group, which included information about CMD and the WSQ, on how to interpret the results from the WSQ and how to give feedback to the patient based on the results. During the training session, the intervention physicians also received a folder containing information about stress-related mental disorders, as well as a contact list to different local healthcare and rehabilitation providers. The aim with the list was that physicians, in consultation with their patients, could use the list for possible patient referrals. We informed the physicians that they first should address the health complaint for which the patient sought care and then address the WSQ. If work-related stress was identified, indicated by high values on the WSQ, the physicians should give recommendations for further care such as referrals to other care providers, both within and outside of the primary healthcare centre. The brief training sessions lasted approximately 1 hour and was given either in a group or one on one depending on what suited the physicians best.

After the training of the intervention physicians, the data collection at the primary healthcare centre started. Me and two other research assistants on site were responsible for the recruitment of patients and was given permission from the head of the healthcare centre to identify eligible patients from the electronic patient record system (figure 1). These patients were then contacted, either on site or by telephone, and were given information about the study and if they were interested to participate. If interested, the patients gave their written informed consent, on site, at the time for their appointment. Patients with an appointment to an intervention physician filled in the WSQ (with additional questions on background characteristics) before their consultation. This procedure took approximately 15 minutes. The research assistants compiled the answers of the WSQ and handed in the results to the treating physician. Depending on whether the result from the WSQ indicated work-related stress in any category or not, the physician gave recommendations for further care. On the document that was handed in to the physician with the results from the WSQ, a checklist for the physician was also included with questions about adherence to the intervention (i.e. if the physician discussed the WSQ with the patient and if any measures based on the results from the WSQ were taken).

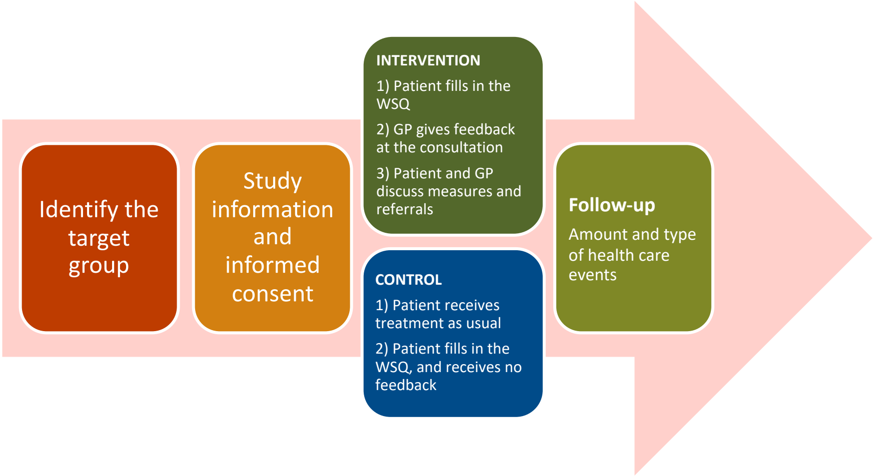

Figure 1. The intervention process from identification of study participants to data collection through follow-up.

Control

The physicians randomised to the control group were instructed to carry on as usual and were not informed about which patients that were included in the study. Patients that had an appointment with a control physician received the same information as the intervention patients and gave informed consent. In contrast to the intervention patients, the control patients only received information about the study and gave informed consent before their appointment with the physician. They were told to return to the research assistant after the appointment to fill in the WSQ with questions on background characteristics. The controls did not receive any feedback from the physician and did not know about the content of the WSQ prior to their appointment.

Data

The WSQ with additional information on background characteristics was collected at the time for recruitment at the participating primary healthcare centre. Background characteristics included information about age, sex, civil status, country of birth, occupation, employment status, educational level etc. Register data on healthcare use and treatment was collected from VEGA and contained information about healthcare level (primary healthcare or specialised hospital care on county, regional or national level), private or public management, inpatient or outpatient care, healthcare provider, number and type of healthcare visits and care measures.

Data on national or regional specialised healthcare levels were excluded from the analyses because of low number of participants in these categories. Moreover, data on healthcare measures not relevant for our research questions and that were listed as exclusion criteria were also excluded from the analyses. The included healthcare measures were categorised into four different groups: i) Diagnostics/Assessments, ii) Treatment, iii) Information/Education, and iv) Collaborative care. The development of these categories was based on the recommendations from the National Board of Health and Welfare. We collected data from 12 months before inclusion date and from inclusion date and 12 months after. One participant did not have follow-up data from the register, only self-reported questionnaire data collected at inclusion, because of incorrect/not interpretable personal identification number. The data from VEGA was merged and analysed with the questionnaire data.

Statistical analysis

Fischer's exact test was performed for a comparison between groups. Additional sub-group analyses were performed with participants (in both groups) reporting high stress. The reason for sub-group analyses was to distinguish the effect of the intervention as the physicians did not give any further feedback or recommendations if no stress was indicated in the WSQ. IBM SPSS statistics version 25 was used for the statistical analyses. Statistical significance was set at $p < 0.05$.

Study II

The second and third papers in the thesis were register-based studies with the aim to evaluate the impact of the implementation of the care manager organisation in the primary healthcare in Region Västra Götaland. Both studies used aggregated register data with information on primary healthcare centre level. Study II investigated the continuity of antidepressant medication users between primary healthcare centres with and without a care manager organisation, and over time. The study period was 1st of January to 31st of December 2015 (before the implementation of the care manager organisation), and 1st of January to 31st of December 2016 (when the implementation was achieved).

The work process of the care manager organisation

The implementation process of a care manager organisation starts with introducing all personnel in the treatment guidelines for CMDs. They are also informed on how to cooperate with the care manager, an employed nurse at the primary healthcare centre with a finished care manager education. The treating physician notifies the care manager when a primary healthcare patient is diagnosed with a CMD. A first contact between the care manager and the patient takes place within 7 days after the appointment with the physician where a structured and person-centred care plan is set up together with the patient. Scheduled follow-ups of the care plan continue for approximately 3 months, mostly by telephone contacts. The care manager collaborates with the treating physician and notifies him/her about the patient's progression, and if the treatment needs adjustments, for example change of dosage or type of medication. Furthermore, the care manager collaborates with other personnel at the primary healthcare centre engaged in psychosocial care, preferably in regular team cooperation.

Participants

We included all primary healthcare centres in Region Västra Götaland that were in operation (had an active healthcare organisation) within the whole study period. The reason for excluding primary healthcare centres not active during the complete study period was to have comparable groups in the analyses. Furthermore, primary healthcare centres that either started or ended their organisation some time during the study period, distinguished themselves on several points, such as numerous missing values, which would impinge the

analyses. We received a list from the region with information on which primary healthcare centres that had implemented a care manager organisation during our study period (i.e. in 2015 and 2016).
Based on the information from this list, the primary healthcare centres were divided into three groups depending on whether they had implemented the care manager organisation from the start (referred to as CMO), if they shifted to a care manager organisation from mid of 2016 and forward (referred to as Shift), or if they had not implemented a care manager organisation within the study period (referred to as care as usual 'CAU').

Data

Register data were collected per primary healthcare centre from the regional databases Digitalis (medications) and VEGA (healthcare). Information from Digitalis included dispensed antidepressant medications (Anatomical Therapy Chemical 'ATC' code N06A) among patients ($\geq$18 years) with a CMD diagnosis (Table 2) who received care at the primary healthcare centre within the study period. Antidepressants was chosen as medication group because these medications are the most commonly used in the treatment for both depression and anxiety syndromes (Swedish Medical Products Agency [Läkemedelsverket], 2016a) and are recommended in the treatment guidelines (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020). Each primary healthcare centre group (CMO, Shift and CAU) was controlled for the following covariates: i) private or public management, ii) number of listed patients, and iii) proportion of patients with CMD diagnosis (attained by dividing number of patients with CMD diagnosis with number of patients listed).

Table 2. Included CMD diagnosis according to ICD-10

F32	Mild to severe depression
F33	Recurrent depression
F40	Social phobia
F41	Anxiety syndrome
F43	Stress-related mental disorders

Outcome measure

The patient population of interest was based on number of patients aged 18 years and older with a CMD diagnosis who were dispensed at least 1 antidepressant medication within the study period, as obtained from each primary healthcare centre. Continuity of medication treatment was measured with the variable *Defined Daily Doses* (DDD). In line with clinical treatment guidelines, 1-179 DDD, or less than six months treatment, was defined as inadequate medication use. Patients who were dispensed antidepressant medication for less than 180 DDD, grouped on primary healthcare centre level, were defined as inadequate medication users. As outcome measure, we used *Proportion of inadequate medication users* calculated with the following equation:

$$\frac{No.\,of\ patients\ who\ where\ dispensed\ 1-179\ DDD}{No.\,of\ patients\ who\ where\ dispensed\ at\ least\ 1\ DDD} = Proportion\ of\ inadequate\ medication\ users$$

Statistical analysis

The non-parametric Kruskal-Wallis test was conducted to obtain *p*-values for group differences of the primary healthcare centres' characteristics, presented per primary healthcare centre group (i.e. CMO, Shift, and CAU). For the cross-sectional analyses, linear regression models were used. A log-transformation of the outcome variable *proportion of inadequate medication users* was necessary as the variable was skewed to the right. The log-transformation yielded normally distributed residuals in the linear regression models. Primary healthcare centre group was used as independent variable (reference = CAU) and the analyses were further adjusted for private management (reference = public). The linear regression models resulted in beta-coefficients β that were further calculated $((\exp(\beta) - 1)\ x\ 100\%)$ to give the relative difference in percent for PIMU in primary healthcare centres with CMO and Shift compared to CAU. Cross-sectional analyses were performed for both years, i.e. 2015 and 2016.

A mixed-effects model was implemented to investigate the effect of the care manager organisation on the longitudinal change in *proportion of inadequate medication users* within primary healthcare centre groups. The model took into consideration the correlation between repeated measures for the same primary healthcare centre and was further adjusted for private management status and proportion of patients with a CMD diagnosis. *P*-values of differences within primary healthcare centre groups were given.

All analyses were performed with IBM SPSS Statistics version 25 and 26, and SAS version 9.4 (SAS Institute: Cary, NC). Statistical significance was set at 0.05 (2-sided tests) with presentation of 95% confidence intervals.

Study III

Study III had similar design as study II but investigated number and type of healthcare contacts and the extent of psychotherapy between primary healthcare centres with and without a care manager organisation, and over time. The study aimed to distinguish differences and possible shifts in trends, among both a female and male patient population, the first and second year after implementation of a care manager organisation. The study periods were 1st of September 2015 to 31st of August 2016 (when the implementation had been ongoing for a year), and 1st of September 2016 to 31st of August 2017 (the second year after first initiating the care manager organisation).

Participants

All primary healthcare centres in Region Västra Götaland were included, excluding only emergency primary healthcare centres (jourvårdcentraler) open during evenings and weekends when the regular primary healthcare centres are closed. In contrast to study II, we this time used the registration of a special care measure code for care managers – UV119 (established in 2016) – to divide the primary healthcare centres into separate groups depending on whether they had registered the care manager code or not. This resulted in only two groups: primary healthcare centres that had registered a care manager code during both study periods and thus having a care manager organisation, and primary healthcare centres that had not registered the code at all within the study periods and, thus, defined as primary healthcare centres offering usual care.

Data

Register data on healthcare contacts and psychotherapy were collected from VEGA. The data was presented with information separate for women and men, as well as the pooled population.

Outcome measure

The patient populations were female and male patients with a CMD diagnosis aged 18 years and older that visited and received care at a primary healthcare centre within the study period. For the first outcome *healthcare contacts,* two different measures were used: 1) mean number of visits to (i) psychotherapist, (ii) physician, (iii) nurse, by the patient population; and 2) mean proportion of visits to (i) psychotherapist, (ii) physician, (iii) nurse, of total visits to the primary healthcare centre by the patient population. The two following equations were used to calculate the both outcome measures for each healthcare professional:

$$\frac{No.of\ visits\ to\ (Nurse)}{No.of\ patients\ with\ CMD\ at\ the\ PHCC} = Mean\ no.of\ visits\ to\ (Nurse)\ by\ the\ patient\ population$$

$$\frac{No.of\ visits\ to\ (Nurse)}{No.of\ visits\ to\ (Nurse + Physician + Psychotherapist + Other)} = Mean\ proportion\ of\ visits\ to\ (Nurse)\ per\ PHCC$$

For the second outcome *extent of psychotherapy*, we used the measure mean proportion of patients with a CMD diagnosis receiving psychotherapy with short (1-5 sessions) or long (6 or more sessions) duration, of total received psychotherapy (at least one session) at the primary healthcare centre. The following equation was used to calculate mean proportion of short-term and long-term psychotherapy respectively:

$$\frac{No.of\ patients\ with\ psychotherapy\ (Short)}{No.of\ patients\ with\ psychotherapy\ (Short + Long)} = Mean\ proportion\ of\ (short)psychotherapy$$

Mean proportions of the outcome measures were calculated to minimize the effects of substantial variations in the primary healthcare centres' sizes (i.e. their number of listed patients).

Statistical analysis

Differences in characteristics between the primary healthcare centre groups (i.e. CMO and CAU) were calculated using the non-parametric Mann-Whitney U test with presentation in *p*-values. A linear mixed-effects model was used to measure both cross-sectional effects and longitudinal changes in proportion of visits to different healthcare professionals and in proportion of patients with psychotherapy with short versus long duration, both within and between primary healthcare centre groups. Care manager status, the two time periods and the interaction between care manager status and time were included in the model. The presentation of the results from the mixed-effects model was in mean percent with confidence intervals. All analyses were performed with the statistical software IBM SPSS Statistics version 27 and SAS version 9.4 (SAS Institute: Cary, NC). Significance level was set at 0.05 with 95% confidence intervals.

Ethics

For study I, all patients received both oral and written information about the study and about the possibility to withdraw their participation at any stage without any consequences for their further care at the primary healthcare centre. Written consent was received for each patient prior to the inclusion. The regional Ethical Review Board in Gothenburg, Sweden approved the study (Dnr: 125-15; T131-17). The study was also registered at ClinicalTrials.gov (Identifier: NCT02480855) before the recruitment of primary healthcare centres and patients began.

For study II and III, the collected data was on aggregated level with information per primary healthcare centre and not per patient. Hence, no identification of individual patients was possible and no informed consent was needed. Ethical approval for the extraction of register data was obtained from the regional Ethical Review Board in Gothenburg, Sweden (Dnr: T566-17).

Results

This section summarises the main findings from each study. A more detailed description of the results can be found in the referred papers in the appendix. An in-depth discussion about the findings and concluding remarks are given in the Discussion and Conclusion sections respectively.

Study I

Study I aimed at evaluating whether patients, reporting high perceived stress (as measured by the WSQ) and receiving feedback at a physician consultation, would have an increased number of rehabilitative care measures during follow-up, compared to controls receiving usual treatment.

Overall, 271 patients were recruited at seven different primary healthcare centres: 139 to the control group and 132 to the intervention group. Of these, 87 of the intervention participants reported high stress in at least one of the four categories in the WSQ, at baseline. Among the controls, the number was 97. Of 31 physicians randomised to give the intervention, 29 gave feedback on the participants' WSQ score with recommendations on further care measures. Two physicians were excluded because they either did not have the target group or declined participation. A summary of the main characteristics of the study participants is presented in Table 3, for the complete table please see Table 2 (Paper 1) in the appendix.

As shown in figure 2, no major differences were found between the two groups in perceived stress at baseline. High work commitment was reported by most participants regardless of group belonging (48 % among the intervention group and 45 % among controls).

Table 3. Summary of baseline characteristics of study participants, data from self-administered questionnaire

	WSQ intervention n (%)	Controls n (%)
Sex		
Female	88 (67)	97 (70)
Male	44 (33)	42 (30)
Age categories		
19-30 years	21 (16)	26 (19)
31-50 years	58 (44)	76 (54)
51-64 years	53 (40)	37 (27)
Educational level		
Compulsory schooling	13 (10)	15 (11)
Secondary school	61 (46)	59 (42)
University or higher	57 (44)	65 (47)
Occupational class		
Skilled/unskilled manual	49 (37)	58 (42)
Medium/ low non-manual	60 (46)	56 (41)
High-level non-manual	23 (17)	24 (17)
*Reasons for consultations**		
Mental or behavioural	75 (57)	69 (50)
Musculoskeletal	62 (47)	44 (32)
Gastrointestinal	26 (20)	28 (20)
Cardiovascular	16 (12)	16 (11)
Other	29 (22)	27 (19)

*Several responses were possible

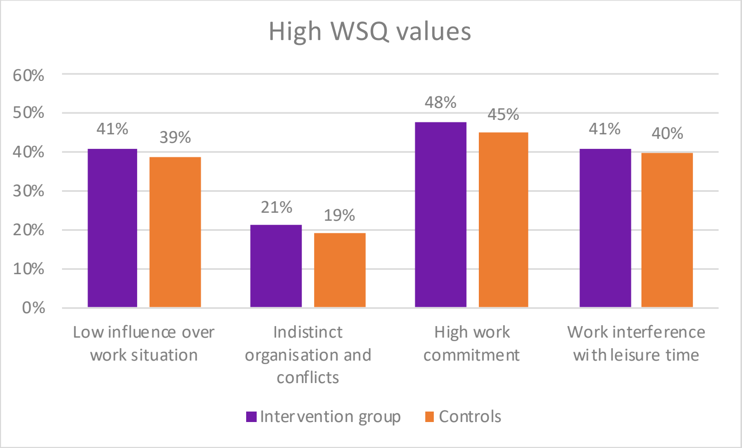

Figure 2. Reported perceived stress among participating patients (n = 271) in each of the four categories of the WSQ.

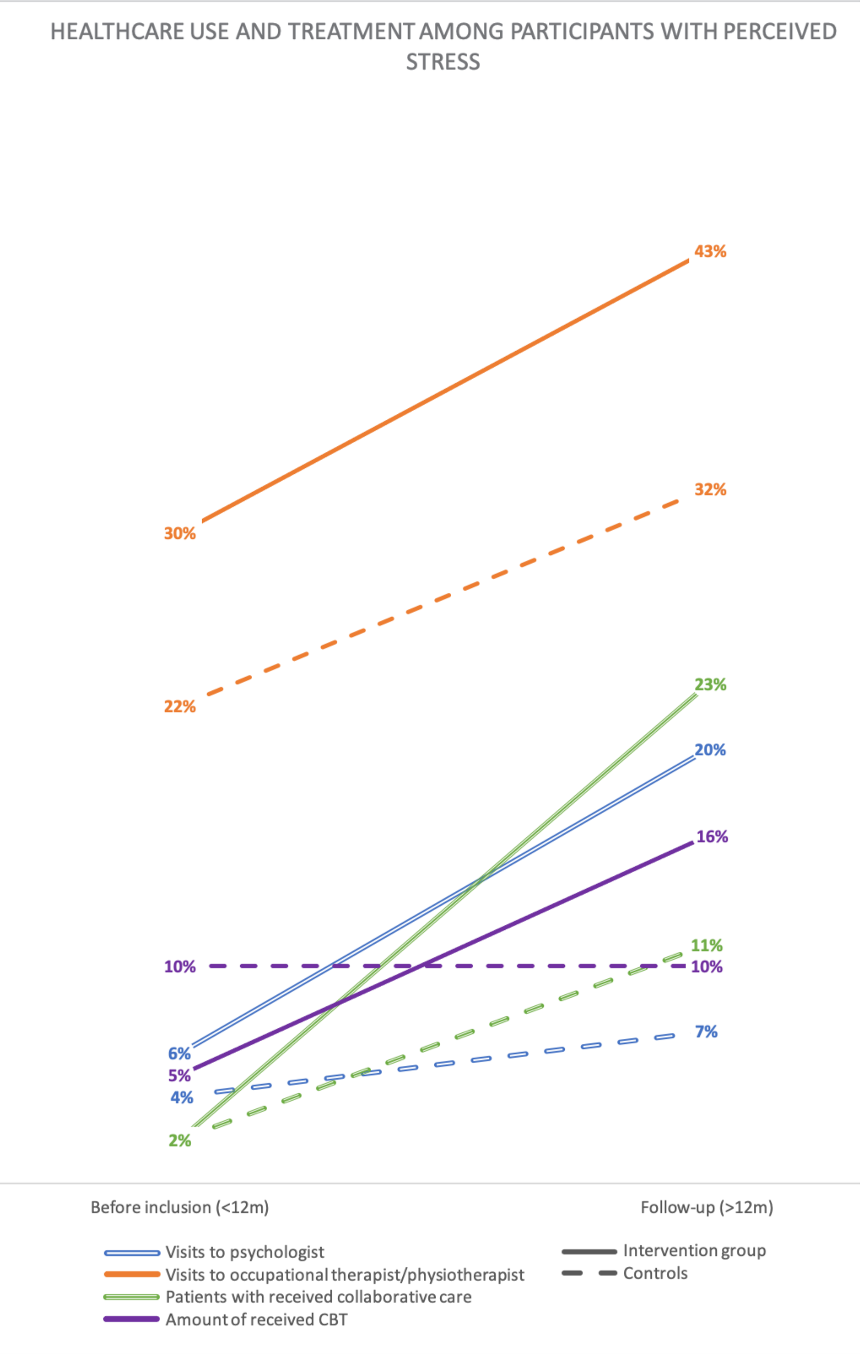

Figure 3. Healthcare use and treatment among participants with reported high perceived stress at baseline (n = 184).

The two groups with reported high stress did not differ regarding types of healthcare use received during follow-up (i.e. hospital/primary healthcare, public/private care, inpatient or outpatient care). However, when it came to visits to different healthcare providers, the intervention group with high stress had more appointments with psychotherapists compared to the stressed controls (20 % vs 7 %, $p = 0.048$) (figure 3).

The amount of received healthcare treatments were higher in both groups during follow-up compared to the year before inclusion. Among the four categories of healthcare measures (i.e. Diagnostics/Assessments, Treatment, Information/Education, and Collaborative care), Treatment was the most frequent one in both groups. In the intervention group reporting high perceived stress, more patients received collaborative care measures during follow-up (23 % compared to 2 % pre-inclusion), and compared to their control counterparts (11 % at follow-up vs 2 % pre-inclusion). The difference between the groups was statistically significant ($p = 0.048$).

Cognitive behavioural therapy (CBT) was the most frequent care measure at the 12-month follow-up among the intervention group that reported high perceived stress (16 % compared to 5 % before inclusion). For the stressed controls, same amount of CBT (10 %) was received in the period before inclusion as in the follow-up period.

Study II

Study II aimed at investigating effects of the implementation of a care manager organisation on antidepressant medication patterns, per primary healthcare centre, compared to primary healthcare centres without the organisation. We also wanted to determine whether the primary healthcare centres, by establishing a care manager organisation, had an antidepressant medication pattern more in line with treatment guidelines, that is, treatment lasting at least six months.

The number of primary healthcare centres included in the study was 190: 67 primary healthcare centres were classified as having a care manager organisation (CMO), 42 as primary healthcare centres that shifted to a care manager organisation (Shift), and 81 as primary healthcare centres with care as usual (CAU). A description of the included primary healthcare centres, including number of visits to different healthcare providers by patients with a CMD diagnosis, is presented in Table 4 (see also Table 1 in paper II in the appendix).

Table 4. Description of primary healthcare centres (PHCCs) by care manager status (CAU[a] n=81, Shift[b] n=42, or CMO[c] n=67) year 2015 (baseline) and 2016 (when the implementation was accomplished 2016).

	n[d]	CAU[a]	Shift[b]	CMO[c]	*p*
PHCC status					
2015 Private, n (%)	190	48 (52)	26 (62)	16 (24)	***.001***
2016 Private, n (%)	190	48 (52)	26 (62)	16 (24)	***.001***
No. of listed patients per PHCC					
2015 Mean value (SD)	190	8206 (3631)	8268 (3787)	8855 (3842)	*.53*
2016 Mean value (SD)	190	8452 (3594)	8442 (3749)	8921 (3802)	*.69*
PHCCs with proportion of patients with CMD diagnosis					
2015 % (SD)	190	9.4 (2.2)	9.3 (1.7)	9.2 (1.7)	*.95*
2016 % (SD)	190	9.9 (2.3)	10.2 (1.9)	10 (1.7)	*.25*
No. of patients on antidepressants per PHCC					
2015 Mean value (SD)	190	450 (223)	461 (241)	485 (233)	*.70*
2016 Mean value (SD)	190	487 (231)	499 (249)	528 (244)	*.57*
Difference Mean value (SD)		24 (62)	38 (55)	42 (45)	*.44*
No. of visits by patients with CMD per PHCC to: Physicians[e]					
2015 Mean value (SD)	188	1660 (855)	1584 (994)	1839 (954)	*.27*
2016 Mean value (SD)	190	1873 (946)	1985 (1245)	2202 (1218)	*.35*
Difference Mean value (SD)		155 (385)	401 (647)	378 (480)	*.12*
Nurses[e],					
2015 Mean value (SD)	176	293 (453)	191 (322)	291 (450)	*.61*
2016 Mean value (SD)	181	455 (588)	282 (368)	571 (690)	*.05*
Difference Mean value (SD)		134 (333)	106 (230)	275 (389)	***.006***

[a]Care as usual, [b]Shifted from CAU to care manager organisation, [c]Care manager organisation
[d]Number of valid observations
Text marked in bold is statistically significant at the 95% level (two-sided).

The results showed that all three primary healthcare centre groups had about 30 to 33 % of inadequate medication users (patients with a CMD diagnosis with less than six months treatment) in 2016 when the implementation was accomplished (CAU 32.5 %, Shift 31.6 %, and CMO 29.9 %) (Figure 4). Moreover, all primary healthcare centres had lower proportions of inadequate medication users in 2016 compared to the previous year (baseline). However, it was only among the primary healthcare centres that shifted to a care manager organisation from June 2016 (Shift) that this decrease was statistically significant (p =0.01).

Primary healthcare centres with a care manager organisation had lower proportion of inadequate medication users compared to primary healthcare centres without (CAU) during both years, but it was only in 2016 the difference was statistically significant (p = 0.02, confidence interval: -11.6; -0.9).

Another finding showed that having a public or private management was strongly associated with whether the primary healthcare centres had implemented a care manager or not (Table 4). Consequently, when controlling for management status (public or private) during the analyses, the differences between the groups attenuated. Further sensitivity analysis was conducted with the covariates *Proportion of patients with CMD diagnosis* and *Number of listed patients* but these did not have any effect on the association between the outcome variable (proportion of inadequate medication users) and care manager status.

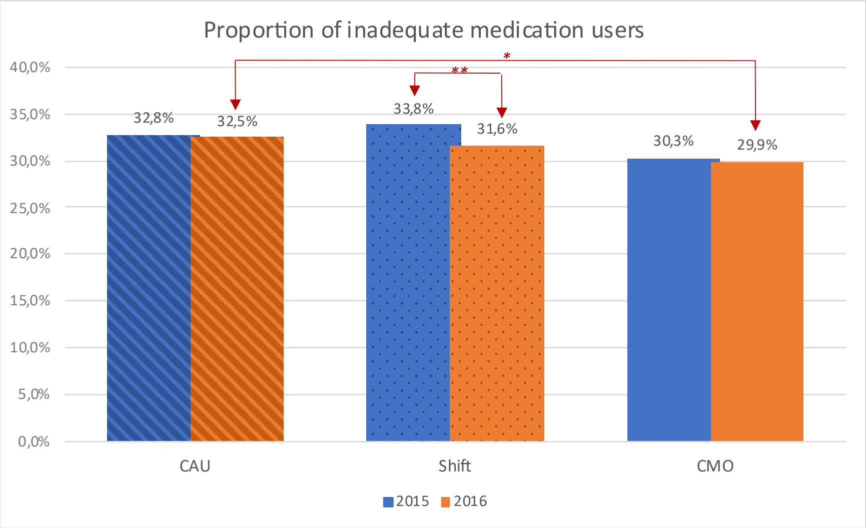

Figure 4. Proportion of inadequate medication users in each primary healthcare centre group (Care as usual ‘CAU’, Shift, and care manager organisation ‘CMO’) from baseline (2015) to 2016.
* = p<0.05, **= p<0.01.

Study III

Study III aimed at assessing the first and second year after the implementation of a care manager organisation in primary healthcare centres in Region Västra Götaland by investigating whether the implementation affects number of healthcare contacts and extent of psychotherapy in patients with a CMD diagnosis, compared to primary healthcare centres without this organisation. Moreover, to discern any gender differences in healthcare contacts and psychotherapy in primary healthcare centres with and without a care manager organisation.

The total sample consisted of 81 primary healthcare centres that had an implemented care manager organisation at both time periods, and 134 primary healthcare centres without a care manager organisation within the study periods (referred to as usual care). A summary of the description of the primary healthcare centres' characteristics is found in Table 5, the complete table is presented in paper III (Table 1) in the appendix.

The descriptive analysis showed a statistically significant difference in management status (private or public) between the two primary healthcare centre groups; primary healthcare centres with usual care were to a greater extent privately driven compared to primary healthcare centres with a care manager organisation (55 % versus 35 %, $p = 0.003$). Primary healthcare centres with a care manager were to a greater extent larger in size with more listed patients per centre, compared to primary healthcare centres without the organisation ($p = 0.004$ year 1, and $p = 0.01$ year 2).

When it came to healthcare contacts between the two primary healthcare centre groups, no differences could be seen in mean number of visits per patient with CMD either to a psychotherapist or to a physician.

The primary healthcare centres with a care manager had higher mean number of visits to a nurse per patient with CMD both years ($p = 0.001$ for both time periods), and higher proportion of visits to a nurse compared to primary healthcare centres with usual care (Table 5). Visits to a nurse by male patients with a CMD were somewhat higher than visits made by female patients with CMD in primary healthcare centres with a care manager organisation. The increase in nurse visits did not negatively impact the visits to physicians.

In the second year, the proportion of visits to a physician by male patients with CMD was significantly higher in primary healthcare centres with usual care compared to primary healthcare centres with a care manager organisation

(+3.4%, CI: -6.0; -0.7) (data not shown here but is found in Table 2 in paper III in the appendix).

Table 5. A summary of descriptive statistics of PHCCs by care manager status (CAU^{+}, CMO^{++}) at year 1 (201508-201609) and year 2 (201609-201708)

	Introductory phase (year 1)			**Establishment phase (year 2)**		
	CAU n (%)	CMO n (%)	*P*	CAU n (%)	CMO n (%)	*P*
PHCC status						
Public	60 (45)	53 (65)	.003**	60 (45)	53 (65)	.003**
Private	74 (55)	28 (35)		74 (55)	28 (35)	
PHCCs with no. of listed patients						
Median	7441	9020	.004**	7811	8932	.01*
Min-max	252-20219	2390-1894		503-19210	2667-18504	
Proportion of patients with CMD diagnosis per PHCC^{1},	% (SD)	% (SD)		% (SD)	% (SD)	
Women	11.9 (4.3)	11.9 (2.4)	.40	12.7 (4.7)	12.5 (2.5)	.41
Men	5.7 (2.2)	5.7 (1.2)	.25	6.0 (2.7)	6.0 (1.4)	.33
Mean no. of visits per patient with CMD to^{2}:	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Psychotherapist						
By female patients	0.79 (.60)	0.66 (.46)	.32	0.62 (.43)	0.63 (.45)	.89
By male patients	0.69 (.49)	0.62 (.40)	.65	0.56 (.39)	0.56 (.40)	.92
Nurse						
By female patients	0.93 (.60)	1.34 (.49)	.000***	1.01 (.65)	1.39 (.49)	.001***
By male patients	1.0 (.65)	1.40 (.65)	.03*	1.06 (.69)	1.46 (.58)	.002***
Physician						
By female patients	3.0 (.66)	3.0 (.44)	.84	2.93 (.58)	2.97 (.45)	.70
By male patients	2.70 (.60)	2.69 (.42)	.54	2.68 (.57)	2.68 (.41)	.92

$^{+}$CAU, care as usual, $^{++}$CMO, care manager organisation

[1] Proportion calculated by dividing mean number of patients with CMD with mean number of listed patients at each PHCC group.

[2] Mean number calculated by dividing mean number of visits for e.g. physician by patients with CMD with mean number of patients with CMD at each PHCC group.

*P-value of <0.05. **P-value of <0.01. ***P-value of <0.001.

The longitudinal analysis showed a statistically significant difference over time in primary healthcare centres with usual care having a decreased proportion of visits to a psychotherapist in both male and female patients with a CMD diagnosis compared to primary healthcare centres with a care manager organisation.

Regarding the extent of psychotherapy, the cross-sectional analysis showed that primary healthcare centres with a care manager organisation had significantly lower proportion of psychotherapy with short duration, in both the female and male patient population the second year after implementation, compared to primary healthcare centres with usual care (Figure 5).

Only primary healthcare centres with usual care had increased their proportion of short-term psychotherapy, in both patient populations, year 2 (CI: 2.5; 7.3 for women and CI: 0.7; 6.6 for men). Furthermore, it was only in primary healthcare centres with usual care that the proportion of long-term psychotherapy in female patients with CMD decreased significantly from year 1 to year 2 (CI: -8.7; -2.8).

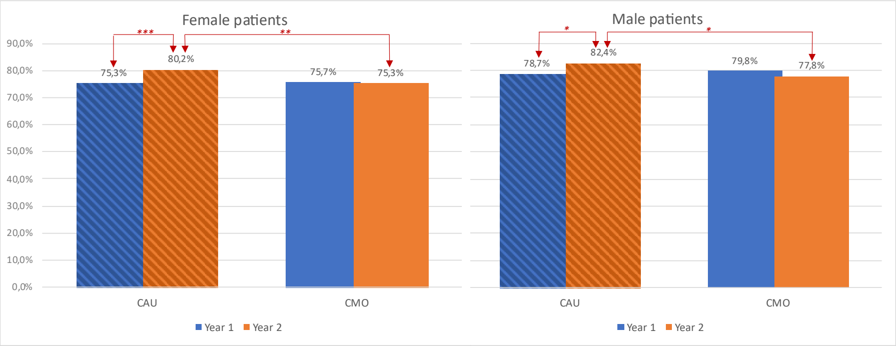

Figure 5. Mean proportion of short-term psychotherapy (1-5 sessions) in female and male patients with CMD as presented in respective primary healthcare centre group (care as usual ‘CAU’ and care manager organisation ‘CMO’) at year 1 and year 2.
* = $p<0.05$, **= $p<0.01$, ***= $p<0.001$.

Discussion

The overall aim of this thesis was to evaluate effects of one intervention and one organisational implementation in the primary healthcare in Sweden, which focused on identification and treatment of patients with CMDs. In this section, I discuss the findings of each study in relation to other research and to the treatment guidelines. Moreover, methodological considerations with strengths and limitations, as well as ethical considerations will be discussed accordingly.

The use of a work stress questionnaire in practice

The findings from study I showed that the intervention group with participants reporting high perceived mental stress at baseline had more visits to psychotherapists and received more CBT compared to the control participants with high stress. Furthermore, significantly more patients in the intervention group with high stress received collaborative care compared to the corresponding control group.

The primary healthcare has been shown to have difficulties in both identifying patients with mental ill-health, and not being able to offer adequate care or treatment even when the ill-health has been identified (Sinnema et al., 2018; Sundquist et al., 2017). The findings from our study implies that the use of a screening instrument – in this case the WSQ – could improve the recognition of patients' ill-health and need of suitable treatment at an earlier stage in the care process. This is in line with the findings by Magruder-Habib and colleagues (Magruder-Habib et al., 1990) who showed positive effects on the recognition and treatment of patients with depression when the physicians administered a screening instrument. However, newer studies have shown that screening instrument – filled in by the patient with feedback on the results from the physician – only had limited effect on the detection and management of the mental disorder (often depression) (S. Gilbody et al., 2008; S. M. Gilbody, 2003). Due to the ambiguous research about screening instruments' effectiveness, it is difficult to draw any absolute conclusions about what factors that caused the differences observed in our study; if it was the patient's

use of the WSQ or the feedback from the intervention physician – or a combination of both. A study by Østerås and colleauges found that physicians trained on patient-related work factors and functional assessments increased the physicians' awareness of their patient's work-related stressors (Østerås et al., 2009). Based on this assumption, it could be that the training session with the intervention physicians in combination with the use of the WSQ to detect work-related stress resulted in patients with high perceived mental stress received more adjusted care measures.
Another finding from our study was that more participants in the intervention group with reported high mental stress received collaborative care compared to the stressed controls. Furthermore, the intervention group with stress had higher number of visits to psychotherapists and received more CBT treatment during follow-up compared to the corresponding control group. This implies that the use of the WSQ can lead to higher amount of treatments that in earlier research have been shown to be more effective and lead to better health outcomes for patients with CMD, compared to usual care (Chaney et al., 2011; Coventry et al., 2014; Ejeby et al., 2014; Johnson et al., 2014; Parikh et al., 2016).

Other studies have been conducted from this RCT with different outcome measures (Bjerkeli et al., 2020; K. Holmgren et al., 2019; Hultén et al., 2020). One study measuring the effect of the WSQ intervention on number of sick leave days found no differences between the intervention group and the control group (K. Holmgren et al., 2019). In contrast, Bjerkeli and colleagues found that the intervention had an effect on the medication treatment, as measured in less polypharmacy (defined as having prescriptions of at least 10 different medications) and fewer number of clinics issuing their prescription, indicating some form of changed behaviour in either patients or physicians (Bjerkeli et al., 2020). Although observed differences in the study by Bjerkeli and in our study, indicating a behavioural change among the participants, a focus group study with the participating physicians found that the physicians did not perceive the WSQ as useful and instead regarded their own competence and everyday consultative practice as sufficient (Hultén et al., 2020).

A care manager organisation for patients with CMD

The evaluations of the implementation of the care manager organisation in Region Västra Götaland showed that primary healthcare centres with the organisation had fewer patients with an inadequate antidepressant medication treatment (less than 6 months of treatment), a higher number of visits to different healthcare providers, and more consistent psychotherapy duration compared to primary healthcare centres with usual care.

Regarding antidepressant medication patterns, primary healthcare centres with a care manager organisation had consistently better antidepressant medication pattern compared to primary healthcare centres without the organisation from study start. The primary healthcare centres that shifted to a care manager organisation gained most in implementing the organisation, as this group had an improved antidepressant medication pattern over time. These findings imply that a care manager can support the patient in following the medication regime to a higher extent than patients receiving usual care. In many cases, usual care with antidepressant medication treatment means that the patients' medication regime is not monitored or followed-up adequately (DeJesus et al., 2013). Several studies conducted on the patient level have shown that the care manager positively influenced the patients' antidepressant medication use to be more adequate (Björkelund et al., 2018; Hudson et al., 2019; Rost et al., 2001).

Another finding, which was somewhat unexpected, was that public or private management status explained some of the difference seen in antidepressant medication pattern in the three groups of primary healthcare centre. Primary healthcare centres with the care manager organisation had almost exclusively public management; these primary healthcare centres had a more adequate antidepressant medication pattern even before the introduction of the organisation. The primary healthcare centres with usual care, on the other hand, were mostly privately driven and had a higher proportion of patients with an inadequate antidepressant medication use. One potential explanation behind this could possibly be found in the study by Axelsson et al. (Axelsson et al., 2008). The researchers found that physicians in private primary healthcare centres in Region Västra Götaland were more negatively inclined toward the region's prescribing guidelines booklet, and did not use or follow the booklet to the same extent as the physicians in the public primary healthcare centres. The prescribing guideline booklet contains the prescribing objectives for the region with the aim to aid and guide the healthcare providers to good prescribing routines that conforms to established clinical treatment guidelines (Carlzon et al., 2010).

Although differences and improvements in antidepressant medication patterns could be seen between the three primary healthcare centre groups, all centres had overall low levels of inadequate antidepressant medication users (i.e. patients with less than 6 months of treatment). In an international comparison, our results of 66 % – 70 % of patients with at least 6 months of antidepressant medication treatment are in line with other findings from Nordic countries (Hansen, 2004; Sundell et al., 2013) but somewhat higher than rest of Europe (Forns et al., 2019; Gomez-Lumbreras et al., 2019; OECD, 2013). A French study had 55 % of patients with long antidepressant treatment (Bocquier et al., 2014), and corresponding number for an Italian study was approximately 50 % (Lunghi et al., 2020). Almost 10 % of the Swedish population are antidepressant medication users, and Region Västra Götaland is one of Sweden's 21 regions with the highest number of users (OECD, 2013; The Swedish National Board of Health and Welfare [Socialstyrelsen], 2021). This aspect could perhaps partially explain the high proportion of patients with long antidepressant medication use found in Swedish studies.

Regarding healthcare contacts, primary healthcare centres without the care manager organisation had a decrease in visits to psychotherapists by both female and male patients with CMD over time. Among the primary healthcare centres with the care manager organisation, this number was consistent over time. Primary healthcare centres with the organisation instead showed a significant increase in visits to a nurse. This was expected as the care manager visits were imbedded in the nurse visits. However, we did not expect to find the stronger increase in visits to a nurse by the male patients with CMD the second year after implementation. This was an interesting finding as this group, in previous research, has been shown to have lower health seeking behaviour compared to women, regardless of present need of care (Olsson et al., 2021). Moreover, another study found that men had lower belief in the helpfulness of psychotherapy, with consequently poorer commitment to the treatment, compared to women, which negatively impacted on the treatment outcome (Grubbs et al., 2015). Thus, our finding could indicate that the care manager can support the male patients with CMD to engage more in their treatment with higher number of care visits as a result.

A study by Celano and colleagues (Celano et al., 2016) showed that the overall healthcare contacts per patient increased after an implementation of a collaborative care model with a care manager. This led to increased healthcare costs per patient which also have been shown for the care manager organisation in Region Västra Götaland (Holst et al., 2018). The study by Holst and colleagues (ibid.) showed, on the other hand, that the societal costs per patient decreased with a care manager organisation because of shorter duration of illness, less sick-listing days, and faster improvement of quality adjusted life years (QALY). This scenario was also seen in the study by Celano and colleagues (Celano et al., 2016). It is important to acknowledge the shift in healthcare costs. Since the Region Västra Götaland in 2017 decided on a wide implementation of the care manager organisation, the region has allocated extra resources and reimbursements to the primary healthcare centres with the organisation to compensate this increase in costs. This action from the region might have resulted in better sustainability of the implementation, as also confirmed in another study that emphasised the need of top-down support in order for an new care model to be successful in the clinical context of primary healthcare (Miller et al., 2013).

Regarding the extent of psychotherapy, the primary healthcare centres with a care manager organisation had significantly fewer patients with less than 6 treatment sessions (i.e. what we defined as short-term psychotherapy). The same pattern was shown in both the female and male patients with CMD. For the primary healthcare centres with usual care, the frequency of short-term psychotherapy instead increased over time.

The existing evidence of effective length of psychotherapy (such as CBT and IPT) have reported treatment duration of six sessions or more (Grubbs et al., 2015; Parikh et al., 2016). Furthermore, this extent of psychotherapy is also what the recommendations in national clinical treatment guidelines are based upon (NICE, 2011; The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020). For this reason, it was somewhat surprising that both primary healthcare groups had highest frequency of psychotherapy lasting only between 1 to 5 sessions. An aspect important to acknowledge is that we lack information on the individual level. Thus, we cannot say anything about fulfilled care needs among the patient population (i.e. whether all patients with need of psychotherapy received the treatment, or if the received psychotherapy was perceived as sufficient).

Findings in relation to treatment guidelines

The findings from all three studies showed that with the change of practice in the primary healthcare for patients with work-related stress and/or CMD, the care and treatment received seemed to be more in accordance to clinical treatment guidelines.

For study I, an increased number of intervention participants with perceived stress received collaborative care measures compared to the stressed controls. The intervention participants also received more CBT during follow-up, and compared to the control group. As the treatment guidelines clearly recommend these measures for patients with CMD (NICE, 2011; The Swedish National

Board of Health and Welfare [Socialstyrelsen], 2020), we can conclude that the use of the WSQ in our study seemed to aid the physicians in detecting work-related stress in the patients, consequently leading to recommendations of more suitable and guideline-concordant care. This is in line with the conclusions made by Smolders et al. who found that the detection and recording of a diagnosis (in this case depression and anxiety) influenced the adherence to guideline-based treatments (Smolders et al., 2009).

For study II, a more guideline-consistent antidepressant medication pattern was shown in primary healthcare centres with a care manager organisation from start. Moreover, in primary healthcare centres that implemented the care manager organisation later on (i.e. the “shifters”) improved their antidepressant pattern significantly over time. These findings indicate that the care manager organisation could support the patients in a better adherence to medication regime, leading to an antidepressant treatment more in accordance with the guidelines (Swedish Medical Products Agency [Läkemedelsverket], 2016b).

For study III, primary healthcare centres with a care manager organisation had a consistent number of visits to psychotherapists and to physicians, with an increased number of visits to nurses, and less proportion of patients with short psychotherapy. These findings indicate that the care manager organisation could improve the primary healthcare centres capacity to better comply with the recommendations in the treatment guidelines, which emphasise the importance of accessibility and continuity of care for patients with CMD (The Swedish National Board of Health and Welfare [Socialstyrelsen], 2020).

To sum up, both the use of a screening instrument (the WSQ) and organisational changes in the primary healthcare (the care manager organisation) can have a positive effect on adherence to guidelines.

Methodological considerations

Research is never completely free from bias and it is the responsibility of the researcher to be as transparent as possible and to disclose and discuss the methodological issues in his or her research. In this section, the methodological considerations in each study will be discussed and both strengths and weaknesses will be presented. Furthermore, aspects of efficacy and effectiveness will be discussed as the three studies fall on different sides of this research spectrum.

Study I

A two-armed randomised controlled trial (RCT) was chosen as study design for paper I. RCTs have been regarded as the “gold standard” when it comes to research about psychiatric treatments and their effects on health (Wells, 1999). A strength with this study is the predefined study protocol which increases the internal validity (Haynes et al., 2006). Internal validity refers to the extent to which the findings from the study represent the truth in the population of interest and are not merely a result of methodological errors (Patino & Ferreira, 2018).

The study protocol was defined in accordance with strictly controlled guidelines, in this case the CONsolidated Standards of Reporting Trials (CONSORT) guidelines (CONSORT, 2010).

The randomisation of the intervention arm was conducted on the physician level. The strategy to randomise the physicians at the same primary healthcare centre either to conduct the intervention or to be part of the control group was chosen as the benefits were considered greater than the disadvantages. The main advantage of including both intervention and control participants at the same primary healthcare centre was the minimised risk of having large variations in sociodemographic and socioeconomic factors between the two patient groups, thus avoiding recruitment bias. Furthermore, a former study showed that recruiting both intervention and control participants at the same centre led to higher participation rates (Morténius et al., 2015).

However, a possible disadvantage could be the contamination effect, meaning that the intervention physicians could talk about the study procedure with their colleagues randomised to the control group. However, we anticipated this risk to be low since the intervention was very brief and imbedded in the physicians’ ordinary consultation routines. Moreover, earlier research has shown that physicians work autonomously and do not usually discuss their practices with colleagues, even if they consider themselves being part of a team (Coles, 1995).

Study II and III

Papers II and III were register-based studies with data on aggregated primary healthcare level. Both studies were defined in accordance with the STROBE guidelines (Strengthening the reporting of observational studies in epidemiology). These guidelines were founded as an international initiative to improve the quality in research (STROBE, 2009).

The main advantage of register-based data is that the information is already collected (Thygesen & Ersbøll, 2014). Other advantages are the minimised risk of attrition bias connected to high drop-out rates, recall bias among the participants, and population bias due to a non-representative sample (Morgenstern, 1995; Olsen, 2011; Thygesen & Ersbøll, 2014).

However, some common disadvantages of register data exist and these are, for example, difficulties in controlling for confounding variables, the lack of information about coding practices, missing data and information on the quality (Thygesen & Ersbøll, 2014). Both VEGA and Digitalis are actively monitored databases that are updated regularly which could imply trustworthy and valid sources of data.

Another drawback with register-based data, especially when the data is aggregated, is that it requires many hours in data management to make it analysable in research. This put extra efforts and resources on the researchers and may ultimately affect the reproducibility of the research. However, with expertise help and extra scrutiny of the data, we believe the reliability of our findings increased.

Regarding the methods used to separate the primary healthcare centres into different groups depending on whether they had implemented a care manager organisation or not has been a challenge. For study II, the division was made with the use of a list obtained from the region. Fort study III, we instead used a care measure code (KVÅ-kod) first introduced in 2016. It could be discussed which method that is preferable. However, it is part of the challenge with implementation research that new methods arise and organisations are in transformation, which becomes visible through for example new care codes for registration.

Generalisability

Generalisability means how the findings from a specific research population are applicable to the general population (Patino & Ferreira, 2018). Generalisability is an underlying concept of the construct of external validity that also include the concepts of applicability, transferability, directedness, and representativeness, etc. (Murad et al., 2018).

The major strength with this research project is the "real world" setting; it is primary healthcare research conducted in the clinical context of primary health care. To conduct research in the same setting in which the findings should apply to minimises the gap between the research and clinical practice (Haynes et al., 2006). Furthermore, the generalisability could be expected to be high when the research population and the target group for the research is the same, which in this research consists of "real" primary healthcare patients. For this reason, the applicability of the research findings to the clinical context should therefore be facilitated.

However, in paper I, exclusion criteria were set in which people with chronic illness, psychiatric disorders and/or that did not speak Swedish were excluded. This could negatively affect the generalisability to the general population but was a necessity for the conduct of the RCT. However, patients that fulfilled the exclusion criteria were not the study's target group.

For papers II and III, all primary healthcare centres in Region Västra Götaland were included implying a high generalisability of our findings to other primary healthcare sectors in Sweden. Another factor that points to a high generalisability not only to a Swedish context are the previously made studies in the United Kingdom (S. M. Gilbody, 2003) and the United States (Rost et al., 2001) on which the design of the care manager organisation in Region Västra Götaland is based (Björkelund et al., 2018).

Efficacy research versus effectiveness research

Two research traditions that are common in the medical research field are efficacy research and effectiveness research. Effectiveness research measures the effect of an intervention under "normal conditions", i.e. in daily practice. Effectiveness studies apply a pragmatic design that allows for a more practical and flexible trial, adjustable to the real-world setting. Efficacy research, on the other hand, is often designed to measure the isolated effects of an intervention under ideal research conditions, that is, how the intervention works under strictly controlled (laboratory) settings (Haynes et al., 2006; Patsopoulos, 2011; Roy-Byrne et al., 2003; Wells, 1999). RCTs are often designed as efficacy studies in order to gain a strong internal validity.

A pragmatic approach can also increase the translational factor, in other words, the applicability of the research to the primary healthcare clinical context (Roy-Byrne et al., 2003). There is a trend in moving from more traditional RCT studies to the use of more pragmatic trials that are better adjusted to the setting in which the research lies and aims to improve (Roy-Byrne et al., 2003). According to Haynes and colleagues (Haynes et al., 2006), effectiveness research (pragmatic trials) and efficacy research (clinical trials) are not "polar" states (i.e. dichotomous) but rather a continuum where one trial can be more or less pragmatic or efficacious. Based on this argument, I would reason that the first part of this thesis falls more on the efficacious side of the continuum and the second part more on the pragmatic. The first paper is a more strictly defined RCT with randomised allocation and blinding of subjects that strengthens the internal validity but decreases the external validity. For the second part (papers II and III), the care manager organisation is an already implemented organisational change in the region's primary healthcare centres. The translational factor is therefore very high as the research originates from the clinical context of primary healthcare and the findings can easily be reapplied in the primary healthcare.

Ethical considerations

Since this thesis included patients and patient data, ethical approvals from an ethical committee were necessary, and obtained, before initiation of the studies. Two aspects of ethical considerations will be discussed; the possible benefits or risks of participating in the different studies and aspects of consent.

Possible benefits versus risks of participation

One of the basic ethical principles stated in the Belmont report is the principle of *Beneficence* (Post, 2004). Beneficence, according to the report, should be understood as an obligation for researchers to (i) do no harm, and (ii) maximise possible benefits of participation and minimise risks and harms.

Individuals that seek care at their primary healthcare centre are keen to get help and can therefore feel obliged to participate in the study when asked.

For study I, myself and the other two research assistants in charge of the recruitment of patients were very aware of this aspect and therefore stressed, both orally and in writing, the fact that participation was voluntary and that declining participation would not affect the patients' further care at the primary healthcare centre. The participating patients either got the intervention or treatment as usual, that is, the treatment they are entitled to. The aim with study I was to improve the care and treatment given in practice, which will only benefit the patients, and for this reason it should not be any risk for the single individual.

In papers II and III, the care of patients with CMD was compared between primary healthcare centres with a care manager organisation offering enhanced treatment with primary healthcare centres offering usual care, i.e. not having the organisation. The care manager organisation is an already (evidence-based) implemented organisational care model in the region. Our studies aimed to measure the impact after the accomplished implementation by using indicators obtained in registers with information on the organisational level. No patients could be identified and, thus, no harm could be done to the individual patient.

Free and informed consent

In study I, all recruited participants were given oral and written information about the study, that participation was voluntary and the possibility to withdraw their participation at any time without further consequences. However, there is one aspect that one could argue affected the participants free and informed consent, namely the time for the decision to participate. In study I, the recruitment of participants was done adjacent to their doctor's appointment, hence, not allowing much time for the research assistant to give the oral information and letting the potential participant read the written information and thereafter sign the consent form. The eligible patient had to give his or her consent right away to be included in the study – he/she could not bring home the information to consider possible participation. Consequently, individuals who wanted extra time to rethink about participating in the study were, thus, excluded by the research assistants. This could mean that some persons eligible for the study did not participate due to the time issue, which in turn increases the drop-out rate and consequently the population bias. However, it could also have meant that some individuals felt stressed about making a fast decision to participate and, thus, agreed although they might not have done so if they were given the time to reflect upon their decision. Another basic ethical principle stated in the Belmont report is the principle of *Respect for Persons* (Post, 2004). This principle states that all individuals should be treated as an autonomous person who is capable of making informed decisions and actions. For research, this means that the subjects should agree to participate in the research voluntarily and with sufficient information.

To counteract the time issue at the recruitment process for our study, all patients received a copy with information about the study, which information that we were going to collect about them in register with our contact details. All patients had, thus, the possibility to contact the research team afterwards to decline their participation.

For study II and III, only register data was collected, with information per primary healthcare centre that did not include personal or identifiable information about single patients. For this reason, there was no need to obtain consent from each patient receiving care at the included primary healthcare centre.

Conclusion

The overall conclusion of the findings covered by this thesis is that the primary healthcare efforts in focus – the WSQ and the care manager organisation – aimed at improving the identification and treatment of patients with symptoms of, or with diagnosed CMD, had positive effects on received care and treatment compared to care as usual. What is more, the care received was also more in accordance with established national and regional clinical treatment guidelines indicating a care of better quality and equality.

Study I

The use of the WSQ in the primary healthcare could improve detection of work-related stress in patients and help healthcare professionals in their recommendations of further treatment and more rehabilitative measures earlier on in the care process.

Study II

Primary healthcare centres in Region Västra Götaland had overall an antidepressant medication pattern in line with the recommendations in treatment guidelines but the implementation of a care manager organisation further improved the frequency of patients receiving adequate medication treatment.

Study III

Primary healthcare centres with a care manager organisation showed a more consistent number of healthcare contacts and psychotherapy duration compared to primary healthcare centres without the organisation, indicating a better accessibility and sustainability of care at least two years after the implementation.

Implications and future perspective

The findings covered by the present thesis add to the knowledge base of effective treatment in the primary healthcare for patients with both early signs of CMD and with a diagnosable CMD.
The high prevalence of CMD in the population, both in Sweden and abroad, is a most relevant public health issue important to study. Furthermore, as this patient group is found in the primary healthcare first-hand, the research should also be conducted there.

In this thesis, we evaluated a screening instrument for the identification and treatment of work-related stress, and evaluated the impact of a new organisational implementation of the care manager organisation for patients with CMD. These evaluations were made possible by the use of existing registers allowing us to study not only patient outcomes on the individual level but also to study outcomes on primary healthcare centre level. It is important that healthcare registers continue to be available to and are used in research as these enable both compilation and evaluation of the quality of care.

The new knowledge obtained from this PhD project can, hopefully, be a contribution in the continuous development and improvement of the primary healthcare sector. The findings covered by this thesis are relevant for healthcare personnel as well as policymakers responsible for organising healthcare in Sweden.

Finally, the research in the present thesis was conducted in the regional primary healthcare of Region Västra Götaland only. Future studies should also be conducted in other primary healthcare sectors in Sweden and in other primary healthcare systems in other countries.

Acknowledgement

Gunnel Hensing for including me in the research programme New Ways and for the overall funding of my PhD.

Kristina Holmgren for including me in the research project TIDAS for paper I.

Cecilia Björkelund for including me in the research project PRIM-CARE for papers II and III.

Valter Sundh for all help with the data management and statistical expertise in paper I.

Anna Frantz and Caroline Rådbring who assisted me in the data collection at primary healthcare centres in Region Västra Götaland for paper I.

Nashmil Arai for her invaluable help with the data management in papers II and III.

Kirsten Mehlig for her invaluable support and excellent statistical expertise in paper II.

References

Adamsson, A., & Bernhardsson, S. (2018). Symptoms that may be stress-related and lead to exhaustion disorder: A retrospective medical chart review in Swedish primary care. *BMC Family Practice*, *19*(1), 1–9. https://doi.org/10.1186/s12875-018-0858-7

Archer, J., Bower, P., Gilbody, S., Lovell, K., Richards, D., Gask, L., Dickens, C., & Coventry, P. (2012). Collaborative care for depression and anxiety problems. *Cochrane Depression, Anxiety and Neurosis Group*, *20*(1).

Augustsson, P., Holst, A., Svenningsson, I., Petersson, E. L., Björkelund, C., & Brämberg, E. B. (2020). Implementation of care managers for patients with depression: A cross-sectional study in Swedish primary care. *BMJ Open*, *10*(5). https://doi.org/10.1136/bmjopen-2019-035629

Axelsson, M. A. B., Spetz, M., Mellén, A., & Wallerstedt, S. M. (2008). Use of and attitudes towards the prescribing guidelines booklet in primary health care doctors. *BMC Clinical Pharmacology*, *8*, 1–8. https://doi.org/10.1186/1472-6904-8-8

Barkil-Oteo, A. (2013). Collaborative care for depression in primary care: How psychiatry could "Troubleshoot"current treatments and practices. *Yale Journal of Biology and Medicine*, *86*(2), 139–146. http://www.ncbi.nlm.nih.gov/pubmed/23766735

Bjerkeli, P. J., Skoglund, I., & Holmgren, K. (2020). Does early identification of high work related stress affect pharmacological treatment of primary care patients? - analysis of Swedish pharmacy dispensing data in a randomised control study. *BMC Family Practice*, *21*(1), 70.

Björkelund, C., Svenningsson, I., Hange, D., Udo, C., Petersson, E. L., Ariai, N., Nejati, S., Wessman, C., Wikberg, C., André, M., Wallin, L., & Westman, J. (2018). Clinical effectiveness of care managers in collaborative care for patients with depression in Swedish primary health care: A pragmatic cluster randomized controlled trial. *BMC Family Practice*, *19*(1), 1–10. https://doi.org/10.1186/s12875-018-0711-z

Björkelund, C., & Västra Götalandsregionen Allmänmedicinskt Centrum. (2020). *[Vårdsamordnare vid psykisk ohälsa i primärvården - forskning, organisation och implementering]*. Gothenburg.

Bocquier, A., Cortaredona, S., Verdoux, H., Casanova, L., Sciortino, V., Nauleau, S., & Verger, P. (2014). Social Inequalities in Early Antidepressant Discontinuation. *Psychiatric Services*, *65*(5), 618–625. https://doi.org/10.1176/appi.ps.201300184

Carlzon, D., Gustafsson, L., Eriksson, A. L., Rignér, K., Sundström, A., &

Wallerstedt, S. M. (2010). Characteristics of primary health care units with focus on drug information from the pharmaceutical industry and adherence to prescribing objectives: A cross-sectional study. *BMC Clinical Pharmacology*, *10*, 7–11. https://doi.org/10.1186/1472-6904-10-4

Celano, C. M., Healy, B., Suarez, L., Levy, D. E., Mastromauro, C., Januzzi, J. L., & Huffman, J. C. (2016). Cost-Effectiveness of a Collaborative Care Depression and Anxiety Treatment Program in Patients with Acute Cardiac Illness. *Value in Health : The Journal of the International Society for Pharmacoeconomics and Outcomes Research*, *19*(2), 185–191. https://doi.org/10.1016/j.jval.2015.12.015

Chaney, E. F., Rubenstein, L. V., Liu, C.-F., Yano, E. M., Bolkan, C., Lee, M., Simon, B., Lanto, A., Felker, B., & Uman, J. (2011). Implementing collaborative care for depression treatment in primary care: a cluster randomized evaluation of a quality improvement practice redesign. *Implementation Science : IS*, *6*(1), 121. https://doi.org/10.1186/1748-5908-6-121

Christensen, M. K., Lim, C. C. W., Saha, S., Plana-Ripoll, O., Cannon, D., Presley, F., Weye, N., Momen, N. C., Whiteford, H. A., Iburg, K. M., & McGrath, J. J. (2020). The cost of mental disorders: a systematic review. *Epidemiology and Psychiatric Sciences*, *29*, e161. https://doi.org/10.1017/S204579602000075X

Coles, C. (1995). Educating the health care team. *Patient Education and Counseling*, *26*(1–3), 239–244. https://doi.org/10.1016/0738-3991(95)00727-h

CONSORT. (2010). *The CONSORT 2010 Statement Checklist*. http://www.consort-statement.org/consort-2010

Coventry, P. A., Hudson, J. L., Kontopantelis, E., Archer, J., Richards, D. A., Gilbody, S., Lovell, K., Dickens, C., Gask, L., Waheed, W., & Bower, P. (2014). Characteristics of Effective Collaborative Care for Treatment of Depression: A Systematic Review and Meta-Regression of 74 Randomised Controlled Trials. *PLoS ONE*, *9*(9), e108114. https://doi.org/10.1371/journal.pone.0108114

DeJesus, R. S., Angstman, K. B., Cha, S. S., & Williams, M. D. (2013). Antidepressant Medication Use Among Patients with Depression: Comparison between Usual Care and Collaborative Care Using Care Managers. *Clinical Practice & Epidemiology in Mental Health*, *9*(1), 84–87. https://doi.org/10.2174/1745017901309010084

Ejeby, K., Savitskij, R., Öst, L. G., Ekbom, A., Brandt, L., Ramnerö, J., Åsberg, M., & Backlund, L. G. (2014). Randomized controlled trial of transdiagnostic group treatments for primary care patients with common mental disorders. *Family Practice*, *31*(3), 273–280. https://doi.org/10.1093/fampra/cmu006

Forns, J., Pottegård, A., Reinders, T., Poblador-Plou, B., Morros, R., Brandt, L., Cainzos-Achirica, M., Hellfritzsch, M., Schink, T., Prados-Torres, A., Giner-Soriano, M., Hägg, D., Hallas, J., Cortés, J., Jacquot, E., Deltour, N., Perez-Gutthann, S., Pladevall, M., & Reutfors, J. (2019). Antidepressant use in Denmark, Germany, Spain, and Sweden between 2009 and 2014: Incidence and comorbidities of antidepressant initiators. *Journal of Affective Disorders*, *249*(October 2018), 242–252. https://doi.org/10.1016/j.jad.2019.02.010

Frantz, A., & Holmgren, K. (2019). The Work Stress Questionnaire (WSQ) - reliability and face validity among male workers. *BMC Public Health*, *19*(1), 1580. https://doi.org/10.1186/s12889-019-7940-5

GBD 2019 Diseases and Injuries Collaborators. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet (London, England)*, *396*(10258), 1204–1222. https://doi.org/10.1016/S0140-6736(20)30925-9

Gilbody, S. M. (2003). Improving the detection and management of depression in primary care. *Quality and Safety in Health Care*, *12*(2), 149–155. https://doi.org/10.1136/qhc.12.2.149

Gilbody, S., Sheldon, T., & House, A. (2008). Screening and case-finding instruments for depression: a meta-analysis. *Canadian Medical Association Journal*, *178*(8), 997–1003. https://doi.org/10.1503/cmaj.070281

Gomez-Lumbreras, A., Ferrer, P., Ballarín, E., Sabaté, M., Vidal, X., Andretta, M., Coma, A., & Ibáñez, L. (2019). Study of antidepressant use in 5 European settings. Could economic, sociodemographic and cultural determinants be related to their use? *Journal of Affective Disorders*, *249*(February), 278–285. https://doi.org/10.1016/j.jad.2019.01.039

Grubbs, K. M., Cheney, A. M., Fortney, J. C., Edlund, C., Han, X., Dubbert, P., Sherbourne, C. D., Craske, M. G., Stein, M. B., Roy-Byrne, P. P., & Sullivan, J. G. (2015). The Role of Gender in Moderating Treatment Outcome in Collaborative Care for Anxiety. *Psychiatric Services*, *66*(3), 265–271. https://doi.org/10.1176/appi.ps.201400049

Hammarberg, S. af W., Hange, D., André, M., Udo, C., Svenningsson, I., Björkelund, C., Petersson, E.-L., & Westman, J. (2019). Care managers can be useful for patients with depression but their role must be clear: a qualitative study of GPs' experiences. *Scandinavian Journal of Primary Health Care*, *37*(3), 273–282. https://doi.org/10.1080/02813432.2019.1639897

Hansen, D. G. (2004). Early discontinuation of antidepressants in general practice: association with patient and prescriber characteristics. *Family Practice*, *21*(6), 623–629. https://doi.org/10.1093/fampra/cmh608

Haynes, R. B., Sackett, D. L., Guyatt, G. H., & Tugwell, P. (2006). *Clinical epidemiology how to do clinical practice research* (3rd ed.). Lippincott Williams & Wilkins. http://ezproxy.ub.gu.se/login?url=http://ovidsp.ovid.com/ovidweb.cgi?T=J

S&PAGE=booktext&NEWS=N&DF=bookdb&AN=01222980/3rd_Edition/4&XPATH=/PG(0)

Holmgren, K., Hensing, G., Bültmann, U., Hadzibajramovic, E., & Larsson, M. E. H. (2019). Does early identification of work-related stress, combined with feedback at GP-consultation, prevent sick leave in the following 12 months? a randomized controlled trial in primary health care. *BMC Public Health*, *19*(1), 1–10. https://doi.org/10.1186/s12889-019-7452-3

Holmgren, Kristina, Dahlin-Ivanoff, S., Björkelund, C., & Hensing, G. (2009). The prevalence of work-related stress, and its association with self-perceived health and sick-leave, in a population of employed Swedish women. *BMC Public Health*, *9*, 1–10. https://doi.org/10.1186/1471-2458-9-73

Holmgren, Kristina, Fjällström-Lundgren, M., & Hensing, G. (2013). Early identification of work-related stress predicted sickness absence in employed women with musculoskeletal or mental disorders: a prospective, longitudinal study in a primary health care setting. *Disability and Rehabilitation*, *35*(5), 418–426. https://doi.org/10.3109/09638288.2012.695854

Holmgren, Kristina, Hensing, G., & Dahlin-Ivanoff, S. (2009). Development of a questionnaire assessing work-related stress in women - identifying individuals who risk being put on sick leave. *Disability and Rehabilitation*, *31*(4), 284–292. https://doi.org/10.1080/09638280801931287

Holmgren, Kristina, & Ivanoff, S. D. (2004). Women on sickness absence—views of possibilities and obstacles for returning to work. A focus group study. *Disability and Rehabilitation*, *26*(4), 213–222. https://doi.org/10.1080/09638280310001644898

Holmgren, Kristina, Sandheimer, C., Mårdby, A. C., Larsson, M. E. H., Bültmann, U., Hange, D., & Hensing, G. (2016). Early identification in primary health care of people at risk for sick leave due to work-related stress - Study protocol of a randomized controlled trial (RCT). *BMC Public Health*, *16*(1), 1–8. https://doi.org/10.1186/s12889-016-3852-9

Holst, A., Ginter, A., Björkelund, C., Hange, D., Petersson, E.-L., Svenningsson, I., Westman, J., André, M., Wikberg, C., Wallin, L., Möller, C., & Svensson, M. (2018). Cost-effectiveness of a care manager collaborative care programme for patients with depression in primary care: economic evaluation of a pragmatic randomised controlled study. *BMJ Open*, *8*(11), e024741. https://doi.org/10.1136/bmjopen-2018-024741

The Swedish Health and Medical Services Act 2017:30 [Hälso- och sjukvårdslagen 2017:30], Pub. L. No. HSL 2017:30 (2017). https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/halso--och-sjukvardslag_sfs-2017-30

Hudson, J. L., Bower, P., Kontopantelis, E., Bee, P., Archer, J., Clarke, R., Moriarty, A. S., Richards, D. A., Gilbody, S., Lovell, K., Dickens, C., Gask, L., Waheed, W., & Coventry, P. A. (2019). Impact of telephone delivered case-management on the effectiveness of collaborative care for depression and anti-depressant use: A systematic review and meta-regression. *PLOS ONE*, *14*(6), e0217948. https://doi.org/10.1371/journal.pone.0217948

Hultén, A. M., Dahlin-Ivanoff, S., & Holmgren, K. (2020). Positioning work related stress - GPs' reasoning about using the WSQ combined with feedback at consultation. *BMC Family Practice*, *21*(1), 1–11. https://doi.org/10.1186/s12875-020-01258-y

Johnson, J. A., Al Sayah, F., Wozniak, L., Rees, S., Soprovich, A., Qiu, W., Chik, C. L., Chue, P., Florence, P., Jacquier, J., Lysak, P., Opgenorth, A., Katon, W., & Majumdar, S. R. (2014). Collaborative care versus screening and follow-up for patients with diabetes and depressive symptoms: Results of a primary care-based comparative effectiveness trial. *Diabetes Care*, *37*(12), 3220–3226. https://doi.org/10.2337/dc14-1308

Karlberg, I. (2011). *[Från Vasa till vårdval: om ansvar och styrning av svensk hälso- och sjukvård]* (1. uppl.). Lund : Studentlitteratur.

Katon, W. (2012). Collaborative Depression Care Models: From Development to Dissemination. *American Journal of Preventive Medicine*, *42*(5), 550–552.

Lidwall, U., & The Swedish Social Insurance Agency [Försäkringskassan]. (2020). *Sick Leave in Mental Disorders [Sjukfrånvaro i psykiatriska diagnoser]: Vol. 2020:8*.

Ludvigsson, J. F., Otterblad-Olausson, P., Pettersson, B. U., & Ekbom, A. (2009). The Swedish personal identity number: possibilities and pitfalls in healthcare and medical research. *European Journal of Epidemiology*, *24*(11), 659–667. https://doi.org/10.1007/s10654-009-9350-y

Lunghi, C., Antonazzo, I. C., Burato, S., Raschi, E., Zoffoli, V., Forcesi, E., Sangiorgi, E., Menchetti, M., Roberge, P., & Poluzzi, E. (2020). Prevalence and Determinants of Long-Term Utilization of Antidepressant Drugs: A Retrospective Cohort Study. *Neuropsychiatric Disease and Treatment*, *16*, 1157.

Magruder-Habib, K., Zung, W. W. K., & Feussner, J. R. (1990). Improving Physicians?? Recognition and Treatment of Depression in General Medical Care. *Medical Care*, *28*(3), 239–250. https://doi.org/10.1097/00005650-199003000-00004

Miller, C. J., Grogan-Kaylor, A., Perron, B. E., Kilbourne, A. M., Woltmann, E., & Bauer, M. S. (2013). Collaborative chronic care models for mental health conditions: cumulative meta-analysis and metaregression to guide future research and implementation. *Medical Care*, *51*(10), 922–930. https://doi.org/10.1097/MLR.0b013e3182a3e4c4

Morgenstern, H. (1995). Ecologic Studies in Epidemiology: Concepts, Principles, and Methods. *Annual Review of Public Health*, *16*(1), 61–81. https://doi.org/10.1146/annurev.publhealth.16.1.61

Morténius, H., Baigi, A., Palm, L., Fridlund, B., Björkelund, C., & Hedberg, B. (2015). Impact of the organisational culture on primary care staff members' intention to engage in research and development. *Journal of Health Organization and Management*, *29*(2), 234–251.

Murad, M. H., Katabi, A., Benkhadra, R., & Montori, V. M. (2018). External validity, generalisability, applicability and directness: a brief primer. *BMJ Evidence-Based Medicine*, *23*(1), 17–19. https://doi.org/10.1136/ebmed-2017-110800

NICE. (2011). *Clinical guidelines: common mental health problems - identification and pathways to care.* https://www.nice.org.uk/guidance/CG123/chapter/1-Guidance#steps-2-and-3-treatment-and-referral-for-treatment

Nutting, P. A., Rost, K., Smith, J., Werner, J. J., & Elliot, C. (2000). Competing demands from physical problems: effect on initiating and completing depression care over 6 months. *Archives of Family Medicine*, *9*(10), 1059–1064. https://doi.org/10.1001/archfami.9.10.1059

OECD. (2013). Health at a Glance 2013. In *OECD Publishing*. OECD. https://doi.org/10.1787/health_glance-2013-en

OECD. (2018). Health at a Glance: Europe 2018 (Summary in Spanish). In *OECD Publishing*. https://doi.org/10.1787/fd41e65f-es

Olsen, J. (2011). Register-based research: Some methodological considerations. *Scandinavian Journal of Public Health*, *39*(3), 225–229. https://doi.org/10.1177/1403494811402719

Olsson, S., Hensing, G., Burström, B., & Löve, J. (2021). Unmet Need for Mental Healthcare in a Population Sample in Sweden: A Cross-Sectional Study of Inequalities Based on Gender, Education, and Country of Birth. *Community Mental Health Journal*, *57*(3), 470–481. https://doi.org/10.1007/s10597-020-00668-7

Østerås, N., Gulbrandsen, P., Benth, J. Š., Hofoss, D., & Brage, S. (2009). Implementing structured functional assessments in general practice for persons with long-term sick leave: a cluster randomised controlled trial. *BMC Family Practice*, *10*(1), 31. https://doi.org/10.1186/1471-2296-10-31

Parikh, S. V, Quilty, L. C., Ravitz, P., Rosenbluth, M., Pavlova, B., Grigoriadis, S., Velyvis, V., Kennedy, S. H., Lam, R. W., MacQueen, G. M., Milev, R. V, Ravindran, A. V, & Uher, R. (2016). Canadian Network for Mood and Anxiety Treatments (CANMAT) 2016 Clinical Guidelines for the Management of Adults with Major Depressive Disorder. *The Canadian Journal of Psychiatry*, *61*(9), 524–539. https://doi.org/10.1177/0706743716659418

Patino, C. M., & Ferreira, J. C. (2018). Internal and external validity: can you apply research study results to your patients? *Jornal Brasileiro de Pneumologia*, *44*(3), 183–183. https://doi.org/10.1590/s1806-37562018000000164

Patsopoulos, N. A. (2011). A pragmatic view on pragmatic trials. *Dialogues in Clinical Neuroscience*, *13*(2), 217–224. http://www.ncbi.nlm.nih.gov/pubmed/21842619

Post, S. G. (Ed.). (2004). *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research* (3rd ed. IB, Vol. 5, pp. 2822–2827). Macmillan Reference USA. https://link.gale.com/apps/doc/CX3402500603/GVRL?u=gu&sid=GVRL&xid=76d662e2

Region Västra Götaland. (2020). *[Primärvård i Västra Götaland - Med fokus på Vårdval Vårdcentral och Vårdval Rehab]*.

Rost, K., Nutting, P., Smith, J., Werner, J., & Duan, N. (2001). Improving depression outcomes in community primary care practice: A randomized trial of the QuEST intervention. *Journal of General Internal Medicine*, *16*(3), 143–149.

Roy-Byrne, P. P., Sherbourne, C. D., Craske, M. G., Stein, M. B., Katon, W., Sullivan, G., Means-Christensen, A., & Bystritsky, A. (2003). Moving Treatment Research From Clinical Trials to the Real World. *Psychiatric Services*, *54*(3), 327–332. https://doi.org/10.1176/appi.ps.54.3.327

Sinnema, H., Terluin, B., Volker, D., Wensing, M., & Van Balkom, A. (2018). Factors contributing to the recognition of anxiety and depression in general practice. *BMC Family Practice*, *19*(1). https://doi.org/10.1186/s12875-018-0784-8

Smolders, M., Laurant, M., Verhaak, P., Prins, M., van Marwijk, H., Penninx, B., Wensing, M., & Grol, R. (2009). Adherence to evidence-based guidelines for depression and anxiety disorders is associated with recording of the diagnosis. *General Hospital Psychiatry*, *31*(5), 460–469. https://doi.org/10.1016/j.genhosppsych.2009.05.011

Steel, Z., Marnane, C., Iranpour, C., Chey, T., Jackson, J. W., Patel, V., & Silove, D. (2014). The global prevalence of common mental disorders: A systematic review and meta-analysis 1980-2013. *International Journal of Epidemiology*, *43*(2), 476–493. https://doi.org/10.1093/ije/dyu038

STROBE. (2009). *STROBE Statement. Strengthening the reporting of observational studies in epidemiology*. https://www.strobe-statement.org/index.php?id=available-checklists

Sundell, K. A., Waern, M., Petzold, M., & Gissler, M. (2013). Socio-economic determinants of early discontinuation of anti-depressant treatment in young adults. *European Journal of Public Health*, *23*(3), 433–440. https://doi.org/10.1093/eurpub/ckr137

Sundquist, J., Ohlsson, H., Sundquist, K., & Kendler, K. S. (2017). Common adult psychiatric disorders in Swedish primary care where most mental health patients are treated. *BMC Psychiatry*, *17*(1), 1–9. https://doi.org/10.1186/s12888-017-1381-4

Svenningsson, I., Petersson, E.-L., Udo, C., Westman, J., Björkelund, C., & Wallin, L. (2019). Process evaluation of a cluster randomised intervention in Swedish primary care: using care managers in collaborative care to improve care quality for patients with depression. *BMC Family Practice*, *20*(1), 108. https://doi.org/10.1186/s12875-019-0998-4

Swedish Council on Health Technology Assessment [’SBU’ Statens beredning för medicinsk utvärdering]. (2012). *Implementation support for psychiatric evidence in primary care. Report 211*.

Swedish Medical Products Agency [Läkemedelsverket]. (2016a). *N06A Antidepressants*. The Pharmaceutical Book [Läkemedelsboken. Swedish]. https://lakemedelsboken.se/kapitel/lakemedelsanvandning/trafik_riskfyllt_arbete_och_lakemedel.html?search=N06A&id=N06A-Antidepressiva-medel#N06A-Antidepressiva-medel

Swedish Medical Products Agency [Läkemedelsverket]. (2016b). Pharmaceutical treatment of depression, anxiety syndrome and OCD amongst children and adults [Läkemedelsbehandling av depression , ångest- syndrom och tvångssyndrom hos barn och vuxna]. *Information from the Swedish Medical Products Agency [Information Från Läkemedelsverket. Swedish]*, *6:2016*.

Swedish Work Environment Authority. (2018). *Work-Related Disorders 2018 (Swedish Work Environment Authority Report 2018:3)*. *2018:3*, 1–60. https://www.av.se/globalassets/filer/statistik/arbetsorsakade-besvar-2018/arbetsorsakade_besvar_2018_rapport.pdf

The Swedish Ministry of Health and Social Affairs [Socialdepartementet]. (2021). *[God och nära vård. Rätt stöd till psykisk hälsa]: Vol. SOU 2021:6*. https://www.regeringen.se/49c941/contentassets/85abf6c8cfdb401ea6fbd3d17a18c98e/god-och-nara-vard--en-primarvardsreform_sou-2018_39.pdf

The Swedish National Board of Health and Welfare [Socialstyrelsen]. (2020). *National guidelines for care of depression and anxiety disorders [Vård vid depression och ångestsyndrom]*. Socialstyrelsen.

The Swedish National Board of Health and Welfare [Socialstyrelsen]. (2021). *Statistical database for pharmaceuticals [Statistisk databas för läkemedel]*. https://sdb.socialstyrelsen.se/if_lak/val.aspx

Thygesen, L. C., & Ersbøll, A. K. (2014). When the entire population is the sample: strengths and limitations in register-based epidemiology. *European Journal of Epidemiology*, *29*(8), 551–558. https://doi.org/10.1007/s10654-013-9873-0

Toft, T., Fink, P., Oernboel, E., Christensen, K., Frostholm, L., & Olesen, F. (2005). Mental disorders in primary care: prevalence and co-morbidity among disorders. results from the functional illness in primary care (FIP) study. *Psychological Medicine*, *35*(8), 1175–1184. https://doi.org/10.1017/s0033291705004459

Trautmann, S., Rehm, J., & Wittchen, H. (2016). The economic costs of mental disorders. *EMBO Reports*, *17*(9), 1245–1249. https://doi.org/10.15252/embr.201642951

Vård- och omsorgsanalys. (2021). *The healthcare from the perspective of the population 2020 [In Swedish: Vården ur befolkningens perspektiv 2020]*. https://www.vardanalys.se/rapporter/varden-ur-befolkningens-perspektiv-

2020/

Vingård, E. (2020). *Common Mental Disorders, Working Life and Sickness Absence. A knowledge review. [In Swedish: Psykisk ohälsa, arbetsliv och sjukfrånvaro. En kunskapsöversikt]*. FORTE.

Wagner, E. H., Austin, B. T., Korff, M. Von, Wagner, E. H., & Austin, B. T. (1996). Organizing Care for Patients with Chronic Illness. *The Milbank Quarterly*, *74*(4), 511–544. https://www.jstor.org/stable/3350391?seq=1#metadata_info_tab_contents

Wells, K. B. (1999). Treatment Research at the Crossroads: The Scientific Interface of Clinical Trials and Effectiveness Research. *American Journal of Psychiatry*, *156*(1), 5–10. https://doi.org/10.1176/ajp.156.1.5

WHO. (2013). *Investing in mental health: evidence for action*. https://www.who.int/publications/i/item/9789241564618

Wiegner, L., Hange, D., Björkelund, C., & Ahlborg, G. (2015). Prevalence of perceived stress and associations to symptoms of exhaustion, depression and anxiety in a working age population seeking primary care - An observational study. *BMC Family Practice*, *16*(1), 1–8. https://doi.org/10.1186/s12875-015-0252-7

Wiegner, L., Hange, D., Svenningsson, I., Björkelund, C., & Petersson, E. L. (2019). Newly educated care managers' experiences of providing care for persons with stress-related mental disorders in the clinical primary care context. *PLoS ONE*, *14*(11), 1–12. https://doi.org/10.1371/journal.pone.0224929

Wittchen, H.-U., & Jacobi, F. (2005). Size and burden of mental disorders in Europe—a critical review and appraisal of 27 studies. *European Neuropsychopharmacology*, *15*(4), 357–376. https://doi.org/10.1016/j.euroneuro.2005.04.012

Wittchen, H. U., Jacobi, F., Rehm, J., Gustavsson, A., Svensson, M., Jönsson, B., Olesen, J., Allgulander, C., Alonso, J., Faravelli, C., Fratiglioni, L., Jennum, P., Lieb, R., Maercker, A., van Os, J., Preisig, M., Salvador-Carulla, L., Simon, R., & Steinhausen, H.-C. (2011). The size and burden of mental disorders and other disorders of the brain in Europe 2010. *European Neuropsychopharmacology*, *21*(9), 655–679. https://doi.org/10.1016/j.euroneuro.2011.07.018