Early identification of primary health care patients at risk of sick leave due to work-related stress

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To Matilda, Hugo, and Alma

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ABSTRACT

Aim: Work-related stress and sick leave are common among primary health care patients, and general practitioners (GPs) often handle cases involving stress and work capacity in their daily practices. This thesis aimed to improve the understanding of how to early identify primary health care patients at risk of sick leave due to work-related stress.

Methods: The four studies included in the thesis are based on a two-armed randomized controlled trial evaluating a brief intervention in which the Work Stress Questionnaire (WSQ) was used to screen for work-related stress. In all, 271 patients seeking care for mental and physical health complaints and 63 GPs took part. The first two studies evaluated the process and effectiveness of using the intervention based on focus group discussions, questionnaire data, and data collected by telephone or e-mail. The last two studies analysed the association between work-related stress, reason for consultation, and sick leave based on questionnaire and register data. Focus group analysis and statistical analysis were used in analysing the data retrieved.

Results: Study I showed that the intervention was not seen as useful by the GPs, as they had to depart from their regular consultative way of working. They also expressed a need for increased skills, tools, and team collaboration to care for patients with work-related stress. Study II could not show that the intervention affected future self-reported sick leave among the patients. Study III showed that influence at work, indistinct organization and conflicts, individual demands and commitment, as well as interference between work and leisure time affected the risk of future registered sick leave, especially if the patients perceived stressors and stress in multiple areas. Study IV showed that the reason for consultation and the sick leave diagnosis merit consideration when studying the association between work-related stress and sick leave, and

that work-related stress is seen mainly as a mental issue from the perspectives of both the GP and patient.
Conclusions: The thesis confirms prior studies of the association between work-related stress and sick leave among primary health care patients, and also highlights factors along the illness–sickness–sick leave trajectory that are important for the association. Knowledge was also gained of the GPs' handling of cases involving stress-related ill health and the prerequisites for implementing a preventive intervention. Overall, the thesis advances the discussion of how stress should be conceptualized and measured as well as how to handle the negative health effect of stress.

Keywords: mental and physical complaints, prevention, primary health care patients, sick leave, work-related stress, Work Stress Questionnaire (WSQ), general practitioners, health insurance

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SAMMANFATTNING PÅ SVENSKA

Arbetsrelaterad stress och sjukskrivning är vanligt förekommande hos primärvårdspatienter. Det saknas dock metoder för att tidigt identifiera patienter som riskerar sjukskrivning på grund av arbetsrelaterad stress, vilket försvårar arbetet med att förebygga ohälsa och erbjuda lämpliga behandlingar till dessa patienter. I avhandlingen undersöktes hur man tidigt kan identifiera primärvårdspatienter som riskerar sjukskrivning på grund av arbetsrelaterad stress, för att kunna vidta lämpliga åtgärder.

Avhandlingens fyra studier baseras på en randomiserad kontrollerad studie som utfördes på vårdcentraler i Västra Götaland, för att utvärdera om en kort intervention kunde användas för att förebygga sjukskrivning till följd av arbetsrelaterad stress hos patienter. I interventionen ingick att patienter som sökte vård för psykiska och fysiska åkommor screenades för arbetsrelaterad stress med frågeformuläret Work Stress Questionnaire (WSQ) innan de fick återkoppling på resultaten av en läkare. I de två första studierna utvärderades både processen att använda den korta interventionen och dess effektivitet. I de två sista studierna analyserades sambandet mellan arbetsrelaterad stress, sökorsak och sjukfrånvaro.

Avhandlingsarbetet visar att inflytande över arbetet, otydlig organisation och konflikter, individuella krav och engagemang samt konflikt mellan arbete och fritid påverkade risken för framtida sjukskrivning, särskilt om patienterna upplevde stressorer och stress inom flera områden. Dessutom synliggörs att sökorsak och sjukskrivningsdiagnos hade betydelse för sambandet mellan arbetsrelaterad stress och sjukskrivning, samt att både läkare och patienter såg arbetsrelaterad stress främst som en psykisk åkomma. Interventionen sågs dock inte som användbar, eftersom interventionsläkarna behövde avvika från sitt inarbetade konsultativa arbetssätt. De uttryckte också ett behov av ökad kompetens, verktyg och teamsamarbete samt ett tydliggörande av ansvarsfördelningen för att ta hand om patienter med arbetsrelaterad stress. Det gick inte heller att påvisa att den korta interventionen hade någon effekt på patienternas framtida självrapporterade sjukfrånvaro.

Med tanke på hur vanligt förekommande arbetsrelaterad stress och sjukskrivning är i undersökningsgruppen är det nödvändigt att arbeta vidare med att utveckla och implementera strategier, program och behandlingsåtgärder för att minska risken för sjukskrivning på grund av arbetsrelaterad stress. Åtgärderna behöver sättas in där de gör mest nytta med

hänsyn till situationen, där personen, arbetet och miljön tillsammans bidrar till förståelsen.

Avhandlingen bekräftar tidigare forskningsresultat om sambandet mellan arbetsrelaterad stress och sjukskrivning bland primärvårdspatienter, men lyfter också fram behovet av att beakta sökorsaken och sjukskrivningsdiagnosen. Dessutom erhölls kunskap om läkarnas hantering av ärenden rörande stressrelaterad ohälsa samt förutsättningarna för att implementera sjukdomsförebyggande behandlingar. På ett övergripande plan kan avhandlingen bidra till diskussioner om hur man kan begreppsliga och mäta arbetsrelaterad stress samt hur man kan förebygga stressens negativa hälsoeffekter.

LIST OF PAPERS

This thesis is based on the following studies.

I. Hultén AM, Dahlin-Ivanoff S, Holmgren K. Positioning work related stress - GPs' reasoning about using the WSQ combined with feedback at consultation. BMC Fam Pract. 2020;21(1):187.

II. Hultén A-M, Bjerkeli P, Holmgren K. Self-reported sick leave following a brief preventive intervention on work-related stress: a randomised controlled trial in primary health care. BMJ Open. 2021;11(3):e041157.

III. Hultén AM, Bjerkeli P, Holmgren K. Work-related stress and future sick leave in a working population seeking care at primary health care centres: a prospective longitudinal study using the WSQ. BMC Public Health. 2022;22(1):851.

IV. Hultén A-M, Holmgren K, Bjerkeli P. Work-related stress, reason for consultation and diagnosis-specific sick leave: How do they add up? Submitted for publication.

CONTENT

ABBREVIATIONS

GP	General practitioner
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th Revision
PEO model	Person–environment–occupation model
RCT	Randomized controlled trial
WSQ	Work Stress Questionnaire

1 INTRODUCTION

1.1 THE RESEARCH SETTING

This thesis is part of the research conducted in the TIDAS research group. The research group focuses on preventive and rehabilitative methods for the early identification, treatment and support of people, to maintain their capacity to work and reduce their need for sick leave.

The thesis examines the early identification and treatment of patients at risk of sick leave due to work-related stress in a primary health care setting. The thesis research proceeded from a two-armed randomized controlled trial (RCT) conducted between May 2015 and January 2016 at primary health care centres located in both urban and rural areas in southwest Sweden (1). The overall aim of the trial was to evaluate whether systematic use of the Work Stress Questionnaire (WSQ) (2) combined with feedback during consultation could serve as a brief intervention allowing general practitioners (GPs) to prevent sick leave due to work-related stress. In the thesis, both the process and outcome of the trial were evaluated, as both the GPs' perception of the brief intervention (Study I) and the intervention's effectiveness in reducing self-reported sick leave among patients (Study II) were studied. The trial has also been evaluated based on other outcome measures (3-6). For this thesis, it was also found relevant to gain further knowledge of factors important for identifying patients at risk of future sick leave due to work-related stress. Based on data from the RCT, the association between self-assessed work-related stress and future registered sick leave was analysed (Study III). Furthermore, the relationships between reason for consultation, work-related stress, and diagnosis-specific sick leave were also studied (Study IV).

There are different ways to understand and perform research on preventing ill health due to work-related stress. This thesis addresses research questions and research topics studied in the research fields of occupational health, stress, work environment, insurance medicine, primary health care, and public health. These research fields include both basic and applied research from an interdisciplinary perspective, with different scientific objectives and methodological boundaries (7). For instance, these research fields were important for understanding why certain situations are perceived as stressful, how stress relates to sick leave, and what factors are considered important for perceiving ill health at work. In addition, understandings of how to organize health care, how to provide measures to meet patient and population health

needs, determinants of health, and the prevention of ill health at the population level were useful for the thesis.

An additional research field of importance for this thesis was occupational science research, which concerns the study of humans as occupational beings with innate needs and capacities to engage in occupations throughout the lifespan (8). This research field is more similar to those of psychology, sociology, and anthropology, than to those of the natural sciences (8). In recent years, occupational science has had a stronger focus on the political, cultural, and social aspects of daily living than on the individual's occupational performance per se (9, 10). Occupational science was useful here for understanding work and work performance, especially the relationship between the individual, the work and the environment. In occupational science, and in this thesis, occupations refer to everyday activities.

1.2 THEORETICAL PERSPECTIVES

The biomedical model is and has long been the dominant model for an understanding of health and disease in Western medicine. The model is reductionist in that health, illness, and disease, irrespective of cause, can be explained as resulting from identifiable biological processes (11). Psychological, social, and behavioural aspects of illness are therefore not considered important for this understanding, prompting major criticism. In addition, by reducing complex problems to static identifiable parts, it is assumed to be possible to find a single cause for any health problem (12). The person perceiving the illness is therefore not in focus, but rather the clinical findings and abnormalities, which can be understood, classified, and treated independently of the person afflicted. An important reason for its popularity is that this model has its ontological and epistemological basis in the natural sciences, which render precision in diagnosis as well as more reliable and quantifiable treatments and measures than do practices based on social science or occupational science (13).

The biopsychosocial model was developed in reaction to what was considered an overly simplistic view of health, illness, and disease described in the biomedical model, in which an individual is reduced to a disease. This alternative medical model is based on general systems theory emphasizing the whole as superordinate to its parts, which are organized in a dynamic system (14). The simple cause-and-effect relationship is thereby replaced with a reciprocal causal model integrating information on biological, psychological, and sociological systems important for illness. The systems are hierarchically ordered from the subatomic particles of the person to the biosphere, and a

lower-level system forms part of a higher-level system, so that the person represents both the highest system of the organismic hierarchy and the lowest system of the social hierarchy (14). Since its introduction, the biopsychosocial model has not escaped criticism; for instance, it has been argued that the conceptual development of the model is insufficient (15), and that the model is too inclusive to guide practice and lacks operationalization (16, 17).

In this thesis, the biomedical model was considered important, since the model is widely used for understanding illness and disease in both health care and the general population (11). Most visits to primary health care in Sweden concern physical illness (18), so the model can be considered frequently used in practice. Moreover, the model is of fundamental importance in defining the area of responsibility of medical work (17). Although the biomedical model has remained the dominant theory in medicine, the biopsychosocial model has made its mark in the understanding of health and disease, and the basic features of this model have made their mark in recommendations and guidelines (17). In addition, health professionals sometimes use the biopsychosocial model in practice, for example, in cases in which the symptoms cannot be translated into a diagnosis (16), which could be the case for patients with ill health due to work-related stress. Hence, the biopsychosocial model was considered important for the thesis.

Given the above, these models have somewhat similar flaws and there are aspects that neither of the models touch on (13). The transactional perspective and its application within occupational science (19) was therefore used in the thesis, as a reminder of the limits of both these models and to counterbalance the philosophical dualism. In addition, the WSQ (2, 20), used in the thesis to assess work-related stress, is based on Law's (21) transactional approach to occupational performance. Based on this perspective, the nature of elements is seen to change in response to the changing nature of other elements in a given situation (22). By applying the transactional perspective of occupation, the individual and the environment are equally important for the understanding and conceptualization of stress reactions and behaviours, as the individual and the environment are inseparably united by occupations (19). This fosters a more dynamic understanding of working life (both the patient's and the GP's), of the uniqueness of the situation, and of the behaviours used and measures taken to address problems that arise (10), an understanding considered useful for this thesis.

1.3 THE PRIMARY HEALTH CARE SETTING AND PRACTICE

The thesis research was set in primary health care centres with specific boundaries and characteristics of importance for the study design and the interpretation of the results.

Around the world, countries acknowledge the importance of primary health care in achieving high-quality universal health coverage with an emphasis on disease prevention, health promotion, and non-fragmented care (23). In recent years, the importance of non-communicable diseases, including mental disorders, has been recognized (23). However, national legislation, priorities and health care systems can affect the implementation and daily practice of primary health care, which means that the primary health care mission, organization and measures taken differ between countries (24, 25). Swedish primary health care, like primary health care in other countries, focus on being the first line of care, and having knowledge of the patient's health as a whole (25). However, the governance, the organization, and the range of services may differ. Contrary to centres in other countries, Swedish centres have several other healthcare professions than GPs and nurses (25), such as occupational therapists, counsellors, and social workers, sometimes organized in psychosocial teams. Primary health care also collaborates with municipal health care and with other specialties in health care, but also with social services and the Swedish Social Insurance Agency when deemed necessary.

In recent years, Swedish primary health care has been given greater responsibility as it must now provide the health care services required to meet "commonly occurring care needs", instead of just "basic needs", as previously (26). In addition, it is responsible for preventive measures based on both the population's needs and the patient's individual needs and conditions. Furthermore, the care must be easily accessible and different interventions must be coordinated for the patient when it is most appropriate for coordination to take place in primary care. Finally, primary health care must enable participation in research work. Due to the increased responsibility and upcoming adaptations to changed conditions, needs, expectations, and requirements, a strengthening of resources is required (24, 27).

Based on data from three Swedish counties, approximately two-thirds of the population visit primary health care at least once a year, and on average four visits are made per person per year (28). In addition, primary care accounts for many of the care interventions provided by health care (29) and it provides an entry point for further medical treatment. Understanding the underlying causes

of the reason for consultation and making a diagnosis are central for primary health care practice, to ensure that appropriate measures can be put in place at the appropriate level of care. Data from regional electronic patient records show that most visits to primary health care concern diseases linked to the musculoskeletal system and connective tissue, the circulatory system, the respiratory system, and mental symptoms (18). In addition, research has shown that work-related stress is common among primary care patients (30-32). Although stress is not classified as a disease according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) (33), it can cause ill health, which in turn manifests itself in various diseases and conditions that belong to these and other ICD groups (32, 34-36).

Primary health care's mission, its central position within health care and the high prevalence of ill health due to work-related stress among its patients imply that primary health care has an important role in preventing sick leave due to work-related stress if the necessary resources are provided. In addition, GPs regularly handle cases concerning sickness certification (37).

1.4 SICKNESS INSURANCE AND SICK LEAVE

1.4.1 SICKNESS INSURANCE REGULATIONS

Persons working in Sweden are entitled to sickness cash benefits in the event of reduced work capacity due to illness or disease, provided that the capacity is reduced by at least 25% (38). To receive sickness cash benefits, income must come from work that can be assumed to have lasted for at least six consecutive months or be annually recurring. Furthermore, sick leave is granted for 25, 50, 75 or 100% of the hours worked. During the first fourteen days of sick leave, the sickness cash benefits are paid by the employer, with one qualifying day. Starting from day fifteen, the benefits are handled by the Swedish Social Insurance Agency. In addition, for the first seven days of sick leave, the employee certifies that the capacity to work is reduced due to illness. Thereafter, a sickness certificate issued by a physician is needed. This certificate, together with information provided by the employee and the employer, forms the basis for the decision to grant sick leave. In addition, the capacity to work has to be tested against different types of work depending on how long the sick leave has lasted (38).

1.4.2 SICK LEAVE TRENDS

The average number of days of sickness benefits per individual covered by Swedish social insurance has varied greatly in recent decades (Figure 1). These variations are partly due to changes in health, lifestyle, and population structure as well as to regulatory changes in health insurance (39). However, other factors are also important for large- and small-scale variations, such as healthcare organization and practice, attitudes to sick leave, labour market conditions, economic incentives to work, the work environment, and the employer's costs for sick leave (39). In addition, work capacity and sickness are both normative concepts, so their meaning can change over time. Recent years' variations in sick leave need to be seen in relation to changed sick leave rules, such as stricter requirements for the granting of sick pay, but the application of existing rules as well as political goals for unemployment and sick leave are also important explanatory factors (39).

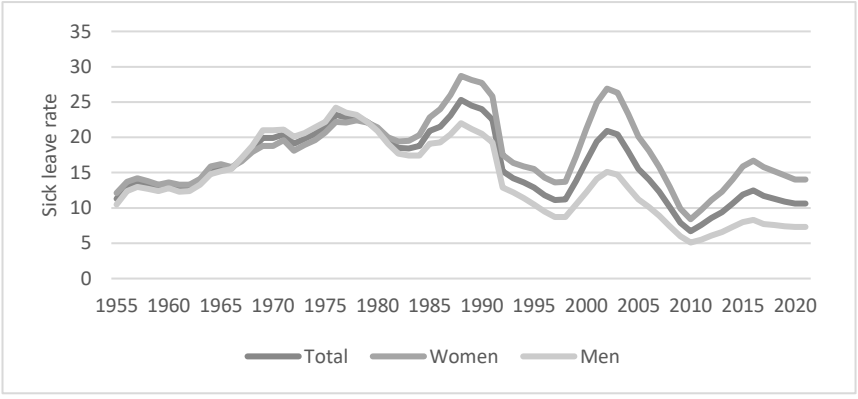

Figure 1. The number of days of sickness benefit per year and individual covered by Swedish social insurance, 1955–2020.The data were extracted from a database hosted by the Swedish Social Insurance Agency (40).

After a decreasing trend ending in 2010, the number of ongoing cases of sickness benefits then increased until 2016 (Figure 2). After a shorter downward trend, the number of ongoing cases increased again during the Covid-19 pandemic in the spring of 2020. Notably, the number of ongoing cases of sick leave related to the category of reaction to severe stress and adjustment disorders (F43, ICD-10) has increased in recent years and is now at the same level as ongoing cases with musculoskeletal diagnoses (Figure 2).

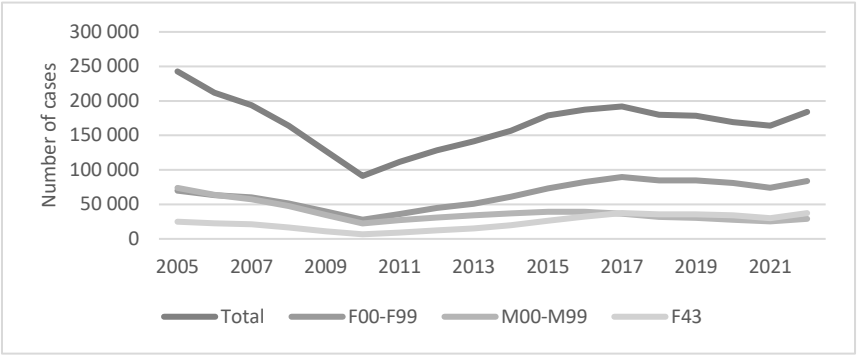

Figure 2. Number of ongoing cases of sickness benefits in January each year, 2005–2021. The data were extracted from a database hosted by the Swedish Social Insurance Agency (40). F00–F99 = Mental and behavioural disorders, M00–M99 = Diseases of the musculoskeletal system and connective tissue, and F43 = Reaction to severe stress and adjustment disorders, according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (33).

1.4.3 SICK LEAVE RATES AND WORK-RELATED STRESS

According to Statistics Sweden, there were 4.6 million employees aged 15–74 years in 2021, that is, nearly two thirds of the population (41). In that year, 619,000 individuals received sickness cash benefits at some point, of whom approximately two thirds were women and one third men (42). On average, the number of days of sickness benefit increases with age irrespective of gender, due to, for example, increased risk of sickness and longer recovery times. Among the recipients, sick leave with a mental disorder was the most common diagnosis in all age groups except men aged 60 years and above, for whom sick leave with a musculoskeletal disease was the most common diagnostic group (42).

Based on data from a survey conducted by the Swedish Public Health Agency (43), 15% of the population, aged 16–84 years, perceived stress (Figure 3). Stress was more common in women than men (Figure 3), with the highest proportion, 36%, among women 16–29 years of age. In the working population, approximately 25% perceived their work as mentally taxing and 60% felt they had too great a workload (44). Studies have shown that mental, behavioural, and physical illnesses due to work-related stress can lead to

reduced work capacity and sick leave (45, 46). Consequently, these potentially harmful working conditions are reflected in the sick leave rates, for instance, the rate of sick leave for the category reaction to severe stress and adjustment disorders (F43, ICD-10) (Figure 2). Since 2014, psychiatric diagnoses have constituted the most common diagnosis group for sick leave, with the diagnosis of adjustment disorders and reaction to severe stress accounting for half of all initiated sick cases within the group (47).

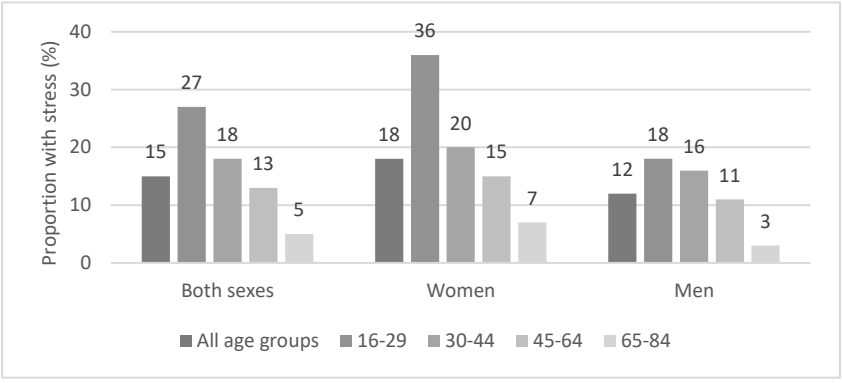

Figure 3. Stress by sex in Swedes above 16 years of age, 2021. Stress was measured with the single item "Are you currently feeling stressed?", with the response options being "Not at all", "To a certain extent", "Quite a lot", and "Very much". The data were extracted from a database hosted by the Swedish Public Health Agency (43).

1.5 CONCEPTUALIZING WORK AND WORK-RELATED STRESS

1.5.1 THE SWEDISH LABOUR MARKET

A well-functioning labour market provides good opportunities for livelihoods for all inhabitants of the country. However, there are group-level variations in the labour market, that can affect the individual's health depending on group affiliation (48). There are also ongoing structural changes in the labour market to consider, and these changes are being accelerated by the ongoing pandemic (49). Of employees aged 15–74 years, 85% were permanent employees, with the highest rate in the 25–54-year-old age group, and 15% were temporary employees, with the highest rate in the 15–24-year-old age group, in 2021 (41). Two-thirds of employees worked in the private sector, a quarter in the municipal sector, and the remaining in the central government sector. Of

employees aged 16–64 years, professionals with requirements for in-depth university skills constituted the largest professional area with 25% of all employees, followed by service, care and sales professions with 22% in 2018 (50). The Swedish labour market is gender segregated, however, with women and men working in different sectors and holding different occupations (41). The gender segregation is also evident in the fact that women and men have different opportunities to pursue careers and advance to higher positions in professional life (48). Work- and sectors-specific health hazards, as well as gender segregation in occupations and sectors, can in part explain differences in sick leave (51).

1.5.2 THE MEANING OF WORK

In this thesis, the conceptualization of work, including the understanding of both work and working, is addressed from different angles to give an idea of how work can be understood and perceived as affecting stress and ill health. The insufficiency of applying a "single-lens" approach to understanding the meaning of work has been stressed (52, 53). Therefore, none of the conceptualizations or representations described below is seen as the single best way to capture the essence of work; instead, they together cast light on how work can be perceived as contributing to health and ill health.

This thesis focuses on employed primary health care patients with different formal occupations. According to the Merriam-Webster dictionary, "work" can apply to any purposeful activity whether remunerative or not. However, the thesis only concerns waged activities in the market society performed by persons who are included in the Swedish social insurance system and pay taxes. Thereby, unpaid and untaxed work as well as non-market voluntary work are not considered here.

The overall reason for exploring the brief intervention and the potential use of the WSQ was to prevent sick leave due to work-related stress in order to contribute to a sustainable working life. This reason rests on the belief that performing work and being included in working life are healthy for the individual and the population as a whole under the right circumstances (54, 55). A crucial factor is the different meanings attributed to work, as they affect the approach, enactment, engagement, and experience of work and the workplace (56, 57), the perception of stress (7, 58), as well as illness (54, 59). Work can then be seen as a productive activity separate from self-care and leisure or as one of many activities involved in fulfilling needs in everyday life (52, 53, 60). It has also been described as the sum of doing, being, becoming and belonging (55). Furthermore, work can also relate to personal

development, contribution to society, instrumental economic purposes, a means to an end for organizational goals (61) or, in more general terms, a duty, virtue, calling, or norm.

1.5.3 FRAMING WORK-RELATED STRESS

The framing and conceptualization of stress in general and work-related stress in particular is an almost overwhelming task, since stress by its nature is a socially, culturally, and historically specific construct (62). Hence, there are numerous discourses and lay representations of the concept of stress depending on the point of view. These discourses and lay representations are important to acknowledge (63), since they can affect the assessment of stress as well as the interpretation of symptoms, help-seeking, caregiving and compliance with measures advised.

In science, the conceptualization of stress depends on the discipline in question and its broad application in, for example, medical, behavioural, and social science research since the adoption of the concept in the 1950s (64). Initially, the focus was on decent work conditions and the need to fulfil psychological needs (65). Later, this humanistic and social-psychological perspective shifted to the micro level and the dominant individualistic psychomedical and new management-oriented approach. The concept of stress has been used to describe a stimulus impinging on the individual, a response to that stimulus, an interactional process with a lack of fit between stimulus and response, and a transaction depending on the scientific perspective applied (62, 66). From a biomedical point of view, work-related stress can be understood as a universal mechanism and an adverse response to objective characteristics of work (62). Stress is then described as a clinical, biological, and psychological state independent of individual, culture, and time (7). However, this static stimulus–response understanding of stress has been questioned, mainly due to the exclusion of the individual's varying appraisal of stressors in a given situation (66). In line with this understanding, Lazarus and Folkman (67, p.19) described psychological stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being". Hence, today work-related stress is considered both a social and medical issue, especially in Western countries (62), even if stress as a category of its own is questioned due to its vagueness (7).

The elaboration of the concept of stress within science and research has affected lay representations and behaviours, and vice versa (68). Apart from the scientific discourses of stress, it is therefore important to acknowledge that

there are other ways to talk about stress in the scientific world as well as in media, health care, authorities and the general population in order to claim truths about stress. However, as for scientific discourses of stress, the lay representations of work-related stress are diverse, as stress, apart from being a clinical, biological, and psychological state, is seen as a social construction (7). Consequently, the representations are sometimes contradictory. For instance, on one hand, being subject to stress at work is considered normal, whereas showing that one is stressed at work is abnormal (69).

Lazarus and Folkman's definition of stress, with its focus on the transactional relationship between the person and the environment, has been central to understanding stress in this thesis; however, when interpreting the results, other discourses were useful as scientific and lay discourses cross-fertilize each other.

1.5.4 WORK STRESS MODELS AND QUESTIONNAIRES

Depending on the theoretical foundation, various stressors and protective factors related to the social and organizational work environment, as well as individual characteristics, are highlighted. Some of the most influential models used in work stress research to address the critical components of working life are described below.

- In the demand–control model (70), developed by Karasek, the combination of high psychological demands and low control at work is postulated to be an important predictor of psychological strains such as mental fatigue. However, the model has been criticized for being overly simplistic (71, 72) and only including the task-specific level of work (70).
- The effort–reward imbalance model, introduced by Siegrist, emphasizes the importance of lack of reciprocity between costs and gains for emotional distress and sustained stress reactions. In addition, the model also includes overcommitment as a personal characteristic of importance for the experience of and coping with an imbalance between costs and gains (73). However, the hypothesis underlying the model has not been unambiguously verified (74) and the model only includes a few work environment factors.
- The job demands–resources model, like the demand–control model and the effort–reward imbalance model, focuses on the imbalance between positive and negative work characteristics

as an important predictor of employee health (75). However, this model has a wider scope, since it theoretically is not restricted to certain specified job demands and resources. Although personal resources have been included in the model, it has not yet been clarified how this should be done (75, 76). In addition, the conceptual differences between job demands and job resources have been questioned (75).

- In the person–environment (P-E) fit approach to stress, stress is conceptualized as a lack of correspondence between characteristics of the person and the environment (77). The approach can be used as a general paradigm of how to understand stress (78). In application, however, the approach has been criticized for confusing the independent effects of the person and the environment with their joint effect and for not clarifying which characteristics of the person and the environment are in focus for the fit (77).

Apart from the above-mentioned models, the person–environment–occupation model (PEO model) (21) could be valuable in understanding behaviours and responses to work-related stressors. Central to this model is the transactional relationship between the persons, environments, and occupations and roles (21). These components change their characteristics over time and in space, so the dependence between them also changes. The better the congruence between the three components, the more beneficial the transaction is for the occupational performance. The PEO model can therefore be seen as a criticism of interactive models, which assume that the person and the environment can be understood and described independently and that there is a linear causal relationship between stressors and ill health. In this thesis, the PEO model was used to understand which factors could be important for experiencing work-related stress and the relationships between them. Human behaviours, such as responses and coping mechanisms due to stress, are therefore seen to depend on and be inseparable from the environment and the individual (21).

Various questionnaires are used to assess psychosocial factors at the workplace, the resulting psychological and physiological responses, as well as more lasting negative health conditions (7, 79), although with different aims and scopes. Both research studies and work stress models have influenced the development of surveys and questionnaires to assess the perceived work environment from a health perspective (79). Questionnaires have been developed for assessment at the individual and entire workforce levels (80-82), as well as for use in research (73, 83, 84). There are also instruments mainly directed at patients with specific diagnoses, such as musculoskeletal diseases

(85). In addition, questionnaires are used in research simultaneously or aggregated to widen the range of aspects considered important for the perception of work-related stress (86). The WSQ (2, 87) was used in this thesis, as it considers the transactional relationship between the person, environment, and work as conceptualized in the PEO model (21). In addition, the questionnaire was developed in a primary health care context. Prior research showed that work-related stress, as measured with the WSQ, was associated with future sick leave among employed women seeking care for musculoskeletal or mental disorders (30). The WSQ could therefore be useful for primary health care professionals in identifying primary health care patients at risk of sick leave.

1.6 THE ILLNESS–SICKNESS–SICK LEAVE TRAJECTORY

As this thesis concerns the identification of patients at risk of sick leave, a central issue was how to identify factors important for becoming sick listed due to work-related stress. The so-called illness–sickness–sick leave trajectory was used in this thesis to describe the different steps on the way to becoming sick listed as well as the different labels and categorizations used during the trajectory to describe ill health.

The trajectory comprises five steps in which the perceived ill health from work-related stress is labelled in different ways (Figure 4). Ill health is here used as an overall term that covers various problems as well as clinically defined medical conditions. In the first step, the individual works in a stressful environment that causes illness. In the second step, the illness is interpreted as a sickness in need of care, which leads to the individual seeking care and describing symptoms. Next, during consultation, the ill health is categorized as a medical diagnosis based on the anamnesis and clinical findings indicating a disease or disorder. The GP then issues a sickness certificate if the patient's work capacity is reduced by at least 25%. However, to support the decision to issue a sickness certificate, the National Board of Health and Welfare has authored recommendations on the assessment of work capacity for various diagnoses (88). In the fifth step, the administrative officers at the Swedish Social Insurance Agency grant sick leave based on various factors, including the sickness certificate.

Figure 4. The illness–sickness–sick leave trajectory.

The four concepts of illness, sickness, symptoms, and diagnosis are important for the trajectory, as they are used to capture different aspects of ill health (89, 90). Illness is here seen as a broad concept used to describe a personal experience or feeling of ill health. Illness is often expressed as self-reported physical or mental symptoms indicating a condition, disease, or disorder. Sickness, on the other hand, is the socially and culturally negotiated understanding of ill health, so the concept relates to the roles of being sick and being on sick leave. Finally, diagnosis is the standardization of diseases according to diagnostic codes. Hence, it has been shown that illness, diagnosis, and sick leave are overlapping concepts of ill health, but that the degree of overlap can be small (89). Yet another concept associated with ill health and poor functioning is work capacity (46, 88). Each of the concepts thereby contributes to the understanding of ill health (Figure 5).

In this thesis, different factors important for future sick leave were identified based on the trajectory. In addition, the four concepts of ill health used along the trajectory were essential to know the area of responsibility inherent to medical practice (14, 17), such as primary health care's responsibility for prevention.

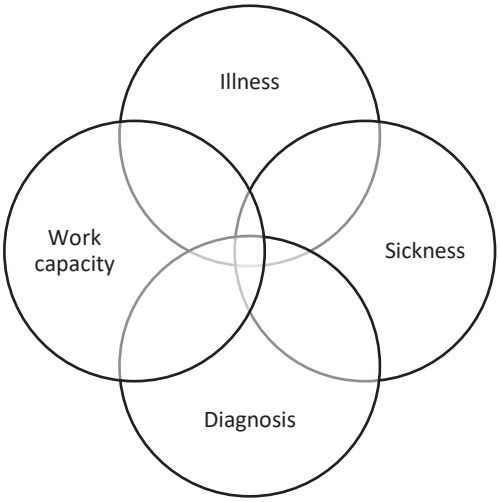

Figure 5. Illness, sickness, diagnosis, and work capacity are concepts describing ill health, but the overlap between the five can be small (inspired by Wikman et al. (89)).

1.7 PREVENTIVE INTERVENTIONS IN PRIMARY CARE

1.7.1 DISEASE PREVENTION STRATEGIES

A fundamental question addressed in this thesis was how to prevent ill health due to work-related stress among primary health care patients. To prevent ill health, both health promotion and disease prevention strategies can be used. In this thesis, disease prevention was in focus. An important assumption for disease prevention is that diseases have a known natural course with some variability, extending from the first stage when the individual does not experience any signs of disease to a late stage of disease during rehabilitation and treatment (91). Four levels of prevention are distinguished, based on where in the course of the disease the preventive measures are introduced:

- Primordial prevention includes measures taken to prevent the development of social, economic, and behavioural conditions as well as conditions in the physical environment known to increase the risk of disease. Measures such as promoting

healthy lifestyles are directed to the total population or selected groups.

- Primary prevention concerns measures intended to prevent disease from occurring. These measures are directed towards specific disease risk factors among susceptible individuals and target the total population, selected groups, and individuals at high risk.
- Secondary prevention targets the early stage of a disease and refers to efforts to detect diseases early and reduce the more serious consequences, as well as to prevent relapse. Individuals with established disease are often detected through screening programs.
- Tertiary prevention aims to reduce the progress or complications of an already developed disease. Through therapeutic treatment and rehabilitation further loss of function and impact on quality of life are prevented.

In this thesis, risk factors important for sick leave due to work-related stress were studied (studies III and IV). These factors could be the targets of primary prevention (92). On the other hand, the brief intervention can be seen as a form of secondary prevention (studies I and II) and perhaps also tertiary prevention, if one also considers any referrals to, for instance, an occupational therapist or physiotherapist for rehabilitation. In secondary prevention, early stage refers to the period between the onset of disease and the normal time of diagnosis. However, a distinction has to be made because "early", as used in this thesis, refers to the time when the risk of sick leave due to work-related stress is still small. Hence, "early" in this sense does not directly relate to the course of a disease.

1.7.2 PREREQUISITES FOR PREVENTIVE INTERVENTIONS IN PRIMARY CARE

According to the inquiry Good quality, local health care – A primary care reform, it is recommended that primary health care should provide preventive interventions based on the needs of both the population and individuals (24). However, Swedish GPs could experience that the mandate, time, and IT support were insufficient for the planning and coordination of patients (93). The prerequisites for handling cases involving work capacity can also be perceived as insufficient, especially for subjective health complaints such as ill health due to work-related stress (94). In addition, stress is one of the indicators chosen by the Public Health Agency to measure public health and its prerequisites (95), but stress is not included among the lifestyle habits

prioritized in the national guidelines on prevention (96). Hence, multiple factors limit the ability of primary health care to comply with preventive services recommendations (97) and to take appropriate measures for people with ill health due to work-related stress, which creates a gap between primary health care's overall mission and practice. This gives a conflicting picture of the need and opportunity to implement preventive stress measures. Accordingly, little research is being carried out on the development and implementation of interventions to treat primary care patients with early stage ill health due to work-related stress (1, 98-101), even though many patients experience work-related stress with high rates of sick leave as a result (30).

1.8 RATIONALE

Today, work-related stress has become an important health consideration for both individuals and organisations, but also for society in general. Demographic and technological changes and the changing structure of the labour market continue to affect the lives of the working population and the quality of work. Lost working days, reduction in work performance and premature exit from the labour market give rise to significant human and economic costs (102). In Europe and the USA, approximately 10% of employees perceive that time is insufficient for them to carry out their work, indicating that the work environment is often to intense and stressful for them (102). In Sweden, high workload is a common cause of ill health regardless of sex and age (103) and 15% of the adult population perceive stress (43). According to the Swedish Social Insurance Agency, SEK 37.6 billion was paid for sickness cash benefits in Sweden in 2021, and mental disorders and musculoskeletal diseases were the most common diagnosis categories independent of sex (42). Measures are therefore being developed, suggested, and taken by health care providers, public health researchers, community leaders and businesses, government, and employees to prevent and mitigate the negative effects of work-related stress (92, 104-106). However, according to the Organisation for Economic Co-operation and Development (OECD) (105, p.13) interventions concerning mental health at work "often leave out key stakeholders, come too late, and are provided in an isolated manner that fails to reflect the integrated nature of the challenges of mental health issues". Considering the amount of sick leave due to stress and mental ill health, further measures are needed to help employees remain healthy at work. As a first step, individuals with mental and physical illness usually consult primary health care, and GPs therefore often deal with issues related to work capacity and stress in their daily work (31, 37). Given the central position within health care and proximity to people's everyday lives, the Swedish primary health has a

central role in performing preventive work (24). Providing tools and interventions to assist GPs is therefore of interest, especially when considering that work-related issues can be perceived as difficult to handle, and require specific strategies, skills and resources (94). As a pre-requisite, it is important to understand the association between work-related stress and sick leave, to direct efforts to those at risk of sick leave.

2 AIM

The overall aim of this thesis was to improve the understanding of how to identify, early on, primary health care patients at risk of sick leave due to work-related stress. This thesis includes four studies aiming to:

I. explore GPs' reasoning about using the WSQ combined with feedback at consultation as an early intervention to reduce sick leave;
II. evaluate the effectiveness of the brief intervention about early identification of work-related stress combined with feedback at GP consultation on the number of self-reported sick leave days;
III. analyse the association between self-assessed work-related stress and registered sick leave, that is sick leave spells lasting more than 14 days, in a working population seeking care at primary health care centres; and
IV. understand the relationship between reason for consultation, work-related stress and diagnosis-specific sick leave for primary health care patients seeking care for mental and physical health complaints.

Studies I–IV are published in four papers, hereafter referred to as papers 1–4. The studies can be applied to different actions and decisions along the illness–sickness–sick leave trajectory (Figure 6).

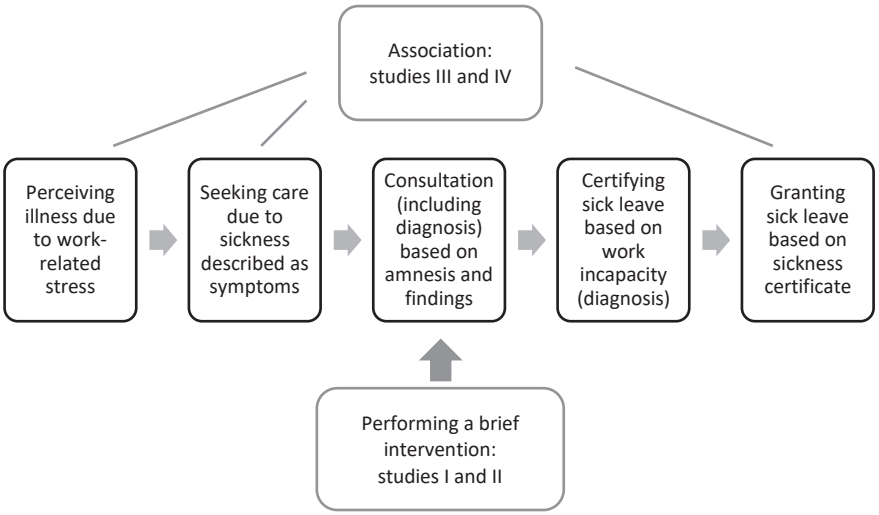

Figure 6. The relationship between the four studies and important steps along the way to becoming sick listed due to work-related stress.

3 PARTICIPANTS AND METHODS

3.1 OVERVIEW OF STUDIES

This thesis includes four studies as summarized in Table 1.

Table 1. *Overview of the four studies presented in papers I–IV.*

Study	I	II	III	IV
Aim (shortened)	Explore GPs' reasoning about using the brief intervention to reduce sick leave	Evaluate the effectiveness of the brief intervention on the number of self-reported sick leave days	Analyse the association between self-assessed work-related stress and registered sick leave	Understand the relationship between reason for consultation, work-related stress, and diagnosis-specific sick leave
Design	Explorative qualitative study	Randomized controlled trial	Prospective longitudinal study	Cross-sectional and prospective longitudinal study
Participants	General practitioners	Primary health care patients	Primary health care patients	Primary health care patients
Data	Focus group discussions	Self-reported data	Questionnaire data and register data	Questionnaire data and register data
Analysis	Krueger and Casey's focus group methodology	Descriptive statistics, Pearson's $\chi 2$ test. and Mann–Whitney U test	Descriptive statistics, Shapiro–Wilk test, Pearson's $\chi 2$ test, and logistic regression	Descriptive statistics, Pearson's $\chi 2$ test, Fisher's exact test, and calculations of crude relative risks

The two first studies evaluated the process and results of using a brief intervention, while the last two studies analysed the association between work-related stress, reason for consultation, and sick leave. Study I was an explorative qualitative study based on focus group discussions. Study II was an RCT using self-reported data. Study III was a prospective longitudinal study based on questionnaire data and register data. Study IV was a cross-sectional and prospective longitudinal study based on questionnaire data and register

data. Hence, both qualitative and quantitative study designs were included. In Study I, the study population consisted of GPs at primary health care centres in the Västra Götaland region, while studies II–IV included patients consulting GPs at these centres.

3.2 THE TIDAS PROJECT

The four studies included in this thesis are based on a two-armed RCT designed to evaluate the effectiveness and process of performing a brief intervention, compared with treatment as usual, referred to as the TIDAS project. The overall aim was to evaluate whether the systematic use of the brief intervention could serve as a method for GPs to prevent or reduce sick leave due to work-related stress (1). The trial was conducted at primary health care centres in the Västra Götaland region in Sweden.

3.2.1 STUDY PROCEDURE

In the Västra Götaland region, there are approximately 200 primary health care centres, of which just over half are public and the rest are private. Of these centres, 51 were identified and consecutively invited to participate in the trial, seven of which accepted. The enrolment of centres took place from May to November 2015. Reasons given for not taking part in the trial were lack of time, involvement in other research studies, or reorganization. Primary health care centres using triage to sort and prioritize patients seeking care to direct them to suitable health care providers were excluded, as this was not compatible with the conduct of the trial. All GPs at the seven centres were then identified. GPs working at least 50% of the time at the primary health care centres were eligible to participate and subsequently invited to participate. In total, 63 GPs gave their consent and took part in the trial. These GPs were randomized to either the intervention or control groups. Folded slips with the GPs' names were put in a non-transparent bowl and mixed. Research colleagues not included in the trial then drew a slip one at a time. The names were alternately randomized to either intervention or control. Thereafter, the project manager and a research assistant visited the primary health care centres to introduce the study to the staff and inform them of which GPs were allocated to intervention. The first step of the brief intervention, a training session for the intervention GPs, was then performed (1).

The parallel recruitment and performance of the remaining steps of the intervention took place during 4–12 weeks at each centre between May 2015 and January 2016. During these weeks, a research assistant was stationed at the centre. For both drop-in and scheduled appointments, eligible patients were

identified by the nurse staffing the reception together with the research assistants via the electronic patient record system. After receiving information about the study, the patients were invited to participate. If interested, the patients provided written consent for their participation before consulting the GP. The primary health care centres participating in the study were compensated financially for each patient who participated (1).

The eligibility criteria are shown in Table 2. In summary, patients who were 18–64 years of age, employed, currently not on sick leave, and seeking care for mental and physical health complaints were eligible to participate. Patients with seven or more days of sick leave during the month before baseline were excluded, as were patients currently receiving sickness or activity benefits. Ongoing pregnancy also provided grounds for exclusion. In addition, patients seeking care for other reasons, such as psychiatric conditions, urinary tract infections, or medical check-ups, were excluded.

Table 2. *Eligibility criteria for the randomized controlled trial.*

Inclusion criteria	**Exclusion criteria**
18-64 years of age	≥ 7 days of sick leave previous month
Employed	Receiving sickness or activity benefits
Seeking care for: • Depression • Anxiety • Musculoskeletal complaints • Gastrointestinal complaints • Cardiovascular complaints • Other symptoms potentially related to mental stress	Ongoing pregnancy (due to risk of pregnancy-related health care contacts) Seeking care for: • Psychiatric diagnoses (e.g. schizophrenia or bipolar diagnosis) • Diabetes • Urinary tract infections • Infections (e.g., cold or sore throat) • Fractures • Lumps and spots • Allergy • Prolonging of sick leave • Medical check-ups • Chronic obstructive pulmonary disease

Due to the design of the trial, neither the GPs nor the patients were blinded. Based on a sample size calculation ($p < 0.05$, 80% power, and two-tailed test) for the main outcome measure, at least 135 patients were needed in each of the intervention group and control group.

3.2.2 THE BRIEF WORK STRESS INTERVENTION

The brief intervention was designed to identify primary health care patients perceiving high work-related stress and to initiate measures if need to decrease the risk of future sick leave. The intervention was developed based on a thesis by Holmgren (107) and a later study aiming to identify work-related stress and its association with future sick leave among primary health care patients (30). The brief intervention consisted of four main steps (Figure 7) (1, 3):

- *Initial training session for intervention GPs*. The training session included information about work-related stress, the brief intervention and the WSQ (including how to use the questionnaire). In addition, the GPs received a folder containing information about stress-related disorders and a list of local health care and rehabilitation providers. This initial step was intended to improve the GPs' awareness and knowledge of work-related stress.
- *Patient assessment of work-related stress*. The WSQ was completed before the patient–GP consultation and this step was intended to raise the patient's awareness of any work-related stress through self-reflection.
- *GP feedback to the patient.* During the consultation, the patient received information about the questionnaire scores. The feedback was intended to increase the motivation to address any work-related stress and stressors at work.
- *GP and patient conferring about and initiating preventive measures.* If necessary, different measures were discussed during the consultation, which was intended to initiate referrals to relevant professionals, such as psychologists/ psychotherapists, occupational therapists, and physiotherapists.

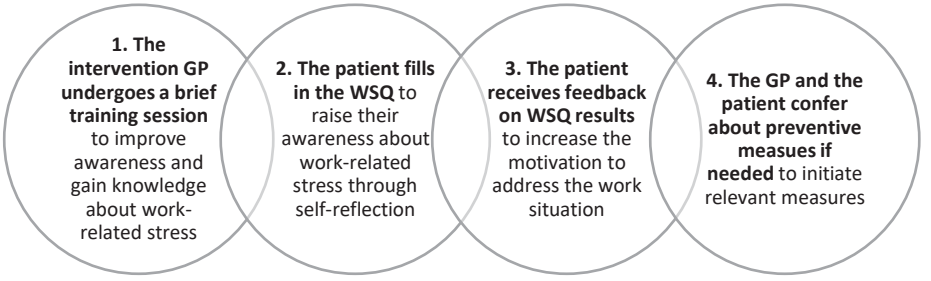

Figure 7. The four main steps constituting the brief intervention designed to prevent or reduce sick leave due to work-related stress (modified from Holmgren et al (3)).

The first step of the brief intervention, the training session, was conducted by the project manager and one of the research assistants. The session was held at the primary health care centre in a group or individually depending on what was convenient for the intervention GPs. In the second step, before the consultation, patients allocated to an intervention GP filled in a questionnaire that included the WSQ and questions about background characteristics. The results of the WSQ were compiled by the research assistant on a form, which was submitted to the intervention GP. The form also included questions about the GP's adherence to the intervention to get an idea of the extent to which the GP and patient discussed the WSQ results and whether any action was taken based on them. When informing the GP about the brief intervention, they were recommended to address the health complaints for which the patient sought care before giving feedback on the questionnaire scores (step three) and conferring about any needed preventive measures (step four).

3.2.3 THE WORK STRESS QUESTIONNAIRE (WSQ)

In this thesis, the WSQ (2) was used to assess perceived work-related stress. In addition, the questionnaire formed the basis of the dialogue between the patient and the GP about the patients self-assessed work-related stress and any needed preventive measures.

The questionnaire was developed based on both theory and empirical findings about work-related stressors and stress. The PEO model (21) was important for understanding the centrality of the triad of individual, environment, and occupation and their dynamics in understanding work-related stress. In

addition, the results of a qualitative study on women's views of opportunities for and obstacles to returning to work (108) significantly affected the questionnaire development. The face validity, that is, the extent to which the questionnaire measures what it is designed to measure based on its subjective face value, has been analysed and found satisfactory for both women and men (2, 87). In addition, the test–retest reliability, that is the extent to which the questionnaire results are consistent over a short time interval, has also been analysed and found satisfactory for both sexes. The questionnaire's development, content, and psychometric properties have been described in detail in two articles (2, 87). The 21 items and 14 appended items (Appendix 1) concern stressors and stress within four dimensions:

1. *Influence at work (four items).* These four items assess the degree of influence on the set-up of daily work and decisions made as well as the degree to which the individual's views are considered.
2. *Indistinct organization and conflicts (seven + seven items).* The first seven items assess how clearly tasks, goals, and decision-making paths have been conveyed and whether there are conflicts and, if so, how these are handled. The seven appended items assess to what degree the indistinct organization and conflicts are perceived as stressful.
3. *Individual demands and commitment (seven + seven items).* The first seven items assess how much effort is put into work, for instance, concerning self-imposed demands, setting limits, and responsibility. The seven appended items assess to what degree the individual demands and commitment are perceived as stressful.
4. *Work interference with leisure time (three items).* These three items assess to what degree work affects time spent with family and friends and time spent on recreational activities.

In this thesis, the items (Appendix I) were combined into six variables corresponding to the four dimensions described above:

1. *Influence at work* captured by items 1–4, answered with the alternatives "Yes, always", "Yes, rather often", "No, seldom", and "No, never".
2. *Perceived stress due to indistinct organization and conflicts* captured by items 5b–11b, answered with the alternatives "Not stressful", "Less stressful", "Stressful", and "Very stressful".

3. *Perceived stress due to individual demands and commitment* captured by items 12b–18b, answered with the alternatives "Not stressful", "Less stressful", "Stressful", and "Very stressful".
4. *Work interference with leisure time* captured by items 19–21, answered with the alternatives "Yes, always", "Yes, rather often", "No, seldom", and "No, never".
5. *Number of dimensions* indicating high exposure to work-related stress.
6. *The combined exposure* from perceived stress due to indistinct organization and conflicts as well as perceived stress due to individual demands and commitment.

The median values for variables 1–4 were calculated as described in the WSQ instructions (Appendix I). The data were then dichotomized into high and low exposures for each dimension, with the median value of 2 as a cut-off on a scale from 1 to 4.

3.2.4 TREATMENT AS USUAL

The patients consulting a control GP received treatment as usual, as these GPs were instructed to perform the consultations as they usually do. The patients were given similar information about the study as the patients seeing an intervention GP. However, they completed the WSQ and the questions on background characteristics after the consultation. Hence, the control patients did not receive any information about the WSQ or the questionnaire results.

3.2.5 EVALUATION

The effectiveness of the brief intervention was evaluated based on the primary measures, i.e., number of registered sick leave days within 12 months of baseline as well as the number of sick leave spells during the same period (3). The data were retrieved from the Micro Database for Analyzing Social Insurance (MiDAS) hosted by the Swedish Social Insurance Agency. In addition, secondary outcome measures were used to evaluate the effectiveness of the intervention:

- self-reported sick leave based on data collected by telephone or e-mail 6 and 12 months of baseline (Paper II);
- health care use and treatment within 12 months of baseline based on data retrieved from the Vega database, which contains data on hospital and primary health care patients in the Västra Götaland region (5);

- pharmacological treatment within 12 months of baseline based on data from the Swedish Prescribed Drug Register, a national population-based register (4); and
- registered sick leave within 24 months of baseline based on data from the MiDAS database (6).

Furthermore, a process evaluation was conducted to evaluate the intervention GPs' reasoning about participating in the trial and performing the brief intervention (Paper I).

3.3 STUDY I: AN EXPLORATIVE QUALITATIVE STUDY

In Study I, the process of performing the brief intervention was evaluated for the overall purpose of gaining insight into the quality of the implementation and identifying contextual factors important for the effectiveness of the brief intervention (109). The qualitative study specifically aimed to explore the GPs' reasoning about using the WSQ combined with feedback during consultation as an early intervention to reduce sick leave. Central to the study was the participants' shared experience and collective understanding of performing the intervention. The study was reported according to the COREQ checklist (110).

3.3.1 THE FOCUS GROUP METHODOLOGY

Focus group methodology was considered useful for this study, as it explicitly uses group interaction during focus group discussions to collect data. The basis for these discussions is the individual's own experiences and views, which are brought up and reflected on during the discussions. Hence, the methodology is not a method used to collect data from several individuals simultaneously (111). The discussions are centred on key questions, with the researcher taking the role of a facilitator rather than a leader, to encourage the participants to share their views and contribute to the discussions. Both the reasoning process and the shared understanding are valuable in order to gain knowledge of what, how and why people think in certain ways about a topic shared by the participants (111). Focus group discussions can also create awareness of the participants' own and others' ways of thinking, which can spur the discussions to take unexpected turns and create new ways of thinking (112). A carefully designed study is of utmost importance if the participants are to interact and share their experiences and views freely. To create a permissive and non-judgemental environment, the selection of participants, role of the group leader, and group setting have to be carefully considered (113). It is also important to include participants with different backgrounds and perspectives.

In this study, the focus group methodology as described by Krueger and Casey (112) was used to explore the collective understanding of performing the brief intervention, an understanding formed in interaction between the research participants (111). The methodology covers research design, data collection, analysis and reporting of results.

3.3.2 STUDY POPULATION AND GROUP COMPOSITION

In this study, it was not possible to choose the participants or the group composition, due to the limited number of intervention GPs and the practical difficulties that would result from mixing GPs from different primary health care centres. Intervention GPs at six out of seven centres were included in the study. The last centre was excluded, as the GPs working there did not have sufficient experience of performing the intervention. The 26 intervention GPs at the six centres were invited to participate and 23 accepted the invitation (Table 3), of whom 11 were women and 12 were men. Fifteen of the participants included were GPs and eight were resident physicians. Parental leave or leaving their positions were given as reasons not to participate.

Table 3. *Group composition for the six focus groups at the primary health care centres (PHCC).*

PHCC	PHCC provision	Number of intervention GPs	Number of GPs participating in the study	Number of patients included (intervention/ control)
1	Public	4	3	87 (42/45)
2	Private	3	-	8 (4/4)
3	Public	5	5	18 (8/10)
4	Private	2	2	51 (25/26)
5	Public	4	4	29 (13/16)
6	Public	6	4	44 (24/20)
7	Private	5	5	34 (16/18)
		29	**23**	**271 (132/139)**

3.3.3 DATA COLLECTION AND ANALYSIS

To reduce the intrusion into daily work and offer as many GPs as possible the opportunity to participate, the discussions were held at the primary health care centres soon after the intervention period was completed. The discussions were centred on four prioritized areas – i.e., the content of the intervention, preparations and peripheral resources, the use of the intervention in daily work, and the prerequisites for future implementation and use in the primary health care centre – that is, areas directly related to the brief intervention and the GPs' daily practice. The discussions were moderated by two researchers well experienced in the focus group methodology.

After being transcribed, the focus group discussions were analysed as described by Krueger and Casey (112). The analysis was explorative and stayed close to the raw data, while focusing on the aim of the study and the four prioritized areas. As the reasoning process and the collective understanding were central to the analysis, separable parts of the discussion, not words or sentences, constituted the unit of analysis. Throughout the analytical process, the researchers explored and verified their different understandings of the discussions. The risk of confirmation bias was decreased in this way.

3.4 STUDY II: A RANDOMIZED CONTROLLED TRIAL

The aim of this study was to evaluate the effectiveness of the brief intervention addressing the early identification of work-related stress combined with feedback during GP consultation on the number of self-reported sick leave days. All 271 patients included in the RCT participated in this study. The reporting of the RCT followed the CONSORT statement for randomized controlled trials (114).

3.4.1 MEASURES

Self-reported sick leave was used as a secondary outcome measure in the RCT to assess the effectiveness of the brief intervention as a complement to the primary outcome measure, that is, registered sick leave. This was done because the two sick leave measures in part measure different aspects of ill health. Self-reported sick leave includes sick leave from day one and onwards, while registered sick leave only includes sick leave from day 15 and onwards granted by the Swedish Social Insurance Agency.

Both the self-reported gross and net days of sick leave were used as outcome measures to account for the effect of part-time sick leave in the analysis. The outcome measures were based on the following item presented at the 6- and 12-month follow-ups: "Define your sick leave during the latest 3 or 6 months, treating each spell of sick leave separately (number of days of sick leave and sick leave as proportion of fulltime per period: 0%, 25%, 50%, 75%, 100%, or varying proportion)". The number of gross sick leave days was calculated as the sum of the self-reported sick leave days during the follow-up period. The number of net sick leave days was calculated by first multiplying the self-reported days of sick leave for each spell by the proportion of fulltime sick leave for that spell during the period. Then, the total number of net days was summed.

3.4.2 STATISTICAL ANALYSIS

As the distribution of the outcome measures, that is, the number of gross and net days of self-reported sick leave, was skewed, non-parametric tests had to be used. These tests make no assumptions about the parameter's distribution. Outcome data were missing for some patients due to non-response at follow-up. Different methods for imputation were considered, but none of them was found useful. As there were no differences in characteristics (i.e., sex, age, and self-rated overall health) between patients taking part at the 6- and 12-month follow-ups, respectively, and the participants at baseline, the patients taking part at the follow-ups were considered representative of the study sample and were thus included in the main analysis. In the main analysis, the Mann–Whitney U test was used to test the difference between median values of gross and net numbers of sick leave days in the control and intervention groups at each follow-up. Based on the assumption that the brief intervention may have better effects among patients perceiving high work-related stress than among those not perceiving high stress, stratified analyses were performed for patients perceiving high work-related stress as measured with the WSQ.

3.5 STUDY III: A PROSPECTIVE LONGITUDINAL STUDY

This prospective longitudinal study aimed to analyse the association between self-assessed work-related stress and future registered sick leave, that is, sick leave spells occurring within 12 months of inclusion and lasting more than 14 days in the working population seeking care at the primary health care centres. The study builds on the prior two studies included in this thesis (studies I and II), as baseline questionnaire data from the RCT combined with data on

registered sick leave were used. In this study, the 232 patients who completed the WSQ participated.

3.5.1 MEASURES

Exposure to work-related stressors and stress was measured with the WSQ at baseline. Based on the items included in the questionnaire, six measures were formulated. The first four measures corresponded to the four areas of work-related stress used in the questionnaire. The fifth variable addresses the effect of perceiving stressors and stress in multiple areas, while the sixth variable addresses the combined effect of perceiving stress from both indistinct organization and conflict as well as stress due to individual demands and commitment. The two summary variables were added as prior studies have shown that perceiving stress related to both the organization of work and the individual's commitment to work are important for the amount of future sick leave (30, 115).

The number of registered gross sick days within 12 months of the assessment of work-related stress was used as the outcome. The data on sick leave were retrieved from the MiDAS database. Before the analysis, the data were dichotomized using 14 days of sick leave as the cut-off, thereby separating patients who had registered sick leave from those who had not.

For the analysis, sex, age, education level, occupational class, and marital status were selected as potential explanatory factors important for the association between work-related stress and sick leave. The selection was made from available data collected with the questionnaire at baseline in the RCT based on scientific literature on work-related stress and sick leave.

3.5.2 STATISTICAL ANALYSIS

The study sample included patients from both arms of the RCT. However, since a prior study showed that the intervention did not affect the odds of future registered sick leave (3), both the intervention and control groups were included in this study and analysed regardless of group allocation. As the outcome measure was skewed, non-parametric tests were used in this analysis. For the main analysis, logistic regression was used to calculate the odds of future sick leave when perceiving work-related stress, while also considering the potential effects that educational level, occupational class, and marital status may have on the association. These background factors were included based on significance testing of the association between each background variable and the outcome using Pearson's $\chi 2$ test.

3.6 STUDY IV: A CROSS-SECTIONAL AND PROSPECTIVE LONGITUDINAL STUDY

This study can be described as a combined prospective longitudinal and cross-sectional study as it aimed to understand the relationship between reason for consultation and work-related stress, collected at baseline, and future diagnosis-specific sick leave in primary health care patients seeking care for mental and physical health complaints. As in the case of Study III, this study builds on studies I and II, as baseline questionnaire data from the RCT combined with data on registered sick leave were used. The study population was the same as that used in Study III, that is, the 232 patients who completed the WSQ in the RCT.

3.6.1 MEASURES

Four variables measuring the degree of influence at work, stress due to indistinct organization and conflicts, stress due to individual demands and commitment, as well as work interference with leisure time were used to describe the exposure to stressors and the perception of stress. In addition, the number of variables indicating high work-related stress was used as a summative value of the exposure to work-related stress.

The reason for consultation was captured at baseline with the question, "What complaints are you seeking care for today?" Based on the 15 response alternatives given, seven dichotomized measures were formulated related to seeking care for mental symptoms, musculoskeletal symptoms, sleep disturbance, fatigue, gastrointestinal symptoms, cardiovascular symptoms, and other symptoms.

The diagnosis can be of great importance for the right to and scope of sick leave, considering the National Board of Health and Welfare's recommendations for the assessment of work capacity for various diagnoses (88). Diagnosis-specific sick leave was captured with two dichotomized variables indicating whether the patient had any sick leave within one year of baseline with a mental or a musculoskeletal diagnosis. Many other diagnoses were represented in the study sample; however, the numbers were not sufficient to perform statistical inference analyses.

3.6.2 STATISTICAL ANALYSIS

Pearson's $\chi 2$ test and Fisher's exact test were used to evaluate the bivariate associations between:

- reason for consultation and work-related stress;
- self-assessed work-related stress and future mental or musculoskeletal sick leave diagnosis; and
- reason for consultation and future mental or musculoskeletal sick leave diagnosis, for the entire sample as well as a stratified sample with patients perceiving high work-related stress.

In addition, the crude relative risks of future mental or musculoskeletal sick leave diagnoses were calculated for patients perceiving high versus low work-related stress.

3.7 ETHICAL CONSIDERATIONS

All four studies included in this thesis are based on the RCT, which received ethical approval from the Regional Ethical Review Board at the University of Gothenburg before recruitment to the study started (reference number 125-15). Ethical approval to conduct in-depth analyses of baseline data and their impact on the outcome of the intervention was obtained from the Regional Ethical Review Board at the University of Gothenburg (reference number 2021-00627). In addition, ethical approval to use registry data for 12 months before baseline was obtained from the Regional Ethical Review Board at the University of Gothenburg (reference number T131-17). The study was also registered at ClinicalTrials.gov (identifier NCT02480855). The studies conducted complied with the ethical principles for medical research involving human subjects as stated in the Declaration of Helsinki (116) developed by the World Medical Association.

The RCT aimed to evaluate whether the brief intervention could serve as a method for GPs to prevent or reduce sick leave due to work-related stress. However, the generation of new knowledge cannot outweigh the rights of the individuals participating in the trial, so it is the duty of the research team to safeguard these rights (116). Involving humans in research entails various ethical considerations, and the importance of the possible outcome of the research must be weighed against the risks to the participants, both during the trial period and later when their personal information is being handled and stored. To increase the likelihood of producing valuable outcomes, the methods and study design of the RCT were aligned with those frequently used in medical and public health research. The findings have been disseminated through different scientific channels, such as scientific conferences and journals. In addition, specific ethical matters were considered during the planning and conduct of the trial.

As the patients were in a dependent position vis-à-vis the GPs, the patients might have felt obliged to participate. Therefore, they were informed both orally and in writing that participation was voluntary and could be interrupted when the patients so wished without affecting their further treatment. Another major concern was the handling of personal and sensitive information, for example, concerning patient health. To reduce the risk of identity breaches and incorrect handling of data, a code key and serial number were used and securely stored, locked up and separated from the collected data. All data processing and analysis were carried out on coded material by researchers who had a duty of confidentiality. The GPs who participated in the process evaluation might have chosen to do so out of loyalty to their managers or employers. Here, too, it was therefore important to emphasize volunteerism and the ability to discontinue participation at any time during the course of the project. Both audio files and transcribed text were handled with care, to ensure that they did not fall into the wrong hands. The results were compiled and published in such a way that it was not possible to identify individual health centres or GPs.

4 RESULTS

4.1 STUDY I: PREREQUISITES FOR USING THE BRIEF INTERVENTION

The study results are based on analysis of the focus group discussions with the GPs. Themes and categories describing the participants' reasoning about using the brief intervention and participating in RCT are illustrated in Figure 8.

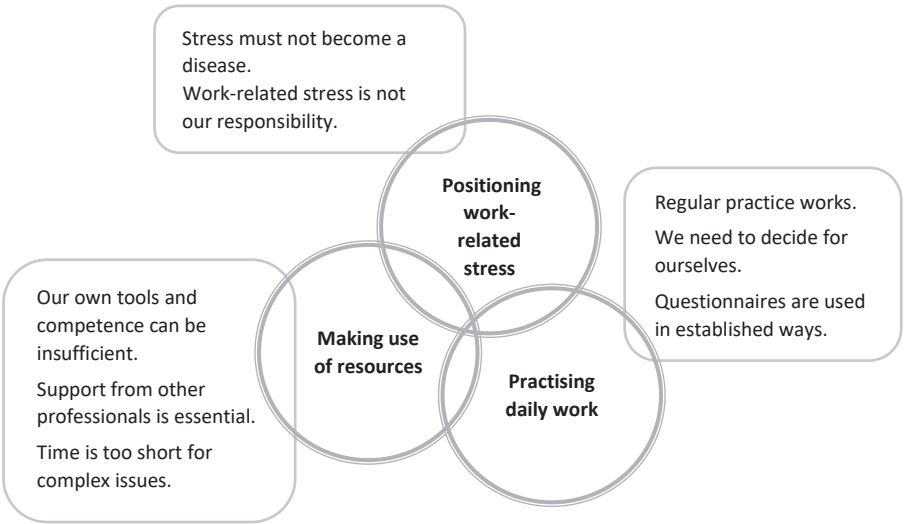

Figure 8. Themes and categories describing the general practitioners' reasoning about using the brief intervention and participating in the randomized controlled trial.

The study showed that when implementing the tested or a similar intervention, different views of work-related stress, primary health care's responsibilities and resources, as well as GPs' preferred ways of working have to be considered. Performing the intervention raised questions about how GPs should address issues concerning work-related stress and how to help people with ill health due to work-related stress at an overall level (i.e., positioning work-related stress). In addition, they questioned whether their own and primary health care resources, taken together, were sufficient to preventatively treat patients with such complex complaints as ill health due to work-related stress (i.e., making use of resources). When the resources were perceived as insufficient, the GPs could question primary health care's responsibility for

these patients. Improved competence and stronger collaboration with other professions were therefore emphasized. Furthermore, the GPs considered themselves in no need of special methods or questionnaires to identify patients with work-related stress and they were critical of the effect that the intervention could have on their well-functioning way of working (i.e., practising daily work). The reasoning process included concurrently taking into consideration factors at the societal, organizational, and individual levels. Performing the brief intervention therefore meant that the GPs had to reflect on and relate to issues beyond the primary health care setting.

4.2 STUDY II: THE EFFECTIVENESS OF THE BRIEF INTERVENTION

This section summarizes the results of the analyses of the effectiveness of the brief intervention. The analyses were based on self-reported days of sick leave at the 6- and 12-month follow-ups.

As shown in Table 4, most of the 271 participants were women 31–50 years of age. Having completed high school or possessing a university degree were equally common in the participants. In addition, the intervention and control groups had similar distributions of background characteristics at baseline.

Table 4. *Characteristics of the patients included in studies II–IV.*

Variable		**Study II (N = 271)** n (%)	**Studies III and IV (N = 232)** n (%)
Sex	Male	86 (32)	79 (34)
	Female	185 (68)	153 (66)
Age, years	18–30	47 (17)	41 (18)
	31–50	134 (50)	117 (50)
	51–64	90 (33)	74 (32)
Educational level[1]	University	122 (45)	103 (44)
	High school	120 (44)	106 (46)
	Elementary school	28 (10)	22 (10)
Occupational class[1]	Skilled/unskilled manual	107 (40)	89 (38)
	Medium/low-level non-manual	116 (43)	100 (43)
	High-level non-manual	47 (17)	42 (18)

[1]One missing value

Due to drop-out, data from 220 participants were included at the six-month follow-up, while the data at the 12-month follow-up covered 241 participants. Based on the analyses, it was not possible to detect statistically significant differences between the intervention and control groups for either of the two follow-up periods. Approximately 50% of the patients reported no sick leave, independent of group allocation and follow-up period. In addition, the numbers of days of sick leave were almost equal in the two groups at follow-up. At the six-month follow-up, the median number of sick leave days was 0 in both groups, while at the 12-month follow-up, the median number of sick leave was 0 in the intervention group and 1 in the control group.

4.3 STUDY III: AN ASSOCIATION BETWEEN WORK-RELATED STRESS AND SICK LEAVE

This section describes the results of the analysis of the association between work-related stress and future registered sick leave among primary health care patients seeking care for mental and physical health complaints.

As seen in Table 4, the characteristics of the 232 participants included in the study are similar to those of the 271 patients included in the RCT. Of the study participants, 41% (94/232) perceived that they had low influence at work and 40% (92/232) perceived that they experienced high work interference with leisure time. In addition, 21% (49/232) reported high stress due to indistinct organization and conflicts, while 45% (105/232) reported high stress due to individual demands and commitment. Furthermore, approximately one third had been on registered sick leave, that is, sick leave spells lasting more than 14 days, within one year of baseline.

Based on the logistic regression analyses, work-related stress was found to be positively associated with registered sick leave within one year of baseline. Perceiving low influence at work, high stress due to indistinct organization and conflicts, high stress due to individual demands and commitment, or high interference between work and leisure time more than doubled the odds of sick leave (Table 5). In addition, perceiving stressors or stress in three or four areas or perceiving stress due to both indistinct organization and conflicts as well as individual demands and commitment quadrupled the odds of sick leave. The analysis also showed that sex, age, educational level, occupational class, and marital status had no effect on the association between work-related stress and future registered sick leave.

Table 5. *Association between work-related stress measured with the Work Stress Questionnaire and registered sick leave within one year of baseline (N=232).*

Variable		Sick leave ≥15 days		Unadjusted
		Yes	No	OR (95% CI)
Influence at work	High	40	98	1.00
	Low	43	51	2.07 (1.20:3.57)
Stress due to indistinct organization and conflicts	Low	58	125	1.00
	High	25	24	2.25 (1.18:4.26)
Stress due to individual demands and commitment	Low	35	92	1.00
	High	48	57	2.21 (1.28;3.82)
Work interference with leisure time	Low	40	100	1.00
	High	43	49	2.19 (1.27;3.80)

4.4 STUDY IV: THE EFFECT OF THE REASON FOR CONSULTATION

In this cross-sectional and prospective longitudinal study, the associations among the patients' reason for consultation, perceived work-related stress as measured with the WSQ, and diagnosis specific sick leave were analysed. As the study population is the same as in Study III (Table 4), the results give further knowledge of the association between work-related stress and future registered sick leave for the primary health care patients seeking care for mental and physical health complaints.

The study showed that musculoskeletal symptoms and mental symptoms were the most reported reasons for consultation among the 232 patients – 38% and 36%, respectively. However, among patients who reported high work-related stress, 59% (60/102) sought care for mental symptoms. Care seeking due to mental symptoms, sleep disturbance or fatigue were more frequent in highly stressed patients than in mildly stressed patients, but care seeking due to musculoskeletal symptoms or any of the other symptoms reported in the study were not associated with work-related stress.

Of the 232 patients, 40 patients had a future mental sick leave diagnosis, while 20 patients had a future musculoskeletal sick leave diagnosis. Patients who sought care for mental symptoms, sleep disturbance or fatigue more often had a future mental sick leave diagnosis than did those who sought care for other reasons. This association was also seen when focusing on patients reporting high work-related stress. In addition, seeking care for musculoskeletal symptoms was associated with having a future musculoskeletal sick leave

diagnosis. No such association was found when focusing on patients reporting high work-related stress.

The study also showed that the risk of sick leave with a mental diagnosis was three times higher among patients who reported high work-related stress than among those who did not. However, the study did not confirm any association between work-related stress and future sick leave with a musculoskeletal diagnosis.

Altogether, work-related stress was seen mainly as a mental issue from the perspectives of both the GP and patient, as care seeking due to mental complaints, sleep disturbance and fatigue followed by a mental sick leave diagnosis was more common among highly stressed patients compared to mildly stressed patients.

5 DISCUSSION

The overall aim of this thesis was to develop a better understanding of the early identification of primary health care patients at risk of sick leave due to work-related stress. The thesis therefore covers different activities and decisions along the so-called illness–sickness–sick leave trajectory. A fundamental issue was then how to characterize the patients at risk of sick leave due to work-related stress, based on our understanding of the relationship between the individual, the environment, and work, and of how the reason for consultation could affect the illness–sickness–sick leave trajectory. Another important issue was how to influence GP and patient behaviours both during and after consultation to improve the identification of work-related stress and the measures taken to prevent sick leave due to work-related stress by using the brief intervention. As this thesis is set in a primary health care context, the responsibility, especially the GPs' responsibility, for taking action to reduce ill health due to stress was reflected on by the intervention GPs. In addition, the responsibility of other actors to prevent and treat ill health due to work-related stress was emphasized. A third important issue was therefore how to share the responsibility in order to use resources efficiently and coordinate efforts. Below, the results are discussed in relation to the three issues considered significant for the thesis as well as the continued work of preventing ill health due to work-related stress.

5.1 HOW TO CONCEPTUALIZE PATIENTS AT RISK?

In this thesis, the risk of sick leave due to work-related stress was studied in relation to factors relating to work, the individual, leisure time, the reason for consultation, and the diagnosis.

The relationship between stress – or more often the imbalance between stress-inducing and -preventing work characteristics – and ill health has been explored extensively (7, 45, 65, 66). From the mid-1980s to the early 2000s, the work initiated by Karasek (70), had great impact on the understanding of risk factors important for work-related stress and sick leave (117). During that period, the levels of demand, control, and support at the work-task level were therefore in focus. Later, theories and research also took account of personal resources or characteristics in understanding the association between stressors at work, work-related stress, and sick leave (20, 59, 75, 118, 119). Due to the inherent complexity of the matter, there are different conceptualizations of the relationship between stressors, stress, and sick leave (73, 75, 120). In this

thesis, the individual, the environment, and work were seen as interrelated, with both these separate components and their relationships changing in every situation (21, 22). For patients at risk of sick leave due to work-related stress, influence at work, indistinct organization and conflicts, individual demands and commitment, as well as work interference with leisure time were all considered important areas (2, 108).

This thesis showed that perceived low influence at work was common among the primary health care patients, being positively associated with future registered sick leave (Paper III). In understanding how to characterize patients at risk of sick leave, it is therefore important to consider their perceived influence on the set-up of daily work and decisions made as well as the degree to which the individual's views are considered. The importance of autonomy and consideration of opinions have also been shown in other studies using the WSQ and other assessment questionnaires (20, 30, 121, 122). The long-dominant demand–control model of work stress focuses on the task-specific level of work, which could be problematic as the demands and authority structure of the organization are left out. To address this problem, Karasek (70) argued that task-specific demands and job control probably also reflect the overall demands and authority structure of the organization. This argument can be questioned when studying future sick leave, as research findings show that the interplay between influence at work and sick leave varies depending on sex, age and occupational group affiliation (122-124). In Paper III, stress due to indistinct organization and conflicts was common among patients and affected future sick leave. The individuals' perception of organizational aspects such as how clearly tasks, goals, and decision-making paths are conveyed, whether there are conflicts, and, if so, how these conflicts are handled could therefore be important in understanding how to characterize patients at risk of sick leave. It is then possible to understand larger patterns that could affect the degree of influence at work or other aspects important for the individual's perception of work-related stress.

The results of Paper III confirmed prior research and theories concluding that it is important to consider individual variability in the perception of work-related stress and associated sickness (30, 73, 75), as stress due to individual demands and commitment was found to be important for future sick leave (Paper III). Hence, needs, values, and abilities are important in order to understand the appraisal, coping strategies, and actions in response to a specific work context (77). To address this variability, work commitment is used to describe a frame of mind that guides an individual to pursue actions relevant to work (125). In addition, work commitment is used to describe the vigour, dedication, and absorption (126) as well as a sense of involvement and positive

meaning (127) when performing work tasks. However, there are limits to the positive effect of work commitment on health and work performance, as excessive work commitment is considered a personal characteristic and a risk factor for stress-related ill health (73). If this holds true, being too occupied with work could be interpreted as solely an individual concern that the individual is responsible to address. Apart from being a personal characteristic, commitment is also viewed as a response pattern subject to changes in the work environment (128). Based on the research of Bakker and Demerouti (76), both personal resources (e.g., optimism and self-efficacy) and job resources (e.g., autonomy, variety of skills, and feedback on work performance) contribute to work commitment (129). In addition, the meaning of work has also been emphasized in order to understand the association between work commitment, stressors at work, and the risk of sick leave (58, 59). This approach to work commitment thereby supports the transactional approach to occupations, as neither the individual nor the work environment is prioritized in thinking about stress reactions or behaviours. Another important result of this thesis was that the combination of high stress due to indistinct organization and conflicts as well as high stress due to individual demands and commitment had a significant impact on the risk of future sick leave (Paper III). This is in line with Katz and Kahn's (130) understanding of role perception and work performance as being determined by the requirements and expectations of organizations and society in general. A possible way to extend the understanding of commitment beyond the individual level would be to include the organizational climate in the understanding of who is at risk of sick leave due to work-related stress, as this climate sets the tone for what is seen as socially acceptable and favourable behaviours, thereby affecting the risk of work-related ill health (131).

Excessive commitment to work can also interfere with time spent with and behaviours towards one's family (132). Based on findings of Study I, the GPs emphasized that stress contributes to work interference with family time and should therefore be viewed as a life style problem stemming from a working situation and a private life that are irreconcilable (Paper I). In addition, this thesis showed that the effect of work on time spent with family/ friends and on recreational activities was important for future sick leave (Paper III). The result is supported by research, showing that work–private life interference is positively associated with future sick leave (133). The interference is, however, bi-directional, as private life also can affect the conditions at work, and the demands arising from different social roles in working life and private life can be incompatible (134). In characterizing patients at risk of sick leave due to work-related stress, it is therefore also important to consider the effect that a stressful work situation might have on other areas of life, and vice versa. In

doing so, the different meanings of work and what counts as work, as described in the introduction above, need to be addressed. Consideration also needs to be given to the positive effects of the interaction between work and leisure, as different social roles can enrich each other (135).

Apart from factors relating to the patient's working conditions, other factors also must be accounted for along the illness–sickness–sick leave trajectory to understand patient characteristics of importance for future sick leave. The patient's reason for consultation gives an indication of the perceived illness, which in turn forms the basis for the GP's medical interpretation, together with, for instance, the anamnesis, health risks, and clinical findings (136). The reason for consultation is especially important when there are few or no clinical findings, as in the case of some disorders and diseases that might be stress related. The thesis showed that patients with high work-related stress sought care for mental symptoms, sleep disturbance, and fatigue more often than those who did not report high work-related stress (Paper IV). This result confirms prior studies showing that complaints such as infections, anxiety, stress, pain, and fatigue were common among patients with stress-related ill health (31, 32). However, it is important to note that the reasons for consultation given by patients may not reflect their needs and expectations regarding health problems, but rather their behaviour with regard to the biomedical understanding of illness, sickness, and disease (137). An additional main result of Study IV was that the patient's reason for consultation was reflected in the sick leave diagnosis. The diagnosis can be of great importance for the right to and scope of sick leave, considering the National Board of Health and Welfare's recommendations for the assessment of work capacity for various diagnoses (88). The reason for consultation could therefore give further information on how to characterize patients at risk of sick leave due to work-related stress, though it may not result in appropriate measures to address their needs and expectations.

5.2 HOW TO INFLUENCE BEHAVIOURS?

The brief intervention was evaluated with regard to sick leave, pharmacological treatment, health care use, and treatment during the year after the intervention was implemented (3-6). To see results in these areas, the intervention GPs had to change their behaviour during the consultation to incorporate the intervention into their regular way of working. In the year that followed, the brief intervention was hypothesized to influence the GPs' way of working, for example, by inducing them to recommend different treatment measures and to prescribe different medications. The patients also had to

change their behaviour in the year that followed by participating in rehabilitation, following the GP's advice about medication use, and managing a work situation that was experienced as stressful. The short intervention had no effect on self-reported sick leave (Paper II) or registered sick leave (3, 6), which could be interpreted as indicating that the intervention did not change the way ill health due to work-related stress was managed or treated. However, the intervention was shown to have an effect on the prescription of drugs (4) and the numbers of rehabilitative measures (5), which could indicate a change in the GP's and patient's actions to handle the patient's ill health.

The person's capability, motivation, and opportunity to change could improve the understanding of characteristics important for engagement in behaviours in a given situation (138). In this way, knowledge, skills, values, habitual processes, emotional responses, and contextual factors enable, prompt, and shape behaviours (10, 138). However, a habit or behaviour will not change unless it is insufficient for the functional coordination of a particular situation (22) or, put differently, when it is viewed as more favourable than any other competing behaviour at that moment (138).

A first step in changing behaviour is to identify that there are problematic circumstances and situations in need of change (10). An important starting point for this thesis was that GPs and patients were not always aware that the conditions and symptoms for which the patient sought care could be stress-related (30, 32) and that certain tools could therefore be useful to assist the GPs in understanding and explaining the underlying causes of the patients' perceived health problems. However, the results of Study I showed that the GPs considered themselves to have a well-functioning working method for identifying and diagnosing patients with various complaints, including ill health due to work-related stress. They therefore did not consider themselves helped by using the WSQ. One explanation offered by the GPs was that the intervention affected their narrative approach during consultation. Another possible explanation of their position is that the biomedical perspective is the dominant theory in medicine, meaning that psychological, social, and behavioural aspects of ill health are less prioritized (12). This perspective is in sharp contrast to the transactional perspective on which WSQ rests, with the premise that the person and the environment cannot be separated and that together they form a dynamic whole. Consequently, the centrality of the biomedical perspective to research and practice gives no clues regarding the use of tools and questionnaires based on other theoretical approaches (16, 17). Furthermore, both patients and GPs seemed to characterize work-related stress as a mental complaint (Paper IV), although there might be other ways of relating to the patient's needs in relation to the perceived ill health.

Work-related stress and sick leave were common among the employed patients seeking care for mental and physical health complaints (papers III and IV), even more so than in the general population (20, 139), indicating that there are opportunities for development and a need to find ways to prevent work-related stress and provide early treatment to patients at risk of sick leave due to such stress within the scope of primary health care. Although the intervention GPs considered themselves to have a well-functioning diagnostic procedure also suitable for patients with illness due to work-related stress without the aid of questionnaires, several circumstances and situations emerged that were perceived as problematic when identifying and treating patients perceiving ill health due to work-related stress. Based on the results of Study I, restricted resources could affect GPs' views of and ability to handle patients with stress-related complaints. For instance, insufficient resources to expediently select, collect, and evaluate data of relevance to patients with ill health due to work-related stress could generate extensive fragmented and loosely related data, rendering tools and practices based on both the biopsychosocial and transactional perspectives too inefficient for use in practice (16, 17). In addition, clinical culture could affect GP reasoning about using the brief intervention, as factors such as communication, work ethic, and sense of mission have been found relevant to the understanding of success in implementing interventions in primary health care (140). Performing the intervention also meant that the intervention GPs had to decide on the need for and benefits of screening for ill health due to work-related stress (Paper 1), due to the risk of the over-diagnosis and medicalization of stress and the consequences thereof for their work (141).

Altogether, performing the brief intervention regularly in daily practice meant that the GPs had to deviate from their regular way of working during consultation. However, the GPs did not favour this new behaviour over their regular behaviour given the prevailing circumstances. Performing the intervention and taking part in the RCT could increase their knowledge and awareness of work-related stress, thereby affecting their capability and motivation to perform the intervention and handle cases of ill health due to work-related stress. This assumption is supported by research performed by Bjerkeli et al. (4) and Sandheimer et al. (5). Even so, the intervention was not considered justified, as it affected their habitual way of working, narrative approach, and medical-professional logic as well as increasing the risk of the over-diagnosis and medicalization of stress. The opportunity to perform the intervention was also unfavourable as the resources were considered insufficient and the division of responsibilities for handling ill health due to work-related stress was unclear. To understand the full potential of the brief intervention, it should be routinely embedded in and become a normal

component of GPs' everyday practice (142). However, there are no national guidelines for primary health care's preventive work on ill health due to stress, which affects the possibility of testing and implementing appropriate interventions.

Apart from addressing the initiation of relevant health measures, the brief intervention was intended to raise patients' awareness of work-related stress and increase their motivation to address problematic work situations (steps 2 and 3 of the intervention). If the patients were unaware that the perceived ill health could be a consequence of work-related stress, these steps might increase their motivation to make decisions and take actions to improve the situation. Even when there is awareness of the causes of illness, individuals might not take relevant actions. So, why do employees maintain an unhealthy level of commitment to work? One plausible explanation is that the patient might view the present behaviour at work as less unfavourable than any other competing behaviour at that moment (138). Various discourses concerning the meaning of work and work-related stress, such as those described in the introduction above, could also explain why work behaviours are not changed, resulting in unhealthy levels of commitment. For instance, viewing work mainly as a norm, a way to achieve economic purposes, or an arena for personal development (61) might affect the employee's decision as to whether or not to maintain an excessive commitment to work. In addition, viewing stress at work as normal, while also considering that displaying that one is stressed at work is abnormal (69) could reduce the incentive to address the work situation (63). Work commitment is an important construct for organizations, as employees committed to their work produce better organizational outcomes (143). Organizations therefore put effort into evoking and directing their employees' actions in a desired direction by means of normative control (144), for instance, through opportunities for learning and development within the organization. Hence, apart from individual resources, work characteristics, and leadership, general understandings of work and work-related stress could affect the decision as to whether and, if so, how to address a stressful work situation (76). Efforts made by the employee to address the stressful work situation could therefore be insufficient to achieve pervasive and long-lasting health effects (10).

5.3 HOW TO JOIN THE EFFORTS?

Today, there is general agreement that actions to address and prevent work-related stress and associated ill health should be taken at both the individual and organizational levels (92, 106). Given the commonness of work-related

stress and sick leave among primary care patients seeking care for mental and physical complaints (papers II–IV), this approach should guide future preventive efforts in which primary health care is included as an important actor. Actions are currently more often directed towards the individual employee (106). This is in line with the findings of Study I, as GPs emphasized that the individual has a great responsibility to prevent the stress from occurring as well as to take the necessary measures to treat any associated ill health. Hence, ill health due to work-related stress can be seen as a problem viewed from the individual, organizational, and societal levels, although it is usually addressed at the individual level (145).

The perspective of the intervention GPs (Paper I) taking part in the trial and performing the brief intervention highlighted that there was a need for increased collaboration within primary care and that the responsibility for the prevention and early treatment of ill health due to work-related stress must be shared between different actors. Primary health care's own responsibility for preventive measures is not specified in detail, although some county councils do give directions (24). This flexibility makes it possible to adapt the preventive measures to local conditions. Still, the prevention of unhealthy lifestyles is prioritized in many county councils, while the broader determinants of health directed towards the general populations' living and working conditions are less considered (24). The extent and direction of the preventive measures also depend on the order of priority that exists for efforts in health and medical care, with prevention and rehabilitation being given higher priority than, for instance, care of less severe acute and chronic diseases (26). Due to a lack of resources and a compensation system that does not reward prevention and rehabilitation, however, these measures are given lower priority (24). Hence, GPs consider that increased resources are needed for preventive work and social interventions (25), and that support from and collaboration with other professions within primary health care could improve the early identification and treatment of complex health problems, such as ill health due to work-related stress (Paper I). Inter-professional teams, care managers, and rehabilitation coordinators could improve care continuity for patients, while also helping them remain at work or facilitating their return to work (24, 146). In addition, various tools and forms of cooperation have been developed to increase the cooperation between GPs, patients, employers, as well as other actors important for preventing ill health and promoting return to work (99, 101, 147). Even so, there are currently no formal and established contact routes to jointly prevent sick leave due to work-related stress.

By performing the brief intervention and screening patients for their perceived work-related stress, the primary health care centres strengthened their position

in preventing ill health due to work-related stress. The screening made it possible to identify patients with high work-related stress early on (papers III and IV), that is, before sick listing was the only option, but it could, as previously mentioned, also be perceived as increasing the risk of the over-diagnosis and further medicalization of stress (Paper I). Due to the commonness of stress among primary health care patients (papers III and IV), making stress into a medical issue could increase the load on an already heavily burdened primary health care system. Performing the intervention thereby highlighted the question of how to distinguish normal human distress from disease (148) and of what could be understood as the starting point for the illness–sickness–sick leave trajectory. If primary care does not take greater responsibility, other actors need to do so, making it necessary to decide when and by whom. The Swedish Social Insurance Agency could be included in discussions of the need for interventions, but involving them at an early stage might make the patient feel criticized. Involving employers could help in finding ways to address problematic situations at work, but the patients might not want to discuss their work situation, health, or private life with their employers. Due to their knowledge and resources, occupational health care could contribute in cases concerning work-related interventions, work capacity, and sickness certification (149), but in Sweden the services provided can be limited. Even so, considering that patients seek care at primary health care centres for problems that could be stress related, an overall strategy is needed for the early identification of individuals at risk of sick leave due to work-related stress (150), offering targeted measures (151), performing team-based measures within primary health care, and, if necessary, collaborating with employers and the Swedish Social Insurance Agency.

If the risk of sick leave due to work-related stress is to be reduced, one must ask what the prerequisites are and how extensive are the changes that we can and are willing to make. In doing so, the situation of the individual as part of a social, cultural, and historical context has to be addressed (10, 21). A step towards reducing the focus on the individual would be to consciously relate to the different discourses that exist regarding work and work-related stress (63, 69). Harkness (69) concluded that reducing the importance of the discourse that describes the employee as stressed would create latitude to consider other discourses and manifestations of stress. For instance, emphasizing the employee as an active part of wider society could broaden the understanding of effective and appropriate preventive measures. Given the complex and dynamic areas of health care, limited resources, as well as the dominance of causal logic and the biomedical perspective, it is fair to question whether there is sufficient room for manoeuvring and doing better (10, 11, 24).

6 METHODOLOGICAL CONSIDERATIONS

6.1 AN INTERVENTION TRIAL ALONG THE EXPLANATORY PRAGMATIC CONTINUUM

In this thesis, the RCT was performed to evaluate the effectiveness of using the brief intervention in reducing the risk of sick leave due to work-related stress among primary health care patients. Trials evaluating the effectiveness of interventions are by their nature more or less pragmatic, as they are optimized to determine whether interventions could be beneficial in the "real world" or to determine which intervention or treatment is to be preferred in clinical practice (152). To maximize interventions' applicability and generalizability, pragmatic trials are designed to evaluate interventions in the broad range of everyday clinical settings (153). These everyday realities include knowledge, habits, values, and experience that bring complexity to pragmatic trials, necessitating that the situation be viewed in its totality (10, 19). In every part of the design of pragmatic trials, the key word is heterogeneity, which applies to, among other things, the patients included, the performance of interventions, and the clinical settings.

It is recommended that the design of pragmatic trials be simple in order to facilitate planning, performance, and follow-up (153). Testing interventions in such a dynamic and time-restricted setting as primary health care presents a range of technical and administrative challenges, and adequate time, additional resources, and intensive facilitation are needed (154). At the start of the TIDAS project, a steering group consisting of people with experience in conducting randomized controlled studies in primary health care was formed. Discussions were also held with representatives of primary health care to examine the conditions for testing the brief intervention. Like many other clinical trials, this RCT can be placed somewhere along a continuum extending between explanatory and pragmatic trials (152, 153). A research assistant administered parts of the intervention, to make the trial feasible. The primary health care centres were also economically compensated for each participant recruited, because of the extra work that participation in the RCT entailed. As a result, the generalizability and applicability of the findings in routine practice settings decreased. Strict control of the trial conditions can result in difficulties translating the findings to the clinical setting, while easily generalizable findings can be unreliable or invalid (155). Hence, performing controlled clinical trials in primary care has been described as the "struggle between external and internal validity" (155).

In the RCT, external validity was accounted for by allowing flexibility in how to perform the intervention and handle decisions that had to be made, for instance, concerning when to give feedback on the results as well as whether to discuss measures with the patient and, if so, which measures to discuss. In addition, the study included both private and public primary health care centres located in both urban and rural areas to increase the external validity. Having few exclusion criteria can also help increase the external validity (155). In this trial, the criteria were therefore carefully selected to limit the number of inclusion and exclusion criteria. Since stress affects health in multiple ways (32, 34-36), the inclusion criteria had to be wide-ranging in scope to include all patients who might receive the intervention in daily practice. Hence, in this RCT, the population included patients seeking care for mental and physical health complaints without specifying further the type of complaints (1), even though some of the complaints specified by the patients as the reasons for consultation might not be associated with work-related stress. In addition, the chosen criteria made it possible to define patients where work-related stress was most likely prevalent and where the risk of sick leave was highest, while excluding those with health issues rarely associated with work-related stress and those already receiving sickness benefits. The criteria were therefore considered suitable to define the population at risk.

Internal validity can be accounted for by reducing the risk of contamination between the intervention and control groups. The level of randomization is therefore important to consider. In this trial, using the GP as the unit of randomization was preferred, as the first step of the brief intervention was a training session for the intervention GPs to improve their awareness and knowledge of work-related stress. An additional reason for randomizing at the level of the GP, was that the entire primary health care centre became involved in the study. The decision could have increased the risk of contamination between the intervention and the control GPs. Another option would have been to use the primary health care centre as the unit of randomization, but the recruitment could have been more difficult, and the centres acting as controls might have been less motivated to participate. Randomization at the level of the patient was not an option, as all GPs would have received the training as a first step in the intervention, and thus knowledge that could have been used during consultation with a control patient. In addition, the first step of the brief intervention, i.e., the training session for the intervention GPs, could increase the adherence and reduce the variability in delivering the remaining steps of the intervention. Bias due to non-blinding and its potentially negative effect on internal validity was also important to consider in this study, as the design of the intervention prevented the blinding of both the patients and the GPs. All patients, GPs, and other staff at the primary health care centres were given

information about the study. The patients also gave their consent to participate before the patient–GP consultations. However, the control GPs performed their consultations without knowing whether or not their patients were participating in the trial, and the patients allocated to the control group filled in the questionnaire after the consultation. Blinding is used to prevent systematic biases due to, for instance, changes in attitudes, behaviours, and decisions when participants know about the treatment given. However, the effect of blinding is ambiguous (156, 157). Patsopoulos (153) has even argued that, in studies evaluating interventions presumed to have moderate effects, non-blinding could be beneficial, as the patients' needs and preferences could inform the intervention and influence the outcome; in this way, the performance of the study may be closer to the real-world setting. This argument could be relevant when considering the effect of non-blinding in this RCT, as the effectiveness of the intervention was evaluated.

As described by the intervention GPs, time could be insufficient for addressing complex issues such as ill health due to work-related stress (Paper I). Time constraints and workload also affect GPs' participation in research and the conduct of clinical trials in primary health care settings (158). In addition, research has shown that GPs might regard research participation as not within their professional responsibility and their voices as insufficiently recognized in research (158, 159). GPs might also be reluctant to involve their own patients in research (158). Morténius et al. (160) emphasized the importance of organizational culture in understanding views of engaging in research among primary health care staff, especially the role of taken-for-granted attitudes, norms, and values such as a general reluctance to change. Attitudes towards participating in research must therefore be considered in the design and conduct of clinical trials in primary health care. The attitudes held by the intervention GPs might also have contributed to the non-significant findings of this RCT.

6.2 USING FOCUS GROUPS FOR PROCESS EVALUATION

Process evaluations are useful in clinical intervention trials to gain knowledge of the experience of performing and implementing an intervention, as well as knowledge of any changes in the design of the intervention or other adaptations or resources needed to make the intervention useful in a specific context (109). This knowledge can be gained by interviews, focus group discussions, surveys, or observation of participants (109, 161). In this thesis, the focus group methodology was used as part of a process evaluation targeting the intervention

GPs. In addition to this evaluation, questionnaires were used before, during, and after the intervention period to address the GPs' readiness to use the WSQ during consultation, the adherence to the study protocol, and the feasibility of using the WSQ in daily practice during consultations (1). The results of the focus group discussions contributed by addressing the socially shared understanding of the design of the intervention, of the performance of the brief intervention, and of the prerequisites for implementing and using the intervention in daily practice as well as the reasoning behind this understanding.

The focus group methodology described by Krueger and Casey (112) was found useful, as it is thoroughly described and covers research design, data collection, analysis, and the reporting of results. In addition, the two moderators were experienced both in using the methodology and in the group leader role. The interaction between the participants in the focus group discussions is seen as the methodology's main feature, as group processes can encourage the exploration and negotiation of views and attitudes held by the participants, even among those feeling less comfortable expressing their views (162). A main issue is how to stimulate productive discussions and to decrease the risk of conformity responses and the withholding of opinions (163). To stimulate the discussions, aspects of the participants and moderator as parts of the situation were considered, such as the moderator's role in the discussions and the time and place of the discussions. However, practical difficulties meant that deviations from Krueger and Casey's recommendations were made, which may have reduced the credibility of the study. For instance, some authors have advocated not using pre-existing groups, in order to increase the explanatory power of the results (112, 162), but in this study the intervention GPs at each primary health care centre naturally formed a group. On the other hand, Kitzinger (111) argued that pre-existing groups are preferable, as the resulting discussion is more natural and more likely to represent views held in the specific context. Despite some minor deviations from Krueger and Casey's recommendations, rich material was obtained for further analysis. All this considered, it is also worth mentioning that the limited number of focus groups in this study could have affected the transferability of the results. However, the six focus groups included might well have contributed a large variety of understandings of the topic at hand, as it has been shown that even a small number of focus groups can give a good picture of the different understandings of the topic of interest (164).

6.3 ASSESSING WORK-RELATED STRESS

In this thesis, the WSQ was used for assessing the patients' perceived work-related stress and the risk of future sick leave. As the odds of sick leave were higher among patients with high work-related stress (Paper III), it can be concluded that the questionnaire can be useful for assessing patients at risk of sick leave due to work-related stress in this population. However, when choosing a questionnaire, it is important to consider the ontological stance and the stress discourse used. As the WSQ is based on the PEO model developed by Law et al. (21), the individual, the work, and the environment cannot be studied in isolation. Having this stance makes it less relevant to use a questionnaire such as the Job Content Questionnaire, as it was designed based on the assumption that there are socially "objective" environments that systematically affect the health, well-being, and behaviours of the employee (83). In an editorial, Rugulies (165) reflected on whether it is even possible to measure the social environment objectively by using self-assessment questionnaires such as the Job Content Questionnaire and thus also whether these measures should be seen as exposures and risk factors for perceiving work-related stress and associated ill health. In this thesis, the mind was considered not to have the ability to distance itself from the body or the physical and non-physical context (19, 21). Trying to measure working conditions objectively was seen as irrelevant. Instead, the appraisal and handling of a work situation that was deemed problematic was in focus (19, 67). Self-assessment questionnaires, such as the WSQ, were therefore found suitable for measuring employees' perceptions and experiences of the working conditions.

Although the WSQ includes aspects of importance for perceiving work-related stress in multiple areas, other factors than those included in the questionnaire can also be useful in assessing work-related stress and the risk of future sick leave, factors such as social support (71) and organizational justice (166). It might, however, be relevant to also consider stress related to other areas of life, as stress can be seen as a lifestyle problem (Paper I). In addition, the triple load of paid, unpaid, and domestic work may affect sick leave (133). Apart from questionnaires, single items with answers given on a Likert-type scale are also used to assess work-related stress (167). On one hand, single items do not limit the work-related stress to any specific areas chosen beforehand; on the other hand, what is deemed work-related stress is up to the person to decide (167) based on different discourses and lay representations. The validity of such items can therefore be questioned. Single items might be useful for screening at an organizational or population level, but not for taking action at the individual level (81). Multi-item multi-dimensional questionnaires such as the

WSQ not only serve as tools for assessment, but could also give an overall picture of the perceived stress-related problems (Paper I). Used during patient–GP consultations, the questionnaire could also structure discussions of work-related stress and of harmonizing work (Paper I). Such aspects are also important to consider when choosing a suitable questionnaire for the assessment of work-related stress for use in clinical practice.

6.4 USING SICK LEAVE AS AN OUTCOME MEASURE

The choice of outcome measure must be carefully considered, as it greatly affects the usefulness of the study results (168, 169). When evaluating the effectiveness of an intervention, the outcome measure should be clinically relevant and reflect what is useful for the decision makers to know (153, 168). In this thesis, the numbers of gross and net self-reported sick leave days were used to evaluate the effectiveness of the intervention, while the number of registered sick leave days was used for the analysis of the association between work-related stress and future sick leave. The use of self-reported sick leave was justified, as it was then possible to account for sick leave lasting less than 15 days. Due to the risk of recall bias, non-response bias, and group differences in accuracy when using self-reports, the use of register data has been recommended when available (170). However, earlier research has shown good agreement between self-reported and register data capturing sick leave (171).

Sick leave could be superficially regarded as an objective and easily interpretable measure. In addition, sick leave is frequently used as an outcome measure when analysing the association between work-related stress and ill health (121-123). However, as described by the illness–sickness–sick leave trajectory, there are many actions and decisions made along the way that could affect whether the perceived ill health results in sick leave. These decisions are informed by health and treatment concerns, as well as by factors such as ethical organizational culture (172) and sickness insurance regulations (173). Using sick leave as an outcome measure for the evaluation of an intervention can also be difficult in that sick leave is itself a measure used by GPs to treat ill health (Paper II). Danielsson et al. (174) showed that short-term sick leave was also used by patients as a form of self-medication to prevent further ill health. Sick leave can therefore be too blunt an outcome measure of ill health and the effectiveness of interventions (175-177), so it should be complemented with other outcome measures.

Apart from self-reported sick leave days, registered sick leave days, prescription medication, and rehabilitative measures were used in the TIDAS project to evaluate the effectiveness of the brief intervention (1). In addition, other sick leave measures, such as the duration of each sick leave spell (169), could have been used to complement the number of sick leave days, as different sick leave measures could capture different processes (118, 173, 174). Other health measures, such as self-perceived health (20), work capacity (46) and well-being (72), could also have been useful to capture the effectiveness of the brief intervention. However, the outcome measures in this RCT were chosen with great care to capture different aspects important for describing the effectiveness of the intervention. In addition, including more outcome measures was not an option, as collecting self-assessed data might have constituted an intervention of its own, risking the dilution of any effect of the brief intervention. Moreover, in this thesis, having at least one spell of sick leave with a mental or musculoskeletal diagnosis was used to detect differences in sick leave among patients perceiving high and low work-related stress who sought care for different reasons (Paper IV). Using such broad categories as mental and musculoskeletal diagnoses has been questioned, however, due to large differences in the length of sick leave between different ICD-10 chapters (178). Apart from the diagnosis stated in the sickness certificate, there might be additional diagnoses or non-diagnosed illnesses relevant to the perceived stress-related illness (179). In conclusion, the sick leave measures and the measurement techniques were carefully chosen to increase the validity and applicability of trial findings.

6.5 STATISTICAL ANALYSIS

The heterogeneity inherent in clinical trials, especially pragmatic trials, is problematic, as it dilutes the effect of the tested intervention. The sample size therefore must be large enough to detect any differences. Due to the inherent complexity of this trial, the statistical power of the study might have been low (Paper II). As the sample size was calculated for the outcome of number of registered days of sick leave (from day 15 of sick leave), and not for the outcome of number of self-reported sick leave days (from day one of sick leave) as used in this thesis for the evaluation, the power can be questioned. In addition, some patients did not respond at the follow-ups, which reduced the sample included in the analysis and thus also the power. A larger study sample might therefore have been required to account for the reduction in effective sample size and to obtain sufficient statistical power. The relatively small sample size also limited the possibility to perform subgroup analysis. For instance, subgroup analyses of patients perceiving high work-related stress

were performed in Study II, as the effect of the intervention was expected to be more pronounced in this group, but a larger sample of patients with high work-related stress might have been needed to detect any differences between the intervention and control groups.

When studying the association between work-related stress and sick leave it is also important to consider the effect of other factors relating to the individual employee, such as sex, age, and occupational class (45, 51). However, these factors were not found to affect the association examined in this thesis (Paper III). The sample size was a concern for the statistical analyses, as the relatively small sample limited the possibility to perform stratified analysis to detect differences between strata (papers III and IV). The sick leave data strongly deviated from a normal distribution, so non-parametric tests had to be used for the statistical analysis (papers II–IV). The Mann–Whitney U test was used in Study II to test group differences in the number of sick leave days. In addition, logistic regression was used in Study III to analyse the association between work-related stress and sick leave, as it is frequently used in etiological analyses of sick leave data (115, 119, 180). In general, parametric tests are more sensitive and powerful than non-parametric tests, as parametric tests analyse actual data, not ranks, and involve distributional assumptions (181). Hence, the relatively small sample size and the statistical methods that had to be used both contributed to lowering the power.

According to the study protocol (1), the analyses of the effectiveness of the brief intervention were intended to follow the intention-to-treat principle. All patients randomized to either intervention or control groups were then to be included in the analysis without any consideration of protocol deviations, missing outcomes, or anything else occurring after randomization. Using this principle reduces the risk of bias, as no subjective decisions about how to handle protocol deviations have to be made (181). The principle was therefore used when evaluating the main outcome of number of registered sick leave days within 12 months after baseline (3), but not for the additional outcome of number of self-reported sick leave days (Paper II). All patients' participating in the RCT complied to the treatment, as the treatment was conducted during one consultation with a GP soon after the eligible participant was identified and recruited. To account for the non-responders at follow-up in the analysis and ensure the validity of the results, the imputation of missing data was considered. In imputation, the missing data are replaced with values estimated based on the available data. However, no suitable simple or multiple imputation method was found due to the skewness of the self-reported sick leave data and the weak association between prior and later values of self-reported sick leave (182). Patients not taking part at the follow-up were

therefore not accounted for in the analysis. Performing the analysis as per protocol thus deviated from the study protocol.

An important question when analysing the sick leave data in Study III was how to dichotomize the continuous outcome variable. To reflect the sickness insurance legislation, 14 days of sick leave was used as a cut-off point, but choosing a different cut-off could have affected the results. Comparison of the results with other research findings was difficult, as different cut-off points for sick leave have been used in other research. For instance, long-term sick leave has been defined as three or more consecutive weeks of absence (123), sick leave since more than a month (175), or medically certified sick leave with a duration of 60 calendar days or more (119). Furthermore, the multiple ways to operationalize reason for consultation, work-related stress, and sick leave, make comparisons of the association between them even more problematic. In addition, in-between country differences in the legislation and organization of health care and sickness insurance also have to be accounted for (24, 25, 183). In turn, this could complicate discussions of risk factors important for sick leave and of how to prevent and treat stress-related ill health.

7 CONCLUSION AND FUTURE PERSPECTIVES

Overall, the population studied, the preventive approach, and the situated understanding of work-related stress contributed to improved knowledge of how to identify persons at risk of sick leave due to work-related stress. In part, the thesis confirms prior studies of the association between work-related stress and sick leave; it also highlights factors along the illness–sickness–sick leave trajectory deepening the understanding of the relationship between work-related stress and sick leave. The thesis also advances knowledge of primary health care's conditions for working with patients with stress-related problems and of how research and implementation can be conducted in a primary care context. At a more comprehensive level, the thesis advances the discussion of how to conceptualize and measure work-related stress and of how to prevent the negative impact of work-related stress on health.

To conceptualize patients at risk of sick leave due to work-related stress, it is important to consider the varying situations in which the individual and the environment are inseparably united by work. For employed primary health care patients seeking care for mental and physical health complaints, influence at work, indistinct organization and conflicts, individual demands and commitment, as well as the interference between work and leisure time all affect future sick leave. Having an even stronger focus on environmental aspects (e.g., organizational climate) as well as different discourses of work and work-related stress could improve the conceptualization of patients at risk. In addition, accounting for the actions and decisions taken along the illness–sickness–sick leave trajectory could move the conceptualization even further.

The brief intervention was intended to influence GP and patient behaviours, but it could not be shown that the intervention had an effect on future self-reported sick leave among the patients. To influence behaviours such as the GP's daily practices during consultation and the employee's handling of a problematic work situation, multiple factors at the individual, organizational, and societal levels have to be taken into consideration. Despite the commonness of work-related stress and sick leave among the patients, the GPs preferred their regular consultative practice. When deciding whether to use the brief intervention or another similar intervention in practice, the GPs' habitual way of working, the medical-professional logic, the risk of over-diagnosing and medicalizing stress, the available resources, and the sharing of responsibility all have to be considered.

Insufficient resources were considered to not only limit the possibility to care for primary health care patients with stress-related ill health, but could also make GPs question their responsibility for these patients. Joining in the effort is therefore essential for the early identification and treatment of patients at risk of sick leave due to work-related stress. Increased formal and informal collaboration as well as additional primary health care resources are warranted, as is collaboration with other actors such as the Swedish Social Insurance Agency and occupational health care providers. Today, however, there is little incentive to establish such collaborations, since primary health care's preventive work often take second place to the care for more easily visible needs, and there are no guidelines for their preventive work addressing ill health due to stress.

Looking forward, global "megatrends" such as technological progress, climate change, and demographic and societal development will increasingly affect the labor market and occupational structure, and thereby also working conditions. In addition, more unforeseen and rapid changes can develop in times of crisis. It is also important to bear in mind that in Europe, there are structural differences between countries and groups in society, which result in variations in working conditions, stress and ill health. These variations and future changes may affect the focus on workers' health, the scientific work-stress tradition, and the perspectives used to understand work-related stress. Health care is now undergoing a transition to increase patients' and their relatives' participation in care, to make care more accessible and to increase care continuity. With primary care as a hub in health care and with patient needs and conditions in focus, the prerequisites for primary health care's preventive work might be improved. However, the division between labour, health, and social security institutions might impede such efforts. The prevention of ill health and sick leave due to work-related stress therefore needs to be based on an overall strategy in which the responsibilities and roles of different actors are made visible.

This thesis has provided answers to many questions, while posing new questions and opening up new areas to explore. Work-related stress, as measured with the WSQ, was associated with future sick leave among the studied patients. Although the GPs expressed no direct desire to use the brief intervention, they did not exclude that the WSQ might be useful if they could decide for themselves when and how to use it. In addition, improved cooperation and additional resources were requested by the GPs. It would therefore be interesting to investigate whether and how the WSQ could be used by different professions in primary care, as well as whether the WSQ could serve as a cohesive link between different health care professions, employers,

occupational health care, and the Swedish Social Insurance Agency. However, this presupposes that there are relevant plans and guidelines to relate to. The thesis forms part of a continuously changing understanding of work, stress, ill health, and sick leave. Given the structural changes in the labour market and in health care as well as the cultural differences and prevailing discourses, it would be interesting to continue developing the questionnaire. The thesis also highlighted the complexity and limited opportunities to carry out research in primary health care. Another interesting question is how to improve the conditions for research in primary health care, especially regarding a topic and frame of reference that is not in line with its main area of work.

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APPENDIX

I. THE WORK STRESS QUESTIONNAIRE

The Work Stress Questionnaire (WSQ) is a self-assessment questionnaire measuring perceived work-related stress. The 21 questions are grouped in four dimensions:

- **Influence at work**, including four items answered with the alternatives "Yes, always", "Yes, often", "No, rarely" or "No, never".
- **Indistinct organization and conflicts**, including seven items answered with the alternatives "Yes", "Partly", or "No".
- **Individual demands and commitment**, including seven items answered with the alternatives "Yes", "Partly" or "No".
- **Work interference with leisure time**, including three items answered with the alternatives "Yes, always", "Yes, often", "No, rarely" or "No, never".

Each question included in the two dimensions Indistinct organization and conflicts and Individual demands and commitment has the supplementary question "Do you perceive that as stressful?" with four alternative answers: "Not stressful", "Less stressful", "Stressful", and "Very stressful". Thereby, two additional dimensions are formed: **Perceived stress due to indistinct organization and conflicts** (seven items) and **Perceived stress due to individual demands and commitment** (seven items).

The perceived work-related stress is calculated by using the values behind each answer in the questionnaire, see below. The median is calculated for four of the dimensions:

- Influence at work, item 1-4.
- Perceived stress due to indistinct organization and conflicts, item 5b-11b.
- Perceived stress due to individual demands and commitment, item 12b-18b.
- Work to leisure time interference, item 19-21.

The median is the central value, when the values are sorted from the smallest to the largest. When the median is calculated for an even number of items, the higher of the two in the middle is used.

Table 1. *Summary of self-assessed work-related stress as measured with the Work Stress Questionnaire (WSQ).*

Dimension	**Sorted values**							**Median**
Influence at work (four items)								
Perceived stress due to indistinct organization and conflicts (seven items)								
Perceived stress due to individual demands and commitments (seven items)								
Work interference with leisure time (three items)								

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01. Do you have time to finish your assignments?	□ Yes, always □ Yes, rather often □ No, seldom □ No, never	1 2 3 4
02. Do you have the possibility to influence decisions at work?	□ Yes, always □ Yes, rather often □ No, seldom □ No, never	1 2 3 4
03. Does your supervisor consider your views?	□ Yes, always □ Yes, rather often □ No, seldom □ No, never	1 2 3 4
04. Can you decide on your work pace?	□ Yes, always □ Yes, rather often □ No, seldom □ No, never	1 2 3 4
05a. Has your workload increased?	□ Yes □ No – if no, go to question **06a**	0 1
05b. If yes: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
06a. Are the goals for your workplace clear?	□ Yes – if yes, continue to question **07a** □ Partly □ No	1 0 0
06b. If partly or no: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
07a. Do you know which assignments your work tasks include?	□ Yes – if yes, continue to question **08a** □ Partly □ No	1 0 0
07b. If partly or no: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
08a. Do you know who is making decisions concerning your workplace?	□ Yes – if yes, continue to question **09a** □ Partly □ No	1 0 0
08b. If partly or no: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
09a. Are there any conflicts at work?	□ Yes □ No – if no, continue to question **10a**	0 1
09b. If yes: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4

10a. Are you involved in any conflicts at your workplace?	□ Yes □ No – if no, continue to question **11a**	0 1
10b. If yes: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
11a. Has your supervisor done anything to solve the conflicts?	□ Yes – if yes, continue to question **12a** □ Partly □ No	1 0 0
11b. If partly or no: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
12a. Do you put high demands on yourself at work?	□ Yes □ No – if no, continue to question **13a**	0 1
12b. If yes: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
13a. Do you often get engaged in your work?	□ Yes □ No – if no, continue to question **14a**	0 1
13b. If yes: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
14a. Do you think about work after your working-day?	□ Yes □ Partly □ No – if no, continue to question **15a**	0 0 1
14b. If yes or partly: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
15a. Do you find it hard to set a limit to work assignment although you have a lot to do?	□ Yes □ Partly □ No – if no, continue to question **16a**	0 0 1
15b. If yes or partly: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
16a. Do you take more responsibility at work than you ought to?	□ Yes □ No – if no, continue to question **17a**	0 1
16b. If yes: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4

17a. Do you work after ordinary working hours to finish your assignments?	□ Yes □ Partly □ No – if no, continue to question **18a**	0 0 1
17b. If yes or partly: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
18a. Do you find it hard to sleep because your mind is occupied with work?	□ Yes □ Partly □ No – if no, continue to question **19**	0 0 1
18b. If yes or partly: Do you perceive that as stressful?	□ Not stressful □ Less stressful □ Stressful □ Very stressful	1 2 3 4
19. Due to work, do you find it hard to find time to be with your nearest?	□ Yes, always □ Yes, rather often □ No, seldom □ No, never	4 3 2 1
20. Due to work, do you find it hard to find time to be with your friends?	□ Yes, always □ Yes, rather often □ No, seldom □ No, never	4 3 2 1
21. Due to work, do you find it hard to find time for your recreational activities?	□ Yes, always □ Yes, rather often □ No, seldom □ No, never	4 3 2 1