Swedish Agency for Work
Environment Expertise

Risk and health-promoting factors in the healthcare sector

– organisational factors of importance to the health of employees

Systematic literature review 2023:11

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Foreword

This systematic literature review is part of the agency's reporting on its government assigned task to "collect and compile knowledge about work environment risks and health-promoting factors among healthcare professionals" (Ref. No. S2021/06572 [in part]).

Organisational factors often affect the demands and resources that employees encounter in their work. Thus, it is no exaggeration to say that organisational work environment risks and health-promoting factors can directly and indirectly affect employees' health and help to promote or prevent a sustainable and healthy working life. When it comes to issues related to such aspects as skills supply and skills development in the healthcare sector, such knowledge is crucial. This systematic literature review aims to increase knowledge about how organisational factors affect the health of professionals in the healthcare field. With the support and guidance of this knowledge, there is a good chance of even more successfully developing work environment management for these employees.

The authors of the report are Associate Professor Magnus Åkerström; Anna-Carin Fagerlind Ståhl, M.D.,and Associate Professor Agneta Lindegård Andersson of the Institute of Stress Medicine, Region Västra Götaland; Associate Professor Jens Wahlström of the Section of Sustainable Health at Umeå University's Department of Public Health and Clinical Medicine, and Associate Professor Inger Arvidsson of Lund University's Division of Occupational and Environmental Medicine. The authors of this systematic literature review have chosen their own theoretical and methodological starting points and are responsible for the results and conclusions presented in the report.

Associate Professor Andrea Eriksson of the Division of Ergonomics at KTH Royal Institute of Technology has reviewed the quality of the report on behalf of the Swedish Agency for Work Environment Expertise. The responsible process manager at the agency has been Thomas Nessen, Ph.D., and the responsible communicator was Kristin Nylander.

I would like to extend my sincere thanks to our external researchers and quality reviewers, as well as to the agency's employees who contributed to the production of this valuable report. The report is published on the agency's website and in the "Systematic literature review" series.

Gävle, November 2023

Nader Ahmadi, Director-General

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Summary

The Swedish Government has tasked the Swedish Agency for Work Environment Expertise to collect and compile knowledge about work environment risks and health-promoting factors among healthcare professionals. The Government task is underpinned by an ambition to offer everyone a sustainable, safe and healthy working life, including through a good work environment.

The purpose of this systematic literature review is to obtain an overall picture of Nordic research on the work environment and the health of healthcare professionals, and to thereby identify risk and health-promoting factors. The focus is on health-related risk and health-promoting factors at the organisational level, i.e., an organisation's structure, principles of work or production, and values.

The goal is for the systematic literature review to serve as a support in work environment management and in practical efforts to prevent illness and promote well-being in healthcare organisations.

We currently have good knowledge of what constitutes work-related risk and health-promoting factors at the workplace level, especially with regard to the factors that increase the risk of illness and disease, but also about what promotes positive experiences associated with the work environment. In summary, high job demands and insufficient resources at work lead to an increased risk of illness. High job demands and insufficient resources can be said to be risk factors at the workplace level, i.e., where tasks are performed and social interactions take place. Conversely, the presence of resources such as social support and perceived autonomy increases the likelihood of well-being, motivation and job satisfaction. Thus, these constitute health-promoting factors at the workplace level. The relationship between job demands and resources, as well as the health of employees, transcends the boundaries of nations, professions, backgrounds, education, or anything else that might seem to distinguish any one person from another on an individual level. On the other hand, these relationships vary across occupations and groups, both in terms of the demands and resources that are present in the work environment and the extent to which these affect employees.

In the healthcare sector, occupational demands or risk factors relate, for example, to emotionally demanding work and work in which various values are in conflict with each other. Yet work that entails heavy lifting and static postures is also fraught with demands and risks. We currently have access to a wealth of past research that focuses on the health and work environment of healthcare professionals.

As a background to this systematic literature review, we have reviewed some of the systematic literature reviews conducted in recent years, wherein the focus has

been on the work environment of healthcare professionals and its connection to health and well-being. We have also summarised existing knowledge about risk and health-promoting factors in the healthcare sector. The summary shows that risk and health-promoting factors are often investigated at the workplace level and comprise various types of demands and resources inherent in the responsibilities and social aspects of work in this sector.

Organisational risk and health-promoting factors emerge more sporadically, for example, in terms of how care is designed and shifts are staffed.

The summary of the previous reviews also reveals that the risk and health-promoting factors in the work environment of healthcare professionals are similar to those of other occupational groups. Moreover, in terms of sickness absence, exhaustion, depression, pain and physical illness, the risk factors pose the same threat to healthcare professionals as they do to the rest of the country's working population. Furthermore, access to a range of resources constitutes a health-promoting factor at the workplace level, and the presence of health-promoting factors promotes engagement, job satisfaction and well-being among employees in this sector, just as it does for the rest of the working population.

This systematic literature review focuses on identifying risk and health-promoting factors at an organisational level, because this level has been the subject of significantly less research than risk and health-promoting factors at the individual and workplace level. Here we define the organisational level as the level at which decisions are made about the organisation's structure, principles for work or production, and the values that should underpin the work. It is at the organisational level that conditions are created, rules are established, and the game plan for the work is defined. Thus, this level plays a key role in the risk and health-promoting factors that exist at the workplace level. By focusing on risk and health-promoting factors at the organisational level, it becomes possible to identify the underlying causes of the challenges in the work environment that are present at the workplace level. It is then possible to eliminate causes of illness, and the organisation also gains the opportunity to provide the necessary resources to ensure the well-being and health of its employees.

Method

This systematic literature review is based on an analysis of studies from the Nordic countries published in peer-reviewed journals between 2016 and 2022. The included studies examined the relationship between health and illness in relation to risk and health-promoting factors at the organisational level, or employees' experiences of these factors.

Once all duplicates were excluded, the searches yielded 2,677 articles. Each article summary was reviewed by two researchers who independently assessed whether the study was relevant to the purpose of the systematic literature review and whether it met the criteria for inclusion. This process resulted in the exclusion of 2,302 articles. The remaining 375 articles were then reviewed in

their entirety. When the reviewing researchers disagreed, a third researcher read and assessed the article, following a general discussion in the working group. Of the reviewed full-text articles, 280 were excluded due to lack of relevance, mainly because they did not investigate a relationship between an organisational risk or health-promoting factor and employee health, or because the study was conducted on a non-Nordic study population. In the end, 95 studies were found to be relevant and of sufficient quality.

Results

Most of the studies had a cross-sectional, cohort-based or qualitative design and examined organisational risk and health-promoting factors for registered nurses or unspecified healthcare professionals, and included a wide range of outcomes related to mental and physical illness, health and well-being. The results illustrate the breadth of organisational risk and health-promoting factors that affect healthcare professionals on a daily basis.

Risk and health-promoting factors at the organisational level

To gain an overview, we categorised the studies based on which aspects of risk and health-promoting factors in a healthcare organisation were examined.

This resulted in the following five categories:

- distribution of working time schedules
- design of operations and working methods
- ergonomic preconditions
- terms of employment and personnel policy
- the organisation's ethical environment

Within these categories, a wide range of risk and health-promoting factors and health outcomes are represented.

In the *distribution of working time schedules* category, we identified risk factors in terms of how the organisation had chosen to staff and distribute shifts and working hours among existing employees – more specifically, whether its distribution of working time schedules involved short rest periods between shifts, long shifts, or long working weeks, but also whether it assigned continuous or long-term night and shift work.

The organisation's s *design of operations and working methods* relates in various ways to the health and well-being of employees, for example, through the degree of solitary and collaborative work, as well as the way in which the organisation has chosen to measure quality and performance.

The existence (or non-existence) of *ergonomic preconditions* that reduce unfavourable workload and the risk of injury, facilitate work, and make it safer, is also an organisational issue. The insufficient optimisation of workload-related

strain in individual work tasks entails risk factors, whereas health-promoting factors can be found in providing and facilitating (at the organisational level) the use of various aids to reduce strain (mental, cognitive and physical) and risk of injury.

The terms of employment and personnel policy category includes studies that have examined the terms on which the organisation chooses to employ staff and how they take care of and support these employees. For example, these studies (which adopt a range of approaches) demonstrate that job security and monetary rewards were positively related to well-being.

The organisation's ethical environment concerns the conditions in which employees perform their work in accordance with their own fundamental values regarding what constitutes good care, as well as those of their profession. Among other things, the studies in this category examine how the organisation ensured that sufficient resources were available to employees to enable them to carry out their work with what is perceived to be a reasonable level of quality.

Overall patterns in the results, and how the knowledge can be translated into practice

In terms of the translation of knowledge from this review into preventive, practical work, our results can give employers and decision-makers an idea of the risk and health-promoting factors that need to be monitored and taken into account in their systematic work environment management. Within the five categories, we further identified two overarching patterns or themes that highlight the collaborative perspectives of the organisation of the healthcare sector that managers and decision-makers should consider in their efforts to manage risk and health-promoting factors in practice.

The first theme emphasises how risk and health-promoting factors are inherent in the organisation's efforts to control and manage the work to meet its goals. These efforts include the organisation's distribution of work, management, staffing and the provision of aids and support, as well as its expression of specific values and priorities regarding its operational goals. The second overarching theme illustrates how the many ways in which an organisation communicates to its employees (often implicitly), as well as what it communicates, entail risk and health-promoting factors. These are associated with both the value the organisation places on its employees and to the ability of employees to do their jobs with a level of quality they consider reasonable. This means that healthcare managers and decision-makers should ensure that staffing, the distribution of working time schedules, and their choice of working methods ensure that there are sufficient staff to meet society's needs for healthcare and that their operations are designed in a way that ensures that their organisation can fulfil its mission. Yet it is equally important that management and decision-makers ensure that healthcare professionals are not exposed to the risk of illness and that they have the opportunity to conduct their work with a level of quality that accords with their fundamental values regarding what constitutes good care. Furthermore, management and decision-makers should ensure that working methods, aids

and work premises enable employees to perform their work in a manner that is satisfactory to both patients and employees.

The terms and conditions of employment and work must meet the organisation's need for flexibility while also ensuring sufficient security to meet the employees' need to feel a sense of security and value. Finally, the organisation should have an ethical environment that permeates its work and takes into account how employees are affected by care priorities.

In addressing any deficiencies in the organisation's conditions, management, together with a working group, should investigate and assess whether the organisational conditions of the enterprise entail a risk to the health of its employees. Management and working groups should also investigate the possibility of promoting health. They can start by looking beyond the work environment's existing demands and resources, to how the work is organised. They can then consider how the resulting factors shape the work environment and promote employees' health and well-being.

Conclusions

It is mainly at the organisational level that there are opportunities to not only manage but also to eliminate risks in the work environment, and it is here that there is an opportunity to actually create the conditions for a health-promoting work environment. The results show that in the Nordic countries, it is still relatively uncommon to focus on the organisational level in relation to employees' health and illness. If the work environment for healthcare professionals is to be improved, the organisational level must be emphasised. That said, there is already good knowledge about how the work environment in the healthcare sector can be made more health conscious and attractive. This applies above all to workplace demands and resources, an area in which there is good knowledge about what can be done in practice to improve the work environment in the Swedish healthcare sector. Thus, the focus should not only be on producing new knowledge, but also on using existing knowledge.

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Key terms

The following key terms are used in the report:

Illness encompasses diagnosed disease, reduced ability/function and subjective discomfort.

Health includes experiences of well-being, satisfaction, motivation and good ability/function.

Demands are the mental, physical, social or organisational aspects of work that involve physical or mental strain. Examples include time constraints, workload and physical or mental exertion.

Resources are the mental, physical, social or organisational aspects of work that are helpful in achieving the work goals, or which themselves play a motivating role. Examples include autonomy, social support, recognition, perception of justice, opportunities for development and learning, as well as access to tools and working methods.

Risk factors are working conditions that increase the likelihood of illness among employees or reduce the likelihood of good health.

Health-promoting factors are working conditions that increase the likelihood of good health among employees or reduce the risk of illness.

The *workplace level* is the level at which day-to-day work is conducted and social interactions between employees and managers take place. Workload and time constraints are examples of workplace demands. Social support and perceived autonomy are examples of workplace resources. Heretofore, research has mainly focused on this level.

The *organisational level* includes an organisation's structure, principles of work or production, and values. It is at this level that the underlying causes of demands and resources at the workplace level can be uncovered.

1. Introduction

The Swedish Government has tasked the Swedish Agency for Work Environment Expertise to collect and compile knowledge about work environment risks and health-promoting factors among healthcare professionals. The Government assigned task is underpinned by an ambition to offer everyone a sustainable, safe and healthy working life, including through a good work environment.

The purpose of this systematic literature review is to obtain an overall picture of current Nordic research on the work environment and the health of healthcare professionals, and to thereby identify risk and health-promoting factors at the organisational level. The goal is for the systematic literature review to serve as a support in work environment management and in practical efforts to prevent illness and promote well-being in healthcare organisations.

This systematic literature review presents a systematic literature search and review that compiles research on organisational risk and health-promoting factors in the healthcare sector. This type of study does not entail any weighted evidence assessment of the conclusions of the included studies; rather, it aims to gain an overview of the knowledge in a certain field or regarding a specific research question. The systematic literature review includes studies from the Nordic countries published in peer-reviewed journals between 2016 and 2022.

It starts by describing the background to the review and defining key terms in the field of work environment and health. It also summarises the existing knowledge about risk and health-promoting factors in the healthcare sector and describes the concepts of *organisational level and workplace level* in greater detail.

This is followed by a method chapter that describes the approach of the literature search of studies that have investigated the relationship between organisational risk and health-promoting factors and the health of employees in the healthcare sector.

The results are then presented, and the systematic literature review ends with a discussion of insights and conclusions, as well as a section that addresses the need for further knowledge.

2. Background

Here we present the current state of knowledge about risk and health-promoting factors at work, both for the working population in general and for healthcare professionals specifically. Risk and health-promoting factors in the workplace and organisational levels are defined, and the focus on organisational risk and health-promoting factors is justified

A good work environment is more than a statutory or moral obligation on the part of an employer. It is also a means of motivating, attracting and retaining staff and has an impact on the quality of the product or service delivered. In many ways, a good work environment is key to a functioning healthcare system, not least in light of the challenges of attracting and retaining staff. Demographic changes, which mean that the number of older people is increasing in relation to people of working age, are creating a demand for labour. At the same time, it has become increasingly difficult for healthcare providers to attract and retain skilled staff (1). To both retain existing staff and attract future employees, healthcare professionals must be organised in a way that actively and clearly protects and values their employees. To achieve this, knowledge of health-related work environment risk and health-promoting factors is needed at the organisational level.

The importance of the work environment for employees' health

The work environment is key to health and well-being. We spend most of our waking hours at work. Thus, it is mostly in the work environment that we are offered opportunities to contribute, perform and develop. But this is also where we are exposed to risks, not least in terms of overloading both our bodies and our minds. This can result in negative effects such as workload-related injuries and exhaustion.

Our work affects us, and how it affects us largely depends on the organisational and social work environment, i.e., the terms and conditions of the work (2).

By now, a wealth of knowledge regarding the importance of the work environment for health and illness has been accumulated, vetted and, not least, has resulted in a long list of promising targets for health promotion and prevention (3).

Theories about the significance of work on experiencing stress and illness, as well as regarding motivation and well-being, have been developed in parallel with the compilation of this knowledge. It has also led to models that summarise the research and theories, and which offer support for modifying the work environment to prevent illness and promote health. One of the previous theories is the job demand-control-support model. It is based on stress theory and focuses

on the consequences of the demands that work places on employees in relation to the opportunities they have to influence their work situation and use their skills, and the workplace-based support available to them from, for example, colleagues. (4).

The more recent effort-reward imbalance model (5) views work as a social contract between the employee and the employer. It is based on the idea that to avoid illness, the rewards of the work (in the form of both pay but also recognition and respect) must fairly outweigh the effort that it demands. In the job demands-resources model (6), on which our Swedish work environment regulations are based, the factors that affect us in the workplace are divided into the demands that the work imposes on employees in relation to the resources available to them (see below). Existing research in the field confirms that high job demands in combination with low levels of control and social support, a work situation in which effort is not compensated by reasonable rewards, and the perception that resources are insufficient or that resources and respect are distributed unfairly among employees in the organisation, all increase the risk of illness in terms of, for example, exhaustion and depression (7), cardiovascular disease (8) and neck and back problems (9).

Counteracting illness and promoting health through the job demands and resources of the work

Illness can be defined as a condition that deviates from what is statistically normal and involves obstacles and discomfort. Health is not just the absence of illness. Health is often described as a continuum along which an individual can move between varying levels of health over time. Theoretically, health could also be defined as a state in which a person can handle everyday life and different situations so well that they can achieve (within reason) what they consider to be important and experience some sort of sense of well-being (10). The promotion of health and well-being thus demands more than the mere prevention of disease, sick leave and illness. Health promotion entails facilitation and organisation that lead to well-being and an ability to function well. In practice, health is often defined in a working life context as subjective experiences of well-being or job satisfaction, but is also described in terms of motivation and engagement. Exhaustion/burnout has become one of the biggest problems in the field of work-related illness (11).

Engagement and motivation are seen as its opposite. This is based on theories that explain our actions based on a basic human need for various resources for survival and well-being, and thus the motivation to accumulate them (12). Not only does a focus on resources explain motivation through our drive to collect and preserve them, but also how stress can occur. From a resource perspective, stress occurs when valuable resources such as reputation, employment or autonomy are threatened, or when resources are simply denied, despite our best efforts (12). Yet what it is that constitutes an ideal level of engagement, i.e., a

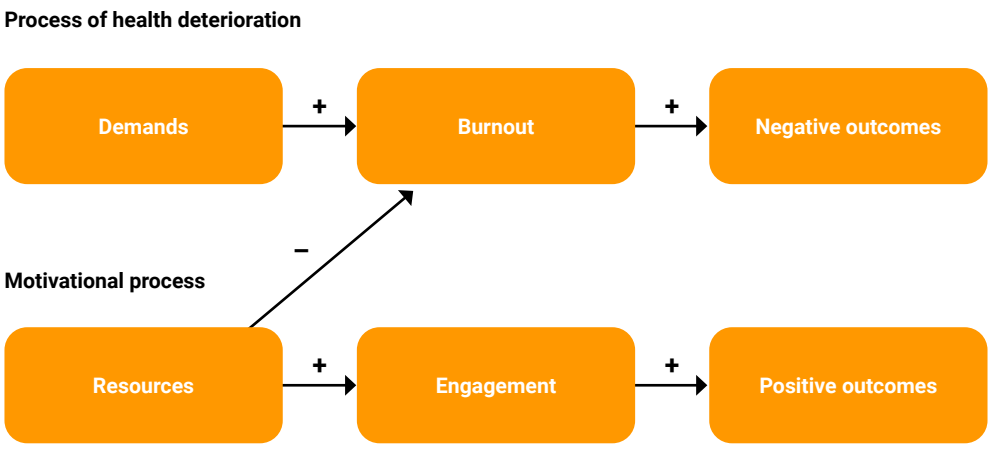
positive expression of well-being, without it turning into a risk of illness in the form of, for example, exhaustion, is debatable. For example, over-engagement is considered a risk factor for stress-related illness (13). Indeed, it is also debatable whether engagement and motivation to work should be regarded as a measure of health at all (14). Research has a tradition of focusing on the risk of illness in the work environment rather than factors that promote health – perhaps because it is easier to observe, measure, count and concretise, for example, injuries, diagnoses or days of sickness absence.

In recent years, the focus has shifted from illness and disease towards positive outcomes such as motivation, engagement and job satisfaction, as well as those workplace factors that not only counteract illness and disease but also actively promote health.

To promote health, we cannot limit ourselves to the causes of stress; we must also investigate what it is that contributes to satisfaction – and thus what drives or motivates people and contributes to their sense of well-being. This could be resources such as physical objects (e.g., aids and tools), social conditions (such as a secure job or supportive relationships), different kinds of skills, or knowledge (12).

The job demands-resources model (6) has embraced the resource perspective and describes how demands and resources initiate two different processes that either undermine health or promote well-being (Figure 1).

Figure 1: The job demands-resources model. The presence of demands and the absence of resources increases the risk of illness in a process of health deterioration, while resources increase the likelihood of well-being in a motivational process. Finally, these processes can lead to positive or negative outcomes for the organisation. From Schaufeli, 2017 (15).



These demands and resources are primarily identified at the workplace level. According to the model, demands consist of mental, physical, social or organisational aspects of the work that require sustained mental or physical strain and threaten to cause illness in a process of health deterioration. Resources are psychological, physical, social or organisational aspects of the work that enable it to be performed and for its goals to be achieved. Not only are they helpful in managing demands, they also encourage development and growth and promote well-being in a motivating process. A number of studies that have followed employees over time confirm that high job demands and insufficient resources increase the risk of illness, not least of exhaustion, and that the presence of resources acts as a motivator and increases the chance of work-related well-being, for example, in the form of engagement (16).

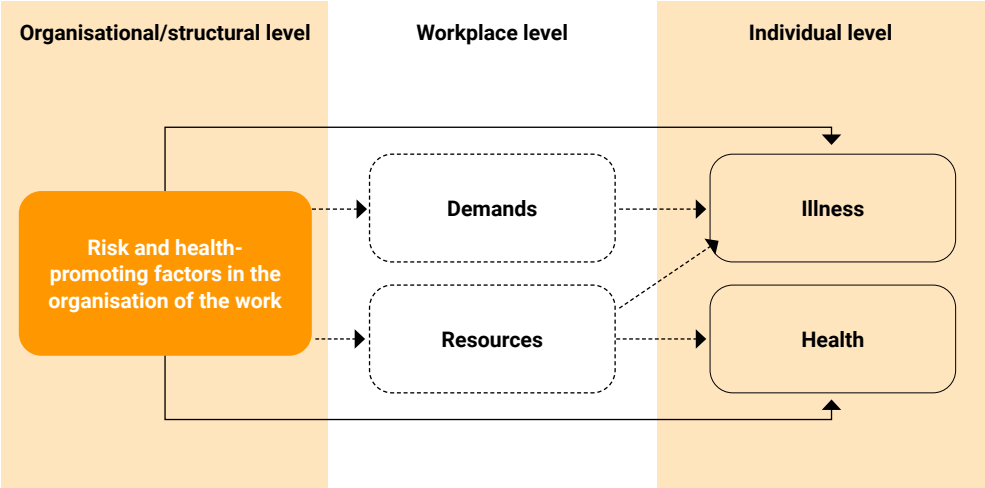
Underlying reasons for demands and resources at work can be found at the organisational level

It is seldom sufficient to know about job demands and resources and the importance of the work environment for health and illness. The knowledge *that* something constitutes a risk and should be changed, or that a resource should be provided, does not automatically imply any knowledge of *how* this should be done. Regardless of how much knowledge has been accumulated about the importance of the work environment for our health, it seems to be undeniably more difficult for employers to know how to create a work environment that does not risk leading to disease and illness, and that even promotes well-being and engagement. The organisational work environment discussed in the Swedish Work Environment Authority's provisions (2) comprises management and governance, communication, participation, decision latitude and distribution of tasks, as well as demands, resources and responsibilities. These can largely be said to constitute workplace-level factors. The concept of the *organisational work environment* should be interpreted here as the sum of the risk and health-promoting factors resulting from an organisation's actions, rather than from the reactions of an individual employee, which the similar concept of the psychosocial work environment could bring to mind.

Although many risk and health-promoting factors are the product of workplace decisions, the decisions made at a higher organisational level within an organisation affect the conditions that exist at the workplace level. Employees' health, as well as workplace demands and resources, can be affected by an organisation's structure, governing principles, and the models used to organise the work, as well as by the values that senior management describes and communicates in various ways. For example, an organisational structure in which there are few managers and therefore a large number of employees per manager means less opportunities for managers to exercise "present leadership" (17). In this example, the structure of the organisation affects leadership at the workplace level which, in turn, is important for the health and well-being of employees (18). An organisation that has adopted principles that entail a high level of standardisation

of working methods, for example, through the introduction of work processes characterised by customer orientation, process flows and the continuous improvement of work processes, risks reducing resources such as room for decision-making or autonomy at the workplace level (19) which, in turn, can lead to an increased risk of stress-related illness. Values are communicated through what the organisation rewards and prioritises, for example, the terms and conditions that apply to employees in various occupational categories, how much focus there is on cost-effectiveness, (care) quality and the well-being of staff, or how the organisation chooses to set schedules and invest in staffing and ergonomic aids. These can be said to be *organisational risk and health-promoting factors* (Figure 2).

Figure 2. Organisational risk and health-promoting factors and their relationship to health outcomes at the individual level, directly or through job demands and work resources.



By focusing on risk and health-promoting factors at the organisational level, it becomes possible to identify the reasons behind problems in the work environment and eliminate them – as well as to see what factors create resources and well-being, and reinforce them. A focus on workplace demands and resources often means that risks are *managed,* for example, with protective equipment or training, rather than *eliminated.*

Risk and health-promoting factors at the organisational level can affect health and illness both directly and through changes in the job demands and resources at the workplace level (see Figure 2). For example, the motivation of healthcare professionals is *directly* affected by the ability of employees to identify with the values of the organisation (20). On the other hand, the health of home care staff is *indirectly* affected by their job demands and work resources when the job demands increase because the organisation does not prioritise the hiring of temporary staff in the event of sick leave (21). Likewise, registered nurses' job satisfaction is *indirectly* affected by how the organisation shares information and offers support which, in turn, affects the demands placed on them and the resources at their disposal (22). In this systematic literature review, the focus is

on research that has identified organisational risk and health-promoting factors that are directly related to the health and illness of healthcare professionals.

Previously compiled knowledge about risk and health-promoting factors in the healthcare sector

There is already good knowledge about how the work environment can be made more health promoting and attractive. As described above, high job demands and insufficient resources increase the risk of illness. These can be said to be workplace-level risk factors.

Good access to resources increases the likelihood of well-being, motivation and job satisfaction. Resources (of various kinds) can be said to constitute workplace health-promoting factors.

The relationship between job demands and resources on the one hand and health on the other is relatively universal. It transcends the boundaries of nations, professions backgrounds, education or anything else that might seem to distinguish any one person from another on an individual level. In other words, high job demands and insufficient resources increase the risk of illness among employees in all sectors, not just the healthcare sector. However, these relationships vary across occupations and groups, both in terms of the job demands and resources in the work environment and the extent to which these affect employees (6).

Healthcare: like any other profession, but not

As a background to this systematic literature review, we have reviewed some of the systematic literature reviews conducted in recent years, wherein the focus has been on the work environment of healthcare professionals and its connection to health and well-being. We have also summarised existing knowledge about risk and health-promoting factors in the healthcare sector. The summary shows that even before this systematic literature review was conducted, there was already a wealth of research that focused on the work environment and health of healthcare professionals. The summary also indicates that risk and health-promoting factors are often investigated at the workplace level and comprise various types of job demands and resources inherent in the responsibilities and social aspects of work in this sector.

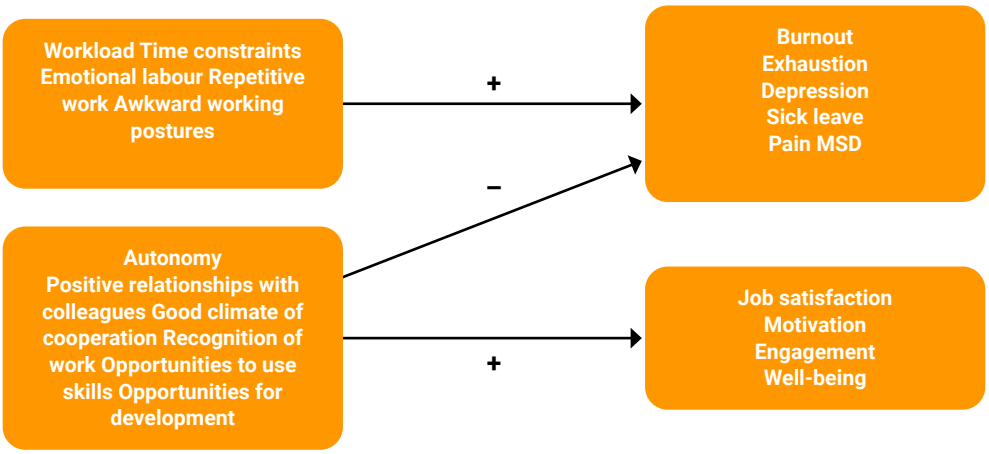
Organisational risk and health-promoting factors emerge more sporadically, for example, in terms of how care is designed and shifts are staffed (Table 1).

Table 1. A selection of recent compilations of risk and health-promoting factors in the work environment of healthcare professionals, in which both workplace and organisational risk and health-promoting factors have been investigated.

Reference	Profession	Number of included articles	Health/illness and related factors at work
Perreira et al., 2016 (20)	Healthcare professionals	25	**Work motivation** relates to work performance, organisational justice, salary, status, social relationships at work, autonomy, identifying with the organisation, education, and the meaningfulness of the work.
Jokwiro et al., 2022 (23)	Healthcare professionals	24	**Stress of conscience** is associated with the workplace culture and environment, stress and quality of care, and can potentially be reduced through patient-centred care.
Jacquier-Bret & Gorce, 2023 (24)	Healthcare professionals	36	The most common causes of **musculoskeletal disorders** are repetitive and prolonged work in awkward postures.
Basu et al., 2017 (25)	Emergency healthcare professionals	25	**Stress** is associated with high job demands and a low level of control, inadequate support at work, an imbalance between effort and reward, and organisational injustice.
Schneider & Weigl, 2018 (26)	Emergency healthcare professionals	39	A large number of factors at work are related to **mental illness and well-being**. The strongest associations identified were to organisational and social factors such as support, reward systems and well-functioning organisational structures.
Omobolaji Alabi et al 2021 (27)	Healthcare professionals working in the field of oncology	17	Risk factors for **burnout** include long days, a high level of patient contact, high administrative workload, time constraints and limited autonomy, as well as insufficient free time in the schedule.
Singh et al., 2020 (28)	Healthcare professionals working in the field of psychiatry	15	The risk **of exhaustion** is increased by strain such as trauma, high workload and the type of enterprise. This risk is reduced by support from managers, colleagues and the organisation.
O'Connor et al., 2018 (29)	Healthcare professionals working in the field of psychiatry	62	**Burnout** is primarily associated with workload and social relationships at work. Role clarity, autonomy, the sense of being treated fairly, and access to clinical supervision can protect against burnout.
Grönoset Grasmo et al., 2021 (21)	Healthcare professionals working with home help	27	Physically strenuous work, organisational conditions and an unpredictable and changing work environment are the main **health risks.**
Lietz et al., 2018 (30)	Healthcare professionals working in the field of dentistry	30	Risk factors for **musculoskeletal disorders and pain** are caused by awkward working postures, a large number of patients, administrative work, vibration, and repetitive work.
Lönnqvist et al., 2022 (31)	Registered nurses	35	Organisational justice is important for **health and well-being.**
Brborovic et al., 2017 (32)	Registered nurses	13	A large number of factors are associated with **sickness absence**, including high workload and insufficient social support. High job demands are associated with sickness presenteeism.
Zangaro & Soeken, 2007	Sjuksköterskor	31	Arbetstillfredsställelse är negativt relaterat till stress, och positivt relaterat till autonomi och samarbete mellan sjuksköterskor och läkare.
(33)	Registered nurses	31	**Job satisfaction** is negatively related to stress, and positively related to autonomy and collaboration between registered nurses and physicians.
Dall'Ora et al., 2020 (34)	Registered nurses	91	The risk of **burnout** increases with a high workload and time constraints, value incongruence, low level of control, insufficient support from colleagues and managers and a lack of collaboration with physicians, inadequate rewards, insufficient staffing, shifts exceeding 12 hours, limited scheduling flexibility, and uncertain employment conditions.
Keyko et al., 2016 (22)	Registered nurses	18	**Work engagement** is related to a variety of factors that can be categorised as organisational climate, resources at the workplace and professional level, and job demands (negative association).
Le Floch et al., 2016 (35)	Physicians	17	**Job satisfaction** is associated, inter alia, with workload and income, responsibility and recognition.
McCormack et al., 2018 (36)	Psychologists	29	Workload and type of enterprise were the main risk factors for **burnout**.

The previously compiled knowledge indicates that healthcare professionals have similar risk factors for sickness absence, exhaustion, depression, pain and physical illness as the working population in general, and that similar resources promote engagement, job satisfaction and well-being. However, in addition to general job demands and resources, there are certain risk and health-promoting factors that are more specific to healthcare, partly because of how operations are organised, and partly due to the purpose of the conducted activities or work (Figure 3). For example, in healthcare, collaboration across professions with different formal and informal hierarchical status is often required. The work largely involves caring for sick and vulnerable people, with all the emotional strain that this can entail. Ultimately, the operations of healthcare organisations are politically controlled, and value conflicts may arise when cost-effectiveness must be weighed against the provision and quality of care. There is a risk that the work environment and quality of care will be affected by requirements for measurements and follow-ups of efficiency and quality. The fact that many healthcare organisations are open around the clock, every day of the year, poses challenges in terms of how shifts and working hours are distributed among the staff.

Figure 3. Examples of workplace risk and health-promoting factors that have been identified in healthcare organisations. For references and further description, see Table 1.



Perhaps the most pronounced connection is the one between job demands and resources on the one hand, and health and illness on the other – for health professionals and for other occupational groups. A number of systematic literature reviews all conclude that high job demands increase the risk of burnout, exhaustion, depression and sick leave, including in the healthcare sector (26, 27, 32, 34, 36, 37). In this context, high job demands means a high workload, mentally taxing work and time constraints. Exposure to trauma, threats and violence also increases the risk of, for example, burnout and depression among healthcare professionals (26). Job demands can also refer to physical strain. A high level of physical strain, such as strain resulting from static work, repetitive task and awkward working postures increases the risk of musculoskeletal disorders, pain and other maladies, not least for surgeons, dental staff and registered nurses – and the greater the number of patients and the higher the workload, the greater the risk (24, 30).

The risk of illness (21, 25, 27, 29, 34) and sickness absence (32, 37) increases with a lack of resources, such as few opportunities to influence own work and use own skills, insufficient support from colleagues and managers, or inadequate rewards in terms of, for example, respect, recognition or career opportunities.

Health-promoting factors that promote job satisfaction, motivation, engagement and well-being of healthcare professionals have been identified in resources such as autonomy and positive relationships with colleagues (20, 33), recognition of own work and opportunities to use skills, develop professionally and do a good job (22, 35), as well as organisational justice (20, 31). Among emergency personnel, a high level of autonomy, support and equity are among the resources that reduce the risk of developing illnesses such as exhaustion (28, 29, 36), and access to assistive technology constitutes a resource that reduces the risk of musculoskeletal disorders and injuries (38).

For many occupational groups, some aspects of the healthcare sector lie at the very core of the profession, namely, caring for the health of fellow human beings, feeling and showing empathy for others, and encounters with suffering and even death.

Many healthcare professionals are exposed to high emotional demands. Feelings of sympathy and empathy with patients, clients and relatives are inevitable, and can even be said to be fundamental to the work (28, 29). Employees must actively manage and regulate their own emotions while acting professionally and taking care of other people and their emotions. This emotionally demanding work (39) has been shown to increase the risk of exhaustion and burnout (25, 28, 36). Literature compilations also indicate that the risk of burnout increases with the ethical stress that arises when – often conflicting – expectations and values are expressed from different directions within an organisation (34). When these values and expectations are also in conflict with a person's own values, situations arise in which they are forced to act in one way but would actually have preferred to act in a completely different way. For example, against their better judgment, care personnel must sometimes refrain from offering the care they know a patient needs, because of the priorities of their work (23).

In addition, many healthcare operations are conducted around the clock, every day of the year. This means that staff must inevitably also work shifts, to ensure the enterprise is staffed at all hours of the day. Existing literature reviews show that shift work entails health consequences in the form of an increased risk of mental illness (40), as well as an increased risk of more somatic symptoms, such as sleep disturbances, obesity and weight gain, type 2 diabetes, cardiovascular disease and cancer (41). Here, the organisation has the opportunity to reduce these health risks, not only by influencing how shifts and working hours are organised, but also by how they are distributed among the staff within the available workforce.

Despite extensive knowledge of what constitutes risk and health-promoting factors in the work of healthcare professionals, we can see that over time, risk factors have increased and health-promoting factors have decreased in this sector. This is based on a study on a Swedish population between the years 1993 and 2013 where the authors found that the demands had increased while control and social support decreased, and consequently reported sick leave increased among health care professionals (42). At present, there is a lack of knowledge about potential changes in risk and health-promoting factors over time, however, health care professionals currently cop the sick leave statistics for both mental and physical illness (43). There is insufficient knowledge and understanding about what causes high job demands and lack of resources in this work environment. To create a good work environment, new knowledge is needed about the organisational reasons behind the job demands and work resources, *i.e. about what constitutes health-related risk and health-promoting factors at the organisational level.*

Purpose

The purpose of this systematic literature review is to gain an overall picture of Nordic research on the work environment and the health of healthcare professionals, and to thereby identify risk and health-promoting factors. The focus is on health-related risk and health-promoting factors at the organisational level.

To achieve the purpose of the systematic literature review, the following question has been formulated:

- What organisational risk and health-promoting factors has research identified for healthcare professionals in the Nordic countries?

The goal is for the systematic literature review to serve as a support in work environment management and in practical efforts to prevent illness and promote well-being in healthcare organisations.

3. Method

The following is a brief description of the methods, approaches and restrictions used in this systematic literature review.

To achieve its purpose and goal and answer the question that serves as its basis, the systematic literature review has been based on a *systematic search and review* (44). This type of systematic literature review is normally used to answer broad questions and combines the benefits of a systematic and comprehensive literature search with a critical review. With our broad research question as its basis, this type of methodology provides a systematic approach to the literature search and includes both qualitative and quantitative studies with different designs. This type of systematic literature review does not include any weighted evidence assessment of the conclusions of the included studies, unlike many systematic literature reviews that have more specific and narrower questions. Instead, the methodology aims to gain an effective overview of the knowledge in a particular field or about a specific research question.

Inclusion and exclusion criteria

This systematic literature review includes studies investigating health-related risk and health-promoting factors for healthcare professionals in the Nordic countries that were published in peer-reviewed journals between 2016 and 2022. Studies from the Nordic countries were included in order to provide a sufficient basis to draw conclusions about health-related risk and health-promoting factors at an organisational level that have been investigated in, or are transferable to, a Swedish setting. Studies comprising data from multiple countries were only included if the relevant results were reported separately for any Nordic country. Studies that focused on professions for which there is no Swedish equivalent have been excluded.

Studies were included if they examined the relationship between health and illness in relation to risk and health-promoting factors at the organisational level, or employees' experiences of these factors.

Descriptive studies, i.e., studies that describe connections or relationships without examining them in any way, were excluded.

Outcomes that cannot be directly seen as an aspect of health or illness have also been excluded, although they may be an outcome of a risk or health-promoting factor and related to health or illness. For example, various performance-related outcomes such as patient satisfaction, quality of care or incidents have been excluded. Outcomes related to employee turnover, such as the desire to leave or remain in the workplace or organisation, have also been excluded.

Finally, studies conducted under non-ordinary or generalisable conditions, such as pandemics or crises, have been excluded.

The inclusion and exclusion criteria are summarised in Table 2.

Table 2: Inclusion and exclusion criteria.

Spider	Inclusion criteria	Exclusion criteria
Population	Healthcare professionals in the Nordic region	Healthcare professionals outside the Nordic region
Phenomenon of interest	Organisational and health-related risk and health-promoting factors that can affect employees' health and illness, either directly or by affecting job demands and resources at the workplace level.	Risk and health-promoting factors at the workplace level. Organisational risk and health-promoting factors that affect staff turnover, as well as willingness to remain at the workplace, or performance-related outcomes such as patient satisfaction, quality of care or patient-related incidents
Design	Observational studies under ordinary conditions	Studies under non-generalisable or extraordinary conditions, for example, purely experimental studies, intervention studies and studies conducted during pandemics and crises
Evaluation/ results	Studies that examined the relationship between health and illness in relation to risk and health-promoting factors at the organisational level.	Studies that did not examine the relationship between health and illness in relation to risk and health-promoting factors at the organisational level.
Type of research	Quantitative, qualitative and mixed methods studies	Systematic reviews, intervention studies, experimental studies, grey literature

Search strategy

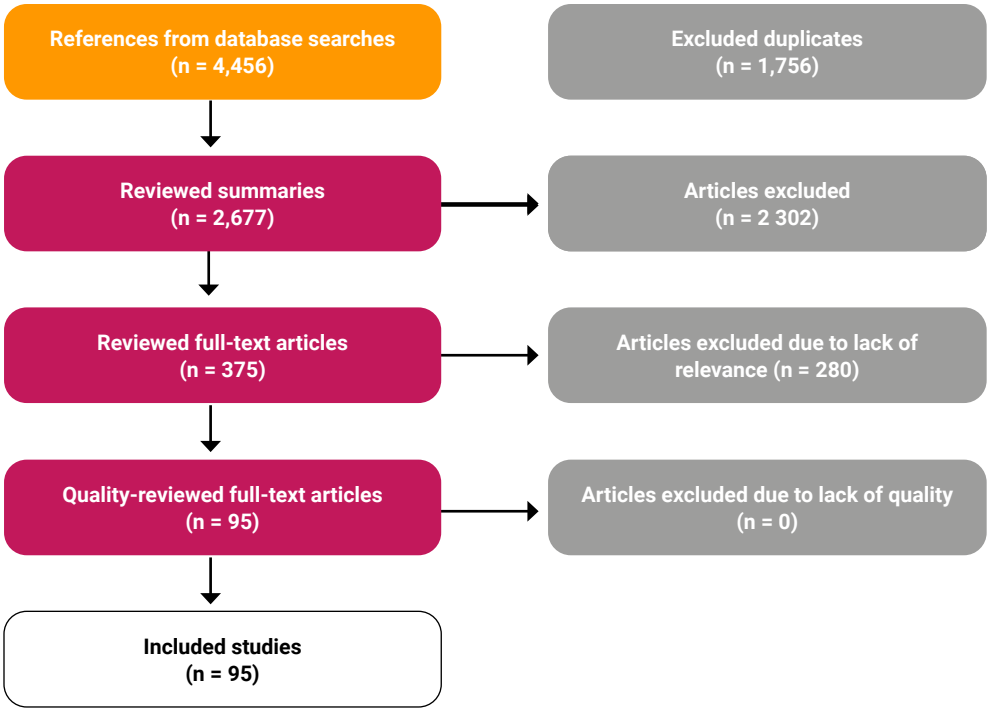
Literature searches were conducted in the Pubmed, Scopus, Cindahl and PsycINFO databases by librarians at Mid Sweden University. The searches were limited to the population, phenomenon of interest, design, evaluation/results and type of research (SPIDER: [45]). The inclusion and exclusion criteria (based on SPIDER) are summarised in Table 2. Articles in Swedish, Norwegian, Danish and English, published between 2016 and 3 January 2023, were included. A more detailed description of the search strategy, including studies and excluded full-text articles, can be found in Appendices 1–3.

Inclusion and exclusion of studies

Once all duplicates were excluded, the searches yielded 2,677 articles. These were transferred to the Covidence (https://www.covidence.org/) programme, which was used to support the continuing process. Each summary of the 2,677 articles was reviewed by two researchers, who independently assessed whether the study was relevant to the purpose of the systematic literature review and whether it met the criteria for inclusion. This resulted in the exclusion of 2,302 articles. The remaining 375 articles were reviewed in their entirety. This process was also carried out by two researchers, who independently read and assessed all the articles.

When the researchers disagreed on the summary or the completeness of the texts, a third researcher read and assessed the article, following discussion in the working group.Of the articles reviewed in their entirety, 280 were excluded due to lack of relevance, mainly because they did not investigate a relationship between an organisational risk or health-promoting factor and employee health, or because they concerned a non-Nordic study population. This resulted in 95 studies, which were then were quality reviewed. All quality-reviewed studies were assessed as meeting the requirements and were included in the results of the systematic literature review; see below for a more detailed description of the quality assessment process. Figure 4 and Appendices 1 and 2 describe the process and how many articles were excluded during the various stages.

Figure 4: Flowchart (PRISMA) showing the number of studies reviewed, excluded and included.



Quality assessment

The reliability of the included studies was assessed using the 2018 Mixed Methods Appraisal Tool (MMAT) (Appendix 4), which is designed to review the quality of studies with different designs and varying methods. When using the MMAT, no scores or overall assessments such as low/medium/high quality are calculated; rather, the MMAT provides an in-depth picture of the quality of the studies. The quality review was conducted in two stages. In the first stage, each study was evaluated on the basis of two overarching questions (whether there were clear research questions and whether these questions could be investigated using the available data in the study). The assessment of these questions determined whether the study should be included or excluded due to a lack of reliability. All quality-reviewed studies were assessed to be reliable and were

included in the systematic literature review. The high proportion of included studies is probably due to the inclusion and exclusion criteria of the systematic literature review, which also indirectly placed demands on the quality of the studies.

In the second stage, the included studies were evaluated using five additional and specific study design questions, in order to provide an in-depth picture of the quality of the study. In this stage, the templates for qualitative studies, randomised controlled trials, non-randomised trials and mixed methods studies were used.

Overall, the results of stage 2 indicated that based on the five questions considered, all the qualitative studies demonstrated a satisfactory level of quality. However, most of these studies lacked information on whether the authors had quality assured the article using a checklist for reporting the study (such as the "Consolidated criteria for reporting qualitative research" [COREQ] or similar resource). As for the quantitative studies, most of them were assessed to be of satisfactory quality, but for 17 out of 75 studies, there were unresolved questions about the extent to which the participants were representative of the intended study population, mainly due to the low response rates and/or a non-random sample of the study population. The results of the two stages are presented in Appendix 4.

Analysis and synthesis

All studies that were assessed to be of sufficient quality were categorised based on which aspects of the organisation of health care had been examined. This made it possible to obtain an overview of their results. This categorisation was done jointly by the researchers and was used together with the more descriptive compilation of the included studies to answer the question posited by the systematic literature review. The risk and health-promoting factors investigated in the studies are described and summarised by category, and the conclusions of the studies are briefly described in the "Results" chapter. Finally, overarching patterns/themes were also identified across these categories, i.e., meaningful patterns that contribute to a better understanding (46). The "Discussion" chapter addresses how the results can be interpreted and understood.

4. Results

Most of the studies applied an cross-sectional design and examined health-related organisational risk and health-promoting factors for registered nurses or unspecified groups in the healthcare sector. The studies included a large number of outcomes related to mental and physical illness and health and well-being. A total of 25 of the 95 included studies were conducted in Sweden. The risk and health-promoting factors identified were categorised into five themes: distribution of working time schedules; design of operations and working methods; ergonomic preconditions; terms of employment and personnel policy, and the organisation's ethical environment. Within these categories, a wide range of risk and health-promoting factors and health outcomes have been investigated, and two overall patterns could be identified across the categories.

Description of the studies

Cross-sectional design was used in 34 studies. This means that risk or health-promoting factors, as well as outcomes in terms of health or illness, were examined on a single occasion, often through questionnaires or other forms of self-assessment. The same number of studies (34) used a longitudinal cohort design, in which a study group was followed over time and the risk or health-promoting factors and outcome measures were examined on several occasions.

A total of 20 studies were qualitative and used interviews, observations or focus groups to investigate their questions. Two studies used both questionnaire and interview questions (mixed methods), and the other five studies used a case-control design or examined the importance of organisational risk and health-promoting factors in connection with natural experiments (randomised controlled trials, quasi-experimental intervention or randomised field experiments). For references, designs, professional groups and purpose, see Appendix 1.

A number of studies (40) included healthcare professionals from different occupational groups, without examining the groups separately or specifying the groups in greater detail. The other studies focused on specific occupational groups. Of these, registered nurses were the most common, and were the focus of 40 studies. Nine studies specifically examined health outcomes among physicians, five focused exclusively on managers, four on midwives, two on dental hygienists and other dental professionals, and one on psychotherapists. See Appendix 1.

Illness and disease were examined in terms of both mental and physical illness. 67 studies focused on illness and disease, and included the following:

- work-related stress
- cerebrovascular disease
- dementia

- diabetes
- mortality
- hoarseness
- heart disease
- dissatisfaction with work
- musculoskeletal disorders
- mental illness
- sickness absence
- sickness presenteeism
- injury
- pain
- pain sensitivity
- stress, experience of
- stroke
- sleep problems
- telomere shortening
- fatigue
- exhaustion
- burnout.

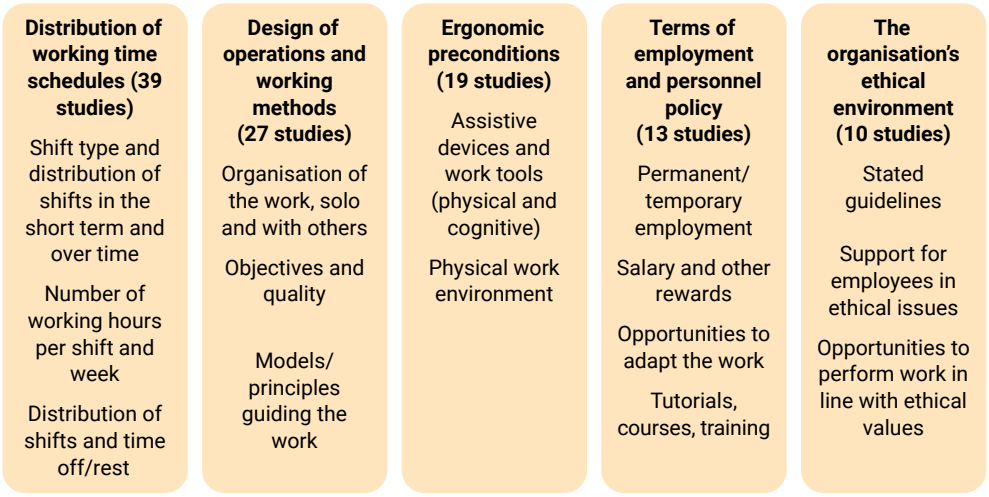
Health and well-being were examined in 28 studies, in terms of :

- working ability
- job satisfaction
- engagement
- motivation
- self-assessed health
- well-being.

Risk and health-promoting factors at the organisational level

To obtain an overview of the results, all studies assessed to be of sufficient quality were categorised based on which aspects of the organisation of health care had been examined. They showed that the risk and health-promoting factors in the organisation of health care were examined in terms of the distribution of working time schedules (39 studies), design of operations and working methods (27 studies), ergonomic preconditions (19 studies), terms of employment and personnel policy (13 studies) and the organisation's ethical environment (10 studies) (Figure 5). These categories are described in greater detail below. In some cases, one study contained risk and health-promoting factors associated with more than one of these categories, bringing the total number of studies in the above summary to more than 95.

Figure 5: Five categories of healthcare organisation in which health-related risk and health-promoting factors have been identified.



Below is a description of the categories and results of the included studies. Each category is first briefly described, including the risk and health-promoting factors investigated in the studies. The overall results are followed by a summary of the results of the included studies within the category.

Distribution of working time schedules

A relatively large group of studies (39 studies) dealt with how illness related to the distribution of working time schedules among employees, i.e., how shifts and working hours were distributed among existing staff. Shift work can refer to both fixed night shifts and rotating shifts. Shifts can rotate regularly or irregularly, and their duration may vary. For many healthcare organisations that must be staffed around the clock and every day of the year, the need for evening and night work is unavoidable. Still, the *distribution* of these shifts and working hours among available staff is an organisational issue.

In summary, the studies highlighted a risk of various types of illness when working hours are distributed in a way that involves shift work, especially when they have been distributed over the day and week in a way that involves short rest periods between shifts (so-called "quick returns"), long work shifts or long work weeks. Furthermore, several studies conclude that the risk is greater when night or shift work continues unabated for an extended period of time.

Risk factors for various forms of illness that were highlighted in the articles entailed a distribution of working time schedules that involved long work shifts (of more than eight hours), long work weeks (more than 40 hours), and a high proportion of quick returns, in which the working hours are distributed so that the time allotted for rest between shifts is short. Furthermore, risks were identified in schedules that largely comprised evening and night shifts, as well as in situations in which staff had to work night and evening shifts for long periods of time. A distribution of working time schedules in which personnel were

required to work irregularly distributed shifts, with irregular rest periods and weekend shifts, was also a risk factor.

A health-promoting factor that was highlighted in the studies was the opportunity for employees to influence how their working hours were distributed.

Summary of the results of the studies in the "distribution of working time schedules" category

Shift and night work is associated with sleep and recovery (47). Although some studies find no association between night work and health (48, 49) or sick leave (50) or only do so in certain subgroups (51-53), night work increases the risk of various types of illness. It is associated with cerebrovascular disease and stroke (54), sleep disturbances and severe fatigue (55), exhaustion (56), heart disease (57), diabetes (58), sick leave (59) and work-related accidents (50). Evening shifts are also a risk factor, and are associated with diabetes (58), long-term sick leave (60) and the incidence of accidents during shifts (61, 62). Some studies find that both evening and night shifts increase the risk of both mental illness (63, 64) and mortality (65), while other studies conclude that the increased risk of suffering from mental illness is greater for people who work night shifts than for people who work evening shifts (66, 67).

Another specific risk factor is quick returns, in which employees have only a few hours between the end of one shift and the start of the next. Quick returns are associated with perceived stress (68, 69), sleep disturbances and severe fatigue (55), exhaustion (70), heart disease (57), cerebrovascular disease and stroke (54), sick leave (60, 71, 72), premature birth (73) and work-related accidents (50, 61, 62, 74).

A majority of the studies in this area emphasise that it is mainly schedules that largely comprise shift work and night shifts, as well as a distribution of shifts that involve shift work and night shifts over several years, that entail particularly significant risk factors for various types of illness. Working several night shifts in a row increases the risk of exhaustion (70), sick leave (60, 75), and premature birth (73), and working night shifts for more than six years increases the risk of dementia (63, 76).

Schedules comprising multiple night shifts over more than five years increase the risk of the shortening of chromosome telomeres which, in turn, increases the risk of breast cancer (77).

Furthermore, the distribution of working time schedules over the day and week also affects the extent to which shift work poses a risk to health; the longer the shifts and working weeks, the greater the risk. Long shifts of more than eight hours and long weeks of more than 40 hours increase the risk of sick leave (60, 72, 75), work-related accidents (74) and work-related injuries (78). A schedule of 12-hour shifts instead of 8-hour shifts on weekends – but in which the employee instead worked fewer weekends – was not perceived to affect job satisfaction either negatively or positively, but whether the registered nurses in question perceived it as stressful and whether it was a health risk varied

depended on their other health conditions and their family circumstances (79). The number of 24-hour on-call shifts was positively associated with burnout among surgeons (80).

The fact that shift work involving intensive evening and night shifts, quick returns and long working days and working weeks generates a range of risk factors is also confirmed by studies that have examined the impact of reducing shift work, quick returns and working hours. The recovery of night workers from symptoms of mental illness was helped by stopping night work (81), and their recovery from sleep disturbances and severe fatigue was facilitated by reducing the number of quick returns, discontinuing night work, or reducing the number of night shifts (55).

A reduction in the number of quick returns also reduced the risk of work-related injuries among registered nurses (82). When working hours were reduced from eight to six hours (with the same salary), assistant nurses and registered nurses felt that they had more energy, both on the job and outside of work (83).

Some studies have examined how healthcare professionals perceive the opportunity to influence their schedule and working hours, with generally positive results. The ability to influence their schedules, working hours and holidays is perceived by registered nurses as both a reward (84) and a factor important for their job satisfaction (85). Another study found that participation in the planning of working hours resulted in an employee perceiving that they were in control of their own schedule, but that it did not automatically lead to a greater sense of well-being compared to traditional planning (86).

Design of operations and working methods

The second largest category comprises studies focusing on how the organisation and its work are designed and what working methods prevail and are rewarded within the organisation (27 studies). This includes different ways in which tasks and responsibilities have been distributed and how the organisation has chosen to structure the work, measure quality, provide feedback, offer rewards and manage goals. Although all studies in this category address design of operations and working methods, this is a broad field, and the identified articles mostly examine different aspects, in different contexts, for different groups, making it difficult to draw overall conclusions.

In summary, the results elucidate the connection between the organisation's design choices with regard to its operations and working methods and employees' health and well-being. A division of work and staffing that entailed solo work or the need for employees to devote themselves to tasks that could not be considered to fall under their job description was associated with illness and sickness presenteeism. Working methods and operational design that resulted in collaboration between professions and across hierarchical boundaries, as well as those which involved the staff in quality work, were described as motivating. Some studies emphasised the importance that both

the organisation's or enterprise's goals and the way in which they chose to measure quality and performance needed to be perceived as relevant and fair by employees, to avoid being seen in a negative light. A senior management team that had the conditions to "see" its employees, take a hands-on approach, and seem to understand employees' needs, reduced the risk of illness and increased the motivation of staff members.

Risk factors identified in the studies comprised an design of operations and working methods that resulted in solo work, in the need for employees to handle a great number of tasks that could not be considered to be part of their job description, and in a focus on financial and performance-based priorities and incentives as rewards from the organisation's side.

Health-promoting factors were identified in an operational design that enables senior management to see and show consideration for employees' needs, as well as in a design of operations and working methods that ensure continuity not only in the care provided, but also in quality work, opportunities for self-determination at the individual or group level, and for equal cooperation within the working group.

Summary of the results of the studies in the "design of operations and working methods" category

Some studies examined the social aspect of how work was designed, in terms of collaborations and hierarchies. Here associations were identified between solo work and perceived anxiety (87), musculoskeletal disorders and pain (88), and increased job satisfaction (89). Non-hierarchical collaboration was associated with motivation among primary care staff (90), and managers cited collaboration within the organisation and with policy-makers and support (administratively and organisationally) in coping with challenges as being beneficial to well-being (91). Opportunities for self-organising teams (92) and self-direction (93) were positively associated with job satisfaction.

Other studies focused on *how the tasks were designed and distributed.* One study found that the more clinical tasks were delegated from the physician, the more the job satisfaction of the working group increased (94). Physicians who felt that they needed to devote themselves to illegitimate tasks (i.e., responsibilities not core to their profession, and which are perceived as wasting time and which could actually be performed by other staff) were more likely to come to work even when they should have taken sick leave – so-called "sickness presenteeism" (95). Primary care physicians felt that the risk of exhaustion increased when they were forced to take over tasks from specialist care providers, as well as because the requirements for documentation and administration have become more numerous and complex (96). The dissatisfaction of general practitioners with their work situation decreased when the time per patient consultation increased from less than 10 minutes to more than 20 minutes (89). For general practitioners in Norway, the number of consultations per day had no relation to stress, but the number of consultations containing elements of conflict did (97).

Among registered nurses, the manner in which responsibility for patients was distributed was both positively and negatively related to various aspects of stress (98).

When the organisation of the work of midwives ensured that patients could have one midwife throughout their pregnancy, this resulted in lower rates of burnout (99) and increased job satisfaction, because they felt meaningful and appreciated (100). The more comprehensively a lean-based[1] working method was implemented in primary care units, the lower the levels of fatigue among staff, who also reported a greater sense of well-being (101). Registered nurses felt it was fundamental for collaboration in the working group to use activity boards in which tasks were visualised and could be discussed and ticked off upon completion. They found this to be motivating (102).

Clear goals and systematic quality work were associated with increased motivation among primary care staff (90), while the use of what was considered to be the wrong measure of quality was associated with reduced job satisfaction among registered nurses (103).

When registered nurses were rewarded based on performance goals, it could cause them stress(84).

A focus on cost-effectiveness within an organisation sparks frustration among home care staff, who feel that they are not able to work as effectively as they would like (104). Accreditation of the enterprise was negatively associated with physicians' job satisfaction in cases in which accreditation was perceived as a means of control, whereas there was a positive correlation with job satisfaction for physicians who considered it to be a tool by which to improve quality (105). Financial constraints and administration and productivity demands imposed by senior management correlated with employee sick leave, as managers who ignored these limitations and demands from senior management had fewer employees on sick leave (106). An operational design that resulted in red tape, short-term planning and uncertainty about the future and finances was a risk factor for managers' health (91).

Finally, this category also included studies of risk and health-promoting factors linked to whether senior management had *the necessary conditions to ""see" their employees, take a hands-on approach, and understand the needs of their staff.* The perception that the management of a healthcare organisation focuses and acts on the basis of the needs and desires of employees is positively linked to job satisfaction and engagement among registered nurses (107). Being seen and receiving recognition and feedback from senior management is perceived as a motivating resource (84, 85). When senior management supports patient safety and inter-unit teamwork, this results in lower levels of burnout (108). An enterprise with a stable organisational structure in which the manager had the opportunity to take a hands-on approach was perceived as health

1 In this context, the word "lean" refers to work processes characterised by customer orientation, process flows, standardisation and the continuous improvement of work processes.

promoting by registered nurses and midwives, whereas a lack of instructions and procedures was perceived as a risk (109). Registered nurses experience greater job satisfaction when their line manager has a "moderate" number of employees, thus enabling them to take on a more active leadership role (110). In another study, the number of subordinate registered nurses had no correlation with the neck and back pain of unit managers (111).

Ergonomic preconditions

In this category, 19 studies had investigated the results of action at the organisational level to eliminate ergonomic risk factors and optimise ergonomic preconditions. This may entail optimising the strain inherent in individual work tasks at the organisational level and providing and enabling the use of various aids (also at the organisational level) to reduce the workload and the risk of injury. In addition to ergonomic preconditions, we have also included electronic information and communication systems, such as electronic medical record systems or registers, the purpose of which is to simplify or facilitate work.

The existence (or non-existence) of ergonomic preconditions that reduce unfavourable strain and the risk of work-related injuries, facilitate work and make it safer, is also an organisational issue. While efforts at the individual level are about minimising the consequences of poor ergonomic preconditions, this issue is elevated to an organisational level when it is about the extent to which the organisation minimises ergonomic risks at a structural level.

The reduction of ergonomic risk at a structural level entails influencing how physical premises and aids are designed and how work is organised and carried out. At the workplace level, there are rarely opportunities to influence this.

In summary, the results indicate that there is a risk of pain and injuries in work tasks where the workload has not been adapted to the employees using adapted working methods or aids. The results also show that the extent to which electronic information and communication systems are perceived as positive or negative depends on the extent to which they facilitate work and the extent to which the enterprise provides support for them to do so.

Risk factors in the field of ergonomic preconditions highlighted in the studies include work in stressful job situations in which there is no access to adequate aids, the use of equipment that requires employees to work in the dark, and work in premises that lack daylight or where good air quality cannot be ensured. IT and communication systems are a risk factor for stress in cases in which the systems are inadequately adapted to the work, instead creating additional strain and resulting in the perception that they are problematic.

Health-promoting factors identified in the studies consist of IT and communication systems that reduce job demands and provide increased security, work in premises that meet employees' needs for daylight, and opportunities for social interaction and the use of adapted aids.

Summary of the results of the studies in the "ergonomic preconditions" category

In one study, access to daylight was perceived to be important for well-being and working ability (112). The inability to see the outside world (for example, through a window, over the course of an entire shift), as well as the long-term use of surgical equipment that requires darkness, contributed to stress and exhaustion (112). Access to adapted assistive devices in the form of prism glasses reduced the risk of neck pain and injury among dental professionals by limiting neck strain (113). Air quality was an important factor for hoarseness (114, 115). A work environment that was perceived as pleasant and open allowed for social interaction, which contributed to job satisfaction at long-term dementia care homes (116). For home help workers, physical risks are identified in both the indoor and outdoor environment. When working in clients' private homes, difficulty in using adequate aids or equipment poses a risk of injury (47). Several studies indicate a connection between illness and the inability to use assistive devices when moving patients from one place to another (47, 117, 118). The design of machinery and other equipment did not affect pain in the hands of dialysis registered nurses (119), but a closer analysis identified risks associated with repetitive tasks and the design of the workplace and various tools (88).

In some cases, potential risk and health-promoting factors were investigated that did not turn out to be of importance for health or illness. In one study, work that involves standing still was not associated with pain (120), and another study found that the use of blue lights had no effect on either stress or mood, compared to normal lighting (121).

IT systems were perceived as positive, as long as they reduced, for example, documentation requirements, improved access to information, and were perceived as giving staff a sense of security (122, 123). However, they were seen as a burden and a source of stress and frustration if their use was found to be an obstacle to the ability of staff to do their work or were fraught with technical problems (124–126). The perceived stress caused by electronic tools was reduced if they were perceived to be user-friendly (127), as well as if managers felt that support and assistance with time-consuming and problematic IT and communication systems reduced the level of stress they caused (122). Using multiple IT systems on a daily basis entails a higher level of stress than using only one system (127, 128). Physicians who already experienced time constraints reported more IT-related stress and, in one study, primary care physicians felt more stress related to IT than physicians in hospitals (126).

Terms of employment and personnel policy

This category includes studies that in various ways have examined the conditions under which their organisation chooses to employ staff and how they take care of and support these staff. The category includes only 13 diverse studies, making it difficult to summarise their results.

These studies (which adopt a range of approaches) demonstrate that job security and monetary rewards were positively related to well-being. When it

came to the organisation's systematic work to create conditions to increase the individual's capacity to handle their work and develop (for example, through the opportunity to attend courses, receive supervision or engage in physical activity during working hours), the results varied.

Risk factors identified in the studies include short-term employment contracts and the inability to adapt work as necessary.

Identified **health-promoting factors** include job security and monetary rewards.

Summary of the results of the studies in the "terms of employment and personnel policy" category

Job security (84, 104), salary and other monetary rewards (84, 91, 129) are associated with higher levels of engagement and job satisfaction.

Short-term work contracts, combined with shift work with variable shift lengths, irregular rest periods and weekend shifts increase the risk of sick leave (130). At the same time, a study found that temporarily employed registered nurses rated their health as better than permanent registered nurses (131). In the period preceding downsizing, staff absenteeism due to illness decreased, mainly among employees with temporary contracts (132). The requirement for an employee to switch units against their will negatively affected job satisfaction (85).

Among psychotherapists, two studies examine access to supervision, with different results: group clinical supervision was associated with lower stress among registered nurses (133), but no associations could be confirmed between participation in clinical supervision and burnout (134).

Another study investigated whether the opportunity to attend courses during working hours can be a health-promoting factor, but found no correlation with job satisfaction (135). Physical exercise at work reduced pain and pain sensitivity more than exercise at home (136). Shortcomings in the adaption of work for pregnant workers and those with health problems were considered by registered nurses to be a reason for their sickness absence (137).

The organisation's ethical environment

The category of studies that addressed the ethical environment of organisations includes relatively few studies (10). However, they are generally homogeneous. This category comprises studies that examine the ability of employees to perform their work in accordance with their own fundamental values regarding what constitutes good care, as well as those of their profession. This concerns the extent to which work is organised so that employees can do their work in a way that is in line with their own values. This, in turn, depends both on whether employees feel that they can share their organisation's values and whether the organisation provides sufficient resources for them to be able to perform their work with what they perceive to be a reasonable level of quality. The ethical environment also encompasses the extent to which the organisation encourages ethical discussions in the workplace and ensures that employees are supported in ethical issues and dilemmas.

In summary, the ability to act in a way that accords with an employee's core ethical principles constitutes a health-promoting factor, whereas the inability to do so is a source of stress that can entail a risk of illness. This category comprises opportunities to share ethical values with the organisation, but also access to necessary resources that keep employees from feeling forced to compromise their own ethical standards, for example, in terms of the quality of care.

Risk factors identified in the studies include inadequate staffing and a lack of time. These can force employees to work in a way that is in conflict with their personal values or ethical principles.

Health-promoting factors identified in the studies include consensus between employees and the organisation regarding ethical principles, support from management on ethical issues, and access to resources that enable staff to perform their work in accordance with their ethical principles.

Summary of the results of the studies in the "organisation's ethical environment" category

The ability of employees to act in accordance with their values and receive support in dealing with ethical issues is important for job satisfaction and engagement. It becomes a health-promoting factor when an organisation shares values with its staff and ensures that there are resources and conditions for employees to be able to deal with ethical issues and act in accordance with their values (138).

Motivation and engagement are fostered when time (102) and number of employees (104, 109) are viewed as sufficient, and when the number of employees in a unit increases or functions are outsourced, the risk of long-term sick leave decreases (139). Conversely, home help staff who are forced to "count the minutes" feel frustrated and unable to work as effectively as they would like (104), and inadequate staffing poses a health risk that entails extra stress, pressure and responsibility (47).

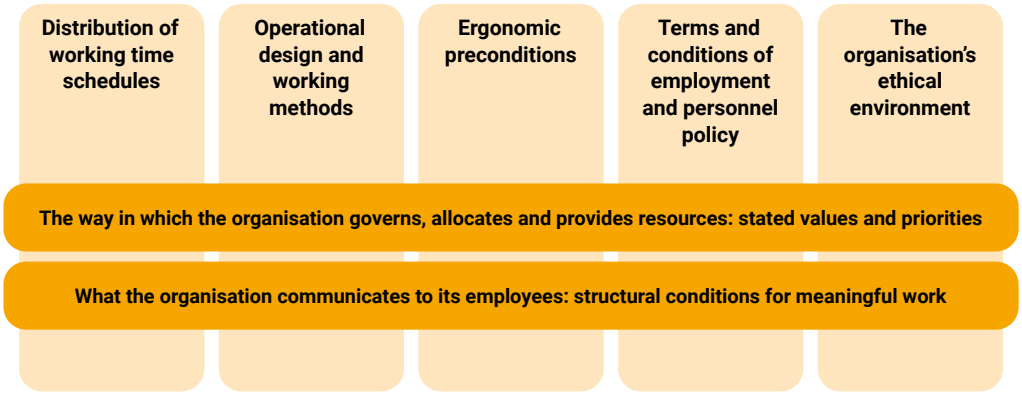
For managers, the inability to implement decisions that were made higher up in the organisation or the obligation to implement decisions with which they personally disagree constitute a risk factor for future illness (140). Another risk factor for reduced job satisfaction arises when an individual's values conflict with the values of the organisation. This demonstrates the importance of management understanding the ethical challenges related to the profession (103). Conversely, a health-promoting factor for job satisfaction was identified in the organisation's encouragement of ethical discussions and support in grappling with ethical issues (141).

Overall patterns in the categories

The above five categories capture different aspects of organisational and health-related risk and health-promoting factors that have been investigated in research focused on healthcare professionals in the Nordic countries. Although there is quite a wide variety within and between the categories in terms of the risk and

health-promoting factors on which the studies focused, there are also similarities. Within each category, the studies demonstrate the importance for employee health of what the organisation does to control and manage the work with the aim of meeting its goals. This applies, for example, to the manner in which the organisation allocates working hours and staffs its operations, manages its objectives, and provides aids and support. Yet in all categories, there are also studies that point to the importance of the organisation's culture and values and what it communicates to its employees, including through priorities that affect both the work environment and the opportunities for employees to work effectively (Figure 6).

Figure 6: Two overarching patterns that are present across the five categories.



5. Discussion

This section discusses how the results can be interpreted in the light of related research and theory, what the results mean for practice, their credibility, and the extent to which individual studies can be generalized.

This systematic literature review presents knowledge from recent Nordic research on organisational risk and health-promoting factors in the healthcare sector. It takes a relatively new approach to risk and health-promoting factors, insofar as it focuses on the organisational level, i.e., the structure, choice of principles, and values of the organisations that were studied. As previously described, when work-related illness and well-being are discussed, workplace and individual factors are usually the dominant theme. At the organisational level, health-related risk and health-promoting factors, as identified in the systematic literature review, can be divided into five categories: *distribution of working time schedules; design of operations and working methods; ergonomic preconditions; terms of employment and personnel policy, and the organisation's ethical environment.* The majority of the included studies focused on risk factors. In many ways, the results of this literature review are unsurprising. The introductory background section presents a selection of overviews made prior to this systematic literature review. These overviews demonstrated the importance of working hours and workplace demands and resources for the health and well-being of healthcare professionals, as well as for the working population at large. They also highlighted workplace risk factors specific to healthcare professionals, including ergonomic preconditions and emotional workload. The results of this systematic literature review contribute to our knowledge about the risk and health-promoting factors at the organisational level. These risk and health-promoting factors are important for health and well-being, but can also explain the job demands and resources that healthcare professionals experience in their working lives. The manner in which healthcare work is organised can both eliminate and generate organisational risk and health-promoting factors. Through the five identified categories, two interacting perspectives could also be discerned. The first perspective indicates that work in the healthcare sector must be organised with regard to society's need for a functioning and efficient healthcare system.

The second perspective points to the fact that such work must be organised in a way that takes into account an employee's need to feel valued and able to do their job with what they consider to be a reasonable level of quality. An organisation's stated values and priorities must not only be in line with laws and guidelines, but also with the ethical principles of its employees.

Things to consider when interpreting the results

The broad questions in this review resulted in the identification of a large number of risk and health-promoting factors, often examined in individual articles.

However, this does not mean that risk and health-promoting factors only exist in these categories and in aspects of the organisation of health care, but rather that these are the aspects on which Nordic studies published between 2016 and 2022 that deal with employees' health and illness have focused. Similarly, not only do the identified outcome measures comprise aspects of illness that affect healthcare professionals, they have also been scientifically investigated during the period in question and pinpointed via the methods used here. Drawing conclusions about the reliability of individual risk and health-promoting factors, and the strengths and weaknesses of the results of the individual studies, must be considered and interpreted in the light of further research, which is not covered by this systematic literature review. Examples of such research include studies conducted beyond the Nordic region under similar conditions, as well as research that investigates the relationship between current risk and health-promoting factors and outcomes other than health, such as the connection to the balance of job demands and resources or the effects on quality and staff turnover.

It should also be pointed out that a large number of the included studies were of a longitudinal cohort design. This means that they followed participants over time and investigated how factors in the organisation of work, health and illness changed in relation to each other. This is useful when pinpointing the risk and health-promoting factors in the work environment. A relatively large number of qualitative studies were identified. These help to provide a deeper understanding of employees' perceptions of risk and health-promoting factors. A number of studies included various occupational groups. This increases the generalisability of the results, but does so at the expense of being able to comment on individual occupational groups. Many of the studies that reported results for individual occupational groups focused on registered nurses.

The results in relation to previous research and theory

A sizable proportion of the studies focus on the *distribution of working time schedules* and the risks that can be created or mediated, depending on how an organisation chooses to distribute working hours among its existing staff. It is common knowledge that the scheduling of shifts (their duration, number and frequency, as well as opportunities for recovery between shifts) can be both a risk factor for physical and mental illness, for example, exhaustion and cancer (26, 27, 34, 40, 41, 142), and a health-promoting factor that increases job satisfaction (142). Extensive overtime work (≥ 10 hours per week) can also increase the risk of both illness and mistakes . Where this systematic literature review breaks new ground is in its discussion of how the distribution of working time schedules is a risk factor at the organisational level, and should therefore not only be managed at the workplace level by first-line managers. This risk factor

also exists at the organisational level, where it can and should be managed. It is the employer's responsibility to ensure that working hours are distributed in a way that eliminates the risk of serious illness among staff. Of course, there are practical obstacles to achieving this – obstacles that in healthcare have nothing to do with skills supply and budgets. Nevertheless, a distribution of working time schedules that involves many quick returns and long periods of night work is an organisational risk that can be eliminated. However, opinions differ as to how this can be achieved in practice. Studies have shown that consulting registered nurses before setting a schedule or giving them an opportunity to control an arrangement themselves can ease the process of adapting to a particular shift schedule. This is because employees are often willing to concentrate their working hours or try to reduce their daily rest period between shifts, probably in order to maximise their periods of continuous leave (143). Days off can alleviate the negative effects of working short, long, early or nightly shifts (144). Thus, in the healthcare sector, the issue of the distribution of working time schedules is closely associated with skills supply. Indeed, not only is access to competent staff necessary to be able to distribute working hours in a way that does not lead to illness, but a health-promoting distribution of working time schedules can both attract and retain competent staff.

It is difficult to discuss the category *design of operations and working methods* in relation to other research, because this category contains studies with relatively different focuses in which relationships have been examined in widely different contexts. The design of operations and working methods must be adapted to the specific context, and even within the healthcare sector, it can be difficult to translate results from one area to another. Thus, details must be considered, rather than the "overall picture". For example, various ways of organising an intensive care unit cannot necessarily be generalised to other operations: What makes lean working methods a health-promoting factor in one particular context cannot be summarised in a few lines, and the aspects of a primary care facility's operational design that pose risks for general practitioners may not be relevant for registered nurses working in municipal eldercare. However, the results in this category can often be understood via overall models and theories about workplace demands and resources. They can thus illustrate how design of operations and working methods constitute organisational risk and health-promoting factors that affect employees' health (directly or indirectly) by impacting job demands and resources in the work environment. For example, when performance is a major focus or work is organised in a way that burdens employees with extra administrative and illegitimate tasks and/or forces them to work alone, job demands are likely to increase and social support is diminished. On the other hand, there are health-promoting factors to be found in an operational design that allows for hands-on leadership that adapts working methods to enable staff to provide continuous care, exercise self-determination, as well as collaborate. These organisational-level factors are likely to reduce emotional demands and ethical stress and increase resources such as recognition, social support and social capital at the workplace level. The job demands-resources model (6) described in the background section of this report tells us that such job demands and resources are well-established workplace risk and health-promoting factors.

By shifting our gaze from the workplace level and focusing instead on which organisational-level factors constitute health-related risk and health-promoting factors, we have an opportunity to discover new ways to reduce these demands and increase resources.

The results in the *ergonomic preconditions* category were relatively consistent and clearly stated how important it is that the organisation provide good ergonomic preconditions and adapted aids – and ensures it is possible to use them to reduce (often physical) strain.

Such results are also in line with previous literature reviews (24). In quite specific terms, this category illustrates the significance of organisational risk and health-promoting factors for employees' health. When it comes to ergonomic preconditions, risk and health-promoting factors at the organisational level comprise tangible, purchasable things – but these purchases must actually provide support, rather than become an added burden, and above all it must also be practically possible to use them. For employers in the emergency services, smart investments in assistive technology could be one of the most effective ways to reduce musculoskeletal disorders and injuries among employees (38). For example, IT systems and electronic communication systems can be seen as both a blessing and a curse. This illustrates how an aid provided by the organisation can be both a risk and a health-promoting factor, depending on whether it proves to be a help or a burden in practice. Here, it is the impact of such an aid on the demands and resources of the work that is decisive – for example, whether the use of an IT or electronic communication system results in more standardised tasks that reduce autonomy and increase demands (and therefore stress) and impacts professional relationships (and therefore social support at work), or whether its use affects employees' ability to work effectively (145).

Relatively few studies examined how risk and health-promoting factors related to the *terms of employment and personnel policy* affected employee health. However, the research that had been conducted sheds light on how an organisation creates risk and health-promoting factors in the way it hires employees and takes care of them by providing targeted support and necessary adaptations. As regards employment conditions outside the healthcare sector, there is a relatively consistent body of research showing that temporary employment poses a risk, both through the uncertainty that such terms of employment entail, and through the various job demands and resources imposed on/available to permanent and temporary workers (146). Among other things, precarious terms and conditions of employment are a risk factor for burnout (34). However, this nuanced relationship must be considered in light of the level of control and security an employee feels they have over their employment situation and livelihood (147). In the same vein, a reduction in short-term sickness absence prior to cutbacks should not be interpreted as an indication that staff become healthier in anticipation of such cutbacks. Rather, this is probably a consequence of the uncertainty that precedes cutbacks, which creates a reluctance to take sick leave even if an employee is ill – an assumption that is supported by the fact that sickness absence decreased the most among temporary employees, i.e., the group that felt they had the least job security.

The studies that examine the *organisation's ethical environmen*t are relatively consistent, which is also in keeping with previous research (20, 34). The organisation's ethical environment can be a source of both risk and health-promoting factors. There is no escaping the ethical aspect of healthcare professions and the risk of ethical stress as a result of contradictory expectations and values from different quarters. It is the employees who interact most closely with patients and who enforce an organisation's ethical stances (148), and research has shown that registered nurses may be forced to deal with the consequences of this on their own, because there are no opportunities to do so at work (149).

The conditions for a positive ethical environment are created at the organisational level. This is done not only through policies and stated values, but also through the signals an organisation sends when it sets priorities, determines working methods and allocates resources. It is also important that it actively encourages discussions that unpack ethical issues and dilemmas. As defined here, the organisation's ethical environment also comprises the actual conditions that are present to enable employees to live up to the values of the organisation. In situations that concern the health and well-being of fellow human beings in particular, an employee who feels forced to compromise their own ethical principles could feel burdened, leading to exhaustion and burnout (34). On the other hand, healthcare professionals are more motivated when they feel they can share their employer's values (20).

Preventing illness and promoting well-being

A majority of the included studies focused on risk factors. According to the key terms used in this systematic literature review, a risk factor is something that increases the risk of illness or reduces well-being, and knowledge about these factors can be used to design measures aimed at preventing work-related illness. In order to not only prevent illness but also promote health, there must be an increased focus (in both research and practice) on health-promoting factors that make a positive contribution and increase the likelihood of well-being or reduces the risk of illness. Based on these definitions, a number of the examined health-promoting factors can also be said to be "false health-promoting factors", making the preponderance of investigated risk factors even greater. In practice, "false health-promoting factors" function as genuine health-promoting factors, but rather than adding something positive to the situation, they simply mean that a risk factor has been addressed (for example, by reducing quick returns or alleviating strain/workload through well-adapted aids). These "false health-promoting factors" reduce the risk of illness, but do not promote health or well-being.

In order to attract workers to the healthcare sector and retain existing personnel, it is crucial that risk factors are addressed. This will prevent staff from going on sick leave or leaving their workplace or even their profession. When resources such as mental and physical health are threatened by a poor work environment and stress, the only way out for an employee may be to stop working in order to conserve their resources (150). Still, this does not mean that health-promoting factors should be overlooked. The focus has long been on risk factors and illness,

and research on health-promoting factors has not yet been adequately addressed (151). We know less about how to promote well-being and health than we do about how to counteract illness and disease. A focus on health-promoting factors is particularly important for the ability of the healthcare sector to actively attract staff to professions that are both demanding for the individual and essential for a well-functioning society. In the results, health-promoting factors ("genuine" factors) were identified at the organisational level, mainly in conditions that enabled employees to feel satisfied with their own work. Fundamental to this was an organisation that promoted collaboration and interaction between colleagues and professions and ensured there was sufficient time (and therefore also staff) to be able to provide care that was in line with their own ethical principles. In the face of ever-present efficiency demands and financial priorities, it is easy for this to be overlooked or even ignored. To offset the challenges of illness, sickness absence and skills supply, healthcare organisations should be organised in such a way as to guarantee sufficient resources for employees to be able to offer care of a quality that is in accordance with both professional and personal fundamental values for what constitutes good care – not just be given enough resources to achieve the organisation's production goals

Particularly vulnerable groups in the healthcare sector

No particularly vulnerable occupational groups or specific contexts have been identified in the included studies, nor did this systematic literature review aim to do so. Challenges in the work environment vary depending on the type of enterprise and how work is organised. Research has shown that the challenges in a work environment are contextual; among other things, they depend on the type of activities being conducted, how work is organised, and the conditions and resources available (152–154).

Certain groups of healthcare professionals are likely to be at greater risk of illness as a result of the presence of risk factors in their work that have not been eliminated at an organisational level. These groups can be found in different occupational cohorts and contexts. For example, they include employees who are expected to work shifts and whose schedules or staffing situation allow no opportunity for sufficient recovery, who work in an enterprise in which the work is organised in a way that impairs their ability to feel that they are working effectively, and/or who must carry out tasks that involve heavy lifting. Other literature reviews have noted similar results. Shift work has been linked to health consequences such as mental illness (40), as well as sleep disturbances, obesity and weight gain, type 2 diabetes, cardiovascular disease and cancer (41). The risk of burnout has been shown to increase as a result of the ethical stress that arises when expectations and values conflict (34), as well as when employees feel unable to provide the level of care they want to offer (23). In addition, among surgeons, dental staff and registered nurses, there is a clear link between the extent of static work, repetitive tasks and awkward postures, and the risk of musculoskeletal disorders, pain and discomfort (24, 30).

What lessons can be learned from existing knowledge that can be translated into practice?

In terms of the translation of knowledge from this review into preventive or health-promoting practical work, our results can give employers and decision-makers an idea of the factors that need to be taken into account in their systematic work environment management.

There may be more areas of organisational risk and health-promoting factors than the five categories identified here (see Figure 6). However, our analysis of overall patterns, which identified two themes, can also give an indication of which perspectives on the organisation of health care are important for both employer and employees, regardless of which specific areas of work organisation are considered. Firstly, risk and health-promoting factors emerged in the concrete efforts by healthcare organisations to control and manage the work with the aim of meeting their goals. In other words, it matters how the highest echelons of management distribute work, manage employees, staff their organisation, and provide aids and support, as well as how they express explicit values and priorities regarding operational goals. Secondly, risk and health-promoting factors emerged in the values that management communicates to its employees through these actions. To ensure a sustainable, safe and healthy working life, both of these perspectives must be given equal priority, regardless of which area of the organisational level is in focus. In summary, management must ensure that its staffing, distribution of working time schedules and choice of working methods ensure that there are sufficient staff on site to meet society's needs for health care and that their operations are designed in a way that ensures that their organisation can fulfil its mission. Yet it is equally important that it prevents the exposure of employees to risks of illness and gives them the opportunity to conduct their work in accordance with their fundamental values regarding what constitutes good care. The organisation must ensure that working methods, aids and work premises enable employees to perform their work in a manner that is satisfactory to both patients and employees. The terms of employment and work must be adapted to the organisation's need for flexibility and simultaneously provide sufficient security to meet the employees' needs for security and value. The organisation's ethical environment must take into account not only care priorities, but also how these affect employees.

In addressing deficiencies in the organisation's conditions, management, together with a working group, should investigate and assess whether the organisational conditions of the enterprise entail a risk to the health of employees, and/or whether it is possible to promote health by emphasising organisational health-promoting factors. For example, the control questions in Table 3 can be used in this work. Since municipalities and regions, which organise a large proportion of Sweden's health care, are governed by politicians in complex organisations, it is important to examine the organisational aspects of the organisation. Moreover, the governing politicians who bear ultimate responsibility here are often far removed from the core activities and employees they manage. This often means that the root causes of problematic as well

as positive aspects of the work environment can be both hard to identify and seem even harder to influence once they have been identified. Yet it is at the organisational level that opportunities arise to not only manage but eliminate risks in the work environment, and it is also here that there is an opportunity to promote health in the workplace. If the work environment of healthcare professionals is to be improved, the importance of the organisational level must be a top priority going forward.

Table 3: Things to consider when translating the aspects of this systematic literature review into practice. Control questions tied to the two overarching perspectives on the five categories of work organisation that have been identified.

Categories within health-related risk and health-promoting factors at the organisational level	Employer's goals, needs and mission	Employees' goals, needs and mission
Distribution of working time schedules	Are there enough staff in place to meet society's need for health care?	Do staffing and working hours enable employees to perform their work with a level of quality that accords with their fundamental ethical principles? Are working hours distributed in a way that does not risk illness?
Design of operations and working methods	Is the work structured in a way that delivers effective care?	Is the work structured in a way that allows management to appreciate the contributions of employees? Is the work structured in a way that ensures employees can do their jobs in a manner in keeping with their fundamental ethical principles?
Ergonomic preconditions	Do work premises and assistive devices make it possible to provide effective care?	Are work premises and aids accessible and designed in ways that make it easier for employees to perform high-quality work? Are work premises and aids accessible and designed in ways that reduce the employees' workload?
Terms of employment and personnel policy	Do the terms and conditions of employment allow the organisation's need for flexibility to be met? Do the terms and conditions of employment and available support for employees ensure that the organisation can deliver the care that society needs?	Do the terms and conditions of employment and available support mean that employees can feel secure (both financially and in terms of competence) and valued?
The organisation's ethical environment	Do the organisation's values and priorities allow for the efficient and safe provision of care?	Does the organisation offer support in ethical issues and dilemmas in a way that minimises the burden on employees and enables them to perform their work without value conflicts?

When the results from this systematic literature review are combined with existing knowledge about change processes in the work environment (see, for example, von Thiele Schwartz et al. 2021 [154] and the Provisions of the Swedish Work Environment Authority on

Systematic Work Environment Management), suggestions can be provided on how work ought to be organised:

1. Identify existing risk and health-promoting factors on an organisational level within the organisation.
2. Analyse and prioritise what needs to be addressed. Both analysis and prioritisation should be conducted in collaboration between management and employees.
3. Always look for opportunities to make health and safety improvements on an organisational level that not only reduce risk factors but also offer value. This refers to aspects that give organisations and employees the right conditions to perform work characterised by commitment and quality, with room for recovery and reflection.
   It may be necessary to address risk factors – but a focus on health-promoting factors is also needed to ensure a good work environment and satisfactory skills supply.
4. Investigate whether new risk and health-promoting factors are added by changes at the organisational level, for example, the introduction of new tasks, systems, procedures, etc. This applies even if the purpose of the change is to address the shortcomings of prevailing conditions.
5. When making decisions that jeopardise employees' sense of being able to work effectively, consider whether there might be another way to achieve the same goal.
6. Follow up on whether the measures have had the intended effect.

Methodology discussion

This systematic literature review presents the knowledge that can be gleaned from the last seven years of Nordic research on organisational risk and health-promoting factors in the healthcare sector. It takes a relatively new approach to the field by focusing on organisational risk and health-promoting factors instead of those factors at the workplace and individual level, which have usually dominated discussions about work-related illness and well-being. In order to achieve this, it was necessary to posit a broad research question. This allowed us to select a methodology that could capture a range of diverse aspects. The research that has been identified here reflects this: the articles are relatively heterogeneous and in some cases capture individual risk and health-promoting factors in widely divergent areas. Such a broad source search can be considered necessary to track down existing articles that investigate risk and health-promoting factors at the organisational level. One of the disadvantages is that we cannot make distinct statements about different relationships and the severity of any risks, which would have been possible if a systematic literature review using a statistical meta-analysis

had been conducted. To obtain a reasonable number of search results, we chose to limit our selected research to studies in a Nordic context published between 2016 and 2022. Studies highlighting risk and health-promoting factors during the COVID-19 pandemic or other extraordinary circumstances were excluded. To draw more general conclusions, research conducted beyond the Nordic region under similar conditions must be taken into account, as well as studies that investigate the relationship between current risk and health-promoting factors and outcomes other than health, such as the connection to the balance of demands and resources or the effects on quality and staff turnover.

With regard to both the systematic literature review's inclusion and exclusion criteria and their definition of the sometimes fluid boundary between workplace level and organisational level, certain restrictions were necessary. For example, we have chosen to exclude studies that focus on leadership in terms of the behaviour of line managers as a risk or health-promoting factor, because we consider this to be on the workplace level. According to our definition, leadership can only be seen as an organisational risk or health-promoting factor when the *condition*s for managers' leadership are examined, for example, in terms of the scope of their control, or when the role of *senior management* in, for example, design of operations and working methods or the organisation's ethical environment is explored.

The healthcare sector largely comprises female-dominated professions and workplaces. No conclusions have been drawn from the included studies about possible gender differences in the organisational risk and health-promoting factors identified in this systematic literature review.

Finally, our compilation should not be regarded as a comprehensive catalogue of risk and health-promoting factors at the organisational level. Such an all-encompassing picture could be obtained by starting with every known risk and health-promoting factor at the workplace level and then exploring the organisational conditions that contribute to them; but that was not the purpose of this systematic literature review. For an overview of the risk and health-promoting factors at the workplace level, reference can be made to the summaries presented in Table 1.

6. Conclusions

There are opportunities at the organisational level to not only manage but eliminate risks in the work environment, and it is here that there is an opportunity to actually create the conditions for a health-promoting work environment.

Organisational risk and health-promoting factors include how an organisation chooses to distribute working hours among its existing staff, design operations and working methods, invest in ergonomic aids that reduce workload/strain and ensure that they can be used, the terms and conditions under which it chooses to employ and make support available to its staff, and the extent to which the organisation takes into account the ethical demands and dilemmas of healthcare work.

In addition to what healthcare organisations do to control and manage the work with the aim of meeting their goals, their values are also fundamental to the health and well-being of their employees. This applies to both stated values and those values communicated through priorities and rewards. Healthcare organisations must ensure that the decisions they make in order to be able to control and manage the work in a manner that helps them achieve their goals do not make their employees ill. It is equally important that management and decision-makers take into account employees' need to feel appreciated and valued, as well as to feel satisfied with the day's work when they clock out.

Our results also show that in the Nordic countries, it is still relatively uncommon to focus on the organisational level in relation to employees' health and illness. If the work environment for healthcare professionals is to be improved, the organisational level must be emphasised.

There is already much knowledge about how the work environment in the healthcare sector can be made more health promoting and attractive. This applies above all to workplace demands and resources, an area in which there is solid knowledge of what can already be done in practice to improve the work environment in the Swedish healthcare sector. Thus, the focus should not only be on producing new knowledge, but also on using existing knowledge.

7. Knowledge gaps and research needs

This systematic literature review shows that it is still relatively uncommon to focus on the structural level/organisation of work in relation to employees' health and illness. Knowledge in this area remains fragmentary. In order to gain a comprehensive overview, the strengths and weaknesses in the results of each study must be weighed together and then interpreted in relation to other research. For example, research that focuses on how organisational risk and health-promoting factors related to demands and resources at the workplace level could be considered.

This would clarify how a health-promoting work environment can be created. Researchers who wish to explore health-promoting and preventive factors in the work environment of healthcare professionals can advantageously focus on the organisational level, rather than on demands and resources at the workplace level. For a more comprehensive overview of the field, research conducted outside the Nordic region, and in adjacent scientific fields, must be taken into account.

Finally, it is important to point out that there is already a wealth of knowledge about what promotes health and counteracts illness, not least at the workplace level but also at the organisational level. This knowledge provides clear indications of what needs to be done to create a health-promoting and attractive work environment. However, to translate this knowledge into practice, more knowledge is needed about effective and applicable working methods that empower management and decision-makers, together with employees, to take on this work and achieve improved working conditions in practice.

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Appendix

1. Table over included studies

2. Compilation of excluded full texts and reasons for exclusion

3. List of search strings

4. Results from quality review

Appendix 1 – Table over included studies

Författare	Ref. nr.	Design	Yrkesgrupp	Land	Syfte (som uttryckt i studien)	Kategori	Risk- eller friskfaktor	Utfall
Ahlstedt 2019	102	Kvalitativ	Sjuksköterskor	Sverige	To explore registered nurses' workday events in relation to inner work life theory to better understand what influences registered nurses to remain in work.	2, 4	F	Motivation
Andersen 2019	118	Kohort	Hälso- och sjukvårds-personal	Danmark	To investigate physical and psychosocial work environmental risk factors for back injury during patient transfer among healthcare workers in hospitals.	3	R	Ryggskada
Beltagy et al 2018	81	Kohort	Hälso- och sjukvårds-personal	Finland	To examine the status of night work as a risk factor for common mental disorders .	1	R	CMD (common mental disorders)
Bernstrøm et al 2020	59	Kohort	Hälso- och sjukvårds-personal	Norge	(1) To describe what shift-work arrangements exist at a large Norwegian hospital, (2) to investigate how these shift schedules relate to employees' sickness absence and (3) to investigate how individual differences in age, gender and parental status moderate the relationship between shift work and sickness absence.	1	R	Sjukfrånvaro
Bigert et al 2022	54	Kohort	Sjuksköterskor och under-sköterskor	Sverige	To evaluate the effects of various aspects of night and shift work, regarding incident stroke and other CeVD, by using detailed and registry-based exposure data.	1	R	CVD (cerebrovaskulär sjukdom) och stroke
Blomberg et al 2016	133	Tvärsnitt	Sjuksköterskor	Sverige	To investigate occupational stress among newly graduated nurses in relation to their workplace and clinical group supervision.	4	F	Stress
Cheng et al 2021	51	Kohort	Hälso- och sjukvårds-personal	Finland	To examine associations between shift work and mood disorders as well as the sleep problems of workers with differing chronotypes.	1	R	Affektiva störningar, sömnproblem
Cohidon et al 2019	89	Tvärsnitt	Läkare	Norge, Sverige	To use international comparisons to explore the structural and organizational factors associated with GP:s dissatisfaction at work.	2	R	Arbetsotillfreds-ställelse
Dahlgren et al 2021	69	Kohort	Sjuksköterskor	Sverige	To use an intensive longitudinal design to determine whether variation in QR, both within and between individuals, was associated with self-rated stress in newly graduated nurses.	1	R	Stress
Erdem et al 2017	77	Case control	Sjuksköterskor	Norge	To investigate telomere length (TL) variation as a potential mechanism of the association between long duration of night shift with several consecutive nights and the increased risk of breast cancer.	1	R	Telomer-förkortning (Telomer shortening)
Fallman et al 2019	140	Kohort	Chefer	Sverige	To investigate how restricted decision-making autonomy and conflicting demands impact operational managers' work performance and health.	5	R	Självskattad hälsa
Fallman et al 2022	106	Kvalitativ	Chefer	Sverige	To identify first-line managers' approaches for maintaining low levels of sick leave among their health care employees.	2	F	Sjukfrånvaro
Gamskjaer et al 2022	93	Kvalitativ	Hälso- och sjukvårds-personal	Danmark	To investigate reflections and perspectives from health professionals working within palliative rehabilitation for elements of importance in relation to job satisfaction.	2	F	Arbetstillfreds-ställelse
Golay et al 2022	123	Kvalitativ	Sjuksköterskor	Sverige	To provide a view of the concrete ways in which work-related IT use can compromise hospital nurses' well-being at work.	3	R	Upplevelse av alienering, ångest, frustration m.m.
Golay et al 2022	125	Kvalitativ	Sjuksköterskor	Sverige	To understand the appraisals and emotions at the core of nurses' positive experiences with information technology use at work.	3	F	Upplevelser av glädje, lättnad, förtroende och avkoppling
Golvani et al 2021	112	Kvalitativ	Sjuksköterskor	Sverige	To describe operating room nurses' experiences of limited access to daylight in the workplace.	3	R	Stress, utmattning, huvudvärk m.m.
Grasmo et al 2021	47	Kvalitativ	Hälso- och sjukvårds-personal	Norge	To explore the views of home care workers on how working conditions affect their safety, health, and wellbeing.	1, 5	R	Trötthet, skador, olyckor, smärta, blodtryck m.m.
Grønstad et al 2020	132	Kohort	Hälso- och sjukvårds-personal	Norge	To examine if and how the relationship between unit-level downsizing and sickness absence is moderated by three salient work factors: temporary contracts at the individual-level, and control and organizational commitment at the work-unit level.	4	R	Sjukfrånvaro
Grønstad et al 2019	139	Kohort	Hälso- och sjukvårds-personal	Norge	To examine the different relationships between six unit-level changes (upsizing, downsizing, merger, spin-off, outsourcing and insourcing) and sickness absence among hospital employees.	5	F	Sjukfrånvaro

Författare	Ref. nr.	Design	Yrkesgrupp	Land	Syfte (som uttryckt i studien)	Kategori	Risk- eller friskfaktor	Utfall
Gyllensten et al 2017	83	Kvalitativ	Under-sköterskor och sjuksköterskor	Sverige	To investigate the experiences of reduced work hours and no lunch breaks among a group of nurses and assistant nurses, with a particular focus on recovery and psychosocial working environment.	1	F	Energi
Hammer et al 2019	49	Kohort	Hälso- och sjukvårds-personal	Danmark	To investigate the association of different dimensions of night work, expressed by frequency and duration of night shifts throughout pregnancy, with the risk of severe PPD.	1	R	Post-partum depression
Hansen et al 2016	58	Kohort	Sjuksköterskor	Danmark	We investigated the association between shift work and incidence of diabetes over13 years among Danish female nurses who were members of the Danish Nurse Cohort.	1	R	Diabetes
Härmä et al 2019	56	Kohort	Hälso- och sjukvårds-personal	Finland	To assess whether continuous exposure to shift work would be associated with the risk for increased fatigue and changes in sleep length over 24 hr.	1	R	Trötthet, sömn
Härmä et al 2018	70	Kohort	Hälso- och sjukvårds-personal	Finland	To examine whether changes in work shifts and shift intensity are related to changes in difficulties to fall asleep, fatigue, and sleep length.	1	R	Trötthet
Härmä et al 2020	78	Kohort	Hälso- och sjukvårds-personal	Finland	We investigated the association of working hours with occupational injuries in hospital shift work.	1	R	Arbetsrelaterade skador
Henriksen et al 2016	53	Tvärsnitt	Barnmorskor	Norge	To assess burnout levels among Norwegian midwives and identify personal and work-related factors associated with burnout.	1	R	Utbrändhet
Heponiemi et al 2017	126	Kohort	Läkare	Finland	To examine the 9-year longitudinal development of SRIS (stress related to information systems) levels among Finnish physicians.	3	R	Stress
Heponiemi et al 2021	127	Tvärsnitt	Sjuksköterskor	Finland	To examine the association between using a mobile version of electronic health records (EHR) and perceived time pressure, stress related to information systems, and self-rated stress.	3	R	Stress
Heponiemi et al 2019	128	Tvärsnitt	Läkare	Finland	To examine the association of usability variables (perceived benefits, technical problems, support for feedback, and user-friendliness), 2) the number of systems in daily use, (3) experience of using information systems, and (4) participation in information systems development work with physicians' distress and levels of stress related to information systems (SRIS) levels.	3	R	Psykisk ohälsa, ångest
Herttuala et al 2020	91	Kvalitativ	Chefer	Finland	To clarify factors that support and prevent managers' work wellbeing by reviewing international research literature and interviewing Finnish social and healthcare managers.	2, 4	R	Välbefinnande
Holmberg et al 2016	129	Tvärsnitt	Sjuksköterskor	Sverige	To identify factors having positive impact on job satisfaction among Swedish psychiatric nursing staff in an inpatient psychiatric clinic.	4	R	Arbetstillfreds-ställelse
Hult et al 2022	131	Tvärsnitt	Sjuksköterskor	Finland	To explore employment precariousness, health and work well-being among permanent and temporary nurses.	4	R	Hälsa/ välbefinnande
Jacobsen et al 2022	110	Tvärsnitt	Sjuksköterskor	Danmark	We argue that employees in units with medium-sized spans of control observe more leadership and have higher job satisfaction. Furthermore, that span of control can affect leadership behaviors differently.	2	F	Arbetstillfreds-ställelse
Jakobsen et al 2018	136	RCT	Sjukhus-personal	Danmark	To evaluate the effect of workplace versus home-based physical exercise on pressure pain threshold (PPT) and musculoskeletal pain intensity in multiple body regions.	4	R	Fysisk ansträngning
Jensen et al 2018	66	Tvärsnitt	Sjuksköterskor	Danmark	To examine how intensive care nurses experience the effects of shift work on life outside work.	1	R	Psykisk ohälsa
Jepsen et al 2017	99	Tvärsnitt	Barnmorskor	Danmark	To investigate burnout among midwives – including a comparison of the level of burnout in caseloading midwives and midwives working in other models of care who do not provide continuity of care.	2	F	Utbrändhet
Jepsen et al 2016	100	Kvalitativ	Barnmorskor	Danmark	To advance knowledge about the working and living conditions of midwives in caseload midwifery and how this model of care is embedded in a standard maternity unit.	2	F	Arbetstillfreds-ställelse

Författare	Ref. nr.	Design	Yrkesgrupp	Land	Syfte (som uttryckt i studien)	Kategori	Risk- eller friskfaktor	Utfall
Johnsen et al 2022	97	Tvärsnitt	Läkare	Norge	To compare the workload and range of tasks between inexperienced and experienced GPs. Additionally, the study addresses the extent to which clinical experience affects the way GPs perceive their daily work, including perceived levels of unhealthy stress.	2	R	Självskattad hälsa
Jørgensen et al 2020	76	Kohort	Sjuksköterskor	Danmark	To examine the association between the type of shiftwork schedule and duration, and the incidence of dementia in the Danish nursing cohort, using detailed exposure information assessed at three different time points.	1	R	Demens
Jørgensen et al 2021	64	Kohort	Sjuksköterskor	Danmark	To examine in detail associations between different shift work schedules (day, evening, night, and rotating) and incidence of major psychiatric disorders, including mood disorders, neurotic disorders, and substance use.	1	R	Affektiva störningar
Jørgensen et al 2017	65	Kohort	Sjuksköterskor	Danmark	To examine the association between shift work and all-cause mortality and mortality due to CVD, cancer, diabetes, neurodegenerative and psychiatric diseases in the Danish nurse cohort (DNC).	1	R	Dödlighet
Jørgensen et al 2021	63	Kohort	Sjuksköterskor	Danmark	To examine whether shift work is associated with incidence of PD, by examining the effect of different shift work schedules (day, evening, night, rotating) and whether there is a dose–response relationship between duration (cumulative years) of different shift work schedules and incidence of PD.	1	R	Parkinsons (PD)
Kader et al 2021	73	Kohort	Hälso- och sjukvårds-personal	Sverige	To investigate the risk of PTB (pre-term birth) in relation to detailed, registry-based data on working hours.	1	R	För tidig födsel
Kader et al 2022	57	Kohort	Hälso- och sjukvårds-personal	Sverige	To examine the effects of various aspects of night and shift work on the risk of incident ischemic heart disease (IHD) and atrial fibrillation (AF) using detailed and registry-based exposure data.	1	R	Hjärtsjukdom
Kaltenbrunner et al 2019	101	Kohort	Hälso- och sjukvårds-personal	Sverige	To examine the extent to which changes over time in Lean maturity are associated with changes over time in care-giving, thriving and exhaustion, as perceived by staff, with a particular emphasis on the extent to which job demands and job resources, as perceived by staff, have a moderated mediation effect.	2	F	Utmattning, välbefinnande
Karhula et al 2018	67	Tvärsnitt	Hälso- och sjukvårds-personal	Finland	To study sleep and psychosocial factors at work among permanent night workers by comparing them to day workers and three shift workers.	1	R	Sömnsvårigheter, utmattning
Karhula et al 2020	86	Kvasi-ex-perimental interven-tion	Sjukhus-anställda	Finland	To investigate the effects of the implementation of software for participatory working time scheduling on realized working hour characteristics and changes in several wellbeing outcomes.	1	F	Hälsa
Kjellström et al 2017	90	Kvalitativ	Hälso- och sjukvårds-personal	Sverige	To carry out a deductive analysis of factors that influence professional work motivation on individual, organizational, and cultural level at well-functioning primary healthcare units.	2	F	Motivation
Kjørstad et al 2022	121	Tvärsnitt	Sjuksköterskor	Norge	To use both work and sleep diaries and actigraphy recordings to investigate nurses' sleep patterns, work functioning, levels of stress, and mood state over a 2-week period during which they undertook shifts in either a BDLE (blue-depleted light environment) or a STLE (standard hospital light environment). The secondary aim was to explore the nurses' self-reported medical and mental health when working in each light environment.	3	R	Fysisk och psykisk ohälsa
Larsen et al 2020	60	Tvärsnitt	Sjuksköterskor	Danmark, Finland	To investigate the association between timing and length of work shifts, short time between shifts (quick returns), number of consecutive nightshifts, and weekly working hours and the risk of long-term sickness absence (≥30 consecutive days) among female nursing personnel in the public healthcare sector in Denmark and Finland.	1	R	Sjukskrivning
Lee et al 2021	116	Kvalitativ	Sjuksköterskor och under-sköterskor	Sverige	To explore staff perspectives of the physical environment in supporting their care practices for residents living with dementia in Canadian and Swedish long-term care facilities.	3	F	Arbetstillfreds-ställelse
Lindegård et al 2016	113	Kohort	Tandvårds-personal	Sverige	To investigate the effects on self-reported neck pain, clinically diagnosed conditions in the neck, perceived exertion, and self-reported work ability among dental personal opting to use prismatic glasses during clinical dental work.	3	F	Nacksmärta

Författare	Ref. nr.	Design	Yrkesgrupp	Land	Syfte (som uttryckt i studien)	Kategori	Risk- eller friskfaktor	Utfall
Liss et al 2018	135	Tvärsnitt	Tandhygienister	Sverige	To explore and analyse DHs' self-reported views on: 1. professional competencies and behavioural interventions in periodontal therapy, 2. work-related support in the treatment of periodontitis patients and daily practice, and overall work satisfaction.	4	F	Arbetstillfreds-ställelse
Loft et al 2020	85	Kvalitativ	Sjuksköterskor	Danmark	To explore which factors are important in terms of experienced nurses' intention to stay in the clinical setting and to learn which factors affect their job satisfaction.	1, 4	F	Arbetstillfreds-ställelse
Lunde et al 2021	120	Kohort	Hälso- och sjukvårds-personal	Norge	To determine the association between objectively measured standing at work and lower-extremity pain intensity (LEPi) in construction- and healthcare workers over a 2- year period.	3	R	Smärta
Mauno et al 2016	138	Tvärsnitt	Sjuksköterskor	Finland	To examine whether three resources, that is, compassion, transformational leadership and work ethic feasibility, buffer against the negative effects of emotional labour on work engagement.	5	F	Engagemang
Møller et al 2022	80	Tvärsnitt	Läkare	Danmark	To identify the prevalence of burnout among VSs (vascular surgeons) and VSTs in Denmark and identify potential burnout risk factors, including psychosocial working conditions.	1	R	Utbrändhet
Nielsen et al 2019	63	Kohort	Hälso- och sjukvårdsper-sonal	Danmark	To assess how duration of time between shifts – and, specifically, quick returns – affect risk of injury. Additionally, we evaluated the association between injury and days since a quick return as well as the number of quick returns in the past week.	1	R	Skador
Nielsen et al 2019	62	Case control	Hälso- och sjukvårds-personal	Danmark	To assess how shift work characteristics affect the risk of occupational, transport and leisure-time injuries.	1	R	Skador
Nielsen et al 2016	104	Kvalitativ	Hälso- och sjukvårdsper-sonal	Danmark	To extend the current knowledge of employee engagement by emphasising how caregivers experience meaning in their work.	2, 4	R	Engagemang
Olsen et al 2017	103	Tvärsnitt	Sjuksköterskor	Norge	To explore the influence of job resources and job demands on bullying and three self-reported nurse outcomes. The selected outcome variables were job performance, job satisfaction, and work ability.	2	R	Arbetstillfreds-ställelse, arbetsförmåga
Ose et al 2022	137	Tvärsnitt	Sjuksköterskor	Norge	To identify the causes of work-related sick leave among Norwegian hospital nurses.	4	R	Sjukfrånvaro
Ose et al 2019	79	Kvalitativ	Sjuksköterskor	Norge	To perform a thorough qualitative study, to understand nurses' experiences and perceptions of working 12-hour shifts compared with the usual 8-hour shifts.	1	R	Hälsa
Pedersen et al 2020	105	Rando-miserat fältexperi-ment	Läkare	Danmark	Hypothesise accreditation to have a negative effect on GP (general practitioner) job satisfaction.	2	R	Arbetstillfreds-ställelse
Persson et al 2018	48	Tvärsnitt	Hälso- och sjukvårdsper-sonal	Sverige	To examine the association between work-place relationships, with a focus on colleague belongingness, and self-rated health among employees in a Swedish municipal elderly health care organization.	1	R	Hälsa
Poikkeus et al 2020	141	Tvärsnitt	Sjuksköterskor	Finland	To examine relationships between nurses perceived organizational and individual support, ethical competence, ethical safety, and work satisfaction.	5	F	Arbetstillfreds-ställelse
Rantanen et al 2016	98	Tvärsnitt	Sjuksköterskor	Finland	To test the differences between the primary nursing model and the individual patient allocation model in: (1) work-related motivational characteristics; (2) work-related stress factors; and (3) job satisfaction, as reported by nurses working at one university hospital.	2	R	Stress
Riisgaard et al 2017	94	Tvärsnitt	Hälso- och sjukvårdsper-sonal	Danmark	The objective of this study was to investigate associations between degrees of task delegation and job satisfaction of GPs and their staff in Danish general practice using the management of patients with chronic obstructive pulmonary disease (COPD) as our case.	2	F	Arbetstillfreds-ställelse
Ropponen et al 2023	74	Kohort	Hälso- och sjukvårds-personal	Finland	To explore and identify working hour patterns among hospital employees working irregular working hours and to investigate the associations between the identified patterns and the risk of occupational accidents.	1	R	Arbetsrelaterade olyckor
Ropponen et al 2022	72	Kohort	Hälso- och sjukvårds-personal	Finland	To investigate the association of the characteristics of working hours with the risk of short (1–3 days) sickness absence among hospital physicians.	1	R	Sjukfrånvaro
Ropponen et al 2020	52	Kohort	Hälso- och sjukvårds-personal	Finland	We studied, first, age group differences in objective working-hour characteristics among women in hospital work and, second, the associations of working-hour characteristics with short (1–3days) sickness absence in different age groups.	1	R	Sjukfrånvaro

Författare	Ref. nr.	Design	Yrkesgrupp	Land	Syfte (som uttryckt i studien)	Kategori	Risk- eller friskfaktor	Utfall
Ropponen et al 2019	75	Case control	Hälso- och sjukvårds-personal	Finland	To investigate the association between working-hour characteristics in shiftwork and the incidence of short (1–3days) sickness absence among hospital employees.	1	R	Sjukfrånvaro
Rosenström et al 2021	130	Kohort	Hälso- och sjukvårds-personal	Finland	To: (i) characterize working hour patterns in shift work by means of permutation distribution clustering as a data-mining tool, and (ii) study associations between these shift work patterns and sickness absence.	4	R	Sjukfrånvaro
Routsalainen et al 2023	92	Tvärsnitt	Hälso- och sjukvårds-personal	Finland	To examine the association between self-organizing teamwork practices and job satisfaction and turnover intentions. Furthermore, we examined whether psychosocial factors acted as potential mediators.	2	F	Arbetstillfreds-ställelse
Routsalainen et al 2020	87	Mixed-method	Hemtjänsts-personal	Finland	To explore the challenges, stressors, team work and management factors that are associated with home care staff members' well-being, job satisfaction and experienced care quality, and further, how staff members experience their work.	2	R	Psykisk ohälsa, ångest
Seitovirta et al 2017	84	Kvalitativ	Sjuksköterskor	Finland	To identify the meaningful types of rewards and the possible consequences of rewards as expressed by RNs (registered nurses).	1, 4	F	Arbetstillfreds-ställelse, hängivenhet
Sigursteinsdóttir et al 2020	111	Tvärsnitt	Chefer	Island	We analyzed musculoskeletal pain/discomfort in the neck and neck area, the shoulder and shoulder area, and the lower back, stressful factors in the work environment, and adequate sleep among Icelandic nursing unit managers, along with the correlation between these three factors.	2	R	Sömn
Slåtten et al 2022	107	Tvärsnitt	Sjuksköterskor	Norge	To examine whether work engagement (WE) is a significant predictor of the achievement of these preferred organizational goals: how best to lower nursing professionals' turnover intentions, and increase their job satisfaction and the quality of care provided to patients.	2	F	Arbetstillfreds-ställelse, engagemang
Spännargård et al 2022	134	Tvärsnitt	Psykotera-peuter	Sverige	To map the level of work-related burnout and fatigue among psychotherapists working in clinical settings and to investigate the relation between burnout and (a) person-related factors such as age, training, level of education, years in profession and perceived competence; and (b) work-related factors such as type of clinical setting, satisfaction with the work situation and access to clinical supervision.	4	F	Utbrändhet
Stadin et al 2020	122	Kvalitativ	Chefer	Sverige	To describe healthcare managers' experience of technostress and their actions for handling it.	3	F	Stress
Svedahl et al 2019	96	Kvalitativ	Läkare	Norge	To explore how GPs and their co-workers in Norway perceive and tackle their workload, and their experiences and reflections regarding explanations for and consequences of increased workload in general practice.	2	R	Hälsa, motivation
Thapa et al 2021	109	Kvalitativ	Sjuksköterskor och barnmorskor	Sverige	To explore and gain a deeper understanding of how nurses and midwives experience their everyday work, with a view toward promoting and sustaining their work-related health.	2, 5	F	Arbetstillfreds-ställelse
Thun et al 2018	95	Tvärsnitt	Läkare	Norge	To describe the relationship between unreasonable illegitimate tasks and sickness presenteeism in physicians after controlling for variance in age, gender, role conflict, control over work pace, exhaustion and administrative tasks.	2	R	Sjuknärvaro
Vainomäki et al 2020	124	Tvärsnitt	Läkare	Finland	We examined the associations of HER (electronic health record)-related variables with time pressure andstress and how these associations diered according to working environment.	3	R	Stress
Vedaa et al 2019	50	Tvärsnitt	Sjuksköterskor	Norge	To examine the association between quick returns (<11h) and night shifts, and self-reported work-related accidents, near accidents or dozing off at work.	1	R	Arbetsrelaterade skador
Vedaa et al 2017	68	Kohort	Sjuksköterskor	Norge	To further examine the specific sleep-related consequences associated with QRs (quick returns), as compared with other common shift transitions.	1	R	Sömn, stress
Vedaa et al 2017	71	Kohort	Sjuksköterskor	Norge	We investigated whether exposure to quick returns and night shifts could predict later sick leave, and to what extent personality traits associated with shift work tolerance predicted sick leave and/or moderated any such prediction by shift schedule characteristics.	1	R	Sjukfrånvaro

Författare	Ref. nr.	Design	Yrkesgrupp	Land	Syfte (som uttryckt i studien)	Kategori	Risk- eller friskfaktor	Utfall
Vedaa et al 2020	82	Kohort	Sjuksköterskor	Norge	To investigate how a reduction or an increase in the number of QR over time are associated with the risk of nurses reporting occupational accidents.	1	R	Arbetsrelaterade skador
Vifladt et al 2016	108	Tvärsnitt	Sjuksköterskor	Norge	To investigate associations between the RNs (registered nurses) perception of the safety culture in ICUs, and burnout and sense of coherence. The secondary objective was to compare the scores for burnout and sense of coherence among the RNs in restructured and not restructured ICUs.	2	R	Utbrändhet
Vilén et al 2022	114	Tvärsnitt	Hälso- och sjukvårds-personal	Finland	To determine the current prevalence of hoarseness among six subgroups of nurses (registered nurses, primary care nurses, pediatric nurses, laboratory nurses, dental nurses, and midwifes) and also to identify potential environmental risk factors in their working environment.	3	R	Heshet
Vilén et al 2021	115	Tvärsnitt	Hälso- och sjukvårds-personal	Finland	To determine the current prevalence of hoarseness among the nurses in six different occupational subgroups (registered nurses, primary care nurses, pediatric nurses, laboratory nurses, dental nurses, and mid-wives) in order to determine whether different occupational subgroups have different environmental risk factors for hoarseness.	3	R	Heshet
Vinstrup et al 2020	117	Kohort	Hälso- och sjukvårds-personal	Danmark	To create an exposure-matrix to identify associations between biomechanical load during patient transfer and the odds of back injury and LBP among healthcare workers.	3	F	Ryggsmärta och ryggskada
Waage et al 2021	55	Kohort	Sjuksköterskor	Norge	To explore how changes in the work schedule would affect the prevalence of SWD (shift work disease) over time.	1	F	Trötthet (shift work disease)
Westergren et al 2022	88	Kvalitativ	Sjuksköterskor	Sverige	To carry out an exploratory analysis of the work situation of haemodialysis nurses from an ergonomic perspective.	3	R	Muskuloskeletala besvär
Westergren et al 2020	119	Tvärsnitt	Sjuksköterskor	Sverige	(1) To examine the association between the type of dialysis machine and disposables used with the occurrence of hand complaints among haemodialysis nurses and (2) to compare occupational risks [revised strain index (RSI)] of developing work-related MSDs of the distal upper extremities based on the materials used for haemodialysis.	3	R	Muskuloskeletala besvär

Kategori 1: arbetstidsfördelning
Kategori 2: organisering och styrning av arbetet
Kategori 3: ergonomiska förutsättningar
Kategori 4: anställningsvillkor och personalpolitik
Kategori 5: organisationens etiska miljö
F: friskfaktor; R: riskfaktor.

Appendix 2 – Compilation of excluded full texts and reasons for exclusion

Authors	Published Year	Title	Journal	Volume	Issue	Notes
Niinihuhta, M.; Terkamo-Moisio, A.; Kvist, T.; Häggman-Laitila, A.	2022	A comprehensive evaluation of factors affecting nurse leaders' work-related well-being.	Leadersh. in Health Serv.	35	3	Exclusion reason: Wrong comparator
Andersen, L. P.; Hogh, A.; Biering, K.; Gadegaard, C. A.	2018	Work-related threats and violence in human service sectors: The importance of the psycho-social work environment examined in a multilevel prospective study.	Work	59	1	Exclusion reason: Wrong comparator
Lexén, A.; Kåhlin, I.; Erlandsson, L. K.; Håkansson, C.	2020	Occupational health among swedish occupational therapists: A cross-sectional study.	Int. J. Environ. Res. Public Health	17	10	Exclusion reason: Wrong outcomes
Johannessen, D. A.; Nordfjærn, T.; Geirdal, A. Ø	2021	Work-related satisfaction among clinicians working at inpatient treatment facilities for substance use disorder: The role of recovery orientation.	Int. J. Environ. Res. Public Health	18	14	Exclusion reason: Wrong comparator
Mahmood, J. I.; Grotmol, K. S.; Tesli, M.; Moum, T.; Andreassen, O.; Tyssen, R.	2019	Life satisfaction in Norwegian medical doctors: A 15-year longitudinal study of work-related predictors.	BMC Health Serv. Res.	19	1	Exclusion reason: Wrong comparator
Ezzatvar, Y.; Calatayud, J.; Andersen, L. L.; Aiguadé, R.; Benítez, J.; Casaña, J.	2020	Professional experience, work setting, work _posture and workload influence the risk for musculoskeletal pain among physical therapists: a cross-sectional study.	Int. Arch. Occup. Environ. Health	93	2	Exclusion reason: Wrong population
Bjorkman, A.; Engstrom, M.; Olsson, A.; Wahlberg, A. C.	2017	Identified obstacles and prerequisites in telenurses' work environment - a modified Delphi study.	BMC Health Serv. Res.	17	1	Exclusion reason: Wrong outcomes
Andersen, L. P.; Elklit, A.; Pihl-Thingvad, J.	2021	Work-related violence and organizational commitment among health care workers: does supervisor's support make a difference?	Int. Arch. Occup. Environ. Health	94	7	Exclusion reason: Wrong comparator
Bazazan, A.; Dianat, I.; Bahrampour, S.; Talebian, A.; Zandi, H.; Sharafkhaneh, A.; Maleki-Ghahfarokhi, A.	2019	Association of musculoskeletal disorders and workload with work schedule and job satisfaction among emergency nurses.	Int. Emerg. Nurs.	44		Exclusion reason: Wrong population
Hvidtfeldt, U. A.; Bjorner, J. B.; Jensen, J. H.; Breinegaard, N.; Hasle, P.; Bonde, J. P. E.; Rod, N. H.	2017	Cohort Profile: The Well-being in HospitAL Employees (WHALE) study.	Int. J. Epidemiol.	46	6	Exclusion reason: Wrong study design
Hadžibajramović, E.; Ahlborg, G., Jr.; Grimby-Ekman, A.	2019	Concurrent and lagged effects of psychosocial job stressors on symptoms of burnout.	Int. Arch. Occup. Environ. Health	92	7	Exclusion reason: Wrong comparator
Marklund, S.; Huang, K.; Zohouri, D.; Wahlström, J.	2021	Dentists working conditions–factors associated with perceived workload	Acta Odontol. Scand.	79	4	Exclusion reason: Wrong outcomes
Kirchhoff, J. W.; Marks, A.; Helgesen, A. K.; Andersen, K. L.; Andreassen, H. M.; Grøndahl, V. A.	2021	The impact of information and communication technology on doctors' and registered nurses' working conditions and clinical work – a cross-sectional study in a norwegian hospital.	J. Multidiscip.Healthc.	14		Exclusion reason: Wrong outcomes
Strandell, R.	2020	Care workers under pressure – A comparison of the work situation in Swedish home care 2005 and 2015.	Health Soc. Care Community	28	1	Exclusion reason: Wrong study design
Helgesson, M.; Marklund, S.; Gustafsson, K.; Aronsson, G.; Leineweber, C.	2021	Favorable Working Conditions Related to Health Behavior Among Nurses and Care Assistants in Sweden—A Population-Based Cohort Study.	Front. Public Health	9		Exclusion reason: Wrong outcomes
Lindberg, J.; Holmström, P.; Hallberg, S.; Björk-Eriksson, T.; Olsson, C. E.	2020	A national perspective about the current work situation at modern radiotherapy departments.	Clin. Transl. Radiat. Oncol.	24		Exclusion reason: Wrong outcomes
Lindmark, U.; Wagman, P.; Wåhlin, C.; Rolander, B.	2018	Workplace health in dental care – a salutogenic approach.	Int. J. Dent. Hyg.	16	1	Exclusion reason: Wrong comparator
Ejlertsson, L.; Heijbel, B.; Andersson, I. H.; Troein, M.; Brorsson, A.	2021	Strengthened workplace relationships facilitate recovery at work – qualitative experiences of an intervention among employees in primary health care.	BMC Fam. Pract.	22	1	Exclusion reason: Wrong study design
Cabezas-García, H. R.; Torres-Lacomba, M.	2018	Prevalence of work-related musculoskeletal disorders in professionals of the rehabilitation services and physiotherapy units.	Fisioterapia	40	3	Exclusion reason: Wrong population
Gustafsson, K.; Marklund, S.; Leineweber, C.; Bergström, G.; Aboagye, E.; Helgesson, M.	2020	Presenteeism, psychosocial working conditions and work ability among care workers—a cross-sectional swedish population-based study.	Int. J. Environ. Res. Public Health	17	7	Exclusion reason: Wrong outcomes
Potrebny, T.; Igland, J.; Espehaug, B.; Ciliska, D.; Graverholt, B.	2022	Individual and organizational features of a favorable work environment in nursing homes: a cross-sectional study.	BMC Health Serv. Res.	22	1	Exclusion reason: Wrong outcomes
Nilsen, P.; Fernemark, H.; Seing, I.; Schildmeijer, K.; Ericsson, C.; Skagerström, J.	2021	Working conditions in primary care: a qualitative interview study with physicians in Sweden informed by the Effort-Reward-Imbalance model.	BMC Fam. Pract.	22	1	Exclusion reason: Wrong outcomes
Bachmann, L.; Michaelsen, R.; Vatne, S.	2019	Professional vulnerability in mental healthcare contexts: A focus group study of milieu-therapists' experiences.	Nurs. Open	6	3	Exclusion reason: Wrong outcomes
Vinstrup, J.; Jakobsen, M. D.; Andersen, L. L.	2020	Perceived Stress and Low-Back Pain Among Healthcare Workers: A Multi-Center Prospective Cohort Study.	Front. Public Health	8		Exclusion reason: Wrong comparator

Authors	Published Year	Title	Journal	Volume	Issue	Notes
Williamsson, A.; Dellve, L.; Karltun, A.	2019	"Nurses' use of visual management in hospitals —A longitudinal, quantitative study on its implications on systems performance and working conditions".	J. Adv. Nurs.	75	4	Exclusion reason: Wrong outcomes
Wallin, S.; Fjellman-Wiklund, A.; Fagerström, L.	2022	Work motivation and occupational self-efficacy belief to continue working among ageing home care nurses: a mixed methods study.	BMC Nurs.	21	1	Exclusion reason: Wrong comparator
Leineweber, C.; Marklund, S.; Gustafsson, K.; Helgesson, M.	2020	Work environment risk factors for the duration of all cause and diagnose-specific sickness absence among healthcare workers in Sweden: A prospective study.	Occup. Environ. Med.	77	11	Exclusion reason: Wrong comparator
Van Den Berg, J.; Bäck, F.; Hed, Z.; Edvardsson, D.	2017	Transition to a New Neonatal Intensive Care Unit: Positive Effects on Staff Working Environment and How the Physical Environment Facilitates Family-Centered Care.	J. Perinat. Neonatal Nurs.	31	1	Exclusion reason: Wrong outcomes
Kaiser, S.; Patras, J.; Adolfsen, F.; Richardsen, A. M.; Martinussen, M.	2020	Using the Job Demands–Resources Model to Evaluate Work-Related Outcomes Among Norwegian Health Care Workers.	SAGE Open	10	3	Exclusion reason: Wrong comparator
Marklund, S.; Gustafsson, K.; Aronsson, G.; Leineweber, C.; Helgesson, M.	2019	Working conditions and compensated sickness absence among nurses and care assistants in Sweden during two decades: A cross-sectional biennial survey study.	BMJ Open	9	11	Exclusion reason: Wrong outcomes
da Silva, S. M.; Braga, N. T.; Soares, R. Â Q.; Baptista, P. C. P.	2020	Musculoskeletal disorders and actions to reduce the occurrence in nursing workers.	Rev. Enferm.	28		Exclusion reason: Wrong population
Helgesson, M.; Marklund, S.; Gustafsson, K.; Aronsson, G.; Leineweber, C.	2020	Interaction effects of physical and psychosocial working conditions on risk for sickness absence: A prospective study of nurses and care assistants in Sweden.	Int. J. Environ. Res. Public Health	17	20	Exclusion reason: Wrong outcomes
Figueiredo, L. C.; Gratão, A. C. M.; Barbosa, G. C.; Monteiro, D. Q.; Pelegrini, L. N. C.; Sato, T. O.	2021	Musculoskeletal symptoms in formal and informal caregivers of elderly people.	Rev Bras Enferm	75	2	Exclusion reason: Wrong population
Anskär, E.; Falk, M.; Sverker, A.	2022	'But there are so many referrals which are totally … only generating work and irritation': a qualitative study of physicians' and nurses' experiences of work tasks in primary care in Sweden.	Scand. J. Prim. Health Care			Exclusion reason: Wrong outcomes
Areskoug Josefsson, K.; Avby, G.; Andersson Bäck, M.; Kjellström, S.	2018	Workers' experiences of healthy work environment indicators at well-functioning primary care units in Sweden: a qualitative study.	Scand. J. Prim. Health Care	36	4	Exclusion reason: Wrong comparator
Hislop, J.; Hensman, C.; Isaksson, M.; Tirosh, O.; McCormick, J.	2022	How Does Robot-Assisted Laparoscopic Surgery Impact Pain and Burnout Among Minimally Invasive Surgeons? A Survey Study.	Lect. Notes Comput. Sci.	13320 LNCS		Exclusion reason: Wrong publication type
Golay, D.; Sving, C.; Cajander, A.	2022	An Emotion-driven Approach to Hospital Physicians' Work-Related User Experience.				Exclusion reason: Wrong publication type
Khamaj, A. M.; Ali, A. M.; Alam, M. M.	2022	Investigating factors affecting musculoskeletal disorders: Predictive models for identifying caregivers at risk.	Work	72	4	Exclusion reason: Wrong population
Cargnin, Z. A.; Schneider, D. G.; Vargas, M. A. O.; Machado, R. R.	2019	Non-specific low back pain and its relation to the nursing work process	Rev. Lat. Am. Enferm.	27		Exclusion reason: Wrong population
Gustafsson, K.; Marklund, S.; Aronsson, G.; Leineweber, C.	2019	Physical work environment factors affecting risk for disability pension due to mental or musculoskeletal diagnoses among nursing professionals, care assistants and other occupations: A prospective, population-based cohort study.	BMJ Open	9	10	Exclusion reason: Wrong comparator
Bjaalid, G.; Olsen, E.; Melberg, K.; Mikkelsen, A.	2020	Institutional stress and job performance among hospital employees.	Int. J. Organ. Anal.	28	2	Exclusion reason: Wrong outcomes
Lunde, L. K.; Koch, M.; Knardahl, S.; Veiersted, K. B.	2017	Associations of objectively measured sitting and standing with low-back pain intensity: A 6-month follow-up of construction and healthcare workers.	Scand. J. Work Environ. Health	43	3	Exclusion reason: Wrong comparator
Andersen, L. L.; Villadsen, E.; Clausen, T.	2020	Influence of physical and psychosocial working conditions for the risk of disability pension among healthy female eldercare workers: Prospective cohort.	Scand. J. Public Health	48	4	Exclusion reason: Wrong comparator
Håkansson, C.; Lexén, A.	2021	The combination of psychosocial working conditions, occupational balance and sociodemographic characteristics and their associations with no or negligible stress symptoms among Swedish occupational therapists – a cross-sectional study	BMC Health Serv. Res.	21	1	Exclusion reason: Wrong outcomes
Anskär, E.; Lindberg, M.; Falk, M.; Andersson, A.	2019	Legitimacy of work tasks, psychosocial work environment, and time utilization among primary care staff in Sweden.	Scand. J. Prim. Health Care	37	4	Exclusion reason: Wrong outcomes
Lundgren, D.; Ernsth Bravell, M.; Börjesson, U.; Kåreholt, I.	2020	The Association Between Psychosocial Work Environment and Satisfaction With Old Age Care Among Care Recipients.	J. Appl. Gerontol.	39	7	Exclusion reason: Wrong outcomes

Authors	Published Year	Title	Journal	Volume	Issue	Notes
Reijula, J.; Ruohomäki, V.	2018	Perception of hospital environment before and after relocation.	Facilities	36	5-6	Exclusion reason: Wrong outcomes
Jeong, C. H.; Yazdanyar, N.	2020	Noise level measured in danish dental clinics.				Exclusion reason: Wrong publication type
Khansa, I.; Khansa, L.; Westvik, T. S.; Ahmad, J.; Lista, F.; Janis, J. E.	2018	Work-Related Musculoskeletal Injuries in Plastic Surgeons in the United States, Canada, and Norway.	Plast. Reconstr. Surg.	141	1	Exclusion reason: Wrong population
Gadolin, C.; Skyvell Nilsson, M.; Ros, A.; Törner, M.	2021	Preconditions for nurses' perceived organizational support in healthcare: a qualitative explorative study.	J. Health Organ. Manage.	35	9	Exclusion reason: Wrong outcomes
Andersen, L. H.; Christensen, T. B.	2022	Taking Prior Sick Leave Patterns Into Account When Estimating Health Consequences of Violence on the Job.	Work. Health Safety	70	11	Exclusion reason: Wrong population
Muthukrishnan, R.; Maqbool Ahmad, J.	2021	Ergonomic risk factors and risk exposure level of nursing tasks: association with work-related musculoskeletal disorders in nurses.	Europ. J. Physiother.	23	4	Exclusion reason: Wrong population
Januario, L. B.; Karstad, K.; Rugulies, R.; Bergström, G.; Holtermann, A.; Hallman, D. M.	2019	Association between psychosocial working conditions and perceived physical exertion among eldercareworkers: A cross-sectional multilevel analysis of nursing homes, wards and workers.	Int. J. Environ. Res. Public Health	16	19	Exclusion reason: Wrong outcomes
Gluschkoff, K.; Hakanen, J. J.; Elovainio, M.; Vänskä, J.; Heponiemi, T.	2022	The relative importance of work-related psychosocial factors in physician burnout.	Occup. Med.	72	1	Exclusion reason: Wrong comparator
Backman, A.; Lindkvist, M.; Lövheim, H.; Sjögren, K.; Edvardsson, D.	2022	Longitudinal changes in nursing home leadership, direct care staff job strain and social support in Swedish nursing homes—findings from the U-AGE SWENIS study.	Int. J. Older People Nurs.			Exclusion reason: Wrong outcomes
Stolt, M.; Miikkola, M.; Suhonen, R.; Leino-Kilpi, H.	2018	Nurses' Perceptions of Their Foot Health: Implications for Occupational Health Care	Work. Health Safety	66	3	Exclusion reason: Wrong outcomes
Marklund, S.; Mienna, C. S.; Wahlström, J.; Englund, E.; Wiesinger, B.	2020	Work ability and productivity among dentists: associations with musculoskeletal pain, stress, and sleep.	Int. Arch. Occup. Environ. Health	93	2	Exclusion reason: Wrong comparator
Milton, J.; Erichsen Andersson, A.; Åberg, N. D.; Gillespie, B. M.; Oxelmark, L.	2022	Healthcare professionals' perceptions of interprofessional teamwork in the emergency department: a critical incident study.	Scand. J. Trauma Resusc. Emerg. Med.	30	1	Exclusion reason: Wrong outcomes
Xu, H. G.; Johnston, A. N. B.; Greenslade, J. H.; Wallis, M.; Elder, E.; Abraham, L.; Thom, O.; Carlström, E.; Crilly, J.	2019	Stressors and coping strategies of emergency department nurses and doctors: A cross-sectional study.	Australas. Emerg. Care	22	3	Exclusion reason: Wrong population
Furunes, T.; Kaltveit, A.; Akerjordet, K.	2018	Health-promoting leadership: A qualitative study from experienced nurses' perspective.	J. Clin. Nurs.	27	23-24	Exclusion reason: Wrong outcomes
Vainiomäki, S.; Aalto, A. M.; Lääveri, T.; Sinervo, T.; Elovainio, M.; Mäntyselkä, P.; Hyppönen, H.	2017	Better usability and technical stability could lead to better work-related well-being among physicians.	Appl. Clin. Informatics	8	4	Exclusion reason: Wrong outcomes
Gustavsson, M. E.; Juth, N.; Arnberg, F. K.; von Schreeb, J.	2022	Dealing with difficult choices: a qualitative study of experiences and consequences of moral challenges among disaster healthcare responders.	Confl. Health	16	1	Exclusion reason: Wrong outcomes
Torp, S.; Bergheim, L. T. J.	2022	Working environment, work engagement and mental health problems among occupational and physical therapists.	Scand. J. Occup. Ther.			Exclusion reason: Wrong comparator
Jutengren, G.; Jaldestad, E.; Dellve, L.; Eriksson, A.	2020	The potential importance of social capital and job crafting for work engagement and job satisfaction among health-care employees.	Int. J. Environ. Res. Public Health	17	12	Exclusion reason: Wrong outcomes
Burr, H.; Pohrt, A.; Rugulies, R.; Holtermann, A.; Hasselhorn, H. M.	2017	Does age modify the association between physical work demands and deterioration of self-rated general health?	Scand. J. Work Environ. Health	43	3	Exclusion reason: Wrong population
Lukasse, M.; Henriksen, L.	2019	Norwegian midwives' perceptions of their practice environment: A mixed methods study.	Nurs. Open	6	4	Exclusion reason: Wrong outcomes
Mathisen, J.; Nguyen, T. L.; Jensen, J. H.; Mehta, A. J.; Rugulies, R.; Rod, N. H.	2022	Impact of hypothetical improvements in the psychosocial work environment on sickness absence rates: a simulation study.	Eur J Public Health	32	5	Exclusion reason: Wrong outcomes
Wells, A. C.; Kjellman, M.; Harper, S. J. F.; Forsman, M.; Hallbeck, M. S.	2019	Operating hurts: a study of EAES surgeons.	Surg. Endosc.	33	3	Exclusion reason: Wrong population
Maneschiöld, P. O.; Lucaci-Maneschiöld, D.	2021	Nursing assistant's perceptions of the good work environment in municipal elderly care in Sweden –a focus group study.	J. Health Organ. Manage.	35	9	Exclusion reason: Wrong outcomes
Chan, K. A. C.; Molina, J. A.; Tirthdas, D. A. T.	2018	Assessment of postural analysis in a dialysis clinic.	Adv. Intell. Sys. Comput.	590		Exclusion reason: Wrong publication type
Mauno, S.; Ruokolainen, M.; De Bloom, J.; Kinnunen, U.	2017	Does recovery buffer against emotional labor in terms of motivational outcomes at work? Analyzing age differences among Finnish health care professionals.	Appl. Nurs. Res.	36		Exclusion reason: Wrong outcomes

Authors	Published Year	Title	Journal	Volume	Issue	Notes
Ree, E.	2020	What is the role of transformational leadership, work environment and patient safety culture for person-centred care? A cross-sectional study in Norwegian nursing homes and home care services.	Nurs. Open	7	6	Exclusion reason: Wrong outcomes
Berthelsen, H.; Owen, M.; Westerlund, H.	2021	Does workplace social capital predict care quality through job satisfaction and stress at the clinic? A prospective study.	BMC Public Health	21	1	Exclusion reason: Wrong outcomes
Bry, A.; Wigert, H.	2022	Organizational climate and interpersonal interactions among registered nurses in a neonatal intensive care unit: A qualitative study.	J. Nurs. Manage.			Exclusion reason: Wrong outcomes
Roelen, C. A. M.; van Hoffen, M. F. A.; Waage, S.; Schaufeli, W. B.; Twisk, J. W. R.; Bjorvatn, B.; Moen, B. E.; Pallesen, S.	2018	Psychosocial work environment and mental health-related long-term sickness absence among nurses.	Int. Arch. Occup. Environ. Health	91	2	Exclusion reason: Wrong outcomes
Derks, M. T. H.; Mishra, A. K.; Loomans, M. G. L. C.; Kort, H. S. M.	2018	Understanding thermal comfort perception of nurses in a hospital ward work environment.	Build. Environ.	140		Exclusion reason: Wrong population
Arakelian, E.; Rudolfsson, G.; Rask-Andersen, A.; Runeson-Broberg, R.; Wålinder, R.	2019	I Stay—Swedish Specialist Nurses in the Perioperative Context and Their Reasons to Stay at Their Workplace.	J. Perianesth. Nurs.	34	3	Exclusion reason: Wrong outcomes
Hildingsson, I.; Karlström, A.; Larsson, B.	2020	A continuity of care project with two on-call schedules: Findings from a rural area in Sweden.	Sex. Reprod. Healthc.	26		Exclusion reason: Wrong population
Jakobsen, M. D.; Sundstrup, E.; Brandt, M.; Andersen, L. L.	2017	Psychosocial benefits of workplace physical exercise: Cluster randomized controlled trial.	BMC Public Health	17	1	Exclusion reason: Wrong study design
Hølge-Hazelton, B.; Berthelsen, C. B.	2021	Why nurses stay in departments with low turnover: A constructivist approach.	Nordic J. Nurs. Res.	41	3	Exclusion reason: Wrong outcomes
Hage, T. W.; Isaksson Rø, K.; Rø, Ø	2021	Burnout among staff on specialized eating disorder units in Norway.	J. Eating Disord.	9	1	Exclusion reason: Wrong outcomes
Pihl-Thingvad, J.; Brandt, L. P. A.; Andersen, L. L.	2018	Consistent Use of Assistive Devices for Patient Transfer Is Associated With Less Patient-Initiated Violence: Cross-Sectional Study Among Health Care Workers at General Hospitals.	Work. Health Safety	66	9	Exclusion reason: Wrong outcomes
Thapa, D. R.; Stengård, J.; Ekström-Bergström, A.; Areskoug Josefsson, K.; Krettek, A.; Nyberg, A.	2022	Job demands, job resources, and health outcomes among nursing professionals in private and public healthcare sectors in Sweden – a prospective study.	BMC Nurs.	21	1	Exclusion reason: Wrong outcomes
Van Diepen, C.; Fors, A.; Ekman, I.; Bertilsson, M.; Hensing, G.	2022	Associations between person-centred care and job strain, stress of conscience, and intent to leave among hospital personnel.	J. Clin. Nurs.	31	5-6	Exclusion reason: Wrong outcomes
Debesay, J.; Arora, S.; Fougner, M.	2022	Organisational culture and ethnic diversity in nursing homes: a qualitative study of healthcare workers' and ward nurses' experiences.	BMC Health Serv. Res.	22	1	Exclusion reason: Wrong comparator
Krupic, F.; Sköldenberg, O.; Samuelsson, K.; Eisler, T.	2018	Nurses' Experience of Patient Care in Multibed Hospital Rooms: Results From In-Depth Interviews With Nurses After Further Education in Anesthesia.	J. Perianesth. Nurs.	33	1	Exclusion reason: Wrong outcomes
Pedersen, L. M.; Jakobsen, A. L.; Buttenschøn, H. N.; Haagerup, A.	2023	Positive association between social capital and the quality of health care service: A cross-sectional study.	Int. J. Nurs. Stud.	137		Exclusion reason: Wrong outcomes
Sjöberg, A.; Pettersson-Strömbäck, A.; Sahlén, K. G.; Lindholm, L.; Norström, F.	2020	The burden of high workload on the health-related quality of life among home care workers in Northern Sweden.	Int. Arch. Occup. Environ. Health	93	6	Exclusion reason: Wrong comparator
Serafin, L.; Bjerså, K.; Doboszyńska, A.	2019	Nurse job satisfaction at a surgical ward – a comparative study between Sweden and Poland.	Med Pr	70	2	Exclusion reason: Wrong population
Hörberg, A.; Jirwe, M.; Kalén, S.; Vicente, V.; Lindström, V.	2017	We need support! A Delphi study about desirable support during the first year in the emergency medical service.	Scand. J. Trauma Resusc. Emerg. Med.	25	1	Exclusion reason: Wrong outcomes
Carstensen, K.; Jensen, E. K.; Madsen, M. Læ; Thomsen, A. M. L.; Løvschall, C.; Tayyari Dehbarez, N.; Risør, B. W.	2020	Implementation of integrated operating rooms: How much time is saved and how do medical staff experience the upgrading A mixed methods study in Denmark.	BMJ Open	10	7	Exclusion reason: Wrong outcomes
Eriksson, A.; Vulkan, P.; Dellve, L.	2022	A Case Study of Critical Reasons Behind Hospital Nurses Turnover Due to Challenges Across System Levels.	J. Multidiscip.Healthc.	15		Exclusion reason: Wrong outcomes
Mikkelsen, A.; Olsen, E.	2019	The influence of change-oriented leadership on work performance and job satisfaction in hospitals – the mediating roles of learning demands and job involvement.	Leadersh. in Health Serv.	32	1	Exclusion reason: Wrong comparator
Aronsson, G.; Marklund, S.; Leineweber, C.; Helgesson, M.	2021	The changing nature of work – Job strain, job support and sickness absence among care workers and in other occupations in Sweden 1991–2013.	SSM Popul. Health	15		Exclusion reason: Wrong outcomes
Hörberg, A.; Kalén, S.; Jirwe, M.; Scheja, M.; Lindström, V.	2018	Treat me nice! -a cross-sectional study examining support during the first year in the emergency medical services.	Scand. J. Trauma Resusc. Emerg. Med.	26	1	Exclusion reason: Wrong outcomes
Selberg, R.; Sandberg, M.; Mulinari, P.	2022	Contradictions in Care: Ward Nurses' Experiences of Work and Management in the Swedish Public Sector.	NORA Nordi. J. Fem. Gender Res.	30	2	Exclusion reason: Wrong outcomes

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Le Floch, B.; Bastiaens, H.; Le Reste, J. Y.; Lingner, H.; Hoffman, R.; Czachowski, S.; Assenova, R.; Koskela, T. H.; Klemenc-Ketis, Z.; Nabbe, P.; Sowinska, A.; Montier, T.; Peremans, L.	2019	Which positive factors give general practitioners job satisfaction and make general practice a rewarding career? A European multicentric qualitative research by the European general practice research network.	BMC Fam. Pract.	20	1	Exclusion reason: Wrong population
Wentz, K.; Gyllensten, K.; Sluiter, J. K.; Hagberg, M.	2020	Need for recovery in relation to effort from work and health in four occupations.	Int. Arch. Occup. Environ. Health	93	2	Exclusion reason: Wrong outcomes
Rodríguez-Socarrás, M.; Vasquez, J. L.; Uvin, P.; Skjold-Kingo, P.; Rivas, J. G.	2018	"Burnout syndrome": Stress, burnout and depression in Urology.	Arch. Esp. Urol.	71	1	Exclusion reason: Wrong language
Schiller, H.; Lekander, M.; Rajaleid, K.; Hellgren, C.; Åkerstedt, T.; Barck-Holst, P.; Kecklund, G.	2017	The impact of reduced worktime on sleep and perceived stress – A group randomized intervention study using diary data.	Scand. J. Work Environ. Health	43	2	Exclusion reason: Wrong population
Mikkola, L.; Suutala, E.; Parviainen, H.	2018	Social support in the workplace for physicians in specialization training.	Med. Educ. Online	23	1	Exclusion reason: Wrong outcomes
Török, E.; Clark, A. J.; Jensen, J. Hø; Lange, T.; Bonde, J. P.; Bjorner, J. B.; Rugulies, R.; Hvidtfeldt, U. A.; Hansen, Å M.; Ersbøll, A. K.; Rod, N. H.	2018	Work-unit social capital and long-term sickness absence: A prospective cohort study of 32 053 hospital employees.	Occup. Environ. Med.	75	9	Exclusion reason: Wrong comparator
Jakobsen, M. D.; Vinstrup, J.; Andersen, L. L.	2022	Factors associated with high physical exertion during healthcare work: Cross-sectional study among healthcare workers.	Work	71	4	Exclusion reason: Wrong outcomes
Sousa-Ribeiro, M.; Lindfors, P.; Knudsen, K.	2022	Sustainable Working Life in Intensive Care: A Qualitative Study of Older Nurses.	Int. J. Environ. Res. Public Health	19	10	Exclusion reason: Wrong outcomes
Arvidsson, I.; Gremark Simonsen, J.; Lindegård-Andersson, A.; Björk, J.; Nordander, C.	2020	The impact of occupational and personal factors on musculoskeletal pain - A cohort study of female nurses, sonographers and teachers.	BMC Musculoskelet. Disord.	21	1	Exclusion reason: Wrong comparator
Sandberg, L.; Borell, L.; Edvardsson, D.; Rosenberg, L.; Boström, A. M.	2018	Job strain: A cross-sectional survey of dementia care specialists and other staff in Swedish home care services.	J. Multidiscip.Healthc.	11		Exclusion reason: Wrong outcomes
Ericsson, C. R.; Lindström, V.; Rudman, A.; Nordquist, H.	2022	Paramedics' perceptions of job demands and resources in Finnish emergency medical services: a qualitative study.	BMC Health Serv. Res.	22	1	Exclusion reason: Wrong outcomes
Roczniewska, M.; Richter, A.; Hasson, H.; Schwarz, U. V. T.	2020	Predicting sustainable employability in swedish healthcare: The complexity of social job resources.	Int. J. Environ. Res. Public Health	17	4	Exclusion reason: Wrong comparator
Török, E.; Rod, N. H.; Ersbøll, A. K.; Jensen, J. H.; Rugulies, R.; Clark, A. J.	2020	Can work-unit social capital buffer the association between workplace violence and long-term sickness absence? A prospective cohort study of healthcare employees.	Int. Arch. Occup. Environ. Health	93	3	Exclusion reason: Wrong comparator
Virtanen, M.; Myllyntausta, S.; Ervasti, J.; Oksanen, T.; Salo, P.; Pentti, J.; Kivimäki, M.; Ropponen, A.; Halonen, J. I.; Vahtera, J.; Stenholm, S.	2021	Shift work, work time control, and informal caregiving as risk factors for sleep disturbances in an ageing municipal workforce.	Scand. J. Work Environ. Health	47	3	Exclusion reason: Wrong population
Larsson, A.; Westerberg, M.; Karlqvist, L.; Gard, G.	2018	Teamwork and safety climate in homecare: A mixed method study.	Int. J. Environ. Res. Public Health	15	11	Exclusion reason: Wrong outcomes
Andersson, I.; Eklund, A. J.; Nilsson, J.; Bååth, C.	2022	Prevalence, type, and reasons for missed nursing care in municipality health care in Sweden – A cross sectional study.	BMC Nurs.	21	1	Exclusion reason: Wrong outcomes
Wålinder, R.; Runeson-Broberg, R.; Arakelian, E.; Nordqvist, T.; Runeson, A.; Rask-Andersen, A.	2018	A supportive climate and low strain promote well-being and sustainable working life in the operation theatre.	Upsala J. Med. Sci.	123	3	Exclusion reason: Wrong outcomes
Pennbrant, S.; Dåderman, A.	2021	Job demands, work engagement and job turnover intentions among registered nurses: Explained by work-family private life inference.	Work	68	4	Exclusion reason: Wrong outcomes
Dalager, T.; Søgaard, K.; Boyle, E.; Jensen, P. T.; Mogensen, O.	2019	Surgery Is Physically Demanding and Associated With Multisite Musculoskeletal Pain: A Cross-Sectional Study.	J. Surg. Res.	240		Exclusion reason: Wrong comparator
Berthelsen, H.; Conway, P. M.; Clausen, T.	2018	Is organizational justice climate at the workplace associated with individual-level quality of care and organizational affective commitment? A multilevel, cross-sectional study on dentistry in Sweden.	Int. Arch. Occup. Environ. Health	91	2	Exclusion reason: Wrong outcomes
Hovlin, L.; Hallgren, J.; Dahl Aslan, A. K.; Gillsjö, C.	2022	The role of the home health care physician in mobile integrated care: a qualitative phenomenograpic study.	BMC Geriatr.	22	1	Exclusion reason: Wrong outcomes
Harrison, J.	2019	Organisational factors: impacting on health for ambulance personnel.	Int. J. Emerg. Serv.	8	2	Exclusion reason: Wrong publication type
Jakobsen, M. D.; Sundstrup, E.; Brandt, M.; Andersen, L. L.	2017	Factors affecting pain relief in response to physical exercise interventions among healthcare workers.	Scand. J. Med. Sci. Sports	27	12	Exclusion reason: Wrong study design

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Banerjee, S.; Califano, R.; Corral, J.; de Azambuja, E.; De Mattos-Arruda, L.; Guarneri, V.; Hutka, M.; Jordan, K.; Martinelli, E.; Mountzios, G.; Ozturk, M. A.; Petrova, M.; Postel-Vinay, S.; Preusser, M.; Qvortrup, C.; Volkov, M. N. M.; Tabernero, J.; Olmos, D.; Strijbos, M. H.	2017	Professional burnout in European young oncologists: results of the European Society for Medical Oncology (ESMO) Young Oncologists Committee Burnout Survey.	Ann. Oncol.	28	7	Exclusion reason: Wrong population
Strid, E. N.; Wåhlin, C.; Ros, A.; Kvarnström, S.	2021	Health care workers' experiences of workplace incidents that posed a risk of patient and worker injury: a critical incident technique analysis.	BMC Health Serv. Res.	21	1	Exclusion reason: Wrong outcomes
Mehta, A. J.; Mathisen, J.; Nguyen, T. L.; Rugulies, R.; Rod, N. H.	2022	Chronic disorders, work-unit leadership quality and long-term sickness absence among 33 025 public hospital employees.	Scand. J. Work Environ. Health	48	7	Exclusion reason: Wrong comparator
Hamnerius, N.; Svedman, C.; Bergendorff, O.; Björk, J.; Bruze, M.; Pontén, A.	2018	Wet work exposure and hand eczema among healthcare workers: a cross-sectional study.	Br. J. Dermatol.	178	2	Exclusion reason: Wrong comparator
Kihlberg, J.; Hansson, B.; Hall, A.; Tisell, A.; Lundberg, P.	2022	Magnetic resonance imaging incidents are severely underreported: a finding in a multicentre interview survey.	Eur. Radiol.	32	1	Exclusion reason: Wrong outcomes
Van Laethem, M.; Beckers, D. G. J.; de Bloom, J.; Sianoja, M.; Kinnunen, U.	2019	Challenge and hindrance demands in relation to self-reported job performance and the role of restoration, sleep quality, and affective rumination.	J. Occup. Organ. Psychol.	92	2	Exclusion reason: Wrong outcomes
Hansson, M.; Lundgren, I.; Hensing, G.; Dencker, A.; Eriksson, M.; Carlsson, I. M.	2021	Professional courage to create a pathway within midwives' fields of work: a grounded theory study.	BMC Health Serv. Res.	21	1	Exclusion reason: Wrong outcomes
Allesøe, K.; Holtermann, A.; Rugulies, R.; Aadahl, M.; Boyle, E.; Søgaard, K.	2017	Does influence at work modify the relation between high occupational physical activity and risk of heart disease in women?	Int. Arch. Occup. Environ. Health	90	5	Exclusion reason: Wrong outcomes
Pekurinen, V.; Willman, L.; Virtanen, M.; Kivimäki, M.; Vahtera, J.; Välimäki, M.	2017	Patient aggression and the wellbeing of nurses: A cross-sectional survey study in psychiatric and non-psychiatric settings.	Int. J. Environ. Res. Public Health	14	10	Exclusion reason: Wrong comparator
Martinussen, P. E.; Davidsen, T.	2021	'Professional-supportive' versus 'economic-operational' management: the relationship between leadership style and hospital physicians' organisational climate.	BMC Health Serv. Res.	21	1	Exclusion reason: Wrong comparator
Eriksson, A.; Jutengren, G.; Dellve, L.	2021	Job demands and functional resources moderating assistant and Registered Nurses' intention to leave	Nurs. Open	8	2	Exclusion reason: Wrong outcomes
Gold, J. E.; Punnett, L.; Gore, R. J.	2017	Predictors of low back pain in nursing home workers after implementation of a safe resident handling programme.	Occup. Environ. Med.	74	6	Exclusion reason: Wrong population
Nurmeksela, A.; Mikkonen, S.; Kinnunen, J.; Kvist, T.	2021	Relationships between nurse managers' work activities, nurses' job satisfaction, patient satisfaction, and medication errors at the unit level: a correlational study.	BMC Health Serv. Res.	21	1	Exclusion reason: Wrong outcomes
Hamnerius, N.; Svedman, C.; Bergendorff, O.; Björk, J.; Bruze, M.; Engfeldt, M.; Pontén, A.	2018	Hand eczema and occupational contact allergies in healthcare workers with a focus on rubber additives.	Contact Dermatitis	79	3	Exclusion reason: Wrong outcomes
Silén, M.; Skytt, B.; Engström, M.	2019	Relationships between structural and psychological empowerment, mediated by person-centred processes and thriving for nursing home staff.	Geriatr. Nurs.	40	1	Exclusion reason: Wrong comparator
Aalto-Korte, K.; Koskela, K.; Pesonen, M.	2021	Allergic contact dermatitis and other occupational skin diseases in health care workers in the Finnish Register of Occupational Diseases in 2005–2016.	Contact Dermatitis	84	4	Exclusion reason: Wrong comparator
Olsen, E.; Jensen, M. T.; Bjaalid, G.; Mikkelsen, A.	2019	Job resources and outcomes in the process of bullying: a study in a Norwegian healthcare setting.	Increasing Occupational Health and Saf. in Workplaces: Individ., Work and Organizational Factors			Exclusion reason: Wrong publication type
Rosenberg, M. K.; Bonsaksen, T.	2022	Job Satisfaction Among Psychomotor Physiotherapists in Norway.	Inquiry	59		Exclusion reason: Wrong comparator
Vauhkonen, A.; Saaranen, T.; Honkalampi, K.; Järvelin-Pasanen, S.; Kupari, S.; Tarvainen, M. P.; Perkiö-Mäkelä, M.; Räsänen, K.; Oksanen, T.	2021	Work community factors, occupational well-being and work ability in home care: A structural equation modelling.	Nurs. Open	8	6	Exclusion reason: Wrong outcomes
Engström, M.; Högberg, H.; Strömberg, A.; Hagerman, H.; Skytt, B.	2021	Staff working life and older persons' satisfaction with care: A multilevel, correlational design.	J. Nurs. Care Qual.	36	1	Exclusion reason: Wrong outcomes
Appel, A. M.; Török, E.; Jensen, M. A.; Garde, A. H.; Hansen, Å M.; Kaerlev, L.; Grynderup, M. B.; Nabe-Nielsen, K.	2020	The longitudinal association between shift work and headache: results from the Danish PRISME cohort.	Int. Arch. Occup. Environ. Health	93	5	Exclusion reason: Wrong comparator
Jäppinen, K.; Roos, M.; Slater, P.; Suominen, T.	2022	Connection between nurse managers' stress from workload and overall job stress, job satisfaction and practice environment in central hospitals: A cross-sectional study.	Nordic J. Nurs. Res.	42	2	Exclusion reason: Wrong outcomes

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Ylitörmänen, T.; Turunen, H.; Mikkonen, S.; Kvist, T.	2019	Good nurse–nurse collaboration implies high job satisfaction: A structural equation modelling approach.	Nurs. Open	6	3	Exclusion reason: Wrong outcomes
Waage, S.; Bjorvatn, B.	2017	Health, psychosocial and workplace characteristics may identify nurses and midwives at risk of high absenteeism.	Evid.- Based Nurs.	20	3	Exclusion reason: Wrong publication type
Wesołowska, K.; Elovainio, M.; Komulainen, K.; Hietapakka, L.; Heponiemi, T.	2020	Nativity status and workplace discrimination in registered nurses: Testing the mediating role of psychosocial work characteristics.	J. Adv. Nurs.	76	7	Exclusion reason: Wrong outcomes
Hansen, M. C. T.; Schmidt, J. H.; Brøchner, A. C.; Johansen, J. K.; Zwisler, S.; Mikkelsen, S.	2017	Noise exposure during prehospital emergency physicians work on Mobile Emergency Care Units and Helicopter Emergency Medical Services.	Scand. J. Trauma Resusc. Emerg. Med.	25	1	Exclusion reason: Wrong outcomes
Setrinen Hansen, N. M.; Mikkelsen, S.; Bruun, H.; From, E.; Milling, L.	2021	Physicians' experiences working in emergency medicine in a rural area in Northern Sweden: a qualitative study.	Rural Remote Health	21	3	Exclusion reason: Wrong outcomes
Ericsson, C. R.; Nordquist, H.; Lindström, V.; Rudman, A.	2021	Finnish paramedics' professional quality of life and associations with assignment experiences and defusing use – a cross-sectional study.	BMC Public Health	21	1	Exclusion reason: Wrong outcomes
Gustafsson, N.; Salzmann-Erikson, M.	2016	Effect of complex working conditions on nurses who exert coercive measures in forensic psychiatric care.	J. Psychosocial Nurs. Ment. Health Serv.	54	9	Exclusion reason: Wrong outcomes
Gemark Simonsen, J.; Gard, G.	2016	Swedish Sonographers' perceptions of ergonomic problems at work and their suggestions for improvement.	BMC Musculoskelet. Disord.	17	1	Exclusion reason: Wrong outcomes
Kuokkanen, L.; Leino-Kilpi, H.; Numminen, O.; Isoaho, H.; Flinkman, M.; Meretoja, R.	2016	Newly graduated nurses' empowerment regarding professional competence and other work-related factors.	BMC Nurs.	15	1	Exclusion reason: Wrong outcomes
Aagestad, C.; Tyssen, R.; Sterud, T.	2016	Do work-related factors contribute to differences in doctor-certified sick leave? A prospective study comparing women in health and social occupations with women in the general working population.	BMC Public Health	16	1	Exclusion reason: Wrong population
Vammen, M. A.; Mikkelsen, S.; Hansen, A. M.; Bonde, J. P.; Grynderup, M. B.; Kolstad, H.; Kærlev, L.; Mors, O.; Rugulies, R.; Thomsen, J. F.	2016	Emotional demands at work and the risk of clinical depression a longitudinal study in the danish public sector.	J. Occup. Environ. Med.	58	10	Exclusion reason: Wrong outcomes
Rehnström, K.; Dahlborg-Lyckhage, E.	2016	Proactive Interventions: An Observational Study at a Swedish Emergency Department.	SAGE Open	6	3	Exclusion reason: Wrong outcomes
Genç, A.; Kahraman, T.; Göz, E.	2016	The prevalence differences of musculoskeletal problems and related physical workload among hospital staff	J. Back Musculoskelet. Rehabil.	29	3	Exclusion reason: Wrong population
Allesøe, K.; Søgaard, K.; Aadahl, M.; Boyle, E.; Holtermann, A.	2016	Are hypertensive women at additional risk of ischaemic heart disease from physically demanding work?	Eur. J. Prev. Cardiol.	23	10	Exclusion reason: Wrong comparator
Brännström, K. J.; Holm, L.; Larsson, J.; Lood, S.; Notsten, M.; Turunen Taheri, S.	2016	Occupational stress among Swedish audiologists in clinical practice: Reasons for being stressed.	Int. J. Audiol.	55	8	Exclusion reason: Wrong study design
Heikkilä, T. J.; Hyppölä, H.; Vänskä, J.; Halila, H.; Kujala, S.; Virjo, I.; Sumanen, M.; Kosunen, E.; Mattila, K.	2016	What predicts doctors' satisfaction with their chosen medical specialty? A Finnish national study.	BMC Med. Educ.	16	1	Exclusion reason: Wrong comparator
Ree, E.; Wiig, S.	2020	Linking transformational leadership, patient safety culture and work engagement in home care services.	Nurs Open	7	1	Exclusion reason: Wrong comparator
Assander, S.; Bergström, A.; Olt, H.; Guidetti, S.; Boström, A. M.	2022	Individual and organisational factors in the psychosocial work environment are associated with home care staffs' job strain: a Swedish cross-sectional study.	BMC Health Serv Res	22	1	Exclusion reason: Wrong outcomes
Sulander, J.; Sinervo, T.; Elovainio, M.; Heponiemi, T.; Helkama, K.; Aalto, A. M.	2016	Does Organizational Justice Modify the Association Between Job Involvement and Retirement Intentions of Nurses in Finland?	Res Nurs Health	39	5	Exclusion reason: Wrong outcomes
Håkansson, C.; Lexén, A.	2022	Work conditions as predictors of Swedish occupational therapists' occupational balance.	Scand J Occup Ther			Exclusion reason: Wrong outcomes
Nunstedt, H.; Eriksson, M.; Obeid, A.; Hillström, L.; Truong, A.; Pennbrant, S.	2020	Salutary factors and hospital work environments: a qualitative descriptive study of nurses in Sweden.	BMC Nursing	19	1	Exclusion reason: Wrong outcomes
Mattsson, S.; Gustafsson, M.	2020	Job Satisfaction among Swedish Pharmacists	Pharmacy (Basel)	8	3	Exclusion reason: Wrong comparator
Reknes, I.; Notelaers, G.; Magerøy, N.; Pallesen, S.; Bjorvatn, B.; Moen, B. E.; Einarsen, S.	2017	Aggression from Patients or Next of Kin and Exposure to Bullying Behaviors: A Conglomerate Experience?	Nurs Res Pract	2017		Exclusion reason: Wrong comparator
Astvik, Wanja; Welander, Jonas; Hellgren, Johnny	2021	A comparative study of how social workers' voice and silence strategies relate to organisational resources, attitudes and well-being at work.	Journal of Social Work	21	2	Exclusion reason: Wrong population
Ventovaara, Päivi; af Sandeberg, Margareta; Petersen, Gitte; Blomgren, Klas; Pergert, Pernilla	2022	A cross-sectional survey of moral distress and ethical climate – Situations in paediatric oncology care that involve children's voices.	Nursing Open	9	4	Exclusion reason: Wrong outcomes

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Norrman Harling, Malin; Högman, Elisabeth; Schad, Elinor	2020	Breaking the taboo: eight Swedish clinical psychologists' experiences of compassion fatigue.	International Journal of Qualitative Studies on Health & Well-Being	15	1	Exclusion reason: Wrong outcomes
Fischer, Shelly A.; Jones, Jacqueline; Verran, Joyce A.	2018	Consensus achievement of leadership, organisational and individual factors that influence safety climate: Implications for nursing management.	Journal of Nursing Management (John Wiley & Sons, Inc.)	26	1	Exclusion reason: Wrong population
Arvidsson, Inger; Gremark Simonsen, Jenny; Dahlqvist, Camilla; Axmon, Anna; Björk, Jonas; Nordander, Catarina; Karlson, Björn	2016	Cross-sectional associations between occupational factors and musculoskeletal pain in women teachers, nurses and sonographers	BMC Musculoskeletal Disorders	17		Exclusion reason: Wrong population
Hansen, Åse Marie; Brødsgaard Grynderup, Matias; Bonde, Jens Peter; Conway, Paul Maurice; Garde, Anne Helene; Kaerlev, Linda; Kolstad, Henrik A.; Mikkelsen, Sigurd; Rugulies, Reiner; Frølund Thomsen, Jane; Willert, Morten; Hogh, Annie	2018	Does Workplace Bullying Affect Long-Term Sickness Absence Among Coworkers?	Journal of Occupational & Environmental Medicine	60	2	Exclusion reason: Wrong comparator
Allerby, Katarina; Goulding, Anneli; Ali, Lilas; Gremyr, Andreas; Waern, Margda	2019	F132. PERSON-CENTERED PSYCHOSIS CARE (PCPC) IN AN INPATIENT SETTING: WARD LEVEL DATA AND STAFF WORKLOAD.	Schizophrenia Bulletin	45		Exclusion reason: Wrong publication type
Tuononen, Tiina; Lammintakanen, Johanna; Suominen, Anna Liisa	2017	Factors supporting dentist leaders' retention in leadership.	Community Dental Health	34	4	Exclusion reason: Wrong outcomes
Lampinen, Mai-Stiina; Konu, Anne Irmeli; Kettunen, Tarja; Suutala, Elina Annikki	2018	Factors that foster or prevent sense of belonging among social and health care managers.	Leadership in Health Services (1751-1879)	31	4	Exclusion reason: Wrong outcomes
Sørensen, Tanja; Tingleff, Ellen B.; Gildberg, Frederik A.	2018	Feeling Safe and Taking on Responsibilities: Newly Graduated Nurses' Perceptions and Evaluations of Their Transition Into a Forensic Mental Health Inpatient Setting.	Journal of Forensic Nursing	14	3	Exclusion reason: Wrong outcomes
André, Beate; Jacobsen, Frode F.; Haugan, Gørill	2022	How is leadership experienced in joy-of-life-nursing-homes compared to ordinary nursing homes: a qualitative study.	BMC Nursing	21	1	Exclusion reason: Wrong outcomes
Paunova, Minna; Li-Ying, Jason	2023	Interactive effects of self-concept and social context on perceived cohesion in intensive care nursing	Applied Psychology: An International Review	72	1	Exclusion reason: Wrong outcomes
Molin, Jenny; Strömbäck, Maria; Lundström, Mats; Lindgren, Britt-Marie	2021	It's Not Just in the Walls: Patient and Staff Experiences of a New Spatial Design for Psychiatric Inpatient Care.	Issues in Mental Health Nursing	42	12	Exclusion reason: Wrong outcomes
Hansson, Malin; Dencker, Anna; Lundgren, Ingela; Carlsson, Ing-Marie; Eriksson, Monica; Hensing, Gunnel	2022	Job satisfaction in midwives and its association with organisational and psychosocial factors at work: a nation-wide, cross-sectional study.	BMC Health Services Research	22	1	Exclusion reason: Wrong study design
Greenslade, Jaimi H.; Wallis, Marianne; Johnston, Amy N. B.; Carlström, Eric; Wilhelms, Daniel B.; Crilly, Julia	2020	Key occupational stressors in the ED: an international comparison.	Emergency Medicine Journal	37	2	Exclusion reason: Wrong outcomes
Lundgren, Dan; Ernsth-Bravell, Marie; Kåreholt, Ingemar	2016	Leadership and the psychosocial work environment in old age care.	International Journal of Older People Nursing	11	1	Exclusion reason: Wrong outcomes
Arakelian, Erebouni; Rudolfsson, Gudrun	2021	Managerial challenges faced by Swedish nurse managers in perioperative settings– a qualitative study.	BMC Nursing	20	1	Exclusion reason: Wrong outcomes
Cajander, Åsa; Moll, Jonas; Englund, Sara; Hansman, Anastasia	2018	Medical Records Online for Patients and Effects on the Work Environment of Nurses.	Studies in Health Technology & Informatics	247		Exclusion reason: Wrong publication type
Andresen, Ida Hellum; Hansen, Thomas; Grov, Ellen Karine	2017	Norwegian nurses' quality of life, job satisfaction, as well as intention to change jobs.	Nordic Journal of Nursing Research	37	2	Exclusion reason: Wrong outcomes
Niinihuhta, Milja; Terkamo-Moisio, Anja; Kvist, Tarja; Häggman-Laitila, Arja	2022	Nurse leaders' work-related well-being —Relationships to a superior's transformational leadership style and structural empowerment.	Journal of Nursing Management (John Wiley & Sons, Inc.)	30	7	Exclusion reason: Wrong comparator
Stevens, Matthew L.; Karstad, Kristina; Januario, Leticia Bergamin; Mathiassen, Svend Erik; Rugulies, Reiner; Hallman, David M.; Holtermann, Andreas	2022	Nursing Home, Ward and Worker Level Determinants of Perceived Quantitative Work Demands: A Multi-Level Cross-Sectional Analysis in Eldercare.	Annals of Work Exposures & Health	66	8	Exclusion reason: Wrong outcomes
Tuvesson, Hanna; Eklund, Mona	2017	Nursing Staff Stress and Individual Characteristics in Relation to the Ward Atmosphere in Psychiatric In-Patient Wards	Issues in Mental Health Nursing	38	9	Exclusion reason: Wrong outcomes
Arnetz, Judith E.; Zhdanova, Ludmila; Arnetz, Bengt B.	2016	Patient Involvement: A New Source of Stress in Health Care Work?	Health Communication	31	12	Exclusion reason: Wrong outcomes
TÄHtinen, Katja; Remes, Jouko; Karvala, Kirsi; Salmi, Kari; Lahtinen, Marjaana; Reijula, Kari; Tähtinen, Katja	2020	Perceived indoor air quality and psychosocial work environment in office, school and health care environments in Finland.	International Journal of Occupational Medicine & Environmental Health	33	4	Exclusion reason: Wrong comparator
Heponiemi, Tarja; Hyppönen, Hannele; Kujala, Sari; Aalto, Anna-Mari; Vehko, Tuulikki; Vänskä, Jukka; Elovainio, Marko	2018	Predictors of physicians' stress related to information systems: a nine-year follow-up survey study.	BMC Health Services Research	18	1	Exclusion reason: Wrong outcomes

Authors	Published Year	Title	Journal	Volume	Issue	Notes
Bonsaksen, Tore; Nerdrum, Per; Østertun Geirdal, Amy	2021	Psychological distress and its associations with psychosocial work environment factors in four professional groups: A cross-sectional study.	Nursing & Health Sciences	23	3	Exclusion reason: Wrong outcomes
Karlsson, Ann-Christin; Gunningberg, Lena; Bäckström, Josefin; Pöder, Ulrika	2019	Registered nurses' perspectives of work satisfaction, patient safety and intention to stay – A double-edged sword.	Journal of Nursing Management (John Wiley & Sons, Inc.)	27	7	Exclusion reason: Wrong outcomes
Dean, Erin	2017	Sickness absence halved in trial of six-hour day.	Nursing Standard	31	20	Exclusion reason: Wrong publication type
Crilly, Julia; Greenslade, Jaimi H.; Johnston, Amy; Carlström, Eric; Thom, Ogilvie; Abraham, Louisa; Mills, Donna; Wallis, Marianne	2019	Staff perceptions of the emergency department working environment: An international cross-sectional survey.	Emergency Medicine Australasia	31	6	Exclusion reason: Wrong population
Öhman, Ann; Keisu, Britt-Inger; Enberg, Birgit	2017	Team social cohesion, professionalism, and patient-centeredness: Gendered care work, with special reference to elderly care - a mixed methods study.	BMC Health Services Research	17		Exclusion reason: Wrong outcomes
Sveinsdóttir, Herdís; Blöndal, Katrín; Jónsdóttir, Heiður Hrund; Bragadóttir, Helga	2018	The content of nurse unit managers' work: a descriptive study using daily activity diaries	Scandinavian Journal of Caring Sciences	32	2	Exclusion reason: Wrong outcomes
Kaihlanen, Anu-Marja; Gluschkoff, Kia; Laukka, Elina; Heponiemi, Tarja	2021	The information system stress, informatics competence and well-being of newly graduated and experienced nurses: a cross-sectional study.	BMC Health Services Research	21	1	Exclusion reason: Wrong comparator
Saukkonen, Petra; Elovainio, Marko; Virtanen, Lotta; Kaihlanen, Anu-Marja; Nadav, Janna; Lääveri, Tinja; Vänskä, Jukka; Viitanen, Johanna; Reponen, Jarmo; Heponiemi, Tarja	2022	The Interplay of Work, Digital Health Usage, and the Perceived Effects of Digitalization on Physicians' Work: Network Analysis Approach.	Journal of Medical Internet Research	24	8	Exclusion reason: Wrong outcomes
Allwood, Carl Martin; Geisler, Martin; Buratti, Sandra	2022	The relationship between personality, work, and personal factors to burnout among clinical psychologists: exploring gender differences in Sweden.	Counselling Psychology Quarterly	35	2	Exclusion reason: Wrong comparator
Lyyra, Eeva; Roos, Mervi; Suominen, Tarja	2021	The workplace culture in addiction psychiatry in Finland as described by healthcare personnel.	Advances in Dual Diagnosis	14	3	Exclusion reason: Wrong outcomes
Anskär, Eva; Lindberg, Malou; Falk, Magnus; Andersson, Agneta	2018	Time utilization and perceived psychosocial work environment among staff in Swedish primary care settings.	BMC Health Services Research	18		Exclusion reason: Wrong outcomes
Lohikoski, K.; Roos, M.; Suominen, T.	2019	Workplace culture assessed by radiographers in Finland.	Radiography	25	4	Exclusion reason: Wrong study design
Gadolin, Christian; Larsman, Pernilla; Nilsson, Maria Skyvell; Pousette, Anders; Törner, Marianne	2022	How do healthcare unit managers promote nurses' perceived organizational support, and which working conditions enable them to do so? A mixed methods approach.	Scandinavian Journal of Psychology	63	6	Exclusion reason: Wrong outcomes
Eklöf, Britta; Larsson, Hanna; Ellbin, Susanne; Jonsdottir, Ingibjörg H.; O'Dwyer, Siobhan; Hansson, Caroline	2022	The role of self-reported stressors in recovery from exhaustion disorder: A longitudinal study.	BMC Psychiatry	22		Exclusion reason: Wrong outcomes
Frennert, Susanne; Erlingsdóttir, Gudbjörg; Muhic, Mirella; Rydenfält, Christofer; Milos Nymberg, Veronica; Ekman, Och Björn	2022	'it increases my ability to influence my ways of working': A qualitative study on digitally mediated patient management in primary healthcare.	Scandinavian Journal of Caring Sciences			Exclusion reason: Wrong setting
Ineland, Jens; Starke, Mikaela	2022	Factors associated with positive work experience among professionals supporting people with intellectual disabilities: A comparative analysis of three welfare organisations in Sweden.	International Journal of Developmental Disabilities	68	4	Exclusion reason: Wrong outcomes
Honkalampi, Kirsi; Kupari, Saana; Järvelin-Pasanen, Susanna; Saaranen, Terhi; Vauhkonen, Anneli; Räsänen, Kimmo; Härmä, Mikko; Lindholm, Harri; Perkiö-Mäkelä, Merja; Tarvainen, Mika P.; Oksanen, Tuula	2022	The association between chronotype and sleep quality among female home care workers performing shift work.	Chronobiology International	39	5	Exclusion reason: Wrong outcomes
Larsson, Ing-Marie; Aronsson, Anna; Norén, Karin; Wallin, Ewa	2022	Healthcare workers' structured daily reflection on patient safety, workload and work environment in intensive care. A descriptive retrospective study.	Intensive and Critical Care Nursing	68		Exclusion reason: Wrong outcomes
Bunkenborg, Gitte; Barfod O'Connell, Malene; Jensen, Hanne Irene; Bucknall, Tracey	2022	Balancing responsibilities, rewards and challenges: A qualitative study illuminating the complexity of being a rapid response team nurse.	Journal of Clinical Nursing			Exclusion reason: Wrong outcomes
Wadman, Cecilia	2022	Psychosocial work conditions and musculoskeletal complaint: The role of affective stress response as a mediator of the effect of psychosocial risk factors on musculoskeletal complaints.			AAI28426849	Exclusion reason: Wrong publication type
Bujacz, Aleksandra; Rudman, Ann; Gustavsson, Petter; Dahlgren, Anna; Tucker, Philip	2021	Psychosocial working conditions of shiftworking nurses: A long-term latent transition analysis.	Journal of Nursing Management	29	8	Exclusion reason: Wrong outcomes
Brubakk, Kirsten; Svendsen, Martin Veel; Deilkås, Ellen Tveter; Hofoss, Dag; Barach, Paul; Tjomsland, Ole	2021	Hospital work environments affect the patient safety climate: A longitudinal follow-up using a logistic regression analysis model.	PLoS ONE	16	10	Exclusion reason: Wrong outcomes

Authors	Published Year	Title	Journal	Volume	Issue	Notes
Söderbacka, Tina; Nyholm, Linda; Fagerström, Lisbeth	2021	What is giving vitality to continue at work? A qualitative study of older health professionals' vitality sources.	Scandinavian Journal of Caring Sciences			Exclusion reason: Wrong comparator
Tangsgaard, Emily Rose	2021	How do public service professionals behave in risky situations? The importance of organizational culture.	The American Review of Public Administration	51	7	Exclusion reason: Wrong outcomes
Huhtala, Mari; Geurts, Sabine; Mauno, Saija; Feldt, Taru	2021	Intensified job demands in healthcare and their consequences for employee well-being and patient satisfaction: A multilevel approach.	Journal of Advanced Nursing	77	9	Exclusion reason: Wrong comparator
Pettersson, Cecilia; Nilsson, Martin; Andersson, Morgan; Wijk, Helle	2021	The impact of the physical environment for caregiving in ordinary housing: Experiences of staff in home- and health-care services.	Applied Ergonomics	92		Exclusion reason: Wrong outcomes
Munch, Pernille Kold; Nørregaard Rasmussen, Charlotte Diana; Jørgensen, Marie Birk; Larsen, Anne Konring	2021	Which work environment challenges are top of mind among eldercare workers and how would they suggest to act upon them in everyday practice? Process evaluation of a workplace health literacy intervention.	Applied Ergonomics	90		Exclusion reason: Wrong outcomes
Ejlertsson, Lina; Heijbel, Bodil; Brorsson, Annika; Andersson, H. Ingemar	2020	Is it possible to gain energy at work? A questionnaire study in primary health care.	Primary Health Care Research and Development	21		Exclusion reason: Wrong outcomes
Ahlstedt, Carina; Eriksson Lindvall, Carin; Holmström, Inger K.; Muntlin, Åsa	2020	Flourishing at work: Nurses' motivation through daily communication—An ethnographic approach.	Nursing & Health Sciences	22	4	Exclusion reason: Wrong outcomes
Kalanlar, Bilge; Kuru Alici, Nilgün	2020	The effect of care burden on formal caregiver's quality of work life: A mixed-methods study.	Scandinavian Journal of Caring Sciences	34	4	Exclusion reason: Wrong population
Bragadóttir, Helga; Burmeister, Elizabeth A.; Terzioglu, Fusun; Kalisch, Beatrice J.	2020	The association of missed nursing care and determinants of satisfaction with current position for direct-care nurses—An international study	Journal of Nursing Management	28	8	Exclusion reason: Wrong population
Jensen, Johan Høy; Flachs, Esben Meulengracht; Török, Eszter; Rod, Naja Hulvej; Madsen, Ida E. H.; Rugulies, Reiner; Kawachi, Ichiro	2020	Work-unit social capital and incident purchase of psychotropic medications: A longitudinal cohort-study of healthcare workers.	Journal of Affective Disorders	276		Exclusion reason: Wrong outcomes
Karhula, Kati; Wöhrmann, Anne Marit; Brauner, Corinna; Härmä, Mikko; Kivimäki, Mika; Michel, Alexandra; Oksanen, Tuula	2020	Working time dimensions and well-being: A cross-national study of Finnish and German health care employees.	Chronobiology International	37	9-10	Exclusion reason: Wrong comparator
Midjo, Turid; Redzovic, Skender Elez; Carstensen, Tove	2020	The complexity of work expectations of staff in supported housing.	Social Work in Mental Health	18	5	Exclusion reason: Wrong outcomes
Alenius, Lisa Smeds; Lindqvist, Rikard; Ball, Jane E.; Sharp, Lena; Lindqvist, Olav; Tishelman, Carol	2020	Between a rock and a hard place: Registered nurses' accounts of their work situation in cancer care in Swedish acute care hospitals.	European Journal of Oncology Nursing	47		Exclusion reason: Wrong outcomes
Török, Eszter; Clark, Alice Jessie; Ersbøll, Annette Kjær; Bjorner, Jakob Bue; Holtermann, Andreas; Rugulies, Reiner; LaMontagne, Anthony D.; Milner, Allison; Rod, Naja Hulvej	2020	Physical workload, long-term sickness absence, and the role of social capital. Multi-level analysis of a large occupation cohort.	Scandinavian Journal of Work, Environment & Health	46	4	Exclusion reason: Wrong outcomes
Vanttola, Päivi; Puttonen, Sampsa; Karhula, Kati; Oksanen, Tuula; Härmä, Mikko	2020	Prevalence of shift work disorder among hospital personnel: A cross-sectional study using objective working hour data.	Journal of Sleep Research	29	3	Exclusion reason: Wrong study design
Ibrahim, Maha E.; Cheval, Boris; Cullati, Stéphane; Mongin, Denis; Lauper, Kim; Pihl-Thingvad, Jesper; Chopard, Pierre; Genevay, Stéphane; Courvoisier, Delphine S.	2020	Back pain occurrence and treatment-seeking behavior among nurses: The role of work-related emotional burden.	Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care & Rehabilitation	29	5	Exclusion reason: Wrong population
Gustafsson, Klas; Marklund, Staffan; Aronsson, Gunnar; Leineweber, Constanze	2020	Interaction effects of physical and psychosocial working conditions on the risk of disability pension among nursing professionals and care assistants in Sweden: A prospective study.	International Journal of Nursing Studies	102		Exclusion reason: Wrong outcomes
Gyllensten, Kristina; Wentz, Kerstin; Håkansson, Carita; Hagberg, Mats; Nilsson, Kerstin	2019	Older assistant nurses' motivation for a full or extended working life.	Ageing & Society	39	12	Exclusion reason: Wrong outcomes
Johansen, Ayna B.; Kristiansen, Eva; Bjelland, Ingerid; Tavakoli, Shedeh	2019	Secondary traumatic stress in Norwegian SUD-therapists: Symptoms and related factors.	Nordic Studies on Alcohol and Drugs	36	6	Exclusion reason: Wrong outcomes
Pergert, Pernilla; Bartholdson, Cecilia; Blomgren, Klas; af Sandeberg, Margareta	2019	Moral distress in paediatric oncology: Contributing factors and group differences.	Nursing Ethics	26	7-8	Exclusion reason: Wrong outcomes
Hagerman, Heidi; Engström, Maria; Wadensten, Barbro; Skytt, Bernice	2019	How do first-line managers in elderly care experience their work situation from a structural and psychological empowerment perspective? An interview study.	Journal of Nursing Management	27	6	Exclusion reason: Wrong outcomes
Leineweber, Constanze; Marklund, Staffan; Aronsson, Gunnar; Gustafsson, Klas	2019	Work-related psychosocial risk factors and risk of disability pension among employees in health and personal care: A prospective cohort study.	International Journal of Nursing Studies	93		Exclusion reason: Wrong comparator
Jakobsen, Markus D.; Aust, Birgit; Kines, Pete; Madeleine, Pascal; Andersen, Lars L.	2019	Participatory organizational intervention for improved use of assistive devices in patient transfer: A single-blinded cluster randomized controlled trial.	Scandinavian Journal of Work, Environment & Health	45	2	Exclusion reason: Wrong outcomes

Authors	Published Year	Title	Journal	Volume	Issue	Notes
Burmeister, Elizabeth A.; Kalisch, Beatrice J.; Xie, Boqin; Doumit, Myrna A. A.; Lee, Eunjoo; Ferraresion, Annamaria; Terzioglu, Fusun; Bragadóttir, Helga	2019	Determinants of nurse absenteeism and intent to leave: An international study.	Journal of Nursing Management	27	1	Exclusion reason: Wrong population
Schön Persson, Sophie; Nilsson Lindström, Petra; Pettersson, Pär; Nilsson, Marie; Blomqvist, Kerstin	2018	Resources for work-related well-being: A qualitative study about healthcare employees' experiences of relationships at work.	Journal of Clinical Nursing	27	23-24	Exclusion reason: Wrong comparator
Wahlberg, Anna Carin; Bjorkman, Annica	2018	Expert in nursing care but sometimes disrespected—Telenurses' reflections on their work environment and nursing care.	Journal of Clinical Nursing	27	21-22	Exclusion reason: Wrong comparator
Ylitörmänen, Tuija; Turunen, Hannele; Kvist, Tarja	2018	Job satisfaction among registered nurses in two Scandinavian acute care hospitals.	Journal of Nursing Management	26	7	Exclusion reason: Wrong outcomes
Aalto, Anna-Mari; Heponiemi, Tarja; Josefsson, Kim; Arffman, Martti; Elovainio, Marko	2018	Social relationships in physicians' work moderate relationship between workload and wellbeing—9-year follow-up study.	European Journal of Public Health	28	5	Exclusion reason: Wrong comparator
Røen, Irene; Kirkevold, Øyvind; Testad, Ingelin; Selbæk, Geir; Engedal, Knut; Bergh, Sverre	2018	Person-centered care in Norwegian nursing homes and its relation to organizational factors and staff characteristics: A cross-sectional survey.	International Psychogeriatrics	30	9	Exclusion reason: Wrong outcomes
Gustafsson, Maria; Mattsson, Sofia; Wallman, Andy; Gallego, Gisselle	2018	Pharmacists' satisfaction with their work: Analysis of an alumni survey.	Research in Social & Administrative Pharmacy	14	7	Exclusion reason: Wrong outcomes
Hylén, Ulrika; Kjellin, Lars; Pelto-Piri, Veikko; Warg, Lars-Erik	2018	Psychosocial work environment within psychiatric inpatient care in Sweden: Violence, stress, and value incongruence among nursing staff.	International Journal of Mental Health Nursing	27	3	Exclusion reason: Wrong outcomes
Lepistö, Sari; Alanen, Seija; Aalto, Pirjo; Järvinen, Päivi; Leino, Kaija; Mattila, Elina; Kaunonen, Marja	2018	Healthcare professionals' work engagement in Finnish university hospitals.	Scandinavian Journal of Caring Sciences	32	2	Exclusion reason: Wrong comparator
Backman, Annica; Sjögren, Karin; Lövheim, Hugo; Edvardsson, David	2018	Job strain in nursing homes—Exploring the impact of leadership	Journal of Clinical Nursing	27	7-8	Exclusion reason: Wrong outcomes
Holmberg, Christopher; Caro, Jino; Sobis, Iwona	2018	Job satisfaction among Swedish mental health nursing personnel: Revisiting the two-factor theory.	International Journal of Mental Health Nursing	27	2	Exclusion reason: Wrong outcomes
Kirkegaard, Marie Louise; Kines, Pete; Nielsen, Helena Breth; Garde, Anne Helene	2018	Occupational safety across jobs and shifts in emergency departments in Denmark.	Safety Science	103		Exclusion reason: Wrong outcomes
Keisu, Britt-Inger; Öhman, Ann; Enberg, Birgit	2018	Employee effort—Reward balance and first-level manager transformational leadership within .elderly care	Scandinavian Journal of Caring Sciences	32	1	Exclusion reason: Wrong outcomes
Rugulies, Reiner; Jakobsen, Louise M.; Madsen, Ida E. H.; Borg, Vilhelm; Carneiro, Isabella G.; Aust, Birgit	2018	Managerial quality and risk of depressive disorders among Danish eldercare workers: A multilevel cohort study.	Journal of Occupational and Environmental Medicine	60	2	Exclusion reason: Wrong outcomes
Ejlertsson, Lina; Heijbel, Bodil; Troein, Margareta; Brorsson, Annika	2018	Variation, companionship and manageability important for recovery during working hours: A qualitative focus group study.	Work: Journal of Prevention, Assessment & Rehabilitation	61	1	Exclusion reason: Wrong outcomes
Nielsen, Helena B.; Larsen, Ann D.; Dyreborg, Johnny; Hansen, Åse M.; Pompeii, Lisa A.; Conway, Sadie H.; Hansen, Johnni; Kolstad, Henrik A.; Nabe-Nielsen, Kirsten; Garde, Anne H.	2018	Risk of injury after evening and night work—Findings from the Danish Working Hour Database.	Scandinavian Journal of Work, Environment & Health	44	4	Exclusion reason: Wrong comparator
Nourollahi, Maryam; Afshari, Davood; Dianat, Iman	2018	Awkward trunk postures and their relationship with low back pain in hospital nurses.	Work: Journal of Prevention, Assessment & Rehabilitation	59	3	Exclusion reason: Wrong population
Ejlertsson, Lina; Heijbel, Bodil; Ejlertsson, Göran; Andersson, Ingemar	2018	Recovery, work-life balance and work experiences important to self-rated health: A questionnaire study on salutogenic work factors among Swedish primary health care employees.	Work: Journal of Prevention, Assessment & Rehabilitation	59	1	Exclusion reason: Wrong outcomes
Yepes-Baldó, Montserrat; Romeo, Marina; Westerberg, Kristina; Nordin, Maria	2018	Job crafting, employee well-being, and quality of care.	Western Journal of Nursing Research	40	1	Exclusion reason: Wrong outcomes
Billsten, Johan; Fridell, Mats; Holmberg, Robert; Ivarsson, Andréas	2018	Organizational Readiness for Change (ORC) test used in the implementation of assessment instruments and treatment methods in a Swedish national study.	Journal of Substance Abuse Treatment	84		Exclusion reason: Wrong outcomes
Kurjenluoma, K.; Rantanen, A.; McCormack, B.; Slater, P.; Hahtela, N.; Suominen, T.	2017	Workplace culture in psychiatric nursing described by nurses.	Scandinavian Journal of Caring Sciences	31	4	Exclusion reason: Wrong comparator
Astala, Lena; Roos, Mervi; Harmoinen, Merja; Suominen, Tarja	2017	Staff experiences of appreciative management in the institutional care of people with intellectual and developmental disabilities—A cross-sectional study.	Scandinavian Journal of Caring Sciences	31	4	Exclusion reason: Wrong outcomes
Andreassen, Cecilie S.; Bakker, Arnold B.; Bjorvatn, Bjørn; Moen, Bente E.; Magerøy, Nils; Shimazu, Akihito; Hetland, Jørn; Pallesen, Ståle	2017	Working conditions and individual differences are weakly associated with workaholism: A 2-3-year prospective study of shift-working nurses.	Frontiers in Psychology	8		Exclusion reason: Wrong outcomes

Authors	Published Year	Title	Journal	Volume	Issue	Notes
Trudel-Fitzgerald, Claudia; Poole, Elizabeth M.; Idahl, Annika; Lundin, Eva; Sood, Anil K.; Kawachi, Ichiro; Kubzansky, Laura D.; Tworoger, Shelley S.	2017	The association of work characteristics with ovarian cancer risk and mortality.	Psychosomatic Medicine	79	9	Exclusion reason: Wrong population
Casalicchio, Giuseppe; Lesaffre, Emmanuel; Küchenhoff, Helmut; Bruyneel, Luk	2017	Nonlinear analysis to detect if excellent nursing work environments have highest well-being.	Journal of Nursing Scholarship	49	5	Exclusion reason: Wrong population
Karhula, Kati; Puttonen, Sampsa; Ropponen, Annina; Koskinen, Aki; Ojajärvi, Anneli; Kivimäki, Mika; Härmä, Mikko	2017	Objective working hour characteristics and work–life conflict among hospital employees in the Finnish public sector study.	Chronobiology International	34	7	Exclusion reason: Wrong outcomes
Hakanen, Jari J.; Seppälä, Piia; Peeters, Maria C. W.	2017	High job demands, still engaged and not burned out? The role of job crafting.	International Journal of Behavioral Medicine	24	4	Exclusion reason: Wrong comparator
Pekurinen, Virve Maaret; Välimäki, Maritta; Virtanen, Marianna; Salo, Paula; Kivimäki, Mika; Vahtera, Jussi	2017	Organizational justice and collaboration among nurses as correlates of violent assaults by patients in psychiatric care.	Psychiatric Services	68	5	Exclusion reason: Wrong outcomes
Riisgaard, Helle; Søndergaard, Jens; Munch, Maria; Le, Jette V.; Ledderer, Loni; Pedersen, Line B.; Nexøe, Jørgen	2017	Work motivation, task delegation and job satisfaction of general practice staff: A cross-sectional study.	Family Practice	34	2	Exclusion reason: Wrong outcomes
Nesje, Kjersti	2017	Professional commitment: Does it buffer or intensify job demands?	Scandinavian Journal of Psychology	58	2	Exclusion reason: Wrong comparator
Uronen, L.; Heimonen, J.; Puukka, P.; Martimo, K. P.; Hartiala, J.; Salanterä, S.	2017	Health check documentation of psychosocial factors using the WAI.	Occupational Medicine	67	2	Exclusion reason: Wrong population
Olafsen, Anja H.; Niemiec, Christopher P.; Halvari, Hallgeir; Deci, Edward L.; Williams, Geoffrey C.	2017	On the dark side of work: A longitudinal analysis using self-determination theory.	European Journal of Work and Organizational Psychology	26	2	Exclusion reason: Wrong comparator
Mahmood, Javed Iqbal; Grotmol, Kjersti Støen; Tesli, Martin; Vaglum, Per; Tyssen, Reidar	2017	Contextual factors and mental distress as possible predictors of hazardous drinking in norwegian medical doctors: A 15-year longitudinal, nationwide study.	European Addiction Research	23	1	Exclusion reason: Wrong outcomes
Lantta, Tella; Anttila, Minna; Kontio, Raija; Adams, Clive E.; Välimäki, Maritta	2016	Violent events, ward climate and ideas for violence prevention among nurses in psychiatric wards: A focus group study.	International Journal of Mental Health Systems	10		Exclusion reason: Wrong outcomes
Meagher, Gabrielle; Szebehely, Marta; Mears, Jane	2016	How institutions matter for job characteristics, quality and experiences: A comparison of home care work for older people in Australia and Sweden.	Work, Employment and Society	30	5	Exclusion reason: Wrong population
Jakobsen, Louise M.; Jorgensen, Anette F. B.; Thomsen, Birthe L.; Albertsen, Karen; Greiner, Birgit A.; Rugulies, Reiner	2016	Emotion work within eldercare and depressive symptoms: A cross-sectional multi-level study assessing the association between externally observed emotion work and self-reported depressive symptoms among Danish eldercare workers.	International Journal of Nursing Studies	62		Exclusion reason: Wrong comparator
Eskola, Suvi; Roos, Mervi; McCormack, Brendan; Slater, Paul; Hahtela, Nina; Suominen, Tarja	2016	Workplace culture among operating room nurses.	Journal of Nursing Management	24	6	Exclusion reason: Wrong outcomes
Saksvik-Lehouillier, Ingvild; Bjorvatn, Bjørn; Magerøy, Nils; Pallesen, Ståle	2016	Hardiness, psychosocial factors and shift work tolerance among nurses – A 2-year follow-up study.	Journal of Advanced Nursing	72	8	Exclusion reason: Wrong outcomes
Päätalo, Kati; Kyngäs, Helvi	2016	Well-being at work: Graduating nursing students' perspective in Finland.	Contemporary Nurse	52	5	Exclusion reason: Wrong population
Vedaa, Øystein; Krossbakken, Elfrid; Grimsrud, Ingse Dagny; Bjorvatn, Bjørn; Sivertsen, Børge; Magerøy, Nils; Einarsen, Ståle; Pallesen, Ståle	2016	Prospective study of predictors and consequences of insomnia: Personality, lifestyle, mental health, and work-related stressors.	Sleep Medicine	20		Exclusion reason: Wrong outcomes
Sveinsdóttir, Herdís; Ragnarsdóttir, Erla Dögg; Blöndal, Katrín	2016	Praise matters: The influence of nurse unit managers' praise on nurses' practice, work environment and job satisfaction: A questionnaire study.	Journal of Advanced Nursing	72	3	Exclusion reason: Wrong comparator
Tuisku, Katinka; Pulkki-Råback, Laura; Virtanen, Marianna	2016	Cultural events provided by employer and occupational wellbeing of employees: A cross-sectional study among hospital nurses.	Work: Journal of Prevention, Assessment & Rehabilitation	55	1	Exclusion reason: Wrong outcomes
Freimann, Tiina; Pääsuke, Mati; Merisalu, Eda	2016	Work-related psychosocial factors and mental health problems associated with musculoskeletal pain in nurses: A cross-sectional study.	Pain Research & Management	2016		Exclusion reason: Wrong population
Heponiemi, Tarja; Presseau, Justin; Elovainio, Marko	2016	On-call work and physicians' turnover intention: The moderating effect of job strain.	Psychology, Health & Medicine	21	1	Exclusion reason: Wrong outcomes
Kinnunen-Amoroso, Maritta; Liira, Juha	2016	Work-related stress management between workplace and occupational health care.	Work: Journal of Prevention, Assessment & Rehabilitation	54	3	Exclusion reason: Wrong population
Strömgren, Marcus; Eriksson, Andrea; Bergman, David; Dellve, Lotta	2016	Social capital among healthcare professionals: A prospective study of its importance for job satisfaction, work engagement and engagement in clinical improvements.	International Journal of Nursing Studies	53		Exclusion reason: Wrong comparator

Appendix 3 – List of search strings

If all or a substantive part of the search strategies below are reused in another publication, please cite this report!

Cinahl med fulltext via EBSCO 2023-01-03
Title: Kunskapssammanställning om arbetsmiljörisker och friskfaktorer bland hälso- och sjukvårdspersonal_version1

	Search terms	Items found
Population: Health personnel		
1.	(MH "Health Occupations+") OR (MH "Health Personnel+")	1 275 025
2.	TI ("health personnel" OR "hospital personnel" OR "health occupation*" OR "nursing staff*" OR physician* OR doctor* OR nurse* OR "medical staff*" OR "health profession*" OR "health care provider*" OR "healthcare provider*" OR "health care worker*" OR "healthcare worker*" OR "health worker*" OR "health workforce*" OR "health care professional*" OR "healthcare professional*" OR "healthcare staff*" OR "health care staff*" OR "healthcare employee*" OR "health care employee*" OR "hospital worker*" OR "hospital staff*" OR "hospital employee*" OR "dental auxiliar*" OR "dental assistant*" OR "dental hygienist*" OR "dental technician*" OR denturist* OR "emergency medical technician*" OR "home health aide*" OR "medical record administrator*" OR "medical secretar*" OR "medical receptionist*" OR "nursing assistant*" OR "psychiatric aide*" OR "operating room technician*" OR "pharmacy technician*" OR "physical therapist assistant*" OR "physician assistant*" OR "ophthalmic assistant*" OR "pediatric assistant*" OR anatomist* OR anesthetist* OR anesthesiologist* OR audiologist* OR caregiver* OR "case manager*" OR "coroners and medical examiner*" OR "dental staff*" OR dentist* OR endodontist* OR "oral and maxillofacial surgeon*" OR orthodontist* OR doula* OR "emergency medical dispatcher*" OR epidemiologist* OR "health educator*" OR "health facility administrator*" OR "hospital administrator*" OR "infection control practitioner*" OR "medical chaperone*" OR "medical laboratory personnel" OR nutritionist* OR "occupational therapist*" OR optometrist* OR "hospital administrator*" OR pharmacist* OR "physical therapist*" OR "physician executive*" OR allergist* OR anesthesiologist* OR cardiologist* OR dermatologist* OR endocrinologist* OR "foreign medical graduate*" OR gastroenterologist* OR "general practitioner*" OR geriatrician* OR hospitalist* OR nephrologist* OR neurologist* OR oncologist* OR ophthalmologist* OR otolaryngologist* OR pathologist* OR pediatrician* OR neonatologist* OR physiatrist* OR pulmonologist* OR radiologist* OR rheumatologist* OR surgeon* OR neurosurgeon* OR urologist* OR psychotherapist* OR midwife* OR midwives)	398 708
3.	AB ("health personnel" OR "hospital personnel" OR "health occupation*" OR "nursing staff*" OR physician* OR doctor* OR nurse* OR "medical staff*" OR "health profession*" OR "health care provider*" OR "healthcare provider*" OR "health care worker*" OR "healthcare worker*" OR "health worker*" OR "health workforce*" OR "health care professional*" OR "healthcare professional*" OR "healthcare staff*" OR "health care staff*" OR "healthcare employee*" OR "health care employee*" OR "hospital worker*" OR "hospital staff*" OR "hospital employee*" OR "dental auxiliar*" OR "dental assistant*" OR "dental hygienist*" OR "dental technician*" OR denturist* OR "emergency medical technician*" OR "home health aide*" OR "medical record administrator*" OR "medical secretar*" OR "medical receptionist*" OR "nursing assistant*" OR "psychiatric aide*" OR "operating room technician*" OR "pharmacy technician*" OR "physical therapist assistant*" OR "physician assistant*" OR "ophthalmic assistant*" OR "pediatric assistant*" OR anatomist* OR anesthetist* OR anesthesiologist* OR audiologist* OR caregiver* OR "case manager*" OR "coroners and medical examiner*" OR "dental staff*" OR dentist* OR endodontist* OR "oral and maxillofacial surgeon*" OR orthodontist* OR doula* OR "emergency medical dispatcher*" OR epidemiologist* OR "health educator*" OR "health facility administrator*" OR "hospital administrator*" OR "infection control practitioner*" OR "medical chaperone*" OR "medical laboratory personnel" OR nutritionist* OR "occupational therapist*" OR optometrist* OR "hospital administrator*" OR pharmacist* OR "physical therapist*" OR "physician executive*" OR allergist* OR anesthesiologist* OR cardiologist* OR dermatologist* OR endocrinologist* OR "foreign medical graduate*" OR gastroenterologist* OR "general practitioner*" OR geriatrician* OR hospitalist* OR nephrologist* OR neurologist* OR oncologist* OR ophthalmologist* OR otolaryngologist* OR pathologist* OR pediatrician* OR neonatologist* OR physiatrist* OR pulmonologist* OR radiologist* OR rheumatologist* OR surgeon* OR neurosurgeon* OR urologist* OR psychotherapist* OR midwife* OR midwives)	776 133
4.	1 OR 2 OR 3	1 848 937
Exposure: Occupational health		
5.	(MH "Occupational Health") OR (MH "Work Environment") OR (MH "Quality of Working Life") OR (MH "Job Satisfaction")	84 028
6.	TI ("occupational health*" OR "occupational safet*" OR "personnel* health*" OR "employee* health*" OR "worker* health*" OR "workplace health*" OR "worksite health*" OR "staff health*" OR "work* environment*" OR "occupational environment*" OR "work* culture*" OR "work* relat*" OR "job related" OR "work* condition*" OR "work* climat*" OR "organizational climate*" OR "organisational climate*" OR "work atmosphere*" OR "job satisfaction*" OR "work* satisfaction*" OR "employee* satisfaction*" OR "quality of work* life" OR "occupational exposure*" OR "work* motivation*" OR "job motivation*" OR "employee* motivation*")	18 039
7.	AB ("occupational health*" OR "occupational safet*" OR "personnel* health*" OR "employee* health*" OR "worker* health*" OR "workplace health*" OR "worksite health*" OR "staff health*" OR "work* environment*" OR "occupational environment*" OR "work* culture*" OR "work* relat*" OR "job related" OR "work* condition*" OR "work* climat*" OR "organizational climate*" OR "organisational climate*" OR "work atmosphere*" OR "job satisfaction*" OR "work* satisfaction*" OR "employee* satisfaction*" OR "quality of work* life" OR "occupational exposure*" OR "work* motivation*" OR "job motivation*" OR "employee* motivation*")	48 590
8.	5 OR 6 OR 7	117 265
Context: Geographic		
9.	(MH "Scandinavia") OR (MH "Denmark") OR (MH "Finland") OR (MH "Norway") OR (MH "Sweden") OR (MH "Greenland") OR (MH "Iceland")	81 697
10.	TI (denmark OR danish OR "faroe island*" OR finland OR finnish OR finns OR greenland* OR iceland* OR norway OR norwegian* OR swed* OR åland* OR nordic* OR scandinavia*)	32 289
11.	AB (denmark OR danish OR "faroe island*" OR finland OR finnish OR finns OR greenland* OR iceland* OR norway OR norwegian* OR swed* OR åland* OR nordic* OR scandinavia*)	65 348
12.	9 OR 10 OR 11	107645

Search terms		Items found
Combined sets		
13.	4 AND 8 AND 12	2045
Limits		
14.	Publication year: 2016/01/01 -	843
15.	Language: Danish, English, Norwegian, Swedish	827
Final result		
16.	**13 AND 14 AND 15**	**827**

[MH] = Exact Subject heading;
[MH+] = Exact Subject heading Explode (The headings are exploded to retrieve all references indexed to that term as well as all references indexed to any narrower subject terms.)
[AB] = Term from abstract;
[TI] = Term from title;
[" "] = Citation Marks; searches for an exact phrase;
[*] = Truncation

PsycInfo via Proquest 2023-01-03
Title: Kunskapssammanställning om arbetsmiljörisker och friskfaktorer bland hälso- och sjukvårdspersonal_version1

Search terms		Items found
Population: Health Personnel		
•	MAINSUBJECT.EXACT.EXPLODE("Health Personnel") OR MAINSUBJECT.EXACT("Clinicians")	196 139
•	noft("health personnel" OR "hospital personnel" OR "health occupation*" OR "nursing staff*" OR physician* OR doctor* OR nurse* OR midwife* OR midwives OR "medical staff*" OR "health profession*" OR "health care provider*" OR "healthcare provider*" OR "health care worker*" OR "healthcare worker*" OR "health worker*" OR "health workforce*" OR "health care professional*" OR "healthcare professional*" OR "healthcare staff*" OR "health care staff*" OR "healthcare employee*" OR "health care employee*" OR "hospital worker*" OR "hospital staff*" OR "hospital employee*")	380 497
•	1 OR 2	453 354
Exposure: Occupational Health		
•	MAINSUBJECT.EXACT.EXPLODE("Occupational Health") OR MAINSUBJECT.EXACT.EXPLODE("Working Conditions") OR MAINSUBJECT.EXACT("Organizational Climate") OR MAINSUBJECT.EXACT("Occupational Exposure") OR MAINSUBJECT.EXACT("Job Satisfaction") OR MAINSUBJECT.EXACT("Employee Motivation") OR MAINSUBJECT.EXACT("Quality of Work Life")	74 075
•	noft("occupational health*" OR "occupational safet*" OR "personnel* health*" OR "employee* health*" OR "worker* health*" OR "workplace health*" OR "worksite health*" OR "staff health*" OR "work* environment*" OR "occupational environment*" OR "work* culture*" OR "work* relat*" OR "job related" OR "work* condition*" OR "work* climat*" OR "organi?ational climate*" OR "work atmosphere*" OR "job satisfaction*" OR "work* satisfaction*" OR "employee* satisfaction*" OR "quality of work* life" OR "occupational exposure*" OR "work* motivation*" OR "job motivation*" OR "employee* motivation*")	127 575
•	4 OR 5	129 834
Context: Geographic		
•	noft(denmark OR danish OR "faroe island*" OR finland OR finnish OR finns OR greenland* OR iceland* OR norway OR norwegian* OR swed* OR åland* OR nordic* OR Scandinavia*)	144 562
Combined sets		
•	3 AND 6 AND 7	1 615
Limits		
•	Publikation year: 2016/01/01 -	530
•	Language: Danish, English, Norwegian, Swedish	529
Final result		
.	**8 AND 9 AND 10**	**529**

[MAINSUBJECT.EXACT] =Term from the PsycInfo thesaurus;
[MAINSUBJECT.EXACT.EXPLODE] = Includes terms found below this term in the PsycInfo thesaurus;
[noft] = Anywhere except full text;
[" "] = Citation Marks; searches for an exact phrase;
[*] = Truncation

Pubmed via NLM 4 2023-01-03
Title: Kunskapssammanställning om arbetsmiljörisker och friskfaktorer bland hälso- och sjukvårdspersonal_version1

Search terms		Items found
Population: Health Personnel		
•	"Health Personnel"[Mesh] OR "Health Occupations"[Mesh]	2272423
•	"health personnel"[Title/Abstract] OR "hospital personnel"[Title/Abstract] OR "health occupation*"[Title/Abstract] OR "nursing staff*"[Title/Abstract] OR physician*[Title/Abstract] OR doctor*[Title/Abstract] OR nurse*[Title/Abstract] OR "medical staff*"[Title/Abstract] OR "health profession*"[Title/Abstract] OR "health care provider*"[Title/Abstract] OR "healthcare provider*"[Title/Abstract] OR "health care worker*"[Title/Abstract] OR "healthcare worker*"[Title/Abstract] OR "health care professional*"[Title/Abstract] OR "healthcare professional*"[Title/Abstract] OR "healthcare staff*"[Title/Abstract] OR "health care staff*"[Title/Abstract] OR "healthcare employee*"[Title/Abstract] OR "health care employee*"[Title/Abstract] OR "hospital worker*"[Title/Abstract] OR "hospital staff*"[Title/Abstract] OR "hospital employee*"[Title/Abstract] OR "community health worker*"[Title/Abstract] OR "dental auxiliar*"[Title/Abstract] OR "dental assistant*"[Title/Abstract] OR "dental hygienist*"[Title/Abstract] OR "dental technician*"[Title/Abstract] OR denturist*[Title/Abstract] OR "emergency medical technician*"[Title/Abstract] OR "home health aide*"[Title/Abstract] OR "medical record administrator*"[Title/Abstract] OR "medical secretar*"[Title/Abstract] OR "medical receptionist*"[Title/Abstract] OR "nursing assistant*"[Title/Abstract] OR "psychiatric aide*"[Title/Abstract] OR "operating room technician*"[Title/Abstract] OR "pharmacy technician*"[Title/Abstract] OR "physical therapist assistant*"[Title/Abstract] OR "physician assistant*"[Title/Abstract] OR "ophthalmic assistant*"[Title/Abstract] OR "pediatric assistant*"[Title/Abstract] OR anatomist*[Title/Abstract] OR anesthetist*[Title/Abstract] OR anesthesiologist*[Title/Abstract] OR audiologist*[Title/Abstract] OR caregiver*[Title/Abstract] OR "case manager*"[Title/Abstract] OR "coroners and medical examiner*"[Title/Abstract] OR "dental staff*"[Title/Abstract] OR dentist*[Title/Abstract] OR endodontist*[Title/Abstract] OR "oral and maxillofacial surgeon*"[Title/Abstract] OR orthodontist*[Title/Abstract] OR doula*[Title/Abstract] OR "emergency medical dispatcher*"[Title/Abstract] OR epidemiologist*[Title/Abstract] OR "health educator*"[Title/Abstract] OR "health facility administrator*"[Title/Abstract] OR "hospital administrator*"[Title/Abstract] OR "infection control practitioner*"[Title/Abstract] OR "medical chaperone*"[Title/Abstract] OR "medical laboratory personnel"[Title/Abstract] OR nutritionist*[Title/Abstract] OR "occupational therapist*"[Title/Abstract] OR optometrist*[Title/Abstract] OR pharmacist*[Title/Abstract] OR "physical therapist*"[Title/Abstract] OR "physician executive*"[Title/Abstract] OR allergist*[Title/Abstract] OR cardiologist*[Title/Abstract] OR dermatologist*[Title/Abstract] OR endocrinologist*[Title/Abstract] OR "foreign medical graduate*"[Title/Abstract] OR gastroenterologist*[Title/Abstract] OR "general practitioner*"[Title/Abstract] OR geriatrician*[Title/Abstract] OR hospitalist*[Title/Abstract] OR nephrologist*[Title/Abstract] OR neurologist*[Title/Abstract] OR oncologist*[Title/Abstract] OR ophthalmologist*[Title/Abstract] OR otolaryngologist*[Title/Abstract] OR pathologist*[Title/Abstract] OR pediatrician*[Title/Abstract] OR neonatologist*[Title/Abstract] OR physiatrist*[Title/Abstract] OR pulmonologist*[Title/Abstract] OR radiologist*[Title/Abstract] OR rheumatologist*[Title/Abstract] OR surgeon*[Title/Abstract] OR neurosurgeon*[Title/Abstract] OR urologist*[Title/Abstract] OR psychotherapist*[Title/Abstract] OR "health worker*"[Title/Abstract] OR "health workforce*"[Title/Abstract] OR midwife*[Title/Abstract] OR midwives[Title/Abstract]	1764884
•	1 OR 2	3402383
Exposure: Occupational Health		
•	"Occupational Health"[Mesh] OR "Job Satisfaction"[Mesh] OR "Occupational Exposure"[Mesh]	127 175
•	"occupational health*"[Title/Abstract] OR "occupational safet*"[Title/Abstract] OR "personnel health*"[Title/Abstract] OR "personnels health*"[Title/Abstract] OR "employee health*"[Title/Abstract] OR "employees health*"[Title/Abstract] OR "worker health*"OR "workers health*"[Title/Abstract] OR "workplace health*"[Title/Abstract] OR "worksite health*"[Title/Abstract] OR "staff health*"[Title/Abstract] OR "work environment*"[Title/Abstract] OR "working environment*"[Title/Abstract] OR "occupational environment*"[Title/Abstract] OR "work culture*"[Title/Abstract] OR "working culture*"[Title/Abstract] OR "work relat*"[Title/Abstract] OR "workplace relat*"[Title/Abstract] OR "job relat*"[Title/Abstract] OR "work condition*"[Title/Abstract] OR "working condition*"[Title/Abstract] OR "work climat*"[Title/Abstract] OR "workers climat*"[Title/Abstract] OR "working climat*"[Title/Abstract] OR "organizational climate*"[Title/Abstract] OR "organisational climate*"[Title/Abstract] OR "work atmosphere*"[Title/Abstract] OR "job satisfaction*"[Title/Abstract] OR "work satisfaction*"[Title/Abstract] OR "workers satisfaction*"[Title/Abstract] OR "working satisfaction*"[Title/Abstract] OR "employee satisfaction*"[Title/Abstract] OR "employees satisfaction*"[Title/Abstract] OR "quality of work life"[Title/Abstract] OR "quality of working life"[Title/Abstract] OR "occupational exposure*"[Title/Abstract] OR "work motivation*"[Title/Abstract] OR "workers motivation*"[Title/Abstract] OR "working motivation*"[Title/Abstract] OR "job motivation*"[Title/Abstract] OR "employee motivation*"[Title/Abstract] OR "employees motivation*"[Title/Abstract]	112 090
•	4 OR 5	198 953
Context: Geographic		
•	"Scandinavian and Nordic Countries"[Mesh]	218793
•	denmark[Text Word] OR danish[Text Word] OR "faroe island*"[Text Word] OR finland[Text Word] OR finnish[Text Word] OR finns[Text Word] OR greenland*[Text Word] OR iceland*[Text Word] OR norway[Text Word] OR norwegian*[Text Word] OR swed*[Text Word] OR åland*[Text Word] OR nordic*[Text Word] OR scandinavia*[Text Word]	323810
•	7 OR 8	324166
Combined sets		
•	3 AND 6 AND 9	3356
Limits		
•	Publikation year: 2016/01/01 -	1019
•	Language: Danish, English, Norwegian, Swedish	1009
Final result		
.	**10 AND 11 AND 12**	**1009**

[MeSH] = Term from the Medline controlled vocabulary, including terms found below this term in the MeSH hierarchy;
[MeSH:NoExp] = Does not include terms found below this term in the MeSH hierarchy; **[TIAB]** = Title or abstract;
[" "] = Citation Marks; searches for an exact phrase; **[*]** = Truncation
[Text Word] = Includes all words and numbers in the title, abstract, other abstract, MeSH terms, MeSH Subheadings, Publication Types, Substance Names, Personal Name as Subject, Corporate Author, Secondary Source, Comment/Correction Notes, and Other Terms

Scopus 2023-01-03
Title: Kunskapssammanställning om arbetsmiljörisker och friskfaktorer bland hälso- och sjukvårdspersonal_version1

Search terms		Items found
Population: Health Personnel		
•	TITLE-ABS-KEY ("health personnel" OR "hospital personnel" OR "health occupation*" OR "nursing staff*" OR physician* OR doctor* OR nurse* OR "medical staff*" OR "health profession*" OR "health care provider*" OR "healthcare provider*" OR "health care worker*" OR "healthcare worker*" OR "health worker*" OR "health workforce*" OR "health care professional*" OR "healthcare professional*" OR "healthcare staff*" OR "health care staff*" OR "healthcare employee*" OR "health care employee*" OR "hospital worker*" OR "hospital staff*" OR "hospital employee*" OR "dental auxiliar*" OR "dental assistant*" OR "dental hygienist*" OR "dental technician*" OR denturist* OR "emergency medical technician*" OR "home health aide*" OR "medical record administrator*" OR "medical secretar*" OR "medical receptionist*" OR "nursing assistant*" OR "psychiatric aide*" OR "operating room technician*" OR "pharmacy technician*" OR "physical therapist assistant*" OR "physician assistant*" OR "ophthalmic assistant*" OR "pediatric assistant*" OR anatomist* OR anesthetist* OR anesthesiologist* OR audiologist* OR caregiver* OR "case manager*" OR "coroners and medical examiner*" OR "dental staff*" OR dentist* OR endodontist* OR "oral and maxillofacial surgeon*" OR orthodontist* OR doula* OR "emergency medical dispatcher*" OR epidemiologist* OR "health educator*" OR "health facility administrator*" OR "hospital administrator*" OR "infection control practitioner*" OR "medical chaperone*" OR "medical laboratory personnel" OR nutritionist* OR "occupational therapist*" OR optometrist* OR "hospital administrator*" OR pharmacist* OR "physical therapist*" OR "physician executive*" OR allergist* OR anesthesiologist* OR cardiologist* OR dermatologist* OR endocrinologist* OR "foreign medical graduate*" OR gastroenterologist* OR "general practitioner*" OR geriatrician* OR hospitalist* OR nephrologist* OR neurologist* OR oncologist* OR ophthalmologist* OR otolaryngologist* OR pathologist* OR pediatrician* OR neonatologist* OR physiatrist* OR pulmonologist* OR radiologist* OR rheumatologist* OR surgeon* OR neurosurgeon* OR urologist* OR psychotherapist* OR midwife* OR midwives)	3 064888
Exposure: Occupational Health		
•	TITLE-ABS-KEY ("occupational health*" OR "occupational safet*" OR "personnel* health*" OR "employee* health*" OR "worker* health*" OR "workplace health*" OR "worksite health*" OR "staff health*" OR "work* environment*" OR "occupational environment*" OR "work* culture*" OR "work* relat*" OR "job relat*" OR "work* condition*" OR "work* climat*" OR "organi?ational climate*" OR "work atmosphere*" OR "job satisfaction*" OR "work* satisfaction*" OR "employee* satisfaction*" OR "quality of work* life" OR "occupational exposure*" OR "work* motivation*" OR "job motivation*" OR "employee* motivation*")	720 897
Context: Countries		
•	TITLE-ABS-KEY(denmark OR danish OR "faroe island*" OR finland OR finnish OR finns OR greenland* OR iceland* OR norway OR norwegian* OR swed* OR åland* OR nordic* OR scandinavia*)	218793
4.	AFFILCOUNTRY(denmark OR danish OR "faroe island*" OR finland OR finnish OR finns OR greenland* OR iceland* OR norway OR norwegian* OR swed* OR åland* OR nordic* OR scandinavia*)	2 674 773
5.	3 OR 4	2 941 071
Combined sets		
6	1 AND 2 AND 5	5693
Limits		
7.	Publication year: 2016/01/01 -	2110
8.	Language: Danish, English, Norwegian, Swedish	2096
Final result		
9.	**6 AND 7 AND 8**	**2096**

[TITLE-ABS-KEY] = Includes terms from the title, abstract and keywords
[AFFILCOUNTRY] = Affiliation Country, from the author affiliation fields
[" "] = Citation Marks; searches for an exact phrase;
[*] = Truncation

Appendix 4 – Results from quality review

		SCREENING QUESTIONS		1. QUALITATIVE STUDIES					COMMENTS
RefID	Citation	S1. Are there clear research questions?	S2. Do the collected data allow to address the research questions?	1.1. Is the qualitative approach appropriate to answer the research question?	1.2. Are the qualitative data collection methods adequate to address the research question?	1.3. Are the findings adequately derived from the data?	1.4. Is the interpretation of results sufficiently substantiated by data?	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	
2492	Ahlstedt et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
55	Fallman et al 2022	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
236	Gamskjaer et al 2022	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
149	Golay et al 2022a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
65	Golay et al 2022b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
669	Golvani 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
12	Grønoset Grasmo et al 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
368	Gyllensten et al 2017	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
2404	Herttuala et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
1873	Jepsen et al 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
303	Kjellström 2017	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
1511	Lee et al 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
2361	Loft et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2034	Nielsen and Jørgensen 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
	Ose et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
2624	Seitovirta et al 2017	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
1161	Stadin et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
2011	Svedahl et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.
181	Thapa et al 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
20	Westergren and Lindberg 2022	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No information on the use of reporting framework.

		SCREENING QUESTIONS		3. RANDOMIZED CONTROLLED STUDIES					COMMENTS
RefID	Citation	S1. Are there clear research questions?	S2. Do the collected data allow to address the research questions?	2.1. Is randomization appropriately performed?	2.2. Are the groups comparable at baseline?	2.3. Are there complete outcome data?	2.4. Are outcome assessors blinded to the intervention provided?	2.5 Did the participants adhere to the assigned intervention?	
1133	Jakobsen et al 2018	Yes	Yes	Yes	No	Yes	Yes	Yes	
1357	Pedersen et al 2020	Yes	Yes	Yes	Can't tell	Can't tell	Yes	Can't tell	

		SCREENING QUESTIONS		3. NON-RANDOMIZED STUDIES					COMMENTS
RefID	Citation	S1. Are there clear research questions?	S2. Do the collected data allow to address the research questions?	3.1. Are the participants representative of the target population?	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	3.3. Are there complete outcome data?	3.4. Are the confounders accounted for in the design and analysis?	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	
560	Andersen et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2566	Beltagy et al 2018	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1173	Bernstrøm and Houkes 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
700	Bigert et al 2022	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1717	Blomberg et al 2016	Yes	Yes	Yes	Yes	Yes	No	Yes	
2309	Cheng et al 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1288	Cohidon et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2282	Dahlgren et al 2021	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Unknown response rate
741	Erdem et al 2017	Yes	Yes	Yes	Can't tell	Yes	Yes	Can't tell	Self-reported retrospective working hours for cases and controls
2465	Fallman et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
962	Grønstad et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
178	Grønstad et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2427	Hammer et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1711	Hansen et al 2016	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Exposure registered in 1993 or 1999 only
1546	Henriksen and Lukasse 2016	Yes	Yes	Yes	Yes	Yes	No	Yes	
1980	Heponiemi et al 2017	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
714	Heponiemi et al 2019	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Low response rate
860	Heponiemi et al 2021	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Unknown response rate
1673	Holmberg et al 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1986	Hult et al 2022	Yes	Yes	Can´t tell	Yes	Yes	Yes	Yes	Low response rate
2569	Härmä et al 2018	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2463	Härmä et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2352	Härmä et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1418	Jacobsen et al 2022	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2556	Jensen et al 2018	Yes	Yes	No	Yes	Yes	No	Yes	
1022	Jepsen et al 2017	Yes	Yes	Yes	Yes	Yes	No	Yes	
2165	Johnsen et al 2022	Yes	Yes	Can't tell	Yes	Yes	No	Yes	Low response rate
1001	Jørgensen et al 2017	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Exposure registered in 1993, 1999 and/or 2009 only
2365	Jørgensen et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Exposure registered in 1993, 1999 and/or 2009 only

		SCREENING QUESTIONS		3. NON-RANDOMIZED STUDIES					COMMENTS
RefID	Citation	S1. Are there clear research questions?	S2. Do the collected data allow to address the research questions?	3.1. Are the participants representative of the target population?	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	3.3. Are there complete outcome data?	3.4. Are the confounders accounted for in the design and analysis?	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	
1202	Jørgensen et al 2021b	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Exposure registered in 1993, 1999 and/or 2009 only
978	Kader et al 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
724	Kader et al 2022	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1341	Kaltenbrunner et al 2019	Yes	Yes	No	Yes	Yes	Yes	Yes	Convenience sampling
2526	Karhula et al 2018	Yes	Yes	Yes	Yes	Yes	Can´t tell	Yes	
2344	Karhula et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2136	Kjørstad et al 2022	Yes	Yes	No	Yes	Yes	No	Yes	Convenience sampling, low response rate
2345	Larsen et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	
1607	Lindegård et al 2016	Yes	Yes	Can't tell	Yes	Yes	No	Yes	
4	Liss et al 2018	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1889	Lunde et al 2021	Yes	Yes	No	Yes	Yes	Yes	Yes	
1953	Mauno et al 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
15	Møller et al 2022	Yes	Yes	Yes	Yes	Yes	No	Yes	
2421	Nielsen et al 2019a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
902	Nielsen et al 2019b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2593	Olsen et al 2017	Yes	Yes	Yes	Yes	Yes	No	Yes	
2574	Persson et al 2018	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
330	Poikkeus et al 2020	Yes	Yes	Can't tell	Yes	Yes	No	Yes	
2683	Rantanen et al 2016	Yes	Yes	Yes	Yes	Yes	No	Yes	
559	Riisgaard et al 2017	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2473	Ropponen et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2382	Ropponen et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2227	Ropponen et al 2022	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1292	Ropponen et al 2023	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2281	Rosenström et al 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1463	Ruotsalainen et al 2023	Yes	Yes	Can't tell	Yes	Yes	Yes	Can't tell	
124	Sigurste-insdóttir et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1223	Slåtten et al 2022	Yes	Yes	No	Yes	Yes	Yes	Yes	Convenice sampling, low response rate
16	Spännargård et al 2022	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Unknown response rate
503	Thun et al 2018	Yes	Yes	Yes	Yes	Yes	No	Yes	

		SCREENING QUESTIONS		3. NON-RANDOMIZED STUDIES					COMMENTS
RefID	Citation	S1. Are there clear research questions?	S2. Do the collected data allow to address the research questions?	3.1. Are the participants representative of the target population?	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	3.3. Are there complete outcome data?	3.4. Are the confounders accounted for in the design and analysis?	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	
1450	Vedaa et al 2017a	Yes	Yes	No	Yes	Yes	No	Yes	Convenience sampling
1052	Vedaa et al 2017b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
110	Vedaa et al 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2353	Vedaa et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2658	Vifladt et al 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
490	Vilén and Putus 2021	Yes	Yes	Can't tell	Yes	Yes	No	Yes	Unknown response rate
548	Vilén et al 2022	Yes	Yes	Can't tell	Yes	Yes	No	Yes	Unknown response rate
585	Vinstrup et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2297	Waage et al 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1888	Westergren et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

		SCREENING QUESTIONS		5. MIXED METHODS STUDIES					COMMENTS
RefID	Citation	S1. Are there clear research questions?	S2. Do the collected data allow to address the research questions?	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	5.2. Are the different components of the study effectively integrated to answer the research question?	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	
	Ose et al 2022	Yes	Yes	Yes	Yes	Yes	Yes	No	Low response rate. No information on the use of reporting framework.
487	Ruotsalainen et al 2020	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	No information on the use of reporting framework.

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