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Do Worksite Health Promotion Programs (WHPP) impact presenteeism among employees?

- How is the concept of presenteeism defined?
- What factors influence presenteeism?
- Which WHPP impact presenteeism?

Abstract

Background: Implementation of worksite health promotion programs (WHPP) aiming at improving wellbeing and productivity while reducing presenteeism and productivity losses are rapidly increasing. However, lack of a common conceptual understanding and theoretical framework, makes effective programs still difficult to recommend.

Aims: : This literature research was done to further increase our knowledge and identify the most important causes and correlates of presenteeism by qualitatively summarising the extant research. The concept of presenteeism, how it is defined, its influencing factors on individual, organisational and managerial level, and what kind of impact WHPP have on presenteeism among employees are investigated.

Methods: A systematic literature review was conducted by searching relevant literature in seven different databases The main search-terms were combinations of "worksite, health promotion, organizational intervention, WHPP, presenteeism, employee productivity". We included only peer-reviewed articles and only reviews. Included studies were analysed according to research questions and methodological quality. Scientific literature reviews from 2010 until summer 2019 was searched. 2139 articles were identified after removing duplicates, and when filtered the articles with a set of inclusion and exclusion criteria 14 articles were picked and investigated in depth to answer the scientific research question.

Results: Out of 2139 eligible studies, 14 review studies were included in the analysis. 93% of the studies described the concept presenteeism, however in different ways. 54% focused productivity loss due to reduced health conditions or unhealthy lifestyle, 31% focused the productivity dimension as a work related outcome, 15% reported on the economic consequences of productivity loss.

Conclusions: The last 10 years the development in the field has been positive. An overview emerges, but there is a considerable focus on the individual level, which probably relates to simple solutions on interventions bringing us no further, but reinforce "blaming the victim". The field of presenteeism is complex and multileveled. The results of this review show promising findings; reinforcement of interventions to be multi-component and implemented multilevel in order to be sustainable and up-scaled from project to operation. A culture must be created for such programs to sustain - i.e. implemented into business plans, strategies and into the companies' operating budget.

Key words: Worksite health promotion, presenteeism, sickness presence, productivity loss, cost, employee.

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This thesis is my final contribution to a master degree in sports science with sports medicine subjects at The Norwegian School of Sport Sciences, Oslo, Norway. After an evaluation of alternatives, I ended up doing a literature review. Despite being a bit sceptical initially, as the research progressed it turned out to be interesting, challenging and educational. During the process we bought a house needing time-consuming renovation. In addition, the covid-19 pandemic and subsequent shutdown measures affecting our four kids in various ways was a significant challenge.

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1. Introduction

1.1 General background

Work is a major part of life for most people. It also has a considerable impact on peoples private life. It is an advantage that it works optimally for the individual, the family, the employer and the community at large (Hubley & Copeman, 2013, p. 233).
The increasing number of people with an unhealthy lifestyle e.g. sedentary behaviour, poor nutrition and lack of stress management (Pedersen & Saltin, 2015, p. 19) has resulted in mental and physical health problems, also affecting the labour force, and often resulting in presenteeism (defined, e.g., as attending work while ill) (Aronsson & Gustafsson 2005; Johns, 2010). This emerges as a growing problem. Sickness presence is about reduced work capacity of employees, due to health problems that not necessarily leads to absence from work. Attending work while ill may lead to productivity loss (Burton, Pransky, Conti, Chen & Edington, 2004). Our focus of interest in this study is to further explore how the concept of presenteeism is described in the scientific literature and to investigate the possible causes to the phenomenon. The way the concept presenteeism is defined, measured and understood influence which worksite interventions that might possible impact presenteeism in different worksites.

The concept of presenteeism is used in different ways in scientific research (Lohaus & Habermann, 2019). Firstly, it is closely related to individual lifestyle and health behaviour (Loeppke et al., 2003, p. 351; Schultz & Edington, 2007, p. 548) secondly, presenteeism is related to psychosocial work environment and productivity (Whitehouse, 2005) and thirdly, it is related to leadership and financial cost (Hummer, Sherman & Quinn, 2002; Chapman, 2005, p. 2). Since presenteeism has mainly been researched the last decades, there is still no common agreement on the definition, framework or tools used to measure the effect of presenteeism.

According to Johns (2010, p. 520) the interest in the concept of presenteeism stems mainly from two distinct sources. One tradition, mostly European, often focused on the frequency of presenteeism, reflecting job insecurity and other occupational characteristics causing stress and illness. The other tradition, mostly American, looked for the productivity consequences of

presenteeism as a function of various health conditions, while ignoring the causes of showing up at work ill (Johns, 2010). More recently, the cost related to productivity loss is introduced as an important consequence of presenteeism (Cooper & Dewe, 2008; Carroll, Rick, Pilgrim, Cameron & Hillage, 2010). Presenteeism is a complex phenomenon influenced by a number of factors. Johns (2010) developed a theoretical framework containing both the traditions above, defining presenteeism as "attending work while ill". He emphasizes the importance to merge organisational theory with the more traditional occupational health and epidemiology scholars. In his study (Johns, 2010) he presents the many researched correlates and assumed causes of presenteeism into three categories: organisational policies (e.g. attendance control, downsizing and sick pay), job design features (e.g. job demand, contextual factors, and ease of replacement) and presenteeism cultures (e.g. work climate factors). There seems to be an agreement about the diversity and complexity of factors influencing presenteeism (Lohaus & Haberman, 2019). However research is missing to conclude about interactions between the factors, which factor is more important than the others, or the importance of level and context (Whitehouse, 2005), and there is still no common agreement on the definition, framework or tools used to measure the effect of presenteeism. However, in a recent study Lohaus & Habermann (2019) presents a comprehensive framework for understanding presenteeism based on Johns' (2010) work, focusing decision-making and the individuals possibility to choose presenteeism or absenteeism. This seems to add an interesting dimension in understanding the phenomenon.

Presenteeism is a complex concept influenced by a number of factors. Employees that frequently exhibit presenteeism are at greater risk of more health problems and illness in the future, which in return may lead to absenteeism (Lohaus & Habermann, 2019). In a sense, absenteeism and presenteeism are both types of absence. Some sources suggest that presenteeism can vary inversely with absenteeism. Empirical research suggests that the relationship between presenteeism and absenteeism may vary depending on context (Arnold, 2015).

Presenteeism seems to be a much costlier problem than absenteeism (refers to being away from work because of illness or disability (Hemp, 2004; Escorpizo et al., 2007), and more complicated to determine as it is not formally registered (Hansen & Andersen, 2008), and it is

both invisible and subjective. Accordingly, it is often a hidden cost in businesses (Goetzel, Long, Ozminkowski, Hawkins, Wang & Lynch, 2004; Søgaard, Sørensen, Linde & Hetland, 2010; Quasi, 2013). The interest of the phenomenon has grown the last decades due to its consequences for both employers and employees.

A healthy and productive workforce is important first of all for the individual well-being, but it is also one of the key factors for economic success in business' and society, as well as the general health in the population (Schultz, Chen & Edington, 2009). That implies decent reasons for developing WHPP in companies. Worksites provide the opportunity to implement multilevel interventions concerning environmental, organisational and individual determinants of health and health behaviours (Kwak, Kremers, van Baak & Brug, 2006). Health can be regarded as a resource of employees' function at work (Zweetsloot & van Scheppingen, 2007), and a good health can provide better productivity (Loeppke, 2008). Despite extensive research on worksite health promotion, there is no consensus which WHPP have the best effect or what programs one can recommend to reduce worksite health problems and its consequences (Johns, 2010). Lack of systematic implementation and process evaluation also seems to influence the outcome effects of WHPP (Wierenga et al., 2013). Poor implementation affect methodological quality and the possibility to successfully upscale evidence based programs to worksite real life settings (Durlak & DuPre, 2008; Grønningsæter & Kiland 2018). The purpose of this review is to increase our knowledge in the field, in a search to understand the causes for increased prevalence of presenteeism and to investigate WHPP impact on presenteeism among employees.

1.2 Research question

To thoroughly explore the main aim of the review, we investigate how the concept of presenteeism is defined in the scientific literature, which factors influence the concept and whether there are effective WHPP that might be recommended. This lead to the following research question:

Do Worksite Health Promotion Programs (WHPP) impact presenteeism among employees?

- How is the concept of presenteeism defined?
- What factors influence presenteeism?
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2. Empirical and Theoretical foundations

2.1 Health and health promotion

“Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" is The World Health Organizations (WHOs) (1948/2006) definition of health. WHO was founded in 1948 to support international activity of improving and protecting health. Through the years health promotion has been named “health propaganda”, “-education”, “-improvement”, “-development” and “social marketing”. The diversity of all this names indicate the complexity of health promotion. In 1986 a health promotion unit of WHO organised the first health promotion conference in Ottawa, where the Ottawa Charter was organised. Their universal guide listed peace, shelter, food, education, income, a stable eco-system, sustainable resources, social justice and equity as the fundamental conditions necessary for health (Kemm, 2015, p. 1, p. 21). In addition, the charter made a practical framework for health promotion including health education, service improvement and advocacy. The framework provides, among other things, education to the employees in health at a work setting; make them aware of risks and rights under current workplace health and safety legislation. Furthermore, it ensures availability of appropriate first aid and occupational health services, training opportunities for management and trade union safety representatives on health issues. Advocacy ensures to release staff for training and introduces health and safety at work policies, and protects employees’ rights (Hubley & Copeman, 2013, p. 236). Health promotion evolves under debates on health education and legislation, establishing a balance between these, as well as between coercive, persuasive and health empowerment approaches (Hubbley & Coperman, 2013, p. 7). The Ottawa Charter for Health Promotion provides guidelines for health promotion. It states that health is a resource for everyday life and a positive concept emphasizing personal, social and physical resources, which reflects a holistic view on what health is (WHO, 1986). Antonovsky (1996) argued that discussions of health promotion mostly focusing on pathogenesis (the process which cause ill health and disease) embraced only half of the picture and should also focus on salutogenesis (the process supporting good health). Through sense of coherence (SOC), he visualised the attempt to help individuals or communities (e.g. worksites) to become healthier and more resistant to stressors. SOC will be further explored in a separate section. Health promotion has

evolved to be the process of empowering people to increase their control over health determinants and accordingly enhance their health (Nutbeam, 1998).

2.1.1 Health determinants

Health promotion research has identified several factors that determine health (Kemm, 2015, p. 41). Important determinants affecting health are individual lifestyle factors (e.g. physical activity, nutritional habits, obesity, alcohol abuse and smoking), and individual health conditions (e.g. musculoskeletal pain, mental health problems). Socio-economic environment is one important determinant stating that unemployment and employment have strong effects on health. Employment secures daily structure, time management, social interactions and income (Kemm 2015). At work, both middle and upper management play a central role in developing and maintaining a stable work environment of crucial importance to employees' health and wellbeing. The determinants impact one another, accordingly health has to be viewed from different levels (Hubley and Copeman 2013, p. 18; Kemm 2015), see figure 1.

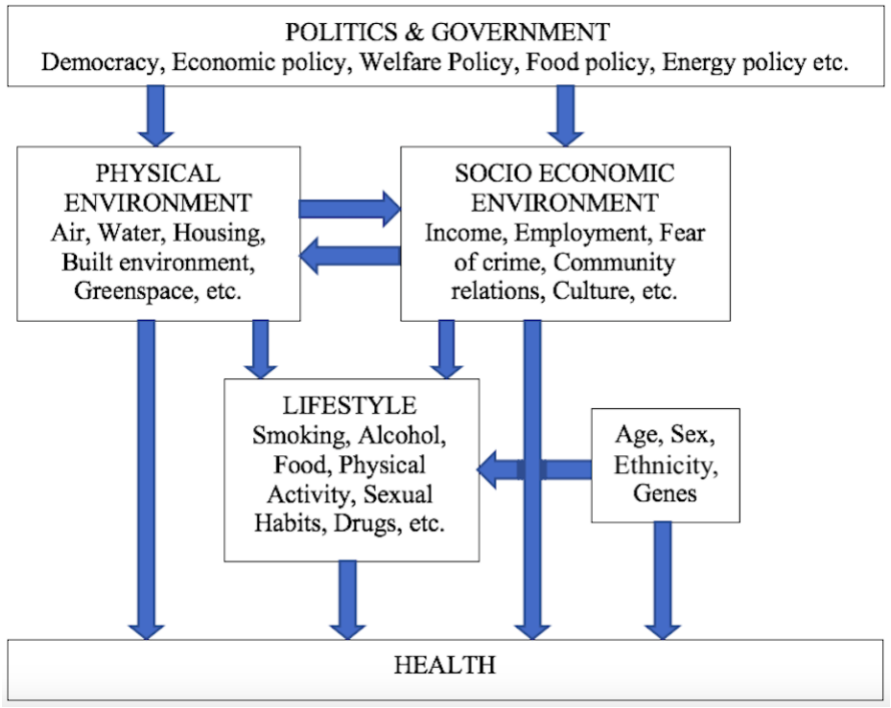


Figure 1. Kemm, (2015, p. 41) Determinants of health.

2.1.2 Worksite Health Promotion

Companies started, as the 21st century approached, to complement their WHPP to population health management, based on the philosophy that a dynamic, active and integrated approach is necessary to improve health at all levels (Chenowet, 2011, p.14). Based on health promotion theory, health is the outcome variable on the individual level (level I), which is affected by lifestyle and biological factors. The next level comprises psychosocial work environment and relations (level II), which includes interactions with department colleagues and line management. This level is affected by i.e. job demands, job stress and coping resources. Level III, is the organisational level (physical environment, socio-economic environment or upper management level). The overall level is the political and governmental level (level IV), including work legislations and laws regulating work and occupational health (Kemm, 2015; Grønningsæter & Kiland 2018). This illustrates how inequality in health and lifestyle is developed (Kemm, 2015), and that causes of good or poor health are influenced by a number of factors, which must be understood and taken into consideration when health related presenteeism is analysed. Research in worksite health promotion indicates that multilevel approaches are necessary for success in implementation of interventions (Wierenga et al., 2013). However, empirical research shows divergent results, Hutchinson & Wilson (2012) did not find evidence to support multiple programs.

In health promotion there are three central approaches; issue, population and setting approach. Promoting health through *issues* can be to injury prevention, weight-reduction or to stop smoking, drinking and/or drug abuse (Thørrisen et al., 2019). *Population* health promotion can be healthy aging and cycle commuting programs (Aglen, Olufsen & Espenes, 2018). Health promotion in *settings* might be health promotion programs in schools/universities or in work settings (Poland, Greene & Rootman, 2000). One of the most important and underutilized setting for health promotion is the workplace (Kwak, Kremers, van Baak & Brug, 2006; van Sheppingen, Ten Have, Zwetsloot, Kok & van Mechelen, 2015). It is a place to reach a large number of people with promotion to enhance health conditions among employees, creating a community of interpersonal support and reinforcement of positive (and negative) health decisions (Hodgins, 2012, p. 187; Hubley & Copeman, 2013, p. 232). The

relationship between health and productivity in the workplace often depends on health promotion and health management in the business (Kirsten, 2010).

2.2 Health related presenteeism

2.2.1 Definitions of health related presenteeism

Gosselin, Lemyre & Corneil (2013) explain presenteeism as despite ill health and complaints indicating rest and absence from work, people are still attending their jobs, while Gilbreath & Karimi (2012) suggest presenteeism to happen when employees are at work, but their cognitive energy is not devoted to the work they do (Gilbreath & Karimi, 2012). Other authors defines presenteeism as being present at work, when one should preferably stay at home due to illness or other health problems that limit job performance (Schultz & Edington, 2007). There are numerous health-related definitions of presenteeism, and the most common components of its description is lifestyle and/or health conditions (Johns, 2010, p. 521).

In health related presenteeism, determinants as attitude and a chosen behaviour are also emphasized (Aronsson, Gustafsson & Dallner, 2000, p. 503; Johns, 2010, p. 519; Lohaus Habermann, 2019). Presenteeism in this context can be thought of as an alternative to absenteeism. Accordingly, it can even be considered a health-promoting measure within a return-to-work framework (Lau, Dye & Aarseth, 2018). A simplified definition is “showing up for work even when ill” (Johns, 2010, p. 519; Aronsson, Gustafsson & Dallner, 2000, p. 503). Johns (2010) argues that when an employee is affected by a health problem, that person goes from being fully productive to having to make the decision between attending work despite being ill, or staying at home. The outcome of the decision is closely related to the severity of the health issue. Less serious illnesses activate other factors of the decision making. Personal and contextual factors become important. In addition to attitude, other personal factors are personality, convictions or other individual characteristics of the person. Furthermore, individual consequences of presenteeism and absenteeism, such as health, productivity and attributions of the self and of others, are taken into consideration.
The motivational component of presenteeism also counts. It comprises conscientiousness, self-esteem, locus of control and hardiness (Bandura 1977; Kobasa, Maddi & Kahn, 1982;

Lefcourt, 2014, p. 42-110) which are individual components. Contextual factors are related to work and organisation characteristics, like job satisfaction, expectations, belonging, and rewards but also stress, organisational justice and social dynamics (Johns, 2010; Gilbreath & Karimi, 2012; Dose, Desrumauxa, Bernaudb, & Hellemansc, 2019). All these factors counts in the decision of go to work or stay at home.

Certain constellations promote absenteeism, while others stimulate presenteeism depending on type of work and organisation. There might be situations were presence at work is more beneficial than staying home, when ill. Presenteeism appears to be positive, especially when the illness is neither contagious nor debilitating, because some productivity is better than no productivity. Work environment, work stress, business events and being busy at work are influencing factors that both inhibit and facilitate health behaviours (Payne, Jones & Harris, 2013). Varying health problems alter job skills and competence in different ways and to various degrees. The way work provides structure, contributes to self-actualisation and development through learning, work is good for health (Steinke & Badura, 2011; Hoeymans et al., 2012). Self-esteem might improve, distraction from health problems might occur and working might be valuable for maintaining employability (Steinke & Badura, 2011; Miraglia & Johns, 2015). Work may also contribute to improved relatedness (Ryan & Deci, 2000) and social support (Karasek & Theorell, 1990; Payne, Jones & Harris, 2013).

2.2.2 Prevalence of presenteeism

The prevalence of presenteeism is difficult to measure, mostly because it is subjective and often invisible, but also because the definition used and its interpretation differs (Goetzel, et al., 2004; Søgaard, Sørensen, Linde, & Hetland, 2010; Quazi, 2013). Questionnaire measures done by Grønningsæter (2009) show an average self-report on presenteeism of 10.1%, compared with absenteeism of 6.4%. Presenteeism was defined only as reduced work performance at work due to health problems. Stress-related factors which also result in impaired work performance were counted in a separate term from presenteeism, called "stress-related productivity leakage" and counted for 13.1% (Grønningsæter, 2009). Both presenteeism and stress-related productivity leakage were based on standardised and validated questionnaires on health complaints and stress (Grønningsæter, Hytten, Skauli, Christensen, & Ursin, 1992). This can be seen in the context of the section 2.4.3 Prevalence of productivity

loss. In the report by Grønningsæter (2009), the prevalence of presenteeism was about twice that of absenteeism. Presenteeism might be measured subjectively through a questionnaire or objectively by measuring employee productivity on the amount of work done (Kessler et al., 2003; Brown, Ryde, Gilson, Burton & Brown, 2013; Walker, Tullar, Diamond, Kohl & Amick, 2017). Measuring productivity may not be relevant in all professions, but when it is possible to do it, the management can analyse causes of fluctuations.

2.3 Causes of presenteeism

Factors documented to influence the concept of presenteeism are described based on current available literature. Individual employee health may be a consequence of presenteeism (Rainbow & Steege, 2017). Established and acute illness and several health problems as physical health, psychosocial work environment, stress, mental health and unhealthy lifestyle, such as inactivity, poor diet and obesity are factors that may contribute to presenteeism (Lohaus & Habermann, 2019).

In general, depression and psychological difficulties are viewed as less appropriate reasons to be absent and are also more complicated to disclose in the workplace (Corrigan, 2005; Hinshaw, 2007). Mental illness is perceived particularly negative and stigmatised; there is even cross-cultural evidence of it (Johns & Xie, 1998). The occurrence of mental health problems among employees is associated with high levels of presenteeism, when psychological demands are high and decision latitude over work tasks limited (Wang, Schmitz, Smailes, Sareen & Patten, 2010). Karlsson, Bjorklund & Jensen (2010) confirmed these results. A major cause of disease-related suboptimal work performance (presentism) is reported to be depression (Hagen et al., 2012; Martinsen 2018, p. 245). Occurrence of depression and migraine correlates reliably with presenteeism as a consequence of work stress (Johns, 2010).

The majority of office workers' time at work, is spent in sitting activities (Kazi, Duncan, Clemes & Haslam, 2014). In fact the workplace can be a potential health risk burden, especially for the occupational groups who are present in inactive working environments due to prolonged sedentary time during working hours (Ryan & Deci, 2000; Thorp, Healy, Winkler, Clark, Gardiner, Owen & Dunstan, 2012). Factors at the workplace have been

shown to be associated with the development of musculoskeletal diseases. Neck and shoulder problems are particularly common among workers using computers many hours a day, and the prevalence increases (Andersen et al., 2008). Musculoskeletal pain is the most frequently reported ailments in Norwegian companies (Rikstrygverket, 2005, p. 88, Ihlebæk & Lærum, 2004, p. 2).

To protect job security, presenteeism may substitute absenteeism especially during economic downturns (Gosselin, Lemyre, & Corneil, 2013). Currently we experience exactly that scenario due to the corona pandemic. Many people are temporarily laid off or are without work. If job security is low and alternatives are few, the threshold to go to work is low. To keep their jobs, employees may choose to attend work despite having a contagious illness, potentially leading to colleagues being infected. The cause of presenteeism can be avoidance of absenteeism linked to sickness, uncertainty, difficulties to find new employment and associated costs (Zakrzewska, 2014). Employees' health status is influenced by adjustments of working conditions and a tough labour market (Biron & Saksvik, 2009; Zakrzewska, 2014). Hence psychological incidents may occur at work. Presenteeism may be regarded as a psychological phenomenon. That implies sick employees present at work, which is associated with distraction and decreased productivity. Impaired quality and amount performed can be affected as well as the potential of inaccuracy, failure and misinterpretation (Zakrzewska, 2014).

The average age of the population is increasing in many countries. As a consequence the expected aging workforce has to be taken into account. Aging may contribute to lower physical capacity and higher prevalence of chronic diseases (Ilmarinen & Tuomi, 1992; Kessler, Greenberg, Mickelson, Meneades, & Wang, 2001; Chapman, 2005)

Choices of a healthy lifestyle, regarding nutrition, physical activity (PA), relaxation and sleep contributes to enhanced health outcomes. First of all by lowering the risk of chronic diseases, but also by leading to higher perceived energy levels, less fatigue, improved mental health, well-being and quality of life (van Duyn & Pivonka, 2000; Penedo & Dahn, 2005; Strijk, Proper, van der Beek & van Mechelen, 2009). In order to achieve health factors that are important for good health in the company, it is crucial to have clear goals and a conscious

organization, a creative environment, management that gives advice to employees and an open working climate. Furthermore, some motivational factors among employees are if they feel well, have a positive attitude and are future optimists and not worried or are not afraid of poor health, do not experience physical stress as very troublesome and are less bothered by sleep disorders (FAFO, 2013). Sometimes employees defy their own sickness and attend work in the sake of colleagues or customers, accumulation of work tasks or concerns about a low rate of absenteeism (FAFO, 2013). These manifestations of presenteeism occur when employees experience various forms of pressure forcing them to attend work despite an acute or chronic illness, where others might decide to stay home (Myhrberg & Vinje, 2014). The most common forms of pressure are indispensability, moral, security and sanction pressure. Employees with a high level of job responsibility, who feel irreplaceable, needed at work constantly and obliged to be instantly available to their colleagues, would fall under the category of indispensability. Their conscience is linked to moral pressure, with a sense of having to perform. Security pressure implies fear of loosing the job if not attending work. This is viewed as a negative presence pressure, potentially leading to harmful sickness attendance. Sanction pressure is exemplified by employees experiencing negative comments and being bypassed by colleagues and management while away (Saksvik, Guttormsen & Thun, 2011, p. 218-222). The instrumental reason for behaviour in such situations, is extrinsic motivation. This external regulation type of motivation is performed to avoid punishment or receive a reward. Examples of reward may be payment, control over ones job status (e.g. prospects of promotion and job security) and self-esteem. Poor employee self-esteem is associated with psychological distress (Makikangas & Kinnunen, 2003). Moreover, Löve, Grimby-Ekman, Eklöf, Hagberg & Dellve (2010) found the risk of presenteeism to be one and a half times greater among individuals with high self- esteem, showing that motivation in these individuals deny them to be absent.

Some other than health factors that influence presenteeism and productivity include the culture and the skill base of the employees; technology advances; the scope, type and size of the company or project and the design of it. The conditions of the location, the physical environment, the implementation of the projects running and the labour/capital ratio are other factors requiring careful consideration (Bernstein, 2003).

2.4 Productivity loss

2.4.1 Definitions of productivity related presenteeism

The second direction of presenteeism aims towards productivity loss and limited ability to work, a common consequence of presenteeism (Thørrisen et al., 2019). Historically, Cooper (1994), defined presenteeism as "…people turning up to work, who are so distressed by their jobs or some aspect of the organizational climate that they contribute little, if anything, to their work" (p. 2). This shows that the boundaries between presenteeism and productivity loss are diffuse. Multiple antecedents can be attributed to the proposed definition of presenteeism, as the act of "being physically present at work with reduced performance". These include professional identity, health, work environment and work-life balance (Rainbow & Steege, 2017). From a social perspective, productivity is defined as "production in relation to effort" (Østenstad, 2020), or as «the ratio of output to input for a particular activity» (Hatry, 1978).

2.4.2 Psychosocial and organisational correlates of presenteeism

Occupational restructuring and downsizing forces exaggerated levels of attendance that might result in presenteeism due to stress and illness (Virtanen, Kivima ̈ki, Elovainio, Vahtera & Ferrie, 2003). Experiences of workload and negative work related stress over time can cause physical or mental symptoms of health problems that eventually may develop disease (Ursin & Eriksen, 2004). Most employees experience stress to varying degrees in their everyday work. Depending on the cause and intensity of the stress experience, productivity can be affected in both directions. A common reaction to short-term stress is motivation and increased energy, with increased productivity as a result (Reme, Eriksen & Ursin, 2008). But with persistent stress, most workers will be adversely affected, with a lack of structure and concentration as well as a loss of analytical ability. This, in turn, affects both quality and quantity of work produced (Grønningsæter, 2009; Rainbow & Steege, 2017). There are several reasons for the emergence of job stress. The kind of stressors experienced is individual and may vary between companies and even internally i.e. between departments of the company. The cognitive activation theory of stress (CATS) (Ursin & Eriksen, 2004), explains the presumed relations between outcome (stress reactions) and internal and external stress events. Both psychological and physiological consequences rely on which cognitive strategies are used in the situation. The combination of psychological demand, skill use and

task control at work, predict stress-related ill health and behavioural correlates of work. The demand-control model of Karasek & Theorell (1990) influences formal or "objective" work conditions, while CATS focuses on the individuals' potential of stress management. It is not sufficient to have control, people must expect this control, sensing a high probability that it will lead to a good result. If not, negative expectancy with guilt might occur, leading to hopelessness in CATS (Ursin & Eriksen, 2004). Helplessness is connected to depression (Seligman, 1992), and further to presenteeism as explained earlier (Hagen et al., 2012; Martinsen 2018, p. 245). These two models complement each other in the analyses of potential psychosocial factors of reduced performance and ill health. It is the experience of the demands and the expectancies of the outcome that regulate the level of the resultant stress responses (Levine & Ursin, 1991, p. 1-21; Reme, Eriksen & Ursin, 2008). The severity of the stress response depends on the expectancy of the outcome of stimuli and the exact responses available for coping (Ursin & Eriksen, 2004; Levine & Ursin, 1991, p. 1-21). In other words, stress will not necessarily result in high presentism. It depends on coping ability (Johns, 2010).

2.4.3 Prevalence of productivity loss

The lack of unified theoretical frameworks for measuring and interpreting the terms presenteeism and productivity also makes it difficult to compare numbers and estimate scope in a credible way. Different numbers and measurements must be assessed on the basis of context and theoretical frame of reference. Grønningsæter (2009) estimates that job stress and lack of coping with stress factors at work result in a lack of work effort, finding an average loss of productivity of 13.1% measured on 4.148 employees in more than 20 different companies over a period of about 7 years. A standardised stress test was used as a base to adjust targets of productivity loss. Grønningsæter distinguishes between reduced work performance due to health problems (presenteeism) and productivity loss associated with job stress. The reason is that employees can be stressed without having health problems, but there is a great overlap (Reme, Eriksen & Ursin 2008). Stress is not neither seen as a legitimate reason to be absent (Johns & Xie, 1998), presenteeism rather becomes a solution. The correlation between absence and work stress is slightly negative (Darr and Johns, 2008). The report by Grønningsæter (2009) also shows that interruptions and lack of continuity at work are the most frequent causes of productivity leaks, being reported by 23% of the employees.

These results are also corroborated by Brisson et al. (1998) who found the psychological demands to comprise mental requirements of a job, e. g. interruption, need of intense concentration and having a high work load. Physical indoor climate, lack of communication, poor technical equipment and inadequate management are other frequently mentioned causes of productivity loss, reported by 15 - 19% of employees. Reports of stress-related productivity leaks are consistently 3-5% higher than reported of presenteeism in the Grønningsæter (2009) analyses, indicating that job stress is a major source of productivity loss.

Satisfaction with working duties and the working environment is seen as a buffer in relation to illness and sick leave, and important for presenteeism (Miraglia & Johns, 2015) as well as well-being. A high level of well-being is often associated with low productivity loss. Healthy employees are more productive, and have lower risks for absence and sick leave. Moreover, they are more engaged in their jobs (von Thiele Schwarz & Hasson, 2011; Strijk, Proper, van Mechelen & van der Beek, 2013).

All sectors can suffer crucial consequences of presenteeism as adverse events, such as failures, e.g. in the health sector medical and medication errors, in the construction business oversights, where the extreme consequence can be death (James, 2013). Prevention of these causes aims towards better care for individuals. Increased population health and lower costs per capita is especially prioritized in the health care sector, but also among consumer organisations and governments worldwide (Rainbow & Steege, 2017). A major cause of changes in productivity is the managements' influence on work environment and the reward systems. There is a clear link between leadership and productivity, as well as between management and the experience of job stress (Ursin & Eriksen 2004; Dose et al., 2019).

2.5 Cost related presenteeism

Work is connected to the employees' physical and mental health (Hemp, 2004). A poor state of health may lead to presenteeism, increased absenteeism, sick leave, lost working days and reduced productivity which influences the companies' profitability (Tveito, Hysing & Eriksen, 2004). Health related presenteeism and cost related presenteeism are two distinct, scientific and empirical directions, both recognising the significance of the concept although researching it in different scientific environments (Johns, 2010). Not all health conditions

result in reduced productivity, but in this review presenteeism is considered as impaired on-the-job performance due to health problems. There is a link between presenteeism, on-the-job productivity and employee health (Schultz & Edington, 2007). The area between optimal work performance and the absence of productivity (e.g., absenteeism) is explored (Johns, 2010). Presenteeism is thus operationalised as the product of a relation between two variables (exposure: presenteeism; outcome: work performance) rather than a single variable (attending work while sick), making it possible to maintain the idea of work performance as a part of the concept of presenteeism without integrating cause and effect (Thørrisen et al, 2019).

Presenteeism has a negative effect on worker productivity, as it is a large contributor to health related costs of the company, it stands for substantial economic losses at the workplace (Aronsson et al., 2000). From the company point of view, measuring and gaining knowledge about presenteeism (explained as health problems leading to limited work capacity), is of interest as it directly affects the economic result. As absenteeism, presenteeism entails productivity loss, thereby adding to the total ”human cost” in a company.
Compared to absenteeism, presenteeism accounts for about four times more productivity loss (Iverson, Lewis, Caputi, & Knospe, 2010), and the cost of health related productivity loss has been estimated to be more than four times that of pharmacy and medical costs (Loeppke et al., 2007). The cost of absenteeism is a fairly straight forward calculation, because the cost of medical premium and claims can easily be accounted for and lost workdays quantified. On the other hand, the cost of presenteeism is a complicated measurement. The framework is not thoroughly defined or operationalised, thus it is difficult to interpret and measure (Aronsson et al., 2000). Nevertheless, numerous of studies demonstrate the cost of lost productivity by referring to measures of presenteeism (Goetzel, et al., 2004; Hemp, 2004; Chapman, 2005; Chapman, 2007).

Mental ill health is expected to result in presenteeism rather than absenteeism (Cooper & Dewe, 2008). Presenteeism accounts for 86% (Stewart, Ricci, Chee, Hahn & Morganstein, 2003) of the economic cost of lost productivity from depression (Collins et al., 2005). In 2007, Sainsbury Centre for Mental Health in UK, interpreted research data and implied that the expenses of presenteeism were 1,8 times as important as absenteeism, and concluding that health related presenteeism has a larger consequence relative to absence. The same year, The

Chartered Institute of Personnel & Development in London, claimed that 46% of reported work-related illnesses are stress, depression or anxiety. It provides compelling evidence to be the largest single cause of work-related illness and absence (Cooper & Dewe, 2008). Addressing this issue the Australian Medibank Report (2011) says it costs the Australian economy between $25 to $34 billion dollars annually. In populous countries, such as the USA, with its different health care system, the cost derived from presenteeism ranges from $150 to $250 billion dollars per year (Hemp, 2004; Prater & Smith, 2011). Bank One conducted research indicating around two thirds of US health-related costs are connected to presenteeism (63%). In comparison to this, absenteeism and short term disability accounted for 6% each, whereas long-term disability stood for (1%) and pharmaceutical and medical bills (24%) (Hemp, 2004). Furthermore, hidden costs of presenteeism surpasses that of absenteeism, treatment and disability (Zakrzewska, 2014).

Provable cost-effectiveness is an important and interesting factor (Proper et al., 2003). The organisational benefits are mostly more strategic and much wider than cost-effectiveness alone (Verbeek, Pulliainen, & Kankaanpää, 2009), and may therefor underestimate the real value of health in a company (Loeppke, 2008). Companies are familiar with health practices and policy by the occupational health and safety (OHS) legislation. In addition human resource (HR) policy and general company structure, culture and policy are influencing health (van Sheppingen et al., 2015).

2.6 Measurement of presenteeism and productivity

In the scientific literature, presenteeism and any resulting productivity loss have been exposed to divided and separate measurement streams (Johns, 2010, p. 522). Several researchers using the same tests (questionnaires) yet defining the outcome using different concepts may explain the lack of clarity in the field. To exemplify, researchers using the WLQ (work limitation questionnaire) (Lerner et al., 2001) report as a measure of presenteeism (e.g. Walker et al., 2017), while others interpret the test as a measure of work ability (Brown et al., 2013). The aim of the WLQ developers was to construct a psychometric questionnaire that would measure to what extent chronic health problems and / or treatment affect the job (Lerner et al., 2001). The WLQ is available in to versions, one consisting of 25 questions (25WLQ), and a short variant of eight questions (8WLQ). The reliability and validity is high in the 25WLQ

(Cronbach's alpha ≥ 0.9) (Lerner et al., 2001). 8WLQ does not reach the same reliability and validity since the measure of reliability depend on the number of questions, but it still has sufficient reliability (Cronbach's alpha ≥ 0.79) and is considered a good option when 25WLQ is not feasible (Walker et al., 2017).

Pereira et al. (2019) use the World Health Organization's Health and Work Performance Questionnaire (HPQ), a self-reported measure of health-related productivity of workers with neck complaints designating the outcome "productivity loss". Self-reported work performance the previous 28 days was calculated and defined as "presenteeism". Kessler et al. (2003, 2004) argues that from the employers' perspective, the scale offers reliable measures on work performance. Since the concepts of presenteeism and productivity are complex measures, being multidimensional, and overlapping, there is a widespread consensus among researchers that future research must focus on establishing a comprehensive definition of these concepts, (Goetzel et al., 2004; Lohaus & Habermann, 2019). With an unique definition of presenteeism and an elaborate framework, the interpretation and the measurement is thought to be more unambiguous in the future.

As Johns (2010) reflects in his review and research agenda, the potential for common method variance of self-report as a basis for measurement of presenteeism is emphasised of bias', due to self-reports of both own health status and then estimate its impact on their own productivity. However, health diagnoses requires self-report to some degree. The WLQ requires respondents to reflect how their condition affects mental and physical performance which might counter method variance (Johns, 2010). Sanderson, Tilse, Nicholoson, Oldenbrug & Graves (2007) found the changes in depressive symptoms and gradations of depression to be more sensitive in the WLQ than e.g. the SPS-6 and other simpler instruments.

2.7 WHPP related to presenteeism

WHPP aim at keeping employees healthy, improve their productivity and moral, attract and retain dedicated workers and reduce employee health care cost (Chenowet, 2011, p. 15). This indicates that WHPP are advantageous in many ways (Kuoppala, Lamminpää & Husman, 2008; Robroek, van Lenthe, van Empelen & Burdorf, 2009). To meet the variety of needs, a

customised WHPP is required constructed on a broad view of the interaction between work and health, individually, organisational, in groups and among leaders in each specific company (Mansoubi, Pearson, Biddle, & Clemes, 2016). Accordingly, the workplace is suggested to be a prioritised arena for health promotion programs (Kuoppala et al., 2008; Robroek et al., 2009). By offering successful WHPP the company image may boost among workers, potential investors, the community and other companies (Chenowet, 2011, p. 15). WHPP are delivered in several levels and settings, as individual, group (social support), organizational or political level or all of these.

2.7.1 WHPP focusing on the individual level

Interventions delivered on the individual level can be PA, sleep programs, health profile tests, neck and shoulder programs and nutritional education among others, e.g. diet and PA interventions have shown beneficial effects on presenteeism and absenteeism (Chapman, 2007). Research indicate that the employee physical fitness has improved while job stress, musculoskeletal pain and sickness absenteeism has decreased (Conn, Hafdahl, Cooper, Brown & Lusk, 2009; Sjøgaard et al., 2016).

People are diverse and have separate needs. The workplaces may contain several employees who most likely would benefit from individualised health promotion programs. Individual differences regarding health issues and physical capacity are present, and have to be taken into consideration, despite the fact that the individuals might be exposed to the same occupational work environment or tasks. Accordingly, individually tailored WHPP, should be designed preferably by balancing the individual physical capacity with job-related exposure and also taking health risk indicators into account (Sjøgaard, Justesen, Murray, Dalager & Søgaard, 2014).

Individualised physical exercise training of adequate adherence, with duration of one year, combined with sufficient leisure-time PA, has been shown to improve presenteeism and absenteeism (Justesen, Søgaard, Dalager, Christensen, Sjøgaard, 2017). A study by Pereira et al. (2019), on office workers and employees suffering from neck pain, indicates a potential benefit on productivity among workers engaging in a combination of workplace intervention

of ergonomic management and neck specific exercise training, as compared to workers receiving a combination of ergonomics and health promotion information. Studies have identified positive results of workplace interventions promoting PA and health (Buckley et al., 2015).

2.7.2 Psychosocial work environment

A study examining how well-being at work draws connection to self-esteem and psychosocial resources such as leader-member exchange, showed that satisfaction of psychological needs for autonomy, competence and relatedness effectuated the connection between self-esteem and leader-member exchange as inductors, and well-being as a base. The relevance of self-esteem and leader-member exchange for counsellors is thereby confirmed and so is the importance of need satisfaction that plays a critical role in matters of well-being. (Dose et al., 2019).

2.7.3 Organisation and management

At the organisational level, WHPP in the work context delivered can be leader training, support, co-worker support, leadership and work organisation. E.g. easy job replacement and personality traits (e.g. the internal locus of control and neuroticism) was shown to be related to presenteeism (Löve et al., 2010; Johns, 2011; Lu et al., 2013). These factors also play a potential role as buffers in reducing or increasing the impact of presenteeism among employees (Lu et al., 2013). How employee wellbeing is influenced by work environment characteristics is described by the job-demand-resource model (Bakker, Demerouti, De Boer & Schaufeli, 2003). Supervisor support is important in encouraging task autonomy, permitting employees to increase their perception of empowerment in their actions at work. Mach et al. (2018, p.1) studying health care, underlined the importance of managers making sure that employees realise their duties and roles, and have an updated, defined and clear role (e.g. job description) in this way they can meet the organisational goals without doubt (Mach et al., 2018, p.1).

Among employees with hypertension risk and obesity a higher participation was shown in multicomponent programs, while in the fitness centre programme there was a higher participation among employees with high fitness and low obesity risks (Lewis, Huebner, Yarborough, 1996). This indicates that individuals that are already fit, may more easily engage in fitness centre programs. In a nutritional programme a higher participation was reported by those with an elevated cholesterol level (Baer, 1993). It is reasonable to believe that individuals that have diagnosed e.g. lifestyle disease as elevated cholesterol level, understand the benefit of doing something to solve their problem. Higher participation level was also reported among employees with less sick leave (Lynchet al., 1990) and less health risks (Shephard, Morgan, Finucane & Schimmelfing, 1980; Gold, Anderson & Serxner, 2000). People with less absenteeism that is in good health might basically be more fit and in a better physical shape and accordingly more engaged in e.g. PA.

2.7.4 Political and cultural level

On the political level, WHPP are delivered as legislations and through the Work Environment Act and the Internal Control Regulations, regulating working hours, breaks and shift work. Companies may also require employees to follow health measures in the company e.g. WHPP (Internal Control Regulations, 1997; Working Environment Act., 2006). To exemplify, Norwegian laws prohibit tobacco smoking in public spaces, like several other countries (Bahus & Gursli-Berg, 2020). In Norway, at and near outdoor entrances to health institutions and public establishments, means of transport and where the public has access, the air must be smoke-free (Tobacco Damage Protection Act, 1975). Through the Work Environment Act and the Internal Control Regulations, companies may require employees to follow health measures in the company e.g. WHPP. In addition they also regulate working hours, breaks and shift work (Internal Control Regulations, 1997; Working Environment Act., 2006).

Tobacco use is associated with serious health risks. Accordingly it is a public health concern to decrease smoking rates. Workplaces can be a smart setting to reach smokers and encourage them to smoking cessation. A 12-month multi behavioural worksite health promotion intervention by Mache, Vitzthum, Groneberg & Harth (2019) aiming to change smoking rates, attitudes and readiness to stop smoking, showed changes in smoking behaviour,

readiness to quit smoking and attitudes towards smoking. Accordingly a number of workers made improvements in smoking behaviour by this WHPP.

Promoting a shift from car to bicycle use is a recommendation for decision-makers on behalf of the results form a cycle commuting study in Belgium. The variation of inter-municipality in bicycle use is related to demographic aspects, town size and travel distance, but also environmental aspects such as the relief, traffic volumes and cycling accidents. In addition, there are regional differences in bicycle use, bicycle accidents and traffic volume. The study indicates that if there in one municipality are high rates of bicycle use, it stimulates a mass effect of cycling in neighbouring municipalities. Thus cycle commuting encourages to more cycle commuters in the area. This political engagement is an opportunity for enterprises to join and encourage their employees to be more active and environmentally friendly (Vandenbulcke et al., 2011).

2.7.5 Multicomponent multilevel programs

Biener et al., (1999) is historically one of the first to recommend a multilevel framework for worksite interventions. Multicomponent programs (e.g. dietary behaviours and PA) achieved higher overall participation rates than programs not using multicomponent strategies and multiple behaviours simultaneously (Robroek et al., 2009). According to this, additional support for using multicomponent WHPP programs is provided to enhance nutritional and PA behaviours among employees, as well as changes on an environmental and policy level in the company. PA is recommended as it reduces mild and moderate depression (Hagen et al., 2012; Martinsen 2018, p. 245). On the contrary Hutchinson & Wilson (2012) did not find any support for multicomponent, multilevel WHPP.

2.7.6 Context and implementation

According to the implementation theory (Durlak & Dupre, 2008), knowledge of the factors that promote and inhibit the implementation is of importance. A strong and supportive leadership and organisational culture are important promoters for the implementation of WHPP. Lack of time and resources are important inhibitors in the implementation (Grønningsæter & Kiland, 2018). An understanding of the health promotion program and how it is intended to work, purposes of process evaluation and how the context and program

characteristics may affect the implementation has to be taken into consideration (Saunders, Evans & Joshi. 2005).

Financial demands combined with chronic illness prove to be a significant challenge for employees as well as employers. Even though the implementation of health promoting programs is increasing among enterprises, the overall usage is still limited (Kirsten, 2010). In the USA the main focus is on individual health risk, while in Europe efforts are aimed at work-related factors connected to psychosocial, physical and risk issues. Analyses of self-reported measuring of such as presenteeism exemplifies that job-related health service strategies are not sufficient to solve the challenges enterprises experience today. Improved and sustainable health among employees can only be achieved when integrating all health related services and confronting psychosocial and organisational factors as well as individual health problems (Kirsten, 2010).

2.8 Social cognitive theory explaining health, health behavioural change and presenteeism

2.8.1 Sense of coherence (SOC)

The theory of "Sense of Coherence" (SOC) is an important theoretical framework within health promotion, understanding health as dynamic and holistic, evolving and moving on an imaginary continuum from disease to ease. It is meant to complement the regular pathogenic health perspective (Antonovsky, 1996; Antonovsky, 1987a). Instead of explaining poor health, the focus is on resources that develops and maintain improved health despite different loads and burdens. The salutogenic approach to tension and stress is the ability of using stressors as resources for coping that potentially promotes health. SOC is the main concept of the theory of salutogenesis, providing a basic description of how to cope and master the unavoidable psychosocial stressors caused by the internal and external environment (Antonovsky, 1979, p. 92-97; Antonovsky, 1987, p. 153-154). The essence of SOC is how to handle everyday-stress, not just to maintain health, but in a way that also promotes health. The aim is to enable people to live optimally with their health challenges in everyday life, by promoting factors that reduces or prevent health problems, and contribute to a better health

(Langeland, 2018). SOC contributes to different degrees of coping, health and well-being and the way you experience reality in terms of comprehensibility, manageability and meaning (Antonovsky, 1984; Antonovsky, 1987; Langeland, 2011; Langeland, 2012).

Comprehensibility is a cognitive element. The term is about how the situation is explainable or if it seems structured and without chaos. Manageability is an element of mastering, which comprises whether we have access to necessary resources to overcome the challenges. Meaningfulness is whether the challenge of demands in life is worth the engagement. This is the factor of motivation, the force to keep going. The SOC theory draws attention to four areas of human life that may be strengthened to facilitate improvement of health; investment in inner emotions to keep mentally stable, social relations including intimate, emotional relations, engagement in rewarding activities (e.g. education, work, sports) and encounter existential issues (political, religious, ideologically). There is always a dynamic interaction between individuals and the environment. By using the coping resources accessible to individuals, mastery of excitement and stress can be achieved, and knowledge thereby gained may encourage further progress of SOC (Antonovsky, 1984; Antonovsky, 1987a).

The self-esteem of an individual refers to his or her view of own values as a person (Coopersmith, 1967). A feeling of knowledge and competence, high work performance, social integration, productive behaviours and occupational success a good self-esteem (Judge & Bono, 2001; Baumeister, Campbell, Krueger, & Vohs, 2003; Bowling, Eschleman, Wang, Kirkendall, & Alarcon, 2010; Bardou & Oubrayrie-Roussel, 2014). Psychological and physical health are influenced by self-esteem, so is well-being (Baumeister et al., 2003; Oyserman, Bybee, Terry, & Hart-Johnson, 2004). A high self-esteem brings about better resistance to stress (Oyserman et al., 2004). Persons with high self-esteem, are accordingly considered less affected by job stressors and thereby less affected by the consequences of such stressors (Hobfoll & Freddy, 1993). Adaption through self fulfillment is facilitated by self-esteem, as well as social integration (Bardou & Oubrayrie-Roussel, 2014). Having adopted good mastering resources and faith in mastery competence, gives a high SOC which makes individuals more likely to actively choose to go to work despite illness.

The SOC theory can be used to raise awareness of resources and coping opportunities both for individuals and for the surroundings (Langeland, 2018). The Ottawa Charter states that health is to be created based on peoples capacity and resources, which is included in the theory of salutogenesis (Morgan & Ziglio, 2007). People with mental and/or musculoskeletal disorders can, with the assistance of a salutogenic approach, return to work. In interaction with the environment, a persons' SOC will build understanding, manageability and meaning. Thus, the experience of work ability and the intention to work is affected. The likeliness of returning to work increases with SOC, an active coping style and high coping expectations. The human adaptability and factors that generate health are emphasized by the theory of salutogenesis. By underlining mastery, opportunities and resources a confidence of development and growth may be created (Langeland, 2012; Langeland, 2018).

The theory of salutogenesis is thought to be a beneficial contribution to the understanding of health promotion in practice (Jensen, 2013). It is reasonable to assume that the correlation between sickness absence and attendance emerges through studies related to WHPP. Furthermore, the studies give indications of the causes of presenteeism, loss of productivity and whether these are linked to stress, anxiety or have other causes. The salutogenic approach is used with the intention to treat employees having musculoskeletal and/or mental disorders. As suggested by Jensen (2013), a persons' SOC in interaction with the environment arises understanding, manageability and meaning while restoring both ability and intention to work.

The purpose of this review is to further increase our knowledge in the field of presenteeism. To thoroughly explore our main aims, we investigate (1) how the concept of presenteeism is defined in the scientific literature, (2) what factors influence the concept and (3) which WHPP impact presenteeism in different worksites. Since analyses of content and causes of the concept presenteeism differ widely in the research literature we chose to categorise according to health promotion theory and levels of implementation (Kemm, 2015). Presenteeism is closely related to lifestyle and health behaviour (Loeppke et al., 2003, p. 351; Schultz & Edington, 2007, p. 548) i.e. individual level. Presenteeism is also related to psychosocial work environment and productivity (Whitehouse, 2005) defined as a group level. At an organizational level, presenteeism is related to leadership, organisational changes and financial cost outcomes (Hummer, Sherman & Quinn, 2002; Chapman, 2005, p. 2) and at a

political and cultural level, presenteeism is related to e.g. labour and health and safety regulations (Saksvik et al., 2011).

3.0 Methods

3.1 Data Sources

To answer the research questions scientific literature published between January 2010 and December 2018 was systematically searched in the databases of the Cochrane library (Systematic reviews and Trials), EMBASE (Ovid), MEDLINE (Ovid), PsycINFO (Ovid), Web of Science, Business Source Complete and Sport Discuss. Initially we searched for articles from year 2000 until 2018. However, during the search process, we found excellent study research performed by, among others, Johns (2010) and Carroll et al. (2010) from earlier years and until 2010. Hence literature from 2010 to 2018 (and ongoing) is applicable in this article. Initially the search included both "presenteeism" and "absenteeism". The articles found was mainly about "absenteeism", leading us to gradually narrow the search to "presenteeism". As the research field of presenteeism is still characterised by a new young framework, the term "presenteeism" is not sufficient to cover the expression. Accordingly we added the keywords "productivity", "productivity loss" and "cost" to cover the area properly.

3.2 Inclusion and Exclusion criteria

To be included in this literature review the setting included a workplace containing employees from 18 to 70 years of age, of both sexes, typically white collar office workers attending health promotion programs provided in work settings. Despite using the term "white collar" in our search, none of the articles in the final selection are solely about white collar workers.

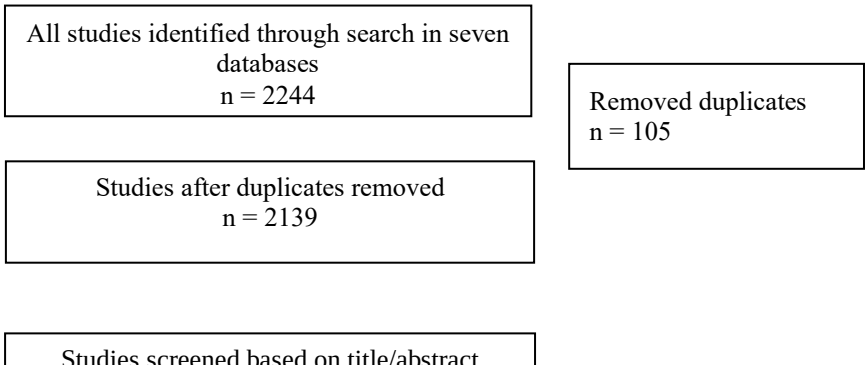
The outcome variable of interest was "presenteeism" and/or "productivity". We included systematic literature reviews from Canada, North America, Europe and Australia written in English. Exclusion criteria were studies published before 2010, articles written in other languages than English, non-review designs or settings other than worksite. Cross sectional studies, reports and grey literature were also excluded. Asian, South American and African

studies were excluded due to non-comparable working environment legislation and labour laws.

3.3 Search Procedures and Selection of Articles

In December 2018 the authors, assisted by a librarian, conducted a search of literature reviews from 2010 to the current date. We had an ongoing search in the databases to track down articles consecutively published throughout summer 2019.

To avoid bias, a Population-Intervention-Comparison-Outcome (PICO) -search customised to this literature study was done to identify and organise precise keywords. Terms were based on MeSH indexing and thesaurus' as well as free text terms. The search was conducted using the following search terms and procedures: (workplace* OR worksite* OR "white collar" OR employ* OR occupation*) AND ("physical activity" OR exercise OR "stress management" OR "health promotion" OR "organizational intervention*" OR occupational health intervention*" OR "WHP program*" OR "worksite health promotion program*" OR leader* OR "life skill") AND (absenteeism OR "sick leave" OR presenteeism OR "employee productivity" OR "productivity loss" OR "cost" "work while ill" OR "work while sick"). Furthermore, the results from the PICO-search was transferred to EndNote, which is a reference mapping tool. As the PRISMA flow chart (Moher, Liberati, Tetzlaff & Altman, 2009) shows (Figure 1.), 2244 publications were identified in the main search, and became 2139 after removing duplicates. All titles found through the search process were read, considered and examined for relevance. Articles that met the above requirements were considered for applicability and inclusion by reading abstracts. Fifty-six articles judged to be of importance, were retrieved in full-text and underwent detailed assessment according to the inclusion criteria. Doubt or disagreement about inclusion was resolved by discussion and consensus among the authors. This resulted in fourteen articles meeting the inclusion criteria. Periodic updating of the search between 2018 and 2019 did not add further publications. See Figure 1. PRISMA 2009 Flow Diagram (Moher, Liberati, Tetzlaff & Altman, 2009).



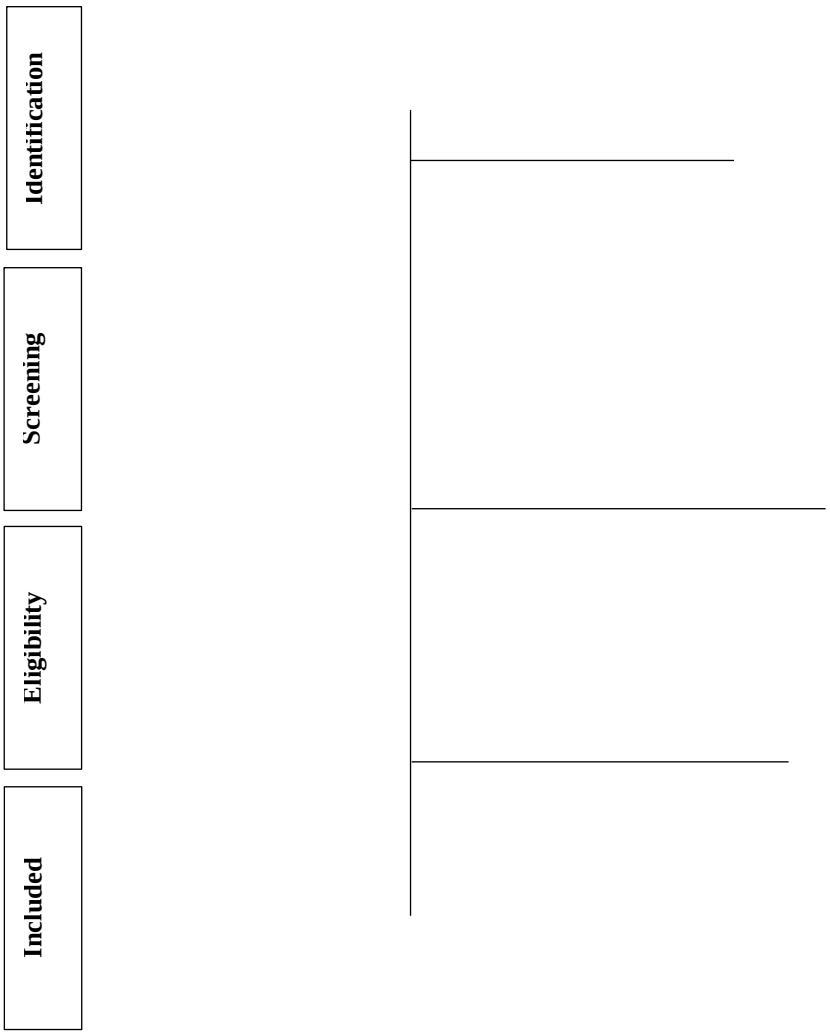


Figure 1. PRISMA Flow diagram (Moher, Liberati, Tetzlaff & Altman, 2009)

3.4 Data extraction scheme

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses - PRISMA checklist (Moher, Liberati, Tetzlaff & Altman, 2009) was followed to complete the literature review properly. The Prisma checklist leads the researcher through all parts of the literature review which have to be considered and explained.

3.5 Risk of Bias

Definition of key terms varies. Lack of a unified established framework and divergent definitions leads to different interpretations and varying quality of measurements. This requires valid narrative analysis. The absence of a valid and clear definition of central terms may lead to interpretation errors. Another source of bias is the measurement of presenteeism. It is measured both objectively and subjectively, by costs and questionnaires (Johns, 2010). There is no standard universal measuring method for presenteeism and lack of standardised

objective measurement tools (Shultz et al., 2009). Intervention studies showing good results are unfortunately mostly of poor scientific quality (Dishman, 1998). During the selection of the 2139 articles, misinterpretation can occur and the consideration of retaining or discarding articles may fail. Exclusively considering studies written in English can represent a selection bias. On the other hand, translating studies written in other languages is a comprehensive and costly procedure, where linguistic nuances may be lost in translation leading to misinterpretation and bias. To reach researchers and other target groups worldwide, we assume studies of importance to be written in English. The diversity of work-norms, social security and insurance systems worldwide may lead to varying cultural and political guiding principles, in turn influencing how researchers interpret presenteeism. A literature review is a qualitative study that requires subjective interpretation. This is exemplified by the researchers Canselliere and Jensen reporting oppositely, e.g. Jensen does not consider Mills' intervention as presenteeism while Canselliere does (see Table 1. Overview of included studies). As presenteeism is a relatively new concept, measuring methods and quality assessment are procedures prone to be interpreted differently. Apparently, different authors measure and assess methodological quality using different assessment methods and interpret them in several ways. The construct validity is low and reflects especially measuring methods, hence there is a lack of valid measurements on presenteeism. The majority of authors use subjectively customized questionnaires. As only literature reviews are included, some of the single studies are being evaluated more than once. We controlled for this by removing four review and several single studies. In this review the quality evaluation is based on our own six different, selection criteria, i.e. number of RCTs, their methodological assessment and outcome reports. Outcome is not always reported, reasons for this may include difficulties to answer it or fear of publisher refusal of negative reports. The field of research is still characterised by an unestablished framework, thus the methodological quality is varying.

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Do Worksite Health Promotion Programs (WHPP) impact presenteeism among employees?

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Abstract

Background: Implementation of WHPP aiming at improving wellbeing and productivity while reducing presenteeism and productivity losses are rapidly increasing. However, lack of a common conceptual understanding and theoretical framework, makes effective programs difficult to recommend.

Aims: To further increase our knowledge, we investigated (1) status about the concept of presenteeism, (2) causes to the phenomenon and (3) WHPP that affected presenteeism.

Methods: A systematic review was carried out searching relevant literature in seven databases. The main search-terms were combinations of "worksite, health promotion, organisational intervention, WHPP, presenteeism, employee productivity". We included only peer-reviewed articles and reviews. Included studies were analysed according to research questions and methodological quality.

Results: Out of 2139 eligible studies, 14 reviews were included in the analysis. 93% described the concept presenteeism. 54% focused on productivity loss due to reduced health conditions, 31% focused the productivity dimension as a work related outcome, while 15% reported on the economic consequences of productivity loss.

Conclusions: The development in the field has lately been positive. An overview emerges, but there is a considerable focus on the individual level, which probably relates to simple solutions on interventions bringing us no further, but reinforce "blaming the victim". The field of presenteeism is complex and multileveled. The results of this review show promising findings; reinforcement of interventions to be multi-component and implemented multilevel in order to be sustainable and up-scaled from project to operation. A culture must be created for such programs to sustain, i.e. implemented into business plans, strategies and operating budgets.

Key words: Worksite health promotion, presenteeism, sickness presence, productivity loss, cost, employee.

Introduction

Work is a major part of life for most people. It also has a considerable impact on peoples private life. It is an advantage that it works optimally for the individual, the family, the employer and the community at large [1, p. 233]. The increasing number of people with an unhealthy lifestyle e.g. sedentary behaviour, poor nutrition and lack of stress management has resulted in mental and physical health problems [2, p.19], also affecting the labour force, and often resulting in presenteeism (defined, e.g., as attending work while ill) [3, 4]. This emerges as a growing problem. Sickness presence is about reduced work capacity of employees, due to health problems that not necessarily leads to absence from work. Attending work while ill may lead to productivity loss [5]. Our focus of interest in this study is to further explore how the concept of presenteeism is described in the scientific literature and to investigate the possible causes to the phenomenon. The way the concept presenteeism is defined, measured and understood influence which worksite interventions that might affect presenteeism in different worksites.

Presenteeism seems to be a much costlier problem than absenteeism (refers to being away from work because of illness or disability [6, 7], and more complicated to determine as it is not formally registered [8], because it is both invisible and subjective. Accordingly, it is often a hidden cost in businesses [9, 10, 11]. The interest of the phenomenon has grown the last decades due to its consequences for both employers and employees. A healthy and productive workforce is important for the individual well-being, economic success in business' and society as well as the general health in the population. Employees that frequently exhibit presenteeism are at greater risk of more health problems and illness in the future, which in return may lead to absenteeism [12]. In a sense, absenteeism and presenteeism are both types

of absence. Some sources suggest that presenteeism can vary inversely with absenteeism. Empirical research indicate that the relationship between presenteeism and absenteeism may vary depending on context [13].

The concept presenteeism is used in different ways in scientific research [12]. Firstly, it is closely related to individual lifestyle and health behaviour [14, p.351, 15, p.548] secondly, presenteeism is related to psychosocial work environment and productivity [16] and thirdly, it is related to leadership and financial cost [17, 18, p.2]. Since presenteeism mainly has been researched the last decades, there is still no common agreement on the definition, framework or tools used to measure the effect of presenteeism.

According to Johns [4, p. 520] the interest in the concept of presenteeism stems mainly from two distinct sources. One tradition, mostly European, often focused the frequency of presenteeism, reflecting job insecurity and other occupational characteristics causing stress and illness. The other tradition, mostly American, looked for the productivity consequences of presenteeism as a function of various health conditions, while ignoring the causes of showing up ill [4]. More recently, the cost related to productivity loss is introduced as an important consequence of presenteeism. The concept of presenteeism is a complex phenomenon influenced by a number of factors. Johns [4] developed a theoretical framework containing both the traditions above, defining presenteeism as "attending work while ill". He emphasizes the importance to merge organizational theory with the more traditional occupational health and epidemiology scholars. In his study [4] he presents the many researched correlates and assumed causes of presenteeism into three categories: organisational policies (e.g. attendance control, downsizing and sick pay), job design features (e.g. job demand, contextual factors,

and ease of replacement) and presenteeism cultures (e.g. work climate factors). There seems to be agreement about the diversity and complexity of factors influencing presenteeism [12]. However research is missing to conclude about interactions between the factors, which factor is more important, or the importance of level and context [4]. Moreover, in a recent study Lohaus and Habermann [12] presents a comprehensive framework for understanding presenteeism based on Johns' [4] work, focusing on decision-making and the individuals' possibility to choose presenteeism or absenteeism. This seems to add an interesting dimension in understanding the phenomenon.

A healthy and productive workforce is one of the key factors for economic success and population health [20]. That implies decent reasons for developing worksite health promotion programs (WHPP) in companies. Research shows a variety of different WHPP, including individual single level lifestyle programs, e.g. physical activity [21] and complex, multilevel interventions concerning environmental, organizational and individual determinants of health and health behaviours [22]. Lack of systematic implementation and process evaluation also seems to influence the outcome effects of WHPP [23]. Poor implementation affect methodological quality and the possibility to successfully upscale evidence based programs to worksite real life settings [24, 25].

The purpose of this review is to further increase our knowledge in the field of presenteeism. To thoroughly explore our main aims, we investigate (1) how the concept of presenteeism is defined in the scientific literature, (2) what factors influence the concept and (3) which WHPP impact presenteeism in different worksites. Since analyses of content and causes of the

concept presenteeism differ widely in the research literature [4] we chose to categorize according to health promotion theory and levels of implementation [26].

Methods

Literature search and study selection

To answer the research questions a systematic review was conducted [27] and scientific literature systematically searched in the databases of the Cochrane library (Systematic reviews and Trials), EMBASE (Ovid), MEDLINE (Ovid), PsycINFO (Ovid), Web of Science, Business Source Complete and Sport Discuss. In December 2018, a librarian along with the authors conducted the search of literature from 2010 to the current date at the point. From that point on we had an ongoing search in the databases to get articles consecutively published throughout 2019. Originally, we started the search from 2000 until 2018, but during the process, we found that among others Johns [4] and Carroll et al. [28] had previously done good research on studies from earlier years and until 2010. Hence, literature from 2010 to 2019 is applicable in this article. To be included in this literature review the setting had to be provided in the workplace representing employees from 18 to 70 years of age, both sexes, typically white collar office workers, employed and attending health promotion programs provided in work settings. The outcome variable of interest was presenteeism and/or productivity. We included systematic literature reviews from Canada, North America, Europe and Australia written in English. Exclusion criteria were studies published before 2010, written in other languages than English, non-review designs, settings other than worksite or any outcome other than presenteeism or productivity. Asian, South American and African studies were excluded due to very different working environment legislation and labour laws compared to European, Canadian, North American and Australian.

A Population-Intervention-Comparison-Outcome (PICO) -search customized to this literature study was done to identify and organize keywords responding the issue precise and clear to avoid bias. Terms were based on MeSH indexing and thesaurus' as well as free text terms. The search were conducted with the base of following search terms and procedure; (workplace* OR worksite* OR "white collar" OR employ* OR occupation*) AND ("physical activity" OR exercise OR "stress management" OR "health promotion" OR "organizational intervention*" OR "occupational health intervention*" OR "WHP program*" OR "worksite health promotion program*" OR leader* OR "life skill") AND (absenteeism OR "sick leave" OR presenteeism OR "employee productivity" OR "productivity loss" OR "cost" OR "work while ill" OR "work while sick"). Furthermore, the results from the PICO-search was transferred to EndNote, which is a reference-mapping tool. We searched for duplicates and removed them. As the PRISMA [29] flow chart (Figure 1) tells, 2139 publications were identified in the main search. All titles identified through the search process were read considered and examined for relevance. The most interesting ones lead us to read the abstracts for applicability and eventually inclusion. Fifty-sex articles, considered to be of importance, was retrieved in full-text and underwent detailed assessment according to the inclusion criteria. When doubt or disagreements about inclusion occurred, the authors resolved it by discussion and consensus. Fourteen articles met the inclusion criteria. Periodic updating of the search between 2018 and 2019 did not identify any additional publications. See Figure 1.

To summarise the key points of the eligible studies an overview of the included studies was conducted (see Attachment, Table 1). From each article independent information about authors, year, nationality, aim and study outcome was assessed. In addition, we included information about method (study design, included number of databases searched, included

number of studies, designs, participants, setting, and methodological quality assessment), and results according to research questions. Evaluation of the methodological quality was retrieved.

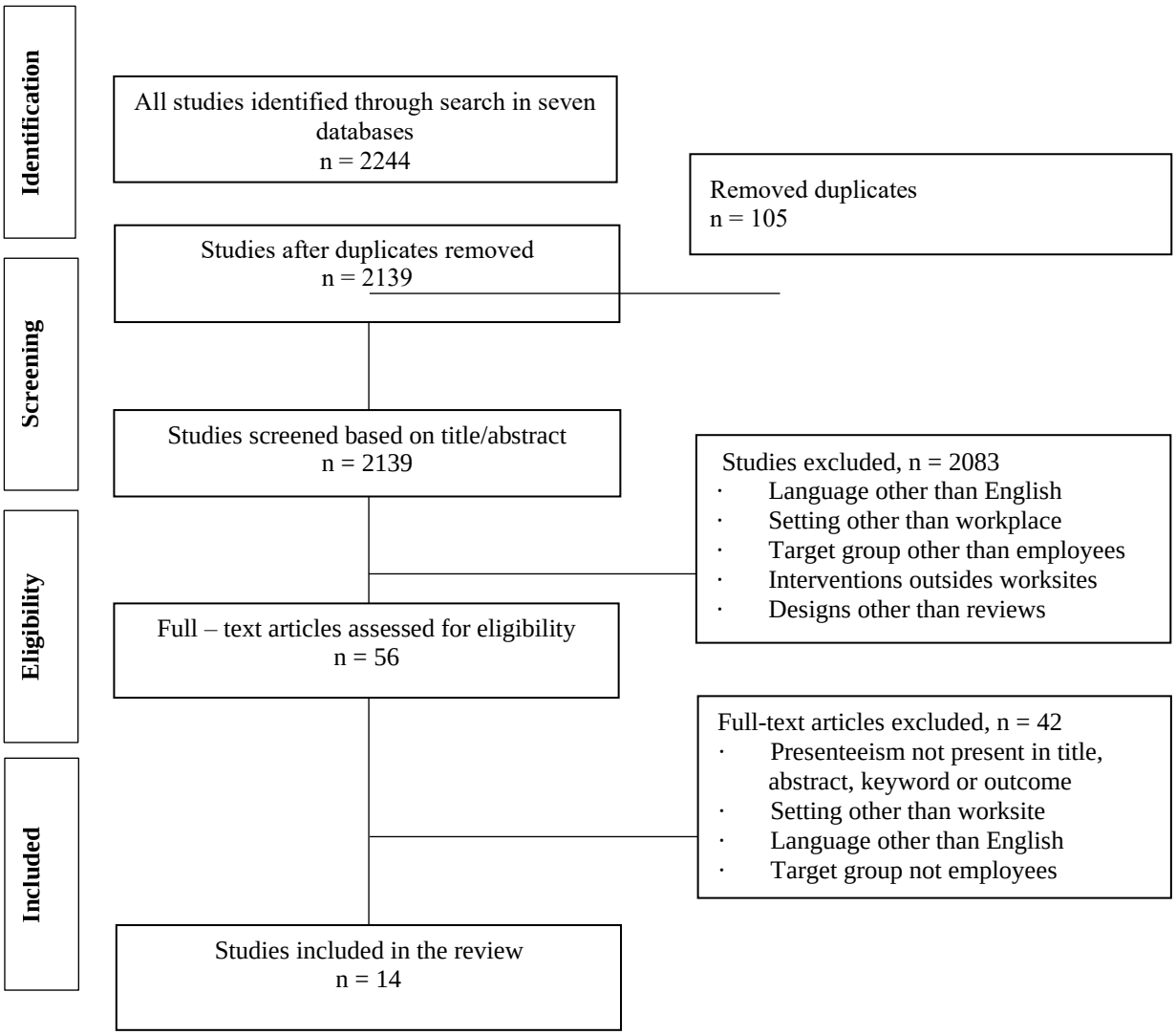

Figure 1. PRISMA Flow diagram [29].

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses - PRISMA checklist was followed to complete the literature review properly. The Prisma checklist leads the researcher through all parts of the literature review that have to be considered and explained [29].

Methodological quality of included studies

Internal methodological quality in each study was assessed according to six criteria developed for this study (see listed below). The use of well-known forms or self-made criteria to assess the quality reflected the validity of the method used. Peer reviewed databases strengthens the search criteria. All our articles are peer reviewed and grey literature was omitted.

1. Special tools (e.g. questionnaires) have been used for methodological quality assessment on included studies (yes/no)
2. Chosen tools standardised and validated (yes/no)
3. Comprehensive methodological evaluation carried out and reported for each study (yes/no)
4. Quality are graded (e.g. strong, moderate, weak evidence for effect) (yes/no)
5. Study design is reported in included studies (yes/no)
6. More than two-thirds of included designs are experimental with control group. Randomized Controlled Trial (RCT) designs ranked highest (yes/no).

Each study is given a number: yes = 1, no = 0, and max sum score is 6. The 14 studies are graded: high methodological quality (5-6), moderate quality (3-4), poor quality (2-0). Studies are identified as inconclusive if no methodological information is presented.

Risk of Bias

Definition of key terms varies. Lack of a unified established framework and divergent definitions leads to different interpretations and varying quality of measurements. It requires valid narrative analysis. The absence of a valid and clear definition of central terms may lead to interpretation errors. Another source of bias is the measurement of presenteeism. It is measured both objectively and subjectively, by costs and questionnaires. There is no standard universal measuring method for presenteeism and lack of standardised objective measurement tools [20].

During the selection of the 2139 articles, misinterpretation can occur and the consideration of retaining or discarding articles may have failed. Only considering studies written in English can represent a selection bias. On the other hand, translating studies written in other languages is a comprehensive and costly procedure. To reach researchers and other target groups worldwide, we assume studies of importance to be written in English. Diversity of work-norms, social security and insurance systems worldwide are so diverse that overall cultural and political guiding principles influence how individuals interpret presenteeism. A literature review is a qualitative study that requires subjective interpretation. It is clearly expressed by Canselliere et al. [30] and Jensen [31] who reports differently, from the same included studies e.g. Mills' intervention [32]. As presenteeism is a relatively new concept, measuring methods and quality assessment are procedures to be interpreted differently. Apparently, the different authors measure and assess methodological quality with different assessment methods and interpret them in several ways [4]. The construct validity is low and reflects especially measuring methods, and we therefore miss valid measurements on presenteeism. In our study the majority of authors use subjectively customized questionnaires. As only literature reviews, and review of reviews are included, both some reviews and some of the single studies are

being evaluated more than once. Due to this, we removed four reviews [30, 31, 33, 34] and several single studies from our analysis to avoid double treatment.

In this review the quality evaluation of included studies is based on customized selection criteria, i.e. number of RCTs, their methodological assessment and own grading of studies. Presenteeism as stated outcome is not always reported, reasons may include difficulties to answer it or fear of publisher refusal of negative reports. The field of research is still characterized by an unestablished framework, thus the methodological quality is varying.

Results

The results are analysed and reported according to the stated research questions: (1) How is the concept of presenteeism defined? (2) What factors influence presenteeism and (3) Which WHPP impact presenteeism?

Description of the material

In the main search, 2139 eligible publications were identified, of which 56 studies were retrieved in full-text and underwent detailed assessment according to the inclusion criteria. Finally, 14 studies were included in this analysis (see flow chart above). 11/14 were systematic reviews containing 262 single studies [33, 30, 31, 35, 36, 37, 38, 39, 40, 41, 42]. 3/14 studies were review of reviews [43, 44, 45] (see attachment, table 1). To reduce selection bias and double report of findings, several reviews [31, 33, 30, 34], and single studies were eliminated in the analyses due to double inclusion. After elimination of duplicates, the latter three studies consisted of 43 reviews and 1128 studies. In total, the material in this study

comprised 53 reviews and 1390 single studies. However, only about 40 single studies (< 3 %) reported on presenteeism or productivity as an outcome variable.

About two-thirds of the single studies comprised a RCT or quasi-experimental design. Other frequently used designs were controlled trials (CT), cohort or observational/epidemiological designs and some cross-sectional studies. The included studies originated from Australia (three studies)[33, 39, 40], Canada (three studies)[30, 44, 45], USA (one study)[41] and seven from Europe (UK [36, 37], Germany [38, 43], Ireland [35], Denmark [31] and the Netherlands [42](see attachment, table 1). The participants were mostly ordinary white and blue-collar employees from a variety of worksite settings; both public and private, health, educational and service settings. Two studies focused on subgroups with employees specifically with musculoskeletal pain [35, 40] and Wagner et al [45] studied employees with mental health problems (e.g. depression and anxiety).

Description of concepts and theoretical framework

We were only able to identify two studies (14%) describing presenteeism/productivity loss in a theoretical context. Kröll, Doebler & Nuesch [38] used the Conservation of resources theory (COR) to predict and understand effects of the interventions, while Oakman et al., [40] used a macro-ergonomics framework, the Sociotechnical system theory to analyse their results on productivity in workers with persistent musculoskeletal pain (PMP).

In our material, all studies except for one [41] (93%) described the concept presenteeism, however in different ways (see table 1). Most of the studies, 7/13 (54%) focused productivity loss due to reduced health conditions [33, 30, 31, 40, 44, 45] (see table 1) or unhealthy

lifestyle/health behaviour [42]. In addition, Brown et al. [33] and Cancelliere et al. [30] added a work performance aspect (e.g. performing below par, decreased quality of work). 4/13 (31%) studies focused the productivity dimension as a work related outcome, not solely related to health [36, 37, 38, 39], while two studies (15%) reported on the economic consequences of productivity loss [35 Cochrane, 43].

Table 1. Definitions / descriptions of presenteeism

Categories of concept description	**Descriptions of presenteeism**
Health related productivity loss or work capacity 54%	• Being at work despite poor health and performing below par [30 Brown et al., • Being present at work, but limited in some aspects of job performance by a health problem. It includes time not spent on job tasks and decreased quality of work [27] Cancelliere et al. • Attending work while sick [28] Jensen, • Productivity loss due to muscle pain [37] Oakman et al. • Productivity loss due to unhealthy lifestyle /health behaviour [39] Rongen et al., • Productivity losses due to different health conditions [41] White et al

	• Productivity losses due to mental health and psychological health conditions [41] Wagner et al., 2016)
Productivity / work related loss 31%	• Having too much to do and not enough time to do it [33] Davies • Time spent at work with decreased levels of productivity [34] Howarth et al • Decreased job satisfaction and productivity due to work pressure [35] Kröll • Categorized as work-related outcome/work performance indicator [36] Neuhaus
Cost related to productivity loss 15%	• Cost of productivity loss due to musculoskeletal pain [32] Cochrane • Economic consequences due to productivity losses [40] Schroer

Factors influencing presenteeism

All, but two studies [39, 41] reported different factors affecting presenteeism, in sum 72 factors. In this analysis, we categorized the factors according to four levels (see table 2). Individual level (I): A majority of the factors (75%), addressed lifestyle (e.g. physical inactivity, unhealthy eating, smoking) [30,42,37] physical and mental health (e.g. musculoskeletal pain, and depression, anxiety, wellbeing) [33,38] [36,37] [40] [35] [30]

[44,45] and cognitive, biological factors (e.g. knowledge, competence, coping resources, working age) [38] [40] [44,45].

Group level (II): 15% of the reported factors were related to the physical and/or psychosocial work environment (e.g. job stress factors, poor relations with co-workers) [30,44,45].

Organizational level (III): 10% of the factors influencing presenteeism were related to work organisation and management level (e.g. lack of resources, poor relation to leaders) [30,44,45].

Political/cultural level (IV): no factors found at this level.

Table 2. Factors reported to influence presenteeism

	Categories	Factors influencing presenteeism / productivity/cost
Individual Level I	Individual lifestyle factors 15 (21%)	• Behavioural factors; being overweight, poor diet, smoking, physical inactivity [27, 39, 34] (Cancelliere, Rongen, Howarth), and insomnia [34] (Howarth) • Decreased physical activity [41, 42] (White, Wagner)
	Physical and mental health factors	• Psychological, mental health and employee-wellbeing [30, 35] (Brown et al., Kröll et al.) • Personal issues; chronic health problems and mental health e.g depression [33, 34] (Davies, Howarth)

	29 (40%)	• Persistent musculoskeletal pain with physical, emotional and social impact [37] (Oakman) • Muscle skeletal pain; e.g. low back// shoulder/neck/forearm pain and knee pain [32] (Cochrane) • Health conditions: a diversity of physical illness and diagnoses (i.e. CHD, diabetes, cancer, metabolic syndrome), mental health (i.e. depression, anxiety) [27] (Cancelliere) • Modifiable worker factors including e.g. decreased poor general physical and mental health ([41, 42] White, Wagner)
	Immaterial, psychological, biological factors 10 (14%)	• Money and power related to employee's wellbeing [35] (Kröll) • Immaterial resources e.g. reserves like energy, time, knowledge [35] (Kröll) • Working age [37] (Oakman) • Negative health/disability perception or negative recovery expectations [41, 42] (White, Wagner).
Group level II	Psychosocial or physical work or private	• Poor relations with co-workers and management [27] (Cancelliere) • Emotional distress, high job stress [27, 41, 42] (Cancellier, White, Wagner)

	environment factors 11 (15%)	• Psychosocial outcome measures; lack of family support [41, 42] (White, Wagner) • Poor physical work-environment [27] (Cancelliere)
Organisational level III	Leader factors Resources Turnover Financial stressors 7 (10%)	• Poor relations with leaders [27] (Cancelliere) • Lack of resources, financial stressors [33] (Davies) • Reduction of health risk factors led to reduced cost of productivity loss due to presenteeism and high turnover [28] (Jensen) • Life-style health issues affect the economic position of organisations and contribute to reduced productivity [40] (Schroer)
Political / cultural level	Political, cultural factors	• None reported

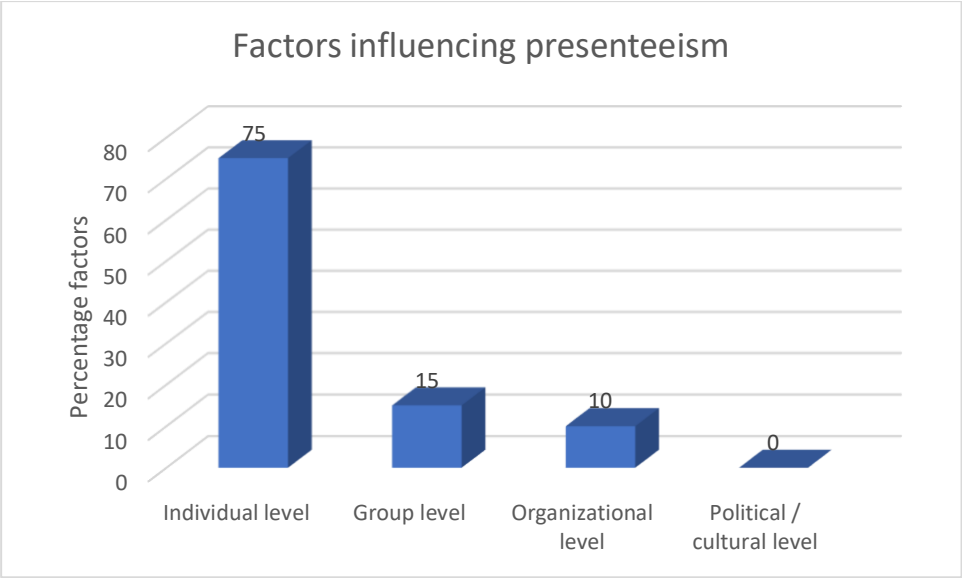

Figure 2 The bars indicate the percentage distribution of factors influencing presenteeism at individual level, psychosocial group level, at organizational level and at a political/cultural level.

WHPP that have an impact on presenteeism or productivity loss

All studies except for two [33, 38], described the intervention programs investigated to influence presenteeism/productivity, in total 36 programs. 24/36 (67%) programs were multicomponent [39, 33, 30, 42, 44, 45, 38, 43, 40,35, 31, 37] and 11/24 (46%) programs showed positive impact on presenteeism [30, 38, 35, 31, 37]. 12/36 (33%) programs were single component [30, 44, 42, 40, 43]. Two-thirds, 8/12 (67%) of the single component programs showed positive impact on presenteeism [40, 30, 42, 43] (see table 3).

Table 3. Worksite health promotion programs impacting presenteeism

Level	Type of worksite programs	Impact on

			presenteeism
Individual level I	Single component programs 10 28%	• Equipment change: implementing a computer mouse with a feedback signal [27] (Cancellier)	No (-)
		• Simple physical exercise intervention [41] (White)	No (-)
		• Weight loss program [39] (Rongen)	No (-)
		• Workplace rehabilitation [36]Oakman	No (-)
		• Ergonomic workplace assessment [36]Oakman	(Pos (+))
		• Exercise based rehabilitation[36]Oakman	(Pos (+))
		• Active worksite exercise [27] (Cancelliere)	Pos (+)
		• Active walking on/off work [39] (Rongen)	Pos (+)
		• Dietary behavioural interventions [40] (Schroer)	Pos (+)
		• Telephone therapy for depressed people [27] (Cancelliere)	Pos (+)
	Multi component programs	• Height adjustable desk intervention 3 months [36] (Neuhaus)	No (-)
		• Height adjustable desk intervention 6 months [36] (Neuhaus)	No (-)
		• Web-based PA program + support [30] (Brown)	No (-)
			No (-)
			No (-)

	6 17%	• Web-based PA program, nutrition, goalsetting and support [27] (Cancelliere) • Web-based PA, monitoring and counselling [39] (Rongen) • Multicomponent health programs [27] (Cancelliere)	Pos (+)
Group level II	Multi component programs 5 14%	• Complex psychosocial intervention [41] (White) • Seminars, campaigns [39] (Rongen) • Multi component SMT; CBT and health interventions [42] (Wagner) • Supervisor educational mental health program [27] (Cancellier) • SMT, relaxation and mindfulness [35] (Kröll)	Inconclusive No (-) No (-) Pos (+) Pos (+)
Organizational level III	Single component Programs 2 5%	• Changed rest break schedules [27] (Cancelliere) • Light change intervention (insomnia) [27] (Cancelliere)	Pos (+) Pos (+)

Multilevel	Multi component programs 13 36%	• Reduced work hours with compulsory worksite exercise [27] (Cancelliere).	No (-)
		• A multilevel LBP program [27] (Cancelliere)	No (-)
		• Nutritional program + environmental components [40] (Schroer)	No (-)
		• Multilevel targeted occupational therapy (rheumatism) [36]Oakman	No (-) Pos (+)
		• Multilevel intervention (rheumatism) [36] Oakman	Pos (+)
		• Two different participatory process interventions, including teamwork with employees, managers, HES staff, researchers [27] (Cancelliere)	Pos (+)
		• Multilevel stepped care: rheumatologist treatment + CBT [32] (Cochrane)	Pos (+) Pos (+)
		• Case manager-lead tailored work rehabilitation [32] (Cochrane)	Pos (+)
		• Two multilevel diet programs: awareness of weight and health habits, weight management in group and environmental initiatives [28] (Jensen)	Pos (+) Pos (+)
		• Health risk assessment, including questionnaires and measurement of biomarkers [28] jensen	

	• Digital CBT + health assessment, tailored feedback, online support against insomnia (three levels)[34] Howarth	
Sum: 36 (100%) programs		19 (+) 53% 17 (-) 47%

PA: physical activity, SMT: stress management training, CBT: cognitive behavioural therapy

At an individual level (I) 16/36, (36%) programs were identified, ten single component (63%) and six multicomponent programs (38%). 6/10 (60%) single component programs showed positive impact on presenteeism [30, 40, 42, 43]. The active component was physical exercise/exercise rehabilitation [30, 42, 40], dietary behaviour [43], telephone therapy program for depressed [30] and ergonomic workplace assessment [40]. Cancelliere et al. [30] reported the only multicomponent program at individual level showing positive impact on presenteeism. Two height adjustable desk interventions (different duration) [39], three multicomponent web-based PA interventions combined with support, and/or other behavioural components [33, 30] and a workplace rehabilitation [40] did not show effect on presenteeism (see table 3).

At group level (II) 5/36 (14%) complex multicomponent programs aiming at reducing psychosocial or mental health problems were identified [44, 42, 45, 30, 38]. A supervisor educational mental health program showed positive evidence of effect [30], so did a SMT program, with relaxation and mindfulness as active components [38]. White et al [44] reported inconclusive results after complex psychosocial interventions. Two multicomponent

programs showed no effect on presenteeism [42, 45]. Rongen et al. [42] reported a program with seminars and campaigns, while Wagner et al. [45] reported a SMT program with cognitive behavioural therapy and health interventions.

At organizational level (III) Cancelliere et al [30] reported two (6%) single component programs including a changed rest break intervention and a light change intervention both showing positive impact on presenteeism.

At combined levels (multilevel) the remaining 13/36 (36%) programs described a variety of multicomponent programs, all with an individual component combined with other levels (e.g. individual PA and environmental change). 8/13 (62%) multilevel programs showed positive effects [30, 35, 31, 37]. Two programs contained participatory processes as key components [30], two programs focused on rheumatologic treatment, including physical training in combination with other factors [35], two programs delivered dietary interventions, weight management and awareness training [31]. One delivered a health risk assessment, including questionnaires and measurement of biomarkers [31]. In the last program, digital CBT, health assessment, tailored information and support were active components [37]. 5/13 (38%) multicomponent multilevel programs did not show effect on presenteeism / productivity [30, 40, 43]. Four studies focused PA/exercise-based rehabilitation in different combinations with other factors [30, 40], one program contained a dietary element combined with environmental changes [43] (see table 3).

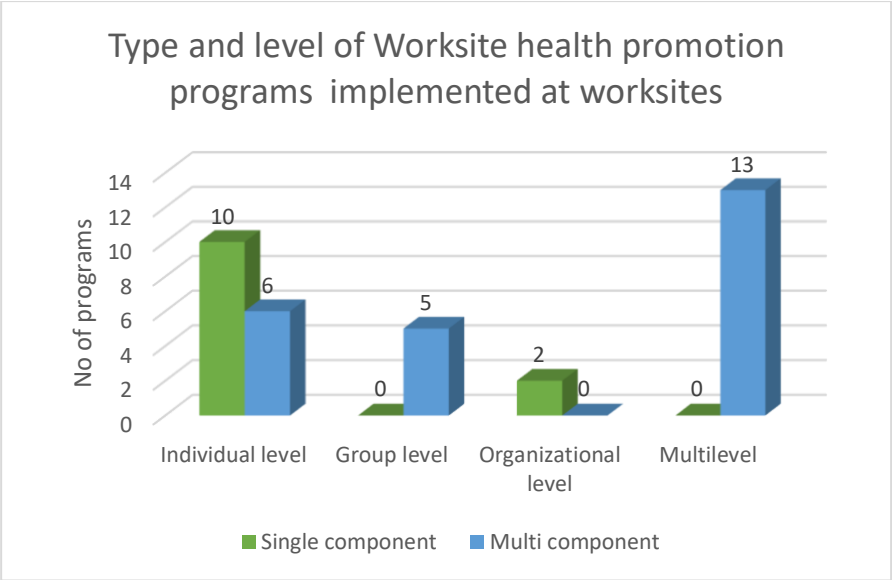

Figure 3 Green bars indicate single component WHPP implemented at the four levels. Blue bars indicate multicomponent WHPP. Most single component programs are implemented at individual level, whereas most multicomponent programs are implemented at combined levels.

Methodological quality of included studies

We conducted quality evaluation of the included studies based on a comprehensive assessment of the following criteria chosen for this study (see methods).

Table 5 Quality assessment of the studies included

Study	**Special tools (questionnaires)**	**Questionnaires standardised & validated**	**Overall evaluation of quality**	**Quality graded**	**Study design reported**	**RCT >67 %**	**Sum**

Brown et al [30]	nr*	nr	nr	nr	1	1	ic*
Cancellier e et al [27]	1	1	1	1	1	1	6
Cochrane et al [32]	1	1	1	1	1	1	6
Davies [33]	1	0	0	0	1	0	2
Howarth et al 34]	1	1	1	1	1	1	6
Jensen [28]	1	0	1	1	1	nr	4
Krôll et al [35]	1	1	1	1	1	0	5
Neuhaus et al 36]	1	1	1	1	1	nr	5
Oakman et al [37]	1	1	1	1	1	1	6
Osilla et al [38]	1	0	0	0	1	0	2
Rongen et al [39]	1	1	1	1	1	1	6

Schroer et al [40]	1	1	1	1	1	1	6
White et al [41]	1	1	1	1	1	1	6
Wagner et al [42]	1	1	1	1	1	1	6

nr: not reported, ic: inconclusive

According to our assessment, 10/14 (71%) studies rated with high methodological quality [30, 35, 37, 38, 39, 40, 42, 43, 44, 45], one with moderate [31], two with low quality [36, 41] and one is inconclusive [33]. We evaluated the quality of the majority of our included studies as moderate to high.

Summary of results

The material in this study comprised 14 review studies, including three review of reviews, in total 53 reviews and 1390 single studies. All, but two of our 14 included review studies reported presenteeism or productivity loss as one of many outcome variables. We were, however only able to identify about 40 (3%) single studies directly reporting outcomes relevant to our study. More than two-thirds of all studies comprised a RCT or a quasi-experimental design. 13/14 (93%) studies defined the concept presenteeism; about half (7/13 (54%)) described it as productivity-loss due to reduced health conditions. The results revealed a variety of different factors affecting presenteeism/productivity losses, in sum 72 factors. Most factors (75%) addressed the individual level (e.g. unhealthy lifestyle and health). The remaining factors (15%) were related to a psychosocial group level (e.g. high job stress) or an

organizational level (10%) (e.g. lack of resources, financial stressors). No factors were identified at a political/cultural level.

Our analysis revealed 36 WHPP affecting presenteeism/productivity. The programs coincide largely with the factors reported to affect presenteeism. A large proportion (29/36) (81%) of the WHPP addressed presenteeism or productivity loss by targeting individual health or lifestyle. 55% of these programs implemented solely at an individual level, while 45% implemented at the individual level combined with other levels (multilevel implementation). Both some single and some multicomponent WHPP showed positive impact on presenteeism. However, single component programs implemented at individual level seem to have better effects than multicomponent programs at the individual level. Multicomponent programs implemented at combined levels/multilevel showed good evidence of positive impact on presenteeism.

Very few WHPP were implemented exclusively at a psychosocial or organizational level, and none at a political/cultural level.

Discussion

The results are discussed according to our research questions concerning (1) how the concept of presenteeism is defined, (2) what factors are identified to influence presenteeism, and (3) which WHPP show an impact on presenteeism.

Before discussing the results, a major concern has to be taken into consideration. Firstly, our search included a large number of studies addressing a great number of worksite health outcomes, including presenteeism, productivity loss and cost. However very few actually

reported on presenteeism (<3%). Secondly, even if our included reviews are rated with moderate to high methodological quality, many of the single studies relevant to this study are reported to be of moderate to low quality. Accordingly, our results have to be interpreted with caution.

Definitions of the concept presenteeism and consequences for research and understanding

Our findings reveal that presenteeism is defined in various ways, and more than half of the definitions are related to health. This corresponds with research in the field [28, 4, 12]. A major challenge is lack of a unified concept definition, leading to low concept validity of presenteeism [4], different measurements and lack of a unified theoretical framework. This is in accordance with research reported by [18, 4, 12]. In this study, there is a general lack of theory; only two studies used theoretical frameworks, although from different perspectives. Kröll, Doebler & Nuesch [38] used a psychological stress-theory, the Conservation of Resources Theory (COR) to analyse psychosocial health and work related outcomes, emphasizing individual and environmental resources to enhance individual resilience. Oakman et al., [40] used a macro-ergonomic multilevel system theory, the Sociotechnical System Theory (STS) focused on the organizational and sociotechnical context to enhance individual health, to analyse their results on persistent muscle pain. This illustrates the challenges encountered when lack of agreement on definitions permit a variety of theoretical frameworks, explaining the term presenteeism differently. Health promotion theory emphasising the complexity of individual and public health while focusing on the importance of a multilevel perspective and context arose in the mid-eighties [46, 47, 26]. Despite this, most studies, with the exception of two studies [38, 40], still lack a theoretical framework. Our results reveal that the large majority of research in the field still is without any theoretical

basis. Johns [4], and Lohaus & Habermann [12] offer a comprehensive theory framework integrating different views and perspectives, suggesting a unified, simple definition of presenteeism where motives for and consequences of presenteeism are not inherent. These researchers claim that their definition "presenteeism understood as employees attending work while ill" is open to a variety of investigations. E.g. working while ill is not necessarily associated with reduced productivity; it may also have positive outcomes e.g. personality-stabilizing outcomes and supportive effects on the economic and social status [12].

Factors identified to influence presenteeism

The concept of presenteeism is multifactorial and inherently complex [12]. This may explain the variety of factors affecting presenteeism revealed in this analysis. Most factors (75%) addressed individual lifestyle and poor health conditions, also reported by Loeppke, Hymel & Lofland [14, p.351]. Few factors are linked to psychosocial group level, organisational level and /or political level, though many scholars [16, 17,18, 4] highlight the importance of these factors as causes of presenteeism. However, several reported high job stress, e.g. poor relations with co-workers, management, leaders, and lack of resources [30, 44, 45, 36]. Organisational, work and personally related factors affect the decision to choose either presenteeism or absenteeism [12, p. 51]. In health related presenteeism, determinants as attitude and a chosen behaviour are emphasized [48, p.503, 4, p. 519, 12]. Presenteeism in this context can be thought of as an alternative to absenteeism [49]. Johns [4] argues that when an employee is affected by a health problem, the individual goes from being fully productive to having to make the decision between attending work despite being ill, or staying at home. The outcome of the decision is closely related to the severity of the health issue. Less serious illnesses activate other factors of the decision-making. Personal and contextual factors

become important, as also shown in our analysis [36, 37, 38] e.g attitudes, expectations, or other individual characteristics of the person. The motivational component of presenteeism also counts. It comprises conscientiousness, self-esteem, locus of control and hardiness [50, 51, 52] which are individual components also present in the COR theory used by Kröll [38]. Contextual factors are related to work and organisation characteristics, like job satisfaction, expectations, belonging, and rewards but also job stress, organisational justice and social dynamics [4, 53, 54]. All these factors counts in the decision of going to work or staying at home.

Which WHPP influence presenteeism

The analysis of this review revealed a large number of different WHPP implemented to impact presenteeism. The programs varied widely regarding design, content, duration, outcomes and implementation, also shown by [55, 56, 57]. One-third of the implemented programs were single component, addressing presenteeism by targeting individual health and/or lifestyle mostly implemented at an individual level. Of these, 67% showed positive impact on presenteeism. Cancelliere et al [30] highlighted that worksite physical exercise and programs addressing depression and mental health, seemed beneficial. In addition, tailoring programs to specific outcomes in subgroups with specific health problems (e.g. muscle pain, overweight and depression) [40, 30, 42, 43]. In addition, Kröll et al [38] reported one study showing positive effect of a SMT intervention on productivity. The effective components were simple relaxation and mindfulness. These studies focused on simplicity by implementing single component programs, a strategy also supported by Hutchinson and Wilson [58], finding that interventions focusing on one main area of change (e.g. health, diet or PA) were associated with larger mean effect sizes.

In our study, most of the programs were multicomponent (67%). However, multicomponent programs implemented at individual level [39, 33, 30, 42] or psychosocial level solely [42, 44, 45], showed mostly negative impact on presenteeism. In contrast to this, multicomponent programs implemented at combined or multi levels, showed mostly positive findings (62%). This is in line with health promotion theory and research [59,60] and scientifically based recommendations for multicomponent and multilevel programs [46, 47, 26, 22] and thus promising.

Several studies did not contain identifiable program factors that were clearly pervasive. Reasons may include a lack of fundamental anchoring at the organizational and management level as well as methodological problems and barriers such as small groups or poor implementation of the programs [24, 25]. Implementation failure might give negative results in an otherwise successful intervention (low participation rate, response rates, and intervention adherence) [30].

Measures should be goal oriented and motivational, with a distinctive multilevel support. The outcome effects of WHPP depend on the degree of systematic implementation of the intervention and its evaluation during and after the process [23]. In addition, multilevel programs demand expertise, are time-consuming and expensive.

To sum up, our findings support a common assumption, that despite extensive research on WHPP in order to reduce worksite health problems and its consequences, there is no consensus as to which WHPP have the best effect or what programs to recommend [19].

Risk of bias

There are several risks of bias in our material. Due to selection bias, there is not sufficient scientific basis to draw firm conclusions. The included studies cannot be directly compared due to validity considerations. Therefore, the interpretation has to be done with caution and in general terms only.

Methodical quality in the included studies was found to be of moderate to high quality, but some single studies within our material may not be of sufficient quality or lack implementation strategies in accordance with recommended guidelines. In addition, an important objection is that few studies actually investigate presenteeism as a main outcome. With one exception [30], the remaining included reviews reported in average 1.5 article with presenteeism as relevant outcome, despite defining presenteeism or productivity as outcome, and/or included in title, abstract or key words. This is a serious selection bias that might have consequences for both conclusions and ability to generalise our results.

Presenteeism seems to have high "face-validity", indicating that stakeholders, both leaders, employees and researchers consider the concept to be a kind of health related productivity loss. Our results reveal that few have a clear definition of the concept, and only half of the studies describe the concept as "productivity loss due to health or lifestyle problems". In addition only two studies analysed their data within a theoretical framework.
The implications of our analysis is highlighting presenteeism as subject to growing interest, practice and financial control among leaders. Increased knowledge about work climate, worksite health promotion theory and implementation is thought to be of importance in choosing the right WHPP at the right level in the company. Employees need to realise the importance of meeting up at work, both culturally and for the society as a whole. Decisions

concerning social problems and challenges should be raised to a level above that of the individual (e.g. the proportion of smokers was reduced only after the introduction of laws and prohibitive regulations by politicians). There have been several promising attempts to build up a theory framework in the field [4, 12] and suggestions for a unified definition of presenteeism.

Conclusion and suggestion for further research

1. During the last ten years, the development in the field has been positive. An overview emerges, but there is still a considerable focus on the individual level. This probably relates to interventions suggesting simple solutions bringing us no further, but reinforcing the tendency of "blaming the victim". This means that no simple solutions will make employees solve their own health problems. Outcomes of sustainability require implementation with a multilevel perspective.

2. To fully understand that the concept of presenteeism is confirmed to be of importance to a variety of stakeholders, meaning:

i. at a political level, the regulation of laws and legislation on work environment, the balance of absenteeism e.g. by financial compensation, downsizing etc., must be prepared.

ii. in the field of practice, due to managers requiring financial control, the concept of presenteeism has to be taken into account.

iii. in the work environment, in relation to responsibility, care, facilitation, work climate etc.

iv. the individual employee and their awareness of attitudes, consequences of choices in relation to work, colleagues, their own health and career.

3. In the field of research, there are several challenges that thoroughly has to be elaborated: the first priority being to establish a unified theory. The significance of developing a common unified language, measurements and understanding of what influences presenteeism i.e. competence to use the right interventions.

4. Methodological problems:

i. Since both single component and multi component program interventions are of importance, more research is needed on analysis of intervention programs to fully understand the concept. The incorporation of proper program designs continues to be a challenge.

ii. In the field of practice, there is insufficient knowledge of how to identify different needs at all levels to enable tailored programs to specific subgroups, if necessary.

iii. Lack of knowledge and competence about implementation of interventions in complex problem areas and settings.

iv. Single component programs implemented on individual subgroup level can be of great importance to the individual with health problems, but must not be understood as a "worksite health promotion program for all". Such measures do not bring the field further, but should be interpreted as rehabilitation programs. They cannot be up-scaled "in the real world".

v. The field is complex and multileveled. The findings of this review are promising; reinforcement of interventions are to be multi-component and implemented in a multilevel fashion to be sustainable and upscaled from project to operation. In order to secure sustainability of programs, a stable culture must be created, i.e. implemented into business plans, strategies and into the companies' operating budget.

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ATTACHEMENT:

Table 1. Overview of included studies

Authors – (year) Nationality	**Aim and study outcome**	**Method (design, material) and methodological quality assessment**	**Studies reporting relevant outcomes (presenteeism, productivity loss)**	• **Descriptions of presenteeism, productivity and theoretical framework?** • **Factors affecting presenteeism?** • **WHP programs with an impact on presenteeism (productivity)** • **Evaluation of methodological quality**
1) Brown, H. E., Gilson, N. D., Burton, N. W., & Brown, W. J. (2011). **[33]** **Australia**	**Aim:** To examine the impact of Physical Activity on employee well-being and presenteeism **Outcome:** Workplace well-being (including presenteeism)	**Systematic review.** Search in six databases. **Included number of studies:** n=20. **Included designs:** 13 intervention trials (eight RCT, five comparison trials). Seven observational studies (three cohort, four cross-sectional) **Participants and setting:** Mixed employees from private and public organisations **Assessment of methodological quality:** not reported.	**One study reported on presenteeism.** Limited evidence of a relationship between physical activity (PA) and presenteeism (RCT design) reported in one study. However, two additional articles introduced presenteeism as a study variable, but did not explicitly report on the construct.	• **Presenteeism** described as being at work despite poor health and performing below par. A clear distinction is make between presenteeism and productivity (defined as work ability, work quality and work performance/engagement respectively) • **Theoretical framework**: not reported. • **Factors affecting presenteeism**: Psychosocial outcome measures; poor mental health and employee-wellbeing. • **WHP programs with an impact on presenteeism:** Web based PA; nutritional feedback and support, goalsetting; electronic logging. Showed inconclusive or borderline significant effect on presenteeism. • **Evaluation of quality in included studies**: Two-thirds of the studies were RCT designed.
2) Cancelliere, C, Cassidy, JD, Ammendolia,	**Aim:** (1) To investigate whether WHPPs are effective at improving	**Systematic review** Search in nine databases. **Included number of studies:** n= 14.	**Thirteen studies reported on presenteeism:** One single study excluded due to double inclusion (in Brown et al 2013).	• **Presenteeism** defined as being present at work, but limited in some aspects of job performance by a health problem. It includes time not spent on job tasks and decreased quality of work.

C., & Cote, P. (2011). **Canada** **[30]**	presenteeism among workers. (2) To identify components of successful WHPPs and identify risk factors for presenteeism. **Outcome:** Presenteeism	**Included designs:** five RCT, five cluster RCT, one interrupted time series study, one cross - over study, one pre-post study, one quasi-experimental design study. **Participants and settings:** A variety of employees and settings; e.g. white collar, blue collar, service personnel in production, office and distribution. **Assessment of methodological quality:** Used the Quality Assessment Tool for Quantitative Studies, (A validated tool) consisting of six criteria: selection bias, allocation bias, control of confounders, blinding of outcome assessors, data collection methods, withdrawal and drop-outs. Studies rated as "weak", "moderate" or "strong".	Nine studies showed strong to moderate evidence of effects. Four studies showed no effects.	Presenteeism is defined rather wide, and inter-changeable with productivity. Some of the single studies included here are excluded in other studies. • **Theoretical framework**: not reported. • **Factors affecting presenteeism:** (1) behavioural and work related factors: being overweight, poor diet, smoking, physical inactivity, high stress, poor relations with co-workers and management, poor physical work-environment. (2) Health conditions: a diversity of physical illness and diagnoses (i.e. CHD, diabetes, cancer, metabolic syndrome), mental health (i.e. depression, anxiety) • **WHP programs with an impact on presenteeism:** *Strong evidence of effect of two programs:* Worksite exercise program. Supervisor education mental health program. *Moderate evidence of effects*: Lifestyle interventions via e-mail, extra rest break time, multidisciplinary occupational health programs, multicomponent health program, participatory processes, exposure to blue-enriched white light for sleep problems, telephone intervention program for depressed workers. *No effect*: Equipment change: implementing a computer mouse with a feedback signal to prevent hovering behaviour. A multidimensional LBP program. Specific resistance training and all-round PA. Reduced work hours with worksite exercise. • **Evaluation of quality in included studies**: Four studies rated as strong, ten studies rated as moderate. Overall, methodological rating evaluated as good.
3) Cochrane, A., Higgins,	**Aim:** To investigate whether early	**Systematic review and meta-analysis**		• **Presenteeism** indirectly described as cost of productivity loss due to musculoskeletal pain.

N. M., FitzGerald, O., Gallagher, P., Ashton, J., Corcoran, O., & Desmond, D. (2017). **Ireland** **[35]**	multicomponent interventions promote work participation (or reduced absenteeism) in people with regional musculoskeletal pain. **Outcome:** -Presenteeism, Duration of sick leave, time to RTW, -Pain, disability, -Psychological functioning; -Quality of life and fatigue.	Search in seven databases. **Included number of studies:** n=20. **Included designs:** 19 RCT's, one cluster RCT. **Participants and settings:** Employees or outpatients with LBP, BP or other musculoskeletal problems. Settings were hospital, health care centres, clinics or other workplaces. **Assessment of methodological quality:** in according to Cochrane guidelines. Quality of evidence for outcome variables assessed by the GRADE System (Cochrane Handbook).	**Three studies reported work related costs and limiting productivity losses.** All reported cost savings in health service costs and limiting productivity losses. All rated with low quality of evidence.	• **Theoretical framework:** not reported**.** • **Factors affecting presenteeism**: Musculoskeletal pain (e.g. low back// shoulder/neck/forearm pain and knee pain) • **WHP programs with an impact on presenteeism/ productivity loss:** Multilevel stepped care **(**Rheumatologist-led specific programme + individualised CBT (three levels)) and case-manager-led tailored work rehabilitation plan developed with interdisciplinary team. • **Evaluation of quality of included studies:** 1/20 study rated as high quality, 11/20 rated as moderate, 8/20 rated of low quality. Moderate to low quality of data, reported mainly due to small number of participants in the interventions groups.
4) Davies, D. (2015). **UK** **[36]**	**Aim:** 1. Determine if HPPs reduce presenteeism and absenteeism, 2. Ascertain whether or not there is a causal relationship between health promotion and improvements in individual health, and 3. Identify which interventions have a positive, negative or	**Systematic literature review.** Searches done in seven databases. **Included number of studies:** n=10. **Included designs:** Six RCT or CT designs. Four observational studies. **Participants and settings:** Employees from a variety of workplaces are included. **Assessment of methodological quality:** Four pre-defined core criteria for CT's: use of control group, corresponding outcome	**No studies reported on presenteeism.** Five studies had presenteeism as an outcome variable, but reported no results.	• **Presenteeism** described as "having too much to do and not enough time to do it". • **Theoretical framework**: Not reported. • **Factors affecting presenteeism**: Lack of resources, financial stressors and personal issues. Chronic health problems and mental health. • **WHP programs with an impact on presenteeism:** No detailed description of study interventions. • **Evaluation of quality of included studies:** 6/10 reach the criteria of reliable evidence of effectiveness.

	nil effect on improving health. **Outcome:** -Presenteeism, -Absenteeism, -Health outcomes	measures and socio-demographic variables. A STROBE checklist used to assess robustness of the studies (Strengthening of Reporting Observational studies in Epidemiology).		
5) Howarth, A., Quesada, J., Silva, J., Judycki, S., & Mills, P. R. (2018). **UK** **[37]**	**Aim:** The impact of digital health interventions on health-related outcomes in the workplace **Outcome:** Physical, psychological, biological, behavioural or work measures e.g. lifestyle parameters, mental and physical health, job stress, satisfaction and presenteeism.	**A systematic review.** Searches done in five databases. **Included number of studies:** n= 22. **Included designs:** RCT's only. **Participants and settings:** A variety of employees from different workplaces e.g. public and private offices, academic or hospital settings and manufacturing plants. **Assessment of methodological quality:** The Cochrane risk of bias tool used to allocate a risk of bias classification of each study.	**One study reported on presenteeism;** Significant reduction in insomnia and presenteeism reported in one study. Rated with high methodological quality.	• **Presenteeism** described as time spent at work with decreased levels of productivity. • **Theoretical framework**: not reported. • **Factors affecting presenteeism**: mental or physical health issues, unhealthy employee behaviours and status (e.g. poor management of health conditions, obesity, insomnia, lack of physical activity or depression). • **WHP programs with an impact on presenteeism:** CBT (digital cognitive behavioural therapy) for insomnia, including assessment, tailored feedback and online support. • **Evaluation of quality of included studies:** 7/22 classified with low risk of bias, 15/22 had an unclear risk of bias. The quality of the studies included rated as adequate.
6) Jensen, J. D. (2011). **Denmark** **[31]**	**Aim:** Whether or how worksite nutritional interventions can improve productivity and firm profitability **Outcome:** -Absenteeism,	**A systematic review.** Searches done in seven databases. **Included number of studies:** n= 30. 13/30 studies reported on direct profitable variables. 17/30 on health promotion outcomes indirectly.	**Two studies reported on presenteeism;** One study reported significant relation between presenteeism and employees with health risk (overweight). Cross sectional study design, moderate quality.	• **Presenteeism** described as attending work while sick. • **Theoretical framework**: not reported. • **Factors affecting presenteeism**: Health factors (e.g. **r**eduction of health risk factors led to reduced cost of productivity loss due to presenteeism and high turnover). • **WHP programs with an impact on presenteeism:**

	-Presenteeism	**Included designs:** RCT's, quasi experimental designs, observational cross sectional designs **Participants and settings:** >120 940 employees included in 13 studies on profitability, 1469 employees reported on health outcomes (17 studies). Employees from a variety of settings. **Assessment of methodological quality:** customized to this study, a quality appraisal scheme used based on study design and clarity in the definition of interventions and environmental and outcome variables.	Another showed reduction in presenteeism in an RCT with multilevel weight management. High quality study.	Health risk assessment: questions and measurement of biomarkers Multilevel treatment: (1) increased awareness of weight and health habits, (2) awareness + weight management in groups + environmental initiatives. • **Evaluation of quality of included studies:** Moderate to high quality in 12/13 studies reporting on profitability.
7) Kröll, C., Doebler, P., & Nuesch, S. (2017). **Germany** **[38]**	**Aim: T**o investigate the effectiveness of primary preventive interventions (FWA; flexible work arrangements) or secondary preventive interventions (SMT; stress management training) at work. **Outcome:** -Psychological health -Job satisfaction -Job performance	**A review and meta-analysis.** Searches done in three databases. **Included number of studies:** n= 43. **Included designs:** Mostly quasi-experimental design and field studies. **Participants and settings**: >64 500 employees from multiple organisations, office, psychological health care or education. **Assessment of methodological quality:** Quality of primary studies measured via Study	**One study reported on productivity** Reported effect of a Stress Management Training (SMT) program on productivity (WLQ - questionnare). High quality study. Another five studies evaluated effect of FWA (mostly flexitime) on productivity. Results on productivity not reported. Moderate to low methodological quality.	• **Presenteeism** described as decreased job satisfaction and productivity due to work pressure. • **Theoretical framework**: The Conservation of resources (COR) theory (stress-theory). Predict and understand effects of the interventions. Resources are defined as anything that individuals values. According to COR theory, individuals want to obtain, retain, foster and protect resources. • **Factors affecting presenteeism**: Immaterial resources e.g. reserves like energy, time, knowledge, psychological health, money and power are related to employee's wellbeing, positive attitudes and psychological health and productivity.

	-Absenteeism	Design and Implementation Assessment Device (DIAD)		• **WHP programs with an impact on presenteeism:** SMT programs: relaxation/mindfulness was the effective component. • **Evaluation of quality of included studies:** Rated of authors as good.
8) Neuhaus, M., Eakin, E. G., Straker, L., Owen, N., Dunstan, D. W., Reid, N., & Healy, G. N. (2014). **Australia** **[39]**	**Aim:** To review systematically the impact of activity-permissive workstations on office workers sedentary time and other outcomes. **Outcomes:** -Overall sedentary time -Health-risk biomarkers -Work performance indicators: e.g. presenteeism) -Cultural-organizational outcomes. -Feasibility outcomes	**Systematic review and meta-analysis.** Searches done in nine databases. **Included number of studies:** n=38 **Included designs:** Pre-post design: 19 laboratory experimental designs, 19 field–based trials. **Participants and settings:** n = 984 employees. Average sample size 27 employees per study. The majority was office workers. In addition, university staff, "adults" and Medical practitioners. **Assessment of methodological quality:** Based on a published standard scoring system. Eight criteria relating to the report of methods and results (0-1).	**Two studies (3 publications) reported on presenteeism (productivity).** One study found no effect of height-adjustable desk intervention (HADM). High quality score. Another reported no significant change after two different HADM interventions on presenteeism. High quality score.	• **Presenteeism** not directly described. Categorized as work-performance indicator. • **Theoretical framework:** Not reported. • **Factors affecting presenteeism:** Not reported • **WHP programs with an impact on presenteeism:** Height-adjustable desk interventions / Activity-permissive workstation interventions (several active components e.g. treadmill desks, cycle ergometers and pedal devices fitted underneath the desk that used while doing usual desk-based job tasks). • **Evaluation of quality of included studies:** 4/38 studies received the maximum quality score. Two of these four reported on presenteeism. In the total sample the average quality score was high.
9) Oakman, J., Keegel, T., Kinsman, N., & Briggs, A. M. (2016).	**Aim:** To analyse the most effective interventions for workers with persistent musculoskeletal pain	**Systematic Review** Searches done in four databases. **Included number of articles**: n=18 (14 studies).	**Five studies reported on productivity.** Three studies reported individually - focused interventions in persons with PMP.	• **Presenteeism** described and measured as productivity loss due to muscle pain • **Theoretical framework:** Sociotechnical system theory used in the analysis. Defined as a systematic approach, which considers the interactions between individual and contextual

Australia **[40]**	(PMP) to remain productively employed. **Outcome** -Productivity -Sick leave -Pain -Job loss -Cost benefit	**Included designs:** 12 RCT's, one cohort-, and one pre-post study. **Participants and settings:** Employees with musculoskeletal pain, number and setting not reported. **Assessment of methodological quality**: Individual studies assessed for risk of bias using the Cochrane Handbook. Non-RCT studies assessed using the Cochrane Bias Method Group criteria. (3) The quality for each outcome assessed by the GRADE tool (Cochrane Handbook).	Two studies showed small positive effects. 1. Ergonomic worksite assessment-based rehabilitation and 2. exercise based rehabilitation. 3. Workplace rehabilitation showed no effect. Two studies reported multilevel focused interventions with no improvement in productivity measures. Evidence quality for productivity was low. In general, individually-focused interventions are likely to have no significant impact on improving productivity	factors with their subsequent impact on individuals' health. • **Factors affecting presenteeism:** persistent musculoskeletal pain with physical, emotional and social impact, working age. • **WHP programs with an impact on presenteeism:** Individual-level compared to other treatment: Ergonomic workplace assessment and exercise-based rehabilitation interventions (pos effect). Workplace rehabilitation (no effect). Multilevel focused intervention compared to usual care (no effect) • **Evaluation of quality of included studies:** Overall, the quality of evidence was low, usually due to the small numbers of studies and sample size.
10) Osilla, K.C., Van Busum, K., Schnyer, C., Larkin, J. W., Eibner, C., & Mattke, S. (2012). **USA** **[41]**	**Aim: T**o **a**nalyse the impact of worksite wellness programs on health and financial outcomes, and the effect of incentives on participation. **Outcomes:** -Exercise, diet, smoking, alcohol use, -Physiological markers, -Absenteeism, mental health.	**Systematic review.** Searches done in five databases. **Included number of studies:** n= 33. **Included designs:** 17 RTCs, 10 observational designs, six comparison with non-random assignment. **Participants and settings:** Medium to large worksites (>100 < 50 000 employees). A variety of industries were represented, e.g. service and manufacturing **Assessment of methodological quality**: Customized to this study. Categorized according to published procedure, e.g.	**No studies reported directly on presenteeism.**	• **Presenteeism** not described in text. Presenteeism described as an outcome variable (key word) in all five searches. • **Theoretical framework:** not reported. • **Factors affecting presenteeism:** not reported • **WHP programs with an impact on presenteeism:** not reported. • **Evaluation of quality of included studies:** Use of weaker evaluation designs in more than half of the studies limits the strength of the evidence.

		random designs, prospective studies, observational studies.		
11) Rongen, A., Robroek, S.J.W., van Lenthe, F.J., & Burdorf,A. (2013). **The Netherlands** **[42]**	**Aim: To e**valuate the effectiveness of WHPPs aimed at a healthy lifestyle on self-perceived health, work absence due to sickness, productivity at work, and work ability. (2) the influence of population and study characteristics, intervention content, and methodologic quality. **Outcome:** -Work ability, productivity, sickness absence, -Self-perceived health.	**Systematic review and meta-analysis.** Searches done in three databases. **Included number of studies**: n= 18. Including 21 interventions. **Included designs:** 18 RCTs. **Participants and settings**: >5750 employees (range 40 – 860) from a variety of workplace settings. **Assessment of methodological quality:** A predefined nine-item checklist based on the guidelines in Cochrane Collaborations tool for assessing risk of bias.	**Four studies reported on productivity.** (One single study is excluded due to double inclusion) One study showed a small, but positive effect on productivity (WLQ) after active exercise. The other three showed no effects after lifestyle programs. All three scored fair to moderate on methodological quality.	• **Presenteeism** described as productivity loss due to unhealthy lifestyle /health behaviour**.** • **Theoretical framework:** Not reported. • **Factors affecting presenteeism:** Unhealthy lifestyle such as smoking, poor nutrition, physical inactivity, obesity. • **WHP programs with an impact on presenteeism:** Pedometer-based active walking exercise programs showed positive impact. Web-based programs containing physical activity alone or in addition to weight or lifestyle components (e.g. health risk assessment, feedback, and/or counselling) showed no effect. • **Evaluation of quality of included studies:** 8/18 were rated as poor-fair, while the remaining 10 were rated as good. No studies observed with excellent methodological quality.
12) Schroer, S., Haupt, J., & Pieper, C. (2014). **Germany** **[43]**	**Aim:** To summarise **e**fficacy and cost-effectiveness of different workplace lifestyle interventions for promoting healthy lifestyle, preventing diseases and	**Systematic review of reviews** Searches done in six databases. **Included number of studies:** n= 15 reviews, including 379 single studies. **Included designs:** Systematic reviews, including a variety of interventional and observational studies. Of the 15 reviews, nine contained RCT's only.	**Two systematic reviews reported on productivity.** (Two reviews: Jensen, [31] and Brown et al, [33] excluded here due to duplicate). One review (n= 13 reviews) reported small effects on economic outcomes after dietary behavioural interventions.	• **Presenteeism** described as economic consequences due to productivity losses. • **Theoretical framework:** Not reported. • **Factors affecting presenteeism:** Life-style health issues affect the economic position of organisations and contribute to reduced productivity. • **WHP programs with an impact on presenteeism:** The two relevant studies focused workplace diet solely, and combined interventions with nutritional

	reducing health care costs. **Outcome:** -Weight related outcomes, -PA, physical fitness related outcomes, -Dietary behaviour, -Economic outcomes	**Participants and settings:** The sample size varied from 10 – 48 835 participants from different work settings. **Assessment of methodological quality:** according to the Cochrane Collaboration quality criteria for systematic reviews.	The other (n=47 reviews) showed favourable effects from one single study reporting a weight-management intervention on productivity and employers health care costs. Several of the studies in the included reviews rated with low to fair quality.	and environmental components. Implemented at individual, organizational or combined level. • **Evaluation of quality of included studies:** the studies did often not meet the Cochrane Collaboration quality criteria for systematic reviews.
13) White, M.I., Dionne, C.E., Warje, O., Koehoorn, M., Wagner, S.L., Schultz, I.Z., Wright, M.D. (2016). **Canada** **[44]**	**Aim** Identify physical activity and exercise interventions that most effectively reduce absenteeism improve productivity or increase financial outcomes. **Outcome:** Workplace absence Worker productivity Financial cost	**Systematic review:** A Stakeholder- centred best evidence synthesis of systematic reviews. Searches done in seven databases and in grey literature. **Included number of studies**: n= 18 reviews, including 511 articles from 490 primary studies. **Participants and settings:** Number of participants not reported. Participants grouped in "general workers" and "workers off-work" at baseline. Here, we report only "general workers". **Assessment of methodological quality:** Customized quality assessment form developed for this study including 18 questions using a modified version of the Health-evidence.ca quality assessment	**Two reviews reported on productivity.** (Cancelliere et al. [30] is excluded here due to duplicate) One review (n=8) found no evidence of simple PA/exercise interventions on work productivity. Six studies reported on productivity, however with different definitions of the concept not relevant for this study. Czabala, et al. [34] (n=16) reported inconclusive evidence after complex psychosocial interventions on productivity. One study reported on relevant outcomes for this study.	• **Presenteeism** described as productivity losses due to different health conditions. • **Theoretical framework:** Not reported • **Factors affecting presenteeism:** modifiable worker factors in an earlier study (Wagner et al. [45]), including e.g. decreased physical activity, lack of family support, poor general health, emotional distress and negative health/disability perception or negative recovery expectations. • **WHP programs with an impact on presenteeism:** Short simple exercise or fitness program (no further details reported). Complex psychosocial interventions. • **Evaluation of quality of included studies:** All 18 included systematic reviews were rated as high quality

		tool, the EBM Glasgow Checklist for Systematic Reviews, and the AMSTAR methodological quality guidelines.		
14) Wagner, S.L, Koehn, C., White, M.I., Harder, H.G., Schultz, I.Z., Williams-Whitt, K., Wärje, O., Dionne, C.E., Koehoorn, M., Pasca, R., Hsu, V., McGuire, L., Schulz, W., Kube, D., Wright, M.D. **(2016)** **Canada [45]**	**Aim:** To determine the level of evidence supporting mental health interventions as valuable to work outcomes. **Outcome:** Absenteeism, Worker productivity Financial outcomes	**Systematic review** Searches done in seven databases and in grey literature. This best-evidence synthesis of systematic reviews is part of a larger synthesis appraising and summarizing workplace interventions to address previously identified modifiable risk factors of work absence across health conditions. **Included number of studies**: n= 14 reviews, including 346 studies. **Participants and settings**: Number of participants not reported. Varieties of worksites represented. **Assessment of methodological quality:** As reported by White et al. [44]	**One review reported on productivity.** (Czabala et al. [34] excluded here due to duplicate). One review reported inconclusive results after multicomponent stress management interventions. Only two single studies reported on relevant outcomes for this study.	• **Presenteeism** described as productivity losses due to mental health and psychological health conditions. • **Theoretical framework:** Not reported • **Factors affecting presenteeism:** As reported by White et al. [44]. • **WHP programs with an impact on presenteeism:** Cognitive behavioural therapy, mental health interventions. • **Evaluation of quality of included studies:** All 14 included systematic reviews were rated as high quality