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What Challenges Manual Workers' Ability to Cope with Back Pain at Work, and What Influences Their Decision to Call in Sick?

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Abstract *Introduction* Although back pain (BP) is a very common cause for sickness absence, most people stay at work during BP episodes. Existing knowledge on the factors influencing the decision to stay at work despite pain is limited. The aim of this study was to explore challenges for coping with BP at work and decisive factors for work attendance among workers with high physical work demands. *Methods* Three focus groups (n = 20) were conducted using an explorative inductive method. Participants were public-employed manual workers with high physical work demands. All had personal BP experience. Thematic analysis was used for interpretation. Results were matched with the Flags system framework to guide future recommendations. *Results* Workers with BP were challenged by poor physical work conditions and a lack of supervisor support/trust (i.e. lack of adjustment latitude). Organization of workers into teams created close co-worker relationships, which positively affected BP coping. Workers responded to BP by applying helpful individual adjustments to reduce or prevent pain. Traditional ergonomics was considered inconvenient, but nonetheless ideal. When pain was not decisive, the decision to call in sick was mainly governed by workplace factors (i.e. sick absence policies, job strain, and close co-workers relationships) and to a less degree by personal factors. *Conclusion* Factors influencing BP coping at work and the decision to report sick was mainly governed by factors concerning general working conditions. Creating a flexible and inclusive working environment guided by the senior management and overall work environment regulations seems favourable.

Keywords Back pain · Workplace · Sick leave · Sickness absence · Social support · Focus groups

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Introduction

Musculoskeletal pain such as back pain (BP) is a common cause for sickness absence and may confer detrimental costs on the individual and on society [1]. Thus, research has focused on identifying people at risk of sickness absence and finding ways to return people to work quickly and effectively. However, most people (60–70 %) suffering from pain conditions stay at work during pain episodes [2–4]. Even so, knowledge on decision-making factors for staying at work despite musculoskeletal pain is limited [5]. A range of factors related to the individual, the workplace and the organization are considered potentially important [6]. These factors are personal characteristics, motivation for work, a good social climate at work and flexibility [5–9]. However, the evidence on this is limited due to the low numbers of existing studies [5]. Furthermore, these studies were conducted on populations with a mixture of

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job types and it is unclear whether factors important for the decision to stay at work differ with the type of work in terms of the physical job demands. People exposed to high workloads are at higher risk of BP [10]. We do not know if manual workers with high physical workload are influenced by other decision-making factors in terms of staying at work during pain compared to an administrative employee, who has sedentary work only. More research is needed to increase knowledge and strengthen evidence in order to improve work participation in various types of workers suffering from musculoskeletal pain disorders.

The present study emerged from an ongoing randomized controlled study (RCT) testing the effect of information (lectures) designed to reduce unhelpful beliefs about health and work on manual workers' back beliefs and BP behaviour. The initial idea of this study was to gain knowledge of participants' experience of the RCT study lectures. However, in order to improve our understanding of the results in the RCT study and with regard to the lack of evidence on work participation within the field of BP, we decided to expand our focus and investigate factors influencing workers' experience of working despite BP and calling in sick. Because our population of workers deviated from populations in previous similar studies [5–9] in terms of physical work demands and knowledge on work and health (lectures), we decided to use an open explorative approach [11] in line with qualitative descriptive methods [12]. We chose the focus group method because it provides insight about how a specific group thinks about an issue and about the range of beliefs, experiences and practices within the (2× specific) group [13]. With regard to a large body of evidence stating that in conditions such as BP, long-term work absence is largely influenced by psychosocial factors [14], we decided to take a psychosocial approach in our interpretation of results. To increase the applicability of our results, the Flags framework was added to the discussion of our findings in order to guide future recommendations. In the most recent edition, the framework helps identify factors ("Flags") important for return to work at the individual level (Yellow Flags), the workplace (Blue Flags) or the organizational level (Black Flags) [14]. We believed that using the Flags framework would clarify the interpretation of our findings and help identify at what levels important factors influence work participation during BP.

The objectives of this explorative qualitative study were:

- to explore and obtain knowledge of factors that challenge/help manual workers to cope with BP at work, and factors influencing their decision to call in sick
- to explore participants' experience of the lectures in term of their perceived usefulness.

Methods

The present study was planned in relation to an initial, but still ongoing RCT, which tested the effect of an education-based workplace intervention on BP beliefs and behaviours (Clinical Trials Reg. No. NCT01918228). The intervention consisted of two lectures providing insight into the most updated scientific knowledge on causes for BP, minor effects of traditional treatments, and how the course of BP is affected by beliefs and behaviour. In total, five public sector municipal departments from two regions in Zealand (Denmark) took part in the RCT study. Participants were workers specialized in maintenance of parks, recreational areas, cemeteries, road service, and utility services and had either administrative or manual work. From this population, manual workers considered eligible for the present study were selected based on three criteria: (1) having attended both lectures, (2) having reported BP at least once during the 1-year follow-up period, and (3) generally having physical strenuous work equivalent to minimum 50 % of a workday (self-reported). Table 1 presents the background characteristics of the workers in this study. Data were based on self-report and selected items came from a national survey programme "Work Environment and Health in Denmark 2012–2020" [15] and the Back Beliefs Questionnaire [16].

Our sampling approach in this study was stratified purposive sampling. This ensures a representation of participants across age, gender and municipality [17]. We aimed at including participants from a variety of municipals with at least 1/3 being women, reflecting the natural composition of gender in our population. Workers eligible for participation were selected using alphabetically indexed name lists from eligible municipalities. A specific sample size was not set prior to inclusion. Instead, final sample size depended on obtaining an optimum amount of groups (min. 3) and minimum 6–8 participants in each group [18]. Participants were included consecutively until we reached the desired amount of participants in each focus group. In total, 24 workers were contacted of which 20 participants accepted to participate. Four workers declined to take part in the study due to lack of time or interest. Participants were invited by phone, informed about the purpose of the study, and their rights as participants in scientific research according to the Helsinki Declaration of 1975 as revised in 2000 [19]. Informed consent was obtained orally from all participants. The Scientific Ethical Committee of the Capital Region of Denmark approved the study (Protocol No. H-1-2014-FSP-014).

Procedure

Three focus group interviews were conducted during February–March 2014. To ensure participation, interviews

Table 1 Characteristics of participants in the 3 focus groups (n = 20)

Variable	Categories	Group 1 (n = 6)	Group 2 (n = 6)	Group 3 (n = 8)
1. Gender				
	M	4 (66.7 %)	6 (100.0 %)	5 (62.5 %)
	F	2 (33.3 %)	0	3 (37.5 %)
2. Age	n/%		[a]	
	60–64	2 (33.0 %)	2 (33.3 %)	2 (25.0 %)
	55–59	3 (50.0 %)	1 (16.7 %)	0
	50–54	0	1 (16.7 %)	1 (12.5 %)
	45–49	1 (16.7 %)	0	4 (50.0 %)
	35–39	0	1 (16.7 %)	1 (12.5 %)
3. Educational level	n/%			
	Primary school	4 (66.7 %)	1 (16.7 %)	2 (25.0 %)
	High school/skilled education	2 (33.3 %)	5 (83.3 %)	6 (75.0 %)
	Higher education	0	0	0
4. Type of work	n/%			
	Primarily physical work	4 (66.7 %)	5 (83.3 %)	8 (100.0 %)
	Equally physical/sendentary	2 (33.3 %)	1 (16.7 %)	0
5. Physical work demands	0 (very low)–10 (extremely high) (mean/SD)	3.67 (2.42)	6.17 (2.40)	7.62 (0.74)
6. Overall job satisfaction	0 (very low)–10 (extremely high) (mean/SD)	7.50 (1.38)	8.00 (2.10)	8.00 (1.92)
7. Getting along with colleagues	0 (Not at all)–10 (very content) (mean/SD)	8.67 (0.52)	8.33 (1.86)	8.86 (1.35)
8. Self-rated health	1 (excellent)–5 (very poor) (mean/SD)	3.00 (0.63)	2.5 (1.23)	2.71 (0.49)[a]
9a. Backache means long periods of sickness absence	0 (disagree)–3 (neither)–6 (agree) (mean/SD)	2.67 (1.51)	3.00 (1.27)	3.29 (2.14)[a]
9b. When you suffer from back pain you ought to rest	0 (disagree)–3 (neither)–6 (agree) (mean/SD)	3.17 (2.23)	2.50 (1.38)	2.86 (2.55)[a]

[a] 1 missing response

took place in a workplace location. Three municipalities contributed to the data. Participants received a reminder SMS 1 day prior to the interview. Transportation costs were covered by the study. Group-discussions were audio taped and subsequently transcribed verbatim and summarizing field notes were taken immediately after completion of the discussions.

To initiate discussion and ensure that discussions remained related to the study objectives, we added a frame to the interviews: an interview guide addressing some overall aspects of the general work environment based on existing literature. The primary investigative topics were (Table 2): (a) challenges with BP at work, (b) physical work conditions, (c) social factors and workplace culture, (d) sickness absence. The secondary investigative topic was (e) experience of the lectures. The focus groups were facilitated by MMK, who was not involved in the RCT study. PF (lecturer in the RCT study) was not initially present during the focus group discussions in order to avoid introducing bias concerning the

utility of the lectures. However, because most workers were unable to remember the lectures in detail, we abandoned the secondary investigative topic in the last two focus groups and thus, it was now possible for PF to act as an observer, which improved the validity of the data. The extra time was used to expand the focus on the primary investigative topics.

Each group discussion commenced with a repetition of the formalities about participants' rights and anonymity. A semi-structured interview guide with open-ended questions was used (Table 2). Brainstorms were performed early in the discussion to involve participants as much as possible in the data-generating process. Issues from the brainstorms were ranked in cooperation as part of the process to assess participants' preferences and to help identify main issues [13, 20]. The discussions lasted approximately 1.5 h. Participants did not comment on the transcripts, but were informed of our findings at the end of the study. Consolidated criteria for reporting qualitative research (COREQ) were used as a checklist for our methodological approach [21].

Table 2 Focus group elements and questions

Element in interview	Question
Secondary investigative topic	
Influence of lectures	Can anyone summarize the key points of the lectures? Was it "old news" or did you learn something new?
Primary investigative topics	
Challenges with BP at work	Can you describe for me how a typical work day with back pain is like?
	What difficulties do you experience?
Facilitators and barriers in the physical working environment	Facilitators: What aspects *ease* a work day with back pain? (Brainstorm)
	Barriers: What aspects make a work day with back pain more *difficult?* (Brainstorm)
	We want to be absolutely clear on what is most important to you in these brainstorms—so please rank your top priorities (Ranking)
Social factors and workplace culture	Have you ever experienced being in so much back pain that working at full capacity was impossible?
	How did your co-workers/supervisor react to that? What did they say?
	Does support and consideration from your co-workers have any influence on how you experience back pain at work? In what way?
	In your opinion, what constitutes a good working environment? What does it take to create it? Is it a management or a co-worker issue?
	Can you tell me about the organization of your work? Who decides your work tasks?
	Do you have any say in planning your assignment of work tasks?
Sickness absence	We have an idea that reporting sick might involve some considerations about workplace responses. What do you think about this idea? Is it true nor not?
	Is back pain a 'valid' reason for sick absence? Why/why not?
	How severe must a back pain be in order to allow you to be absent?
	What is of primary importance for you when considering sickness absence due to back pain?
Future scenario	Which organizational or work-related steps would you take as a supervisor to make it easier for workers with back pain? Specific suggestions?

Data Analysis

Thematic analysis (TA) was applied for data analyses [22]. The analytical process took place continuously. In accordance with TA, analyses involved five steps: familiarizing with the data, generating initial codes, searching for themes, reviewing them in relation to the coded data set, as well as defining and naming each theme [22]. Authors defined themes across all focus group transcripts in order to ensure that the themes were well founded in the data. Definitions and selections of themes were made with consistency across the entire data set. An inductive approach combined with a psychosocial understanding was used during analyses to ensure that themes were linked to the data, and not forced into pre-existing analytic concepts [23].

All steps were performed first by PF and MMK independently and thereafter interpreted in cooperation. No software-package was used during coding/analyses due to the manageable amount of data [24]. The quotes in the following results section were translated from Danish and are presented as representative examples to illustrate the discussions.

Results

Background data on characteristics of the participants (Table 1) was self-reported. The 20 participants had a mean age of 53.5 years (SD 7.0), males/females: 15/5. All had daily physically demanding work, i.e. gardeners or mechanics. A few (n = 3) also functioned as a trade union, safety or working environment representative, which involved half-day administrative work. Groups differed somewhat in age, gender, education, type of work and perceived physical work demands, but not in job satisfaction, how well they got along with co-workers, or self-rated health. Furthermore, equal proportions reported to neither agree/disagree on statements saying that BP results in long-term sick leave or that rest is an appropriate pain response.

Extracted Themes

Figures 1 and 2 demonstrates key themes on challenges with BP at work and considerations about sickness absence due to BP. Six key themes (1–6) and 18 sub-themes (a–r) were extracted from the data set:

Fig. 1 Challenges with staying at work with BP
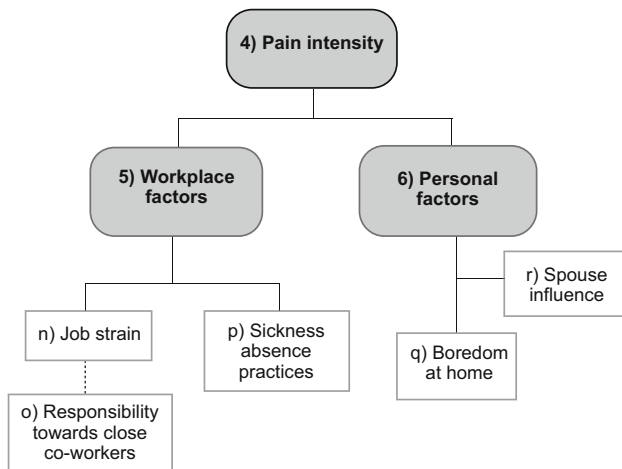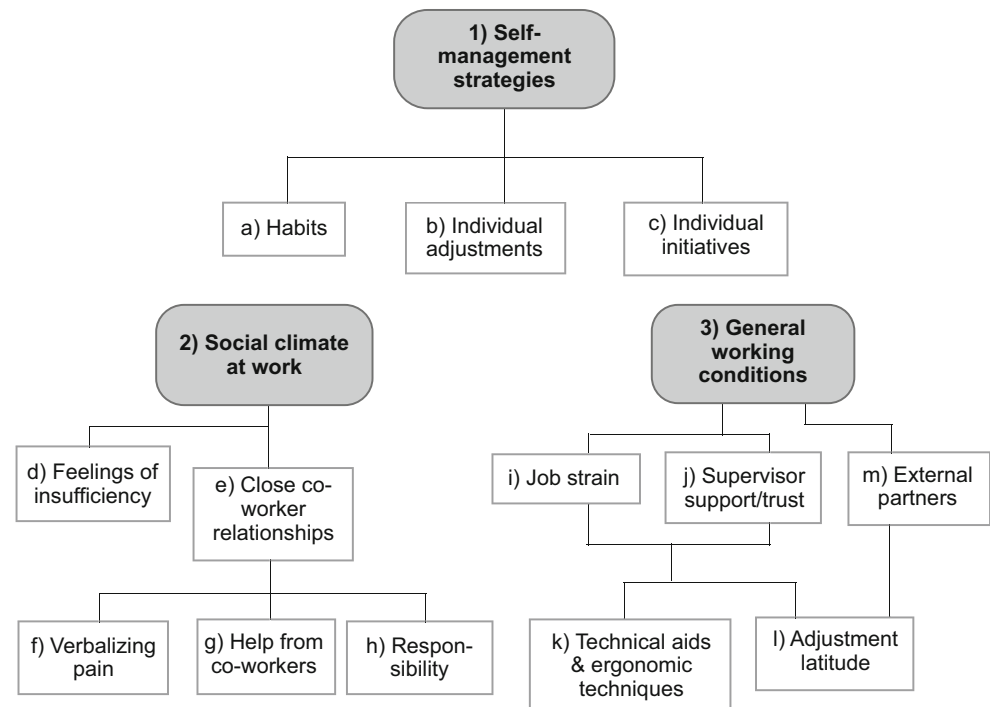
Fig. 2 Considerations about sickness absence due to BP

1. Self-management strategies: (a) Habits, (b) Individual adjustments, (c) Individual initiatives.
2. Social climate at work: (d) Feelings of insufficiency, (e) Close co-workers relationships, (f) Verbalizing pain, (g) Help from co-workers, (h) Responsibility.
3. General working conditions: (i) Job strain, (j) Supervisor support/trust, (k) Technical aids and ergonomic techniques, (l) Adjustment latitude, (m) External partners.
4. Pain intensity.
5. Workplace factors: (n) Job strain, (o) Responsibility towards close co-workers, (p) Sickness absence practices.
6. Personal factors: (q) Boredom at home, (r) Spouse influence.

Challenges with BP at Work

Self-Management Strategies

Habits were mentioned repeatedly as a negative aspect involving automated routines that induced risk of BP. Job strain and a poor physical working conditions caused workers to fall back into habits: "Many times in the heat of the moment you just don't think about it. Then you just go and follow your usual routines and habits, and then your back goes OUCH!" [Male, mechanic]. Contrary to this, workers across all groups mentioned individual work adjustments as a positive way of dealing with BP. Individual adjustments consisted of years of individually formed alternative working routines (specific movements/adjustment of work pace, breaks, and order of work tasks), which were believed to reduce pain or maybe even prevent it from occurring. Generally, BP was described as highly unpredictable though, leading to feelings of despair, insecurity, and fear of pain progression. The application of individual adjustments was an attempt to address this. Workers acknowledged that these adjustments might not be ergonomically correct, but still perceived them as valuable: "It's probably not the right way to do it, but it's the right way for my back! It's probably not the proper way to lift …

or rather; it's NOT the right way. But it's the one thing that helps my back not to say ouch!" [Male, mechanic]. Other self-management strategies included individual initiatives such as applying specific work wear, taking pain medication, or visiting healthcare practitioners.

Social Climate at Work

BP was highly influential on workers' feelings and/or behaviour and disabling BP made the workers perceive themselves as physically weak and insufficient: "I'd say that you often feel insufficient. Even though you have nice colleagues who really want to help, then I'd still like to be able to do things myself." [Female, gardener]. If pain was moderate, their response to these emotions was to try to ignore pain, which they described as an act of stubbornness.

Being organized in work teams/partnerships was emphasized as a general working condition that fostered mutual responsibility between teammates: "One day my partner had to do all the work because my back hurt, and he was cool with it—but that's not okay. You can do it a few times, but not several days in a row. Because then you'll put a strain on your work mate, and then it'll his back snapping." [Male, semi-skilled worker]. Across all focus groups, asking for help was perceived as unpleasant either because it put strain on teammates or because workers feared that co-workers from other teams mistook them for being 'slackers'. However, within teams help was offered more often without having to ask for it: "Once my work mate asked me whether I wanted to control the excavator because I was in pain. That was just really nice, because then I didn't have to get anything by devious means or ask for the help. He simply remembered it, and that was just great!" [Male, gardener]. Furthermore, a tendency to verbalize pain within teams made workers felt less discomfort with asking for help and co-workers were more inclined to offer help: "My close work mates know me well. If I start to slop around and begin to tighten the strings [specific work task, ed.], they know that it usually has to do with my back. And I know that if I say something, then they'll offer to switch positions so I don't bust my back." [Male, paver]. A lack of verbalization of BP was common between teams. According to workers, this created an unfriendly environment between teams and a harsh tone with jokes and sarcasm indirectly questioning the legitimacy to take more breaks. This negatively influenced their inclination to apply certain kinds of individual adjustments.

General Working Conditions

Job strain made workers feel forced to ignore pain in order not to become a burden to close co-workers or a target of bullying remarks from other work teams. Job strain decreased the possibility to organize their own work ('adjustment latitude') and apply individual adjustments and furthermore, refrained workers from using acquired traditional ergonomic techniques (based on a biomechanical injury model) and technical aids. Use of technical aids and traditional ergonomic techniques was also governed by convenience and availability of working space: "It's so hard to manage [lifting device, ed.]… It is easier to fix the problem with a crowbar: stick it under and then just lift it! You'll find yourself in situations where there's just not room, and then you think: Well, what the hell?" [Male, paver]. Although workers associated traditional ergonomic techniques and use of technical aids with inconvenience and idle time, they also believed that use of both were important for reducing workload and thus, risk of BP.

Workers complained that supervisors had little insight in their daily challenges. Supervisors were perceived as responsive to suggestions of improvement, but their willingness to act upon suggestions was believed to be governed by an economic cost-benefit approach. Workers experienced this as a lack of supervisor support: "It all comes down to money. They listen very carefully to what we say, and then that's the end of it. If the supervisors believe that, they've bought a machine that didn't pay off, that's what they'll focus on [cost-benefit, ed.]. And then to hell with the workers' backs shattering into pieces." [Male, mechanic]. All workers, but especially those working alone, stressed that being provided with adjustment latitude was highly important for coping with BP: "Freedom with responsibility is really important! It means that our employers allow us to mind our own business. We have a piece of work to do, and they have confidence in us and let us do it the way we want to." [Male, mechanic]. Supervisors providing adjustment latitude was perceived to be supportive and trustful.

In workers' desired future scenarios (planned discussion topic during focus groups), the supervisors provide more support in terms of more ergonomic training, frequent reminding and appropriate equipment and improved access to health care. This was perceived as ways for supervisors to show their interest in workers' well-being and an appreciation of their efforts.

Another general working condition affecting the ability to cope with BP was cooperation with external partners (i.e. workers from other municipal departments) in locations outside the workplace. Workers described problems with getting help from external partners who were often unwilling to engage actively in i.e. heavy work task arguing that they were subject to different work regulations. Thus, workers felt forced to complete tasks themselves despite high workload, no lifting aids and no help.

Considerations About Sickness Absence Due to BP

Pain Intensity

Pain intensity highly influenced decision-making about reporting sick (Fig. 2). When pain was severely disabling, workers stated that they would stay home irrespective of any other considerations. However, when pain intensity was moderate or low, workplace factors and to a lesser degree, personal factors became decision-making factors.

Workplace Factors

Job strain was highly influential on the decision to call in sick *within* teams. At busy times, responsibility towards teammates made workers more inclined to come to work despite pain: "It really depends on what's going on at work. If we're very busy and my back hurts, then I'll get a bad conscience if I'm not able to keep up […] If there are major projects going on, then you'll drag yourself to work, even though it hurts. And during the quiet times when your back hurts, then you're more inclined to take a day off…or perhaps two." [Male, gardener].

Workers' decision to call in sick was also influenced by the workplace sickness absence practices in terms of their perception of their supervisors' motives and the way sickness absence interviews were carried out. In one municipality, workers were less inclined to call in sick because the interviews were perceived as unpleasant interrogations and because they feared dismissal: "Many people use their compensatory time-off instead to avoid trouble. It's because you're afraid of being laid off or being called to an interview." [Female, gardener]. In the remaining municipalities, interviews were perceived positively as helpful and an act of care from supervisors.

In general, workers expressed suspicion towards initiatives taken to reduce sickness absence. Such initiatives were not seen as steps to improve well-being for the worker, but mainly as being economically beneficial for the workplace.

Personal Factors

An experience of boredom with being at home from work seemed to influence considerations about reporting sick. The opinions of a spouse could also be a decision-making factor for reporting sick if the worker had not yet settled on a decision. Only a few mentioned these factors.

Discussion

Our results from this exploratory study reflected various psychosocial factors influencing the ability to cope with BP at work and the decision to call in sick. Participant profiles varied somewhat in age, gender, education, type of work and self-reported physical work demands. Because extracted themes were consistent across all groups, we do not believe that these background differences affected our results significantly.

Challenges in the Social Working Environment

Readiness to help and verbalization of pain among workers was mentioned as aspects positively influencing the possibilities to cope with BP at work. This resembled findings by Tveito et al. [7]. However, in the present study these aspects were mainly present in close co-worker relationships (within work teams). Our participants did mention the presence of lacking co-worker support between teams as potentially impeding their coping with BP, but this was not reflected in their baseline self-report (Table 1, item 7). Lack of co-worker support has been highlighted as negatively influencing BP coping in other similar studies [5–7, 9, 25] and is generally considered an important factor in work rehabilitation [25]. Responsibility was also attributed to the nature of close co-worker relationships and could work as either a positive aspect fostering workers to be protective of each other or a negative aspect making workers feel insufficient. In line with this, de Vries et al. [6] described loyalty to co-workers as a potential motivator for staying at work despite pain and described how being able to fulfil a position added to workers' self-respect.

In our study, the nature of the co-worker relationships seemed decisive for the presence of positive aspects improving the ability to cope with BP. Similarly, Tveito et al. [7] reported that working in teams was considered an advantage and how some workplaces valued taking care of each other and defined it as a 'good safety climate'. Forming informal support groups was also mentioned as ways for these workers to obtain support.

Challenges with Physical Working Environment

Job strain, lack of supervisor support/trust, inappropriate equipment or working space, and co-operating with external partners generally made it difficult to work during pain episodes i.e. by impeding adjustment latitude and the ability to use acquired ergonomic techniques and technical aids. Other similar studies have also highlighted the importance of a suitable physical working environment for coping with pain at work [5–7, 9]. Workers' suggestions on how to improve their ability to cope with BP mainly concerned supervisor support/trust (providing adjustment latitude and ergonomic training/technical aids). Adjustment latitude was defined as having 'freedom with responsibility' and being able to apply individual adjustments. Similar coping strategies have been described by other studies [6, 7].

Interestingly, workers had accepted inconvenient ergonomic techniques as superior to their own adjustments, which they experienced as autodidactic, straightforward and effective. Although it is widely recognized that high workload increases pain [26, 27], use of traditional ergonomic techniques based on a biomedical approach has shown no or adverse effects on BP and report of injury [28–30]. Thus, with the focus on risk of injury in most traditional ergonomics and the evidence showing that fear of re-injury is a risk factor for developing chronic BP [31], we suggest that supervisors direct their focus on providing adjustment latitude, appropriate equipment to reduce workload, and sufficient working space to apply equipment and abandon the fixation on ergonomic training. However, in Denmark this might involve alterations at legislation levels as well as Danish employers are subject to directives issued by Danish Work Environment Authorities in 2005 commanding them to provide frequent ergonomic training in order to prevent workplace back injuries and employee attrition [32].

Important Factors for Reporting Sick

Considerations about sickness absence were mainly governed by pain intensity. Furthermore, a number of workplace and personal aspects were decision-making factors for sickness absence, which was also found in other studies [33, 34]. Fear of re-injury is believed to be a fundamental personal factor influencing the decision to be absent when suffering from BP [31, 35]. However, not a single worker mentioned this factor although the unpredictable nature and fear of BP received much attention.

A large-scale survey involving data from 18 countries concluded that job strain increased the risk of sickness absence [36]. Our results showed that job strain in combination with close co-worker relationships made workers less inclined to report sick implying that co-worker relationships influence how workers deal with changes in the working environment. Discomfort with sickness absence interviews and fear of dismissal also made workers less inclined to call in sick. Comparable studies described similar worker reports [9, 37]. However, such findings should be interpreted with caution. We believe that achieving better sickness absence rates based on fear of dismissal or by not acting on persistent job strain introduces other problems such as stress and poor psychological working environment. If that so, any positive outcomes will be short-term.

A few workers mentioned that personal factors (boredom at home and spouse beliefs) influenced their decision to call in sick. This is in line with results from other studies [34, 38, 39].

Match of Results to Flags Framework

Initially, the Flags framework was created to help identify clinical aspects important for recovery [40]. Upon further development, it has become a tool to identify obstacles for return to work within the individual, the workplace, and the context [14]. Yellow Flags refer to peoples' emotions, beliefs and behaviour related to their health problem, Blue Flags comprise of factors related to worker perceptions of the working environment, whereas Black Flags refer to contextual aspects of workplace/public systems (healthcare/compensatory) or influence from close surroundings such as spouse/family [14].

Table 3 visualises how our findings line up with the concepts of the Flags framework. Yellow, Blue, and Black Flags all challenged coping with BP with Blue and Black Flags being predominant. Besides co-existing, these also interacted. The organization of workers into teams (Black Flag) seemed to influence the social climate by fostering close co-worker relationships with mutual responsibility (Blue Flag). This highly influenced on workers feelings, ability to cope with BP at work and decision to report sick (Yellow Flags). The organization of workers also seemed to affect how workers responded to job strain (Black Flag) in terms of reporting sick. Other seemingly important Black Flags were supervisor support/trust in terms of providing appropriate working conditions) and sick absence practices which affected either the coping abilities or the decision to report sick. The direction of this interaction seemed to be hierarchic from Black Flags to Blue and Yellow Flags.

Based on our results and their match with the Flags framework, we suggest that alterations to improve workers' coping abilities and their incentives to stay at work during pain are most relevantly made within the Black Flags arena. It seemed that workers had attempted to adapt to the best of their abilities but felt hindered by several challenges mainly related to the general working conditions. They called for supervisor support/trust and highlighted communication and helpfulness as positive features in co-worker relationships. Thus, actions should be taken by the senior management, supervisors and line manager to create an open, inclusive and supportive environment involving high levels of adjustment latitude and access to appropriate equipment and working space.

Limitations of this Study

Our study was conducted on a very specific subgroup and this could limit the use of our results. However, our findings are very similar to those from other studies conducted on mixed populations in terms of gender, sector, and educational level [6–9, 41]. This consistency suggests

Table 3 Results matched to Flags system framework; challenges when working despite BP and factors to influence the decision to call in sick

Flag	Description	Challenges for coping with BP at work	Factors influencing sickness absence
Yellow	Psychological factors with a clinical focus encompassing peoples' beliefs about their health problem	Feeling insufficient	High pain intensity (↑), boredom at home (↓)
Blue	Encompass perceptions about work i.e. relationships with supervisor/co-workers	Lack of verbalization of pain, reluctance to ask for help	Responsibility in close co-workers relationships (↓)
Black	More objective features of the workplace i.e. working conditions and sickness absence policies	Organization of workers, lack of adjustment latitude, lack of appropriate technical aids and working space (supervisor support/trust), job strain, cooperating with external partners	Job strain (↓), sickness absence practices (↓), spouse influence (↑)

results presented here to be highly representative for a general working population suffering from pain conditions.

Concerning the secondary investigative topic in this study, another methodology would have been appropriate providing more detailed information on the influence from lectures, i.e. through a short questionnaire in combination with focus group discussions. We did not aim to explore the workers' back beliefs in depth. Should the RCT study show a quantitative effect of the lectures on back behaviour however, new studies will have to explore how workers benefit from education-based lectures.

Conclusion

Our findings on a population with high physical work demands resemble those of similar studies on working populations with varying physical work demands. Thus, our results seem to be representative for general working populations.

In this study, general working conditions (adjustment latitude, appropriate physical working conditions) were the most predominant factors influencing the ability to cope with BP at work. An organization of workers into teams or partnerships affected co-worker relationships positively. This independent aspect could be utilised to improve the social work climate and workers possibilities to stay at work during pain. A common individual coping strategy was to apply helpful individual adjustments to the work. However, the possibility to apply these depended on the social climate and having adjustment latitude. Pain intensity was moderate, job strain and sick absence practices became influential decision-making factors. With important aspects mainly being related to the general working conditions in this population, any steps to take action rests with the local senior management and the work environment authorities.

This study is one of few that investigates factors important for coping with BP at work and work participation during pain episodes. Therefore, the results of this study contribute to broaden knowledge of BP, which is crucial for planning and conducting effective work participation interventions. With an increasingly aging working population in Western countries, it is highly likely that the negative impacts of health on the ability to work will bring heavier economic burdens on society. Thus, research needs to enhance focus at improving conditions for staying at work with pain conditions.

Conflict of interest Authors Pernille Frederiksen, Tom Bendix, and Mette Marie V. Karsten are employed at Glostrup University Hospital, which is one of the funders of this project. Author Aage Indahl declares that he has no conflict of interest. Neither contributing municipalities nor funders interfered in the scientific or publication process.

Ethical standard All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 [19]. Informed consent was obtained from all participants for being included in the study.

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