Improved recording of work relatedness during patient consultations in occupational primary health care: A cluster randomized controlled trial using routine data

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Abstract

Background: Prolonging working careers is a key policy goal in ageing populations in Europe, but reaching this goal is complex. Occupational health services are in the best position to contribute towards prolonging working careers, through preventing illnesses that cause work disability and early pensions. However, impacting on the trajectory between illness and work disability requires continuity of care and follow-up, enabled through identifying at-risk clients. We aimed to determine whether a combined educational and electronic reminder system could improve the recording and follow-up of primary care visits made by patients at risk of work disability in occupational health care, and whether the system could impact on sickness absence rates. Methods: This study is a pragmatic cluster randomized controlled trial using medical record data. Twenty two Pihlajalinna Työterveys units were randomized into an intervention group consisting of education and electronic reminders and a group receiving usual care through minimization methods. Client consultation data were extracted from routine Pihlajalinna Työterveys patient registers 2015 to 2017. In addition, process indicators were collected from the electronic system. Data were cleaned and analysed intention-to-treat using ANCOVA. Results: There was no significant difference between intervention and control units in terms of sickness absences of different duration. Process indicators suggested that there was a change in physicians' practice of recording clients' risk of work disability and work relatedness of visits following the educational intervention. Conclusion: Education with an electronic reminder can change physicians' practice, but long-term follow-up is needed to determine whether this impacts on patients' sickness absences. Trial registration: ISRCTN45728263

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Background

Prolonging working careers is a key policy goal among ageing populations in Europe [1,2], but reaching this goal is complex. Economics and personal health influence decisions about whether to continue at work at pension age [3]. A more pressing problem in European settings is the increasing number of disability pensions, which at least in Finland mostly affects young people of working age [4]. An estimated 145000[5] individuals are on early disability pension in Finland. Being on disability pensions affects personal finances [4], wellbeing [6] and national insurance expenditure. In 2015 the disability pension expenditure in Finland was 2 057 million euros [7].

Poor working conditions and workplace risks increase the likelihood of disability pensions [8]. While work can bring economic, psychological and even health benefits [9], workplace risks and conditions can impact negatively on both physical and mental health [10,11] and exacerbate already existing conditions, such as depression. Work-related disorders, and thus work disability, can be prevented through close collaboration between workplaces and healthcare. In Finland, occupational health services (OHS) provide both preventive services at workplaces and curative primary healthcare services for individual employees [12]. The key role of Finnish OHS is to provide healthcare services to organisations' employees, during which they can identify patients at risk of work-related diseases, and identify injuries and illnesses that threaten an employee's work ability [13]. They are in a key position in the country to implement workplace interventions that can help prevent work-related diseases and decrease rates of work disability [14]. However, to date, little research has been conducted on OHS' effectiveness in preventing work disability. In order to impact on work disability, we need to test different interventions for identifying patients at risk and to target prevention and care to them before their health worsens to the point of disability. The current OHS process for impacting on work disability mandates that a patient from primary care is directed to appropriate workplace or personal interventions following the identification of a work ability risk or a work related illness. According to Finnish survey 25% of male and 32% of female occupational health primary care visits were work-related [15].

Therefore, recording each visit's work relatedness and the patient's potential risk of disability accurately is important. While recording work relatedness is standard practice across occupational health services in Finland, to date no studies have been published on assessing this process, nor has it been studied how well physician records match true risks, and how well OHS follows up patients and conducts interventions to prevent work disability after the visit.

We hypothesized that clearer recording of work relatedness of client primary care visits and systematic recording of work disability risk of individual clients, with systematic follow up and intervention initiation to mitigate risks could help to reduce work disability. This study aimed to evaluate an intervention designed to improve recording and follow up of OHS primary care visits and its impact on sickness absences.

Methods

The intervention protocol was reported in full elsewhere (see [16]).

Setting

The study was conducted in Pihlajalinna Työterveys, a large private occupational health services' provider, which at the time of starting the study had 28 private healthcare units across Finland. In 2015, Pihlajalinna Työterveys had approximately 68370 employees on their register. The organization went through several rounds of mergers and corporate acquisitions during the study period, which led to a substantial increase in patient and health care unit numbers.

The intervention

The intervention was multifaceted and implemented sequentially. First, a notice was sent to the entire organization informing all practitioners that the study would be conducted. The intervention consisted of two separate activities: one, training, mentoring and follow-up of physicians in intervention units on how to identify and record work related illnesses during primary care visits and how to identify and record risk of work disability. The training sessions were conducted at each intervention unit. During the sessions the intervention and its components were introduced, and information about work related illnesses was reinforced. This also included training on the intervention processes - actions that were to be initiated after a patient was identified during a visit as at risk of work disability. Following the training, a project physician responded to questions and followed up with training participants telephonically. Second, an organization-wide change was made to the electronic health care system, clarifying the way in which work relatedness and risk of disability pension was recorded. This change reinforced the messages given in the training. The electronic change was made to clarify language in sections where work disability risk was assessed. No specific training was conducted on the change to the electronic record system, as changes were minor and had been introduced in the intervention training. Therefore, intervention physicians were more likely to adhere to the change in the electronic health record as they had been trained.

The trainees in the intervention sites were those occupational health physicians, who were responsible for collaboration with their own client companies, working at any of the 22 sites included in the study. The intervention and control sites had 58 physicians and 50 physicians, respectively, employed during the study. These physicians would be responsible for contacting workplaces, and to be involved in tailoring clients' work tasks or conducting other workplace interventions.

If the OH physician noted a client's visit as being related to work or that the client presented with a situation that could potentially result in work disability in the near future, they marked this onto an electronic system. Following this, a sequence of events was kicked off at the intervention sites. The OHS nurses responsible for the employer organisations collected the patients identified as at risk from the electronic health record. They then initiated the interventions that a physician recommended together with physicians, either for the clients or more widely at the workplace. These interventions could include e.g. an occupational health collaborative negotiation to modify the employee's work tasks or timing, or organizational interventions focused on workplace ergonomics or teamwork counselling. Other interventions could include e.g. starting medical or vocational rehabilitation for the individual patient, which involves both the workplace and the client/employee. It was not possible to collect the number of these interventions in this study since the individual patients that were identified as at risk of work disability or that had a work related condition could not be associated with the interventions conducted at workplace level. A fuller description of the intervention can be found in the TIDIER reporting guide for population health interventions: tidierguide.org/#/gen/pFqrFqw3M

Information about the study was sent to all sites in April 2016. The intervention training was conducted in May 2016. The electronic change to systems was implemented in 9.3.2017. Data collection ended in December 2017.

Randomisation

We included 22 Pihlajalinna Työterveys clinics that were functional in 2016 in the study. We treated each healthcare unit as a cluster, as individual randomisation in this context would have been challenging. NT, the team statistician, conducted initial simple randomization to randomize the first four clusters. After this, we used the minimisation approach to randomise the remaining 18 clusters so that the following confounders balanced across the intervention and control sites (see [16]): 1) the occupational sector (e.g. industrial, service sector, public service), 2) presence of a large industry client, and 3) client volume per site. The occupational health professionals and the research team were not blinded to the intervention.

Outcomes

Our primary outcome was reduction of the mean number of medium term (4-14 calendar days) of sickness absences per intervention and control centre from baseline after 1 year of follow up as measured by records kept by OHS patient records [16]. We considered medium length sickness absences from 4 to 14 calendar days, instead of 9 working days as indicated in the original protocol. We chose this to match our findings more closely with the Finnish Insurance Agency's definitions for sickness absences, which considers medium length sickness absences as absences including 9 working days (including Saturdays but not Sundays). The patient records included also weekends as sickness absence days, which differed from this approach. A similar choice was made in [17].

Our secondary outcomes were

1. Reduction in mean number of short term (1–3 consecutive calendar days) sickness absences from the workplace per cluster after 1 year from the start of the intervention as measured either by self-reported sickness absences recorded on the OHS system or sickness absences certified by OHS physicians working at the included OHS units.
2. Reduction of mean number of any form of work disability pensions as measured by an employee registered as receiving a work disability pension on the central pensions register from baseline to up to 2 years from the intervention
3. Reduction of mean number of long-term (15 or more consecutive calendar days) sickness absences from the workplace per cluster from baseline to 1 year after the intervention as measured by OHS records

The follow-up time was set at 1 year due to funding and planned study duration. This article focuses on reporting the primary outcome, medium term sickness absences, as we deemed the follow-up period too short to report on disability pensions or long-term sickness absences. We also report short-term sickness absences and the process indicators collected on recording consultations' work relatedness and risk of work disability across control and intervention sites.

Power calculation

Our initial power calculation suggested that we would have 91% power to detect a 10% change in mean sickness absence rates across intervention and control clusters, if we had 22 occupational health units with 24892 patients. For the trial, we retained all 22 units, with 26804 patients recorded on the system.

Data collection

We collected medical record data on patients' healthcare consultations at Pihlajalinna Työterveys from 2015 to 2017. The medical records included 68370 patients in 2015 and 107413 patients in 2017. The cohort was dynamic, in that patients could be added to the cohort as the study progressed. Data were pseudonymised, and researchers had no access to patient identifying data. All patients above the age of 18 and whose employers had a contract with Pihlajalinna Työterveys including primary healthcare services were included in the study.

The data were combined with pseudonymised data from the Finnish Centre for Pensions, where we obtained all participants' pensions granted for the study period.

Data analysis

After data collection was complete, we noted that Pihlajalinna's acquisition of another large occupational health services provider impacted on our outcomes. Therefore, we used all initially randomised sites in the intention to treat analyses and excluded them in the per protocol analyses.

We included data on curative patient visits to OHS physicians responsible for client organisations. OHS services have many casual workers, who deal with primary care patients but are not occupational health specialists and most of them were not exposed to training. We also excluded preventive visits such as health examinations. We analysed data 6 months before the intervention, during the intervention, and after the intervention for 6 months. After initial analysis we chose a period of 6 months after the intervention corresponding with the same season of the 6 months preceding the intervention, to ensure that seasonal effects did not confound our analysis. We analysed data using ANCOVA, setting alpha at 0.05.

We also analysed process indicators among intervention and control clinics. These indicators included whether physicians had changed their practice of recording a consultation's relatedness to work after the intervention. The intervention required a physician to

record whether or not the patient's visit was related to work or whether this was not assessed. We analysed changes after the educational intervention and after the change in the electronic system using descriptive statistics.

Results

The flowchart below presents the final data after randomization, divided by gender.

Figure 1. Flowchart for the intention-to-treat analysis (ITT)

The baseline characteristics of the study population are in table 1 below.

Table 1. Baseline characteristics of intervention and control groups by sex: mean (standard deviation) or percentage (%) within group.

	Women, n=8735				Men, n=11192			
Baseline characteristics	Control group (n=3911)		Intervention group (n=4824)		Control group (n=5828)		Intervention group (n=5364)	
Age, mean (sd)	44	(12)	42	(12)	43	(12)	42	(12)
No sick leave, only visit, n (%)	1827	(47)	2038	(42)	2924	(50)	2480	(46)
Number of visits per person during 6 months preceding the intervention, mean (sd)	3	(2)	3	(2)	2	(2)	3	(2)
Any work disability pension*, n (%)	133	(3)	195	(4)	128	(2)	180	(3)
Primary outcome**								
Medium term SA (4-14 days), n (%)	783	(20)	1116	(23)	1246	(21)	1127	(21)
Secondary outcome**								
Short term SA (1-3 days), n (%)	1555	(40)	2087	(43)	1993	(34)	2056	(38)
Long term SA (15+ days), n (%)	406	(10)	563	(12)	569	(10)	557	(10)
Number of SA episodes, mean (sd)	2.1	(1.6)	2.3	(1.8)	2.1	(1.6)	2.1	(1.6)
Total length of SA days, mean (sd)	8	(21)	10	(28)	7	(23)	8	(23)

**partial fixed-term disability pension, fixed-term disability pension, partial disability pension, permanent disability pension, vocational rehabilitation allowance*
***including only those with sick leave (control group n=4990; intervention group n=5668)*
SA = sickness absence

There were differences between intervention and control sites women in terms of age, proportion of registered employees visiting without sick leave, total number of visits, and medium and short term sickness absences. For men, only age, visit without sick leave and short term sick leaves seemed different across intervention and control sites (table 1).

The results of our primary outcome analysis are shown in table 2 below. As can be seen, the intervention had no significant

Table 2: Intention-to-treat analysis, sickness absences before and after the intervention (n=22)

tcome riable	Baseline 6kk before the intervention 1.5.2015-31.10.2015		6 months after the intervention 1.5.2017-31.10.2017		Adjusted difference in means between intervention and control groups (CI 95%)*	
ıles						
	Control unit n=11	Intervention unit n=11	Control unit n=11	Intervention unit n=11		
mary outcome	mean (sd)	mean (sd)	mean (sd)	mean (sd)		
dium term 14 days)	187 (160)	151 (111)	201 (176)	149 (70)	22	-46 to 91
condary tcome						
ort term SA 3 days)	316 (230)	319 (327)	381 (319)	317 (195)	66	-122 to 255
ng term SA 5+ days)	94 (63)	84 (48)	99 (65)	81 (45)	10	-23 to 43
tal length of days	4378 (2751)	3886 (2396)	4755 (3486)	3834 (2075)	486	-1118 to 2091
mber of SA isodes	598 (442)	554 (478)	681 (552)	547 (292)	104	-177 to 384
males						
mary outcome	mean (sd)	mean (sd)	mean (sd)	mean (sd)		
dium term 14 days)	116 (96)	153 (156)	160 (122)	193 (138)	-16	-123 to 91
condary tcome						
ort term SA 3 days)	261 (242)	331 (399)	323 (243)	357 (178)	-18	-201 to 165
ng term SA 5+ days)	68 (74)	93 (85)	89 (75)	105 (62)	-3	-52 to 47
tal length of days	3041 (3116)	4172 (4161)	3978 (3405)	4772 (2952)	-233	-2655 to 2189
mber of SA isodes	445 (408)	577 (626)	571 (429)	655 (365)	-41	-372 to 290

SA = sickness absence

Short term and long term Sickness absences reduced among men and increased among women, though none of these changes were statistically significant. The per protocol analysis, excluding entire occupational health units, showed similar results.

Our analysis of process indicators that measured how intervention and control groups recorded patient visits in practice was more promising. Table 3 below shows change in physicians' practice, at baseline, after education, after the electronic information system change and 6 months after the intervention.

Table 3. Process indicators: physician registration of work relatedness of each patient visit

Outcome variable	Baseline 6kk before 1.5.2015-31.10.2015	Intervention (education) 1.5.2016-8.3.2017	Change in the information system (electronic reminder) 9.3.2017-30.4.2017	6 months 1.5.2017-31.10.2017

	Control unit n=11		Intervention unit n=11		Control unit n=11		Intervention unit n=11		Control unit n=11		Intervention unit n=11		Control unit n=11		Intervention unit n=11	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Not assessed	2	0	365	3	10119	50	1763	9	1918	61	308	10	5881	59	1463	13
Not related to work	10888	89	11389	85	7581	38	14525	75	831	26	2348	74	3001	30	7785	72
Work related	1311	11	1714	13	2375	12	3198	16	398	13	490	16	1124	11	1657	15
Total	*12201*	*100*	*13468*	*100*	*20075*	*100*	*19486*	*100*	*3147*	*100*	*3146*	*100*	*10006*	*100*	*10905*	*100*

Table 3 above shows that before the intervention most visits were recorded as “not related to work”, which was the default setting (89% and 85% across control and intervention units, respectively). After the institutional information and education conducted at intervention units, a change could be observed where 75% of intervention units’ records and 38% of control units’ records were in “not related to work”. At the same time, the rates of “not assessed” increased in both units, more in the control units (50%) than in intervention units (9%).

However, after the electronic reminder in the system changed and the default setting changed to “not assessed” from “not related to work”, we can see that while the control sites’ default answers increased (from 50% to 61%), we see that intervention sites’ default answers stayed nearly the same (from 9 to 10%), suggesting that intervention sites’ recordings were actual recordings made actively by physicians more than default choices. These effects sustained over time. As the physicians’ recording improved, we can see that the percentage of visits related to work also increased, from 13% in the beginning to 15% at the end. Trends in recording possible work disability were similar across intervention and control sites. Physicians recorded similar numbers of possible future work disability for each consultation across intervention and control sites. There were slightly more records of no threat of disability in the intervention sites than there were at control sites.

Discussion

Though our intervention showed no effect on sickness absences, it produced a promising indication of the effectiveness of education on improving occupational health professionals’ practices of recording work related visits in primary care. This effect was supported by a change in electronic information systems.

While there was no statistical difference between intervention and control arms on rates of sickness absence as primary and secondary outcomes, there may be a number of reasons for lack of differences. Firstly, while approximately 15% of visits were identified as work related, these form a relatively small subset of the entire population analysed for detecting a difference in sickness absences. At individual level actions leading to shortening of sickness absences take time as rehabilitative processes are gradual. In addition, initiating individual work modifications in collaboration with workplaces requires time. Secondly, many of the conditions that are work related require workplace interventions starting from including workplace assessment, with subsequent commitment by employers to implement these changes. An example of such intervention could be improving workplace psychological wellbeing [18], or changing the workplace environment, for example lighting [19] or disruptions from open plan offices [20]. These interventions are considerable commitments for organisations both in terms of processes and financially, and may take time to be implemented. In order for our intervention to impact on these, it should have had a workplace outreach component.

The increase in sickness absences by women can be related to increasing age over time [21] but also to poor workplace atmosphere [22]. Our linked study on frequent attenders in occupational health services similarly identified women as at risk of frequent use of services

[23], where particularly women from the service industry and public administration were at risk [23]. We also found that frequent attenders of OHS primary care are at an increased risk of sickness absences also after their consultation frequency has diminished [24]. This supports the the lack of impact on sickness absences, when no workplace intervention was included.

Finally, a possible reason for lack of impact are changes in national rules for sickness certification, where employees could be absent from work without a certificate for a longer period (from 3 days to 7 days), which was implemented by many businesses and public organisations [25] during the study period. These, and other changes in sickness certification over time are more likely to impact on sickness absence rates than our intervention. The study sites also experienced relatively high physician turnaround. This means that our intervention might not have reached all practicing physicians in the intervention sites. This suggests a need for a continuous education approach in future interventions.

Our study has several strengths and limitations. As the Pihlajalinna patient register has a large, nationwide sample representing different industries, we can consider our sample generalizable to the working age population in Finland. However, our pragmatic trial approach meant that we could not control the fidelity with which physicians adhered to the educational programme, nor were we able to determine what activities increased at workplaces after the intervention. We also could not prevent crossover of physicians from intervention to control arm. Nevertheless, conducting such trials using routine patient registers allowed us to evaluate the outcome of the intervention with a large sample of high quality data.

Despite the intervention not impacting on patients' sickness absences, the impact of the educational intervention is promising. Early identification of patients with work disability risk enables timely follow-up by the OH team and early intervention for issues that might threaten work ability. This can possibly improve continuity of care in primary healthcare settings. OHS physicians are seen as better positioned to evaluate the need for sickness absences than general practitioners working in other settings [26,27] and early consultation with OH physician has been found effective in reducing the total sickness absence days taken by individuals at risk of sickness absences [28]. With a simple educational intervention combined with an electronic reminder, data indicate that occupational health physicians in eleven intervention clinics changed their practice of recording work relatedness and potential for work disability. These effects sustained after the intervention was concluded. As recording in electronic systems is a challenge and poorly functioning electronic referral systems can even result in occupational stress [29], this is a positive and fairly surprising outcome. Clinicians may feel that electronic health records impact negatively on their professional satisfaction [30], therefore the systems need to be both meaningful and easy to use. This simple intervention succeeded in improving the accuracy and frequency of recording. This better and more accurate recording can enable better follow up, interventions, and assessment. Further training can reinforce this message. While recording of visits' work relatedness or client's risk of work disability itself does not translate into reduced sickness absences, there is a possibility that improved recording can result in better reporting to employers, and better and timelier opportunities for preventive actions in the workplace and for clients.

Conclusions

Our cluster, pragmatic randomised controlled trial using patient registers as data did not find that an educational and electronic health information intervention had significant effects on sickness absences in the context of occupational health primary care in Finland. However, the intervention changed occupational health physicians' practice of recording the work relatedness of patient consultations, and potentially enabled better continuity of care and follow-up for patients at risk of disability pensions. In future, such interventions should include detailed follow-up of patients, with a workplace component to ensure adequate follow-up of, and intervention for, patients at risk.

Abbreviations

OH = occupational health

OHS = occupational health services

SA = sickness absence

Declarations

Ethics approval and consent to participate: The project received an ethical statement from the Pirkanmaa Hospital District, finding no obstacles for conducting the study. Under Finnish legislation at the time of study, where large groups of people are dealt with from registers, individual consent is not required.

Consent for publication: not applicable

Availability of data and material: The datasets generated and/or analysed during the current study are not publicly available due to personal identifiers and sensitive medical record data, but are available de-identified from the research team on reasonable request.

Competing interest: The authors declare no competing interests.

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Authors contributions: All authors conceptualised the study and participated in its implementation and analysis. SA wrote the first draft of the study, all authors commented on the content and contributed to the final version.

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Figures

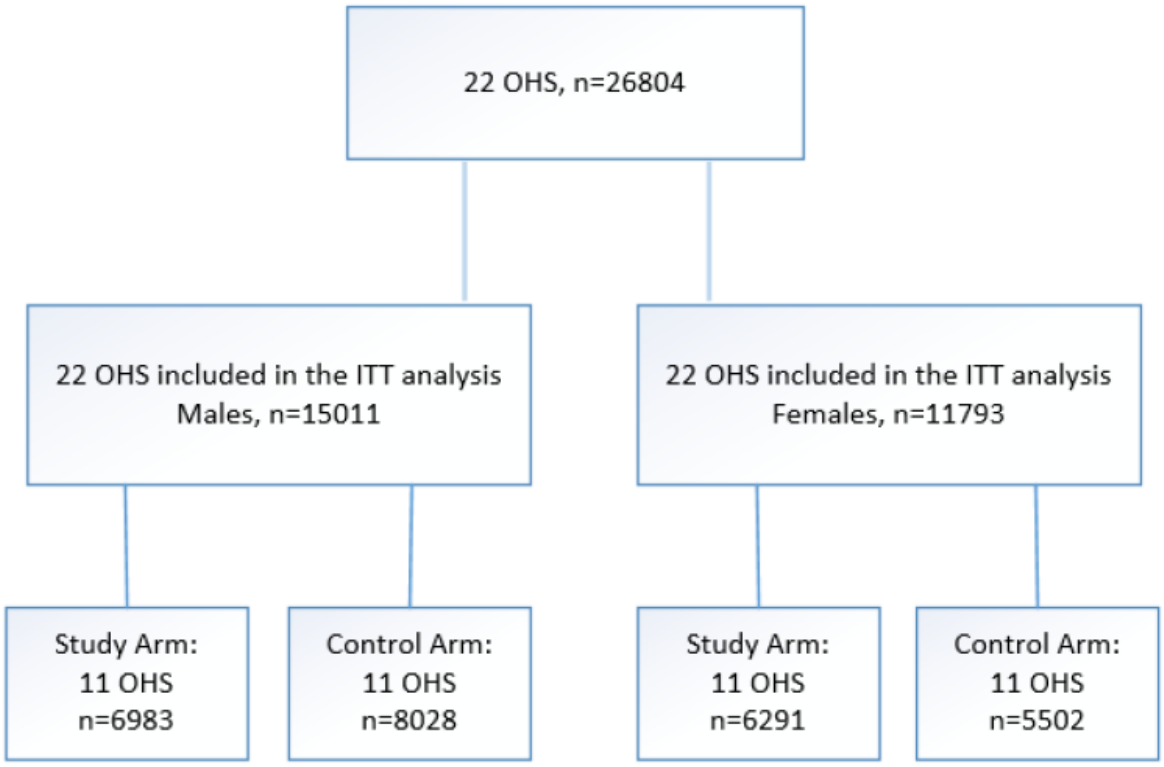

Figure 1

Flowchart of the trial randomisation.

Supplementary Files

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