

Improved recording of work relatedness during patient consultations in occupational primary health care: A cluster randomized controlled trial using routine and register 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, this requires close follow-up and recording of patient health status during consultations, as well as continuity of care. We aimed to determine whether a combined educational and electronic reminder system could improve the recording and follow-up of patient primary care visits in occupational health care, and through this, to impact on sickness absence rates. Methods This study is a pragmatic cluster randomized controlled trial using medical record data. Data were extracted from routine patient registers collected by Pihlajalinna Työterveys from 2015 to 2017. Data were cleaned and analysed intention-to-treat using ANCOVA. Results There was no significant difference between intervention and control sites in terms of sickness absences of different duration. Process indicators suggested that there was a change in physicians' practice following the educational component of the intervention. Conclusion Education with an electronic reminder can change physicians' practice, but longer term follow-up is needed to determine whether this impacts on patients' sickness absences.

Background

Prolonging working careers is a key policy goal in 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, but a more pressing problem in European settings is the increasing number of disability pensions, which at least in Finland mostly affects young working age people ⁴. An estimated 145000⁵ people are on early disability pension in Finland, which impacts both on personal finances ⁴ and wellbeing ⁶. In 2015 the disability pension expenditure in Finland was 2 057 million euros ⁷.

Work disability, and the path to disability pensions, is best intervened in at work. Work-related disorders, and thus work disability, can be prevented at work. Poor working conditions and workplace risks increase numbers 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. Occupational health services (OHS) are in a key position to implement workplace interventions, that have been shown to impact on prevention of work-related diseases and work disability rates ¹². In Finland, occupational health services provide both preventive and curative services ¹³. A key role of Finnish occupational health (OH) primary care services is to identify patients at risk of work-related diseases and injuries and illnesses that threaten employee's work ability ¹⁴. Impact on work disability requires that the patient is directed from primary care to appropriate workplace or personal interventions. For this, recording each visit's work relatedness, and the patient's risk of disability is key. While recording work relatedness is standard practice across occupational health services in Finland, no studies are as yet published on assessing this practice, including on how well physician records match true risks, and how well interventions are conducted after the visit.

A key study about recording and reporting work related primary care visits in Helsinki, Finland suggested that approximately half of the visits were related to work ¹¹ and in half of these, recommendations were made by the doctor for work or workplace interventions. However, while the patient information system in Finland is electronic, the current system is not set up to follow up or analyse these cases in the long term. We aimed to conduct a trial to improve the recording and follow-up of patient primary care visits in occupational health care, in order to impact on sickness absence rates. Our hypothesis was that improved recording of work-relatedness and/or potential disability risk would result in closer follow-up and early intervention, thus protecting patients' health and reducing sickness absences of different lengths.

Methods

The intervention protocol was reported in full elsewhere (see ¹⁵).

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. Pihlajalinna Työterveys 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 trainees in intervention units on how to identify and record work related illnesses in primary care visits and how to identify and record risk of work disability. This also included training on the sequence of actions that was to be implemented when a marking was made. 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.

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 sites had altogether 58 physicians working during the study, while control sites had in total 50 physicians during the study. These physicians can for example be involved in tailoring work tasks and other workplace interventions.

If the OH physician noted a visit as work related, or a patient as at risk of disability in the near future, a sequence of events was kicked off at the intervention sites. The OHS nurses responsible for the employer organisations were to collect the patients for which such reports were made, and initiate the recommended interventions, together with the physicians either for the patients or at the employer organization. The interventions could include e.g. an occupational health collaborative negotiation to modify the employee's work tasks or timing, or organizational interventions on workplace ergonomics or teamwork counselling. Other interventions could e.g. starting medical or vocational rehabilitation for the individual patient, which involves both the workplace and the patient/employee. It was not possible to collect the number of these interventions in this study since the individual patients that received the note and the tasks following conducted could not be associated.

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.

Inclusion and exclusion criteria:

We included 22 clinics within Pihlajalinna 2016 in collaboration with managers at the institution. Clients were included in the analysis if they attended any of the 22 clinics within the trial period, and were between 18 and 64 years of age.

Randomisation

Of all clinics within Pihlajalinna Työterveys in 2016, we included 22. 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 of healthcare units. Randomisation was conducted on an 1:1 ratio. After this, the minimisation approach was used to randomise the remaining 18 clusters using excel so that confounders including 1) the occupational sector (e.g. industrial, service sector, public service), 2) presence of a large industry client, and 3) client volume per site balanced across the intervention and control sites (see ¹⁵).

Occupational health professionals or the research team were not blinded to the intervention.

Outcomes

Our primary outcome was medium-length sickness absences. Deviating from the original protocol, we considered medium length sickness absences from 4 days to two weeks. This time was related to the Finnish Insurance Agency's payment of sickness absences after more than 10 days of sickness absences. However, the Finnish Insurance Agency calculates working days, while sickness absences are registered on the system using calendar days.

Our secondary outcomes were

1. Reduction in mean number of short term (1–3 days) sickness absences from the workplace per cluster from baseline after 1 year from the start of the intervention as measured by self-reported sickness absences that are recorded on OHS records or OHS records of sickness absence written in the OHS units.
2. Reduction of mean number of any form of work disability pensions as measured by an employee registering as receiving a work disability pension on the central pensions register from baseline to up to 2 years from the intervention as measured by the entry on the central pensions register
3. Reduction of mean number of long-term (15+ days) sickness absences from the workplace per cluster from baseline to 1 year after the intervention as measured by OHS records

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 related visits from Pihlajalinna Työterveys from 2015 to 2017. The medical records included between 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 with a healthcare curative contract with Pihlajalinna Työterveys 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. This is because OHS services have many casual workers, who deal with primary care patients but are not occupational health specialists, most of whom 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 yearly 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 the recording of a visit's relatedness to work remained the same as before or whether the physicians recording had changed practice. At each visit a physician would be asked to record whether or not the patient's visit was related to work or not or whether it was not assessed. We analysed changes both after the educational intervention and after change in the electronic system using descriptive statistics.

Results

The flowchart below presents the final data after randomisation 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.

There were differences between women in intervention and control sites on 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 (table 1).

The results of our primary outcome analysis are shown in table 2 below. As can be seen from the analysis, the intervention had no significant effect on short term, long term, or medium term sickness absences for either males or females.

Sickness absences from short term to long term 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 (table 2 above).

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

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' marks and 38% of control units' marks were in "not related to work", and 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 more than default. These effects sustained over time. As the recording was 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 had 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 at control sites.

Discussion

Though our intervention showed no effect on sickness absences, we showed a promising indication of the educational component on 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 usually requires time. Secondly, many of the conditions that are work related require workplace interventions starting from including workplace assessment, and subsequent commitment by employers to implement these changes. An example of such intervention could be improving workplace psychological wellbeing¹⁶, or changing the workplace environment, for example lighting¹⁷ or disruptions from open plan offices¹⁸. These interventions are large commitments by organisations both in processes and in finances, and may take time to be implemented. To impact on these issues, the intervention should have had a component of employer outreach.

The increase in sickness absences by women can be related to increasing age over time¹⁹ but also to poor workplace atmosphere²⁰. Our linked study on frequent attenders in occupational health services similarly identified women as at risk of frequent use of services²¹, particularly women from the service industry and public administration²¹. We also found that frequent attenders of OHS primary care at an increased risk of sickness absences also after their consultation frequency has diminished²². This supports the challenge of the intervention's 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 for example employees could remain away from work without a sickness certificate for a longer period (from 3 days to 7 days) in many businesses and public organisations²³. These, and other changes in sickness certification over time are more likely to impact on sickness absence rates than our intervention, which focused on identifying individuals at risk and initiating interventions on that basis.

Our study has several strengths and limitations. As the Pihlajalinn patient register has a large, nationwide sample representing different industries, we can consider our sample generalizable to the working age population in Finland. However, the pragmatic approach to our trial 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, if any, after the intervention. Nevertheless, conducting such trials using routine patient registers allowed us to evaluate the outcome of the intervention with a large sample with high quality data.

Despite the intervention not having impact on patients' sickness absences, the impact of the educational intervention is promising. Identification of patients with risk of disability enables follow-up with the OH team and early intervention in issues that might threaten work ability, and can possibly improve continuity of care in primary healthcare settings. OHS physicians seen as being better positioned to evaluate sickness absences than general practitioners in other settings^{24,25} and early consultation with OH physician has been found effective in reducing total sickness absence days in individuals at risk of sickness absences²⁶. With a simple educational intervention combined with an electronic reminder, data indicate that occupational health physicians in 11 intervention clinics changed their practice, and the effects sustained after the intervention was concluded. While recording itself does not translate into direct differences in patients' sick leave, there is a possibility that improved recording can result in better reporting to employers, and better opportunities for preventive actions in the workplace and for patients themselves.

Conclusions

Our cluster, pragmatic randomised controlled trial using patient registers as data did not find significant effects on sickness absences after an educational and electronic health information system intervention in the context of occupational health primary care in Finland. However, the education provided to occupational health physicians changed their practice of recording work relatedness of patient consultations, and potentially enabled better continuity of care and follow-up for

patients at risk of disability retirement. In future, such interventions should have detailed follow-up of patients, with an employer organization 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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Tables

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

Baseline characteristics	Women, n=8735		Men, n=11192	
	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

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

Outcome variable	Baseline 6kk before the intervention 1.5.2015-31.10.2015		6 months after the intervention 1.5.2017-31.10.2017		Main comparison between two groups (Intervention vs Control) Adjusted difference in means (CI 95%)*	
Males						
	Control unit n=11	Intervention unit n=11	Control unit n=11	Intervention unit n=11		
Primary outcome	mean (sd)	mean (sd)	mean (sd)	mean (sd)		
Medium term SA (4-14 days)	187 (160)	151 (111)	201 (176)	149 (70)	22	-46 to 91
Secondary outcome						
Short term SA (1-3 days)	316 (230)	319 (327)	381 (319)	317 (195)	66	-122 to 255
Long term SA (15+ days)	94 (63)	84 (48)	99 (65)	81 (45)	10	-23 to 43
Total length of SA days	4378 (2751)	3886 (2396)	4755 (3486)	3834 (2075)	486	-1118 to 2091
Number of SA episodes	598 (442)	554 (478)	681 (552)	547 (292)	104	-177 to 384
Females						
Primary outcome	mean (sd)	mean (sd)	mean (sd)	mean (sd)		
Medium term SA (4-14 days)	116 (96)	153 (156)	160 (122)	193 (138)	-16	-123 to 91
Secondary outcome						
Short term SA (1-3 days)	261 (242)	331 (399)	323 (243)	357 (178)	-18	-201 to 165
Long term SA (15+ days)	68 (74)	93 (85)	89 (75)	105 (62)	-3	-52 to 47
Total length of SA days	3041 (3116)	4172 (4161)	3978 (3405)	4772 (2952)	-233	-2655 to 2189
Number of SA episodes	445 (408)	577 (626)	571 (429)	655 (365)	-41	-372 to 290

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

	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	(%)												
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

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

Figures

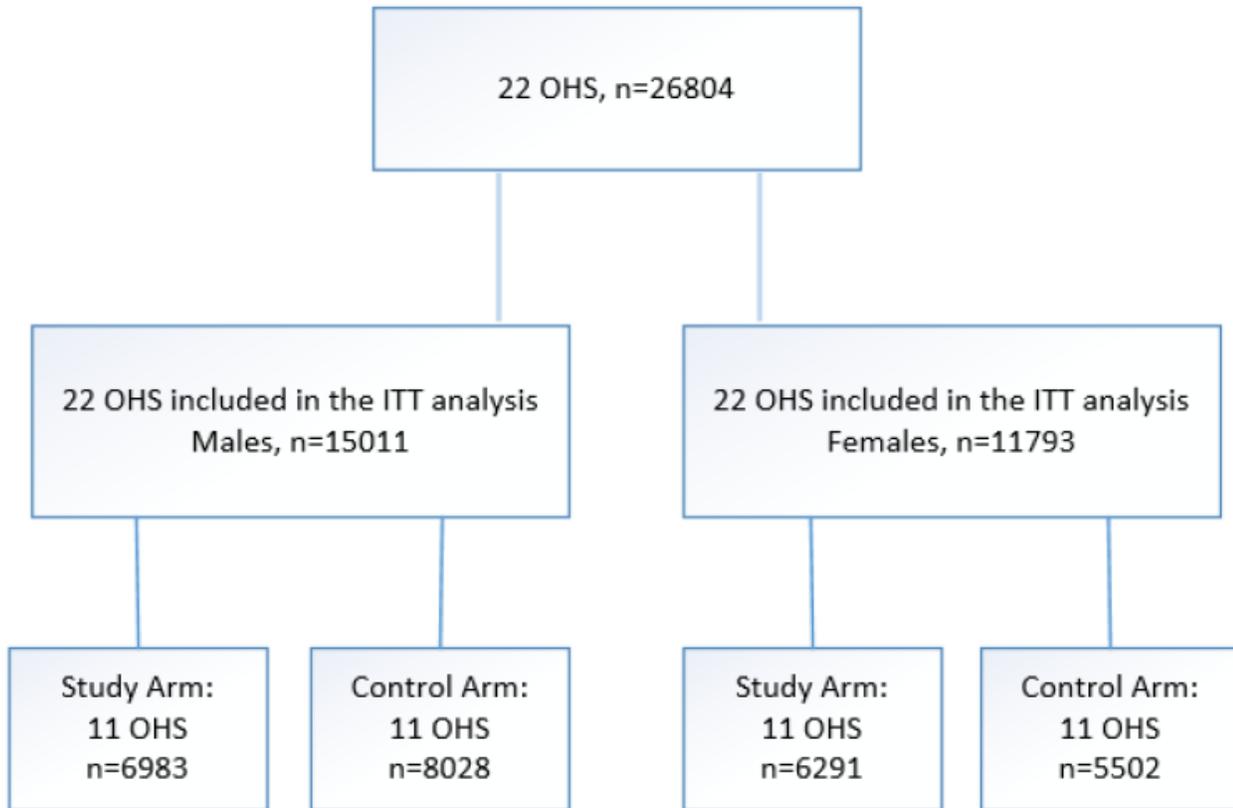


Figure 1

Flowchart of the trial randomisation.

Supplementary Files

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