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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Keywords: Occupational health; Randomized controlled trials; sickness absence; work-related illnesses

Posted Date: December 10th, 2019

DOI: https://doi.org/10.21203/rs.2.9723/v2

Version of Record: A version of this preprint was published at Trials on March 12th, 2020. See the published version at https://doi.org/10.1186/s13063-020-4168-8.

Abstract

Background: Prolonging working careers is a key policy goal 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. Impacting on the trajectory between illness and work disability requires continuity of care, enabled through identifying those at risk and their follow-up. We aimed to determine whether a combined educational and electronic reminder system could improve the recording of patient primary healthcare visits and follow-up of patients at risk of work disability or with work related illnesses 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. An occupational primary healthcare provider's units in Finland were randomized into an intervention group consisting of both education and electronic reminders, and a control group with usual care using minimization methods. Data on patient visits were extracted from routine patient registers collected by Pihlajalinna Työterveys from 2015 to 2017. 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 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 given the ageing populations in Europe (1,2), but reaching this goal is complex. Personal financial situation and 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 working age people (4). An estimated 145000(5) people are on early disability pension in Finland, which impacts on personal finances (4), wellbeing (6) and the country economy. In 2015 the disability pension expenditure in Finland was 2 057 million euros (7).

Poor working conditions and workplace risks increase numbers of disability pensions (8). Work can bring economic, psychological and even health benefits (9) but workplace risks and conditions can impact negatively on both physical and mental health (10,11) and exacerbate already existing conditions. Work-related disorders, and thus work disability, can be prevented through close collaboration with workplaces. Occupational health services (OHS) are in a key position to implement workplace interventions, that can prevent or mitigate work-related diseases and impact on work disability rates (12). In Finland, occupational health services provide both health promotive and primary healthcare services to individual clients of working age, and occupational health and safety services for client organisations (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). To date, there has been little research on the primary healthcare aspect of OH services, in particular interventions for improving patient follow up . Interventions are needed for identifying patients at risk of work disability or those with work related conditions and following them up, and targeting prevention and care to them before their conditions exacerbate to the point of disability. Currently, the follow up of individual patients is left to an individual physician and their team, without dedicated systems or interventions to support this process. Without appropriate recording of patients' visits and their risk of work disability or their condition's work relatedness and a system to support follow-up, impacting on work ability is not possible.

While recording work related conditions and risk of work disability is standard practice across OHS in Finland, no studies are as yet published on assessing this practice. 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. This study did not include an intervention to improve follow up or recording of patient visits. While the patient information system in Finland is electronic, the patient information systems in use are not set up to follow up or analyse patients' outcomes 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 with combined activities to initiate follow-up and early intervention would protect patients' health and possible reduce sickness absences.

Methods

The intervention protocol was reported in full elsewhere (see (15)). This was a parallel pragmatic randomized controlled trial using electronic patient registers.

Setting

The study was conducted in Pihlajalinna Työterveys, a large private OHS 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 healthcare unit numbers.

The intervention

The intervention was multifaceted and implemented sequentially. First, a notice was sent to the entire organization informing all practitioners working in all of Pihlajalinna's units 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. Training sessions were conducted at each intervention unit, presenting the intervention and reinforcing information about work related conditions for all OH physicians and nurses at participating units. This also included training on the actions that were to be implemented after a patient was identified on the system as at risk of work disability or had a work related condition. Following the training, a project physician followed up with participants telephonically and answered any emerging questions. 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, which matched the training. The electronic change was made to clarify text 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.

The trainees in the intervention sites were OH physicians, who were named as responsible for collaboration with a particular client company, working at any of the 22 sites included in the study. The intervention sites had 58 physicians employed as company responsible physicians during the study period, while control sites had 50 physicians during the study period. Named OH physicians are responsible for individual patient consultations, and also providing services to client companies.

If the OH physician noted a visit as work related, or a patient as at risk of work disability in the near future, a sequence of events was kicked off at the intervention sites. The OHS nurses named as responsible for the client companies collected patients from that company, identified as at risk from the electronic health record, onto an excel sheet. They then initiated recommended activities or referrals individually or together with OH physicians, either for the individual patients or for the client company. The interventions could include e.g. an occupational health collaborative negotiation to modify the employee's tasks, or organizational interventions on workplace ergonomics or teamwork counselling. Other alternatives were e.g. medical or vocational rehabilitation for the individual patient, which involves both the workplace and the patient/employee. It was not possible to collect information on the initiated activities as we could not link individual patient identification numbers with workplace or other activities within the electronic health information system.

A full 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

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. After this, the minimisation approach was used to randomise the remaining 18 clusters 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)).

Nor the occupational health professionals or the research team were blinded to the intervention.

Outcomes

Our primary outcome is reduction from baseline of the mean number of medium term (4-14 calendar days) sickness absences per intervention and control centre after 1 year of follow up as measured by OHS patient records (15). Deviating from the original protocol, we considered medium length sickness absences from 4 to 14 calendar days, instead of 9 working days as indicated in the original protocol. This was related to the Finnish Insurance Agency definitions, which limited sickness absence payments to after 9 working days (including Saturdays but not Sundays). It was not possible to separate Sundays from the electronic patient records, thus we expanded our definition from 9 days to 14 calendar days. A similar approach was used in (16).

Our secondary outcomes were

1. Reduction in mean number of short term (1–3 consecutive calendar 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 were 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 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 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 during the study.

Data collection

We collected medical record data on patients' healthcare related visits from Pihlajalinna Työterveys from 2015 to 2017. The medical information system 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 whose employment included a primary healthcare benefit with Pihlajalinna Työterveys were included in the study.

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 acquired units in the per protocol analyses.

We included data on primary healthcare related patient visits to OHS physicians responsible for client organisations. This is because OHS services have many temporary staff, who deal with primary care patients but are not occupational health specialists. Most temporary staff were not exposed to the intervention 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 season of the 6 month baseline, 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 sex.

<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 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 between control and intervention sites (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.

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

Outcome variable	Baseline 6months before the intervention 1.5.2015-31.10.2015		6 month period after the intervention 1.5.2017-31.10.2017		Adjusted difference in means between intervention and control groups (CI 95%)*	
Males						
	Control unit	Intervention unit	Control unit	Intervention unit		
	n=11	n=11	n=11	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

SA = sickness absence

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 recorded patient visits before, during and after the intervention, 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. Process indicators: physician registration of work relatedness of each patient visit

Outcome variable	Baseline 6 months before intervention		Intervention (education)		Change in the information system (electronic reminder)		6 month period after the intervention	
	1.5.2015-31.10.2015		1.5.2016-8.3.2017		9.3.2017-30.4.2017		1.5.2017-31.10.2017	
	Control unit	Intervention unit	Control unit	Intervention unit	Control unit	Intervention unit	Control unit	Intervention unit
	n=11	n=11	n=11	n=11	n=11	n=11	n=11	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). A change could be observed in the recording of work relatedness and work disability risk after the institutional information provided and education conducted at intervention units. In total 75% of intervention units' visit records and 38% of control units' visit records were in "not related to work", showing that intervention units had made an actual choice instead of "clicking through" to the default option. In addition, 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 active choosing of answers to prompted questions rather than default answers. These effects sustained over time. As the recording was improved, we can see that the percentage of visits related to work also increased slightly, 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 indications 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 several reasons for lack of effects. 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 wellbeing (17), or changing the workplace environment, for example lighting (18) or disruptions from open plan offices (19). 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 a component of employer outreach.

The increase in women's sickness absences can be related to increasing age over time (20) but also to poor workplace atmosphere (21). Our linked study on frequent attenders in occupational health services similarly identified women as at risk of frequent use of services more than men (22), a risk that was higher for women from the service industry and public administration (22). 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 (23). 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 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 organisations (24). These changes came into force during our study in many companies. 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 a relatively high staff turnaround. Despite constant contact with primary healthcare units, our intervention might not have reached all practicing physicians in the intervention sites. Future interventions such as this should include a continuous education component to capture new staff during the study period.

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 with access to primary care through OH 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 to address patients' risk of work disability or their work related conditions increased, if any, after the intervention. We also could not prevent physicians from moving from intervention to control arm. Nevertheless, conducting this trial using routine patient registers allowed us to evaluate the outcome of the intervention with a large sample with high quality data in real world conditions.

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 are seen as being better positioned to evaluate sickness absences than general practitioners in other settings (25,26). Early consultation with OH physician has been found effective in reducing total sickness absence days in individuals at risk of sickness absences (27). 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. As using electronic health records has been identified as a challenge and poorly functioning electronic referral systems can even result in occupational stress (28), this is a positive and fairly surprising outcome. Clinicians may feel that electronic health records impact negatively on their professional satisfaction (29), and systems need to be meaningful and easy to use. This simple intervention succeeded in improving the accuracy and frequency of recording, suggesting that we improved the system and through training possibly made its use more meaningful. Better recording can enable better follow up, interventions, and assessment, and training can reinforce this message. Noting down work relatedness or risk of work disability alone does not translate into impact. However, , 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 identifying and 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 upon reasonable request.

Competing interest: The authors declare no competing interests.

Funding: The project within which this study is conducted is funded by the European Social Fund, reference number S20659. The funder has taken no active role in the design, implementation or reporting of this study.

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.

Acknowledgements: The authors would like to acknowledge the participation of the occupational health staff within the study and all the individual clients part of this study, and Pihlajalinna consortium for providing access to data.

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Figures

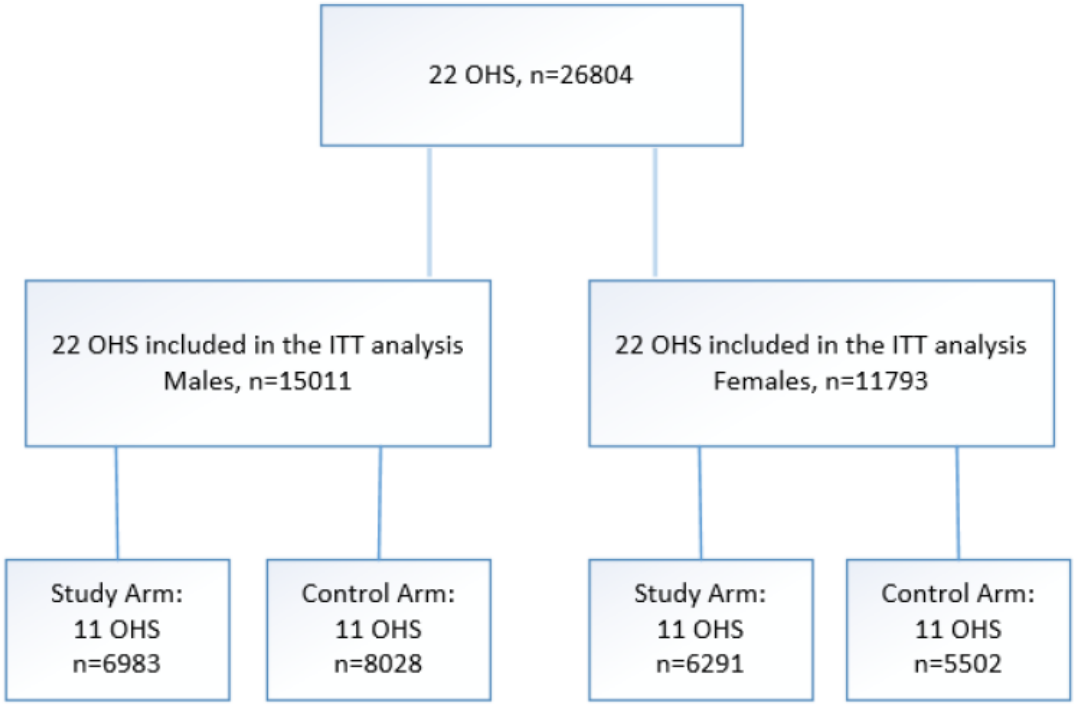

Figure 1

Flowchart of the trial randomisation.

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