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Does having a coordinator during occupational treatment and rehabilitation promote return to work? The rapid-RTW cohort study

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Manuscripts

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3 **Does having a coordinator during occupational treatment and rehabilitation promote**
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5 **return to work? The rapid-RTW cohort study**
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3 **Does having a coordinator during occupational treatment and rehabilitation promote**
4 **return to work? The rapid-RTW cohort study**
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8
9 **ABSTRACT**
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11 **Objectives:** The aim of this study was to assess if the reported provision of a coordinator was
12 associated with time to first- and first full- return to work (RTW) amongst sick-listed employees
13 who participated in different Rapid-RTW programs in Norway.
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18 **Design:** The study was designed as a cohort study.
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22 **Setting:** Rapid-RTW-programs (n=43) financed by the Regional Health Authority in hospitals
23 (RHF) and Norwegian Labour and Welfare Administration (NAV) in Norway.
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26 **Participants:** The sample included employees on full-time sick-leave who participated in Rapid-
27 RTW-programs (n=326), who provided information about the coordination of the services they
28 received. The median age was 46 years (min-max. 21-67), and 71% were female. The most
29 common reported diagnoses were musculoskeletal- (57%) and mental health disorders (14%).
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34 **Interventions:** The employees received different types of individually tailored RTW-programs
35 all aimed at a rapid RTW; occupational rehabilitation (64%), treatment for medical or
36 psychological issues, including assessment, and surgery (26%), and follow-up and work
37 clarification services (10%). It was common to be provided with a coordinator (73%).
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42 **Primary and secondary outcome measures:** Outcomes were measured as time to first-RTW
43 (graded and 100%) and first full-RTW (100%).
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46 **Results:** Employees provided with a coordinator returned to work later than employees who did
47 not have a coordinator; a median (95% CI) of 128 (80-176) days versus 61 (43-79) days for first-
48 RTW, respectively. This difference did not remain statistically significant in the adjusted
49 regression analysis. For full-RTW, there was no statistically significant difference between
50 employees provided with a coordinator versus those who was not.
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3 **Conclusions:** The model of coordination provided in the Norwegian rapid-RTW-programs, did
4 not contribute to a more rapid RTW for sick listed employees. Rethinking how return to work
5 coordination should be organised could be wise in future program development.
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10 **Keywords:** Return to work, occupational rehabilitation, sick leave, return to work coordination,
11 return to work programs
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14 **Article Summary**

15 **Strengths and limitations of this study**

- 16 - This study is strengthened by use of register data on sickness absence
- 17 - This study is strengthened by the number of included employees
- 18 - The study could be strengthened with smaller difference in n between employees
19 with/without a coordinator
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INTRODUCTION

Prolonged sick leave can lead to permanent work disability. Work disability gives health, social and economic consequences for the worker, employer, as well as for society¹. Therefore, interventions facilitating a rapid return to work (RTW) are of importance, both at an individual and at a socioeconomic level¹. The most common diagnostic groupings that cause sick leave in Norway are musculoskeletal disorders (MSD) and mental disorders, which constitute approximately 40% and 20% of the total number of lost sick leave days, respectively². This is in line with other western countries^{1 3}.

To prevent permanent work disability, there has been increasing focus on the role of coordination of RTW-processes and RTW-services. RTW-coordinators are well established as a part of RTW-programs in many western countries⁴. Insurers, employers, or governmental agencies often employ the coordinators⁵. In Norway, however, there are no formal guidelines or requirements for RTW-coordinators. Still, persons in need for long-lasting and coordinated services within health care and social services have a statutory right for an Individual plan, a management tool for holistic coordination, administered by a coordinator^{6 7}. Furthermore, the government has implemented a coordination reform, seeking to offer service users more comprehensive and continuous services⁸. This reflects the government's expectation that RTW-programs cooperate and coordinate their services across stakeholders and arenas. In addition, several initiatives to promote rapid RTW have been implemented, both in the workplace arena and towards RTW-services⁹⁻¹¹. Our recent study of The Rapid-RTW-program, the largest RTW-program in Norway, revealed that approximately two thirds of the employees in the program had a coordinator. However, these coordinators mainly coordinated services within their own programs, not

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3 between the intervention arenas (i.e. workplace, social insurance, and health care), referred to as
4 horizontal integration^{12 13}. Furthermore, most of the employees with a coordinator received
5 occupational rehabilitation services, and were sick-listed with MSD¹².
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12 Environmental interventions such as adjustments and accommodation at the workplace, have
13 been found to be important for work reintegration amongst persons on sick leave due to MSD¹⁴⁻
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16. Recent reviews have further documented the workplace as an important arena for RTW-
programs directed at employees with mental health problems^{17 18}. Inclusion of the workplace in
RTW-programs requires cooperation between several stakeholders across different arenas and
levels of the health and welfare system^{9 19 20}. To enhance such cooperation, provision of RTW-
coordinators has been tested in several countries, using various models for different groups of
patients²¹⁻²⁶.

Although the use of RTW-coordinators has received increasing attention, there is some debate
about the effect of the coordinators for RTW. A recent review conducted by Vogel and
colleagues (2017), concludes that there is no evidence that coordinated RTW-programs facilitate
RTW compared to usual care²⁷. The coordinated RTW-programs in the review were defined as
those identifying barriers to RTW and providing a designated coordinator to overcome these
barriers through multi-professional interventions, with several stakeholders involved and a face-
to-face contact between employee and the coordinator²⁷. However, the included programs were
of various content, set-up and duration. Several of the studies included in the review were carried
out in Norway²⁸, Sweden²⁹ and Denmark^{23 30 31}, indicating the review's²⁷ relevance for the
Scandinavian welfare states. The programs described in the review are comparable to the Rapid-
RTW-program in Norway in regard to their complexity and the aim to promote RTW^{12 27 32}, but

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3 might differ in their focus on barriers to RTW and stakeholder cooperation that are reported
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5 lacking in the Rapid-RTW-programs¹².
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10 In contrast, several studies have found that RTW-coordination and provision of a RTW-
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12 coordinator is positively association with time-to-RTW, and there is increasing evidence stating
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14 that these components are important in occupational rehabilitation^{4 24 33-35}. Furthermore, lack of
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16 coordination is associated with prolonged RTW, and some studies have reported that lack of
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18 coordination can complicate the RTW-process³⁶. Reviews have documented RTW-coordination
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20 as an important intervention predictor for RTW^{15 34 37-41}, and interventions including stakeholders
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22 at both rehabilitation program and the workplace have been found to be successful for RTW^{34 37}
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41 42. A recent review recommend implementation of RTW-programs towards sick listed
employees consisting of multiple components, where service coordination was one of three in
addition to health-focused and work modification components⁴³.

In light of these contradictions, the aim of this study was to assess if the reported provision of a
coordinator was associated with a more rapid time to first- and first full- return to work (RTW)
amongst sick-listed employees who participated in different public and private Rapid-RTW
programs in Norway.

METHODS

Design

The study was designed as a longitudinal cohort study of 326 employees on full-time sick leave,
from 43 different Rapid-RTW programs in Norway.

Setting

The present study is one of several studies in an evaluation of the national RTW-program in Norway, the Rapid-RTW-project. The Rapid RTW-program is a national program for patients on sick leave or at risk for sickness absence, aimed at reducing time to RTW and shorting the waiting-time for treatment. To this date, the program is the largest effort for promoting a fast and safe RTW in Norway¹⁰. The national program was implemented in 2007 and has an annual budget of NOK 700 million (approximately \$82 million). This initiative allowed for services to respond to tenders in order to get funding to develop and drift RTW-services, and prioritize patients in a work relation for assessment, treatment and rehabilitation. The funding of the national program will from 2018 be implemented in the health and welfare services' ordinary budgets⁴⁴. The national program includes approximately 200 different public and private RTW-services, and is organised by the Regional Health Authorities (RHF) and the Norwegian Labour and Welfare Administration (NAV). The main types of programs are [1] occupational rehabilitation, both inpatient and outpatient, [2] assessment and follow-up services by the social security system (NAV), and [3] medical or psychological treatment, including assessment, and surgery¹⁰. The organization, content and intervention components, like the provision of a coordinator, were decided in each of the rapid-RTW-services.

Data collection

All of the approximately 200 clinics or institutions offering Rapid-RTW services were invited to participate in the study. Services (n=46) that agreed to participate provided a local study coordinator, who recruited employees to the study in the period from February to December 2012. Both employees and their providers answered self-administered questionnaires about the

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3 employees' health situation and the service they received, including the question "Did the
4 program provide a person who tailored or coordinated your services?". They could choose to
5 answer on paper, or digitally. Data on sickness absence was retrieved from the Norwegian Social
6 Insurance Register. Data on type of services employees received were retrieved from the
7 Norwegian Patient Registry. The register data was linked to the self-reported data using eleven-
8 digit personal identification numbers. Each individual living in Norway is provided with a unique
9 ID number that enables data from different registries to be linked.
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21 **Outcome measures**

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23 The outcome was defined as time to first-RTW and first full-RTW. Time was measured as days
24 from when the employee started treatment at the RTW-program until the first day back at work,
25 either partial or full job size (first-RTW), and until the employee for the first time returned to
26 work in the same job size they had before (first- or full-RTW). These were therefore overlapping,
27 and not mutually exclusive time frames. This way of measuring RTW is in line with previous
28 research studies on time-to RTW⁴⁵⁻⁴⁷. The employees were followed for 360 days, and those who
29 did not return within the follow-up time were censored in the analyses.
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42 **Patient and public involvement**

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44 Patients were not involved in development of research question and outcome measure, nor
45 design, recruitment or conduction of the study. The results will be made available through plain
46 language synopsis and communicated to the public once published scientifically.
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52 **Participants**

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54 In total, 679 employees completed the questionnaire in the main cohort study. In the present
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study, 326 sick-listed employees who [1] answered the question regarding having a coordinator or not, [2] replied yes/no to the question of provision of a coordinator, [3] were on full-time sick leave at start of the RTW-program were included in the analyses. Reasons for exclusion were accordingly: [1] employees who did not answer (n=185), [2] employees who answered “do not know” (n=120), and [3] employees who were on graded sick leave (n=168).

The samples' characteristics are presented in Table 1. The employees' median age was 46 years (min.-max. 21-67), and the majority had been sick-listed before (96%). The most common diagnoses were musculoskeletal disorders (MSD) (57%) and mental health problems (14%). The most common type of RTW-program provided was occupational rehabilitation (63%), which included rehabilitation in hospitals and institutions, both inpatient and outpatient. These types of services are explained in earlier publications^{10 12}. Of the included participants, 73% were provided with a coordinator.

Table 1: Participants

Variable	Category	n	%
Gender	Female	232	71
	Male	94	29
Age	Up to 30 years	27	8
	31 - 49 years	175	54
	50 years +	123	38
Marital Status*	Living with partner	219	68
	Not living with partner	105	32
Educational Level*	Elementary school (up to 9 years)	38	12
	Upper secondary school (12 years)	154	48
	University degree (up to 4 years)	93	29
	University degree (> 4 years)	35	11
Diagnosis	Musculoskeletal	185	57
	Psychiatric	45	14
	Others incl. cardiovascular	35	11

	Cancer	32	10
	No diagnosis	16	5
	Unspecific	13	4
Symptoms*	Pain at rest (yes)	267	85
	Pain in activity (yes)	277	89
	Depressive mood (yes)	244	78
	Anxiety (yes)	191	60
Type of RTW-program*	Occupational rehabilitation	206	64
	Medical or psychological treatment, including assessment, and surgery	73	26
	Follow-up and Work clarification services	32	10
Provided with a coordinator	Yes	237	73
Sector*	Public	148	48
	Private	158	52
History of sickness absence	Yes	314	96

Note: data on all participants except *Missing; marital status n=2, educational level n=6, symptoms (pain at rest n=10, pain in activity n=15, depressive mood n=11, anxiety n=10), type of RTW-program n=4, sector n=20.

Statistical analyses

Diagnoses were registered as ICPC or ICD codes by the physician in the medical records, and categorised into the largest diagnostic groups “MSD”, “psychiatric disorders”, “cancer” and “common/unspecific disorders”, other diagnosis (including neurological and heart disorders), or missing/no diagnosis, for the descriptive analysis. For the regression analysis, the categories common/unspecific, other diagnoses and missing/no diagnosis were collapsed. Time to first-RTW and full-RTW were calculated using the Kaplan-Meier method, and crude differences between those who had and did not have a coordinator were assessed with log-rank tests.

Stepwise Cox regression models were used to calculate the probability for returning to work (first-RTW and first full-RTW) for employees with a coordinator versus those who had not.

Potential confounders for RTW were entered into the models. The confounders were identified in earlier studies in the literature^{45 48-50}, and included variables such as age, gender, educational level, marital status, diagnosis, self-reported symptoms (pain at rest, pain in activity, depressive

mood, and anxiety), sick leave history, household income, and type of service. The results were expressed as hazard ratios (HR) with 95 % Confidence Intervals (CI). P-values of <0.05 were considered statistically significant and all tests were two-sided. The analyses were conducted in IBM SPSS Statistics 24.

RESULTS

Unadjusted results

Having a coordinator was associated with delayed time to first-RTW (Figure 1). In the unadjusted analyses, employees who had a coordinator experienced a first-RTW after 128 days (median; 95% CI: 80-176) compared to 61 days (95% CI: 43-79) for those who did not. This difference was statistically significant.

Insert Figure 1

The unadjusted results for first full-RTW showed that patients who had a coordinator returned to work a median of 57 days later than employees who did not have a coordinator; a median of 185 days (95% CI 137-233) versus 128 days (95% CI 72-184), respectively (Figure 2). However, this difference did not reach the level of statistical significance ($p=0.24$).

Insert Figure 2

Adjusted results

In the adjusted analysis, we controlled for age, gender, educational level, marital status,

diagnosis, sick leave history, symptoms, household income, and type of program. Neither time to first-RTW nor first full-RTW was statistical significant in the adjusted analysis, with a hazard ratio of 0.75 (95% CI 0.51-1.10) for first-RTW, and 0.82 (95% CI 0.55-1.22) for first full-RTW (Table 2).

Table 2: The probability of experiencing a first- and full RTW

	Unadjusted			Adjusted*		
	HR	95 % CI	p-value	HR	95 % CI	p-value
First-RTW Having a coordinator**	0.70	0.53-0.94	0.02	0.75	0.51-1.10	0.14
Full-RTW Having a coordinator**	0.83	0.62-1.13	0.24	0.82	0.55-1.22	0.32

Notes: *adjusted for age, gender, marital status, educational level, household income, diagnosis, type of RTW-program, symptoms (pain at rest, pain in activity, depressive mood, and anxiety), and history of sickness absence, ** ref not having a coordinator

Only type of RTW-program was a confounding factor between having a coordinator and RTW. In a stepwise adjusted analysis, time to first-RTW remained statistically significant associated with having a coordinator when the other control variables were added to the model except type of program (HR 0.72 CI 0.52-0.99). In order to understand differences between coordinator and type of program in the model, time to first-RTW for the different program types was assessed. The difference in time to first-RTW was statistical significant when comparing the program types; Occupational rehabilitation had a median of 109 days before RTW (95% CI 52-166) and differed from Assessment and follow-up programs through NAV which had a median of 238 days (95% CI 192-284). Medical or psychological treatment, including assessment, and surgery had a median of 55 days (95% CI 37-73) and also differed from Assessment and follow-up programs through NAV.

DISCUSSIONS

This study assessed whether provision of a coordinator was associated with time to first-RTW and first full-RTW in a cohort of sick-listed employees who participated in the Rapid-RTW program in Norway. The results show that having a coordinator did not enhance a more rapid RTW. Even though participants provided with a coordinator had a delayed first return to work compared to those who did not have a coordinator, the adjusted analyses revealed that the type of program the sick listed employee received might be the mediating factor for this delay. These two findings are discussed below.

First, the present study revealed that provision of a coordinator did not contribute to a more rapid RTW for sick listed employees who participated in the Rapid-RTW program in Norway. This result was somewhat unexpected. Even though there is some debate on the effect of coordination, having a coordinator has been found to increase the probability of returning to work in several previous studies^{24 34 35 51}. The results may have several explanations. One explanation might be that the coordinators in the present study were provided by the health care services¹², and they mostly coordinated their own services. In international studies, however, the coordinator is often provided by the insurers, employers or governmental agencies⁵, making the coordinator more directly linked to the workplace. The workplace is one of the most important arenas for RTW-programs^{15 16}, since early contact with the workplace, as well as adaptations and support at the workplace, all are predictors for RTW^{15 34 39-42}. As such, the coordinators in the present study might differ from the RTW-coordinators in international studies, both in regard to who provides them and which of the intervention arenas they coordinate. A recent study from Norway found that adding a workplace focus in a multidisciplinary RTW-program in the specialist health care

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3 did not enhance RTW rates²⁸. The coordination provided in the study resulted in a weak
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5 connection between the RTW-program and the workplace²⁸. Hence, it might be possible that the
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7 model of coordination where the coordinator is placed in the specialist health care service,
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9 without real possibilities to coordinate and accommodate *at* the workplace, does not facilitate
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11 RTW.
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17 Secondly, although an association between having a coordinator and delayed RTW was found in
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19 the univariate analysis, the delayed first-RTW did not reach statistical significance when
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21 controlling for type of program. This suggests type of program as a mediating factor for the delay
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23 in RTW, and that the program type explains more of the variation in RTW than being provided
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25 with a coordinator. Alternatively, the underlying cause for being referred to a specific type of
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27 RTW-program may explain even more of the variation found in this study. The distribution of
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29 coordinators varies across the different types of RTW-programs, and is most likely provided in
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31 assessment or follow-up services through NAV and occupational rehabilitation¹². Furthermore,
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33 treatment programs are often provided to employees with specific MSD or mental disorders,
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35 whereas employees referred to occupational rehabilitation services often have more complex
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37 problems or situations¹⁰. This study shows, regardless of whether the employees are provided
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39 with a coordinator, that the time to RTW doubles for employees receiving occupational
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41 rehabilitation compared to those receiving treatment, and furthermore quadruples for those
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43 receiving assessment and follow-up services through NAV. Therefore, one explanation for the
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45 delayed RTW for those provided with a coordinator may be that it is an expression of the
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47 complexity of the employees' situation. A more complex situation for the sick listed employee, in
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49 terms of for example co-morbid diagnoses^{52 53}, or difficulties in regard to psychosocial factors at
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51 work^{45 48} may work as barriers for RTW. Severity of health problems may as well complicate the
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3 RTW process, as shown in previous studies^{37 38}. Pain may indicate higher experienced severity,
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5 however, even though pain at rest is associated with provision of a coordinator in rapid-RTW-
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7 programs¹², pain is neither revealed as a predictor for provision of a coordinator¹², nor a
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9 significant explanatory factor for first- or full-RTW in this study. Another possible explanation is
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11 connected to the complexity of the RTW-programs¹⁹. Some of the services include several
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13 interventions and components¹⁰, and it is possible that the provision of a coordinator only adds to
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15 an already full schedule of interventions. For some groups, “brief interventions” has been found
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17 to be just as effective as multidisciplinary rehabilitation services with several intervention
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19 components^{30 54-56}. Otherwise, if the services does not make room for enhancing contact with
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21 workplace and other stakeholders¹² the evidence based active elements of coordination may be
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23 absent, leading to delayed RTW or no effect.
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31 Nevertheless, the findings in this study are in line with a recent systematic review²⁷, as well as
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33 other studies on coordination from Scandinavia^{28 30}, supporting the finding that coordination
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35 might not facilitate RTW. Could this be due to the coordinator model used in the Scandinavian
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37 welfare system? This seems at least to have something to do with the type of coordination, where
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39 integration of services across levels and arenas are lacking¹². Furthermore, it might be that the
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41 groups receiving coordination is not well targeted. Still, we need to know more about who might
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43 benefit from having a coordinator. Coordination of RTW-processes for employees with mental
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45 health problems has for example been studied to a small extent²⁷, and we do not know how
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47 coordination affects this group of sick-listed employees. Furthermore, there is a need to
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49 investigate and develop the roles, tasks and competencies of the RTW-coordinator, within a
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51 Norwegian context. The Norwegian model for coordination, where the link between the
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53 coordinator and the workplace is diffuse and not formalized in the RTW-programs^{10 12 57 58},

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3 should be further examined. Implications for practice and research, both in Norway and
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5 internationally, will be to develop new coordination models and implement such models in line
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7 with evidence, where a closer workplace connection seems to be a way forward^{27 28}.
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12 One of the strengths of this study is the high number of participants and the use of register data,
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14 which are both detailed and precise regarding sickness absence and diagnoses, as it is connected
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16 to the public social security benefit system. Approx. two-thirds of the patients in the study were
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18 provided with a coordinator, limiting the power to estimate the effect of not having a coordinator.
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20 Although the variable of provision of a coordinator is based on self-report from employees in
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22 present study, the time-to first-RTW results from the analyses has been verified (median 102 days
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24 versus 79 days for those provided with coordinator versus not, respectively, with p-value 0.25)
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26 when compared with providers' responses to the same variable ("Did your service provide a
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28 coordinator for this patient?"). Furthermore, there was an association between having a
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30 coordinator and type of RTW-program. This make it difficult to generalize the findings to all sick
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32 listed employees participating in the Rapid-RTW-programs as we were not able to distinguish
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34 between the effect of having a coordinator and a given program. Additionally, the proportion of
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36 employees sick-listed due to MSD are higher than in the national statistics of Norway. However,
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38 since employees with MSD are the best-documented group of sick-listed benefiting from RTW-
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40 coordination, this should be more an advantage regarding possibilities of revealing a difference
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42 between those provided with and those not provided with a coordinator. There is a possibility of
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44 selection bias in the study as the percentage of employees sick listed with psychiatric issues and
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46 receiving psychological treatment is higher among the non-respondents. Fewer of employees
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48 with psychiatric issues is provided with a coordinator¹², meaning the power of analysis of this
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50 diagnose group might have been enhanced if more of these employees responded. However,
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3 employees with this diagnosis represent a small proportion of the total number of included
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5 participants. Therefore, inclusion of those employees would most likely not affect the main
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7 results decisively. Analysis of the full material of employees on full-time sick leave (n=546)
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9 shows some statistically significant differences between respondents and non-respondents on the
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11 question of provision of a coordinator. Non-respondents' median age was slightly lower (44
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13 years), and more had mental diagnosis (20%). In addition, fewer received occupational
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15 rehabilitation of the non-respondents (43%). If these were included, the proportion of employees
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17 with mental health disorders receiving treatment would most likely be larger, and this would most
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19 likely strengthen the present results.
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26 **CONCLUSION**

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29 This study revealed that employees participating in RTW-programs and who were provided with
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31 a coordinator had delayed time until they returned to work, compared to those who did not have a
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33 coordinator. However, type of program seems to be a mediating factor in this study, that explains
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35 more of the variation in RTW than being provided with a coordinator and this should be further
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37 investigated. The model of coordination provided in the Norwegian rapid-RTW-programs,
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39 mainly as part of occupational rehabilitation programs in the health care, seems to not add to a
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41 more rapid RTW. Hence, RTW-coordination where all three intervention arenas; the workplace,
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43 social services, and health care are targeted should be further developed, tested and studied.
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50 **Ethical statement**

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52 The Norwegian Centre for Research Data (NSD) approved this study with the reference number:
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54 28988. Furthermore, the Norwegian Data Protection Authority gave consent to handle person-
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3 identified information, reference number: 13/00141-5/KEL. Participants in the study gave
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5 informed consent.
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13
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18

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24
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26
27 the data collection of this study.
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33 **Author Contributions**

34
35 LSS has been involved in data collection, performed the analysis of the material, and has been the
36
37 main author of all parts of the drafted article.
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40 LAH has been involved in data collection, contributed to the discussion, and has commented on
41
42 the drafts.
43
44

45 MCS has commented on the drafts.
46
47

48 WSS has commented on the drafts.
49
50

51 RWA is the principal investigator and project manager of the Rapid-RTW project. She designed
52
53 the cohort study, and managed and took part in all phases of this project. She planned the
54
55 statistical analysis, and commented on the drafts.
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Declarations

The authors declare no conflicts of interests.

Consent for publication

Not applicable.

Availability of data and material

The datasets analysed during the current study are not publicly available due to research ethical considerations, but are available from the corresponding author on reasonable request.

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24 **Figure 1:** Kaplan-Meier survival plot of time until first-RTW (days)

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26 **Figure 2:** Kaplan-Meier survival plot of time until first full-RTW (days)
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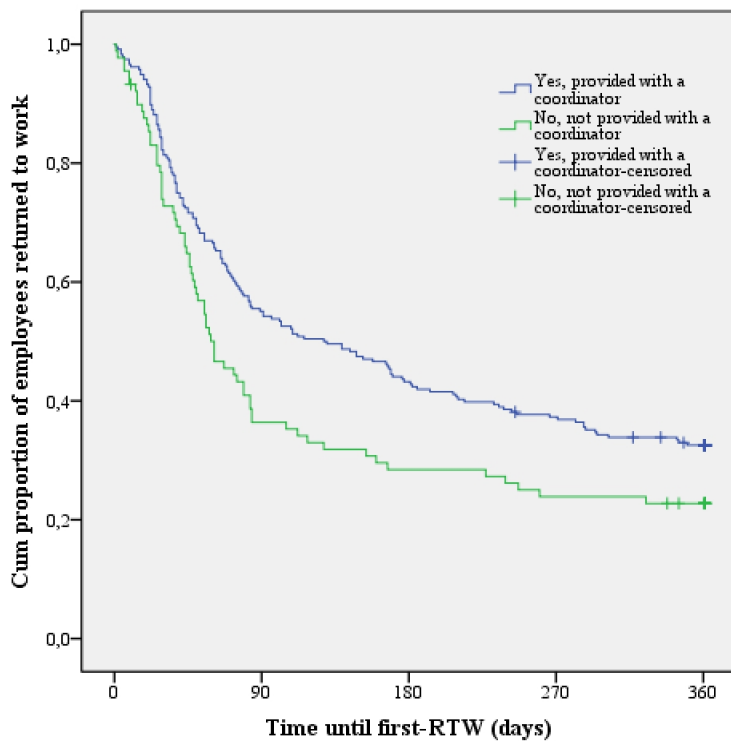


Figure 1: Kaplan-Meier survival plot of time until first-RTW (days)

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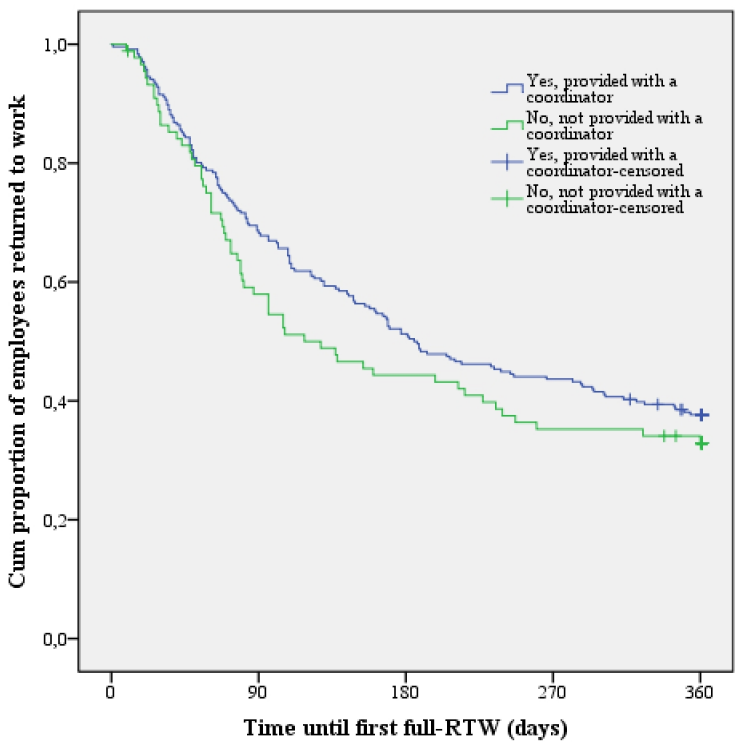


Figure 2: Kaplan-Meier survival plot of time until first full-RTW (days)

105x84mm (300 x 300 DPI)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract <i>Page 1</i>
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found <i>Page 2</i>
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported <i>Page 6</i>
Objectives	3	State specific objectives, including any prespecified hypotheses <i>Page 6</i>
Methods		
Study design	4	Present key elements of study design early in the paper <i>Page 6</i>
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection <i>Page 7</i>
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Page 7-8</i> <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Not matched. Exposed/unexposed page 9-10</i> <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable <i>Page 8</i>
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group <i>Page 8</i>
Bias	9	Describe any efforts to address potential sources of bias <i>Page 15-16</i>
Study size	10	Explain how the study size was arrived at <i>Page 8</i>
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why <i>Page 10</i>
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding <i>Page 10</i> (b) Describe any methods used to examine subgroups and interactions <i>Page 12</i> (c) Explain how missing data were addressed <i>Page 8</i> (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Not applicable</i> <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy
		(e) Describe any sensitivity analyses <i>Not applicable</i>

Results

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed <i>Page 8</i> (b) Give reasons for non-participation at each stage <i>Page 8</i> (c) Consider use of a flow diagram <i>Not applicable</i>
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders <i>Page 9</i> (b) Indicate number of participants with missing data for each variable of interest <i>Page 10</i> (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount) <i>Page 8</i>
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Page 11</i> <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included <i>Page 11-12</i> (b) Report category boundaries when continuous variables were categorized <i>Page 9</i> (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period <i>Not relevant</i>
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses <i>Page 12</i>

Discussion

Key results	18	Summarise key results with reference to study objectives <i>Page 12</i>
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias <i>Page 15-16</i>
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence <i>Page 17</i>
Generalisability	21	Discuss the generalisability (external validity) of the study results <i>Page 16</i>

Other information

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based <i>Page 17</i>
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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Does having a coordinator during occupational treatment and rehabilitation in Norway promote return to work? The rapid-return-to-work cohort study

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Article Type:	Research
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Primary Subject Heading:	Health services research
Secondary Subject Heading:	Occupational and environmental medicine, Public health, Rehabilitation medicine
Keywords:	Return to work, Occupational rehabilitation, Sick leave, Return to work coordination, Return to work programs

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3 **Does having a coordinator during occupational treatment and rehabilitation in Norway**
4 **promote return to work? The rapid-return-to-work cohort study**
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10 Lisebet Skeie Skarpaas^{1,2}, Lise Aasen Haveraaen¹, Milada Cvancarova Småstuen³, William S.
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3 **Does having a coordinator during occupational treatment and rehabilitation in Norway**
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8
9 **ABSTRACT**
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11 **Objectives:** The aim of this study was to assess if the reported provision of a coordinator was
12 associated with time to first- and first full- return to work (RTW) amongst sick-listed employees
13 who participated in different Rapid-RTW programs in Norway.
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18 **Design:** The study was designed as a cohort study.
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22 **Setting:** Rapid-RTW-programs financed by the Regional Health Authority in hospitals (RHF)
23 and Norwegian Labour and Welfare Administration (NAV) in Norway.
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26 **Participants:** The sample included employees on full-time sick-leave (n=326) who participated
27 in Rapid-RTW-programs (n=43), who provided information about the coordination of the
28 services they received. The median age was 46 years (min-max. 21-67), and 71% were female.
29 The most common reported diagnoses were musculoskeletal- (57%) and mental health disorders
30 (14%).
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36 **Interventions:** The employees received different types of individually tailored RTW-programs
37 all aimed at a rapid RTW; occupational rehabilitation (64%), treatment for medical or
38 psychological issues, including assessment, and surgery (26%), and follow-up and work
39 clarification services (10%). It was common to be provided with a coordinator (73%).
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44 **Primary and secondary outcome measures:** Outcomes were measured as time to first-RTW
45 (graded and 100%) and first full-RTW (100%).
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48 **Results:** Employees provided with a coordinator returned to work later than employees who did
49 not have a coordinator; a median (95% CI) of 128 (80-176) days versus 61 (43-79) days for first-
50 RTW, respectively. This difference did not remain statistically significant in the adjusted
51 regression analysis. For full RTW, there was no statistically significant difference between
52 employees provided with a coordinator versus those who was not.
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5 **Conclusions:** The model of coordination provided in the Norwegian rapid-RTW-programs, did
6 not contribute to a more rapid RTW for sick listed employees. Rethinking how return to work
7 coordination should be organised could be wise in future program development.
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11 **Keywords:** Return to work, occupational rehabilitation, sick leave, return to work coordination,
12 return to work programs
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15 16 17 **Article Summary**

18 19 20 **Strengths and limitations of this study**

- 21 - This study is strengthened by use of register data on sickness absence
- 22 - This study is strengthened by the number of included employees
- 23 - The study could be strengthened with smaller difference in n between employees
24 with/without a coordinator
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INTRODUCTION

Prolonged sick leave can lead to permanent work disability. Work disability gives health, social and economic consequences for the worker, employer, as well as for society¹. Therefore, interventions facilitating a rapid return to work (RTW) are of importance, both at an individual and at a socioeconomic level¹. The most common diagnostic groupings that cause sick leave in Norway are musculoskeletal disorders (MSD) and mental disorders, which constitute approximately 40% and 20% of the total number of lost sick leave days, respectively². This is in line with other western countries^{1 3}.

To prevent permanent work disability, there has been increasing focus on the role of coordination of RTW-processes and RTW-programs. RTW-coordinators are well established as a part of RTW-programs in many western countries⁴. Insurers, employers, or governmental agencies often employ the coordinators⁵. In Norway, however, there are no formal guidelines or requirements for RTW-coordinators. Still, persons in need for long-lasting and coordinated services within health care and social services have a statutory right for an Individual plan, a management tool for holistic coordination, administered by a coordinator^{6 7}. Furthermore, the government has implemented a coordination reform, seeking to offer service users more comprehensive and continuous services⁸. This reflects the government's expectation that RTW-programs cooperate and coordinate their services across stakeholders and arenas. In addition, several initiatives to promote rapid RTW have been implemented, both in the workplace arena and towards RTW-programs⁹⁻¹¹. Our recent study of The Rapid-RTW-program, the largest RTW-program in Norway, revealed that approximately two thirds of the employees in the program had a coordinator. However, these coordinators mainly coordinated services within their own

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3 programs, not between the intervention arenas (i.e. workplace, social insurance, and health care),
4 referred to as horizontal integration^{12 13}. Furthermore, most of the employees with a coordinator
5 received occupational rehabilitation services, and were sick-listed with MSD¹².
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11 Environmental interventions such as adjustments and accommodation at the workplace, have
12 been found to be important for work reintegration amongst persons on sick leave due to MSD¹⁴-
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16. Recent reviews have further documented the workplace as an important arena for RTW-
programs directed at employees with mental health problems^{17 18}. Inclusion of the workplace in
RTW-programs requires cooperation between several stakeholders across different arenas and
levels of the health and welfare system^{9 19 20}. To enhance such cooperation, provision of RTW-
coordinators has been tested in several countries, using various models for different groups of
patients²¹⁻²⁶.

Although the use of RTW-coordinators has received increasing attention, there is some debate
about the effect of the coordinators for RTW. A recent review conducted by Vogel and
colleagues (2017), concludes that there is no evidence that coordinated RTW-programs facilitate
RTW compared to usual care²⁷. The coordinated RTW-programs in the review were defined as
those identifying barriers to RTW and providing a designated coordinator to overcome these
barriers through multi-professional interventions, with several stakeholders involved and a face-
to-face contact between employee and the coordinator²⁷. However, the included programs were
of various content, set-up and duration. Several of the studies included in the review were carried
out in Norway²⁸, Sweden²⁹ and Denmark^{23 30 31}, indicating the review's²⁷ relevance for the
Scandinavian welfare states. The programs described in the review are comparable to the Rapid-
RTW-program in Norway in regard to their complexity and the aim to promote RTW^{12 27 32}, but

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3 might differ in their focus on barriers to RTW and stakeholder cooperation that are reported
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5 lacking in the Rapid-RTW-programs¹².
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10 In contrast, several studies have found that RTW-coordination and provision of a RTW-
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12 coordinator is positively association with time-to-RTW, and there is increasing evidence stating
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14 that these components are important in occupational rehabilitation^{4 24 33-35}. Furthermore, lack of
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16 coordination is associated with prolonged RTW, and some studies have reported that lack of
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18 coordination can complicate the RTW-process³⁶. Reviews have documented RTW-coordination
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20 as an important intervention predictor for RTW^{15 34 37-41}, and interventions including stakeholders
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22 at both rehabilitation program and the workplace have been found to be successful for RTW^{34 37}
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41 42. A recent review recommend implementation of RTW-programs towards sick listed
employees consisting of multiple components, where service coordination was one of three in
addition to health-focused and work modification components⁴³.

In light of these contradictions, the aim of this study was to assess if the reported provision of a
coordinator was associated with a more rapid time to first- and first full- return to work (RTW)
amongst sick-listed employees who participated in different public and private Rapid-RTW
programs in Norway.

METHODS

Design

The study was designed as a longitudinal cohort study of 326 employees on full-time sick leave,
from 43 different Rapid-RTW programs in Norway.

Setting

The present study is one of several studies in an evaluation of the national RTW-program in Norway, the Rapid-RTW-project. The Rapid RTW-program is a national program for patients on sick leave or at risk for sickness absence, aimed at reducing time to RTW and shorting the waiting-time for treatment. To this date, the program is the largest effort for promoting a fast and safe RTW in Norway¹⁰. The national program was implemented in 2007 and has an annual budget of NOK 700 million (approximately \$82 million). This initiative allowed for services to respond to tenders in order to get funding to develop and drift RTW-programs, and prioritize patients in a work relation for assessment, treatment and rehabilitation. The funding of the national program will from 2018 be implemented in the health and welfare services' ordinary budgets⁴⁴. The national program includes approximately 200 different public and private RTW-programs, and is organised by the Regional Health Authorities (RHF) and the Norwegian Labour and Welfare Administration (NAV). The main types of programs are [1] occupational rehabilitation, both inpatient and outpatient, [2] assessment and follow-up services by the social security system (NAV), and [3] medical or psychological treatment, including assessment, and surgery¹⁰. The organization, content and intervention components, like the provision of a coordinator, were decided in each of the rapid-RTW-programs.

Data collection

All of the approximately 200 clinics or institutions offering Rapid-RTW services were invited to participate in the study. Programs that agreed to participate provided a local study coordinator, who recruited employees to the study in the period from February to December 2012. Both employees and their providers answered self-administered questionnaires about the employees'

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3 health situation and the service they received, including the question “Did the program provide a
4 person who tailored or coordinated your services?”. They could choose to answer on paper, or
5 digitally. Data on sickness absence was retrieved from the Norwegian Social Insurance Register.
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7 Data on type of services employees received were retrieved from the Norwegian Patient Registry.
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9 The register data was linked to the self-reported data using eleven-digit personal identification
10 numbers. Each individual living in Norway is provided with a unique ID number that enables
11 data from different registries to be linked.
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21 **Outcome measures**

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23 The outcome was defined as time to first-RTW and first full-RTW. Time was measured as days
24 from when the employee started treatment at the RTW-program until the first day back at work,
25 either partial or full job size (first-RTW), and until the employee for the first time returned to
26 work in the same job size they had before (first- or full-RTW). These were therefore overlapping,
27 and not mutually exclusive time frames. This way of measuring RTW is in line with previous
28 research studies on time-to RTW⁴⁵⁻⁴⁷. The employees were followed for 360 days, and those who
29 did not return within the follow-up time were censored in the analyses.
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42 **Patient and public involvement**

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44 Patients were not involved in development of research question and outcome measure, nor
45 design, recruitment or conduction of the study. The results will be made available through plain
46 language synopsis and communicated to the public once published scientifically.
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52 **Participants**

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54 In total, 679 employees completed the questionnaire in the main cohort study. In the present
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study, 326 sick-listed employees who [1] answered the question regarding having a coordinator or not, [2] replied yes/no to the question of provision of a coordinator, [3] were on full-time sick leave at start of the RTW-program were included in the analyses. Reasons for exclusion were accordingly: [1] employees did not answer (n=185), [2] employees answered “do not know” (n=120), and [3] employees were on graded sick leave (n=168). Some contributed to more than one reason.

The samples' characteristics are presented in Table 1. The employees' median age was 46 years (min.-max. 21-67), and the majority had been sick-listed before (96%). The most common diagnoses were musculoskeletal disorders (MSD) (57%) and mental health problems (14%). The most common type of RTW-program provided was occupational rehabilitation (63%), which included rehabilitation in hospitals and institutions, both inpatient and outpatient. These types of services are explained in earlier publications^{10 12}. Of the included participants, 73% were provided with a coordinator.

Table 1: Participants

Variable	Category	n	%
Gender	Female	232	71
	Male	94	29
Age*	Up to 30 years	27	8
	31 - 49 years	175	54
	50 years +	123	38
Marital Status*	Living with partner	219	68
	Not living with partner	105	32
Educational Level*	Elementary school (up to 9 years)	38	12
	Upper secondary school (12 years)	154	48
	University degree (up to 4 years)	93	29
	University degree (> 4 years)	35	11
Diagnosis	Musculoskeletal	185	57

	Psychiatric	45	14
	Others incl. cardiovascular	35	11
	Cancer	32	10
	No diagnosis	16	5
	Unspecific	13	4
Symptoms*	Pain at rest (yes)	267	85
	Pain in activity (yes)	277	89
	Depressive mood (yes)	244	78
	Anxiety (yes)	191	60
Type of RTW-program*	Occupational rehabilitation	206	64
	Medical or psychological treatment, including assessment, and surgery	84	26
	Follow-up and Work clarification services	32	10
Provided with a coordinator	Yes	237	73
Sector*	Public	148	48
	Private	158	52
History of sickness absence	Yes	314	96

Note: data on all participants except *Missing; age n=1, marital status n=2, educational level n=6, symptoms (pain at rest n=10, pain in activity n=15, depressive mood n=11, anxiety n=10), type of RTW-program n=4, sector n=20.

Statistical analyses

Diagnoses were registered as ICPC or ICD codes by the physician in the medical records, and categorised into the largest diagnostic groups “MSD”, “psychiatric disorders”, “cancer” and “common/unspecific disorders”, other diagnosis (including neurological and heart disorders), or missing/no diagnosis, for the descriptive analysis. For the regression analysis, the categories common/unspecific, other diagnoses and missing/no diagnosis were collapsed. Time to first-RTW and full-RTW were calculated using the Kaplan-Meier method, and crude differences between those who had and did not have a coordinator were assessed with log-rank tests.

Stepwise Cox regression models were used to calculate the probability for returning to work (first-RTW and first full-RTW) for employees with a coordinator versus those who had not.

Potential confounders for RTW were entered into the models. The confounders were identified in earlier studies in the literature^{45 48-50}, and included variables such as age, gender, educational

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3 level, marital status, diagnosis, self-reported symptoms (pain at rest, pain in activity, depressive
4 mood, and anxiety), sick leave history, household income, and type of service. The results were
5 expressed as hazard ratios (HR) with 95 % Confidence Intervals (CI). P-values of <0.05 were
6 considered statistically significant and all tests were two-sided. The analyses were conducted in
7 IBM SPSS Statistics 24.
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17 **RESULTS**

18 **Unadjusted results**

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20 Having a coordinator was associated with delayed time to first-RTW (Figure 1). In the unadjusted
21 analyses, employees who had a coordinator experienced a first-RTW after 128 days (median;
22 95% CI: 80-176) compared to 61 days (95% CI: 43-79) for those who did not. This difference
23 was statistically significant.
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34 *Insert Figure 1*

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38 The unadjusted results for first full-RTW showed that patients who had a coordinator returned to
39 work a median of 57 days later than employees who did not have a coordinator; a median of 185
40 days (95% CI 137-233) versus 128 days (95% CI 72-184), respectively (Figure 2). However, this
41 difference did not reach the level of statistical significance (p=0.24).
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50 *Insert Figure 2*

51 **Adjusted results**

In the adjusted analysis, we controlled for age, gender, educational level, marital status, diagnosis, sick leave history, symptoms, household income, and type of program. Neither time to first-RTW nor first full-RTW was statistical significant in the adjusted analysis, with a hazard ratio of 0.75 (95% CI 0.51-1.10) for first-RTW, and 0.82 (95% CI 0.55-1.22) for first full-RTW (Table 2).

Table 2: The probability of experiencing a first- and full RTW

	Unadjusted			Adjusted*		
	HR	95 % CI	p-value	HR	95 % CI	p-value
First-RTW Having a coordinator**	0.70	0.53-0.94	0.02	0.75	0.51-1.10	0.14
Full-RTW Having a coordinator**	0.83	0.62-1.13	0.24	0.82	0.55-1.22	0.32

Notes: *adjusted for age, gender, marital status, educational level, household income, diagnosis, type of RTW-program, symptoms (pain at rest, pain in activity, depressive mood, and anxiety), and history of sickness absence, ** ref not having a coordinator

Only type of RTW-program was a confounding factor between having a coordinator and RTW.

In a stepwise adjusted analysis, time to first-RTW remained statistically significant associated with having a coordinator when the other control variables were added to the model except type of program (HR 0.72 CI 0.52-0.99). In order to understand differences between coordinator and type of program in the model, time to first-RTW for the different program types was assessed.

The difference in time to first-RTW was statistical significant when comparing the program types; Occupational rehabilitation had a median of 109 days before RTW (95% CI 52-166) and differed from Assessment and follow-up programs through NAV which had a median of 238 days (95% CI 192-284). Medical or psychological treatment, including assessment, and surgery had a median of 55 days (95% CI 37-73) and also differed from Assessment and follow-up

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3 programs through NAV. Figure 3 shows RTW-rates (first-RTW within 360 days yes/no) by type
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5 of program. Of employees participated in Medical or psychological treatment, including
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7 assessment, and surgery, 88 % (n=74) had returned to work within the first year. The RTW-rates
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9 for employees that participated in Occupational rehabilitation or Assessment and follow-up
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11 programs through NAV were approximately 63 %.
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17 *Insert Figure 3*
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21 Furthermore, the provision of a coordinator varied between different types of RTW-programs.
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23 For the program types Occupational rehabilitation and Assessment and follow-up programs
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25 through NAV, 72.4 % and 76% respectively were provided with a coordinator. For Medical or
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27 psychological treatment, including assessment, and surgery 50% of the sick-listed employees
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29 were provided with a coordinator. Being provided with a coordinator were almost three times
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31 more likely in Occupational rehabilitation and Assessment and follow-up programs through NAV
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33 than in Medical or psychological treatment, including assessment, and surgery (OR 2.7, 95% CI
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35 1.3-5.5).
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42 **DISCUSSIONS**

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44 This study assessed whether provision of a coordinator was associated with time to first-RTW
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46 and first full-RTW in a cohort of sick-listed employees who participated in the Rapid-RTW
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48 program in Norway. The results show that having a coordinator did not enhance a more rapid
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50 RTW. Even though participants provided with a coordinator had a delayed first return to work
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52 compared to those who did not have a coordinator, the adjusted analyses revealed that the type of
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54 program the sick listed employee received might be the mediating factor for this delay. These two
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3 findings are discussed below.
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8 First, the present study revealed that provision of a coordinator did not contribute to a more rapid
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10 RTW for sick listed employees who participated in the Rapid-RTW program in Norway. This
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12 result was somewhat unexpected. Even though there is some debate on the effect of coordination,
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14 having a coordinator has been found to increase the probability of returning to work in several
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16 previous studies^{24 34 35 51}. The results may have several explanations. One explanation might be
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18 that the coordinators in the present study were provided by the health care services¹², and they
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20 mostly coordinated their own services. In international studies, however, the coordinator is often
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22 provided by the insurers, employers or governmental agencies⁵, making the coordinator more
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24 directly linked to the workplace. The workplace is one of the most important arenas for RTW-
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26 programs^{15 16}, since early contact with the workplace, as well as adaptations and support at the
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28 workplace, all are predictors for RTW^{15 34 39-42}. As such, the coordinators in the present study
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30 might differ from the RTW-coordinators in international studies, both in regard to who provides
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32 them and which of the intervention arenas they coordinate. A recent study from Norway found
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34 that adding a workplace focus in a multidisciplinary RTW-program in the specialist health care
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36 did not enhance RTW rates²⁸. The coordination provided in the study resulted in a weak
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38 connection between the RTW-program and the workplace²⁸. Hence, it might be possible that the
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40 model of coordination where the coordinator is placed in the specialist health care service,
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42 without real possibilities to coordinate and accommodate *at* the workplace, does not facilitate
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54 Secondly, although an association between having a coordinator and delayed RTW was found in
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56 the univariate analysis, the delayed first-RTW did not reach statistical significance when
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3 controlling for type of program. This suggests type of program as a mediating factor for the delay
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5 in RTW, and that the program type explains more of the variation in RTW than being provided
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7 with a coordinator. Alternatively, the underlying cause for being referred to a specific type of
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9 RTW-program may explain even more of the variation found in this study. The distribution of
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11 coordinators varies across the different types of RTW-programs, and is most likely provided in
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13 Assessment or follow-up services through NAV and Occupational rehabilitation¹². Furthermore,
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15 treatment programs are often provided to employees with specific MSD or mental disorders,
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17 whereas employees referred to occupational rehabilitation services often have more complex
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19 problems or situations¹⁰. This study shows, regardless of whether the employees are provided
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21 with a coordinator, that the time to RTW doubles for employees receiving Occupational
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23 rehabilitation compared to those receiving Treatment, and furthermore quadruples for those
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25 receiving Assessment and follow-up services through NAV. Therefore, one explanation for the
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27 delayed RTW for those provided with a coordinator may be that it is an expression of the
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29 complexity of the employees' situation. A more complex situation for the sick listed employee, in
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31 terms of for example co-morbid diagnoses^{52 53}, or difficulties in regard to psychosocial factors at
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33 work^{45 48} may work as barriers for RTW. Severity of health problems may as well complicate the
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35 RTW process, as shown in previous studies^{37 38}. Pain may indicate higher experienced severity,
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37 however, even though pain at rest is associated with provision of a coordinator in rapid-RTW-
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39 programs¹², pain is neither revealed as a predictor for provision of a coordinator¹², nor a
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41 significant explanatory factor for first- or full-RTW in this study. Another possible explanation is
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43 connected to the complexity of the RTW-programs¹⁹. Some of the services include several
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45 interventions and components¹⁰, and it is possible that the provision of a coordinator only adds to
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47 an already full schedule of interventions. For some groups, "brief interventions" has been found
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49 to be just as effective as multidisciplinary rehabilitation services with several intervention
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3 components^{30 54-56}. Otherwise, if the services does not make room for enhancing contact with
4 workplace and other stakeholders¹² the evidence based active elements of coordination may be
5 absent, leading to delayed RTW or no effect.
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12 Nevertheless, the findings in this study are in line with a recent systematic review²⁷, as well as
13 other studies on coordination from Scandinavia^{28 30}, supporting the finding that coordination
14 might not facilitate RTW. Could this be due to the coordinator model used in the Scandinavian
15 welfare system? This seems at least to have something to do with the type of coordination, where
16 integration of services across levels and arenas are lacking¹². Furthermore, it might be that the
17 groups receiving coordination is not well targeted. Still, we need to know more about who might
18 benefit from having a coordinator. Coordination of RTW-processes for employees with mental
19 health problems has for example been studied to a small extent²⁷, and we do not know how
20 coordination affects this group of sick-listed employees. Furthermore, there is a need to
21 investigate and develop the roles, tasks and competencies of the RTW-coordinator, within a
22 Norwegian context. The Norwegian model for coordination, where the link between the
23 coordinator and the workplace is diffuse and not formalized in the RTW-programs^{10 12 57 58},
24 should be further examined. Implications for practice and research, both in Norway and
25 internationally, will be to develop new coordination models and implement such models in line
26 with evidence, where a closer workplace connection seems to be a way forward^{27 28}.
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49 One of the strengths of this study is the high number of participants and the use of register data,
50 which are both detailed and precise regarding sickness absence and diagnoses, as it is connected
51 to the public social security benefit system. Approx. two-thirds of the patients in the study were
52 provided with a coordinator, limiting the power to estimate the effect of not having a coordinator.
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3 Although the variable of provision of a coordinator is based on self-report from employees in
4 present study, the time-to first-RTW results from the analyses has been verified (median 102 days
5 versus 79 days for those provided with coordinator versus not, respectively, with p-value 0.25)
6 when compared with providers' responses to the same variable ("Did your service provide a
7 coordinator for this patient?"). Furthermore, there was an association between having a
8 coordinator and type of RTW-program. This make it difficult to generalize the findings to all sick
9 listed employees participating in the Rapid-RTW-programs as we were not able to distinguish
10 between the effect of having a coordinator and a given program. Additionally, the proportion of
11 employees sick-listed due to MSD are higher than in the national statistics of Norway. However,
12 since employees with MSD are the best-documented group of sick-listed benefiting from RTW-
13 coordination, this should be more an advantage regarding possibilities of revealing a difference
14 between those provided with and those not provided with a coordinator. There is a possibility of
15 selection bias in the study as the percentage of employees sick listed with psychiatric issues and
16 receiving psychological treatment is higher among the non-respondents. Fewer of employees
17 with psychiatric issues is provided with a coordinator¹², meaning the power of analysis of this
18 diagnose group might have been enhanced if more of these employees responded. However,
19 employees with this diagnosis represent a small proportion of the total number of included
20 participants. Therefore, inclusion of those employees would most likely not affect the main
21 results decisively. Analysis of the full material of employees on full-time sick leave (n=546)
22 shows some statistically significant differences between respondents and non-respondents on the
23 question of provision of a coordinator. Non-respondents' median age was slightly lower (44
24 years), and more had mental diagnosis (20%). In addition, fewer received occupational
25 rehabilitation of the non-respondents (43%). If these were included, the proportion of employees
26 with mental health disorders receiving treatment would most likely be larger, and this would most
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3 likely strengthen the present results.
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7 **CONCLUSION**

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11 This study revealed that employees participating in RTW-programs and who were provided with
12 a coordinator had delayed time until they returned to work, compared to those who did not have a
13 coordinator. However, type of program seems to be a mediating factor in this study, that explains
14 more of the variation in RTW than being provided with a coordinator and this should be further
15 investigated. The model of coordination provided in the Norwegian rapid-RTW-programs,
16 mainly as part of occupational rehabilitation programs in the health care, seems to not add to a
17 more rapid RTW. Hence, RTW-coordination where all three intervention arenas; the workplace,
18 social services, and health care are targeted should be further developed, tested and studied.
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31 **Ethical statement**

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34 The Norwegian Centre for Research Data (NSD) approved this study with the reference number:
35 28988. Furthermore, the Norwegian Data Protection Authority gave consent to handle person-
36 identified information, reference number: 13/00141-5/KEL. Participants in the study gave
37 informed consent.
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3 We would like to thank the participants, and the 43 rapid-RTW-programs for their valued
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5 programs. We would further like to thank the Ministry of Labour and Social Affairs for co-
6 funding the data collection of this study.
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14 **Author Contributions**

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16 LSS has been involved in data collection, performed the analysis of the material, and has been the
17 main author of all parts of the drafted article.
18

19
20 LAH has been involved in data collection, contributed to the discussion, and has commented
21 critically on the drafts.
22
23

24
25 MCS has been involved in the analysis, and commented critically on the drafts.
26

27
28 WSS has contributed to the interpretation of data, and commented critically on the drafts.
29

30
31 RWA is the principal investigator and project manager of the Rapid-RTW project. She designed
32 the cohort study, and managed and took part in all phases of this project. She planned the
33 statistical analysis, and commented critically on the drafts.
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40 **Declarations**

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42 The authors declare no conflicts of interests.
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46 **Consent for publication**

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48 Not applicable.
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54 **Availability of data and material**

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56 The datasets analysed during the current study are not publicly available due to research ethical
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considerations, but are available from the corresponding author on reasonable request.

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3 **Figure 1:** Kaplan-Meier survival plot of time until first-RTW (days)
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5 **Figure 2:** Kaplan-Meier survival plot of time until first full-RTW (days)
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7 **Figure 3:** RTW-rates (first-RTW within 360 days yes/no) by type of program
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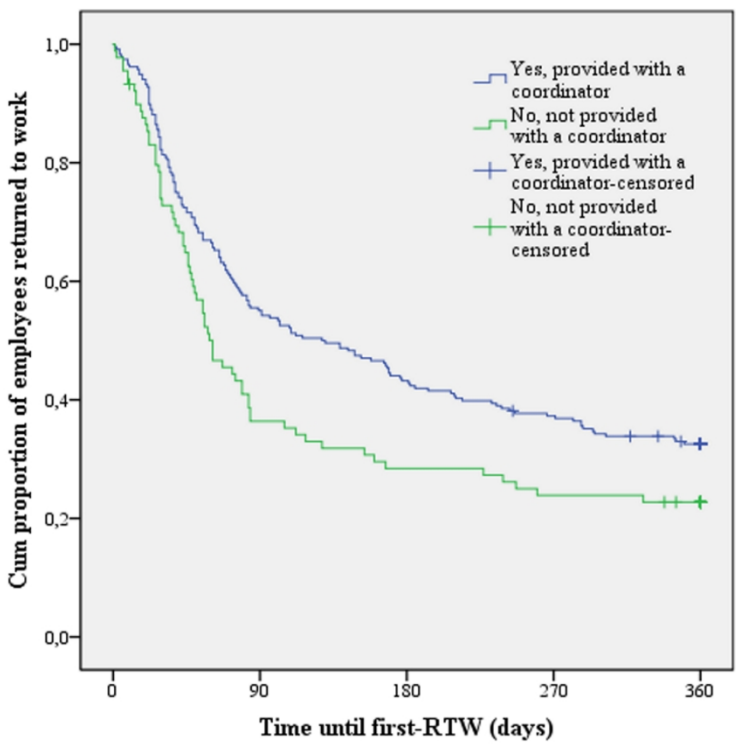


Figure 1: Kaplan-Meier survival plot of time until first-RTW (days)

357x285mm (300 x 300 DPI)

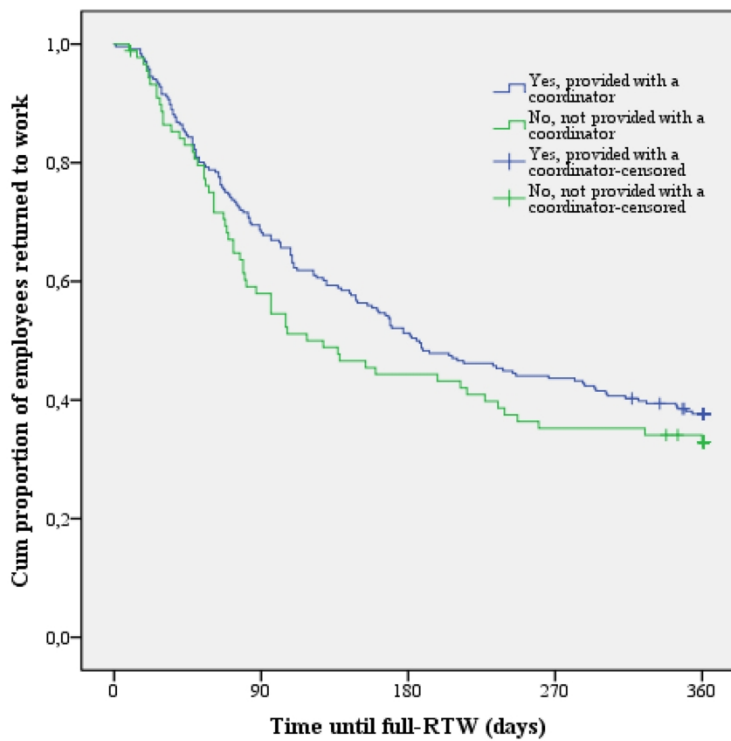


Figure 2: Kaplan-Meier survival plot of time until first full-RTW (days)

291x233mm (300 x 300 DPI)

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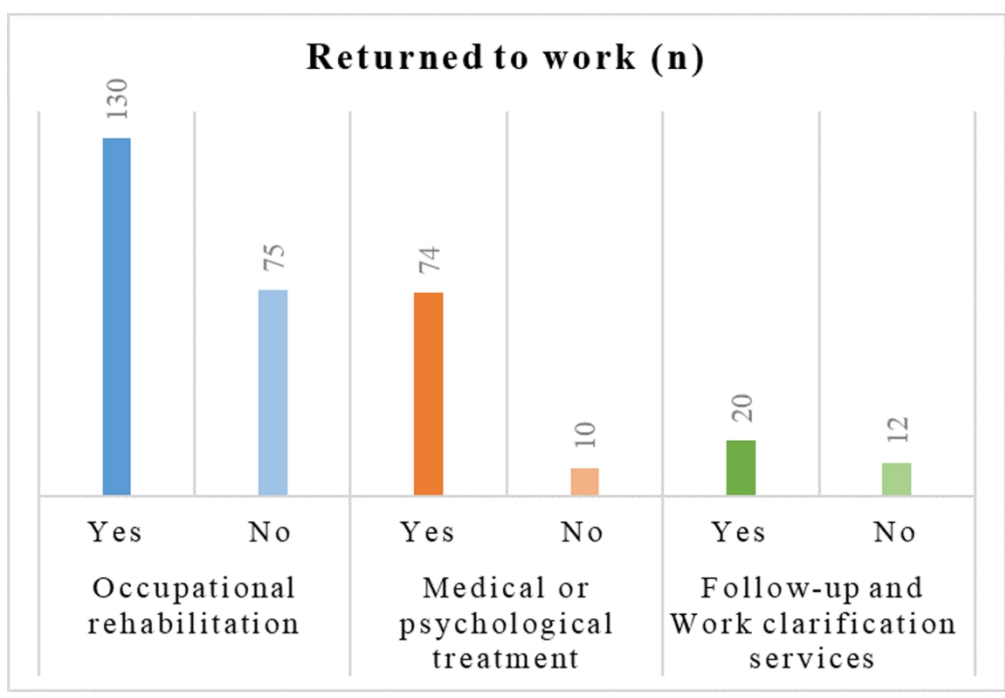


Figure 3: RTW-rates (first-RTW within 360 days yes/no) by type of program
301x204mm (300 x 300 DPI)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract <i>Page 1</i>
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found <i>Page 2</i>
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported <i>Page 6</i>
Objectives	3	State specific objectives, including any prespecified hypotheses <i>Page 6</i>
Methods		
Study design	4	Present key elements of study design early in the paper <i>Page 6</i>
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection <i>Page 7</i>
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Page 7-8</i> <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Not matched. Exposed/unexposed page 9-10</i> <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable <i>Page 8</i>
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group <i>Page 8</i>
Bias	9	Describe any efforts to address potential sources of bias <i>Page 15-16</i>
Study size	10	Explain how the study size was arrived at <i>Page 8</i>
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why <i>Page 10</i>
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding <i>Page 10</i> (b) Describe any methods used to examine subgroups and interactions <i>Page 12</i> (c) Explain how missing data were addressed <i>Page 8</i> (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Not applicable</i> <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy
		(e) Describe any sensitivity analyses <i>Not applicable</i>

Results

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed <i>Page 8</i> (b) Give reasons for non-participation at each stage <i>Page 8</i> (c) Consider use of a flow diagram <i>Not applicable</i>
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders <i>Page 9</i> (b) Indicate number of participants with missing data for each variable of interest <i>Page 10</i> (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount) <i>Page 8</i>
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Page 11</i> <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included <i>Page 11-12</i> (b) Report category boundaries when continuous variables were categorized <i>Page 9</i> (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period <i>Not relevant</i>
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses <i>Page 12</i>

Discussion

Key results	18	Summarise key results with reference to study objectives <i>Page 12</i>
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias <i>Page 15-16</i>
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence <i>Page 17</i>
Generalisability	21	Discuss the generalisability (external validity) of the study results <i>Page 16</i>

Other information

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based <i>Page 17</i>
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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.