

# Effects of Collaborative Care compared with care as usual on sustainable return to work for sick listed employees with Major Depressive Disorder:

Results of a randomized controlled trial

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department Diagnosis & Treatment

Study:	Clinical- and Health Psychology, University of Utrecht
Date:	June 2011
Student:	W.H.A. van den Bersselaar (3086321)
Supervisors:	Trimbos institute: drs. M.C. Vlasveld University of Utrecht: dr. S. Doosje



**Universiteit Utrecht**

 **Trimbos  
instituut**  
Netherlands Institute of  
Mental Health and Addiction

## **Abstract**

**Objectives.** The purpose of the present study was to evaluate the effectiveness of the Collaborative Care (CC) model implemented in the Dutch occupational health care setting compared to care as usual (CAU) in terms of the duration until sustainable return to work (RTW) in sick-listed employees with Major Depressive Disorder (MDD). The Collaborative Care intervention is expected to promote faster sustainable RTW.

**Methods.** 126 Employees with a diagnosis of MDD sick listed between 4 and 12 weeks were included and followed up for 12 months. 65 Employees were randomized to the CC condition and 61 to the CAU. Employees in the CC condition received treatment from an Occupational Physician-care manager, according to a CC model, including a workplace adjustment module. Data on RTW was derived from OHS systems. Using Cox regression analyses outcomes on RTW were compared between groups. A process evaluation was done to determine the degree to which the intervention was implemented.

**Results.** 64.6% of employees allocated to the CC intervention and 59.0% of employees allocated to CAU returned to work within the 12 month follow up. But CC was not superior to CAU in terms of duration until sustainable RTW, neither in total number of sick leave days during the follow up. A process evaluation showed that just 66.7% (N = 40) of employees in the CC condition actually received treatment according to the CC model. Of these employees only 21.7% (N = 5) received the workplace adjustment intervention.

**Conclusions.** The lack of difference between the CC and CAU may be explained by the extent to which the treatment was successfully implemented. We suggest this may have been caused by OP/patient distrust but future research should aim for more clearance.

## **Foreword**

This thesis was written for my Master degree in Clinical and Health Psychology. I am grateful for having had the possibility to perform my master thesis during an internship at the Institute of Mental Health and Addiction (TRIMBOS) in Utrecht. This project perfectly suited my personal interests and motives and from day one it was therefore easy to dedicate my time and devotion. I've learned a lot and spending 560 hours at the institute gave me great insides in the profession of scientific researcher.

I would like to thank my colleagues at the TRIMBOS department of Diagnosis and Treatment for their kindness, interest and involvement during my internship. A special word of thank goes to my supervisor Moniek Vlasveld from the Institute of Mental Health and Addiction for her feedback, suggestions and guidance in my approach of the research data and writing of my thesis. Final gratitude is for my supervisor drs. Sibe Doosje from the University of Utrecht for his input, support, assessment and willingness to visit the institute for meetings and the final presentation of my thesis.

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## **Introduction**

Major Depressive Disorder (MDD) is a common mental disorder. In the Netherlands MDD has a lifetime prevalence of 15.4% and a 12-month prevalence of 5.7% (Bijl, Ravelli, & van Zessen, 1998). MDD often causes long-term absenteeism (Kruijshaar, Hoeymans, Bijl, Spijker, & Essink-Bot, 2003; Plaisier et al., 2010). In addition to financial implications this also has social consequences for the patients themselves. Prolonged absence from work regularly results in a lack of social structure, a lack of meaningful activity and as a result decreased quality of life (Bilsker, Wiseman, & Gilbert, 2006; Bowling, 1995). Moreover, prolonged sickness absence is associated with a reduced probability of eventual return to work and subsequent economic and social deprivation (Bilsker et al., 2006; Henderson, Glozier, & Holland, 2005). Besides absenteeism MDD is often related to presenteeism (attending work while sick) (Plaisier et al., 2010; Koopman et al., 2002). MDD is associated with the highest productivity-loss related costs of all chronic illnesses (Druss, Rosenheck, & Sledge, 2000; Buist-Bouwman, de Graaf, Vollebergh, & Ormel, 2005).

Many treatments have for MDD have proven to be effective in reducing symptoms (Ormel, Bartel, & Nolen, 2003). However a reduction in depressive symptoms does not automatically lead to a recovery of functioning at work (Schene, Koeter, Kikkert, Swinkels, & McCrone, 2007; van der Klink, Blonk, Schene, & van Dijk, 2003; Adler et al., 2006). Treatment of people on sick-leave due to depression should therefore not only be aimed at symptom reduction, but on a rapid and sustainable return to work (RTW) as well. This focus is lacking in current treatment (Nieuwenhuijsen, Verhoeven, Bültmann, Neumeyer-Gromen, & Van der Feltz-Cornelis, 2007).

A promising model in the treatment of MDD is the Collaborative Care model. Collaborative Care is characterized by the organization of evidence-based treatment modes in a collaborative framework. Key components of Collaborative Care are: treatment is tailored to one's personal needs through structured and systematic delivery of evidence based treatment; easy communication between different health-care professionals; systematic monitoring of treatment adherence and outcomes; and the introduction of a care manager, who is the key figure in the systematic coordination of interventions (Bower, Gilbody, Richards, Fletcher, & Sutton, 2006; Katon & Seelig, 2008; Simon, 2009; Richards et al., 2008). This model has proven to be effective in primary care settings in the US (Katon et al., 1999; Unutzer et al., 2002; Unutzer et al., 2002; Katon et al., 1995; Katon et al., 1996) as well as in the UK (Richards et al., 2008; Chew-Graham et al., 2007). Meta analysis shows that on average depression outcomes were improved at 6 months and evidence of long-term benefit was found for up to 5 years (Gilbody, Bower, Fletcher, Richards, & Sutton, 2006). Since most studies focusing on

Collaborative Care have been conducted in the US, an important question is whether or not the positive outcomes of Collaborative Care can be replicated in the Netherlands.

Since the beginning of the 20<sup>th</sup> century treatment and sickness certification are separated in the Netherlands. The intended benefits of this separation were the preservation of trust between doctor and patient and protection of patient's privacy. However as a consequence of that separation, and the certifying role of occupational physicians (OPs), treatment has often been lacking a focus on the consequences of sickness for work functioning. The importance of work for the wellbeing of patients in general was often neglected in the curative sector. Since 2006, only the nature, content and extent of care are enshrined in the new law for insurance of healthcare. By whom and where the treatment should be conducted is no longer statutory (Willems & Doppegieter, 2007).

In this study, Collaborative Care was implemented in the occupational health care setting. OPs have specific knowledge about the influence of the work environment on diseases and are expected to be of added value in the promotion of rapid RTW. Therefore the care manager role in this setting was fulfilled by OPs who were especially trained for this. A workplace adjustment intervention was added to the Collaborative Care model in the present study to promote faster and sustainable RTW. In prior studies similar work adjustment interventions have proven to be effective in reducing the duration of absenteeism. (Anema et al., 2007; Oostrom et al., 2007; van Oostrom et al., 2010). To our knowledge, this is the first study in which the Collaborative Care model is applied in this setting and is focused on promoting RTW.

The purpose of the present study was to evaluate the effectiveness of the Collaborative Care model in the Dutch occupational health care setting compared to care as usual in terms of the duration until sustainable RTW in sick-listed employees with MDD. Based on prior results it is expected that employees treated according to the Collaborative Care model will return to work faster than employees treated according to care as usual. Furthermore, the total number of sick leave days during the follow-up is expected to be less for participants in the Collaborative Care group than for employees in the Care as Usual group. Finally a process evaluation will be conducted to determine the efficiency of the treatments implementation.

## **Methods**

### ***Design & Procedure***

This study was a randomized controlled trial (RCT) in which a Collaborative Care intervention for MDD was compared to care as usual in the occupational health care setting. Randomization was at participant level. The intervention could not be blinded, as participants were aware of the allocation to either the Collaborative Care or the usual care group. The data considering the duration until sustainable RTW were derived from the occupational health care system (OHS) register, which was an advantage because the study was not vulnerable for any non-response. All other data were obtained from self-report questionnaires, in order to exclude the possibility of interviewer bias. Participants in both groups were allowed to accept any other form of care outside of this study.

### ***Participants***

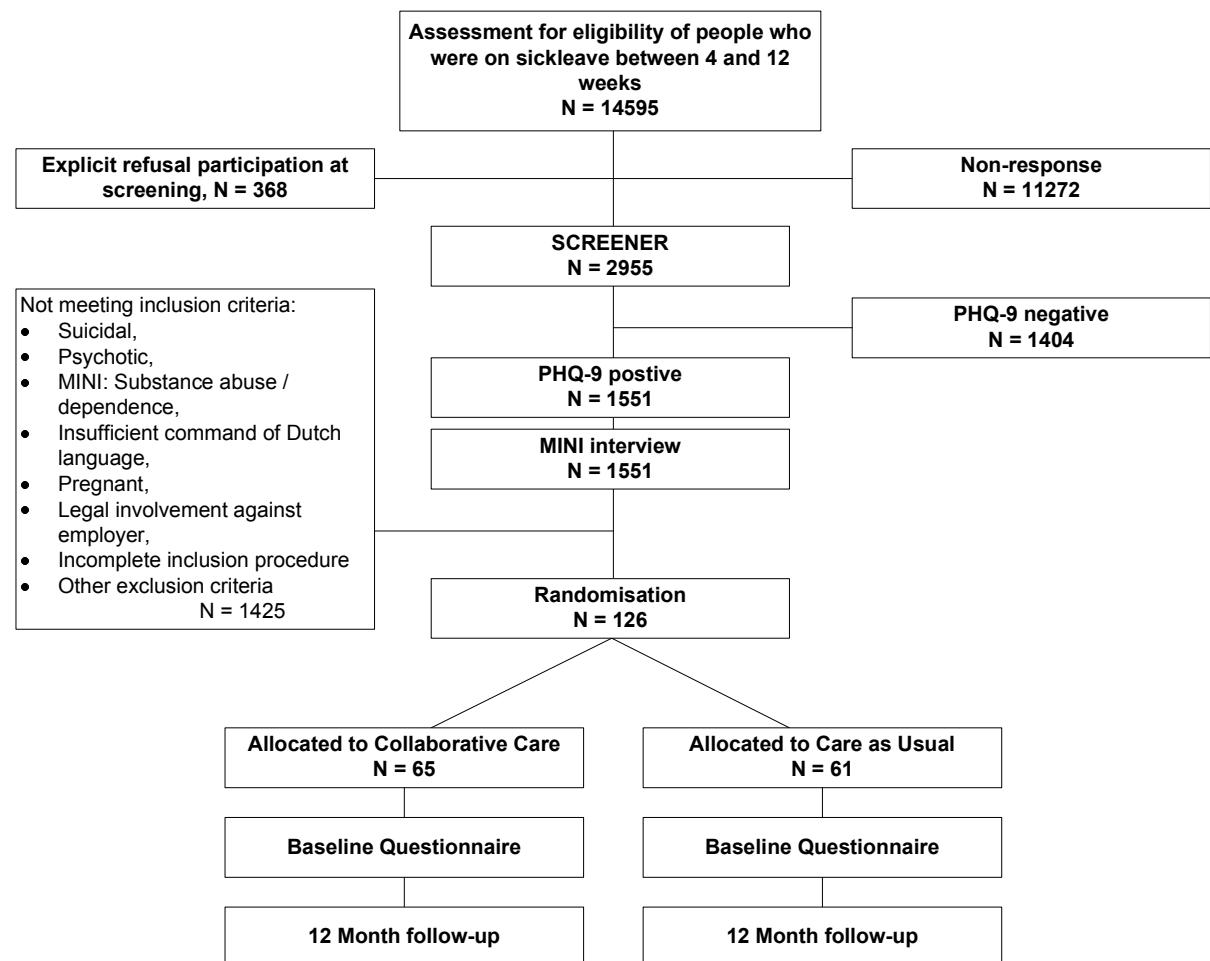
The sample included employees with a diagnosis of MDD who were on sick leave for between four and twelve weeks. Research on low back pain suggests that treatment at a sub-acute phase (4-12 weeks) is more effective in preventing chronic disability than attempts to treat it when it has become chronic (Waddell & Burton, 2001). In the present study a comparable 'window of opportunity' is assumed for MDD and therefore the abovementioned duration of sick leave was chosen as an outcome variable. The restriction to a minimum of four weeks of sick leave was chosen to avoid including too many employees with spontaneous recovery.

Employees that were on sick leave for between four and twelve weeks received written information from the OHS to announce the study. Next, they were sent written information by the researchers about the study along with an informed consent and screening form. The screening form consisted of 9 items of the depression scale of the Patient Health Questionnaire, the PHQ-9, which is a brief and valid instrument that measures each of the DSM-IV criteria for MDD (Lowe, Unutzer, Callahan, Perkins, & Kroenke, 2004; Kroenke, Spitzer, & Williams, 2001). A MINI-International Neuropsychiatric Interview (MINI) was administered by telephone for DSM-IV classification. If MDD was confirmed by the MINI, the employees were screened for exclusion criteria. These included being suicidal, psychotic, having a primary diagnosis of substance abuse or dependence (as assessed by the MINI interview), having an insufficient command of the Dutch language to fill in the questionnaires, being pregnant and being legally involved in a dispute with the employer, e.g. due to a conflict at work. Employees who did not meet any of the exclusion criteria were randomly assigned to either the usual care or to the Collaborative Care treatment.



### Flowchart

Participants were recruited from November 2007 until September 2009. Figure 1 presents the flow of participants. During that period 14595 sick-listed employees were screened for depressive symptoms, of which 368 employees refused to participate. In total, 2955 employees returned the screener, of which 1551 (52.5%) employees screened positive for depression. Subsequently, 1425 of the employees who screened positive were excluded for various reasons, for example, employees that were suicidal, had a primary diagnosis of substance abuse or dependence or employees who did not have sufficient command of the Dutch language to fill in the questionnaires. The final sample included 126 employees, of which 61 were randomly assigned to the Care as Usual and 65 to the Collaborative Care group.



**Figure 1. Flowchart of participants**, according to CONSORT statement (Schulz, Altman, Moher, & the Consort Group, 2010). PHQ-9: Depression Scale of the Patient Health Questionnaire, MINI: MINI-International Neuropsychiatric Interview.

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### ***Interventions***

#### *The Collaborative Care intervention team in the occupational health care setting*

In the Collaborative Care intervention in this occupational health care setting, OPs fulfilled the role of care manager and were trained in advance. The intervention team was formed by the consultant-psychiatrist and OP-care manager. Participants allocated to the intervention group were referred to the OP-care manager in order to receive multidisciplinary treatment based on the Collaborative Care framework.

In accordance with the separation in the Dutch legislation, in this study the treatment of MDD and the certification of sickness absence were separated. The study was approved by the Institutional Review Board (in Dutch: METC) of the VU University Medical Center Amsterdam. As usual, patients' own OP provided sickness certification and was not involved in the intervention team. Communication between the OP-care manager and the own OP was only permitted after written consent by the participant; the same applied to communication between the OP-care manager and the participants general practitioner (GP). Communication within the Collaborative Care team was allowed without limitations.

#### *The content of the Collaborative Care intervention*

- Psycho-education
- Monitoring the treatment progress using the PHQ-9 in a tracking system
- Manual guided self-help aimed at RTW and a healthy lifestyle
- Problem Solving Treatment (PST)
- Workplace intervention
- Optional: anti-depressant medication
- Relapse prevention
- Psychiatric consultation

The first six appointments with the OP-care manager were on a weekly basis, after that the participant and the OP-care manager met every other week. After the psycho-education and drafting of the treatment plan, treatment started with PST and the self-help manual. Participants immediately had the option to start taking antidepressants as well. Every six weeks the treatment was evaluated using the PHQ-9. Besides the screening of depressive symptoms, the PHQ-9 is a valid instrument for monitoring symptoms (Lowe et al., 2004). The OP-care manager and participant regularly monitored the progress of the treatment to determine whether an adjustment was

needed. If needed the treatment could be intensified by adding an extra 6 sessions of PST, by adding antidepressant medication to the treatment plan or by increasing or changing the antidepressant medication. The OP-care manager could consult the consultant psychiatrist in the event of treatment stagnation, increased suicide risk or with other questions. If after six weeks the PHQ-9 had not dropped by at least 5 points which is required for a significant treatment response - (Lowe et al., 2004; Kroenke et al., 2001) or if after twelve weeks no remission had occurred, treatment was intensified. The consultant-psychiatrist was asked to consider what steps to take next.

#### *The work adjustment intervention*

The Collaborative Care treatment in this study contained a component specially focused on RTW, the work adjustment intervention. To achieve a greater chance of acceptance of the workplace adjustment, participant and employer together looked for bottlenecks and generated effective adjustments in work conditions (STEPR Platform Reintegratie, 2006). A work adjustment intervention has shown to be effective among employees with low back pain in reducing the duration of absenteeism. The intervention was adjusted for absent employees with stress related problems through an Intervention Mapping strategy. This intervention did not have an overall effect on sustainable RTW but it significantly reduced the time until sustainable RTW for employees who at baseline intended to work despite symptoms (Anema et al., 2007; Oostrom et al., 2007; van Oostrom et al., 2010).

The content of the Collaborative Care including the work adjustment intervention is described more thoroughly elsewhere (Vlasveld et al., 2008).

#### *Care as usual*

Participants allocated to the usual care group only received sickness certification by their regular OP. Usual care was provided according to the OP guidelines of the Dutch Board for Occupational Medicine. As considerable variation was expected in the usual care that was provided for participants with MDD, the actual care that was provided in the CAU group (e.g. medication and number of contacts with physicians) was assessed by questionnaire.

#### **Outcome measures**

The primary outcome measure was sustainable RTW, defined as the duration of sick leave due to MDD in calendar days from the day of randomization until full RTW, for at least 4 weeks without recurrence. Recurrences of sick leave within 4 weeks of full RTW are considered as belonging to the initial period of sick leave, in accordance with the

requirements of the Dutch Sickness Benefits legislation. In addition, the total number of days of sick leave in 12 months was calculated to take in account recurrence of sickness absence (Anema et al., 2007; Oostrom van et al., 2008). Data were derived from OHS databases, Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness (TiC-P) were used to check for accuracy of these data (Hakkaart-van Roijen, van Straten, Al, Rutten, & Donker, 2006).

### ***Data analysis***

All analyses were done using SPSS (version 15). The data were analyzed on an intention-to-treat basis, i.e. the patients remained in the group to which they were randomly allocated at baseline.

A Kaplan Meier analysis was used to describe the association between the sick leave duration until full RTW and the group allocation, status was censored for when participants did not return to work within the follow-up year and for participants who left their current jobs. An unadjusted Cox regression analyses was performed. After that confounding and effect modification were assessed in an adjusted Cox regression analyses. The potential confounders or effect modifiers were predefined and were all measured at baseline: personal characteristics (sex and age); job characteristics (decision latitude and physical job demands) and symptoms and conditions (duration of sick leave before baseline, severity of physical symptoms, chronic diseases and severity of depressive symptoms). First, univariate tests for confounding and effect modification were performed. Covariates were considered as confounders if the  $\beta$  of the intervention changed more than 10% by adding the covariate to the Cox regression model. Effect modification was considered to be present when the  $\beta$  coefficient of the interaction term had a  $p<.05$ . A test of the proportional hazard assumption was conducted. A Mann-Whitney U test was used to determine differences in total number of sick leave days during the 12 month follow-up.

A process evaluation was conducted to determine if the participants received the Collaborative Care treatment according to the guidelines. Information was collected from the tracking system, from questionnaires filled out by participants and from questionnaires filled out by the OP-care managers. Another Cox regression analysis was performed to determine the effect of the Collaborative Care treatment compared to care as usual for employees that did truly receive the CC treatment.

## Results

### Sample characteristics

Table 1 shows the baseline characteristics of the participants. There were no significant differences between the CC and CAU conditions, except for physical job demands.

**Table 1. Baseline characteristics of the participants**

	CC N = 65	CAU N = 61	Total N = 126	P
<i>Demographics</i>				
Gender (% male)	43.1	49.2	46.0	.996
Age in years	41.8 (11.4)	43.3 (11.5)	42.6 (11.4)	.452
Dutch nationality (%)	95.4	91.8	93.7	.418
Born in the Netherlands (%)	95.4	85.2	90.5	.058
Married / cohabiting (%)	60.0	73.3	66.4	.117
Educational level (low)	27.8	35.0	31.4	.317
Educational level (med)	36.1	30.0	33.1	.604
Educational level (high)	36.1	35.0	35.5	.946
<i>Symptoms and conditions</i>				
Depressive Symptoms (PHQ9) (range 0 - 27)	15.9 (4.8)	16.0 (5.4)	16.0 (5.1)	.888
Duration of sickleave at baseline	70.7 (20.6)	69.9 (20.2)	70.3 (20.3)	.825
Somatic symptoms (range 0 - 27)	13.6 (5.1)	12.3 (5.1)	13.0 (5.13)	.139
Chronic diseases	1.2 (1.1)	1.2 (1.3)	1.2 (1.2)	.942
Generalized Anxiety (%)	51.6	50.8	51.2	.934
Panic Disorder (%)	15.9	16.9	16.4	.874
Psychological/Psychiatric co-intervention (%)	86.0	93.9	89.9	.196
<i>Job characteristics</i>				
Decision latitude (range 26 - 92)	67.6 (12.6)	64.2 (12.4)	66.0 (12.5)	.136
Physical job demands (range 5 - 20)	9.4 (3.5)	11.3 (3.8)	10.3 (3.7)	.006*

Note: Numbers are means and standard deviations, unless otherwise specified;

CC = Collaborative care; CAU = Care As Usual. ; \*p <.05

### Time until sustainable return to work

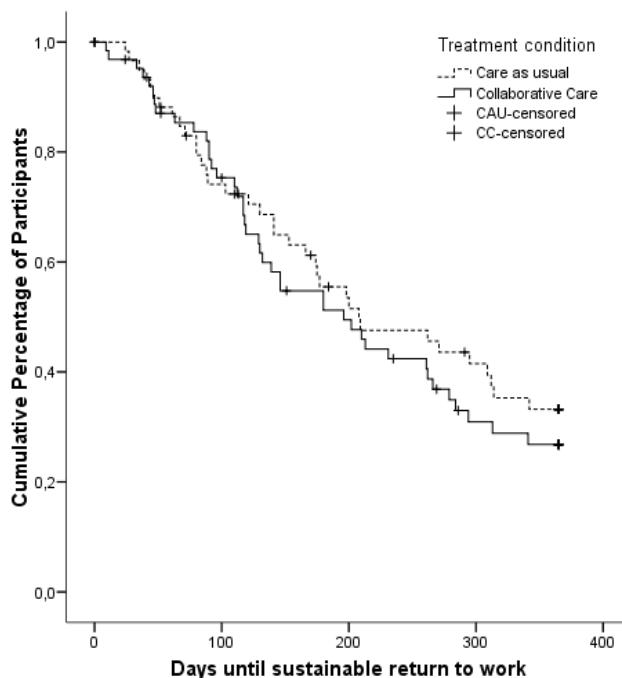
After the 12 month follow-up, 42 employees (64.6%) that were allocated to the Collaborative Care condition sustainably returned to work. In the care as usual condition 36 employees (59.0%) returned to work. In the CC condition 9 employees and in the CAU condition 8 employees left their current job during the follow-up. The median time until sustainable RTW was 146 days in the Collaborative Care and 175 days in the care as usual group. After the 12 month follow up, the Cox regression analysis showed no significant difference between the Collaborative Care group and the Care as Usual group on duration until RTW. The unadjusted HR was 1.176 (95% CI 0.753 to 1.837).

In the univariate analyses, no variables appeared to be significant effect modifiers. In the final multivariate model physical symptoms, age, depressive symptoms, sexe and chronic diseases remained as confounders (table 2).

**Table 2. Cox proportional hazard model**

	B	SE	p	HR	95% CI	
					Lower	Upper
Crude model	0.162	0.227	0.475	1.176	0.753	1.837
Adjusted model*	0.116	0.236	0.625	1.122	0.707	1.783

\* Adjusted for physical symptoms, age, depressive symptoms, sexe and chronic diseases



**Figure 2. Kaplan Meijer Survival function.** Numbers of days of sickness absence until sustainable return to work.

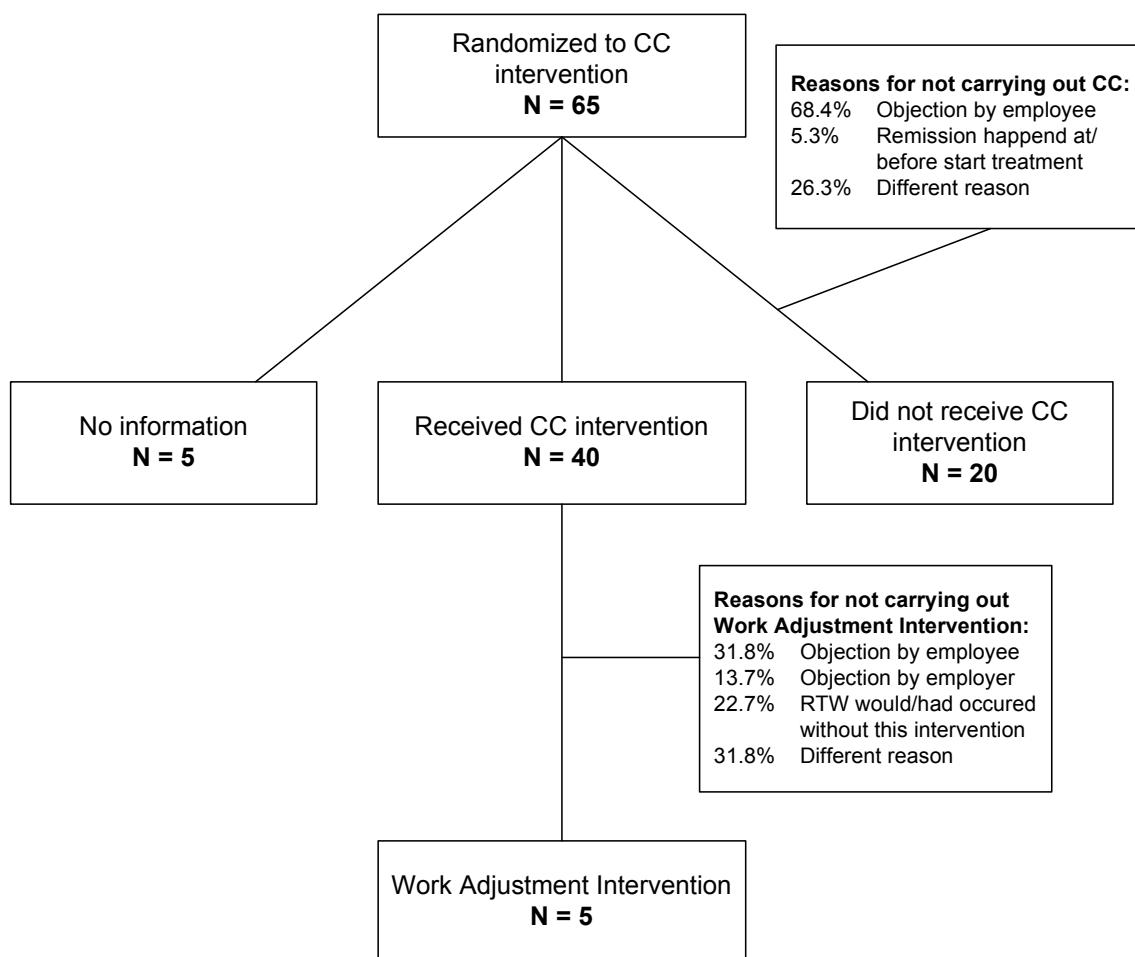
#### **Total number of sick days during 12 month follow-up**

The median total number of sick-leave days during the 12 month follow-up was 185 days for the CC group, of which on average 7.5 days occurred after initial the full RTW. For the CAU group the median total number of sick-leave days was 176 of which on average 4.8 occurred after the initial full RTW. The total number of sick-leave days nor the number of sick-leave days after RTW differed significantly between the Collaborative

Care (mean rank score 62) and the care as usual (mean rank score 65) groups ( $U = 1883$ ;  $p = .625$ ).

### **Process evaluation**

As can be seen in Figure 2, 66.7% ( $N = 40$ ) of the participants randomized to the CC treatment actually received the CC treatment from an OP-care manager. Only 21.7% ( $N = 5$ ) of the participants receiving the CC treatment received the workplace adjustment intervention as well. Reasons for not carrying out the Collaborative Care intervention were because of objections by the employee (68.4%). With 5.3% of participants that were randomized to the Collaborative Care intervention remission happened before starting the treatment. Reasons for not carrying out the workplace adjustment intervention were in 31.8% because of objections by the employee, in 13.7% because of objections by the employer and with 22.7% RTW had occurred (or was expected to occur) without applying this intervention.



**Figure 3. Process Evaluation Flowchart**, data derived from tracking system.

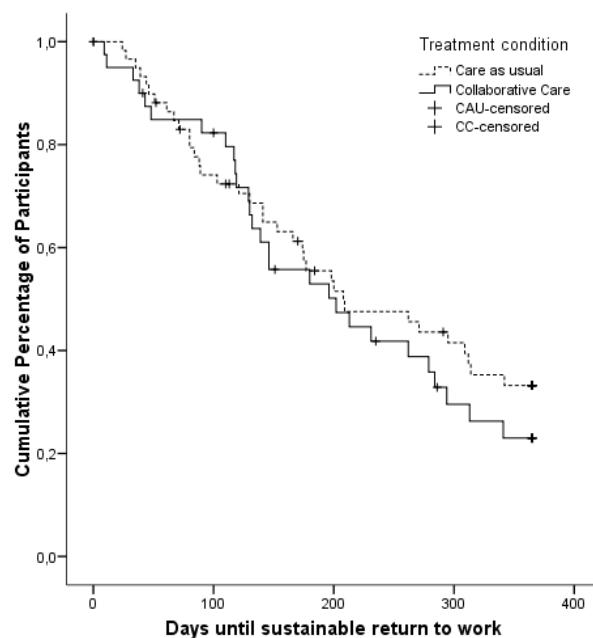
Of the 40 employees that did receive the CC intervention (according to the process analysis) 28 employees (70%) returned to work during the 12 month follow-up. This did not differ significantly ( $p=.26$ ) from CAU. 5 Employees (12.5%) left their current jobs during the 12 month follow-up. This did not differ significantly ( $p=.93$ ) from the CAU either.

The median time until sustainable RTW was 165.5 days for participants who received the Collaborative Care intervention. The Cox regression analysis still showed no significant difference between the CC group and the CAU group on duration until RTW. The unadjusted HR was 1.227 (95% CI 0.748 to 2.013).

**Table 3. Cox proportional hazard model**

	B	SE	<i>p</i>	HR	95% CI	
					Lower	Upper
Crude model	0.205	0.253	0.418	1.227	0.748	2.013
Adjusted model*	0.137	0.262	0.6	1.147	0.687	1.915

\* Adjusted for physical symptoms, age, depressive symptoms, sex and chronic diseases



**Figure 4. Kaplan Meijer Survival function.** Numbers of days of sickness absence until sustainable return to work after process analysis.

## **Discussion**

Primary objective of the present study was to evaluate the effectiveness of Collaborative Care in terms of time until sustainable RTW in sick-listed employees with MDD in the Netherlands compared to CAU. Initial analysis of the data show that 64.4% of the employees that were randomized to the CC treatment returned to work compared to 59% of the employees randomized to care as usual within the 12 month follow-up. This difference was not significant and therefore no superior effect on sustainable return to work of CC compared to CAU was found.

The process evaluation that was conducted in this study showed that only 66.7% of the participants that were randomized to the CC treatment actually received the treatment from an OP-care manager. Only 21.7% of them also received the workplace adjustment intervention. These results suggest that implementation of the Collaborative Care intervention was insufficient. OP-care managers were asked why Collaborative Care and the workplace adjustment intervention were not conducted. According to the OP-care managers most of the time the CC intervention, as well as the work adjustment intervention were not conducted because of an objection by the employee. Another reason that was often mentioned for not conducting the intervention was that RTW would have occurred without applying the intervention. Secondary analysis of the results show that 70% of the employees that actually received the CC treatment returned to work within the 12 month follow-up, but again (compared with the 59% of employees that returned to work in the CAU condition) the results showed no superior effect on sustainable return to work of CC compared to CAU. Per protocol analysis for the workplace adjustment intervention was impossible because of the small sample size. This lacking implementation may have influenced the power of the analyses that were conducted.

CC has proven to be effective in reducing depressive symptoms in the USA as well as in the UK (Katon et al., 1999; Unutzer et al., 2002; Unutzer et al., 2002; Katon et al., 1995; Katon et al., 1996). As far as we know, no other studies are performed yet where CC was evaluated in terms of RTW and where CC was implemented in an occupational health care setting. In other studies OPs have been successful in promoting RTW using a similar version of the workplace adjustment intervention as we used in this study (Anema et al., 2004; Anema et al., 2007; Oostrom et al., 2007), but the disorders in most of these studies were physical in nature. In one of them a similar workplace adjustment intervention has proven to be effective in promoting RTW in employees with mental distress when at baseline employees were motivated to return to work despite symptoms. It was suggested that among employees and employers it is more acceptable to work while still having symptoms of low back pain than with mental health problems

(van Oostrom et al., 2010). In this study we did not measure this motivation but this may have influenced our results as well.

An explanation for the lacking implementation could be found in the OPs role of care manager. We suggest that the separation of treatment and sickness certification in the Netherlands, and an OPs historical position in this system, may have played a role in the insufficient implementation of the intervention. The position of OPs is controversial as they work with patients, employers and management of OHS who all have different interests (Rebergen et al., 2006). Literature confirms that employees as well as other healthcare professionals lack a clear perception about the role and abilities of OPs in the general health care system (Anema et al., 2006; Andrea et al., 2004). In this study the concerns about the dual responsibility of the OP to employer and employee were tried to be minimized by having a different OP-care manager than one's own OP. We nevertheless suggest that OPs independency, agency and expertise were still questioned and distrust may have come into play. Furthermore, patient-OP distrust is recognized in various countries (Buijs, Anema, Evers, van Dijk, & van der Klink, 2006; Plomp & Ballast, 2010). Besides this distrust, literature shows that employees seem to prefer to visit a GP when work related health problems are related to emotional work demands and work-family conflicts and prefer a visit to an OP for problems related to physical work demands (Andrea et al., 2004). The latter could possibly explain the difference in outcome with the other studies in which workplace adjustment interventions provided by OPs have proven to be effective, as well. Either way it is possible that the OPs role of care manager and the nature of symptoms have had major impact on the outcome of the present study.

#### *Strengths and limitations*

As far as we know this study is the first in which CC was evaluated in the occupational health care setting for patients with MDD. It therefore is an important contribution to the research into the possible implementation of CC in other health care settings. The present study had a solid RCT design, with randomization at patient level which minimized contamination between the two treatment groups. We were able to follow participants for a relatively long period of 12 months. Because the data on RTW was conducted from the OHS systems it was available for all employees, was unbiased and had no loss to follow-up.

Despite these strengths, this study has some limitations. Regardless of the reasons for not performing the CC intervention, the implementation of the intervention was inadequate. Consequently because of the limited amount of people that actually received the workplace intervention, power was too low to be able to perform a proper

per-protocol analysis and determine the effects of the individual modules of the intervention.

*Advice for future research and clinical implementation*

It is thought that patients distrust in an OPs care managing abilities may have had major impact on the implementation of the CC intervention in this study. We therefore suggest qualitative research to acquire understanding of the limits, obstacles and strengths of implementation of CC in the occupational health care setting. Another option would be to have the care managing role be fulfilled by another health care professional who could consult the OP for advice on work adjustment, to overcome the trust related problems around OPs. In order to provide better care in work related healthcare issues it would be good to promote the abilities, qualities and added value of OPs in the primary health care. Because of the separated treatment and sick leave certification in the Netherlands the results in this study should be generalized with caution. More extensive research on implementing CC in other countries and implementing CC to promote RTW would be desired.

**Abbreviations**

MDD	Major Depressive Disorder
CC	Collaborative Care
CAU	Care as usual
RTW	Return to work
OP	Occupational Physician
OHS	Occupational health care service
GP	General Practitioner
RCT	Randomized controlled trial
PST	Problem Solving Treatment
MINI	MINI-International Neuropsychiatric Interview

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