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Components of primary care multimodal rehabilitation and their association with changes in sick leave: An observational study

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Abstract.
BACKGROUND: To address the increase in sick leave for nonspecific chronic pain and mental illness, the Swedish government and the Swedish Association of Local Authorities and Regions entered into an agreement on a "Rehabilitation Guarantee" to carry out multimodal rehabilitation (MMR).
OBJECTIVE: To investigate whether components of primary care MMR are associated with changes in sick leave.
METHODS: A web-based survey was conducted in conjunction with a retrospective cross-sectional observational study of 53 MMR units. Sick leave data for the years before and after MMR completion was collected for 846 individuals.
RESULTS: There was great disparity in how MMR was delivered. The average duration of rehabilitation was 4–8 weeks, and 74% of the MMR teams reported having fewer patients than recommended ($\geq$20/year). Only 58% of the teams met the competence requirements. In-depth competence in pain relief and rehabilitation was reported by 45% of the teams and was significantly associated with fewer sick leave days after MMR (26.53, 95% CI: 3.65; 49.42), as were pain duration (17.83, 95% CI: –9.20; 44.87) and geographic proximity (23.75, 95% CI: –5.25; 52.75) of the health care professionals included in the MMR unit.
CONCLUSIONS: In-depth competence and knowledge about the complex health care needs of patients seem essential to MMR teams' success in reducing sickness benefits for patients with nonspecific chronic pain and mental illness. Further research is needed to elucidate the optimal combination of primary care MMR components for increasing the return-to work rate and to determine whether involvement of the Social Insurance Agency or employers could support and further contribute to recuperation and help patients regain their previous work capacity.

Keywords: Bio-psycho-social rehabilitation, multimodal rehabilitation, multidisciplinary rehabilitation, sick leave

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1. Introduction

The main reasons that employees take sick leave from work in Northern Europe include mental health problems such as stress, depression and anxiety, and chronic musculoskeletal pain [1–3]. Moderate to severe chronic nonmalignant musculoskeletal pain occurs in about 20% of the Swedish population [4], which is similar to an estimated 19% prevalence throughout all of Europe [5]. In Sweden, adaptation disorders, abnormal and excessive reactions to identifiable life stressors and reactions to severe stress, are the fastest growing cause of sick leave. These disorders are more prevalent among women than men [6]. Up to 44% of all sick leave taken in Sweden is related to mental illness [6]. The average duration of sick leave is increasing, especially among unemployed people suffering from mental illness [3]. In Sweden, unemployed people registered with the Swedish Public Employment Service can obtain sickness benefits [3].

Prolonged pain, work-related stress, depression and anxiety, and low confidence in one's ability to cope negatively affect work capacity [7–12] and make return to work (RTW) more difficult and stressful [7–12]. In the case of complex disabilities, more extensive multiprofessional rehabilitation efforts are often required to improve the health and quality of life of patients [12, 13]. However, the resources devoted to rehabilitation of patients on sick leave for mental illness and musculoskeletal pain in Sweden are estimated to be small in comparison with the costs of production loss [14]. Some 20–40% of patients visiting primary care units in Sweden suffer from pain, which is chronic in about half of the cases [15, 16]. Chronic pain may result in long-term sick leave, and the socioeconomic burden of patients with chronic pain is about €32 billion per year in Sweden [2]. The annual socioeconomic burden of patients with mental illness was about 70 billion Swedish crowns in 2015 [17].

To address increases in sick leave for generalized or nonspecific chronic pain in the neck, back, or shoulders and for mild to moderate mental illness, the Swedish Government and the Swedish Association of Local Authorities and Regions entered into an agreement on a "Rehabilitation Guarantee" in 2008, which has since been renewed annually [18]. The primary aim of the "Rehabilitation Guarantee" was to provide County Councils with financial support for evidence-based rehabilitation of working-age patients with chronic pain and long-term mild to moderate mental illness. The objective was to promote RTW and prevent sick leave among patients in whom such conditions last for more than 3 months.

The "Rehabilitation Guarantee" mandates that evidence-based methods such as MMR should be used for pain rehabilitation in primary care settings [15]. MMR has primarily focused on health improvement and not specifically on work-life oriented rehabilitation [15]. In MMR, a multidisciplinary team of health professionals coordinate physiological, psychological, and occupational therapeutic interventions. Rehabilitation may include functional training, physical exercise, body awareness training, education, lifestyle changes, coping strategies for daily life, and cognitive behavioral therapy (CBT) or interpersonal psychotherapy (IPT) from a biopsychosocial perspective to achieve goals defined collaboratively with the patient [15, 17, 18].

Depending on the severity of the disorder and the team´s capacity and competence, MMR is provided at two levels in Sweden. MMR1 is usually offered in a primary health care setting, while MMR2 is also offered at the specialist level at university hospitals or regional county hospitals. MMR2 is indicated for complex problems that greatly interfere with daily activities. MMR2 teams should have clinical skills and in-depth knowledge in pain rehabilitation. A social counselor, psychologist, or psychotherapist should be included in MMR2. Even though MMR principles are consistent, health care units differ in their organization and in the content of the rehabilitation and the specific methods used.

This study focuses on MMR1, which was most commonly used in regional primary care settings during the study period. According to the "Rehabilitation Guarantee," MMR1 should consist of 2–3 sessions per week for at least 4–8 weeks. Teams must include at least three different types of health professionals, including a physician and someone with basic education in CBT. The target was to treat at least 20 patients per year. Cooperation with the Swedish Social Insurance Agency was recommended for cases involving work-related problems and to facilitate contact with the employer if needed.

Self-reported health measures are frequently used as primary outcome measures in MMR research and have shown improvements in health perception and self-reported work ability [19–21]. In a qualitative study [22], patients reported greater empowerment, a sense of increased living space (meaning a more open mind for participation in society), increased embodied knowledge, and a regained hope.

In another qualitative study [23], patients with severe whiplash-associated disorders reported having more tools to manage their pain and a renewed ability to perform daily activities and RTW after MMR. Nevertheless, no report has convincingly shown that MMR increases RTW faster or that MMR patients return to the same work ability level as prior to their disability to a higher extent [24, 25]. In Sweden, people can work part-time, depending on the assessment of their degree of work ability, and sickness benefits can be paid at 25%, 50%, 75%, or 100%. A gradual return to work is often used after extended periods of sick leave [26]. The strongest predictor of reduced sick leave after MMR is prior sickness absence [19, 20]. Moreover, sick leave benefits decrease with MMR, regardless of the current sick leave situation (none, part-time, full-time, or full-time permanent sick leave) of patients with chronic pain [26, 27]. There are many important aspects to consider when studying sick leave benefits and RTW [3, 6]. Contradictory results such as non-return to work may reflect a lack of clearly defined goals and guidelines for RTW, as well as differences in the training of caregivers and their attitudes toward RTW [28].

Despite evidence that MMR is effective, knowledge about its organizational aspects is lacking, and it is not known whether the content and the specific rehabilitation methods used are associated with the amount of sick leave after MMR. In addition, the long-term effectiveness of MMR has yet to be assessed [21, 29, 30, 33, 34]. Therefore, the aim of this study was to investigate whether the organization, structure, rehabilitation content, and specific methods used in regional primary care MMR1 were associated with changes in sickness benefits (days with received sick pay) between the 12-month periods before and after completion of MMR.

2. Material and Methods

2.1. Study design and selection of primary health care units

This study is part of an earlier retrospective cross-sectional observational study that has not been reported before. The project was ongoing from 2014 to 2016. Sick leave data was delivered from the Social Insurance Agency in April and May of 2016. Data on sick leave and sickness benefits received during the 12-month periods before and after MMR intervention was collected retrospectively. In order to assess the organization of MMR teams, the content of MMR, and the methods used, we used a web-based questionnaire. The questionnaire data was analyzed in relation to sickness benefits among patients who had completed MMR1 intervention.

All primary health care units in the Region Västra Götaland (VGR) that implemented the "Rehabilitation Guarantee" in 2013 were eligible for the study. Inclusion in the study required approval from the head of the primary health care unit to extract information about sick leave for MMR1 participants included in the survey and that the specific codes for MMR was registered in patients' medical records as described by the Swedish Classification of Health Interventions (KVÅ-code UV114 for MMR1).

All primary health care units reimbursed by the health care department in VGR for the provision of MMR1 were invited to participate in the survey. All data was extracted according to the Swedish Social Insurance Agency's standard routine for disclosure of individual data for research.

2.2. Ethical considerations

The study was approved by the Regional Ethical Review Board in Gothenburg, Sweden (no. 2014/741).

2.3. Reporting guidelines

The reporting of manuscript adhere to the STROBE Statement Checklist obervational cross-sectional studies.

2.4. Data collection

2.4.1. Web-based questionnaire

At each unit, a contact person familiar with the organization of the MMR team was asked to be responsible for ensuring timely completion of the survey. The survey took approximately 30 minutes to complete and was designed to allow respondents to pause and resume filling in the form at another time. Two reminders to complete the survey were sent by e-mail, one week apart. The online survey consisted of 44 questions divided into three categories: (1) organization and structure: 22 questions about wait time before enrollment in MMR, professions represented in the MMR team, referral and recruitment within the team, specialist doctors on the team, and access to common facilities; (2) rehabilitation and content: 11 questions about the length

and content of rehabilitation, treatment methods, workplace-oriented arrangements, routines for meetings, and cooperation with external stakeholders; and (3) routines for outcome assessment: 11 questions about documentation of activity level and functional capability, cooperation with external stakeholders (e.g., Swedish Social Insurance Agency, employers, Employment Agency, Social Services), the concluding rehabilitation meeting, and outcome assessments after MMR.

2.4.2. Sick leave data

Sick leave data was collected from the Social Insurance Agency's list of statistical register [35]. The data was delivered to Närhälsan, Research and Development, Primary Care, VGR, and included the following variables: country of origin, marital status, level of education, sickness benefit qualifying income (SGI), primary sick leave diagnosis, number of gross days of sickness benefits (one-quarter, one-half, three-quarters, or full) and total net days (part time sickness benefit days converted to full days), maximum time in the social insurance system, and registration status at the employment service. The sick leave outcome variable was defined as the difference in the number of days of sickness benefits, both gross total and net days, between the 12-month periods before and after MMR completion. Gross days means the days are summed regardless of the degree of compensation the sick leave has (25, 50, 75, or 100 percent), while in the net measure the days are weighted with the respective of degree of sick leave, i.e., a 50 percent compensation rate that lasts for 10 days is thus counted as 5 net days and 10 gross days, respectively [3, 6].

2.5. Study population

Fifty-three MMR1 units that enrolled a total of 846 patients for MMR1 treatment were included in the study. Of these patients, 120 (14%) were excluded because of missing survey data, and 82 (10%) were excluded because they likely received no sickness benefits during the study period. Data on sick leave and survey data could be retrieved for 644 patients (74%) and was included in the analyses.

2.6. Statistical analyses

The questions in the web-based questionnaire about organization, structure, rehabilitation, and content were sorted into three themes for the analyses. The themes, which were based on the "Rehabilitation Guarantee," were categorized as follows: (1) occupational categories and competencies, (2) treatment components, and (3) organized work as a team. All questionnaire items were categorical. As the aim of the study was to identify factors associated with changes in patients' sickness benefits after participation in MMR1, variables that differed between primary care units were of specific interest. To understand patterns of variation in the investigated variables from the web-based questionnaire, we used principal component analysis (PCA) of a data set with 53 observations – one for each primary care unit. The PCAs were done in subgroups of factors based on the three themes described above. In the PCA we used eigenvalue > 1 to decide the number of PCA components, and we used an orthogonal rotation.

Regression analysis was used to identify factors regarding organization, content, and specific methods of MMR1 that were associated with changes in sickness benefits after MMR1 participation. In the regression models, we had to consider the repeated-measure structure of the data, the clustering of patients in primary care units, and factors measured at the primary care unit level. We therefore used generalized estimation equations (GEE) models, with a working correlation matrix defined as exchangeable. All the factors used as explanatory variables in the regression models were checked for multicollinearity. None of the variables selected for multivariable regressions had problems with multicollinearity. In a first step, each dimension from the PCAs was used as a single explanatory factor in univariable GEE regressions. As none of the PCA dimensions showed statistical significance, we decided instead to look at each separate question in the PCA and to test each of them in univariable GEE regressions.

All regression analyses were also checked for confounding effects of sex, education, age, and SGI [36]. None of these variables were found to confound the results. Potential confounding by pain duration and mean sick leave duration was also investigated, and pain duration was found to be a confounding variable. We also investigated whether the sick leave diagnoses at baseline were of importance. No confounding was found. The diagnosis variable had four categories: musculoskeletal diagnosis, mental diagnosis, other diagnoses, and not presently on sick leave. The regression analyses were done in two steps. First we tested each factor by itself in separate mod-

els, and then all factors significant at $p < 0.25$ were analyzed in a multiple model. Multicollinearity was checked before factors were included in a multiple model [36]. In the multiple model, factors significant at $p < 0.25$ were retained, according to the purposeful selection method [36]. Statistical significance was set to $p < 0.05$ used for individual tests. The statistical software package IBM SPSS Version 25 was used for all analyses.

3. Results

Demographic and clinical characteristics of the patients who received MMR1 are summarized in Table 1. A large majority were women (84%). The mean age for both sexes was 49 years, and the majority (52%) had secondary school as their highest completed educational level. The two most frequent primary sick leave diagnoses were musculoskeletal disorders and mental disorders.

3.1. Description of the MMR1 units in relation to the "Rehabilitation Guarantee"

The organizational and structural aspects of the MMR1 teams and the rehabilitation provided are summarized in Table 2. Forty-eight of the 53 MMR1 units (91%) had at least three of the following types of professionals providing services: physicians, physiotherapists, occupational therapists, psychologists, social counselors, and nurses. Only 31 of the units (58%) met the combined criteria of including three of the stated professions and one provider trained to at least CBT level 1. Twenty-four MMR1 teams (45%) included professionals with in-depth knowledge of pain relief and rehabilitation. It is unclear which particular professions met this criterion. All units met the MMR1 program length criterion, i.e., at least 4–8 weeks. The criterion of 2–3 days of organized activity per week was harder to investigate, as we had only the number of hours per week, including home assignments. Therefore, this criterion was considered to correspond to more than 10 hours of activities per week (based on 2–3 hours of each MMR1 organized activity), including home assignments. Fifteen units (28%) had a treatment duration longer than 8 weeks and organized activity exceeding 10 hours per week, including home assignments. A large variation in treatment components was reported. Group or combined group and individual treatments were most common; nine of 48 units (19%) offered only individual treatments. Only 26 units (51%) had regular weekly meetings. On the other hand, 36 of 51 units (71%) reported that they established joint target plans and held closure meetings for patients and their treatment teams. Of the 53 units, 39 (74%) enrolled fewer than 20 patients per year (criterion for "Rehabilitation Guarantee"). The most commonly reported physiotherapeutic treatments were relaxation and stress management, followed closely by pain management and physical exercise.

Table 1
Demographic and clinical characteristics of the patients who received MMR1 ($n = 644$), excluding those with missing data on sick leave or missing data in the questionnaire survey ($n = 202$)

Characteristic	Number (%) or mean (SD)	Median (Q1; Q3)	Min – max
Sex			
Women	541 (84)		
Men	103 (16)		
Education, highest completed			
Elementary school	74 (11.5)		
Secondary school	333 (51.7)		
Upper secondary school	237 (36.8)		
Age (years)	49 (9.9)	50 (42; 56)	23 – 68
Sickness benefit qualifying income (SEK)	268 103 (95 043)	270 550 (222 000; 317 625)	0 – 768 700
Primary sick leave diagnosis			
Musculoskeletal disorders	207 (32.1)		
Mental disorders	240 (37.3)		
Other	105 (16.3)		
Not on sick leave	92 (14.3)		
Sick leave 12 months before MMR			
Gross days	161 (131.8)	127 (42; 281)	0 – 366
Net days	132 (123.7)	92 (23; 226)	0 – 366

Table 2
Organizational and structural aspects of the MMR1 team and rehabilitation provided by the MMR1 units ($n = 53$). The significant result is italicized

MMR 1	*n* (%)
Organizational and structural aspects of the MMR 1	
Health professions or competence in the MMR 1 team	
Physician	49 (92)
Physiotherapist	50 (94)
Nurse	13 (24)
At least basic education in psychological therapy (CBT 1)	31 (58)
Social councelor	17 (32)
Occupational therapist	37 (70)
In-depth knowledge in pain relief and rehabilitation	24 (45)
Team on same postal address	21 (40)
Establishment of a joint target plan	40 (76)
Regular weekly meetings	26 (40)
Joint meetings with team and patient during rehabilitation	32 (60)
Closure meeting with team and patient	42 (79)
Units with a standardized rehabilitation program	33 (62)
Number of patients in MMR1 2013	
<10	27 (51)
10–19	12 (23)
≥20 (criterion for RG)	14 (26)
Rehabilitation and content	
Duration of at least 4–8 weeks	53 (100)
More than 10 hours of activities per week, including home assignments	33 (62)
Most frequently reported physiotherapeutic treatments	
Relaxation	45 (85)
Stress management	41 (77)
Pain management	38 (72)
Physical exercise	35 (66)
Basic body awareness	30 (57)
Ergonomics	28 (53)
Mindfulness	27 (51)
Aquatic exercise	25 (47)
Acceptance and commitment therapy	22 (42)

3.2. Variable dimensions

For occupational categories and competencies, the PCA resulted in three dimensions: (1) to have nurses and in-depth knowledge of pain relief and rehabilitation; (2) to have either a social counselor or an occupational therapist; and (3) to have a psychologist or someone with basic education in psychological therapy. Only occupations that varied among units were included in the PCA, as this analysis captures the variation in multidimensional data sets. Hence, physiotherapists were not included, as all but two units had physiotherapists (Table 2).

For the variables describing team organization, the PCA resulted in three dimensions: (1) establishment of a joint target plan, joint meetings between the team and patient during rehabilitation, and a closure meeting between the team and the patient; (2) number of hours of activity per week, length of the program, and closure meetings between the team and the patient; and (3) locations nearby (team located at the same postal address), weekly team meetings, standardized rehabilitation programs, number of MMR1 patients in 2013, and length of the program.

For the treatment components, the PCA resulted in three dimensions: (1) ergonomics, hydrotherapy, mindfulness, supervised group conversations, and pain and stress management; (2) physical exercise, CBT, acceptance and commitment therapy (ACT), and sleep schools; and (3) basic body awareness, Yoga, Tai Chi, and mindfulness.

3.3. Results for net and gross sick leave days

The organization and structure, rehabilitation, and specific methods used in regional primary care MMR1 were not associated with changes in the total number of *net* sick leave days after MMR1 completion.

In the initial analysis of change in *gross* sick leave days, comparing the 12-month periods before and after rehabilitation (Table 3) **(I.)**, *all* patients were

Table 3
Regression analysis for the association between study variables and change in gross sick leave days from 12 months before to 12 months after MMR1 Analyses were done and presented separately for **I.** *all* patients independent on being on sick leave or not at start of the rehabilitation and **II.** only *sick-listed* patients at start of the rehabilitation. The significant result is marked in bold

Variable	Parameter estimate	95% confidence interval	Type-III *p* value
Intercept			
I. All patients ($n = 726$; missing $n = 120$)	8.01	–13.05; 29.66	<0.001
II. Sick-listed ($n = 644$; missing $n = 82$)	11.55	–9.44; 32.54	<0.001
In-depth knowledge of pain relief and rehabilitation			
I. All patients	22.60	–2.26; 47.50	0.075
II. Sick-listed	26.53	**3.65; 49.42**	**0.023**
Locations nearby			
I. All patients	20.05	–6.92; 47.01	0.145
II. Sick-listed	23.75	–5.25; 52.75	0.108
General pain duration			
I. All patients	22.56	–3.34; 48.46	0.088
II. Sick-listed	17.83	–9.20; 44.87	0.196

included regardless of whether they were on sick leave at the start of rehabilitation ($n = 726$). Survey data was missing for 120 patients. For *in-depth knowledge of pain relief and rehabilitation*, the model mean for number of gross sick leave days was 29 (95% CI: 14.2; 44.4) if that factor was present and 52 (95% CI: 33.1; 70.7) if it was not. For *locations nearby*, the model mean for number of gross sick leave days was 31 (95% CI: 13.2; 48.0) if that factor was present and 51 (95% CI: 32.4; 68.9) if it was not.

In the second analysis (**II.**), only patients who were on sick leave at the start of rehabilitation were included for change in gross sick leave days, again comparing the 12-month periods before and after rehabilitation ($n = 626$). Survey data was missing for 18 patients. For *in-depth knowledge of pain relief and rehabilitation*, the model mean for number of gross sick leave days was 32 (95% CI: 16.8; 47.9) if that factor was present and 59 (95% CI: 43.8; 74.0) if it was not. For *locations nearby*, the model mean for the number of gross sick leave days was 34 (95% CI: 15.6; 51.9) if that factor was present and 57 (95% CI: 40.2; 74.8) if it was not.

4. Discussion

This study shows that the organization of MMR1 teams, the content of rehabilitation, and the specific methods used vary widely. About half of all units were organized in a way that enabled teamwork according to the guidelines. The majority of teams did not fulfill the requirements spelled out in the "Rehabilitation Guarantee" in 2013. The most common health professions included in MMR1 teams were physicians and physiotherapists, followed by occupational therapists and psychologists or CBT therapists. More than half of the primary care units fulfilled the combined criteria for health professions represented on the team and CBT 1 competence. Only 31 of the units (58%) met the combined criteria of including three of the stated professions and one provider trained to at least CBT level 1. The absence of such competence in MMR1 teams may have negatively affected rehabilitation results, given the high frequency of sick leave due to mental disorders among patients. However, this was not statistically demonstrated in this study.

Even though the MMR1 units were required to have in-depth knowledge of pain relief and rehabilitation, only 24 of 53 units reported having such competence. This type of knowledge, along with geographic proximity, had a potentially positive effect on MMR1 outcomes in terms of sick leave. In a previous study, patients with severe pain and complex situations in general benefited more from MMR than patients with minor problems [34]. Severe chronic pain often produces long-term consequences, sequelae, and life impacts. This underlines the importance of in-depth competencies in pain rehabilitation being represented in a team-based MMR approach.

It seems that the same interventions do not help everyone to the same degree. A register study of pain rehabilitation for Swedish patients concluded that stronger connections between clinical pictures and the content of MMR would help improve results [33]. In order to establish a proper rehabilitation plan, and to better understand the primary problem, the care provider should see the patient in his or her entire context. This requires clinical experience and in-depth knowledge among team members. Only 26% of the units met the requirement to treat at least 20 MMR1

patients per year; 51% of the units enrolled fewer than 10 patients per year. The minimum annual number of patients was set to maintain experience and competence in the treatment of patients with long-term pain.

Other authors have concluded that unclear guidelines are a barrier to implementing MMR [28, 34]. One such barrier could be uncertainty about whether patients fulfill the criteria for achieving MMR, as could have been the case in the present study. All units met the criterion for program length; however, 15 of the units did not meet the criterion for organized weekly activities, as they had at most 10 hours of activities per week, including homework. One possible reason for this is that many teams had few patients and therefore offered only individual treatments and no standardized rehabilitation program. Again, we agree with the conclusion of a previous report [21], which states that better standardized measurements and rehabilitation programs at both the group and the individual level are needed to evaluate MMR in clinical work and research [21, 34].

The foundation of MMR is a well-functioning collaboration among team members and working together with the patient to establish a common goal [15]. More than half of the units reported having joint meetings between the team and the patient during the rehabilitation period. Almost half of the teams had regular weekly meetings. Establishment of a joint target plan was quite common. However, many teams were spread out over a large geographical area, which may have affected the results.

Our findings suggest that patients who were on sick leave before enrolling in MMR will most likely continue their sick leave after completing MMR. These results are in accordance with an MMR evaluation at the Karolinska Institute (KI) [19, 20], at least when estimating net days of sick leave. To reduce sick leave burden, the authors of that study suggested that rehabilitation should start within the 60 first days of sick leave. However, based on the Swedish Quality Registry for Pain Rehabilitation, sick leave benefits for patients with chronic pain decrease over time with MMR, regardless of their current sick leave situation [26]. On average, the patients in our study had sick leave significantly longer than 60 days. The median for gross days of sick leave was about four months. A quarter had been on sick leave for more than nine months and a quarter for fewer than 42 days before the start of MMR. We agree that MMR should be initiated in the early phase of sick leave, especially considering the regulations of the Swedish Social Insurance Agency and the extended rehabilitation responsibility of employers in Sweden. The results showed that there was a difference in gross days but not in net days of sickness benefits after MMR.

The chances of a successful outcome, i.e. fewer days of sickness benefits, were evidently higher for patients with a history of long-term sick leave than for patients with only a few days of sickness benefits before MMR. One should however be careful in interpreting the results, since a patient with a long history of sick leave prior to MMR start could have exceeded the maximum compensation that the person is entitled to receive from the insurance system during the time of the study. In most cases, a gradual return to work is important after long-term sick leave [26], for example starting at 25% and gradually increasing to 100%. The time needed to return to full-time employment can thus vary, which might have impacted the significant reduction in gross days in the present study.

Mental illness was common among our participants, and females were overrepresented; these findings are consistent with previous MMR studies [37, 19, 20]. The prevalence of mental illness [38] and chronic pain [5, 39] in general populations are higher among women than men. The causes of a higher incidence of chronic pain in women are multifactorial, where a number of factors such as neurobiological and social factors play a role, i.e. sex and gender [40]. As previously noted [34, 37], future MMR should be improved and better adapted to a biopsychosocial model. In a recent meta-analysis of MMR interventions for patients with chronic nonspecific back pain, treatment success did not differ between MMR programs that provided predominantly physical treatment, predominantly psychological treatment, or a combination of these. The conclusion of that study, stating that more research is needed to determine whether treatment outcome is affected by more tailored treatment that takes individual factors into account [41], is in line with the conclusions of the present study.

Factors other than self-reported pain seem to be more often associated with assignment to MMR [42]. Studies of referral patterns and decision-making processes may give a better understanding of the clinical practice by which patients are assigned to MMR [43]. The presence of common goals set by the team and patient and the willingness of patients and caregivers to cooperate with external actors regarding RTW are of major importance in MMR [28, 30, 32]. MMR programs also need to be designed to provide long-term

follow-up of patients' work status [31]. Employment status is an important predictor for improved physical and emotional functioning one year after MMR [44]. We had no information about our participants' work status. Some may have been unemployed and on sick leave, while others were employed but did not work for a long time. It is likely that stigma causes problems for individuals with complex health problems in the RTW process. Workplace-based rehabilitation might be used to earlier address musculoskeletal or psychological/stress-related problems. However, a model tested with an early team assessment of 779 employees who been on sick leave for 90 days encountered many challenges and illustrated the need for coordination when multiple stakeholders are involved [45].

4.1. Strength and limitations

The foremost strength of this study is that our sample included more or less all patients on sick leave who received MMR1 within primary care in the VGR in 2013, ensuring a representative study population. However, several limitations should be considered when interpreting the results. The most important limitation is the retrospective observational design with no control group, which may compromise the internal validity of the study. Furthermore, this limitation makes it impossible to draw conclusive inferences, and retrospective survey studies also carry a risk for recall bias. However, an observational MMR study that had a matched control group also showed method bias [20]. In that study, the MMR teams were spread across the country and the rehabilitation content varied substantially, as in the present study. Such methodological aspects influence the generalizability of the findings in the present study and thus limit the external validity of the study results. Future studies should be prospective and controlled to minimize bias. Another important limitation in our study is the possible presence of discrepancies between the self-reported survey data from the MMR1 units and the actual MMR provided to patients at each unit. This study was designed to investigate differences in sick leave data 12 months before and 12 months after MMR, but work status and RTW were not considered. As we mentioned previously, many patients could have returned to part-time work while still getting sickness benefits. Possibly, treatment success in terms of reduced sickness benefits seems to depend more on individual factors among the patients themselves, their work status and workplace, and the process in the Swedish sickness benefit insurance system, rather than on the organization of the MMR, its content, and the specific methods used. According to The Swedish National Audit Office [33], the "Rehabilitation Guarantee" has not contributed to the reduction in sick leave. This discrepancy could reflect the aforementioned factors and also the large number of primary care units in the study that did not meet the criteria for MMR teams.

5. Conclusion

In-depth competence and knowledge about the complex health care need of patients seem to be important factors for MMR teams to be successful in reducing sickness benefits for patients with nonspecific chronic pain and mental illness. Further research is needed to elucidate the optimal combination of primary care MMR components for increasing the return-to work rate and to determine whether involvement of the Social Insurance Agency or employers could support and further contribute to recuperation and help patients regain their previous work capacity.

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Conflict of interest

The authors declare that they have no conflict of interest.

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References

[1] Henderson M, Harvey SB, Overland S, Mykletun A, Hotopf M. Work and common psychiatric disorders. J R Soc Med. 2011;104(5):198-207.

[2] Gustavsson A, Bjorkman J, Ljungcrantz C, Rhodin A, Rivano-Fischer M, Sjolund KF, Mannheimer C. Socio-economic burden of patients with a diagnosis related to chronic pain–register data of 840,000 Swedish patients. Eur J Pain. 2012;16(2):289-99.

[3] Swedish Social Insurance Agency. Version 2020 Mars 30;1.0001573-2019. Available from: https://www.forsakringskassan.se/wps/wcm/connect/fb32bcf5-7ed4-4356-b18b-6adc7ca20fcd/1573-19-svar-regeringsuppdrag.pdf?MOD=AJPERES&CVID=./

[4] Harker J, Reid KJ, Bekkering GE, Kellen E, Bala MM, Riemsma R, Worthy G, Misso K, Kleijnen J. Epidemiology of chronic pain in Denmark and Sweden. Pain Res Treat. 2012;2012:371248.

[5] Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. Eur J Pain. 2006;10(4):287-333.

[6] Swedish Social Insurance Agency. Rapport - Uppföljning av sjukfrånvarons utveckling 2020. Available from: https://www.forsakringskassan.se/wps/wcm/connect/974d1839-45b5-4f14-b0e1-8ccb31cbf23d/svar-pa-regeringsuppdrag-rapport-uppfoljning-av-sjukfranvarons-utveckling-2020.pdf?MOD=AJPERES&CVID=.

[7] Bertilsson M, Petersson EL, Ostlund G, Waern M, Hensing G. Capacity to work while depressed and anxious- a phenomenologigal study. Disabil Rehabil. 2013;35(20):1705-11.

[8] Holmgren K, Fjällström-Lundgren M, Hensing G. Early identification of work-related stress predicted sickness absence in employed women with musculoskeletal or mental disorders: a prospective, longitudinal study in a primary health care setting. Disabil Rehabil. 2013;35(5):418-26.

[9] Lydell M, Baigi A, Marklund B, Månsson J. Predictive factors for work capacity in patients with musculoskeletal disorders. J Rehabil Med. 2005;37(5):281-5.

[10] Nordeman L, Gunnarsson R, Mannerkorpi K. Prognostic factors for work ability in woman with chronic low back pain consulting primary health care: a 2-year prospective longitudinal cohort study. Clin J Pain. 2014;30(5):391-8.

[11] Larsson MEH, Nordholm LA, Ohrn I. Patients´views on responsibility for the management of musculoskeletal disorders-a qualitative study. BMC Musculoskelet Disord. 2009;10:103.

[12] Stigmar KGE, Petersson IF, Jöud A, Grahn BEM. Promoting work ability in a structured national rehabilitation program in patients with musculoskeletal disorders: outcomes and predictors in a prospective cohort study. BMC Musculoskelet Disord. 2013;14:57.

[13] Kamper SJ, Apeldoorn AT, Chiarotto A, Smeets RJ, Ostelo RW, Guzman J, van Tulder MW. Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis. BMJ. 2015;350:h444.

[14] Persson J, Bernfort L, Wåhlin C, Öberg B, Ekberg K. Costs of production loss and primary health care interventions for return-to-work of sick-listed workers in Sweden. Disabil Rehabil. 2015;37(9):771-6.

[15] SBU- Statens beredning för medicinsk utvärdering. Rehabilitering vid långvarig smärta. En systematisk litteraturöversikt. Stockholm: Statens beredning för medicinsk utvärdering (SBU). SBU-rapport nr 198. ISBN 978-91-85413-34-8; 2010. [Rehabilitation for chronic pain: A literature review.] Stockholm: Board of Directors and Scientific Advisory Committee (SBU); May 2010. Swedish.

[16] Hasselström J, Liu-Palmgren J, Rasjö-Wrååk G. Prevalence of pain in general practice. Eur J Pain. 2002;6(5):375-85.

[17] Riksrevisionen. Swedish National Audit Office. Stockholm. RIR 2015:19. Audit report; 27 October 2015. Available from: https://www.riksrevisionen.se

[18] Sveriges Kommuner och Regioner. Rehabiliteringsgarantins riktlinjer 2013, Hälso- och sjukvårdsavdelningen, Stockholm 2013-03-28;Dnr RS 2772-2012. [Swedish Association of Local Authorities and Regions. The rehabilitation warranty 2012] Swedish.

[19] Hellman T, Bonnevier H, Jensen I, Hagberg J, Busch H, Björk Brämberg E. Bergström G. En processutvärdering av multimodala team inom ramen för rehabiliteringsgarantin Slutrapport. Enheten för interventions- och implementeringsforskning, Institutet för miljömedicin (IMM). Karolinska Institutet. Stockholm 2014. Swedish. Available from: https://ki.se/sites/default/files/migrate/slutrapport_rehabgarantin_webbversion.pdf/

[20] Busch H, Björk Brämberg E, Hagberg J, Bodin L, Jensen I. The effects of multimodal rehabilitation on pain-related sickness absence – an observational study. Disabil Rehabil. 2018;40(14):1646-53.

[21] Gerdle B, Molander P, Stenberg G, Stålnacke BM, Enthoven P. Weak outcome predictors of multimodal rehabilitation at one-year follow-up in patients with chronic pain- a practice based evidence study from two SQRP centres. BMC Musculoskelet Disord. 2016;17(1):490.

[22] Ekhammar A, Melin L, Thorn J, Larsson MEH. A sense of increased living space after participating in multimodal rehabilitation. Disabil Rehabil. 2016;38(25):2445-54.

[23] Rydstad M, Schult ML, Löfgren M. Whiplash patients' experience of a multimodal rehabilitation programme and its usefulness one year later. Disabil Rehabil. 2010;32(22):1810-8.

[24] Hägglund P, Johansson P, Laun L. Insatser inom rehabiliteringsgarantin och deras effekter på hälsa och sjukfrånvaro. IFAU, Institutet för arbetsmarknads- och utbildningspolitisk utvärdering. Rapport 2014:12. Available from: https://docplayer.se/6581433-Rehabiliteringsgarantins-effekter-pa-halsa-och-sjukfranvaro-1.html

[25] Sennehed CP, Stigmar K, Grahn B, Fischer MR, Forsbrand M, Nyberg A, Petersson IF, Holmberg S. Evaluation of a multimodal pain rehabilitation programme in primary care based on clinical register data: a feasibility study. Prim Health Care Res Dev. 2020;21:e2.

[26] Rivano Fischer M, Persson EB, Stålnacke BM, Schult ML, Löfgren M. Return to work after interdisciplinary pain rehabilitation: One- and two-year follow-up based on the Swedish Quality Registry for Pain Rehabilitation. J Rehabil Med. 2019;51(4):281-9.

[27] Pietilä-Holmner E, Enthoven P, Gerdle B, Molander P, Stålnacke BM. Long-term outcomes of multimodal rehabilitation in primary care for patients with chronic pain. J Rehabil Med. 2020;52(2):jrm00023.

[28] Björk Brämberg E, Jensen I, Kwak L. Nationwide implementation of a national policy for evidence-based rehabilitation with focus on facilitating return to work: a survey of perceived use, facilitators, and barriers. Disabil Rehabil. 2020;42(2):219-27.

[29] Aronsson, G., & Lundberg, U. (2015b). Rehabilitering och samordning. Delrapport 2: Kvalitetsbedömning och utvärdering inom REHSAM-satsningen. Forskningsrådet för hälsa, arbetsliv och välfärd (Forte). Swedish. Available from: https://forte.se/app/uploads/2016/02/rehsam-rapport-2.pdf.

[30] Brämberg EB, Klinga C, Jensen I, Busch H, Bergström G, Brommels M, Hansson J. Implementation of evidence-

based rehabilitation for non-specific back pain and common mental health problems: a process evaluation of a nationwide initiative. BMC Health Serv Res. 2015;15:79.

[31] Hellman T, Jensen I, Bergström G, Busch H. Returning to work – a long-term process reaching beyond the time frames of multimodal non-specific back pain rehabilitation. Disabil Rehabil. 2015;37(6);499-505.

[32] Stenberg G, Pietilä Holmner E, Stålnacke BM, Enthoven P. Healthcare professional experiences with patients who participate in multimodal pain rehabilitation in primary care - a qualitative study. Disabil Rehabil. 2016;38(21):2085-94.

[33] The Swedish National Audit Office. The rehabilitation guarantee is not working-rethink or discontinue (RiR 2015:19). Available from: https://www.riksrevisionen.se/en/audit-reports/audit-reports/2015/the-rehabilitation-guarantee-is-not-working—rethink-or-discontinue.html/

[34] Gerdle B, åkerblom S, Brodda Jansen G, Enthoven P, Ernberg M, Dong HJ, Stålnacke BM, Äng BO, Boersma K. Who benefits from multimodal rehabilitation – an exploration of pain, psychological distress, and life impacts in over 35,000 chronic pain patients identified in the Swedish Quality Registry for Pain Rehabilitation. J Pain Res. 2019;12:891-908.

[35] Försäkringskassan. Sjukpenning och Rehabiliteringspenning. MiDAS Version 1.02. Swedish. Available from: https://www.forsakringskassan.se.

[36] Bursac Z, Gauss CH, Williams DK, Hosmer DW. Purposeful selection of variables in logistic regression. Source Code Biol Med. 2008;3:17.

[37] Gerdle B, Åkerblom S, Stålnacke BM, Brodda Jansen G, Enthoven P, Ernberg M, Dong HJ, Äng BO, Boersma K. The importance of emotional distress, cognitive behavioural factors and pain for life impact at baseline and for outcomes after rehabilitation – a SQRP study of more than 20, 000 chronic pain patients. Scand J Pain. 2019;19(4):693-711.

[38] Steel Z, Marnane C, Iranpour C, Chey T, Jackson JW, Patel V, Silove D. The global prevalence of common mental disorders: a systematic review and meta-analysis 1980-2013. Int J Epidemiol. 2014;43(2):476-93.

[39] Vos T, Allen C, Arora M. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet. 2017;390:1211-59.

[40] LeResche L. Gender considerations in the epidemiology of chronic pain. I: Crombie IK, red. Epidemiology of pain. Seattle: IASP Press; 1999; s 43-52.

[41] O'Keeffe M, Purtill H, Kennedy N, Conneely M, Hurley J, O'Sullivan P, Dankaerts W, O´Sullivan K. Comparative Effectiveness of Conservative Interventions for Nonspecific Chronic Spinal Pain: Physical, Behavioral/Psychologically Informed, or Combined? A Systematic Review and Meta-Analysis. J Pain. 2016;17(7):755-74.

[42] Enthoven P, Molander P, Öberg B, Stålnacke BM, Stenberg G, Gerdle B. Do pain characteristics guide selection for multimodal pain rehabilitation? J Rehabil Med. 2017;49(2):161-9.

[43] Haukenes I, Hensing G, Stålnacke BM, Hammarström A. Does pain severity guide selection to multimodal pain rehabilitation across gender? Eur J Pain. 2015;19(6):826-33.

[44] Tseli E, Vixner L, LoMartire R, Grooten WJA, Gerdle B, Äng BO. Prognostic factors for improved physical and emotional functioning one year after interdisciplinary rehabilitation in patients with chronic pain: Results from a national quality registry in Sweden. J Rehabil Med. 2020;52(2):jrm00019.

[45] Heijbel B, Josephson M, Vingård E. Implementation of a rehabilitation model for employees on long-term sick leave in the public sector: difficulties, counter-measures, and outcomes. Work. 2013;45(3):323-33.