ORIGINAL REPORT

INTRODUCTION OF A MULTIMODAL PAIN REHABILITATION INTERVENTION IN PRIMARY CARE: A PILOT STUDY

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Objective: To evaluate patient-reported outcome measures in patients with chronic musculoskeletal pain 1 year after participation in a case manager-led multimodal rehabilitation intervention in a Finnish primary care centre. Changes in healthcare utilization (HCU) were also explored.

Methods: A prospective pilot study with 36 participants. The intervention consisted of screening, multidisciplinary team assessment, a rehabilitation plan and case manager follow-up. Data were collected through questionnaires filled in after the team assessment and 1 year later. HCU data 1 year before and 1 year after team assessment were compared.

Results: At follow-up, satisfaction with vocational situation, self-reported work ability and health-related quality of life (HRQoL) had improved and pain intensity had diminished significantly for all participants. The participants who reduced their HCU improved their activity level and HRQoL. Early intervention by a psychologist and mental health nurse was distinctive for the participants who reduced HCU at follow-up.

Conclusion: The findings demonstrate the importance of early biopsychosocial management of patients with chronic pain in primary care. Identification of psychological risk factors at an early stage may lead to better psychosocial wellbeing, improve coping strategy and reduce HCU. A case manager may free up other resources and thereby contribute to cost savings.

Key words: *Chronic pain*; *early identification*; *multimodal rehabilitation*; *case manager*; *healthcare utilization*; *primary care.*

LAY ABSTRACT

The majority of patients with chronic pain seek and receive care in primary care, yet their identification and management are often fragmented and inadequate. Many patients end up in a vicious circle of healthcare utilization (HCU), undergoing unnecessary diagnostic and medical procedures. Identifying those at risk of developing chronic pain and avoiding exclusion from work, family and social life may generate cost savings and reduce individual suffering. Multimodal rehabilitation (MMR) is an evidence-based treatment for patients with chronic pain, recurrently provided in specialized care but underutilized in primary care. This pilot study evaluated a case manager-led MMR intervention for patients with musculoskeletal chronic pain in a Finnish primary care centre. HCU was also studied. The results showed that addressing physiological, psychological and social factors in the patient's life simultaneously and at an early stage may lead to reduced pain perception, increased psychosocial wellbeing and cost savings for society.

Chronic pain is defined as pain that lasts more than 3 months. It is a disabling condition that often leads to impaired function and activity level and a deterioration in health-related life quality. It is associated with comorbidities such as anxiety and depression (1). Approximately 19% of adult Europeans suffer from moderate to severe chronic pain (2). Apart from causing individual suffering, chronic pain also generates significant costs for society, especially in terms of lost productivity due to long-term sick leave and early retirement (3, 4). It is also associated with excessive healthcare utilization (HCU) (5, 6).

Multimodal rehabilitation (MMR) is an evidence-based treatment for patients with chronic pain (7). It is based on a biopsychosocial approach that views pain as an outcome of the interaction between physiological, psychological and social factors and which tackles these areas simultaneously (8). MMR has its foundation in cognitive behavioural therapy and is provided by a multidisciplinary team. Traditionally, MMR has been offered in specialist care to patients with severe, complex chronic pain. It has been shown to be more effective than care as usual for reducing pain and disability (9) and is considered to be cost-saving in terms of, for example, decreasing lost work days and HCU (10, 11). Though little studied, a few studies in primary care have reported similar results (12–16).

Around 2% of patients with chronic pain are treated in specialized care (2), leaving the majority to seek care in primary care. Yet, management of chronic pain remains mostly unimodal and fragmented in primary care (17). Many patients fall into a vicious circle of HCU, undergoing unnecessary diagnostic and medical procedures (18). Capturing those at risk of developing chronic pain early, and thereby avoiding exclusion from work, family and social activities may generate cost savings and reduce individual disability and suffering.

The prevalence of chronic pain in the Finnish population has been estimated at 19–34% (2, 19). Nearly 40 % of primary care visits are associated with pain (20) and 20% with musculoskeletal pain (21).

The aim of this pilot study was to evaluate patient reported outcome measures (PROMs) in patients with chronic musculoskeletal pain after they participated in a case manager-led MMR intervention in a Finnish primary care centre. In addition, the aim was to evaluate HCU during 1 year before and after entering the intervention.

METHODS

This was a prospective pilot study conducted in an ordinary clinical practice at the primary care centre of Jakobstad between 15 September 2015 and 15 September 2018.

Participants

Thirty-six participants were consecutively recruited. Inclusion criteria were: *(i)* disabling chronic pain that had lasted more than 3 months, *(ii)* aged between 18 and 65 years, *(iii)* a score on the Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ) of >50 points (22), *(iv)* sufficient knowledge of the Swedish or Finnish language, *(v)* agreement not to participate in other parallel treatments and *(vi)* no access to occupational healthcare. Comorbidities, such as anxiety and depression, or/and medication were not a restriction to participate in the study.

Multimodal rehabilitation

The MMR intervention consisted of 5 steps: *(i)* screening using the ÖMPSQ at the point of seeking primary care physician or physiotherapist, *(ii)* meeting with case manager (CM) and formal consent from the patient, *(iii)* CM presentation of the new patient at the weekly core MMR team meeting including planning if care, examination or social service were needed, *(iv)* team assessment together with the patient for individual rehabilitation plan composition starting the rehabilitation process (in some cases the only intervention), and *(v)* CM follow-up and implementation of the rehabilitation plan (Fig. 1). The core of the MMR team included the primary care physician, the physiotherapist and the CM. Existing personnel and resources were remodelled to meet the needs of the MMR intervention. When needed, the MMR team also included a social worker, a mental health nurse, a specialist in physical medicine and rehabilitation as well as an occupational therapist and nutrition therapist. A specialist physician was occasionally consulted for differential diagnostics. All patients were expected to actively participate.

The MMR intervention was highly patient-oriented and the individual rehabilitation plan was outlined according to the needs of each patient. Therefore, there was no time limit for the intervention, which could continue even after 1-year follow-up. The plan could contain, for example, appointments with a physiotherapist, psychologist and/or occupational therapist, lifestyle plan changes, social worker contact, etc.
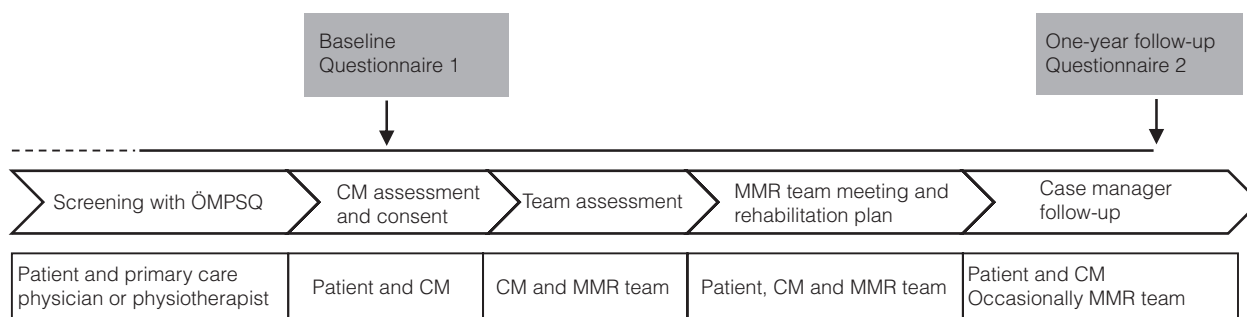

Fig. 1. Outline of the intervention.

The case manager

A successful coordinator has been described as having a comprehensive view of the process, working closely with the patient, co-workers and external players, referred to as the "spider in the net" (23). In this pilot study, a nurse with extensive experience of patients with chronic pain was appointed as the CM. The CM was allocated 50% of her working hours to the assignment and was responsible for coordination and follow-up, for guiding the patient and planning appointments according to the rehabilitation plan. The CM also functioned as the patient's contact person in the healthcare system. When needed, the CM arranged internal meetings involving different members of the MMR team and external meetings with the Social Services, Social Insurance Office, Public Employment Service, vocational rehabilitation actors, and addiction care.

Instruments

Data were collected using a comprehensive questionnaire entailing PROMs, applied with consent from the Swedish Quality Registry for Pain Rehabilitation for primary care (SQRP-PC) (24). The following standardized instruments were included: Numeric Pain Rating Scale (NPRS)(25), the Hospital Anxiety and Depression Scale (HADS) (26), the Functional Rating Index (FRI) (27), the Chronic Pain Acceptance Questionnaire (CPAQ) (28), the Pain Catastrophizing Scale (PCS) (29), the European Quality of Life instrument (EQ5D-3L) (30), 2 variables from the Life Satisfaction Questionnaire (LiSat-11) (31), and one item from the Work Ability Index (WAI) (32) accompanied by one additional work-related question. Questionnaires were completed individually after team assessment (baseline) and 1 year later.

Healthcare utilization

HCU was defined as the sum of healthcare visits and telephone calls to primary care physicians and nurses, specialists, mental health and addiction care nurses, psychologists, physiotherapists, occupational therapists, and social workers connected to the primary care centre. HCU was studied both in terms of total costs (€) and number of contacts with healthcare, including telephone calls. HCU for each participant during the time period 1 year before and 1 year after team assessment was compared with a focus on increased and decreased HCU. A decrease was considered a favourable outcome. The primary care centre physicians suffered from an excessive workload and there was a wish to screen for unnecessary contacts with healthcare. For the sake of simplicity, the group who increased their HCU at follow-up were referred to as "bad responders" and those who decreased as "good responders". Data were retrieved from the Hospital District of Southwest Finland and the Department of Social and Health Care in Jakobstad. Dental and maternal care data were excluded.

Table I. Patient characteristics at baseline

All participants, n = 36	
Women, n (%)	28 (77.8)
Age, mean (SD)	40.1 (12.0)
Country of origin, n (%)	
Finland	31 (81.6)
Other country	5 (13.5)
Education, n (%)	
Compulsory school	10 (27.8)
Upper secondary school	21 (58.4)
University/College	3 (8.3)
Not specified	2 (5.6)
Working status, n (%)	
Full-time	3 (8.3)
Part-time	10 (27.8)
Not working	23 (63.9)
Anxiety, HADS-A[a] > 11 points, n (%)	12 (34.3)
Anxiety, HADS-A[a], mean (SD)	8.71 (4.57)
Depression, HADS-D[a] > 11 points, n (%)	4 (11.4)
Depression, HADS-D[a] mean (SD)	5.80 (3.76)

SD: Standard deviation.

[a]The Hospital Anxiety and Depression Scale (HADS-A and HADS-D), > 11 points is the cut-off for a possible clinically significant disorder.

Data analysis

Data were analysed with IBM SPSS (Chicago, IL) using a significance level of $p < 0.05$ (2-tailed) and 95% confidence intervals (CI). Variables were compared at baseline and at 1-year follow-up using non-parametric Wilcoxon signed-rank test and Mann–Whitney U analysis. No imputation was carried out for missing values. Cohen's effect size (ES) was calculated with the help of a psychometric webpage (33). Absolute ES of 0.0–0.2 was non-significant, 0.2–0.49 small, 0.5–0.79 medium, and ≥0.8 large significance (34).

RESULTS

Patient characteristics

In total, 36 participants – 28 women and 8 men with chronic musculoskeletal pain – were included in the study (Table I). At baseline, the mean age was 40 years (22–62 years). The variation in pain duration was large, ranging from 2 months to 50 years. The mean pain duration was approximately 9½ years (SD 11.5). Thirty-four per cent of the participants scored > 11 points on the HADS-A and 11% scored > 11 points on the HADS-D indicating a possible clinically significant disorder.

The majority of participants were not working (63.9%) at baseline and the percentage increased somewhat at follow-up (65.5%) (Table II). Four participants (11.1%) were on sick leave and one participant was on part-time pension at baseline.

Non-response analysis

All 36 participants filled in the questionnaire at baseline. At 1-year follow-up, 7 patients did not return the questionnaire, resulting in a non-response rate of 19.4%.

Table II. Working status, sick leave and pension at baseline and -year follow-up

Working status, n 36(%)	Baseline, n = 36	One-year follow-up, n = 29
Full-time	3 (8.3)	4 (13.8)
Part-time	10 (27.8)	6 (20.7)
Not working	23 (63.9)	19 (65.5)
Sick leave	4 (11.1)	0
25%	1 (2.8)	0
50%	1 (2.8)	0
100%	2 (5.6)	0
Pension	1 (2.8)	2 (5.6)
100%	0	2 (5.6)
50%	1 (2.8)	0

There were no significant differences in PROMs between baseline and 1-year follow-up when comparing responders and non-responders.

Patient reported outcomes at baseline and 1-year follow-up

All participants showed reduced current pain intensity on the NPRS ($p=0.023$, ES 0.55). The participants were significantly more satisfied with their work situation (Lisat-vocation) ($p=0.011$, ES 0.42) and reported a significant improvement in self-reported work ability ($p<0.001$, ES 0.41). Significantly improved HRQoL (EQ VAS) ($p=0.009$, ES 0.63) was also reported. There were no significant changes in HADS-A and HADS-D between baseline and follow-up. When the subgroups were analysed separately, the bad responders had reduced current pain intensity significantly ($p=0.013$, ES 0.54) at follow-up whereas the good responders showed significant

improvements in HRQoL ($p=0.041$, ES 0.66) and activity engagement ($p=0.024$, ES 0.63). Both subgroups reported significant improvements in work ability at follow-up ($p=0.020$, ES 0.31 vs $p=0.014$, ES 0.58) (Table II).

Significant differences in PROMs between subgroups at baseline and follow-up (Table IV) were that the bad responders had higher pain intensity recent week ($p=0.050$, ES 0.11) and more depression ($p=0.034$, ES 0.13) at baseline. The good responders had higher pain acceptance level ($p=0.037$, ES 0.18) at follow-up.

Healthcare utilization

The total healthcare costs for all participants increased by 46% during the measured period. The mean healthcare costs per participant was € 1631 1 year before team assessment and € 2998 1 year after. Contacts with healthcare were grouped as follows: visits to primary care physicians (both emergency and planned), specialized physician (internal medicine, surgery/orthopaedics, psychiatry), rehabilitation personnel (physical therapy, occupational therapy and assisting rehabilitation personnel) and psychologists and mental health nurses (psychiatric nurses receiving patients with or without a psychiatric diagnose acutely or planned). Visits to specialist in physical and rehabilitation medicine and primary care nurses other than CM, telephone calls to primary care nurses and primary care physicians as well as visits and telephone calls after team assessment to CM nurse were presented individually.

The only significant change in HCU from 1 year before to 1 year after team assessment for all participants

Table III. Patient reported outcome measures for all participants, bad responders and good responders at baseline and 1-year follow-up

	All participants (Baseline n = 34–36, 1-year n = 24–29)				Bad responders (Baseline n = 23–25, 1-year n = 14–19)				Good responders (Baseline n = 10–11, 1-year n = 9–10)			
	Baseline	1-year	Wilcoxon		Baseline	1-year	Wilcoxon		Baseline	1-year	Wilcoxon	
	Median (IQR)	*Median (IQR)*	*p*	*ES*	*Median (IQR)*	*Median (IQR)*	*p*	*ES*	*Median (IQR)*	*Median (IQR)*	*p*	*ES*
Pain intensity (NPRS) recent week	7.0 (4.0)	6.0 (3.8)	0.192	0.39	8.0 (3.0)	6.0 (3.0)	0.311	0.78	6.0 (4.0)	5.0 (6.0)	0.317	0.12
Pain intensity (NPRS) current week	7.0 (3.8)	5.0 (5.0)	0.023	0.55	7.0 (2.0)	5.0 (5.0)	0.013	0.54	6.0 (5.0)	4.0 (4.0)	0.622	0.08
Anxiety (HADS-A)	8.0 (7.0)	8.0 (6.8)	0.534	0.08	8.0 (7.5)	6.5 (9.8)	0.377	0.09	10.0 (6.0)	9.5 (4.3)	0.719	0.03
Depression (HADS-D)	6.0 (5.0)	3.5 (6.0)	0.223	0.49	6.0 (5.8)	4.5 (6.5)	0.381	0.26	4.0 (5.0)	2.5 (6.25)	0.348	0.03
Activity engagement (CPAQ)	34.0 (16.0)	37.5 (11.0)	0.061	0.27	34.0 (16.0)	39.0 (11.8)	0.379	0.86	33.0 (14.8)	35.5 (13.5)	0.024	0.63
Pain willingness (CPAQ)	21.0 (8.8)	24.5 (8.3)	0.117	0.18	21.0 (8.5)	23.0 (8.5)	0.220	0	21.0 (11.0)	27.5 (7.8)	0.372	0.32
Pain Catastrophizing Scale (PCS)	23.0 (15.0)	20.0 (15.0)	0.077	0.20	27.0 (14.0)	23.5 (14.8)	0.195	0.12	18.0 (10.0)	15.5 (24.8)	0.203	0.25
Disability (FRI)	40.8 (24.4)	25.0 (38.8)	0.400	0.20	42.5 (23.8)	25.0 (40.6)	0.246	0.39	27.5 (25.0)	28.8 (36.3)	0.906	0.10
LiSat-life	4.0 (2.0)	4.0 (1.5)	0.256	0.13	4.0 (2.0)	4.0 (1.0)	0.368	0.13	4.0 (2.0)	5.0 (2,5)	0.429	0.13
LiSat-vocation	3.0 (3.0)	4.0 (4.0)	0.011	0.42	3.0 (2.75)	4.0 (2.5)	0.051	0.33	3.0 (2.0)	4.5 (4.0)	0.102	0.55
EQ5D index	0.62 (0.60)	0.73 (0.61)	0.052	0.42	0.66 (0.67)	0.73 (0.71)	0.209	0.42	0.59 (0.53)	0.69 (0.52)	0.122	0.40
EQ VAS	50.0 (20.8)	74.0 (35.0)	0.009	0.63	50.0 (22.5)	70.0 (40.0)	0.116	0.60	50.0 (25.0)	78.5 (35.8)	0.041	0.66
Self-reported work ability (WAI)	5.0 (3.0)	6.0 (5.0)	< 0.001	0.41	4.5 (3.0)	6.0 (5.0)	0.020	0.31	5.0 (5.0)	6.5 (5.0)	0.014	0.58
Chance to return to work within 6 months	4.0 (3.25)	4.5 (5.8)	0.367	0.16	4.0 (3.0)	4.0 (4.0)	0.390	0.09	3.0 (5.0)	8.0 (6.0)	0.796	0.34

NPRS: Numerical Pain Rating Scale; HADS-A and HADS-D: The Hospital Anxiety and Depression Scale; CPAQ: The Chronic Pain Acceptance Questionnaire; FRI: The Functional Rating Index; LiSat-11: The Life Satisfaction Questionnaire; WAI: Work Ability Index.

IQR: Interquartile Range; CPAQ: Chronic Pain Acceptance Questionnaire – Activity Engagement and Pain Willingness; EQ5D index and EQ VAS: The European Quality of Life instrument contains the EQ5D descriptive system; VAS: Visual Analogue Scale.

Table IV. A comparison of patient reported outcome measures between subgroups at baseline and 1-year follow-up

	Baseline			One-year follow-up		
	Bad responders	Good responders		Bad responders	Good responders	
	Median (IQR)	Median (IQR)	p*	Median (IQR)	Median (IQR)	p*
Pain intensity recent week (NPRS)	8.0 (3.0)	6.0 (4.0)	0.050	6.0 (3.0)	5.0 (6.0)	0.568
Pain intensity current (NPRS)	7.0 (2.0)	6.0 (5.0)	0.092	5.0 (5.0)	4.0 (4.0)	0.695
Anxiety (HADS-A)	8.0 (7.5)	10.0 (6.0)	0.618	6.5 (9.8)	9.5 (4.3)	0.445
Depression (HADS-D)	6.0 (5.8)	4.0 (5.0)	0.034	4.5 (6.5)	2.5 (6.25)	0.534
Activity engagement (CPAQ)	34.0 (16.0)	33.0 (14.8)	0.454	39.0 (11.8)	35.5 (13.5)	0.953
Pain willingness (CPAQ)	21.0 (8.5)	21.0 (11.0)	0.317	23.0 (8.5)	27.5 (7.8)	0.037
Pain Catastrophizing Scale (PCS)	27.0 (14.0)	18.0 (10.0)	0.210	23.5 (14.8)	15.5 (24.8)	0.228
Disability (FRI)	42.5 (23.8)	27.5 (25.0)	0.209	25.0 (40.6)	28.8 (36.3)	0.930
LiSat-life	4.0 (2.0)	4.0 (2.0)	0.770	4.0 (1.0)	5.0 (2,5)	0.770
LiSat-vocation	3.0 (2.75)	3.0 (2.0)	0.857	4.0 (2.5)	4.5 (4.0)	0.857
EQ5D Index	0.66 (0.67)	0.59 (0.53)	0.570	0.73 (0.71)	0.69 (0.52)	0.595
EQ VAS	50.0 (22.5)	50.0 (25.0)	0.945	70.0 (40.0)	78.5 (35.8)	0.381
Self-reported work ability (WAI)	4.5 (3.0)	5.0 (5.0)	0.678	6.0 (5.0)	6.5 (5.0)	0.561
Chance to return to work within 6 months	4.0 (3.0)	3.0 (5.0)	0.672	4.0 (4.0)	8.0 (6.0)	0.498

NPRS: Numeric Pain Rating Scale; HADS-A and HADS-D: The Hospital Anxiety and Depression Scale; CPAQ: The Chronic Pain Acceptance Questionnaire; FRI: The Functional Rating Index; LiSat-11: The Life Satisfaction Questionnaire; WAI: Work Ability Index; EQ5D index and EQ VAS: The European Quality of Life instrument contains the EQ5D descriptive system and Visual Analogue Scale.
*Mann–Whitney U analysis.

was increased visits to specialized physician services ($p=0.005$). Within the subgroups, the patients who had increased their HCU 1 year after team assessment, that is the bad responders, increased visits to almost all professionals 1 year after team assessment, of which visits to specialized physicians ($p=0.001$), rehabilitation personnel ($p=0.050$) and specialists in physical and rehabilitation medicine ($p=0.012$) increased significantly. The patients who had decreased their HCU, the good responders, reduced their visits to primary care physicians significantly ($p=0.014$) (Table V).

Comparing the subgroups at baseline, the good responders visited psychologists and mental health nurses ($p=0.005$) and primary care nurses ($p=0.046$) significantly more often than the bad responders did. At follow-up, the use of primary care physicians ($p=0.033$) and specialized physicians ($p=0.015$) was significantly lower for the good responders (Table VI).

Case manager utilization

The bad responders visited and called the CM 56 and 70 times respectively. The good responders made 20 visits and 26 telephone calls to the CM. There were no significant differences (Table VI).

DISCUSSION

This pilot study evaluated a CM-led MMR intervention in primary care and the impact on HCU of the participants. The results showed that the participants were more satisfied with their vocational situation and experienced increased self-reported work ability, HRQoL and reduced pain intensity at 1-year follow-up. Before the intervention, the bad responders, experienced significantly higher pain intensity and more depression than the good responders. At follow-up, the bad responders reported a significant decrease in pain intensity whilst the good responders had significantly increased activity engagement and HRQoL.

Table V. Contacts with healthcare 1 year before and 1 year after team assessment for all participants, bad responders and good responders

	All participants					Bad responders					Good responders				
	n = 36					n = 25					n = 11				
	Before		After			Before		After			Before		After		
	Total	Median (IQR)	Tot	Median (IQR)	p*	Tot	Median (IQR)	Tot	Median (IQR)	p*	Tot	Median (IQR)	Tot	Median (IQR)	p*
Primary care physicians	142	3.0 (3.8)	120	2.5 (3.0)	0.140	86	3.0 (2.5)	102	3.0 (3.5)	0.866	56	5.0 (5.0)	18	1.0 (3.0)	0.014
Specialized physician	23	0 (1.0)	55	1.0 (2.8)	0.005	14	0 (1.0)	49	1.0 (3.0)	<0.001	9	0 (2.0)	6	0 (1.0)	0.450
Psychologists and MHN	63	0 (3.0)	75	0 (3.0)	0.443	19	0 (0)	39	0 (1.0)	0.223	44	3.0 (6.0)	36	3.0 (6.0)	0.655
Rehabilitation personnel	76	1.0 (2.0)	133	2.0 (6.8)	0.086	56	1.0 (2.0)	100	3.0 (6.5)	0.050	20	1.0 (2.0)	33	1.0 (3.0)	0.959
Specialist in physical and RM	13	0 (0)	23	0 (1.0)	0.104	5	0 (0)	20	1.0 (1.0)	0.012	8	0 (0)	3	0 (1.0)	0.461
Primary care nurses excl. CM	134	2.0 (4.8)	108	1.0 (3.0)	0.618	63	2.0 (3.0)	84	2.0 (4.0)	0.397	71	5.0 (12.0)	24	1.0 (3.0)	0.097
Telephone calls to PCP	19	0 (1.0)	29	0 (1.0)	0.243	13	0 (1.0)	19	0 (2.0)	0.350	6	0 (1.0)	10	0 (1.0)	0.518
Telephone calls to PCN	56	0 (1.8)	79	0.5 (3.0)	0.243	47	0 (1.5)	46	1.0 (2.5)	0.709	9	1.0 (2.0)	32	0 (5.0)	0.172
Visits to CM	NA	NA	76	1.0 (1.0)	NA	0	NA	56	1.0 (1.5)	NA	0	NA	20	1.0 (1.0)	NA
Telephone calls to CM	NA	NA	96	2.0 (3.8)	NA	0	NA	70	2 (3.5)	NA	0	NA	26	1.0 (3.0)	NA

MHN: mental health nurse; RM: rehabilitation medicine; CM: case manager; PCP: primary care physician; PCN: primary care nurse.
*Wilcoxon signed-rank test.

Table VI. A comparison of contacts with healthcare between subgroups 1 year before and 1 year after team assessment

	Bad responders		Good responders			Bad responders		Good responders		
	Total	Median (IQR)	Tot	Median (IQR)	p*	Tot	Median (IQR)	Tot	Median (IQR)	p*
Primary care physicians	86	3.0 (2.5)	56	5.0 (5.0)	0.158	102	3.0 (3.5)	Tot	1.0 (3.0)	0.033
Specialized physician	14	0 (1.0)	9	0 (2.0)	0.541	49	1.0 (3.0)	18	0 (1.0)	0.015
Psychologists and MHN	19	0 (0)	44	3.0 (6.0)	0.005	39	0 (1.0)	6	3.0 (6.0)	0.053
Rehabilitation personnel	56	1.0 (2.0)	20	1.0 (2.0)	0.829	100	3.0 (6.5)	36	1.0 (3.0)	0.243
Specialist in physical and RM	5	0 (0)	8	0 (0)	0.901	20	1.0 (1.0)	33	0 (1.0)	0.135
Primary care nurses excl. CM	63	2.0 (3.0)	71	5.0 (12.0)	0.046	84	2.0 (4.0)	3	1.0 (3.0)	0.360
Telephone calls to PCP	13	0 (1.0)	6	0 (1.0)	0.672	19	0 (2.0)	24	0 (1.0)	0.680
Telephone calls to PCN	47	0 (1.5)	9	1.0 (2.0)	0.837	46	1.0 (2.5)	10	0 (5.0)	0.883
Visits to CM	0	NA	0	NA	NA	56	1.0 (1.5)	32	1.0 (1.0)	0.896
Telephone calls to CM	0	NA	0	NA	NA	70	2 (3.5)	20	1.0 (3.0)	0.248
								26		

MHN: mental health nurse; RM: rehabilitation medicine; CM: case manager; PCP: primary care physician; PCN: primary care nurse.

*Mann–Whitney U analysis.

The good responders used psychological and mental health nursing services significantly more often than the bad responders did at baseline. One year after, the good responders had reduced their use of primary care physicians and specialized physicians significantly while the bad responders had increased visits to all but one professional category.

Our findings indicate regained confidence in work ability, both for the whole population and separately within the subgroups. This is interesting because there were differences in the significant improvements in PROMS that each subgroup displayed. This may be explained by the complexity of work ability, involving several factors such as health and functional capacities as well as factors linked to work (35). Improved work capacity has been reported previously in similar studies (36, 37). Decrease in pain intensity and increased HRQoL are also in line with earlier studies (14, 38).

Results regarding differences between the subgroups may suggest that the subgroups were at different points in their coping processes when participating in the intervention. The good responders made more frequent use of psychological and mental health nursing services than the bad responders did, which may have been beneficial for their coping strategies. This may have led to earlier reorientation towards activation, contributing to an earlier start of the pain rehabilitation process. Improvements in activity engagement and HRQoL, as well as a significantly higher pain acceptance level at follow-up, as observed in the good responders, could further support this hypothesis. According to Jensen and colleagues (39), improved functioning and reduced HCU are associated with changes in both confidence and cognitive coping strategies. The reduction in pain intensity in the bad responders can be interpreted as an indication that the group reacted positively to the rehabilitative efforts but still evaluated themselves in terms of pain and not activity. Several studies have shown an association between pain-related psychological impairment and increased HCU (5, 40–42).

One year after team assessment, the bad responders had not reached the level of HCU that characterized the good responders. This advocates the importance of early multidisciplinary intervention that encourages activation, reduces fear and avoidance and includes work-related goal-setting with a focus on the labour market. It takes time to reach acceptance and enhance coping strategies. The importance of an early biopsychosocial perspective that addresses the complexity of chronic pain management and prevents the development of persistent pain and disability has been emphasized in studies similar to ours (10, 43).

There were no obvious benefits of the implementation of a CM in our results but there were some indications. The good responders reduced their use of primary care physician services during the period after team assessment, which may reflect a partially successful re-arrangement of work load, since the CM was regarded as the primary leader of the rehabilitation process. In Sweden, a rehabilitation coordinator with similar function as the CM has been implemented in the primary healthcare and it has been reported that the rehabilitation coordinator relieved the work load of the primary care physician and contributed to a better work environment for all coworkers (23).

Early MMR interventions in primary care settings have been suggested to lead to economic savings (12, 16, 40). Nevertheless, the total healthcare cost of our study population increased between the 2 measure points. Differences between the subgroups regarding their current stage in the coping process indicate that HCU needs to be evaluated in a longer time frame. Pain perception and intensity have been shown to be predictors of greater HCU in primary care (5, 40, 44). In our study, the significant reduction in pain intensity in the bad responders at 1-year follow-up may indicate that continuing improvement in pain-coping strategies may lead to future reductions in HCU.

The differences between the bad responders and the good responders in their HCU raise questions of whether the intervention was more suitable for one or the other subgroup. Although the intervention was highly customized, some patients may have benefitted from a more structured form with fixed content and time frame such as that offered by a traditional MMR program. In a qualitative study (45) where 10 of the participants who took part in this study were interviewed about their experiences of multidisciplinary

team assessment, the authors concluded that some participants found it challenging that the responsibility of the adoption and success of the rehabilitation plan was ultimately up to them. Hence, some patients might have needed extra support in addition to the team assessment, the rehabilitation plan and the CM follow-up.

To our knowledge, this project was a first step in Finnish primary care to move from a unimodal to a multimodal way of approaching one of the major patient groups that stand for a considerable part of the total healthcare costs. This subject has been little studied and our pilot study may contribute valuable information about how this transition can be realized by the reorganisation of existing resources in everyday clinical settings. Validated instruments were used to gather descriptive data. Our study was limited by the small size of the study population, which also limits the generalizability of the results. Furthermore, measures based on self-ratings may lead to recall bias and influence results. Another limitation is the lack of a control group. However, our data were generated in a clinical setting in ordinary healthcare and the possibility of having a control group was limited and ethically complicated. This limitation has been described previously in a number of publications from the SQRP research group (46, 47).

In conclusion, for patients with chronic musculoskeletal pain, CM-led MMR and the reorganizing of existing resources in primary care may increase HRQoL, reduce pain intensity and improve work ability. Early biopsychosocial intervention by a psychologist and mental health nurse was associated with greater progress in one's coping process and reduced HCU. The benefits of having a CM seemed to be reduced workload for the primary care physicians, a freeing up of resources and costs savings since a visit to a nurse is considerably cheaper than a visit to a physician. Further long-term studies on early MMR in primary care are needed to optimize the early identification of chronic pain patients and match them with an appropriate intervention.

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Conflict of interest statement

The authors have no conflicts of interest to declare.

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