

# Network pain rehabilitation

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## Summary

This thesis describes the development and evaluation of a new interdisciplinary care intervention within primary care and between primary care and the other healthcare levels: 'Network Pain Rehabilitation Limburg' (NPRL). The main objective was to investigate the feasibility and (cost-)effectiveness of NPRL.

**Chapter 1**, the general introduction of this thesis, presents the background to and relevance of the conducted studies. Chronic musculoskeletal pain (CMP) is the major cause of pain and disability and includes a diverse range of diagnoses, with a prevalence of 18% in the adult Dutch population. An ageing population, increased life expectancy, elevated levels of obesity, and lack of physical activity will all increase the prevalence in the coming years. CMP is complex as it has a multidimensional, biopsychosocial character. Patients report lower quality of life than other patient groups. CMP is also strongly associated with impaired function and is a leading cause of work absenteeism and health-related early retirement. In the Netherlands, the direct and indirect medical costs for CMP are approximately €20 billion per year. Despite these high costs, treatments received are often perceived as inadequate in solving patients' complaints, with patients often left seeking explanations or solutions for their CMP complaints.

In the Netherlands, the highly diversified primary to tertiary healthcare levels and the social care system need to be managed to be able to regulate this growing group of patients. In current care, HCPs feel less equipped to treat patients with complex diseases, increase the self-management skills of patients, and use ICT facilities in care. Additionally, HCPs experience time pressure and increased administrative tasks which can lead to burnout, especially among general practitioners (GPs) and medical specialists. Healthcare is fragmented due to working in different care levels, and this leads to suboptimal working conditions for HCPs when treating patients with complex chronic diseases. Different healthcare levels in service delivery have different financing arrangements and collaboration between the lines can unfortunately be limited.

To overcome these problems in the organization of care, the World Health Organization (WHO) proposed in a recent report that multidisciplinary rehabilitation services be integrated into and between primary, secondary, and tertiary levels of health systems. An example of this integrated care is the Standard of Care for Chronic Pain in the Netherlands, which describes an integrated, multidisciplinary organization of regional networks working with a biopsychosocial vision as a possible solution for fragmented care. The Network Pain Rehabilitation Limburg (NPRL), an implementation of the Standard of Care for Chronic Pain, is described in this thesis.

The evaluation of such a complex, multidisciplinary network for patients with CMP needs to be multi-dimensional. The Quadruple Aim is an approach to optimizing health system performance, proposing that healthcare institutions simultaneously pursue four dimensions of performance: improving the health of populations, reducing the per capita cost of healthcare, enhancing the patient experience of care, and improving the work-life balance of HCPs and other staff.

Following the WHO's recommendations, digital health investments should be integrated into care to support future continuity of care and integrated service delivery. EHealth has the potential to provide numerous benefits for patients and health systems, such as improving the accessibility and cost-effectiveness of health care. With this goal, a diverse range of effective eHealth applications for patients with CMP, from webpages with patient education and online treatment courses to video-

conference calls with HCPs, have been developed and evaluated. However, the implementation of eHealth in interdisciplinary care needs further exploration.

**Chapter 2** presents an overview of articles reporting on rehabilitation care networks, within primary care or between primary and other health care settings for patients with CMP. Moreover, their impact on the Quadruple Aim outcomes (health; health care costs; quality of care experienced by patients; work satisfaction for HCPs) is studied. For this systematic review, studies were included if the main population comprised patients with CMP, the intervention was implemented in primary care or a combination of primary care and other care settings, with a rehabilitation aim, and an interdisciplinary care network. Only original descriptions of interventions in Dutch, English, or German published between 1 January 1994 and 14 November 2019 were included. The search was performed in the databases PubMed, CINAHL, Web of Science, and PsycInfo, and by tracing publications from the reference sections of included papers and relevant reviews.

Forty-nine articles were included, describing 34 individual interventions. Twenty-one interventions consisted of collaborations of HCPs within primary care, such as various therapists and nurse practitioners or physicians/physiatrists, psychologists. There were six interventions involving collaboration between primary care and secondary or tertiary care (e.g. a GP with a therapist, orthopaedic surgeon/specialist, nurse practitioner, or extensive rehabilitation teams). One intervention took place in an interdisciplinary pain clinic in primary care where therapists who usually work in both primary care and secondary/tertiary care settings delivered the treatment. Two interventions were a collaboration between primary care and social care with teams comprising several therapists, a psychologist, and a case manager. Two interventions consisted of a collaboration between primary, secondary/tertiary, and social care, also involving patients' medical specialists during workplace interventions. Finally, two interventions involved collaboration between primary care and community-based initiatives, comprising fitness instructors and telephone coaches along with therapists in primary care. The content of collaborations ranged from simply performing an assessment together to delivering a fully integrated interdisciplinary treatment.

Among the 49 articles, 19 randomized trials, 12 non-randomized studies, seven qualitative studies, seven study protocols, one description of an intervention, two studies with a population with mixed diagnoses, and one study regarding barriers and facilitators, were found. Thirty-nine articles had at least one of the Quadruple Aim outcomes as the primary outcome: 18 articles described health outcome measures, 12 described cost outcome measures, four described quality of care experienced by patients, and five articles described work satisfaction for HCPs. We therefore conclude that there is a wide variety in content, collaboration, and evaluation methods of interdisciplinary rehabilitation interventions within primary care, and between primary care and other health care settings. Most interdisciplinary interventions are evaluated in primary care, with fewer involving primary care with other health care settings. It seems that interventions with the involvement of different HCP disciplines, and more patient-centred interventions, with broader content and duration of treatment, show more promising results than care as usual.

**Chapter 3** describes a protocol to evaluate the feasibility of the NPRL1.0. This is the original version of a transmural healthcare network providing integrated rehabilitation care for patients with CMP with a biopsychosocial approach in the province of Limburg, the Netherlands. Collaboration of HCPs is supported by information meetings, education days, treatment protocols, guidelines, eHealth, and facilitation of communication between patients and all HCPs. This study was to give insight into the

barriers and facilitators, perceived value, acceptability, and implementation strategies of NPRL1.0. During an iterative, user-centred design with three phases, quantitative and qualitative methods (mixed methods) were used for evaluation. In Phase 1, NPRL1.0 was developed and HCPs were educated; Phase 2 focused on implementing NPRL1.0; and Phase 3 focused on the transferability of NPRL1.0. In addition, data on patients' work status, general health, and participation levels were collected. The Consolidated Framework for Implementation Research (CFIR) was proposed for qualitative analysis and to refine NPRL1.0 to better fit with daily practice. The evidence generated from this feasibility study would not only help to adjust the design and content of NPRL1.0 but also help future studies in developing and implementing transmurals networks in healthcare.

In **Chapter 4**, the results of the feasibility study (October 2017 to October 2018) (described in Chapter 3) are presented. The aim was to identify barriers and facilitators for the development, implementation, and transferability of NPRL1.0. The study was conducted with a three-phase iterative and incremental design. The network comprised two rehabilitation practices for specialized medical rehabilitation, and three local primary care networks, each with a GP, a mental health practice nurse, and a physiotherapist or exercise therapist. These stakeholders, together with a random sample of participating patients, took part in evaluations which consisted of interviews, focus groups, and observations. Field notes and observations were recorded during meetings. The CFIR guided data collection and analysis. Results were used to refine the next phase and results at the end of the study were used to make recommendations for revised designs of NPRL. Five focus groups and six interviews with 21 HCPs from different disciplines, and one focus group with six patients (out of 58) were held. Facilitators of NPRL1.0 were consistency and transparency in ways of collaboration, speaking in a biopsychosocial language, and working to treatment protocols. An important facilitator in the development and implementation of NPRL1.0 was the iterative and incremental design, based on key principles of user-centred design. HCPs were enthusiastic about the iterative, bottom-up development in which they participated. This bottom-up strategy increased the focus on patients' and HCPs' needs and led to greater usability and acceptance. One barrier to the implementation of NPRL1.0 was the stigmatization of CMP by the general population. Patients expected a biomedical elucidation of their CMP complaints, which made it difficult for HCPs to stick to a biopsychosocial treatment. Additionally, the current organization of healthcare and its financing, including the culture, structure, and financing of healthcare practices, complicated the implementation of NPRL1.0 within and between practices. Moreover, a sufficient amount of healthcare organizations in the region is needed for proper implementation but our convenience sample of three local networks only covered a small number of practices and was restricted to one geographic area, and therefore may not be representative of other populations. In conclusion, NPRL1.0 is feasible in daily practice if barriers are overcome and facilitators of development, implementation, and transferability are promoted. The results of this feasibility study were used to adjust education for HCPs, the eHealth application for HCPs and patients, and educational information for patients. These proposed adaptations to NPRL1.0 will facilitate the development of NPRL2.0. Moreover, the results of this feasibility study can assist other healthcare organizations in implementing a transmurals network using a similar model.

**Chapter 5** describes the pragmatic study protocol of NPRL2.0, presenting a network care approach based on NPRL2.0 and the evaluation of its (cost-) effectiveness. The evaluation had three aims: 1) to study the effectiveness (concerning the functioning and participation of patients) of the treatment in

primary care for patients with CMP, comparing care organized following NPRL2.0 with usual care; 2) to study the cost-effectiveness and cost-utility regarding health-related quality of life and healthcare costs; and 3) to study the effect of duration of participation in a local network in primary care. This study comprised two designs: a prospective cohort study and a stepped-wedge design. Within this project, 105 patients had first to be recruited for a prospective cohort study situated in two local primary care networks that had previously participated in NPRL1.0 and were continuing their participation in NPRL2.0. Secondly, 184 patients were needed to be recruited from six new local primary care networks (April 2019 to December 2020). These practices all started by providing care as usual and then, after training to provide care according to NPRL2.0, switched to the new approach for CMP within their practice. The change in the content of care was approached based on a stepped-wedge design. Patients in both study groups were to complete four questionnaires about health, and societal and medical costs. Outcomes were to be compared using linear mixed-model analyses and costs were to be compared using bootstrapping methods.

We aimed to evaluate NPRL2.0 with regard to the Quadruple Aim: the health of populations, the per capita cost of healthcare, the patient experience of care, and the work-life of HCPs and staff. Unfortunately, due to the COVID-19 pandemic, too few patients were included to reach sufficient power for analysis of health, costs, and patient experiences of care. No final conclusions regarding NPRL2.0 could thus be presented to address these topics.

**Chapter 6** reports on the study aiming to provide insight into the perceived changes in interprofessional collaboration practice (ICP) and work satisfaction of HCPs participating in NPRL1.0 and NPRL2.0. In this mixed-methods study, diverse frameworks were used to compose an Integrated ICP and Quadruple Aim framework for analysis. Between 2017 and 2020, eleven semi-structured focus groups and one interview were conducted in two stages. In 2020, the Interprofessional Collaboration Attainment Survey was used to retrospectively measure HCPs' ability to perform ICP before and after receiving NPRL training. In total, 37 HCPs were enrolled, including GPs, therapists, and mental health practice nurses. In conclusion, HCPs described positive experiences but no major changes in ICP and work satisfaction. There is a commitment to interdisciplinary collaborations in primary care to guide patients with CMP. It seems that more time is needed on working in a structure like NPRL but it may result in advantages in ICP and work satisfaction.

**Chapter 7** reports on the feasibility of eCoach-Pain, an eHealth application facilitating biopsychosocial care for CMP, for use in interdisciplinary primary care. ECoach-Pain comprises a tool measuring pain complexity, diaries, pain education sessions, monitoring options, and a chat function. The feasibility was assessed by considering learnability, usability, desirability, adherence to the application, and experiences from patients and GPs, mental health practice nurses, and physiotherapists (June to December 2020). Six primary HCPs from two settings participated in the study, recruiting 29 patients. The HCPs together with the software developers participated in two focus groups. ECoach-Pain was perceived to provide additional value to their treatment. However, for optimal use, a case manager is recommended as well, since GPs will not be able keep track of all these patients in the long term. The deployment of mental health practice nurses should be further investigated as their role was not clear in this study. Patients participated in evaluation questionnaires (n = 11), individual interviews (n = 11), and their eCoach-Pain-use registration data (n = 26) were extracted. Patients saw treatment benefits and they were generally satisfied with the

eCoach but they indicated that the current content of eCoach-Pain did not optimally match their complaints. Moreover, communication between HCPs and patients about the use and results of the eCoach should be further improved for future use. Also, the integration of other eHealth applications and electronic patient dossiers with eCoach-Pain should be studied. We recommend improving the implementation strategy and involve a case manager for each patient.

**Chapter 8** is general discussion in which the findings are summarized, discussed, and combined into an overall conclusion. Based on the results of this thesis, it has become clear that NPRL is feasible in daily practice when the identified facilitators and barriers are taken into account. In future implementation projects and research, the organization and financing of current care should be further explored and adjusted to facilitate such initiatives. Moreover, the transition from biomedical towards a biopsychosocial orientation in Dutch society should be stimulated to accelerate the adoption of such initiatives.

More enthusiasm for CMP and the organization of interdisciplinary primary care was found among HCPs. Changes in attitudes towards working with a biopsychosocial approach were realized as a result of participation in NPRL. However, optimal implementation of NPRL lagged. Therefore, when implementing interventions in health service delivery, sufficient time and new ways of financing are necessary. As a result of these, the quality of care and the working conditions of HCPs will improve with the successful implementation of these networks.

ECoach-Pain has not yet stimulated interdisciplinary collaborations in primary care. The added value of using currently existing eHealth applications for patients with CMP for interdisciplinary primary care should be further studied, as do the possibilities of integrating the use of eCoach-Pain with existing eHealth applications or patient dossiers.

As a reflection on the methodology used, this thesis shows that user-centred designs and mixed methods are suitable for evaluations of health service delivery innovations. The bottom-up design and quantitative evaluation resulted in increased enthusiasm among HCPs for NPRL. For further studies, the use of co-creation and single-case experimental designs to implement and evaluate meaningful interventions in daily practice is recommended. In order to make valid statements about the effects of a new intervention, a broad range of qualitative and quantitative study outcomes, such as those of the Quadruple Aim, should be measured.

In conclusion, the results of this thesis have led to new insights into the role of integrated, interdisciplinary care networks for patients with CMP. The main deliverable of this thesis is a network of HCPs in primary, secondary, and tertiary care, aiming to deliver integrated interdisciplinary care for patients with CMP. Additionally, an education programme is developed for HCPs which focuses on learning to work with a biopsychosocial vision, stimulating early recognition of sub-acute and chronic patients, updating neurophysiology knowledge, and discussing collaboration strategies in primary care. Moreover, a first version of the eCoach-Pain is available for use in primary care for HCPs and patients with CMP. The main conclusions of this thesis are that, with the development of NPRL, important first steps are being taken in the transition of care for patients with CMP but it takes time to change to interdisciplinary collaboration and to shift towards a biopsychosocial vision of HCPs and patients. HCPs show increased enthusiasm for CMP and the organization of interdisciplinary primary care. However, challenges remain in the (financial) organization of care and in the transition from a biomedical to a biopsychosocial orientation in wider Dutch society. Working in this structure seems feasible, but can still be further improved. Additionally, the effectiveness of care delivered in NPRL needs further study.