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Swiss chiropractic practice-based research network and musculoskeletal pain cohort pilot study: protocol of a nationwide resource to advance musculoskeletal health services research

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ABSTRACT

Introduction Musculoskeletal (MSK) pain conditions, a leading cause of global disability, are usually first managed in primary care settings such as medical, physiotherapy, and chiropractic community-based practices. While chiropractors often treat MSK conditions, there is limited real-world evidence on the topic of health service outcomes among patients receiving this type of care. A nationwide Swiss chiropractic practice-based research network (PBRN) and MSK pain patient cohort study will have potential to monitor the epidemiological trends of MSK pain conditions and contribute to healthcare quality improvement. The primary aims of this protocol are to (1) describe the development of an MSK-focused PBRN within the Swiss chiropractic setting, and (2) describe the methodology of the first nested study to be conducted within the PBRN—an observational prospective patient cohort pilot study.

Methods and analysis This initiative is conceptualised with two distinct phases. Phase I focuses on the development of the Swiss chiropractic PBRN, and will use a cross-sectional design to collect information from chiropractic clinicians nationwide. Phase II will recruit consecutive patients aged 18 years or older with MSK pain from community-based chiropractic practices participating in the PBRN into a prospective chiropractic cohort pilot study. All data collection will occur through electronic surveys offered in the three Swiss official languages (German, French, Italian) and English. Surveys will be provided to patients prior to their initial consultation in clinics, 1 hour after initial consultation, and at 2, 6 and 12 weeks after initial consultation.

Ethics and dissemination Ethics approval has been obtained from the independent research ethics committee of Canton Zurich (BASEC-Nr: 2021-01479). Informed consent will be obtained electronically from all participants. Findings will be reported to stakeholders after each study phase, presented at local and international conferences, and disseminated through peer-reviewed publications.

Study pre-registration Phase I—Swiss chiropractic PBRN (ClinicalTrials.gov identifier: NCT05046249); Phase 2—Swiss chiropractic cohort (Swiss ChiCo) pilot study (ClinicalTrials.gov identifier: NCT05116020).

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Use of a flexible practice-based research network (PBRN) model will allow for a diverse range of nested study design types as well as the future expansion of the network.
⇒ Development of protocol methods is guided by patient and public involvement activities with key stakeholders.
⇒ Sole use of electronic data capture methods may lead to selective participation of both clinician and patient participants.
⇒ Maintenance of the PBRN and subsequent expansion of the patient cohort will depend on ongoing stakeholder support and involvement.

INTRODUCTION

Musculoskeletal (MSK) pain conditions are the leading cause of disability worldwide, with low back pain being the largest single cause in over 160 countries, including Switzerland.[1 2] This health burden translates to an economic cost of approximately €6.6 billion or about 2% of Switzerland's total gross domestic product for low back pain alone.[3] Best practice recommendations and systematic reviews on MSK pain largely focus primarily on regional pain locations, such as low back pain or neck pain.[4–7] However, in the population and in primary care settings, it is common that those experiencing an MSK pain complaint also present with coexisting pain in another body region.[8–10] There is increasing evidence suggesting that these pain conditions, although localised to different regions, share similarities with respect to the course of symptoms, prognostic factors, and clinical care recommendations.[11 12] A siloed body region focus to MSK health may create gaps in patient-centred

research and difficulties with knowledge implementation in healthcare settings.

Further contributing to practice gaps is the lack of practice-based data collection in MSK healthcare research.[13] To help bridge the divide between research and practice, countries such as the UK, Denmark, Sweden, and Australia have engaged in practice-based research and worked with MSK-focused practice-based research networks (PBRNs).[14–16] A PBRN is a group of at least 15 primary care settings united under a commitment to advance the science base of clinical care.[17] These 'real-world' clinical research environments allow for sustained collaborations between practitioners, patients, and academicians facilitating the co-creation of relevant research questions and production of clinically applicable results.[13 17 18]

The chiropractic scope of practice in Switzerland includes the diagnosis and management of MSK pain conditions through manual medicine, prescription medication, and diagnostic imaging (radiography, ultrasound, CT, MRI). As of December 2021, there were approximately 326 chiropractors practising across Switzerland with the large majority providing care in community-based settings. MSK complaints such as low back pain and neck pain, which result in the largest burdens of disability, are commonly seen in chiropractic practice.[19] Chiropractic healthcare centres may serve as useful settings to further investigate MSK pain conditions, to understand what role chiropractors play in the current management of these conditions, and to identify opportunities for Swiss MSK primary healthcare quality improvement. As management of MSK conditions moves away from traditional medical and pharmacological treatments and towards more physical and preventative approaches, there is a need to describe non-pharmacological treatment options to make informed decisions on how best to use this capacity in the current healthcare system.[4 20]

Given the high burden of MSK pain conditions, which are frequently managed by chiropractors, and limited practice-based evidence on the topic of chiropractic care for MSK conditions, particularly in Switzerland, this protocol report outlines the creation of a nationwide PBRN and subsequent nested prospective cohort (Swiss ChiCo) pilot study for chiropractic patients with MSK pain. Once established, this PBRN will provide the framework to help monitor the epidemiological trends of MSK pain in primary care settings, contribute to MSK healthcare quality improvement, and support future development and growth of practice-based MSK clinical research.

The main objectives of this protocol report are to: (1) describe the development of an MSK focused PBRN and describe the enrolment of Swiss chiropractors into the PBRN, and (2) describe the methods of the first nested study to be conducted within the PBRN—an observational prospective patient cohort pilot study.

METHODS AND ANALYSIS

Study design

The Swiss chiropractic PBRN will use a substudy PBRN model, similar to that of the Australian Chiropractic Research Network.[14 21 22] In substudy PBRN models, data are initially collected from participating clinicians/clinical practices through self-report to first establish and describe characteristics of the PBRN. Following development, nested substudies may be performed using this PBRN framework.

The current project will consist of two phases. Each project phase will have a specific aim and report on two primary feasibility and clinical outcomes related to this aim. In phase I, we aim to develop the Swiss chiropractic PBRN and describe the demographics of participating chiropractors at project initiation using a cross-sectional study design. In phase 2, we aim to launch a 12-week observational prospective Swiss chiropractic cohort (Swiss ChiCo) pilot study, which will assess the feasibility for longitudinal data collection and describe the clinical course of patients with MSK pain presenting to Swiss chiropractors. Figure 1 provides an overview of the two nested phases of this project.

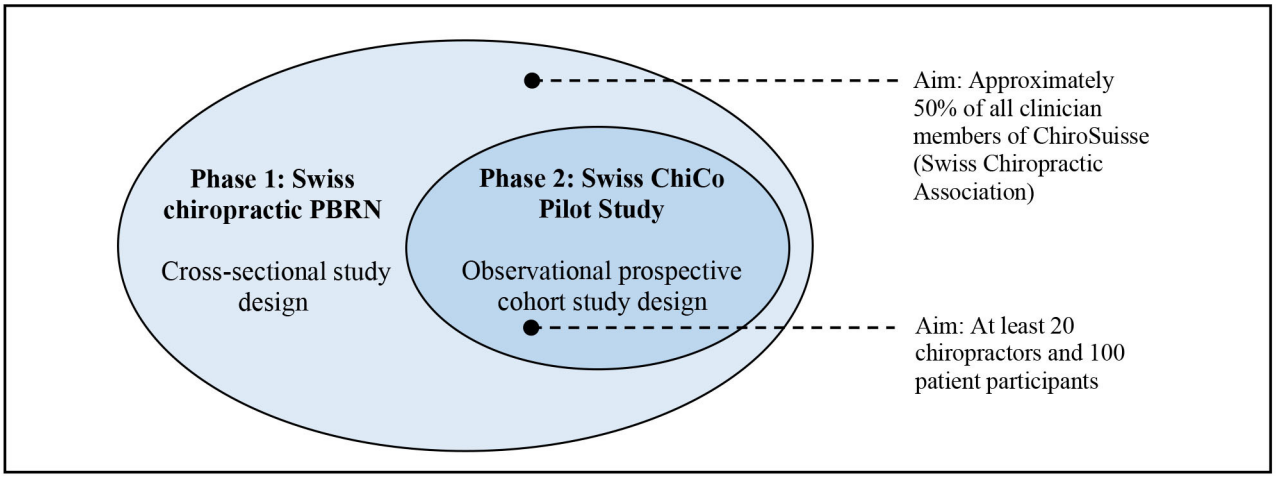

Figure 1 Nested design of the Swiss chiropractic practice-based research network (PBRN) and the Swiss ChiCo pilot study.

Patient and public involvement

To guide development of this project, we hosted several events to gather information from key stakeholders. Key stakeholders identified include the Swiss Chiropractic Association (ChiroSuisse), the Swiss Chiropractic Patient Association (Pro Chiropractic Switzerland), Swiss chiropractors, and an international group of researchers with experience in practice-based research. Participatory engagement activities were first performed collaboratively with all stakeholders and focused on study relevance, team building, project infrastructure development, and the collaborative creation of relevant research questions. A consensus-based understanding was reached by all members, which outlined the need for more clinical MSK research within the Swiss setting and a pledge to provide support to achieve this project goal. Other recommendations included the practicality to start with a small cohort study to first test data collection methods, as well to explore both clinical and feasibility-related objectives to help drive recruitment from community-based chiropractors and patients.

Individualised one-on-one meetings were subsequently conducted to discuss specific project methods with each stakeholder group. Recommendations provided by ChiroSuisse and Pro Chiropractic Switzerland included the addition of several questions to the Swiss ChiCo pilot study patient participant questionnaires. Consequently, questions relating to patient work status, past use of chiropractic care, and use of other healthcare in MSK pain management were added. Both associations also recommended increasing patient participant recruitment weighting for the Swiss ChiCo pilot study in the French and Italian language regions of Switzerland by 5% from what was initially proposed.

One-on-one meetings with a small group of interested Swiss chiropractors were carried out for the purpose of understanding how best to integrate study processes into clinical practice settings. According to all clinician advisors, the recruitment of approximately 5–10 consecutive patients per clinical practice was feasible. Outside of clinical workflow processes, patient participant inclusion criteria were revised from new healthcare seeking for an MSK pain condition (operationalised as not having received any (patient-reported) healthcare for current MSK complaint) to new conservative healthcare seeking for an MSK complaint (not having received any (patient-reported) chiropractic, physiotherapy, osteopathy or massage therapy for current MSK complaint in the last 1 month, and not a follow-up visit). Many clinician advisors recommended this change based on the clinical profile of their patients and insurance coverage practices in Switzerland (where chiropractic care typically follows an initial visit with a primary care physician or general practitioner).

Participatory engagement is an iterative process and requires continuous reflection of previous project processes and results to inform subsequent phases (action–reflection process).[23] Following completion of each project phase, individual meetings with each stakeholder group will be scheduled to disseminate findings, discuss how best to generate future PBRN growth and explore ways to expand the MSK clinical cohort study.

Phase I: development of the Swiss chiropractic PBRN

Participants

All registered active chiropractor members (fully licensed chiropractors and postgraduate assistant chiropractors) of ChiroSuisse will be eligible and invited to participate. Approximately 98% of all practicing Swiss chiropractors hold an active membership with ChiroSuisse (personal communication, 22 April 2021).

Recruitment

To aid with clinician recruitment, we plan to launch the PBRN development phase on 9 September 2021 at the annual ChiroSuisse Continuing Education Convention 2021 (Lausanne, 9–11 September 2021). Clinicians will have the opportunity to ask questions directly of the project team, test electronic study methods, sign up as a clinician member of the PBRN, and provide input and feedback for the subsequent Swiss ChiCo pilot study. Those interested will be invited to join the Swiss chiropractic PBRN by scanning a quick response code and completing the linked clinician entry survey using personal mobile devices. For those who do not attend the conference, we plan to use electronic email invitations containing the Research Electronic Data Capture (REDCap) PBRN entry survey link. This invitation will be paired with an information sheet outlining project goals, good conduct procedures for the PBRN, opportunity for subsequent substudy involvement, and risks and benefits for participation. Clinician recruitment for the Swiss chiropractic PBRN will be scheduled to end on 19 December 2021. Similar to other PBRNs within the scope of chiropractic and MSK health, we hope to achieve a clinician participation proportion of approximately 50%.[21 24]

Data collection procedures and variables

All data acquisition will occur electronically using the REDCap web application platform.[25] Clinicians participating in the Swiss chiropractic PBRN will be asked to fully complete one electronic survey of approximately 10 min duration. Clinician surveys will only be provided in English as this is the official language used for communication by ChiroSuisse. Table 1 outlines the specific data, which will be collected from clinicians for the development of the Swiss chiropractic PBRN. Online supplemental file 1 provides the data dictionary and specific response options that will be used for the Swiss chiropractic PBRN development survey.

Main outcomes and analysis

The first primary clinical outcome will be practitioner self-confidence in the clinical management of patients with low back pain (as measured by the practitioner self-confidence scale (PCS)).[26] The PCS contains four items with a total score of 20. A score of 4 represents higher

Table 1 Outcome measures to be collected for description of the Swiss chiropractic PBRN

Construct	Measurement method/instrument	Inception
Demographics	Gender, age, year of graduation	X
Practice characteristics	Number of years in practice, location of practice	X
	Primary language used in practice	X
	Number of healthcare practitioners involved in practice	X
	Type of healthcare offered	X
	Average number of patients seen per week	X
	Types of patients seen within practice	X
	Frequency of complaints seen within practice	X
Confidence	Practitioner self-confidence scale[26]	X
Beliefs and attitudes	Pain attitudes and beliefs scale—Musculoskeletal[27]	X
	Level of motivation to be involved in the Swiss ChiCo pilot study	X
Digitalisation of chiropractic practices	Electronic patient record system in practice	X
	Encrypted email use in practice	X
	Offering virtual care in practice	X
COVID-19 aspects	Change in quality of life, change in patient numbers, change in work hours, change in use of telehealth/e-health services.	X

self-confidence in the management of patients with low back pain, while a score of 20 represents lower self-confidence. The second primary clinical outcome will be practitioner biomedical versus biopsychosocial MSK pain treatment orientation (as measured by the pain attitudes and beliefs scale, musculoskeletal version (PABS-MSK)).[27] The PABS-MSK contains two domains, with a higher score on either of the domains (each 10-items, with a score range of 10–60) representing higher biomedical and biopsychosocial MSK pain treatment orientation. The order of 20 items of the PABS-MSK will be randomised using the 'randomizeR' package in RStudio and administered as a single questionnaire so as to mask respondents to the specific treatment orientation domains. Both primary clinical outcomes will be reported as means and SDs, with 95% CIs calculated as appropriate. Primary feasibility outcomes of (1) clinician participation proportion in the Swiss chiropractic PBRN will be assessed by reporting the proportion of all eligible clinicians that enrol in the PBRN development phase using raw numbers and percentages, and (2) motivation for clinician participation in the Swiss ChiCo pilot study will be assessed using a visual analogue scale (VAS, 0–100), with higher scores reflecting higher motivation for participation. Level of motivation to participate in the Swiss ChiCo pilot study will be reported as means, SDs and with 95% CIs calculated as appropriate. Participants who score 70 or more on the pilot study motivation VAS will be conceptualised as 'highly motivated', and described using raw numbers, and proportions with 95% CIs.

Phase II: the Swiss chiropractic cohort (Swiss ChiCo) pilot study

Participants

Patients will be eligible to participate if they are 18 years of age or older, are seeking new conservative healthcare for an MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic treatment, are able to respond to surveys in German, French, Italian or English, have an active email account and are willing and able to complete electronic study questionnaires. Patient participants will be excluded if they present to clinician practices with red flag symptoms (ie, saddle anaesthesia, loss of bowel and/or bladder control, history of major trauma, fracture, fever, severe or rapidly progressive neurologic deficit, sudden unexplained weight loss), and/or with a non-MSK-based pain condition based on the chiropractor's clinical suspicion that symptoms relate to a systemic disease.

Recruitment

Following the development of the Swiss chiropractic PBRN, we plan to recruit a subset of clinicians to participate in the Swiss ChiCo pilot study. Chiropractors will be recruited through general interest, VAS motivation score (≥70) on the PBRN entry questionnaire and using a purposeful sampling approach based on Swiss chiropractic clinician distribution across German, French and Italian language regions of Switzerland (55% DE, 35% FR, 10% IT). The Swiss ChiCo pilot study aims to recruit at least 20 chiropractors. Participating chiropractors will be asked to recruit new consecutive eligible patient participants from their clinical practices. We will hold pilot study training meetings with participant clinicians and clinical staff to introduce study objectives, methods and procedures prior to individual clinic pilot study launch dates, with the anticipated date for overall initiation of the patient cohort pilot study of 01 April 2022. During previous patient and public involvement work, Swiss chiropractors described the recruitment of 5–10 consecutive patients with new conservative onset MSK pain as feasible. We will aim to recruit at least 100 patient participants to enable a preliminary characterisation of the population. A stopping point for recruitment will be considered at approximately 5 to 10 patients enrolled per participating chiropractor.

Potentially eligible patients visiting a participating clinician will be first provided a study flyer, which will briefly outline the study objectives and participation

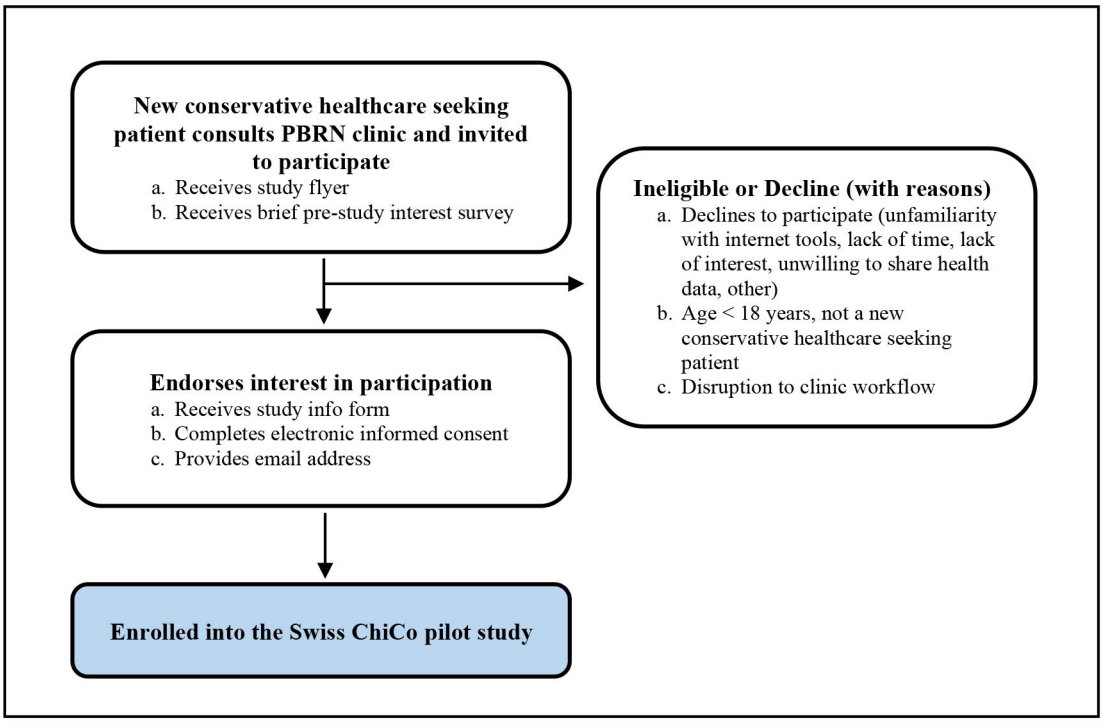

Figure 2 Summary of the Swiss ChiCo pilot study in-clinic patient participant recruitment. PBRN, practice-based research network.

requirements. Patients will then be asked to indicate their interest to participate using a brief electronic survey. Those not interested will be prompted to provide reasons for non-participation. Patients expressing interest in participation will be forwarded to the full study information form and electronic informed consent procedure. This in-clinic patient participant procedure was developed in consultation with Swiss chiropractic clinicians (both women and men) across all language regions. To aid with workflow, clinicians expressed interest in asking new patients to arrive approximately 20 min prior to their appointment to complete electronic study forms. Clinicians also recommended adding 'disruption to clinic workflow' as a clinic-implemented response option for non-participation of an eligible patient. This survey option could be selected by clinical staff when deemed that patient participant recruitment may greatly impact clinical workflow (eg, patient was late for visit, emergency visit). Figure 2 outlines the in-clinic patient recruitment procedure.

Data collection procedures and variables

Immediately following completion of the in-clinic recruitment procedure, study participants will be forwarded to the first patient survey (previsit patient survey) on an electronic device (mobile phone or tablet). This previsit initial patient survey will collect information on clinical measures that are likely to be influenced by the first visit (ie, pain impact, MSK health status, illness perception).[28–30] The previsit patient survey will take approximately 5 min to complete and is the only survey that is completed at clinical practices. Subsequent questionnaires will take approximately 10–12 min to complete and are emailed directly to patient participants 1 hour after (post-visit patient survey) and at 2, 6 and 12 weeks following completion of the previsit survey. REDCap will be used for longitudinal data collection, with survey data transmitted automatically to the research team at Balgrist University Hospital and the University of Zurich. Similar administration procedures were performed for the Danish chiropractic low back pain cohort study.[31] Patient participant surveys will be provided in English, German, French and Italian, with patients having the ability to choose their preferred language for completion. Validated, translated versions of the patient reported outcome measures (PROMs) will be used when possible.[32–39] If not available, translation of the PROMs by a native speaker will be performed. Table 2 outlines specific outcome measures and timing of data collection for the Swiss ChiCo pilot study. Online supplemental file 2 provides the data dictionary and specific response options to be used for the Swiss ChiCo pilot study surveys.

Main outcomes and analysis

The prespecified primary clinical outcomes will be: (1) change in MSK pain impact, as measured by the 3-item pain, enjoyment and general activity scale (PEG scale, score range 0–10)[28] with higher scores representing worse outcomes and (2) change in MSK health status, as measured by the MSK health questionnaire (MSK-HQ, score range 0–56)[29] with higher scores reflecting better health status. Clinical outcomes of the PEG scale and MSK-HQ prior to initial chiropractic assessment will be reported as means, SDs and 95% CIs; and clinical course

Table 2 Outcome measures and timing of data collection for the Swiss ChiCo patient pilot study

Construct	Measurement method/instrument	Pre visit	Post visit	Week 2	Week 6	Week 12
Clinic	Clinic name, clinician	X				
Demographics	Gender, age, nationality, level of education, smoking status		X			
	Work status, time lost from work due to pain complaint		X	X	X	X
Injury characteristics	Naïve to chiropractic care		X			
	Duration of complaint		X			
	Location of pain complaint		X			
	Pain, enjoyment, general activity scale[28]	X	X	X	X	X
	Other healthcare professional involved in care		X	X	X	X
	Number of chiropractic visits since initial visit			X	X	X
Pain medication use	Medication use for pain reduction (prescription or non-prescription)		X	X	X	X
Imaging use	Diagnostic imaging use for this specific MSK complaint		X	X	X	X
	Diagnostic imaging received in the past year for other complaint		X			
Psychosocial profile	Örebro Musculoskeletal Pain Screening Questionnaire—Short Form[44]		X			
COVID-19 aspects	Quality of life now compared with before COVID-19		X			
	Activity compared with before COVID-19		X			
	Cancelled medical treatment due to COVID-19		X			
MSK health status	Musculoskeletal health questionnaire[29]	X	X	X	X	X
Illness perception	Brief illness perception questionnaire (question 9)[30]	X				
Change in condition	Patient Global Impression of Change scale[45]			X	X	X

of patient pain impact and MSK health status will be reported as a mean difference with SDs and 95% CIs as appropriate. The primary feasibility outcomes will be: (1) the proportion of invited patients presenting to chiropractic practices who subsequently agree to participate in this study and (2) change in patient participant follow-up and retention over 12 weeks. Invited patient participation will be reported as raw numbers and proportions. Patient participant retention will be reported as the proportion of enrolled participants who complete follow-up surveys across 12 weeks. Based on the definition of a PBRN from the Agency for Healthcare Research and Quality,[17] it will be deemed feasible to initiate the Swiss chiropractic PBRN and expand the Swiss ChiCo pilot study if at least 15 clinical practices agree to participate in the Swiss chiropractic PBRN and each recruit at least 5 patients for enrolment in the Swiss ChiCo pilot study.

Ethics and dissemination

The Swiss chiropractic PBRN and Swiss ChiCo pilot study have been reviewed and jointly approved by the independent research ethics committee of Canton Zurich (BASEC-Nr: 2021-01479). Informed consent will be obtained from both clinician and patient participants electronically on entry into the Swiss chiropractic PBRN and the Swiss ChiCo pilot study. Clinician responses for PBRN development will be stored securely and confidentially within the study REDCap database, but not anonymously due to the need of identifying clinicians to participate in future nested PBRN projects. Data collected for PBRN development and for the Swiss ChiCo pilot study will be stored as two separate projects within REDCap. Individual-level data will not be shared with study stakeholders.

The findings from the Swiss chiropractic PBRN and the Swiss ChiCo pilot study will be disseminated first to the various stakeholder groups involved in study development through individual meetings. Findings will also be presented through presentations at academic conferences and fully reported in peer-reviewed publications.

Availability of data and materials

Data from this work will be made available for research purposes. Requests, including a synopsis of the study proposal, can be addressed to the corresponding author.

DISCUSSION

This project is designed to attract a large proportion of Swiss chiropractors into a nationwide PBRN and subsequently recruit patients from participating clinics into a longitudinal cohort pilot study. This approach combines a substudy PBRN model, with longitudinal electronic capture more readily seen in register-based approaches. The unique collaboration with clinicians, advocacy groups, and academicians—a growing trend in healthcare research—has led to the promotion of research objectives that are deemed clinically relevant and patient-centred, and a study implementation strategy supported by Swiss chiropractic primary care clinicians.

Traditional healthcare research approaches typically face challenges with regard to study relevance, patient recruitment, and knowledge translation.[13 40] The use of a participatory research approach can help overcome such challenges by integrating the diverse knowledge, values, and preferences of non-academics into the research process. An example of a longitudinal register-based study successfully implementing this approach is the Swiss Multiple Sclerosis Registry (SMSR).[41] This project was designed in collaboration with the multiple sclerosis (MS) community in Switzerland to tackle the lack of epidemiological data and to promote patient perspectives in MS research. Participatory elements of the SMSR include a flexible approach to study involvement based on participant comfort, involvement of patients in the study design and execution, and data feedback to provide ongoing results to participants. Due to such efforts, recruitment for the SMSR exceeded expectations; with the goal of 400 participants achieved in under 20 days.[42] A second example of a participatory research approach driving recruitment is the recently established national osteopathy PBRNs of Australia and New Zealand.[24] Here, the project team engaged with both osteopathic communities for 12 months prior to clinician recruitment. Today, these two PBRNs represent the largest coverage of any voluntary health profession PBRN, with 43.5% of all registered osteopaths in Australasia. The Swiss chiropractic PBRN has followed a similar approach, with community outreach and promotion efforts lasting more than 12 months prior to clinician recruitment.

What remains unclear is if early engagement of stakeholders can overcome the unique limitations of electronic observational studies. Typically, unequal access to technology resources and lack of digital literacy can lead to a young, well-educated, and high socioeconomic status study sample. For example, participants in the SMSR who opt for physical forms are older, show increased care-seeking behaviour, and suffer from more progressive illness compared with those using electronic forms. This trend also extends to clinician participants, as our own survey on health information technology use among Swiss chiropractors found that clinicians aged 60 years and over were 74% less likely to use electronic health records when compared with the those under 40 years.[43] To limit this threat to external validity, the Swiss chiropractic PBRN will recruit clinicians through both online and in-person channels. In addition, chiropractic clinician recruitment for the Swiss ChiCo pilot study will be proportionally overweighted in French and Italian language regions. These areas showed lower health information technology use when compared with German-speaking regions of Switzerland. To recruit a diverse group of patient participants, clinicians will be asked to consecutively recruit eligible patients from private practice. Although consecutive recruitment does not eliminate the threat of self-selection bias, it ensures all eligible patients seeking chiropractic care will be invited to participate in a non-selective manner. The Swiss chiropractic PBRN and Swiss ChiCo pilot study presents a model for PBRN development and rapid engagement of a newly created clinical research network. Once complete, this PBRN will serve as a platform for answering important research questions in the field of MSK primary healthcare.

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Contributors CAH conceived the project idea. CAH, RL, AK, VvW, MAP and LH contributed to the design of the protocol. RL and CAH designed, undertook and coordinated stakeholder participatory activities. RL and CAH led the drafting of the protocol manuscript. All authors gave important intellectual input and provided critical review of the protocol manuscript and approved the final version of the manuscript. CAH obtained funding. CAH and RL were the guarantors of this manuscript. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the methods and analysis sections for further details.

Patient consent for publication Not applicable.

Ethics approval The Swiss chiropractic PBRN and Swiss ChiCo pilot study have been reviewed and jointly approved by the independent research ethics committee of Canton Zurich (BASEC-Nr: 2021-01479).

Provenance and peer review Not commissioned; externally peer reviewed.

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Supplementary material 1. Clinician reported-variables captured in the Swiss chiropractic practice-based research network

Construct	Item Content	Variable Code	Choices, Calculations, OR Slider Labels	Branching Logic
Identification	Record ID	record_id		
	I consent to participate in the Swiss ChiCo study clinician survey	clin_consent	1, Yes | 2, No	
	Clinic name:	clinic_name		
	Clinic address:	clinic_address		
Demographics	Sex	sex	1, Male | 2, Female	
			1, Assistant / Resident, first year | 2, Assistant / Resident, second year | 3, Fully licensed	
	ChiroSuisse member classification	membership	chiropractor	
	Years of chiropractic practice	practice_years		
	Average number of patients seen per week over the last 3 months	n_patients	1, < 50 | 2, 50-99 | 3, 100-149 | 4, 150-199 | 5, 200-249 | 6, ≥ 250	
	Average number of new patients seen per week over the last 3 months	n_new	1, 0 | 2, 1-3 | 3, 4-6 | 4, 7-9 | 5, 10-12 | 6, 13-15 | 7, 16-20 | 8, > 20	
	How many chiropractors work at your clinic?	n_chiros	1, 1 | 2, 2 | 3, 3 | 4, 4 | 5, 5 | 6, 6 or more	
	Do you work with other healthcare professionals besides chiropractors?	other_health	1, Yes | 2, No	
	How many other healthcare professionals work at your clinic?	n_otherhealth	1, 1 | 2, 2 | 3, 3 | 4, 4 | 5, 5 | 6, 6 or more	[other_health] = '1'
			1, Physiotherapist | 2, Massage therapist | 3, Medical doctor | 4, Acupuncturist | 5, Nutritionist | 6,	
	Other healthcare practitioners involved in the practice (select all that apply)	specify_otherhealth	Other {specify_otherhealth2}	[other_health] = '1'
		specify_otherhealth2		[specify_otherhealth(6)] = '1'
	What language do you primarily use in your practice?	lang	1, Deutsch | 2, Français | 3, Italiano | 4, Romansh | 5, English | 6, Other {otherlang}	
		otherlang		[lang] = '6'
Frequency with which each condition is managed in your practice	Neck pain without arm pain	msk_1	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Neck pain with arm pain	msk_2	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Neck pain with headache	msk_3	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Thoracic spine and rib pain	msk_4	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Low back pain without leg pain	msk_5	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Low back pain with leg pain	msk_6	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Shoulder pain	msk_7	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Elbow pain	msk_8	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Wrist and hand pain	msk_9	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Hip pain	msk_10	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Knee pain	msk_11	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Ankle and foot pain	msk_12	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Jaw pain / TMJ pain	msk_13	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Degenerative spine disorders	msk_14	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Other degenerative joint disorders	msk_15	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Postural disorders	msk_16	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Headaches	msk_17	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Tendinopathy	msk_18	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Chronic pain	msk_19	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Spinal health maintenance	msk_20	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Non MSK complaints	msk_21	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
Frequency with which each patient type is managed in your practice				
	Children (0-3 years of age)	patient_type1	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Children (4-18 years of age)	patient_type2	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Older persons (≥ 65 years of age)	patient_type3	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Pregnant women	patient_type4	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Motor-vehicular accident injuries	patient_type5	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Work-related injuries	patient_type6	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Sport-related injuries	patient_type7	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Post surgical care and rehabilitation	patient_type8	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
	Ethnic and minority groups	patient_type9	1, Often | 2, Sometimes | 3, Rarely | 4, Never	
Practitoner confidence scale (PCS)	I lack the diagnostic tools or knowledge needed to effectively assess patients with low back pain	pcs_1	1, 1. Strongly agree | 2, 2. Agree | 3, 3. Not sure | 4, 4. Disagree | 5, 5. Strongly disagree	
	I know exactly what to do to effectively treat patients with low back pain	pcs_2	1, 1. Strongly agree | 2, 2. Agree | 3, 3. Not sure | 4, 4. Disagree | 5, 5. Strongly disagree	
	I am very comfortable treating patients with low back pain	pcs_3	1, 1. Strongly agree | 2, 2. Agree | 3, 3. Not sure | 4, 4. Disagree | 5, 5. Strongly disagree	
	How well prepared to manage low back pain are you?	pcs_4	1, 1. Very well | 2, 2. Well | 3, 3. Adequately | 4, 4. Poorly | 5, 5. Very poorly	
	I feel confident using psychological and behavioural elements in the treatment of low back pain patients	pcs_5	1, 1. Strongly agree | 2, 2. Agree | 3, 3. Not Sure | 4, 4. Disagree | 5, 5. Strongly Disagree	
	I feel confident working with a patient with low back pain not basing this on a structural diagnosis	pcs_6	1, 1. Strongly agree | 2, 2. Agree | 3, 3. Not sure | 4, 4. Disagree | 5, 5. Strongly disagree	

Construct	Item Content	Variable Code	Choices, Calculations, OR Slider Labels	Branching Logic
Pain Attitudes and Beliefs Musculoskeletal (PABS-MSK) Questionnaire - Biomedical	Pain is a nociceptive stimulus, indicating tissue damage	pabs_med_1 (randomized to Q17)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	Patients with musculoskeletal pain should preferably practice only pain free movements	pabs_med_2 (randomized to Q7)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	Musculoskeletal pain indicates the presence of organic injury	pabs_med_3 (randomized to Q18)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	If musculoskeletal pain increases in severity, I immediately adjust the intensity of treatment accordingly	pabs_med_4 (randomized to Q2)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	If therapy does not result in a reduction in pain, there is a high risk of severe restrictions in the long term	pabs_med_5 (randomized to Q6)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	Pain reduction is a precondition for the restoration of normal functioning	pabs_med_6 (randomized to Q16)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	Increased pain indicates new tissue damage or the spread of existing damage	pabs_med_7 (randomized to Q3)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	If patients complain of pain during exercise, I worry that damage is being caused	pabs_med_8 (randomized to Q9)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	The severity of tissue damage determines the level of pain	pabs_med_9 (randomized to Q11)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	In the long run, patients with musculoskeletal pain have a higher risk of developing functional impairments	pabs_med_10 (randomized to Q15)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
Pain Attitudes and Beliefs Musculoskeletal (PABS-MSK) Questionnaire - Biopsychosocial	Biological, psychological and social factors should be included in the clinical assessment	pabs_biopsyc_1 (randomized to Q19)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	How a patient currently copes with their pain problem must be assessed	pabs_biopsyc_2 (randomized to Q13)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	The reaction of a patient's family and friends will promote recovery	pabs_biopsyc_3 (randomized to Q5)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	A patient's beliefs about the cause of their musculoskeletal pain must be understood	pabs_biopsyc_4 (randomized to Q1)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	Specific and realistic goals for treatment must be agreed	pabs_biopsyc_5 (randomized to Q4)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	A patients perceived barriers to work must be assessed	pabs_biopsyc_6 (randomized to Q10)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	A patient's expectations about treatment for musculoskeletal pain affect their outcome	pabs_biopsyc_7 (randomized to Q14)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	I consider a patient's social support network in my clinical management	pabs_biopsyc_8 (randomized to Q20)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	A patient's physical activity level should be considered in the management of their musculoskeletal pain problem	pabs_biopsyc_9 (randomized to Q12)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
	Reducing a patient's fear is essential to the treatment process	pabs_biopsyc_10 (randomized to Q8)	1, Totally disagree | 2, Largely disagree | 3, Disagree to some extent | 4, Agree to some extent | 5, Largely agree | 6, Totally agree	
Digitalization of clinics	Do you use an electronic patient record (EPR) system for clinical record keeping in your practice?	epr_use	1, Yes. I use only an EPR system | 2, Partially. I use a mix of an EPR and paper | 3, No. I use a paper-based system, but am considering switching | 4, No. I use only a paper-based system	
	Please indicate the Manufacturer Name and Product Name for the EPR information system that you use in practice.	epr_manu_prod		[epr_use] = '1' or [epr_use] = '2'
	Please indicate the Manufacturer Name and Product Name for the EPR information system that you are considering to use in practice	epr_manu_prod_considering		[epr_use] = '3'
	Do you use a secure/encrypted email system for patient communication in your practice (e.g., HIN or ProtonMail)?	secure_email_use	1, Yes | 2, No	
	Please indicate the Product Name for the secure/encrypted email system you use in practice.	email_manu_prod		[secure_email_use] = '1'
	How would you compare your quality of life now, when compared to before the COVID-19 pandemic?	cov_clin_1	1, Better | 2, Similar | 3, Worsened	
	How have your patient numbers been affected since the start of the COVID-19 pandemic?	cov_clin_2	1, Increased | 2, Unchanged | 3, Decreased	
	Have you changed your work hours since the start of the COVID-19 pandemic?	cov_clin_3	1, Increased | 2, Unchanged | 3, Decreased	
	Does your clinic offer telehealth/virtual care services?	cov_clin_4	1, Yes | 2, No | 3, No, but I am considering integrating it into my practice	
	How has patient use of telehealth or virtual care services changed since the start of the COVID-19 pandemic?	telehealth	1, Increased use | 2, Unchanged | 3, Decreased use	[cov_clin_4] = '1'
Motivation for sub-study involvement	On a scale from 0 to 100 how motivated are you to participate in the patient cohort phase of the Swiss ChiCo study?	motivation	0 (not motivated at all) | | 100 (highly motivated)	

Supplementary material 2. Patient-reported variables captured in the Swiss ChiCo pilot patient cohort

Construct	Item Content	Variable Code	Choices, Calculations, OR Slider Labels	Branching Logic
Reasons for non-participation	Record ID	record_id		
Collected at in-clinic recruitment	Are you interested in participating in this study?	chico_interest	1, Yes | 2, No	
	Reasons for not participating	nonparticipation	1, No email address | 2, Unfamiliar with electronic or internet tools | 3, Lack of time | 4, Lack of interest in the study | 5, Data privacy concerns | 6, Other	[chico_interest] = '2'
	Other reason for not participating	nonparticipation_other		[nonparticipation(6)] = '1'
	For clinic staff only	clinic_disrup	1, Disruption to clinic workflow	[nonparticipation(6)] = '1'
Pain, enjoyment and general activity (PEG) scale	What number best describes your pain on average in the past week?	peg_q1_beforetx / peg_q1 / peg_q1_2wks / peg_q1_6wks / peg_q1_12wks	1, 0 = No pain | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Pain as bad as you can imagine	
Collected at baseline, 1 hour, 2-, 6-, and 12-wks	What number best describes how, during the past week, pain has interfered with your enjoyment of life?	peg_q2_beforetx / peg_q2 / peg_q2_2wks / peg_q2_6wks / peg_q2_12wks	1, 0 = Does not interfere | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Completely interferes	
	What number best describes how, during the past week, pain has interfered with your general activity?	peg_q3_beforetx / peg_q3 / peg_q3_2wks / peg_q3_6wks / peg_q3_12wks	1, 0 = Does not interfere | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Completely interferes	
Musculoskeletal health questionnaire (MSK-HQ)	1. Pain/stiffness during the day			
Collected at baseline, 1 hour, 2-, 6-, and 12-wks	How severe was your usual joint or muscle pain and/or stiffness overall during the day in the last 2 weeks	mskhq_q1_beforetx / mskhq_q1 / mskhq_q1_2wks / mskhq_q1_6wks / mskhq_q1_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Fairly severe | 5, Very severe	
	2. Pain/stiffness during the night			
	How severe was your usual joint or muscle pain and/or stiffness overall during the night in the last 2 weeks?	mskhq_q2_beforetx / mskhq_q2 / mskhq_q2_2wks / mskhq_q2_6wks / mskhq_q2_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Fairly severe | 5, Very severe	
	3. Walking	mskhq_q3_beforetx / mskhq_q3 / mskhq_q3_2wks /		
	How much have your symptoms interfered with your ability to walk in the last 2 weeks?	mskhq_q3_6wks / mskhq_q3_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Severely | 5, Unable to walk	
	4. Washing/Dressing			
	How much have your symptoms interfered with your ability to wash or dress yourself in the last 2 weeks?	mskhq_q4_beforetx / mskhq_q4 / mskhq_q4_2wks / mskhq_q4_6wks / mskhq_q4_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Severely | 5, Unable to wash or dress myself	
	5. Physical activity levels			
	How much has it been a problem for you to do physical activities (e.g. going for a walk or jogging) to the level you want because of your joint or muscle symptoms in the last 2 weeks?	mskhq_q5_beforetx / mskhq_q5 / mskhq_q5_2wks / mskhq_q5_6wks / mskhq_q5_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Very much | 5, Unable to do physical activities	
	6. Work/daily routine			
	How much have your joint or muscle symptoms interfered with your work or daily routine in the last 2 weeks (including work & jobs around the house)?	mskhq_q6_beforetx / mskhq_q6 / mskhq_q6_2wks / mskhq_q6_6wks / mskhq_q6_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Severely | 5, Extremely	
	7. Social activities and hobbies			
	How much have your joint or muscle symptoms interfered with your social activities and hobbies in the last 2 weeks?	mskhq_q7_beforetx / mskhq_q7 / mskhq_q7_2wks / mskhq_q7_6wks / mskhq_q7_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Severely | 5, Extremely	
	8. Needing Help			
	How often have you needed help from others (including family, friends or carers) because of your joint or muscle symptoms in the last 2 weeks?	mskhq_q8_beforetx / mskhq_q8 / mskhq_q8_2wks / mskhq_q8_6wks / mskhq_q8_12wks	1, Not at all | 2, Rarely | 3, Sometimes | 4, Frequently | 5, All the time	
	9. Sleep			
	How often have you had trouble with either falling asleep or staying asleep because of your joint or muscle symptoms in the last 2 weeks?	mskhq_q9_beforetx / mskhq_q9 / mskhq_q9_2wks / mskhq_q9_6wks / mskhq_q9_12wks	1, Not at all | 2, Rarely | 3, Sometimes | 4, Frequently | 5, Every night	
	10. Fatigue or low energy	mskhq_q10_beforetx / mskhq_q10 / mskhq_q10_2wks /		
	How much fatigue or low energy have you felt in the last 2 weeks?	mskhq_q10_6wks / mskhq_q10_12wks	1, Not at all | 2, Slight | 3, Moderate | 4, Severe | 5, Extreme	
	11. Emotional well-being			
	How much have you felt anxious or low in your mood because of your joint or muscle symptoms in the last 2 weeks?	mskhq_q11_beforetx / mskhq_q11 / mskhq_q11_2wks / mskhq_q11_6wks / mskhq_q11_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Severely | 5, Extremely	
	12. Understanding of your condition and any current treatment			
	Thinking about your joint or muscle symptoms, how well do you feel you understand your condition and any current treatment (including your diagnosis and medication)?	mskhq_q12_beforetx / mskhq_q12 / mskhq_q12_2wks / mskhq_q12_6wks / mskhq_q12_12wks	1, Completely | 2, Very well | 3, Moderately | 4, Slightly | 5, Not at all	
	13. Confidence in being able to manage your symptoms			
	How confident have you felt in being able to manage your joint or muscle symptoms by yourself in the last 2 weeks (e.g. medication, changing lifestyle)?	mskhq_q13_beforetx / mskhq_q13 / mskhq_q13_2wks / mskhq_q13_6wks / mskhq_q13_12wks	1, Extremely | 2, Very | 3, Moderately | 4, Slightly | 5, Not at all	
	14. Overall Impact	mskhq_q14_beforetx / mskhq_q14 / mskhq_q14_2wks /		
	How much have your joint or muscle symptoms bothered you overall in the last 2 weeks?	mskhq_q14_6wks / mskhq_q14_12wks	1, Not at all | 2, Slightly | 3, Moderately | 4, Very much | 5, Extremely	
	Physical activity Levels	mskhq_activity_beforetx / mskhq_activity / mskhq_activity_2wks / mskhq_activity_6wks /		
	In the past week, on how many days have you done a total of 30 minutes or more of physical activity.	mskhq_activity_12wks	1, None | 2, 1 day | 3, 2 days | 4, 3 days | 5, 4 days | 6, 5 days | 7, 6 days | 8, 7 days	

Construct	Item Content	Variable Code	Choices, Calculations, OR Slider Labels	Branching Logic
Brief illness perception (IPQ brief) Collected at baseline	Please list in rank-order the three most important factors that you believe caused your current pain complaint	briefillness		
	1	ipq_q1		
	2	ipq_q2		
	3	ipq_q3		
Demographics Collected 1 hour after initial assessment	Sex	sex_p	1, Male | 2, Female	
	Nationality	nationality	1, Swiss | 2, Non-Swiss	
	Highest level of education	education	1, Compulsory | 2, Secondary | 3, Tertiary	
	At present, are you working	Job	1, Full time at your usual job | 2, Full time at a lighter job | 3, Part time | 4, Not working - disability | 5, Not working - IV/pensioner applicant | 6, Housewife/Husbehusband | 7, Retired (not disability) | 8, Unemployed | 9, Student	
	How would you describe the total physical strain caused by your work?	workstrain	1, Very light | 2, Light | 3, Somewhat strenuous | 4, Strenuous | 5, Very strenuous	[job] = '1' or [job] = '2' or [job] = '3' or [job] = '6' or [job] = '9'
	Have you missed any days of work due to your current pain complaint?	sick_leave	1, Yes | 2, No	
	How many days of sick leave have you had in the last 2 weeks ?	n_sickleave		[sick_leave] = '1'
	Smoking Status	smoking	1, Current smoker | 2, Previous smoker | 3, Never smoker	
	How much do you smoke on average per day?	n_cigarettes		[smoking] = '1'
	Have you visited a chiropractor before?	newpatient	1, I am new to chiropractic | 2, I have visited a chiropractor before	
Injury Characteristics Collected 1 hour after initial assessment	Have you visited a medical doctor for your current pain complaint?	md_currentpain	1, Yes | 2, No	
	Were you referred to chiropractic care for your pain complaint from a healthcare professional?	referral_source	1, Yes | 2, No	
	Which healthcare professional referred you to chiropractic care?	hcrefer_specify	1, Other chiropractor | 2, Family practitioner | 3, Internist | 4, Orthopaedic surgeon | 5, Physical therapist | 6, Massage therapist | 7, Other	[referral_source] = '1'
	Please specify which healthcare professional referred you to chiropractic care.	hc_refer_other		[hcrefer_specify] = '7'
	How long has it been since your current pain complaint began?	date_of_inj	1, 1-2 days | 2, 3-7 days | 3, 1-2 weeks | 4, 2-4 weeks | 5, 1-3 months | 6, 4-12 months | 7, More than 12 months	
	Main location of pain complaint	pain_complaint	1, Low back pain | 2, Low back pain with leg pain | 3, Neck pain | 4, Neck pain with arm pain | 5, Middle back pain | 6, Headache | 7, Shoulder pain | 8, Hip pain | 9, Knee pain | 10, Pain in multiple areas | 11, Other	
	Please specify the main location of your pain complaint	pain_complaint_other		[pain_complaint] = '11'
	Are you currently taking medication to reduce your pain?	medication	1, Yes, prescription medication | 2, Yes, non-prescription medication | 3, No	
Imaging Use Collected 1 hour after initial assessment	In the last 1 month have you received any diagnostic imaging for your current pain complaint?	image_postvisit	1, Yes | 2, No	
	X ray (radiography) in the last 1 month?	xray_postvisit	1, Yes | 2, No | 3, Unsure	[image_postvisit] = '1'
	Ultrasound scan in the last 1 month?	ultra_postvisit	1, Yes | 2, No | 3, Unsure	[image_postvisit] = '1'
	MRI scan in the last 1 month?	mri_postvisit	1, Yes | 2, No | 3, Unsure	[image_postvisit] = '1'
	CT scan in the last 1 month?	ctscan_postvisit	1, Yes | 2, No | 3, Unsure	[image_postvisit] = '1'
	In the last 1 year have you received diagnostic imaging for any pain complaint?	imaging1y_postvisit	1, Yes | 2, No	
	X-ray (radiography) in the last 1 year?	xray_1yr	1, Yes | 2, No | 3, Unsure	[imaging1y_postvisit] = '1'
	Ultrasound scan in the last 1 year?	ultrasound_1yr	1, Yes | 2, No | 3, Unsure	[imaging1y_postvisit] = '1'
	MRI scan in the last 1 year?	mri_1yr	1, Yes | 2, No | 3, Unsure	[imaging1y_postvisit] = '1'
	CT scan in the last 1 year?	ctscan_1yr	1, Yes | 2, No | 3, Unsure	[imaging1y_postvisit] = '1'
COVID-19 aspects Collected 1 hour after initial assessment	How is your quality of life at the moment compared to the time before the COVID-19 pandemic?	patient_cov_1	1, Better | 2, Similar | 3, Worsened	
	How are your physical activity habits at the moment compared to the time before the COVID-19 pandemic?	pat_cov_2	1, Better | 2, Similar | 3, Worsened	
	Have you been unable to seek planned or necessary medical treatment because of the COVID-19 pandemic?	pat_cov_3	1, Yes | 2, No	
	What treatment could you not participate in because of the COVID-19 pandemic?	pat_cov_4		[pat_cov_3] = '1'
	Would you be interested in receiving virtual or telehealth chiropractic sessions?	virtual	1, Yes | 2, No | 3, Unsure	

Construct	Item Content	Variable Code	Choices, Calculations, OR Slider Labels	Branching Logic
Orebro Musculoskeletal Pain Screening Questionnaire - Short Collected 1 hour after initial assessment	How long have you had your current pain complaint?	omps_q1	1, 0-1 weeks | 2, 2-3 weeks | 3, 4-5 weeks | 4, 6-7 weeks | 5, 8-9 weeks | 6, 10-11 weeks | 7, 12-23 weeks | 8, 24-35 weeks | 9, 36-52 weeks | 10, > 52 weeks	
	How would you rate the pain that you have had during the past week?	omps_q2	1, 0 = No pain | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Pain as bad as it could be	
	How tense or anxious have you felt in the past week?	omps_q5	1, 0 = Absolutely calm and relaxed | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = As tense and anxious as I've ever felt	
	How much have you been bothered by feeling depressed in the past week?	omps_q6	1, 0 = Not at all | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Extremely	
	In your view, how large is the risk that your current pain may become persistent?	omps_q7	1, 0 = No risk | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Very large risk	
	In your estimation, what are the chances you will be working your normal duties in 3 months?	omps_q8	1, 0 = No chance | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Very large chance	
	An increase in pain is an indication that I should stop what I'm doing until the pain decreases.	omps_q9	1, 0 = Completely disagree | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Completely agree	
	I should not do my normal work with my present pain.	omps_q10	1, 0 = Completely disagree | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Completely agree	
	I can do light work for an hour	omps_q3	1, 0 = Can't do it because of the pain problem | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Can do it without pain being a problem	
	I can sleep at night.	omps_q4	1, 0 = Can't do it because of the pain problem | 2, 1 | 3, 2 | 4, 3 | 5, 4 | 6, 5 | 7, 6 | 8, 7 | 9, 8 | 10, 9 | 11, 10 = Can do it without pain being a problem	
Follow-up Questionnaire: injury characteristics and imaging use Collected at 2-, 6-, and 12-wks	In the last 2 wks / 4 wks / 6 wks have you had any follow-up visits with the chiropractor for your pain complaint?	fu_chiro_2wks / fu_chiro_6wks / fu_chiro_12wks	1, Yes | 2, No	
	How many times have you seen your chiropractor in the last 2 wks / 4 wks / 6 wks?	nfu_chiro_2wks / nfu_chiro_6wks / nfu_chiro_12wks	1, Once | 2, 2-4 times | 3, More than 4 times	[fu_chiro_2wks] / [fu_chiro_6wks] / [fu_chiro_12wks] = '1'
	In the last 2 wks / 4 wks / 6 wks have you visited another healthcare professional other than your chiropractor for your pain complaint?	hc_2wks / hc_6wks / hc_12wks	1, Yes | 2, No	
	How many times have you visited another healthcare professional in the last 2 wks / 4 wks / 6 wks?	nfu_otherhealth_2wks / nfu_otherhealth_6wks / nfu_otherhealth_12wks	1, Once | 2, 2-4 times | 3, More than 4 times	[hc_2wks] / [hc_6wks] / [hc_12wks] = '1'
	Medical doctor visit in the last 2 wks / 4 wks / 6 wks for your pain complaint?	gp_2wks / gp_6wks / gp_12wks	1, Yes | 2, No	[hc_2wks] / [hc_6wks] / [hc_12wks] = '1'
	Physiotherapist visit in the last 2 wks / 4 wks / 6 wks for your pain complaint?	physo_2wks / physo_6wks / physo_12wks	1, Yes | 2, No	[hc_2wks] / [hc_6wks] / [hc_12wks] = '1'
	Other healthcare professional seen in the last 2 wks / 4 wks / 6 wks for your pain complaint?	otherhealth_2wks / otherhealth_6wks / otherhealth_12wks	1, Yes | 2, No	[hc_2wks] / [hc_6wks] / [hc_12wks] = '1'
	Which other healthcare professional did you see?	specif_otherhealth_2wks / specif_otherhealth_6wks / specif_otherhealth_12wks		[otherhealth_2wks] / [otherhealth_6wks] / [otherhealth_12wks]= '1'
	Are you currently taking medication to reduce your pain?	medication_2wks / medication_6wks / medication_12wks	1, Yes, prescription medication | 2, Yes, non-prescription medication | 3, No	
	Have you missed any days of work due to your pain complaint in the last 2 wks / 4 wks / 6 wks?	sickleave_2wks / sickleave_6wks / sickleave_12wks	1, Yes | 2, No	
	How many days of sick leave have you had in the last 2 wks / 4 wks / 6 wks due to your pain complaint?	n_sickleave_2wks / n_sickleave_6wks / n_sickleave_12wks		[sickleave_2wks] / [sickleave_6wks] / [sickleave_12wks] = '1'
	In the last 2 wks / 4 wks / 6 wks have you received any diagnostic imaging for your pain complaint?	imaging_2wks / imaging_6wks / imaging_12wks	1, Yes | 2, No	
	X-Ray (radiography) in the last 2 wks / 4 wks / 6 wks	xray_2wks / xray_6wks / xray_12wks	1, Yes | 2, No | 3, Unsure	[imaging_2wks] / [imaging_6wks] / [imaging_12wks] = '1'
	Ultrasound scan in the last 2 wks / 4 wks / 6 wks	ultra_2wks / ultra_6wks / ultra_12wks	1, Yes | 2, No | 3, Unsure	[imaging_2wks] / [imaging_6wks] / [imaging_12wks] = '1'
	MRI scan in the last 2 wks / 4 wks / 6 wks	mri_2wks / mri_6wks / mri_12wks	1, Yes | 2, No | 3, Unsure	[imaging_2wks] / [imaging_6wks] / [imaging_12wks] = '1'
	CT scan in the last 2 wks / 4 wks / 6 wks	ct_2wks / ct_6wks / ct_12wks	1, Yes | 2, No | 3, Unsure	[imaging_2wks] / [imaging_6wks] / [imaging_12wks] = '1'
Patients' Global Impression of Change (PGIC) scale Collected at 2-, 6-, and 12-wks	To what extent has your pain complaint changed when compared with the situation just before you started chiropractic care?	pgic_q1_2wks / pgic_q1_6wks / pgic_q1_12wks	1, 1. Completely recovered | 2, 2. Much improved | 3, 3. Slightly improved | 4, 4. Not changed | 5, 5. Slightly worsened | 6, 6. Much worsened | 7, 7. Worse than ever	