



RESEARCH

Open Access



Patient experience and satisfaction with chiropractic care: a national survey

Line Lyskjær^{1*}, Werner Vach^{1,2,3}, Casper Nim^{3,4,5}, Steen Harsted^{3,6}, Marlene Øllegaard Terkelsen¹ and Rikke Krüger Jensen^{1,3}

Abstract

Background Patient experience and satisfaction are important to stakeholders in the healthcare system, including payers, providers and patients. This study explores the patient experience and satisfaction with chiropractic care in Denmark including how aspects of patient experience and patient characteristics influence overall satisfaction.

Methods A national survey was conducted over a two-week period in January 2023, targeting patients in all chiropractic clinics in Denmark. Clinics were asked to invite all patients to participate. Enrolled participants completed an electronic survey, containing 28 items on patient experience and satisfaction (5-point Likert scale). Associations of aspects of patient experience and patient characteristics with overall satisfaction were analysed with ordinal regression. Variation across clinics was analysed by forest plots and random effect models.

Results Of the 250 clinics invited, 228 clinics (91%) recruited 27,577 patients for the survey (invitation rate of 53%). Of these, 17,974 (65%) were included in the final analysis. Patients reported 'very high' or 'high' degree of overall satisfaction with care (97%). Overall satisfaction was associated with personal experiences involving the chiropractor, particularly in the areas of examination and communication, patient involvement and information, and perceived effectiveness and reassurance. Lower satisfaction was linked to experiences involving delays, unexpected adverse events, and the process of collaboration with other health care professionals. Higher satisfaction was reported among women, patients under 30 years, and those with prior chiropractic care. Variation in overall satisfaction and patient experiences could not be fully explained by differences in known patient characteristics.

Conclusion While patients generally reported very high satisfaction with chiropractic care in Denmark, certain experiences and patient characteristics influenced this perception. Chiropractors should continue to prioritise quality interactions, personalised care, clear communication about risks of adverse events, and effective collaboration with other health care professionals.

Keywords Patient satisfaction, Patient experiences, Chiropractic care, Personalised care, Patient interaction, Provider variation

*Correspondence:

Line Lyskjær
llyskjaer@kiroviden.sdu.dk

¹Chiropractic Knowledge Hub, Odense, Denmark

²Basel Academy for Quality and Research in Medicine, Basel, Switzerland

³Center for Muscle and Joint Health, Department of Sport Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark

⁴Medical Research Unit, Spine Centre of Southern Denmark, University Hospital of Southern Denmark, Kolding, Denmark

⁵Department of Regional Health Research, University of Southern Denmark, Odense, Denmark

⁶SDU Health Informatics and Technology, The Maersk Mc-Kinney Møller Institute, Odense, Denmark



© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

Background

Patient experience, including patient satisfaction, has become an increasing focus in healthcare due to its potential impact on patient safety, treatment adherence, and outcomes [1]. As a result, collecting patient experience data has become a key component in assessing the quality of healthcare services [2]. Many countries have established routines for measuring and publishing patient experience data as a result of governmental or other regulatory requirements, although the implications of patient feedback for system improvement are often unclear [3].

In Denmark, chiropractors work as independent contractors regulated by the Danish National Health Authorities. The terms of regulation include a collective agreement negotiated by the Danish Health Authorities and the Danish Chiropractic Association (DCA). The 2021 agreement led to the establishment of a Quality Unit, which was responsible for implementing a quality model in chiropractic practice, with patient satisfaction identified as one of the core quality indicators [4]. In alignment with this mandate, the Quality Unit planned and conducted a National Survey of Patient Experience and Satisfaction with Chiropractic Care.

In Denmark, systematic measurement of patient experience is well established in the public healthcare sector, where national surveys such as the “Nationwide survey of patient experiences” [5] are conducted every year to monitor and improve the quality of care.

High levels of patient satisfaction with chiropractic care have consistently been reported [6–9]. Satisfaction is influenced by factors such as perceived treatment effectiveness and pain improvement [10], thorough examinations, time spent during consultation, the chiropractor’s communication about diagnosis and prognosis, and coordination of care [6].

Although patient experience and satisfaction with chiropractic care has been studied extensively, a recent systematic review highlights gaps in knowledge, particularly with regard to factors that are associated with patient satisfaction and how these factors can be used to improve the patient experience [11]. Furthermore, most of the studies identified in the review had sample sizes of less than 1000 patients or were based on selected samples. To date, no comprehensive national study of patient experience and satisfaction with chiropractic care has been conducted.

Therefore, this study addresses the gap by analysing data from the National Survey of Patient Experience and Satisfaction with Danish Chiropractic Care. The study aimed to (i) assess overall patient satisfaction, (ii) describe specific aspects of patient experience, (iii) investigate how aspects of experiences and patient characteristics are associated with satisfaction, and (iv) investigate

variation in overall satisfaction and specific domains of experience across chiropractic clinics.

Methods

Design and setting

The National Survey of Patient Experience and Satisfaction with Chiropractic Care was conducted among patients in chiropractic clinics in Denmark. The survey was developed, conducted and analysed by the Quality Unit. The Quality Unit is organised at the Chiropractic Knowledge Hub, funded by the Danish Health Authorities and the DCA, and it has its own separate steering committee with representatives from the Danish Health Authorities and the DCA. The Chiropractic Knowledge Hub is a chiropractic centre for research, postgraduate education, and quality development within the chiropractic profession. The author LL was involved in all aspects of the national survey, including its conceptualisation, data collection, analysis, and writing of the final reports. The regulatory and operational framework supporting the conduct of the survey is illustrated in Fig. 1.

All patients able to complete the survey in Danish, and with at least one contact to a chiropractor working under the collective agreement (~90% of all Danish chiropractic clinics [12]) during a two-week period in January 2023, were eligible. Patients under the age of 16 required parental consent to be included. This study was conducted and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [13]. Patient response data were processed anonymously. According to the Danish Act on Research Ethics Review of Health Research Projects no ethical approval is required for health research based solely on questionnaire surveys and registry data [14].

Enrolment of participants

All clinics were provided with written information about the study via email and post and were invited to participate in an online information meeting. Prior to data collection, clinics were asked to complete a preparation test to confirm their participation and to evaluate the practical procedures for patient enrolment and data collection. The preparation test was considered complete once a clinic successfully submitted a test document to the study team. Clinics that did not complete the preparation test initially received a second reminder by email. If there was still no response, they were contacted by telephone. Clinics that declined participation after the final phone contact were excluded from the study.

The enrolment of patients is presented in a flowchart in Fig. 2. Participating clinics were encouraged to invite all patients visiting the clinic during the two-week data collection period. Patients in the participating clinics

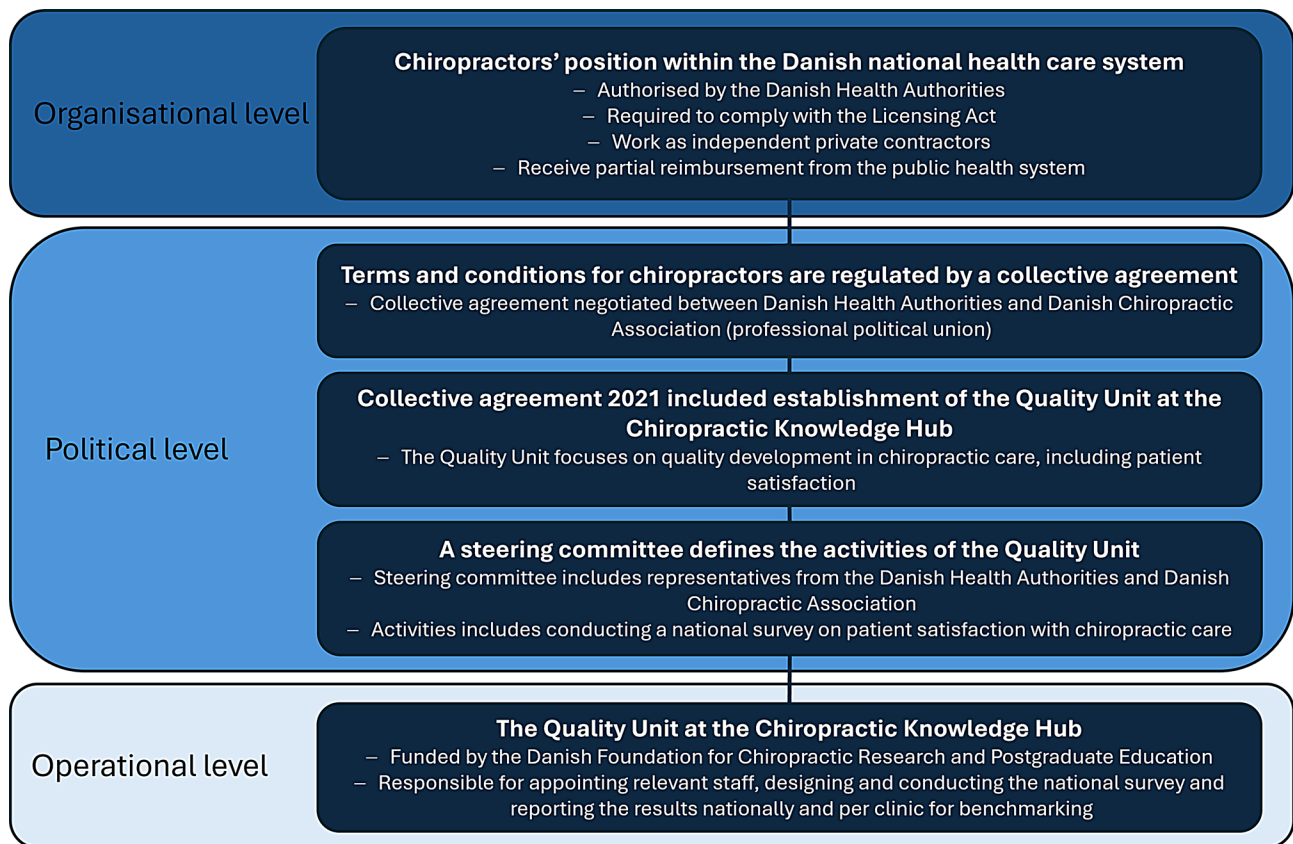


Fig. 1 Illustration of the regulatory and operational structure supporting the 'National survey of patient experience and satisfaction with chiropractic care'

received a brief information sheet explaining the purpose of the study and were invited to participate. The patient participation was voluntary. Patients who agreed to participate provided their email addresses and were informed that they would receive an email with a link to an online questionnaire along with written consent to participate. Patients who were not invited or declined to participate were not registered, and therefore no further information is available for this group. To allow assessment of participation rates, the total number of patients and their ages in the overall Danish chiropractic population were obtained from national registries. These registries include both responders and non-responders, but individual patients could not be identified separately. At the end of each day during the study period, clinics submitted a list of participating patients' email addresses to the study team. The study team registered these emails the following day using the electronic online system Research Electronic Data Capture (REDCap). Participants received a non-individualised questionnaire link within one to three days after their initial consultation. If a questionnaire was not completed within the first five days, a reminder email was sent. A second and final reminder was sent five days later, after which data collection for that patient was closed. If a clinic failed to submit

email lists for more than two consecutive days, the study team contacted them via email or telephone. In cases where clinics forgot to submit the list, emails were registered with a delay based on the date the patient received chiropractic care. Clinics that failed to submit any email addresses throughout the study period were considered dropouts.

The national survey

The 'National Survey of Patient Experience and Satisfaction with Chiropractic Care' was developed based on two previous national surveys of patient experience in Danish specialised medical practices [15] and in Danish public hospitals [5], as well as a Danish master's thesis on patient-perceived quality in chiropractic care [16]. The three surveys included between 33 and 40 items covering a wide range of topics, including patient characteristics, reception and clinic contact, facilities, staff, patient involvement, examination and management, information, reassurance, confidentiality, interdisciplinary collaboration, and overall assessment.

From these sources, 30 items, two of which included six subitems, were identified as transferable and relevant to chiropractic care and were selected for inclusion in a preliminary version of the national survey. The selection was

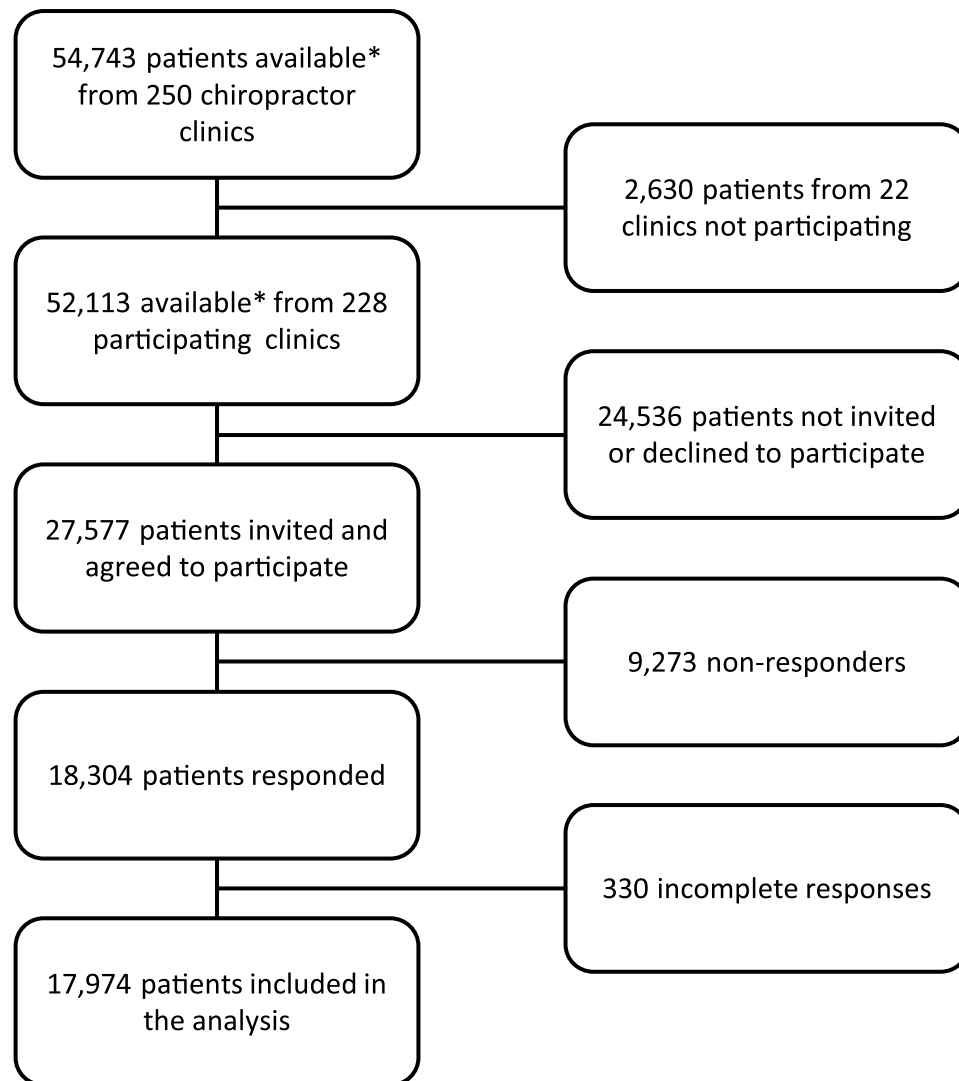


Fig. 2 Participant flow chart. *Patients with a chiropractic service code in one of the participating clinics according to Danish registries

carried out by the Quality Unit in collaboration with a team from the Chiropractic Knowledge Hub with expertise in quality development, research, and clinical practice. Key criteria for selection included item relevance to quality development and overall questionnaire length. Minor adjustments were made to adapt the wording of some items to fit the chiropractic context.

To assess face validity, the preliminary version of the national survey was evaluated through semi-structured interviews with nine chiropractors and eight patients from four different chiropractic clinics. This led to the removal of four items and the addition of two new items: (i) previous experience with chiropractic care and (ii) whether patients felt they had adequately described their problem to the chiropractor.

The final version of the national survey therefore included 28 items, two of which had six subitems. An

informal English translation of the Danish questionnaire has been included in this paper (Appendix A).

Grouping of items

For the purpose of this study, the items were categorised into five groups: patient characteristics, patient satisfaction, patient experience, factual experiences, and other items (Table 1).

Patient characteristics included age, gender, phase in current treatment course, and previous use of chiropractic care.

Patient satisfaction was assessed using three items placed at the end of the survey, aiming to capture an overall evaluation. These items measured: (i) confidence in the treatment, (ii) the extent to which expectations were met, and (iii) overall satisfaction. Each item was rated on a 5-point Likert response scale (5: 'very high degree,' 4:

Table 1 The five item groups

Item group	Item text
Patient characteristics	How old are you? What is your gender? Please indicate where you are in your course of treatment with the chiropractor? Have you seen a chiropractor before regarding another course? How many times have you been to a chiropractor with a new course?
Patient satisfaction (5-point Likert scale)	How confident are you that you received the correct treatment from the chiropractor? Did your visit to the chiropractor meet your expectations? Overall, are you satisfied with your visit to the clinic?
Patient experience (5-point Likert scale)	Was the ability to contact the clinic to book an appointment satisfactory? To what extent do the physical conditions of the clinic meet your needs in terms of opening hours? ... parking conditions? ... access conditions? (e.g., stairs, elevator, etc.) ... waiting facilities? (e.g., chairs, toilets, etc.) ... changing facilities? ... treatment rooms? Were the clinic staff friendly and welcoming when you arrived? Was the length of delay acceptable? Was the chiropractor good at examine you? ... making you feel that they had time for you during the consultation? ... listening to you and understanding your situation? ... involving you in decisions about your examination, treatment and treatment plan? ... talking to you about your symptoms and your condition, so that you felt well informed? ... inform you about what to do after your visit to the clinic? Do you feel that you adequately described your problem to the chiropractor? To what extent do you feel that your visit to the chiropractor have helped you? Did you feel safe with your condition when you went home after your visit to the chiropractor? Do you experience that the chiropractor shares necessary information with others who need it? (e.g., general practitioner, physiotherapist, hospital)
Factual experience (Binary 'yes', 'no')	Where you asked about your/the patient's symptoms when making an appointment? Did you experience a delay between the time you were supposed to arrive at the clinic and the time you were called? Did you experience any side effects from the treatment that you were not told about in advance? Has there been a need to collaborate with others (e.g., general practitioner, physiotherapist, hospital) in connection with your current course of treatment?
Other items (Item specific response categories)	Who is completing the form? Who recommended that you see a chiropractor for your current condition? (multiple answers possible) How did you book your first appointment with the chiropractor in your current course? On average, how long was the delay? How did the chiropractor make sure you were the right patient? (multiple answers possible)

'high degree,' 3: 'moderate degree,' 2: 'low degree,' 1: 'very low degree').

Patient experience included 19 items covering various aspects of care, including clinic facilities, the arrival process, examination by the chiropractor, communication during the consultation, post-visit instructions, patient involvement, and the post-examination process. The phrasing of these items focused on the degree to which patient expectations were met, either explicitly (e.g., "To what extent do the physical conditions of the clinic meet your need in term of ...") or implicitly (e.g., "Was the chiropractor good at examining you?"). All items used the

same 5-point Likert scale (5: 'very high degree,' 4: 'high degree,' 3: 'moderate degree,' 2: 'low degree,' 1: 'very low degree').

Factual experience was assessed through four binary (yes/no) items related to the patient's symptoms, any delay in seeing the chiropractor upon arrival at the clinic, adverse events, and whether collaboration with other health professionals was needed.

Other items included questions not directly related to experiences or satisfaction but considered relevant for contextual or methodological reasons. Two items asked how the patient initially contacted the chiropractor, and

one item addressed how the chiropractor identified the patient. These items reflected a tradition in Danish quality of care surveys. An additional question asked whether the patient received assistance in completing the questionnaire. Finally, patients who reported a delay in seeing the chiropractor upon arrival at the clinic were asked to indicate the duration of delay. These items used item-specific response categories (Appendix A).

Structure of survey

Within the survey, the items were arranged in six sections corresponding to different stages of a typical clinic visit. This structure was intended to present the questions in a logical and meaningful sequence from the patient's perspective. The six sections included patient details, making an appointment, arriving at the clinic, examination and management, after the clinic visit, and overall assessment. Each section consisted of a mix of items from the previously described groups (e.g., patient characteristics, patient satisfaction, patient experience, factual experience, and other items). For all items related to experience and satisfaction, a 'don't know/not relevant' response option was provided. In addition, patients were invited to elaborate on their experiences through open-ended questions. These questions were not analysed systematically in this paper.

Analytical strategy and statistical methods

The distribution of responses to single items was described using absolute and relative frequencies. Relative frequencies refer to the proportion on responses among all patients who answered a given item. Stacked bar charts were used to visualise the results, including the categories 'don't know/not relevant'. The age distribution between respondents and the total patient population was visualised using bar charts.

To identify subdomains within the 19 patient experience items, a factor analysis was conducted using the principal factor approach. First a varimax rotation was used to identify broad factors and then a parsimax rotation was used to identify a finer division of the items. The empirical correlation matrix based on pairwise correlations (available case approach) was used as input to the factor analysis. The loading matrix of the two analyses was visualised as a heat map. Domain specific experience scores were computed by taking the average over the corresponding items (using the available values in the case of missing responses).

The associations between domain-specific experience scores, factual experience items, and patient satisfaction were analysed using ordinal logistic regression, with the single item on overall satisfaction as the outcome. The analyses were conducted separately for the following three variable groups: experience domain scores, the

items on factual experience, and the patient characteristics. Within each variable group, both unadjusted and adjusted ORs were reported, with adjustments made for all other items within the same group. For each analysis, only patients with complete information on all corresponding items were included. The estimated ORs were presented with corresponding 95% confidence intervals (CIs). The ability of the variable groups to explain the variation in overall satisfaction was compared by the Akaike Information Criterion (AIC), including only patients with complete information on all variables.

Variation across clinics in overall satisfaction and in the six experience domains was visualised by forest plots of the clinic specific mean values with 95% confidence intervals. The true variation across the clinics taking into account the sampling error within each clinic was depicted by estimates of the standard deviation (SD) from a random intercept model without and with adjustment for the four items on patient characteristics.

Results

Study population

Of the 250 clinics invited, 228 clinics (91%) participated and recruited a total of 27,577 patients to participate in the national survey, representing 53% of the 52,113 eligible patients (range 2 to 604 patients per clinic). Among those invited, 18,304 patients (66%) responded to the survey, with clinic-level response rates ranging from 3% to 100% (Fig. 3). After excluding incomplete responses, 17,974 patients (65%) were included in the final analysis (Fig. 2).

The mean age of the included patients was 51 years (SD 16), and 59% were women. The age distribution was generally similar between survey respondents and the total patient population. However, patients under 39 years of age were slightly underrepresented, while those aged 40 to 79 were slightly overrepresented in the study (Fig. 4). Most patients were in the middle of their current treatment course (79%), and most had previous experience with chiropractic care (71%). Of those with previous experience with chiropractic care, 22% had undergone 1–2 previous courses, 21% had 3–4 courses, 48% had 5 or more courses, and 8% were unsure.

Patient satisfaction

The three items on patient satisfaction showed very high levels of satisfaction. Patients reported 'very high' or 'high' levels of confidence that they were receiving the right care (97%), that the visit met their expectations (95%), and overall satisfaction with care (97%).

Patient experience

The overall results for the patient experience items are presented in Fig. 5. Patients generally reported very

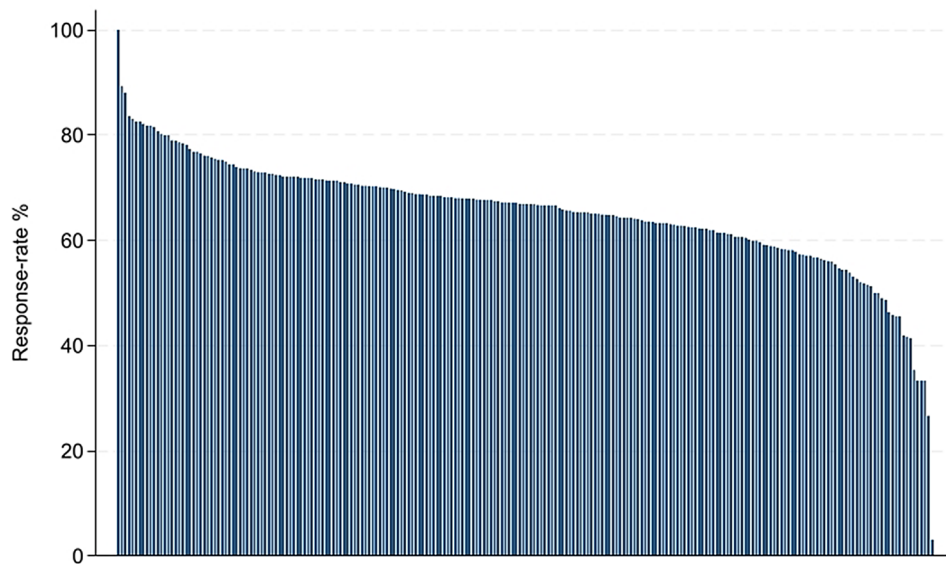


Fig. 3 Variation in response rate for the 228 participating clinics

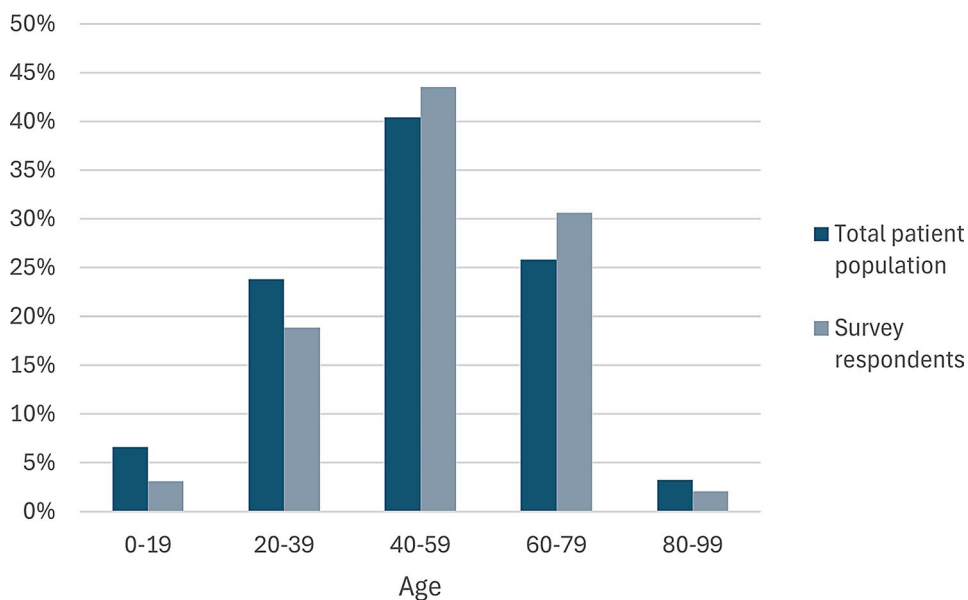


Fig. 4 The age distribution of the total patient population ($N=54,743$) and survey respondents ($N=17,974$)

positive experiences. When focusing on the proportion of respondents who reported a ‘very high’ or ‘high’ degree of alignment with their expectations, the highest ratings were given for the friendliness and welcoming attitude of clinical staff upon arrival (98%), the chiropractor’s ability to listen to and understand the patients’ situation (98%), the quality of the examination by the chiropractor (98%), satisfaction with the appointment booking process (97%), and the sense that there was sufficient time during the consultation (97%). The lowest ratings were observed for the acceptability of the length of delay in seeing the chiropractor upon arrival at the clinic (56%), parking conditions meeting patient’s needs (76%), and the sharing of

necessary information from the chiropractor with other health professionals, in cases where collaboration with other health care professions were needed (84%).

With respect to factual experiences not all patients were asked about their symptoms when booking an appointment, 63% reported that they were asked, while 18% responded that they did not know or did not find the question relevant. A total of 3,642 patients (20%) experienced a delay in seeing the chiropractor upon arrival at the clinic. Additionally, 3% of all patients reported adverse events from the treatment that they were not informed about beforehand. Patients elaborated on these experiences in the open text field, with the five most



Fig. 5 Patient responses to categorical items on a 5-point likert scale. Likert scale: 5: 'very high degree'; 4: 'high degree'; 3: 'moderate degree'; 2: 'low degree'; 1: 'very low degree'. Q15 was only asked if patients reported a delay in seeing the chiropractor upon arrival at the clinic and Q24 was only asked if patients reported a need to collaborate with other health care professionals

frequently reported types of adverse events being headache, fatigue, non-specific soreness, dizziness, and pain outside the treated area. Furthermore, 3,710 patients (20%) were undergoing a course of treatment where collaboration with other health care professions were needed (e.g., general practitioner, physiotherapist, hospital, etc).

Other variables

In most cases it was the patient (96%) who completed the survey. Most patients consulted a chiropractor on their own initiative (59%), on the recommendation of a social network (18%), on the advice of their general practitioner (GP) (9%), or for other reasons (15%). Patients most often made the appointment with the chiropractor by phone (73%), through online booking (12%) or health insurance (7%), or in other ways (8%). The chiropractor often identified the patient through multiple sources: registering or showing the patient's health card (81%), recognising the patient in the clinic (32%), or asking the patient for their name (10%) or CPR number (personal identification number) (10%), or other identification methods (6%) (Appendix A).

Identification of experience domains

Factor analysis of the 19 patient experience items suggested several latent factors. The varimax rotation identified two primary factors explaining 97% of the overall variation. Ten items reflecting the personal experience with the chiropractor were loading high on the first factor

(Appendix B1). Nine items reflected aspects related to the clinic facilities and most of them were loading on the second factor. A parimax rotation identified six factors explaining again 97% of the overall variation (Appendix B2). They suggested dividing each of the two item groups identified by the varimax rotation into three subgroups. Together with conceptual considerations this leads to the definition of six experience domains: *examination and communication*, *patient involvement and information*, *effects and reassurance*, *clinic accessibility*, *clinic contact and reception*, and *clinic area premise* (Table 2).

Association between patient experience and satisfaction

The association between each of the six experience domains and overall satisfaction is depicted in Table 3. All experience domains showed a clear association with overall satisfaction. The strongest associations were observed in domains related to personal experiences with the chiropractor, with ORs above 5. In contrast, domains related to clinic facilities showed weaker associations, with ORs around 3. In the adjusted model the effect of the three domains related to clinic facilities diminished substantially, indicating that they play only a minor role in addition to the other three domains related to direct experiences with the chiropractor. The experience domain *patient involvement and information* showed a weaker association than *examination and communication* and *effects and reassurance*. However, this should be interpreted cautiously due to the high correlation ($r=0.84$) between *patient involvement and information*

Table 2 Mapping of items to the six experience domains

Experience domains	Single items
Personal experiences with the chiropractor	
<i>Examination and communication</i>	Was the chiropractor good at examining you? ... making you feel like there was enough time for you during the consultation? ... listen to you and understand your situation? ... talking to you about your symptoms and your condition, so you felt well informed?
<i>Patient involvement and information</i>	Was the chiropractor good at involving you in decisions regarding your examination, treatment and treatment plan? ... informing you about how to behave after your visit to the clinic? Do you feel that you described your problem sufficiently to the chiropractor?
<i>Effects and reassurance</i>	To what extent do you feel that your visit to the chiropractor has helped you? Did you feel safe about your condition after your visit to the chiropractor? Do you experience that necessary information from the chiropractor is passed on to others who need it? (e.g., general practitioner, physiotherapist, hospital, etc.)
Clinic facilities	
<i>Clinic accessibility</i>	To what extent do the clinic's facilities meet your needs in relation to parking? ... accessibility? ... opening hours?
<i>Clinic contact and reception</i>	Was the possibility of contacting the clinic in connection with your appointment satisfactory? Was the clinic staff friendly and welcoming upon your arrival? Was the length of delay acceptable?
<i>Clinic area premises</i>	To what extent do the clinic's facilities meet your needs in relation to waiting facilities? ... dressing conditions? ... clinic room?

Table 3 Ordinal regression of associations between patient experience domains and overall satisfaction ($n = 17,715$)

Experience domains*	Unadjusted model		Adjusted model**	
	OR	95% CI	OR	95% CI
Personal experiences with the chiropractor				
<i>Examination and communication</i>	6.21	5.93–6.50	2.39	2.22–2.57
<i>Patient involvement and information</i>	5.84	5.57–6.12	1.50	1.39–1.61
<i>Effects and reassurance</i>	6.42	6.10–6.76	3.26	3.08–3.46
Clinic facilities				
<i>Clinic accessibility</i>	2.31	2.23–2.39	1.03	0.97–1.09
<i>Clinic contact and reception</i>	2.93	2.82–3.04	1.38	1.31–1.45
<i>Clinic area premises</i>	3.25	3.13–3.38	1.34	1.26 – 1.42

*The six domain scores were standardized to mean 0 and standard deviation 1

**Model adjusted for all six experience domains

and *examination and communication*, making it difficult to separate their individual effects.

The association between the items on factual experience and overall satisfaction is depicted in Table 4. Patients who were asked about their symptoms when booking an appointment were more likely to report higher satisfaction than those who were not asked. Patients who experienced delays in seeing the chiropractor upon arrival at the clinics or mild adverse events that had not been communicated in advance, were less satisfied than those who did not. In cases where collaboration

with other health care professions were needed, patients were less satisfied than those whose care did not involve such collaboration, although this association was less pronounced than the others.

Association between patient characteristics and satisfaction

The association between patient characteristics and overall satisfaction is depicted in Table 5. Women were more likely to be satisfied than men, while the likelihood of satisfaction decreased with increasing age. Patients were

Table 4 Ordinal regression of associations between items on factual experiences and overall satisfaction ($n = 17,679$)

Factual experience	Unadjusted model		Adjusted model*	
	OR	95% CI	OR	95% CI
Asked about symptoms when booking an appointment				
No	Ref		Ref	
Yes	1.45	1.34–1.58	1.46	1.34–1.59
Don't know/not relevant	1.39	1.25–1.54	1.41	1.26–1.57
Experience of delay in seeing the chiropractor upon arrival at the clinic				
No delay	Ref		Ref	
1–10 min	0.74	0.68–0.81	0.76	0.69–0.83
> 10 min	0.51	0.45–0.59	0.53	0.47–0.61
Don't know/not relevant	0.84	0.71–0.99	0.91	0.77–1.08
Experience of adverse events that the patient was not told about in advance				
No	Ref		Ref	
Yes	0.47	0.39–0.58	0.50	0.41–0.61
Don't know/not relevant	0.41	0.34–0.49	0.43	0.36–0.52
There was a need to collaborate with other health professionals in connection with the course of treatment				
No	Ref		Ref	
Yes	0.88	0.81–0.95	0.89	0.82–0.96
Don't know/not relevant	0.70	0.59–0.84	0.76	0.63–0.92

*Model adjusted for all four items on factual experiences

Table 5 Ordinal regression of associations between patient characteristics and overall satisfaction ($n = 17,308$)

Patient characteristics	Unadjusted model		Adjusted model*	
	OR	95% CI	OR	95% CI
Age				
< 30 year	Ref		Ref	
30–60 year	0.85	0.75–0.96	0.80	0.71–0.90
> 60 year	0.70	0.62–0.79	0.65	0.57–0.74
Gender				
Man	Ref		Ref	
Woman	1.46	1.37–1.56	1.45	1.36–1.55
Other gender identity	0.38	0.17–0.84	0.36	0.16–0.81
Course of treatment				
This is the first visit in my course	Ref		Ref	
I am in the middle of a course	0.94	0.84–1.05	0.92	0.82–1.03
My course just finished	0.94	0.81–1.10	0.95	0.82–1.10
Experience with chiropractic care				
No experience	Ref		Ref	
1–2 times	1.05	0.94–1.16	1.06	0.96–1.18
3–4 times	0.98	0.89–1.09	1.03	0.93–1.15
5 times or more	1.22	1.13–1.33	1.30	1.19–1.41
Don't know/not relevant	1.25	1.07–1.46	1.33	1.14–1.56

*Model adjusted for patient characteristics (age, gender, course of treatment, experience with chiropractic care)

slightly less satisfied when they were in the later phase of the treatment course compared to those in earlier phases. Patients with more extensive prior experience with chiropractic care were more likely to be satisfied compared to those with little or no previous experiences. Overall, the associations between patient characteristics and overall satisfaction were less pronounced than those observed for factual experience items.

According to the Akaike Information Criterion, the model including the six experience domains explained

substantially more variation in overall satisfaction than the two models on factual experience and patient characteristics alone (AIC = 11472 vs. AIC = 22798 and 22895). Combining any two or all three models (patient experience domains, factual experience, patient characteristics) consistently resulted in lower AIC values, suggesting that all three variable groups contributed independent information.

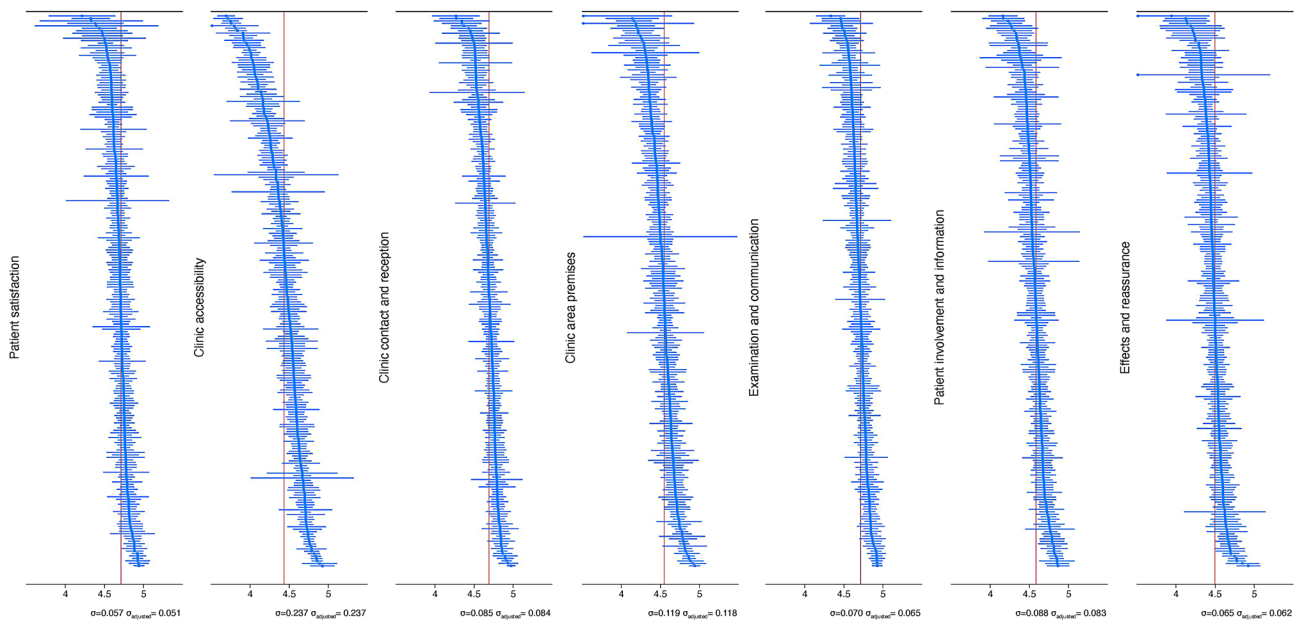


Fig. 6 Forest plots of variation in overall satisfaction and the six experience domains across chiropractor clinics. The variation is quantified by the estimated true standard deviation across clinics with and without adjustment for case-mix

Variation across chiropractic clinics

The variation in overall satisfaction and the six experience domains across clinics are shown in forest plots (Fig. 6). There were some variations in overall satisfaction across clinics ($SD=0.06$) which could be explained by patient characteristics only to a negligible degree. Within the six experience domains, the greatest variation across clinics was observed for *clinic accessibility* ($SD=0.23$) and *clinic area premises* ($SD=0.11$). Smaller variations were observed for experience domains related to personal interactions including, *clinic contact and reception* ($SD=0.08$), *examination and communication* ($SD=0.07$), *patient involvement and information* ($SD=0.08$), and *effects and reassurance* ($SD=0.06$).

Discussion

Summary of findings

This national survey provides important insight into patients' experiences and satisfaction with chiropractic care, as well as the underlying patient aspects that contributed the most to overall satisfaction. Generally, patients reported high levels of satisfaction with the care they received, reporting mostly very positive experiences across six domains of patient experience. The domains that contributed the most to overall satisfaction were those involving personal experience with the chiropractor, such as *examination and communication*, *patient involvement and information*, and *effects and reassurance*. In contrast, domains related to clinic facilities, such as *clinic accessibility*, *clinic contact and reception*, and *clinic area premises*, contributed less to overall satisfaction. Patient characteristics were less associated with

satisfaction than patient experiences. However, higher levels of overall satisfaction were more likely among women, patients under 30 years, and those with previous experience with chiropractic care. Some differences in overall satisfaction and patient experience domains were observed between participating clinics, but these could not be explained by differences in patient characteristics.

Interpretation of findings

The findings suggest that clinicians should continue to prioritise personal interactions with patients in order to maintain high levels of patient satisfaction. This includes thorough and timely examination, listening to patients and communicating with them about their diagnosis, engaging in shared decision-making, providing follow-up instructions, and focusing on the patient's perception of reassurance and expectations of treatment effectiveness.

The results also pointed to areas for potential improvement. In addition to the focus areas mentioned above, communication with patients should always include asking about symptoms when an appointment is made and informing patients about the risk of adverse events as part of the informed consent process. This information should include, but not be limited to, the most common adverse events, such as headache, fatigue, non-specific soreness, dizziness, and pain outside the treated area. These are very similar to the most frequently reported adverse events following spinal manual therapy in the literature [17].

The results also suggest that there may be some issues about the process of collaboration with other health care

professionals. Patients who reported a need for such collaboration were less satisfied than patients who did not report this need. Among those reporting a need for collaboration, patients were subsequently asked whether relevant information had been shared from the chiropractor to other health care professionals, and many expressed uncertainties. This lack of clarity indicates an area where chiropractors could improve their communication and transparency with patients.

The variation in overall satisfaction and experience domains across clinics was most pronounced for domains related to clinic facilities such as clinic accessibility and space, factors that are often difficult for clinics to change. Since these domains did not contribute the most to overall satisfaction, they are not necessarily something that clinics should prioritise. However, clinics with suboptimal facilities, such as parking conditions, could provide proactive information ahead of visits. In general, the existence of variation in overall satisfaction and experience domains related to the patient-provider communication indicates opportunities for improvement and the potential to learn from high-performing clinics.

Comparison with other findings

The very high patient satisfaction found in this study is similar to other findings on patient satisfaction with chiropractic care. A systematic review of 43 studies on patient experience and satisfaction with chiropractic care reported high and consistent levels of patient satisfaction and positive experiences with chiropractic care [11]. Some studies have compared patient satisfaction between chiropractic patients and medical patients, suggesting higher satisfaction with chiropractic care [18]. Also, our findings suggest that chiropractic patients may be more satisfied than patients in other parts of the Danish health care system. For example, 97% of chiropractic patients in this survey reported high or very high levels of satisfaction, compared to 88% of patients in Danish somatic hospital (general hospitals providing inpatient and outpatient care for physical conditions) (2023) [5] and 92% in specialised medical care (2017) [15]. However, direct comparisons between chiropractic care and other sectors are challenging, as there are substantial differences in patient populations. Chiropractic patients are typically highly self-selected, which is also evident in our study, where the majority had previous experience with chiropractic care.

Concerns about interprofessional communication coincide with the findings of a British survey, in which patients expressed strong expectations that chiropractors would communicate with general practitioners when necessary. In that survey, these expectations were not fully met, as only 62% of patients reported that this communication occurred, and 20% were unsure whether

it was taking place [9]. The same study also found that most patients expected chiropractors to inform them about any possible adverse events related to treatment, an expectation that was also associated with overall satisfaction in our study. This suggests that these aspects of patient experiences may be relevant across different countries, and that data from national studies can help to validate and expand upon previous findings.

The six experience domains in our factor analysis are largely consistent with themes previously identified in other national surveys of Danish health care [5, 15, 16]. The domains related to the personal experience with the chiropractor that contributed most to overall satisfaction in this study were similar to findings from two systematic reviews of the experience, satisfaction and perceived needs of chiropractic and low back pain patients [11, 19]. The findings suggested that patients want a patient-centred approach from their health care provider that includes good communication skills, shared decision-making, empathy, and active listening. It is important that these skills and approaches are prioritised in therapeutic encounters [11].

Strength and limitations

This is the first comprehensive national assessment of patient experience and satisfaction with chiropractic care in Denmark. Nearly all clinics operating under the collective agreement participated in the study, and a relatively high response rate of 66% was achieved among the patients who agreed to participate. However, the study has several limitations. One limitation of the study is that only half of the patients receiving chiropractic care were registered by clinics during the study period, and we do not know whether this was because patients refused to participate, were not eligible for inclusion, or were not invited. Therefore, there is a risk of selection bias, which limits the generalisability of the results. The items were affected by ceiling effects, whereby a high proportion of patients gave the highest possible score. Agreement-based scales such as the one used in this study have been criticised for being biased by acquiescence and straight lining [20], where patients tend to agree with an item regardless of the question, or give identical or nearly identical responses to consecutive items. Therefore, the measured satisfaction and experience may be more positive than the true patient satisfaction and experience.

Perspectives

These results will serve as foundation for ongoing quality improvement initiatives in Denmark. A new quality model will be implemented in chiropractic practice in 2025, where representatives from clinics meet in cluster formations to discuss and exchange experiences using quality metrics based on data packages to drive quality

improvements in chiropractic clinics. Individual benchmarking reports from the national survey, which are provided to all participating clinics, are an obvious data source where clinics can discuss and share experiences on how to improve different aspects, such as focusing on the process of collaboration with other health care professionals. For example, analysing patient comments from open-ended questions in the national survey regarding chiropractors' examinations, treatments and overall assessments could provide a more detailed understanding of the context behind satisfaction rates. Patients' written comments could also assist clinics in their individual quality development.

If further studies are conducted to assess patient satisfaction in chiropractic practice, some items should be adjusted to better capture the intended area of experience. This includes collaboration with other health care professionals and a clearer separation between items on patient involvement in treatment and communication about symptoms and condition. Encouraging patients to use open text fields, as well as obtaining interview data, can help overcome the limitations of fixed-response scales and provide deeper insight into the patient experience. Future research might also consider longitudinal designs to track satisfaction over the course of treatment, since most current studies (including this one) are cross-sectional [11].

Conclusion

Patients reported very high levels of satisfaction with chiropractic care in Denmark and reported overall very positive patient experiences, although there was some unexplained variation across clinics. The most important driver of satisfaction was the personal experience with the chiropractor. Chiropractors should continue to focus on the quality of communication, personalised care, and shared decision making, while improving the sharing of information about adverse events, and focus on the process of collaboration with other health care professionals.

Supplementary information

The online version contains supplementary material available at <https://doi.org/10.1186/s12913-025-13767-6>.

Supplementary Material 1: Table of items and results from the 'National Survey of Patient Experience and Satisfaction with Chiropractic Care' (N=17,974).

Supplementary Material 2: Heatmap of the loading matrix of the first 2 factors of a varimax rotation based on applying a factor analysis to the 19 items on patient experience.

Supplementary Material 3: Heatmap of the loading matrix of the first 6 factors of a parsimax rotation based on applying a factor analysis to the 19 items on patient experience.

Supplementary Material 4: Table of the age distribution of survey respondents and the total patient population.

Acknowledgements

We acknowledge OPEN patient data Exploratory Network, Odense University Hospital, Region of Southern Denmark, for access to REDCap and technical support.

Author contributions

All authors contributed to the concept and design. LL and MØT collected and prepared the data for analysis. LL, CN, SH and WV performed the analysis and created the graphical presentations. LL and RKJ outlined the draft manuscript. All authors participated in the interpretation of the results and critically reviewed and revised the manuscript. All authors read and approved the final manuscript.

Funding

No grants were received for this project.

Data availability

The data analysed in the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

According to the Danish Act on Research Ethics Review of Health Research Projects no ethical approval is required for health research based solely on questionnaire surveys and registry data. Participation in the study was completely voluntary, written informed consent was obtained, participants' anonymity was respected, and the participants were provided with an opportunity to withdraw from the study. The study was conducted in accordance with the Declaration of Helsinki.

Competing interests

LL and MØT are employed by the Quality Unit, which is organised by the Chiropractic Knowledge Hub. The Hub is funded by the Foundation for Chiropractic Research and Post Graduate Education, who also funded the national survey. RKJ has a part time research position at the Chiropractic Knowledge Hub which is funded by the Foundation for Chiropractic Research and Post Graduate Education. The position of WV at the Basel Academy is partially paid by the Chiropractic Knowledge Hub.

Received: 15 August 2025 / Accepted: 11 November 2025

Published online: 26 November 2025

References

- Doyle C, Lennox L, Bell D. A systematic review of evidence on the links between patient experience and clinical safety and effectiveness. *BMJ Open*. 2013;3(1).
- Ahmed F, Burt J, Roland M. Measuring patient experience: concepts and methods. *Patient*. 2014;7(3):235–41.
- Kumah E, Osei-Kesse F, Anaba C. Understanding and using patient experience feedback to improve health care quality: systematic review and framework development. *J Patient Cent Res Rev*. 2017;4(1):24–31.
- National Agreement on Chiropractic (in Danish). 2021. <https://okportal.dk/media/18964/5604.pdf>. Accessed 14 Aug 2025.
- Center for patient involvement. Nationwide survey of patient experiences (in Danish). Capital region of Denmark. 2023. https://www.regionh.dk/patient-inddragelse/LUP/aktuel-undersogelse/Documents/LUP%20Somatik_onepager_2023.pdf. Accessed 14 Aug 2025.
- Jensen RK, Lillesø S, Jensen JS, Stochkendahl MJ. Patient expectations and levels of satisfaction in chiropractic treatment for lumbar radiculopathy. A mixed methods study. *Chiropr Man Therap*. 2023;31(1):13.
- Gaumer G. Factors associated with patient satisfaction with chiropractic care: survey and review of the literature. *J Manipulative Physiol Ther*. 2006;29(6):455–62.
- Kongsted A, Christensen MR, Ingensen KK, Secher Jensen T. Feasibility of the consultation-based reassurance questionnaire in Danish chiropractic practice. *Chiropr Man Therap*. 2018;26:27.

9. MacPherson H, Newbronner E, Chamberlain R, Hopton A. Patients' experiences and expectations of chiropractic care: a national cross-sectional survey. *Chiropr Man Therap*. 2015;23(1):3.
10. Maiers M, Vihstadt C, Hanson L, Evans R. Perceived value of spinal manipulative therapy and exercise among seniors with chronic neck pain: a mixed methods study. *J Rehabil Med*. 2014;46(10):1022–28.
11. Newell D, Holmes MM. Patient experience and satisfaction with chiropractic care: a systematic review. *J Patient Exp*. 2024;11:23743735241302992.
12. Danish regions. List of Danish chiropractic clinics. 2023.
13. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *Epidemiology*. 2007;18(6):800–04.
14. National Scientific Ethics Committee. Overview of mandatory reporting. <https://researchethics.dk/information-for-researchers/overview-of-mandatory-reporting>. Accessed 10 Oct 2022.
15. The Quality Unit in Specialist Medical Practices. Survey of patient experienced quality in specialist medical practices. 2017. <https://ekvis.dk/wp-content/uploads/2023/07/Landsrapport-2017.pdf>. Accessed 14 Aug 2025.
16. Brodersen JLBB, Fakultet SUDS. Patientoplevelt kvalitet i kiropraktorpraksis: Syddansk Universitet; 2014.
17. Pohlman KA, Funabashi M, O'Beirne M, Cassidy JD, Hill MD, Hurwitz EL, et al. What's the harm? Results of an active surveillance adverse event reporting system for chiropractors and physiotherapists. *PLoS ONE*. 2024;19(8):e0309069.
18. Houweling TA, Braga AV, Hausheer T, Vogelsang M, Peterson C, Humphreys BK. First-contact care with a medical vs chiropractic provider after consultation with a swiss telemedicine provider: comparison of outcomes, patient satisfaction, and health care costs in spinal, hip, and shoulder pain patients. *J Manipulative Physiol Ther*. 2015;38(7):477–83.
19. Chou L, Ranger TA, Peiris W, Cicuttini FM, Urquhart DM, Sullivan K, et al. Patients' perceived needs of health care providers for low back pain management: a systematic scoping review. *Spine J*. 2018;18(4):691–711.
20. Dykema J, Schaeffer NC, Garbarski D, Assad N, Blixt S. Towards a reconsideration of the use of agree-disagree questions in measuring subjective evaluations. *Res Soc Adm Pharm*. 2022;18(2):2335–44.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.