

Demographic profile of pediatric patients attending a Norwegian chiropractic practice

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ABSTRACT

Background: The use of chiropractic care for the pediatric patient in Norway has been under investigated along with the demographic profile of the presenting patients. Chiropractic is considered one of the most popular complementary and alternative medicine (CAM) therapies for children worldwide and many chiropractors provide care to children. Doctors of chiropractic sometimes claim to treat a wide variety of pediatric health conditions. This has been considered a controversial area of chiropractic care, both within, and outside the profession. Routine presentations are not widely investigated. **Objective:** To investigate the demographic profile of pediatric patients aged 0-18 years of age presenting to a Norwegian chiropractor and their primary complaints. **Methods:** A retrospective cross sectional study of electronic patient files to locate patients presenting in the correct age group. The data were recorded anonymously. Two main software packages were used to analyze data; Microsoft Excel 2000 spreadsheet and SPSS V 21. **Results:** 258 pediatric patients were enrolled in the study. The most common age at presentation was one month (n=68). 49% were female; boys more commonly presented in infancy, girls more commonly in adolescence. On average there were three visits per patient. The patients had two or more presenting complaints (average 2.5). The most common presenting complaint was favored (asymmetrical) head position (n=84, 33%), followed by infant positioning/postural difficulties (n= 81; 31%) and inconsolable crying (n=79, 31%). No serious adverse events were reported; 5% reported an intermittent and self-limiting mild side effect lasting less than 24 hours. Approximately 13% of pediatric patients were referred from health care professionals. 85% of parents/children reported either full recovery or good improvement following a chiropractic treatment protocol. **Conclusion:** The infant was the most common age in pediatric presentations to a Norwegian chiropractic practice. The most common complaints were musculoskeletal in origin followed by excessive crying. On average pediatric patients had three treatment sessions, and most parents/patients reported full recovery or good improvement with no adverse events.

Keywords: chiropractic, infant crying, sleeping difficulties, pediatric, demographic, manual therapy, cross-sectional study

Introduction

Chiropractic care is considered one of the most popular complementary and alternative medicine (CAM) therapies for children.¹ Chiropractic care of pediatric conditions has been considered a controversial area of expertise, both within, and outside the profession.²

Studies have been done that record the presentation of the pediatric patient in chiropractic practice and their characteristics. A recent Norwegian study found that the youngest children constituted the largest pediatric group in chiropractic practice which was in line with studies from Denmark and England.³ In addition, the study revealed a greater proportion of males than females when the child presented under five years of age, that MSK problems are common, and that there was a tendency for MSK complaints to become chronic as a considerable proportion of patients had been

waiting more than a year before seeking chiropractic care.³ In terms of what conditions chiropractors treat, findings suggest the most common conditions treated by chiropractors are musculoskeletal in origin.⁴ There was a low presentation level of children with non-MSK ailments to chiropractors in Norway.³

When chiropractors focus their practice on musculoskeletal conditions, they reported more referrals from the medical community.⁵ In Switzerland, 22% of chiropractors receive weekly or monthly referrals of pediatric patients from pediatricians.⁶ Chiropractic is under the medical umbrella in Switzerland. In Norway, the chiropractic profession is authorized to practice as primary contact practitioners and their patients qualify for partial reimbursement from the national health care system. In addition, chiropractors are able to authorize sick leave and they can refer patients directly for radiological

procedures or to other medical specialists for further assessment.⁷

The objective of the study was to investigate the descriptive characteristics of pediatric patients in one chiropractic clinic in Norway, and to illustrate whether these findings corroborate with previous studies.

Methods

The study was designed as a retrospective health service evaluation, a cross sectional study and it was scheduled to include a minimum of 200 subjects for the raw data collection. The patient records were obtained from an electronic clinical patient record database from a single chiropractor, working at a single chiropractic clinic alongside two chiropractors (NEMUS Arendal, Norway). A manual search through the clinic electronic patient database was performed to identify the pediatric patients attending the clinic for the first time (new patients), in the time period from January 1, 2013 to December 31, 2014. The number of new patients (non age specific) attended the clinic in the same time period for comparison was also identified.

Inclusion criteria for the study included patient ages (0-18 years of age) at presentation, calculated using date of birth compared to date of presentation. No other exclusion criteria were set for the raw data collection. The study sought to investigate the demographic profile (age, gender) of pediatric patients along with their presenting complaints (as described by parents in younger children, or by the patient him/herself in older children).

The number of visits in an episode of care was recorded. Treatment modalities divided into:

- High velocity low amplitude (HVLA) spinal manipulation fit to age — defined as a maneuver consisting of three distinct phases: the preload phase, the thrust phase and the resolution phase, usually associated with an audible ‘pop’ or ‘click’ which is caused by an event termed cavitation, occurring within synovial fluid of the joint.
- Mobilization - a passive movement of a skeletal joint.
- ‘Press and hold’ - a low force by hand technique addressed to a restricted barrier in children 0 to 12 months of age.
- Soft tissue work (STW) - may be comprised by different manual soft tissue techniques such as massage, trigger point therapy, stretching and other.

Report of benefit or not, and if there were any reported adverse events or side effects by parent or child was also investigated as described by parent or child, recorded by practi-

tioner. Reports of side effect were divided into the following:

- No reported side effect/adverse event.
- Mild (irritable 24-48 hours), resolving on its own.
- Moderate (the patient was referred to GP for complications).
- Severe - true adverse event (the patient was acutely referred to Hospital).

The data were analyzed using Microsoft Excel and Statistical Package for Social Sciences (SPSS) version 2.1. Age group divisions were applied into the following: early infancy (0-3 months), late infancy (4-6 months and 7-12 months), preschool age (1-5 years of age), school aged (5-12 years of age) and adolescence (over 12 years of age).

Results

The manual search identified 258 subjects younger than 18 years of age at the time of new patient consultation; none were excluded from the study. This accounted for 15% of the total clinic new patient population in the same time period. The mean age at first presentation in the cohort was 35 months (2 years and 9 months of age). The most common age at presentation was 1 month of age (26%; n=68), and 50.4% of the presenting pediatric population was male.

Tables 1 and 2 show the demographic presentation of the children attending this chiropractic clinic and an overview of their presenting complaints. On average, each pediatric patient had 2.5 presenting complaints. The most common presenting complaint regardless of age was favored (asymmetrical) head position (n=84, 32.5%), followed by infant positioning/postural difficulties (n= 81, 31.4%) and inconsolable crying (n=79, 30.6%). Sixty-six (25.6%) subjects presented due to restless supine sleeping, 52 patients (20%) with breastfeeding/feeding issues and 17.8% (n=46) patients presented with asymmetrical flattening of the head (non synostotic plagiocephaly). Neck pain accounted for 10.8% of the patients (n=28) and low back pain accounted for 8.9% (n=23).

Table 3 depicts the types of therapies given. Press and hold was the most commonly utilized manual therapy technique in the cohort (60%, n=155), followed by mobilization (53%,

Table 1: Frequency of children in each age category attending a Norwegian chiropractor (N=258).

Age at presentation	N=258			Referral rate (n=) from health care practitioners in each age group.
	Total	Male	Female	
0-3 months	157	84	73	17
4-6 months	18	9	9	4
7-12 months	16	9	7	2
1-5 years	11	5	6	1
5-12 years	23	14	9	1
> 12 years	33	10	23	8
Total	258 (100%)	130 (50.4%)	128 (49.6%)	33 (12.8%)

Table 2: Frequency and percentage of presenting complaints in a pediatric population presenting to a Norwegian chiropractor (n=258). All presenting children could present with more than one complaint. On average, each child presented with 2.5 complaints.

Presenting complaints	0-3 months (n=157)	3-6 months (n=18)	7-12 months (n=16)	1-5 years (n=11)	5-12 years (n=23)	>12 years (n=33)	Presenting complaint n=	% of n=258
Neck pain	0	0	0	1	11	16	28	(10.8%)
Mid back pain	0	0	0	1	5	12	18	(6.9%)
Low back pain	0	0	0	2	5	16	23	(8.9%)
Headache/migraines	0	0	0	0	4	5	9	(3.4%)
Pain in extremities	0	0	0	1	3	5	9	(3.4%)
Postural asymmetry	24	2	1	0	2	1	30	(11.6%)
Nonsynostotic plagiocephaly (NSP)	37	4	5	0	0	0	46	(17.8%)
Favored head position (FHP)	67	12	5	0	0	0	84	(32.6%)
Inconsolable/Excessive crying	75	1	2	1	0	0	79	(30.6%)
Restless supine sleeping	42	6	11	7	0	0	66	(25.6%)
Sleep disturbance not related to supine sleeping	15	3	4	7	1	1	31	(12.0%)
Feeding/breastfeeding difficulties	45	6	1	0	0	0	52	(20.1%)
Infant positioning difficulties (tummy time, nappy change etc.)	63	13	5	0	0	0	81	(31.4%)
Check up following trauma/birth trauma	19	4	2	2	3	11	41	(15.9%)
Question of delayed motor development	3	5	4	2	0	0	14	(5.4%)
Nocturnal enuresis	0	0	0	0	4	0	4	(1.5%)

Table 3: Frequency of manual therapy in a pediatric population attending a Norwegian chiropractor (more than one therapy could be applied or there could have been no therapy provided at all).

Age groups	N=	High velocity low amplitude adjustment (HVLA) modified to age	Mobilization	Soft tissue work	Press and hold	No therapy – wait and see approach	No therapy – refer out
0-3 months	157	37	110	33	135	9	1
4-6 months	18	14	14	3	15	0	0
6-12 months	16	16	8	9	5	0	1
1-5 years	11	10	2	4	0	0	0
5-12 years	23	22	2	13	0	0	0
>12 years	33	31	1	23	0	0	1
Total	258	130	137	85	155	9	3

n=137) and HVLA manipulation modified to suit the age (50%, n=130). Each child may have received more than one treatment modality. In addition, some children were not given manual therapy (n=12; 4.6%), either because there were no findings relating the presenting complaint to an issue concerning the musculoskeletal system, or they were referred back to GP, other health care professional or diagnostic imaging. Any parental/self-reported change in the condition was recorded and 85% (n=218) of parents or patient reported good or full improvement following chiropractic care (Table 4). There were no reports that a child was worse following a chiropractic evaluation/treatment. Mild side effects (mild irritability lasting no longer than 24 hours) were reported by 5.4% (Table 5, n=14) and there were no reported adverse events following care requiring any additional care or referral to Primary Care Physician or to hospital. As seen in Table 6, 12.8% (n=33) of patients were referred to the clinic

Table 4: Reported change in a pediatric population following a course of treatment in pediatric patients attending a Norwegian chiropractor.

Age groups	N=	Child is worse	No change	Improvement	Full recovery
0-3 months	157	0	28	66	62
4-6 months	18	0	2	9	8
6-12 months	16	0	3	6	7
1-5 years	11	0	1	5	5
5-12 years	23	0	4	13	6
>12 years	33	0	2	20	11
Total	258	0	40	119	99

Table 5: Reported side effects/adverse events in a pediatric population attending a Norwegian chiropractor.

Age groups	N=	No reported side effect/adverse event	Mild (irritable 24-48 hrs)	Moderate (refer to GP)	Severe (refer to hospital)
0-3 months	157	146	11	0	0
4-6 months	18	18	0	0	0
6-12 months	16	15	1	0	0
1-5 years	11	11	0	0	0
5-12 years	23	23	0	0	0
>12 years	33	31	2	0	0
Total	258	244	14	0	0

GP= General practitioner, AE= Adverse event.

Table 6: Distribution of referrals (informal) (n=33) from health care practitioners in children attending a Norwegian chiropractor (n=258).

Health care practitioners	N=
Primary care physician	10 (3.9%)
Physiotherapist	2 (0.8%)
Pediatric physiotherapist	18 (6.9%)
Mid wife	1 (0.4%)
Other chiropractors	2 (0.8%)
Not referred by HCP (parental referral source)	225 (87.2%)
Total	258 (100%)

from HCP. Most commonly referrals were seen in the youngest population, 0-3 months (n=17, 52% of referrals) and with children older than 12 years of age (n=8, 24% of referrals).

Discussion

This study sought to investigate the demographic profile of pediatric patients attending a Norwegian chiropractic practice, and hopefully assist the understanding regarding why parents bring their child to a chiropractor. Thus, this study sought to serve as a spring-board for higher level research into efficacy of treatment for the types of conditions that routinely present.

The age groups presenting most often were the youngest age group (<3 months of age), followed by the oldest age group (13-18 years of age), showing similar results to previous studies revealing that the highest pediatric users of health care of any type are infants and teenagers.^{3,4,8,9,11,12} In a survey of Danish chiropractic practices, infants (defined as children less than one year of age) were the most common pediatric patients, with one-third of them between 0 and 4 months of age.⁷ It has also been noted that matured chiropractic practices tend to intake the full range of age groups but most prominently the infant patient.⁴ In this study the pediatric population made up roughly 15% of the total new patient population seen by the chiropractor. Studies have shown that pediatric patients take up 10-15% of the chiropractic practice around the world,⁹ with higher percentages in those practices that have advanced education to attend the pediatric population population.¹⁰

There was a close to even split between girls and boys attending the clinic. However, when dividing by age groups, in infancy, the presenting child was more likely to be male and as the child reached adolescence, the ratio of girls versus boys at presentation was approximately 2:1. Thus, this survey precisely corroborates previous work showing more boys than girls presenting as infants^{3,4} and a higher number of girls than boys presenting in puberty.^{3,11,12,13,14} One of the explanations could be that as newborn boys often are usually slightly larger, they could be more likely to have intrauterine constraint or a difficult birth which could require post-natal musculoskeletal attention.³ Girls in puberty are thought to be more susceptible to injury and pain, and it has in previous studies been suggested that testosterone could be protective of musculoskeletal problems in teenaged boys.¹⁵

The more common presenting complaints overall were postural in nature. The number one presenting complaint was favored head position, followed by infant positioning difficulties and inconsolable crying (formerly known as infantile colic and now considered a pain syndrome of infancy (PSI)).¹⁶ These are likely different sides of the same coin indicating discomfort or pain in the infant. Asymmetrical head position and infant positioning difficulties could include difficulties with infant tummy time, or parents complaining about irritability around nappy changing, inability to sleep supine or difficulty with positioning during breastfeeding and asymmetrical flattening of the head (non-synostotic plagiocephaly or positional head deformation). These conditions could also incite increased bouts of crying. Generally, all of these can be characterized as musculoskeletal complaints, although they may not be described as such by the parent. Still, by and large, it was the parent that made the decision to see the chiropractor. What they do know is that they want their baby to be more comfortable. Musculoskeletal pain has shown to alter mood in older children.^{3,8} Why would it not be the same with younger children, who can only respond through changes in their behavior? Infants cannot really say, "it hurts here," but only show their problem by selecting favored postures that hurt less, or show other types of irritability.⁸ The lack of full cervical rotation is a sign of a MSK problem and doesn't differ from antalgic postures (posture held for the sake of comfort) in the adult population where the musculoskeletal irritant must be removed in order to facilitate resistance-free and normal full range of motion.

Many parents who present their infants will often give a self-diagnosis such as infantile colic, or complain of their infant's excessive crying. Excessive crying is the cause of 10 to 20% of all early pediatrician visits in infants aged two weeks to three months. This condition is not without risks. Although often described as benign and self-limiting, excessive crying has been associated with parental exhaustion and stress, shaken baby syndrome and other long-term risks.^{17,18} Supine sleep

disturbance is a public health concern for children as the inability to sleep supine is a risk for sudden infant death syndrome (SIDS)¹⁹ and more than a quarter of the infants in this study suffered from irritability in supine sleep. As SIDS is a key public health issue, it is important that these infants are offered treatment so that they can comfortably sleep supine, for their own safety.

The population that suffered with non-synostotic plagiocephaly required more treatment sessions (5-11 treatments) than average (3), the cause most likely being that the condition usually has been longstanding by the time of presentation. Non-synostotic plagiocephaly may become a long-term debilitating problem that is associated with both short-term and long-term developmental delay and thus may require multimodal follow-up over a longer period of time.²⁰ In children who presented with favored head position, many also suffered with breastfeeding issues. Thus favored head position in infants may be a risk factor for suboptimal breastfeeding in infancy.²¹ Crying infants have been described as a stress-increasing factor in mothers/parents and there have been studies looking at inconsolable infant crying and its effect on maternal postpartum depressive symptoms.²² This may in turn be a risk for giving up breastfeeding.²³ It may be that one simple musculoskeletal problem can have several ramifications that can affect both short and long-term health of the child.

This study showed that teenagers present with complaints similar to the adult population, with musculoskeletal complaints such as neck and back pain being the most common. Preschool children (1-5 years of age) also point to neck, back or limbs as their cause of pain. Spinal pain was the most common presenting complaint in the school aged and adolescent population. Musculoskeletal complaints in children have been associated with both physical and psychological consequences.^{3,8} These complaints can alter participation in physical activity and sports, which again might result in negative consequences for life-long health.⁸ A recent study showed that levels of exercise steadily decrease with increasing age in children, which could be a factor in spinal pain acceleration with age^{3,24} and children with high lumbar isometric muscle endurance have been found to be less likely to report back pain.¹¹

The most common manual therapy treatment administered was press and hold technique,²⁵ followed by mobilization. As the age of the child increased, so did the differentiation in treatment modalities, and a large proportion of the cohort were treated with age specific HVLA manipulation.²⁶ In addition, one out of 20 children did not receive manual therapy, the cause likely being that they had a presentation that did not correlate with a true musculoskeletal condition. Three children were referred back to their GP or referred by the

chiropractor for diagnostic imaging for further evaluation, thereby manual therapy was not applicable.

Parents reported good results. In all, 85% of the patients/parents reported a full recovery and good improvement following chiropractic care. This rate is similar to what previous studies have found.¹⁷ Also, as previously reported, the rate of reported side effects and adverse events was very low; 5% reported a mild side effect (irritable/soreness for up to 24-48 hours) and none reported adverse events. Previous studies reporting on side effects and adverse reporting have shown similar results.^{4,6,17,27} It is likely that adverse events in chiropractic care of pediatric patients are rare.²⁸ Still, this must be investigated in a prospective way, rather than retrospectively as in this research study.

Referrals were uncommon. The most frequently referred age groups were the most common age groups (infants and teens) at presentation. The youngest age group was referred twice as often as any other age group.

This study uncovered that the types of pediatric problems that were most commonly presented to a chiropractic clinic included public health issues that could put young children at risk for developmental delay and suboptimal breast feeding, favored head position and positional plagiocephaly.^{21,23} Another concern raised by parents who brought their child in for a checkup was problematic supine sleeping in infants. Supine sleeping is considered an important factor in the prevention of sudden infant death syndrome (SIDS).¹⁹ Chiropractic care could be considered part of the assessment and

treatment protocol for supine sleeping difficulties in infants. This is a key part of the public health agenda for infants, just as is breastfeeding and therefore studies investigating the use of chiropractic care to assist children in order to support public health initiatives should be considered. This study supports previous studies suggesting that further investigation in MSK pain in childhood and adolescence is important. MSK complaints are common, they are likely to progress and for some become a longtime problem.²⁹

The key limitation of this study is that it was done in one chiropractic clinic, with only patients presenting to a single chiropractor. This may not have been representative of other practices in Norway or even internationally. As the data collected were the patient records of the author, there was room for bias and unsystematic reporting. Further, in this type of study, no claims can be made for generalization to the larger population, as there was no randomization and the study was purely observational.

Conclusion

The children in this study primarily presented with musculoskeletal problems and infant excessive crying. On average, the patients had three treatment sessions and most cases reported full recovery or good improvement. Further research is a necessity to better understand musculoskeletal pain in the pediatric population, as there appears to be increasing prevalence as the child ages. As such, musculoskeletal problems may occur at a young age and it may follow children into adulthood, creating a potential need for early chiropractic intervention.

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