

Infant presentations and outcomes at a chiropractic clinic in the UK: Parent report of treatment outcomes using the United Kingdom Infant Questionnaire (UKIQ)

By Pascal Nicolas-Schmid,¹ Marte Amanda Hetlevik,² Joyce Miller, DC, PhD³

1. MSc student, Anglo European College of Chiropractic, Bournemouth, United Kingdom

2. MSc student, Anglo European College of Chiropractic, Bournemouth, United Kingdom

3. Associate Professor, Anglo European College of Chiropractic; Lead Tutor, Musculoskeletal Health in Pediatrics, Bournemouth University, United Kingdom.

Corresponding author: Joyce Miller, DC, PhD. Email: jmiller@aecc.ac.uk

ABSTRACT

Objective: The purpose of this study was to pilot a new-validated infant treatment outcome measure and to describe basic characteristics and outcomes of infant chiropractic patients. The aim was to assess the performance of an outcome measure of infant care by chiropractic treatment through a before and after survey. This preliminary study may indicate usefulness of a newly validated measure of manual therapy care for common complaints of infancy. **Methods:** A validated parent report of outcomes (PROMS) was used. Mothers completed a questionnaire at entrance to a university-affiliated chiropractic teaching clinic and again at follow up when treatment was completed / infant discharged. Collection of demographic data including age, gender, condition at presentation, previous clinicians consulted and medications were included. **Results:** The study sample included 194 infant patients at intake and 102 at follow-up. Overall, 56% of patients (n=108) were aged between three days and 4 weeks and classified as neonate. In all, 96% of the infants were under 6 months of age. The most common presenting complaints were crying (n=65; 21%), feeding problems (n=62; 20%), discomfort in supine sleeping (n=58; 19%), check up after difficult birth (n=49; 16%), general sleeping problems (n=49; 16%) and head shape (n=25; 8%). A total 68% (n=120) had seen 1-4 clinicians, before presenting to the chiropractor and 60% (n=104) were taking from one to four medications. Prior to treatment the average score of the baby's discomfort or pain was 4.3 (Pain scale 0-10). At the follow-up survey the average was 1.7, a 60% reduction and a statistically significant difference. The relative risk ratio for the parent report of improvement after attending treatment was 2.3 (95% confidence interval = 1.73-2.87). The mothers anxiety, depression and quality of life before and after treatment improved by a factor of 2.1 (95% confidence interval = 1.58-2.62). The narrow confidence intervals suggest that these findings might be applied to the general population. On follow-up, 97% of mothers reported a positive improvement of the baby's condition and or behaviour since the beginning of care and satisfaction with the care provided. No adverse events were reported. **Conclusion:** The pilot study of this validated infant survey suggests it can be administered to mothers and that they are compliant in completion. Mothers report good success for chiropractic treatment for the infant's problems along with satisfaction with the treatment.

Keywords: pediatric, infant, manual therapy, chiropractic, demographic.

Introduction

The aim of this study was to investigate the parent report of outcomes of infant patients who attended a university-affiliated chiropractic teaching clinic on the south coast of England, using a newly validated parent reporting outcomes instrument, the United Kingdom Infant Questionnaire (UKIQ). Between 2006 and 2010, 21% of the patients that presented to this same clinic were pediatric patients, classified as being between the age of 2 days and 15 years.¹ In that study 98% of pediatric patients were infants. Likewise a Danish study of chiropractic care for pediatric patients showed that infants were the highest users of care.² The Center for Disease control in the USA reported that

manual therapy was the most common type of practitioner-based Complementary and Alternative Medicine (CAM) therapy chosen for children and musculoskeletal conditions were the most common types of conditions for which treatment was sought.³ A 2007 Canadian study corroborated these findings, stating that musculoskeletal care was the most common type of CAM treatment chosen by parents for their children.³ Personal experiences, lack of appropriate treatments available from conventional medicine or referral from a physician were the key reasons given for parents seeking alternative care for their infant.⁴ Chiropractic has been criticized for too little research for pediatric care.⁵ The safety and effectiveness of pediatric chiropractic

care was investigated in a survey of chiropractors and parents in a practice-based research network,⁶ but no attempt was made to use a reliable or valid measuring instrument. Further, satisfaction with chiropractic care for children has been rarely studied.⁷ With chiropractic care widely sought by parents for their infants, it is necessary to investigate the parents' report of the outcomes of that care in an evidence-based approach.

Methods

This was a pilot study of the instrument that had previously undergone reliability and validity studies, the United Kingdom Infant Questionnaire, and was presented for use in the teaching clinic. The goal was to collect the first 150 forms in order to sample the ease of usage and results. Every infant's mother was given a 12-question form at entrance by the reception staff and 13 questions on completion of treatment. The first 12 questions were the same at presentation and follow-up. The 13th question was the Parent's Global Impression of Change (PGIC), a gold standard reference used to document change over treatment time.⁸ The questionnaire was set out to monitor the baby's progress over the course of treatment. Only mothers were chosen to complete the questionnaire as they have been shown to be excellent monitors and reporters of their child's health.⁹ They were asked to answer all the questions. The questions were set to obtain an overall picture of the baby's complaints or discomfort and also the mother's concerns. At discharge, the survey asked her to rate her level of dis-satisfaction or satisfaction with the care received along with any adverse events that occurred with treatment. The intake form was accompanied by a demographic survey to understand the type of patient who presented to the clinic.

After the follow-up questionnaire was completed, both evaluations were collected and data transferred into Microsoft Excel[®] where descriptive statistical analysis was performed. All data was held confidentially. Parents consented at intake that the data could be used for research purposes. Ethical approval was granted by the Anglo European College of Chiropractic Project Panel.

Whenever comparisons were made, a P value of < .05 or no overlapping 95% CI were considered significant.

Results

Initial questionnaires were completed (n=194) and 102 (53%) follow-up questionnaires were returned during the time of this project (more outcome forms are anticipated, but this study had to be cut-off at a specific point in time). Table 1 shows demographic results. Figure 1 shows ratings of infant behaviours before and after treatment. The average age of the mothers was 32 with a minimum age of 20 and a maximum age of 41. The average age of the infants presenting to the clinic was 8 weeks of age with a range from 3 days to 2 years. Regarding gender, 105 (55%) were

boys and 87 (45%) were girls. Two patients stated no identification of age or gender.

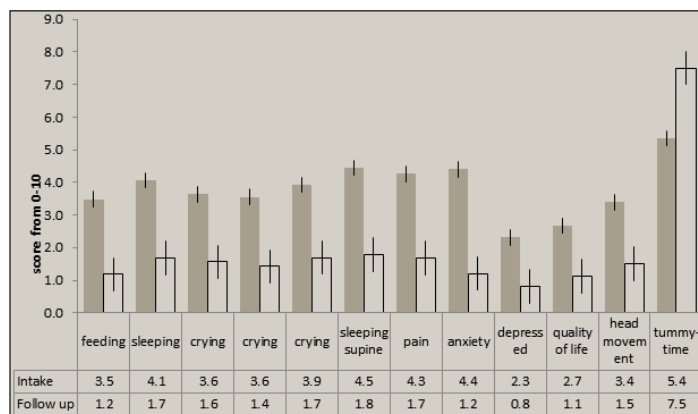


Figure 1. Mean scores for United Kingdom Infant Questionnaire. Shaded bar, mean at intake; open bar, mean at follow-up; solid line, standard error. The final question regarding tummy time was measured in an opposite way to the other questions. Hence an increase in tummy time was considered a positive result.

Figure 2 shows the most common complaints of the infants at presentation and Figure 3 duration of complaints and Figure 4 shows the irritability patterns of the infants. In the majority of cases (n=104) the problem started at birth (66%); 60% (n=96) of infants had an assisted birth and the remaining 40% were non-assisted (n=63) which is defined as home birth or hospital birth without medical intervention. Only 25% of patients presented to the chiropractic clinic first; 75% had previously attended one to more than four other health care professionals prior to attendance at this clinic for the same condition. In all, 61% (n=108) of the infants were given one or more medications, without benefit, before presenting to the clinic.

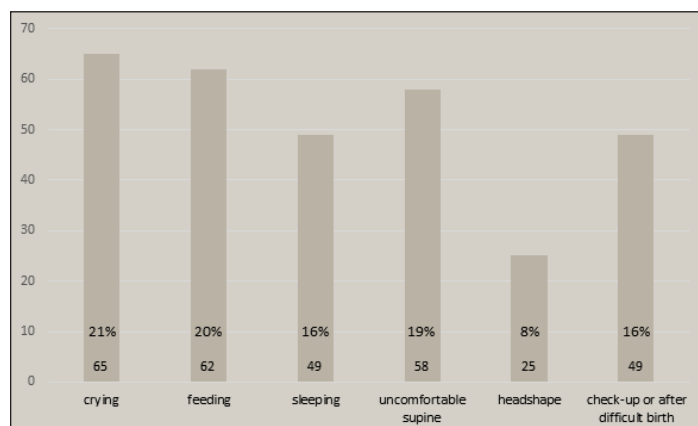


Figure 2. Reason for infant presentation to chiropractor. Total: 308*

*more than one option could be ticked

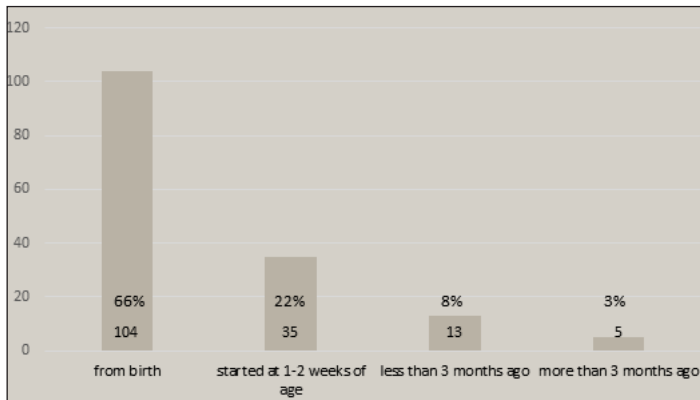


Figure 3. Duration of problem at presentation. Total: 157

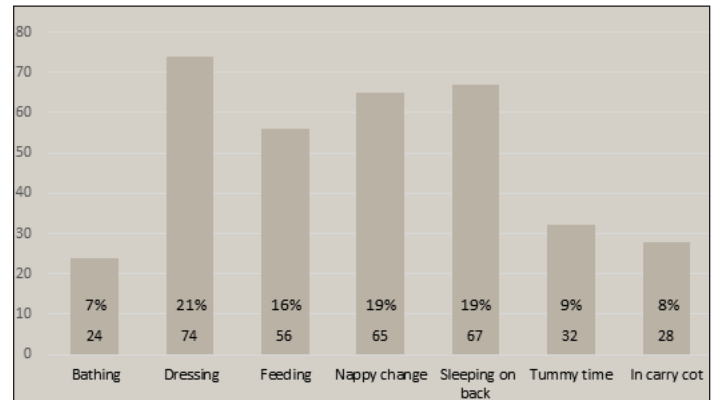
Figure 4. Maternal report of infant irritability. Total: 346 *
*more than one option could be ticked

Table 1. Socio-demographic characteristics of infants presented to a chiropractic clinic

Mother's age, years (n = 165)			Baby's preferred sleeping position (n = 207)*		
	Percentage	Frequency		Percentage	Frequency
<20	0%	0	Back	51%	105
20-24	5%	8	Front	19%	40
25-29	22%	37	right side	18%	38
30-34	45%	75	left side	12%	24
35-39	24%	39			
40-44	4%	6			
Age of infant at presentation, weeks (n = 192)			Baby becomes irritable during different activities (n = 336)*		
< 1	6%	12	dressing	21%	74
1-4	50%	96	sleeping on back	19%	67
5-26	40%	77	nappy change	19%	65
27-52	2%	3	feeding	16%	56
> 52	2%	4	tummy time	9%	32
Infant's feeding, milk (n = 173)			in carrycot	8%	28
breast	58%	102	bathing	7%	24
formula	27%	48			
both but more breast than formula	12%	21	How many health consultant seen (n = 176)		
both but more formula than breast	3%	6	0	25%	44
Reason for seeing chiropractor (n = 308)*			1	31%	55
crying	21%	65	2	23%	40
feeding	20%	62	3	10%	18
uncomfortable supine	19%	58	4	4%	7
check-up/after difficult birth	16%	49	>4	7%	12
sleeping	16%	49			
Head shape	8%	25	How many medication taken (n = 176)		
Onset of problem (n = 157)			0	39%	68
at birth	66%	104	1	31%	54
between 1-2 weeks	22%	35	2	14%	24
less than 3 months	8%	13	3	10%	17
more than 3 months	3%	5	4	5%	9
			>4	2%	4

*more than one option could be ticked

The relative risk ratio for the infant getting better after attending a chiropractic treatment was 2.3 (95% confidence interval = 1.73-2.87) indicating a child treated in the clinic was more than twice as likely to get better than if not presented here. The relative risk ratio for the mother to report

less anxiety, depression and increase in quality in life was 2.1 (95% confidence interval = 1.58-2.62). Over-all 97% of mothers reported positive improvement on the PGIC scale for global improvement and 34% stated "completely better, like a different baby."

There were no problems with dissemination, completion or collection of the surveys.

Discussion

The goal of this project was to investigate whether this newly validated infant PROMS survey was practical for use in a busy chiropractic clinic and whether it registered any change in the infant’s condition over a course of chiropractic care. No previous study has used PROMS to examine the effect of chiropractic treatment for infants. Overall, limited evidence exists to support chiropractic treatment for infants.^{10,11} The lack of a validated outcomes measure may be partially responsible for lack of infant research in the profession. The aim of this survey was to test whether a reliable and validated survey might be useful to address this paucity of evidence for chiropractic care of the infant patient and mother’s point of view.

Along with the report of outcomes, the demographics were examined to assess whether patients were representative of the general population. Boys (n=105) were more commonly presented than girls (n=87). This may be due to the prevalence of musculoskeletal health problems which have previously been shown to be more common in boys.¹² The patient proportions in that study (55%) male versus girls (45%) were the same as in this clinic (55% male and 45% female). At birth, boys are often larger than girls and intra-uterine constraint may result in biomechanical imbalance or asymmetries in their cranium, spine or extremities.¹³ It is no surprise that mechanical constraints at any age would be amenable to chiropractic care.

In 2013-14 almost two-thirds of all childbirths (61.8%; 343,797) in the UK were spontaneous and did not need any assistance; 13.2% (73,486) were caesarean section and a quarter 25% (139,112) were induced.¹⁴ Compared to our study, only (40%; n=63) of deliveries were unassisted. The type of delivery has also been implicated in infant complaints in this study. Nearly two-thirds of infants had an interventional e.g. induced, ventouse, forceps or C-section delivery (60%; n=96). This has been shown in other studies as well, that babies with assisted births are over-represented in a chiropractic practice.¹⁰ It stands to reason that children born by instrumentation may be more likely to need musculoskeletal treatment.

On a positive note, those with assisted births had similar outcomes to those with routine vaginal birth. This may

suggest that this is an appropriate treatment for the infant who has had a difficult birth, seeing as the biomechanical constraints were reduced with treatment. Different tensile strengths of adults and pediatric specimens have been documented in the literature along with care plans for infants.¹⁵

The largest age-group for mothers (n=75) was between 30-34 years of age (46%). There could be a correlation between age and seeking help from a health care professional. We had few mothers at the age between 20-24 years of age in our study. Those findings correlate with the findings of the office for national statistics,¹⁶ that babies born in England and Wales in 2014 were most likely to have a mother aged 25-34, with over a half (59%) of mothers in this age group (Table 2).

In our study the mothers aged 25-34 account for 68% (n=112) which is almost 10% higher than the statistics of 2014, but the number of births in a given year is dependent on the number of women in the key childbearing ages (15-44 years) and on fertility rates in that year.

Although the Back Safe to Sleep® campaign has been running for many years to decrease the sudden infant death syndrome (SIDS), just half of mothers stated that their child had a preferred sleeping position on the back. Other studies have suggested that chiropractic is appropriate and useful care for infants who cannot lie supine for sleep.¹⁷ Back Safe to Sleep® is an important public health issue and parents seem to understand that chiropractors can provide the treatment to assist the baby sleep with comfort in the safe supine position. In this study, the improvement of sleeping supine improved by 2.6 points (60% reduction, which can be classed as a clinically significant difference since other studies have labelled 34% improvement on such a scoring system sufficient to distinguish clinically meaningful improvement).¹⁸ This was the biggest infant improvement of all the questions we asked the parents. Because it is clinic policy not to release an infant from care unless they reach the healthy goal of supine sleep, this rating of change can be seen not only as statistically significant but also clinically significant for more than one reason. This is clear support for the role of chiropractic care in this key public health issue of Back Safe to Sleep®.

Part of the purpose of this project was to determine whether Patient Reported Outcome Measures (PROMs) are as useful for children as for adults. The National Health Service

Table 2. Live births by age group of mother in England and Wales 2014 compared to study population:							
	Under 20	20-24	25-29	30-34	35-39	40-44	45 and over
Mothers in UK	3.7%	16.2%	28.3%	31.0%	16.6%	3.9%	0.3%
Study population	0.0%	4.8%	22.4%	45.5%	23.6%	3.8%	0.0%

and Care quality commission¹⁹ have urged that the parent's point of view be heard. This use of PROMS in this age group would meet that goal. PROMS were designed to measure either patient's perception of their general health or in relation to specific diseases. In common usage, a set of PROMs is to be completed after a certain time of patient treatment, and the two scores are then compared to show the change in score, indicating improvement or worsening of the condition.²⁰ Clinicians and hospitals are increasing the use of PROMs²¹ but widespread use is uncommon beyond England, Sweden and parts of the United States. In England, PROMs use has been encouraged by the government's wishes to have a public comparison of the health care practitioner's performance, whereas in Sweden and the US, it has been driven by practitioners' wish to improve. The routine use of PROMs is an opportunity to help change the way healthcare is organised, because it incorporates important perceptions of the patient, or in this study's case, the parent.^{22,23}

Although the results are positive and mothers appear to be very pleased with chiropractic care for their infant, this type of study cannot imply effectiveness of that care. However, with mothers as excellent reporters for their child's health, with the short term of treatment time (on average less than four treatments); these improvements by and large cannot be credited to the natural history of the disorders.

Limitations

This type of study, by its definition, cannot determine efficacy of the therapy given. A randomized controlled trial is the best way to determine conclusively whether manual therapy is a viable option of care. This study does serve to understand the mother's point of view, which is currently considered key to health care choice.¹⁹

All follow-up forms were not included because at the time it was necessary to stop the study. In total half of the follow-up forms had not been returned. This can be a problem with reaching statistical significance, although most of the maternal reports were quite positive. Further, some mothers did not have any problems with their baby and they just presented for a check-up and did not require follow-up care. Many of those patients were not treated and were instead discharged after the first visit. Further, it is likely that some patients have been lost to follow-up.

There were few negative reports so it is difficult to know whether there was a halo effect in reporting. One of the mothers stated that the baby was getting worse and suffering from "dairy intolerance." This may have indicated poor diagnosis or a concurrent condition, and one that is not treatable with manual therapy. This valuable information might have been missed in a much larger study including thousands of infants, rather than less than 200.

Conclusion

This study of parent report of treatment outcomes using a validated questionnaire for infants who presented to a chiropractic clinic found parent-reported improvement in the baby's condition to a significant degree. Parents of infants in this study were more than twice as likely to report statistically significant improvement after the chiropractic treatment. There were no impediments found in this study to the use of this questionnaire and it should be considered for wider usage.

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Arnold-Chiari Malformation

By Elise Déry, D.C.

Private practice, Charny, Quebec Canada.
Email: elise.dery@hotmail.com

Definition

The usual age of onset of Arnold-Chiari malformation ranged from the second to the fourth decade, with female preponderance. It is assumed to rarely present clinically before adolescence¹ and is often associated with syringomyelia². Arnold-Chiari Malformation can be divided in three subtypes;

Type 1: (MC) Caudal herniation of the cerebellar tonsils through the foramen magnum that exceeds 5 mm into the cervical spinal canal.^{1,3}

Type 2: Caudal herniation that involves the cerebellar vermis and medulla, usually diagnosed in childhood with an average survival time of less than 2-3 years.⁴

Type 3: Caudal herniation of cerebellum and medulla accompanied by meningoencephalocele of the top of cervical vertebra and occipital region, cerebellar prolapse and hydrocephalus. ACM type III is an extremely rare anomaly with poor prognosis for newborn infants because of respiratory failure, swallowing dysfunction, hypertonía, or amyotonia.¹

Symptoms

The symptoms usually consist of neck ache, headache, weakness and numbness that present and progress gradually, but can be asymptomatic.^{1,3,5} Compression of the medulla, spinal cord and cerebellum or blockage of CSF can cause various symptoms: lower cranial nerve palsies, vertigo, visual and hearing disturbances, nystagmus, swallowing difficulties, spastic or ataxic paraparesis, bladder dysfunction, gait abnormality, tremor and chronic headache because of hydrocephalus.^{1,2}

DDX: Multiple sclerosis, primary headache syndromes, spinal tumours and benign intracranial HT.

Diagnosis

Diagnosis of the disease without radiologic evaluations is difficult because there are no distinguishing symptoms of the disease.⁴ Radiography may offer early suspicion for ACM: Small posterior fossa; Enlarged foramen magnum with a convex posterior border; Enlarged diameter of the spinal canal. MRI is the procedure of choice.

Treatment

Arnold-Chiari Malformations may be prevented by precon-

ceptional folic acid (or methylfolate if positive for the MTHFR genetic mutation) and Vitamin B12 supplementation.⁷ The ACM process usually begins during the third week of embryonic life at the time of closure of the neural groove.⁶

ACM with pregnancy

Women with ACM were not more likely to die during delivery-related admissions despite more frequent severe morbidity. They are more likely to develop severe medical complications including acute respiratory distress syndrome, stroke/cardiovascular accident, sepsis and seizures. Women with ACM were also more likely to be delivered by caesarean or develop preeclampsia.⁷

Medical treatment

The typical management of ACM is suboccipito-cervical decompression surgery. Surgery has a typical prognosis of greater than 80% improvement in ACM.⁴

Chiropractic literature

Few studies reported on chiropractic treatment for ACM patient. The first showed no improvement of symptoms for two patients with ACM.⁶ In the second, Applied kinesiology chiropractic and SOT treatment was used for treatment of loss of vision and nystagmus. After treatment, the patient's ability to see, read, and performs smooth eye tracking showed improvement.⁸ According to another study, asymptomatic Type I ACM is not necessarily a contraindication to skilled adjustments to the cervical spine.⁹ The frequency of complications after spinal manipulation is not known, but seem to be relatively risk free. One case study, showed significantly increased of symptoms after spinal manipulation of ACM patient. The literature would suggest that there is a real, if small, complication rate with a substantial long-term morbidity and disability.⁵

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