

A pragmatic multi-site clinical trial of chiropractic treatment for asthma

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**A thesis submitted in fulfilment of the requirements of the degree of
Doctor of Philosophy**

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Statement of candidate

I certify that the work presented in this thesis entitled: ‘a pragmatic multi-site clinical trial of chiropractic treatment for asthma’ has not been submitted, in whole or in part, for a higher degree to any university or institution other than Macquarie University.

I also certify that the thesis is an original piece of research, and has been written by me. Any help and assistance that I have received in my research work and the preparation of this thesis has been appropriately acknowledged.

In addition, I certify that all information sources and literature used are indicated in the thesis.

The research for this thesis was carried out under the umbrella of an asthma research study, ‘A Multi-site trial: Chiropractic and Asthma with Physiological Markers’. This research was funded by the Foundation of Chiropractic Education and Research (FCER Grant #99-10-12) under the leadership of the principal investigator, Dr Ray Hayek with a multi-disciplinary research team representing three departments at Macquarie University, as shown in the following table.

Asthma Study Multi-disciplinary Research Team		
	Member	Role
Department of Chiropractic	Dr Ray Hayek, principal investigator	Multi-site trial of chiropractic and asthma using laboratory-based physiological markers
	Dr Robyn Beirman, medical liaison	Medical liaison officer
Department of Biological Sciences	Dr Sinan Ali, co-investigator	Laboratory analysis of physiological markers of chiropractic treatment in asthma
	Dr Rita Holland, laboratory work	Laboratory analysis and research assistant
Department of Human Geography	Professor Peter Curson, associate investigator	Data synthesis of factors in health promotion and disease patterns
	Sue-Ellen McKelvey, PhD candidate and co-investigator	Clinically-based research and healthcare paradigms of multi-factorial chronic illness, asthma

The following is an overview of areas of responsibility during the study.

Research design

The practice-based research design of the trial was developed by me in discussion with the principal investigator, Dr Ray Hayek. I made a major contribution to all preliminary studies, the research design and the trial, and reviewed the research methods for the chiropractic practice-based trial. I was directly involved in the practical responsibilities of the trial: all clinical research protocols, participating chiropractors' and clinics' standardisation, protocols

of the ‘no treatment’ and ‘non-technique treatment’ for participating chiropractors and the patient-centred research tools’ development and organisation.

Laboratory- based work

Laboratory-based work to establish the salivary testing methods took place before the clinical trial commenced. Dr Sinan Ali principally developed these testing methods, as well as the laboratory methodology for the physiological markers during the trial, in discussion with the principal investigator, Dr Ray Hayek. Drs Sinan Ali and Rita Holland were responsible for all technical work and details of the laboratory-based analysis during the trial.

Project co-ordination, collation and analysis of data

During the trial

The part-time office co-ordinator, who was not involved in the study, assisted in all project office work. As PhD candidate, I initially set up and monitored questionnaires, forms, research standards and procedures involving asthma participants and participating chiropractors; helping the co-ordination of the clinical research. Throughout the clinical trial, the asthma project office called management discussions and there were regular clinical trial review meetings. The development of statistical methodology for the trial was managed by the principal investigator. This included informal meetings with Macquarie University statisticians (Dr David Cairns and staff of the Department of Statistics, Prof. Don McNeil and PhD student Ms Shanley Chong) to discuss the progressive results of data analysis coming in from the groups of asthma participants during the trial.

After the trial

After completion of the trial processes, the final data assessments, statistical analyses and reviews of research methodology all required input from the multi-disciplinary team. Not all the members of this multi-disciplinary team of researchers were able to continue their involvement throughout the trial. Since the completion of the trial, some meetings and email

correspondences have continued between Dr Sinan Ali, Dr Ray Hayek and me. There have been discussions regarding drafts for papers about this asthma study; these continue at the completion of this thesis.

The preparation of the thesis

The preparation of the thesis has been assisted by successive supervisors - Professor Peter Curson, Dr Ray Hayek, Dr Peter Bull and Associate Professor Subramanyam Vemulpad. In the final preparation and presentation of the thesis Associate Professor Subramanyam Vemulpad, and before him Dr Peter Bull, have provided counsel and constructive input.

I certify my specific contributions to this research under the thesis chapters here.

Chapter 1: Introduction

Conception 80%; writing 90%

Chapter 2: Origins to the clinical trial: background to planning; research design and aims and objectives

Conception 80%; writing 90%

Chapter 3: Methods

Conception 70%; laboratory-based methods 10%; statistically-based methods 10%; clinically-based methods 80%; writing 90%

Chapter 4: Results and chapter 5: Discussion

Conception 70%; data collection: laboratory-based 10%, clinically-based 80%; data interpretation and synthesis 70%; writing 90%

Ethics clearance

This research project has had ethics clearance from Macquarie University Australia (reference numbers: 26MAY2000-RO42 and HE 26SEP2003-RO2633). The ethics document is included in the appendix.

I include at the end of the thesis comment on my personal experience of the asthma study.

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Department of Chiropractic

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Professor Don McNeil

Ms Shanley Chong

Department of Human Geography

Professor Peter Curson

Administrative staff

I acknowledge the part-time administrative staff that ably assisted us all in the co-ordination of the asthma research project:

Ms Kate Boyce

Mrs Chandrika Subramanyam.

Asthma participants

I acknowledge all the asthma sufferers who volunteered and participated in this clinical trial. I thank each one for their active co-operation and compliance throughout the trial.

Participating chiropractors

I acknowledge the chiropractors in private practice who each donated their physical practices and professional time to participate in this multi-site clinical trial.

I record my gratitude to these individuals who contributed to this research by providing a ‘typical’ practice of chiropractic to be appraised in this clinical trial. I also acknowledge the front desk and administrative staff of these participating clinics for their huge generosity of time and complete co-operation in all required research standards and practical requirements for the duration of this trial.

Lastly, and most importantly, I would like to acknowledge on behalf of the multi-disciplinary asthma research team, the Foundation for Chiropractic and Education Research (FCER), in the United States of America, for fully funding this clinical trial.

Conflicts of interest

None to declare.

Abstract

Background

There is anecdotal evidence that chiropractic treatment helps asthma. A review of the applicability of research methods that may be adopted to test for any benefits from chiropractic treatment informed the clinical research design

Methods

A multi-site pragmatic clinical trial was conducted. The clinical trial involved asthma sufferers who chose to attend for a series of 18 chiropractic treatments whilst maintaining their own active asthma management plan. The six week clinical phase occurred in a ‘typical’ setting of chiropractic practices of 19 chiropractors; participating chiropractors administered treatment ‘typical’ of their daily practice.

Trial Participants

The study (N = 142) randomised participants into four groups. The asthma group A (41 participants) attended the clinic and received treatment, asthma group B (40 participants) attended appointments at the participating clinics but did not receive treatment. The asthma group C (39 participants) was monitored from home. Group D (22 participants) was a group of age-matched participants who did not suffer from asthma and were monitored from home.

Outcome measures

Three self-reporting questionnaires were used to assess physical, emotional and mental health in the context of asthma. Participants monitored their Peak Expiratory Flow (lung function) at home daily with Peak Flow Meters.

Physiological changes in health within the context of asthma were measured by laboratory analysis of cortisol and IgA levels from salivary samples. These provided biomarkers of health in asthma.

Results

Results indicated that there were some therapeutic benefits occurring for the asthma participants that had received chiropractic treatment. Group A sustained an increase in IgA levels and a decrease in cortisol levels supporting a trend of improving PEF scores (lung function) statistically significant at completion of the trial ($P < 0.05$). These findings were supported by self-reported decrease in symptoms and use of reliever medication with improvements in physical and mental health domains of SF36 and an improved locus of negative emotions.

Discussion

Observed changes in neuro-endocrine and neuro-immune activity indicate some therapeutic mechanism underlying these health benefits from chiropractic that requires further research.

Chiropractic and alternative healthcare developments with emerging models of patient-centred healthcare delivery are discussed.

(Macquarie University Human Research Ethics approval reference no: 26MAY2000-RO42 and HE26SEP2003-RO2633)

(Australian Clinical Trial Registry Number: ACTR 00081909)

Synopsis

The World Health Organisation (WHO) estimates that 300 million people suffer from asthma. The prevalence of asthma in Australia is one of the highest in the world, according to population studies.

It is a fact that health consumers consult chiropractors for treatment of asthma; and report beneficial outcomes. It is also the fact that research studies into the potential benefits of chiropractic in the treatment of asthma have been inconclusive. The thesis reports on a clinical trial, the research methodology of which was designed by the Macquarie University multi-disciplinary team of researchers with specific regard for those seemingly contradictory facts.

The focus of this thesis is to review particular evidence of efficacy in chiropractic as a treatment for improving the health of the individual asthma sufferer and to consider the applicability of research methods that may be adopted to evidence any such benefits from chiropractic treatments. The nature of chiropractic treatment is reviewed through research to date and with identification of current topics of research significance in chiropractic healthcare.

The complex condition of asthma as a chronic multi-factorial condition is reviewed, as is the pathophysiological nature of asthma as a potential factor of influence itself. Chiropractic healthcare is discussed in its context as a Complementary and Alternative Medicine (CAM) healthcare service.

The thesis identifies strengths and weaknesses in research methods of chiropractic and CAM healthcare approaches that are non-pharmaceutical by nature. It is recognised that in CAM there are therapeutic mechanisms of health change that are yet to be understood. A pragmatic research trial within an asthma management plan offered a patient-centric model for

examining the health of the individual asthma sufferer, with the inclusion of a non-pharmaceutical treatment program. The thesis acknowledges the importance of emerging trends in issues such as consumer health demand and clinical co-management, and offers observations on the place of a patient outcome-centric model of health delivery in particular in the context of CAM.

There is background to the research design of the clinical trial. The research design was informed by preliminary studies and constructed by the multi-disciplinary team. The clinical trial then proceeded.

The clinical trial was undertaken to examine whether there are any therapeutic benefits for the individual with asthma from chiropractic treatment; the trial is discussed in terms of its findings and also in terms of its implications on the question of research design in the context of medical and alternative healthcare.

Method

A multi-site pragmatic clinical trial was conducted over a 14 week period with a six week clinical period of treatment, phase 2. The six week clinical phase was preceded by the two week baseline period, phase 1 and followed by the six week post-treatment period, phase 3. There was data collection daily from home by all trial participants and questionnaires were completed at each of the phases, 1 2 and 3, of the 14 week study. The clinical trial involved asthma sufferers who chose to attend for a series of 18 chiropractic treatments at participating clinics whilst maintaining their own active asthma management plan. The six week clinical phase of the experimental intervention occurred in a ‘typical’ setting of the chiropractic practices of 19 chiropractors; with the participating chiropractor administering treatment ‘typical’ of their daily practice.

Study participants

The study (N = 142) randomised the asthma participants into three groups with a fourth control group of non-asthma participants. The asthma group A (41 participants) attended the clinic and received treatment, asthma group B (40 participants) attended appointments at the participating clinics but did not receive treatment. The asthma group C (39 participants) was monitored from home. Group D (22 participants) was a group of age-matched participants who did not suffer from asthma and were monitored from home.

The asthma participants in groups A and B expected to receive their 18 chiropractic adjustments at some point during the 14-week trial. Those in group A were asthma sufferers who received 18 chiropractic treatments during their attendance at the participating clinics. Group B did attend the participating clinics for 18 appointments but did not receive chiropractic treatment during the 14-week period of the clinical trial. Participants in group C were asthma sufferers who did not receive any chiropractic treatment and participated in the 14-week study from home. Participants in group D were not asthma sufferers and did not receive any chiropractic treatment and participated in the 14-week study from home.

Participating chiropractors

Each participating chiropractor had a minimum of five years' experience in private practice and was able to demonstrate the use of a clinical technique considered mainstream for the purpose of the research. The participating chiropractors were required to manage the asthma participants in the normal course of their typical practice. Each chiropractor was instructed to record treatment of any spinal level(s) of dysfunction at for participants in group A. A clinical recording sheet was developed for the research trial. The participating chiropractors delivered a series of 18 chiropractic treatments, three times weekly in their own practice. For the purposes of the trial this was called a 'program of chiropractic care'.

Outcome measures

Research measures included three self-reporting questionnaires to assess physical, emotional and mental health in the context of asthma. These were the SF-36, a wellness questionnaire, the Depression, Anxiety and Stress Scales (DASS) and an asthma-specific questionnaire. Also asthma participants monitored their Peak Expiratory Flow (PEF) or lung function at home daily with Peak Expiratory Flow Meters (PFM).

Changes in health within the context of asthma were measured by laboratory analysis of cortisol and IgA levels from salivary samples collected throughout the 14-week trial. These provided biomarkers for measuring health changes in the asthma sufferers.

There was a baseline collection of all data (phase 1) at two weeks prior to the treatment phase and again at the completion of the treatment phase (phase 2) with a final data collection point at the six-week post-treatment phase (phase 3).

Results

Group A showed improvements in physical and mental health in the results of the SF36. Decreased use of reliever medications and decreased asthma symptoms was found in relation to Group A, recorded in disease specific questionnaires. A reduced association of depression, anxiety and stress according to the DASS scales was also noted in group A.

The laboratory-based analysis of the two biomarkers showed a decrease in circulating cortisol and increased levels of IgA in saliva for group A. PFM readings showed a significant trend of improvement in the lung function of asthma participants in group A that was sustained in the six-week post-treatment data collection results.

Discussion

The findings of this study demonstrate therapeutic benefits from chiropractic treatment for individuals suffering from asthma. The observed changes in neuro-endocrine and neuro-immune activity indicate a therapeutic mechanism underlying these health benefits.

The combined results of the findings of the six research measures were indicative of some physiological response to the chiropractic treatment registered in the simultaneous decrease in cortisol, the increase in IgA, the trend of lung function improvement and the improved sense of physical, mental and emotional wellbeing observed in group A.

Further clinical research may develop a validated treatment program for asthma sufferers' inclusion in personal asthma management plans.

Further clinical research with a focus on multi-disciplinary professional co-operation could contribute to the developing research model of integrative healthcare delivery.

It is recognised that in Complementary and Alternative Medicine (CAM) research, there are therapeutic mechanisms of health change that are yet to be understood. Without these established therapeutic mechanisms, the development of CAM healthcare systems is limited. Research design is critical to this growth. The randomised controlled trial (RCT) delivers rigour when appropriate to the purpose of the research. By contrast, the whole practice setting or 'typical' practice environment offers a range of possibilities for understanding the human-to-human interaction in healthcare.

A pragmatic research trial within an established medical regimen can offer a patient-centric model for examining the health of the individual asthma sufferer, with the inclusion of a non-pharmaceutical treatment program. Further clinical research with a focus on multi-disciplinary professional co-operation could contribute to the developing research model of integrative healthcare delivery.

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