A study into Osteopathic treatment of pregnant women in NSW and Queensland.

Master of Health Science (Osteopathy)

School of Health Sciences

Sarah Smith

Student number: 3550453

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Supervisors

Dr Jenny Hynes B.App.Sci (Physio); M. Physio (Musculoskeletal)

Cameron M. Gosling B.App.Sc (HM). M.App.Sci

ABSTRACT

Background and Objectives:

Throughout pregnancy, the body undergoes continual musculoskeletal changes, which can be frequently associated with functional limitations and disability such as pelvic pain and low back pain, however, there is little literature regarding the role of the osteopathic profession in the treatment of the pregnant patient. The osteopath has the opportunity to contribute to the musculoskeletal system structure and function and hence influence the altered homeostasis hence reducing the patients discomfort and making the pregnancy more comfortable for the woman.

Aims:

This study aims to determine treatment modalities utilized by osteopaths for treatment of pregnant patient, and the rate and incorporation of patient education as part of the management of the pregnant women in NSW and Queensland.

Procedure:

Surveys were sent to all registered Osteopaths in NSW and Queensland (N=440). Survey content was based on past literature and research that has been done in similar areas. Returned surveys were analyzed using descriptive statistics such as frequency distribution and percentages.

Results:

Information was received from 17% of osteopaths surveyed. Lumbar pain was the most common presentation throughout the pregnancy (trimester 1- 62%, trimester 2- 88%, trimester 3- 95%, and post natal 89%), and high velocity low amplitude (HVLA) manipulation was the most commonly used treatment technique (86%), with 62% of the sample using HVLA manipulation on the lumbar spine during pregnancy, and 39% on the pelvis. 92% of the respondents feel they could play a larger role in the future, and 78% feel that other professions do not fully understand the role that Osteopaths could play in pre- and post- natal care with their current qualifications.

Conclusion:

This study has highlighted that the majority of sample osteopaths surveyed treat pregnant women using similar techniques, that they don't only treat the musculoskeletal system but also provide information and support throughout the pregnancy. It has shown that the sample practitioners feel their qualifications in the field are underestimated, illustrating that the profession needs to educate not only the

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public but also fellow primary health care practitioners, so they are more aware of the role Osteopaths could play in the treatment of pregnant women in the future.

Keywords:

Osteopathy, pregnancy, low back pain, pelvic pain, exercise

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INTRODUCTION

Pelvic girdle pain and low back pain are reported as common complaints among pregnant women throughout the world, and have been reported to cause severe pain and considerable impairment of daily functions in one third of affected women.[1-5] Factors associated with developing pregnancy related low back pain (PLBP) include physically strenuous work and previous low back pain.[6-7] Ostgaard et al.[6] found that women who had been pregnant previously tended to have an increased risk of PLBP, and found a significant correlation between multiparity and longer periods of back pain. He found that young age increased the risk of back pain, and the pain intensity was higher in younger women during the first part of the pregnancy but not later on. Other factors that have been found to increase the risk of developing LBP and pelvic pain during pregnancy include body mass index, a history of hypermobility, and amenorrhea.[8] It is important for the Osteopath to be aware of the risk factors in the patients' presentation so that they can be taken into consideration in the management of the patient.

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Although many causes have been speculated in the underlying pathological process leading to LBP and pregnancy related pelvic girdle pain (PRPP), little research has been done to name one single causative factor. It has been proposed that with foetal weight altering load on muscles, tendons and joints, muscle weakness and insufficiency of the pelvic ligaments results in painful overload, and this increased laxity exaggerates pelvic pain during the pregnancy.[9] Because the levels of the hormone relaxin in pregnant women with pelvic pain do not differ from levels in other pregnant women, relaxin can most likely be excluded as an important cause of pelvic pain and LBP during pregnancy.[10] Thus, the biomechanics of the low back and pelvis muscles and ligaments are one aspect the Osteopath should investigate when treating a patient with PRPP and PLBP.

It has been suggested that there is an association between increased sacroiliac joint (SIJ) laxity and PRPP. Damen et al.[11] found that pregnant women with moderate or severe PRPP have the same laxity in the SIJs as pregnant women with mild or no pain. However, they did find a relation between asymmetric laxity of the SIJs and PRPP, which indicates that an asymmetrical dysfunction maybe the cause of

the pain rather than laxity. A review of 100 consecutive pregnancies indicated 23 women spontaneously reported back pain to the physician.[12] Eleven of the 23 women met diagnostic criteria for what they termed SI subluxation. The 11 women were treated with rotational manipulation of the SIJs and after this 10 of the 11 women (91%) had relief of pain and no longer exhibited signs of SI subluxation. Daly's research highlights the relationship between PRPP, pelvic asymmetry, and PLBP,[12] thus this study may emphasize the importance of the osteopath applying a holistic approach to treatment supporting Daly's research.

Pelvic girdle relaxation and pain due to hormonal and biomechanical factors has also been theorized as a cause of pelvic pain. Larsen et al.[13] found that the symptoms associated with pelvic girdle relaxation that occurs in pregnancy usually cease shortly after delivery, however in 4% of patients, symptoms can persist for several months postpartum, indicating pelvic joint syndrome. Ostergaard et al.[14] defined pelvic girdle relaxation as a condition with pain at the pubic symphysis and/or SIJ developing in connection with pregnancy or delivery. He found the frequency to be 7.6-18.5 per 1000 deliveries, and an increased incidence in multiparae and women with physically demanding occupations, therefore these are factors the Osteopath should consider in the treatment and management.

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Osteopathy can be used in pregnancy to optimize a women's health through manual treatment of her body structure to assist her and the baby for the duration or pregnancy and following delivery.[15] Fendall[15] states that osteopathy has an important role to play in assisting the neuromusculo-skeletal system to accommodate to the increasing demands of the growing fetus. Osteopathic manipulative treatment (OMT) in pregnancy should also include nutrition, detoxification and psychological balance.[16] OMT may benefit woman during pregnancy by helping the body adjust to a growing uterus and displaced organs, and is used to help with their posture by adjusting the body mechanics to work more efficiently. However, within the literature there are no set guidelines suggested for Osteopathic treatment and management of the pregnant patient, thus this study may determine common treatment and management approaches by the Osteopath for the pregnant patient.

Other physical therapy treatments aside or in conjunction with OMT for PRPP/PLBP may consist of a pelvic belt, a home exercise programme, and patient education, and more current treatments may also include stabilising exercises and acupuncture.[14,17-19] Elden et al. [1] compared the efficacy of standard treatment, standard treatment plus acupuncture and standard treatment plus stabilising exercises for PRPP. It was found that acupuncture and stabilizing exercises constitute efficient complements to standard treatment for the management of pelvic girdle pain during pregnancy, and acupuncture was superior to stabilizing exercises alone in the treatment of PRPP and PLBP. However the specific techniques used would have been practitioner dependent so results may have differed if another practitioner or a practitioner with other qualifications were performing the techniques. Insufficient evidence is available to give strong recommendations for or against any particular treatment modality for PRPP.[4] A range of therapies in conjunction with exercise programs are suggested by current research, however there is no research on Osteopathy in conjunction with exercise programs for pregnant patients, thus this study may determine how much surveyed Osteopaths incorporate exercise into their treatments.

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Altered motor control of the pelvic floor muscles has been found to occur in over half (52%) of patients with PLBP, and has been associated with impaired bladder control and voiding dysfunction.[20,21] It has also been suggested that training the pelvic floor muscles during pregnancy can prevent urinary incontinence postpartum; [22,23] hence pregnant women are encouraged to do exercises for these muscles.[24] It has also been reported that an individualized treatment approach with specific stabilizing exercises for the pelvic floor appears to be more effective than physical therapy without specific stabilizing exercises for women with pelvic girdle pain after pregnancy.[17] Thus this study surveys Osteopaths on their recommendations of pelvic floor muscle strengthening as research has shown it is important for the therapist to include individualised exercises for the pelvic floor in conjunction with their treatments to obtain optimal results.

Many women change their exercising patterns when they become pregnant, as some no longer have the energy to work out, and others have concerns for the wellbeing of the foetus. Positive effects of exercise during pregnancy include a

greater sense of well-being, increased energy, improved sleep, decreased backaches, better weight control, and enhanced strength and endurance.[25] A review of previous literature by Dempsy[26] reports that women who engage in physical activity during pregnancy have about 50% reduction in the risk for gestational diabetes compared with inactive women, and about 40% reduction in preeclampsia risk. Shorter labour and obstetric interventions have been reported.[27] The main safety concern expressed is the potential harm from hyperthermia that may be associated with higher aerobic exercise level as a temperature of 39.2 degrees Celsius or higher has been proposed as presenting a risk for the foetus. Larsson et al.[28] studied temperature and oxygen saturation responses to low-impact exercise in healthy pregnant women and found that the low-impact exercise at about 70% of one's maximum heart rate appears to be safe in terms of risk of maternal hyperthermia. If the pregnant patient is hypertensive prior to the pregnancy then they should be advised of precautions to take when doing exercise as it has been found that there is a continuous inverse association between fatal growth and maternal blood pressure.[29] Garshasbi et al.[30] designed a prospective randomised study to investigate the effect of exercise during pregnancy on the intensity of low back pain and kinematics of the spine. He found that exercise in the second half of pregnancy significantly reduced the intensity of low back pain. Thus, exercise should be encouraged by the Osteopath for pregnant patients who do not present with any risk factors for complications.

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This study seeks to determine common presenting complaints of pregnant women to osteopaths and treatment modalities utilized by the osteopath for the pregnant patient. This study also aims to look at the rate and incorporation of patient education as part of the management of the pregnant patient. The contribution of this data may lead to a more clearly defined role the osteopathic profession may play in regards to the treatment of pregnant women.

METHODS

Participants

All registered Osteopaths listed in pubic domain advertising material (i.e. Yellow pages and AOA documents) practicing in NSW and Queensland (N=440) were sent a survey on Osteopathic practice as it relates to pregnancy. Victorian Osteopaths weren't included in the survey as they have been over surveyed. The

Human Research Ethics committee of Victoria University approved this study and consent was assumed upon return of the completed questionnaire. Participants' data was excluded from the study if the questionnaire was returned unfinished.

Procedure

Surveys were developed from an extensive literature review into research conducted in similar areas. Questions included topics regarding how long the practitioner has practiced, and their practice setting. Other topics included common presenting complaints from the patient, types of treatment methods used, and questions on the use of HVLA in pregnancy. Questions were asked regarding use of exercise programs prescribed, additional information given to the pregnant patient such as nutritional advice, and the osteopaths' perspective on the role that the profession plays in the community to determine common reoccurring themes.

The survey yielded face validity only, and was trailed on four experts in the field (EIF) who have research qualifications or experience in the treatment of pregnant women and survey design. The EIF provided feedback on the appropriateness of the survey and it was modified prior to distribution. Return rate for the survey was estimated at 30% due to the sample being chosen from the profession directly relating to the study.

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Statistical methods

Raw data was collated using Microsoft Excel and data was analyzed with descriptive statistics such as frequency distribution and percentages. Analysis of Question 10b, which was the qualitative part of the survey, was analyzed for content and recurring themes, which were identified and reported. Data was coded and placed into categories to allow contextual interpretation of patterns and common themes that emerged.

RESULTS

The final return rate for the surveys was 17% (n=72), and no data was excluded. The sample of osteopaths ranged in age from 24-64 years, 81% having completed their osteopathic studies in Australia. Over half of the Osteopaths work in private practice (54%), with a large majority of the remaining in multidisciplinary

clinics (38%). 96% of the respondents have treated pregnant women, and 74% of these have treated pregnant women through multiple pregnancies. More than half of the respondents treated 1-5 pregnant patients per month (62%).

Table 1: Characteristics and percentages of the sample data

Characteristic:	**no:**			
Age:	**Mean**	**Range**	**SD**	
	40.6	24-64	11.1	
Education:	**Institution:**		**Country:**	
	Sydney College	24%	Australia	UK
	RMIT*	22%	81%	19%
	UWS*	16%		
	BSO*	15%		
	Windsor College	11%		
	VU*	10%		
	PCOM*	6%		
	ICO*	1%		
	BCNO*	1%		
	ESO*	1%		
Place of work:	**setting:**			
	Private	54%		
	Multidisciplinary	38%		
	Gym	5%		
	Medical	4%		
	weekly hours:		**weekly patients:**	
	Average	30.3	Average	40.1
	Standard Deviation	14.5	Standard Deviation	24
Treatment of pregnant women:	**Yes**	**No**		
	96%	4%		
Pregnant patients per Month	**Number**	**%**	**Number**	**%**
	1-5	62%	16-20	2%
	6-10	25%	>21	2%
	11-15	9%	<1 p/month	2%
Multiple pregnancies:	**Yes**	**No**		
	74%	26%		

(* RMIT = Royal Melbourne Institute of Technology, UWS=University of Western Sydney, BSO= British School of Osteopathy, VU=Victoria University, ICO=International College of Osteopathy, PCOM=Pacific College of Osteopathic Medicine, ESO=European School of Osteopathy, BCNO=British College of Naturopathy and Osteopathy)

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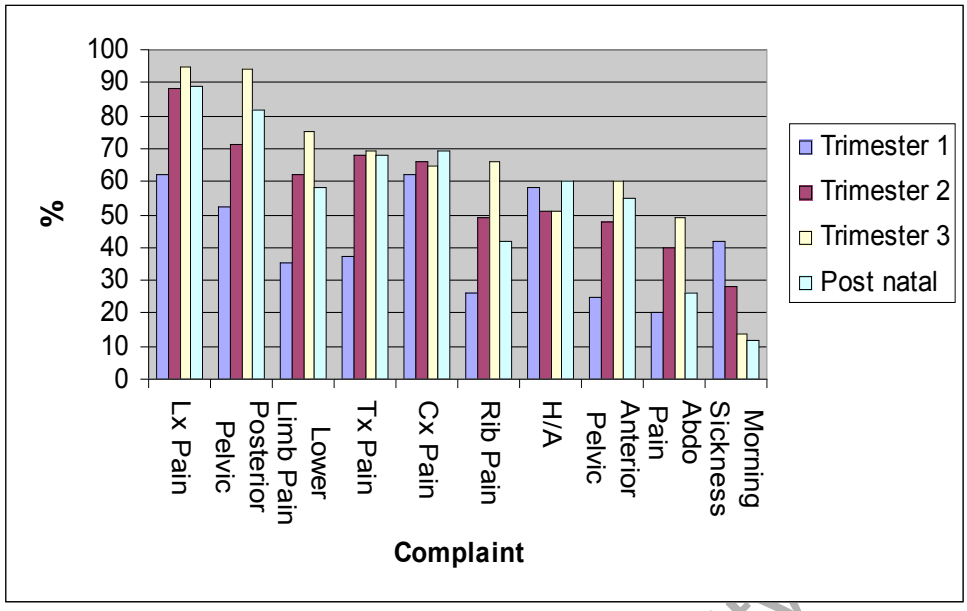
76% of practitioners treated pregnant patients through the entire pregnancy, including post partum, while only 7% treated for 6-9 months during the pregnancy, and 6% treated for 1-3 months during the pregnancy.

The site of complaint varied for each trimester, with women in the first trimester primarily reporting lumbar and cervical pain (62%). Symptom reporting in trimester two showed a substantial increase in lumbar pain (88%), as well as thoracic pain increasing from 37% in trimester 1 to 68%. In trimester 3 lumbar pain was again the most common presentation (95%) followed by posterior pelvic pain (94%), and lower limb pain (75%). Lumbar pain was the main presentation in postnatal patients (89%), followed by posterior pelvic pain (82%)(Figure 1).

Figure 1: Common presenting problems in the pregnant patient



Carpal tunnel (11%) was the main presentation seen by respondents that wasn't listed in the survey (Figure 2). Other areas of complaints included the ITB, coccyx, elbows, groin and hip; and other symptoms that patients presented with include breathlessness, fatigue, depression, insomnia, dyspareunia, and bowel dysfunction.

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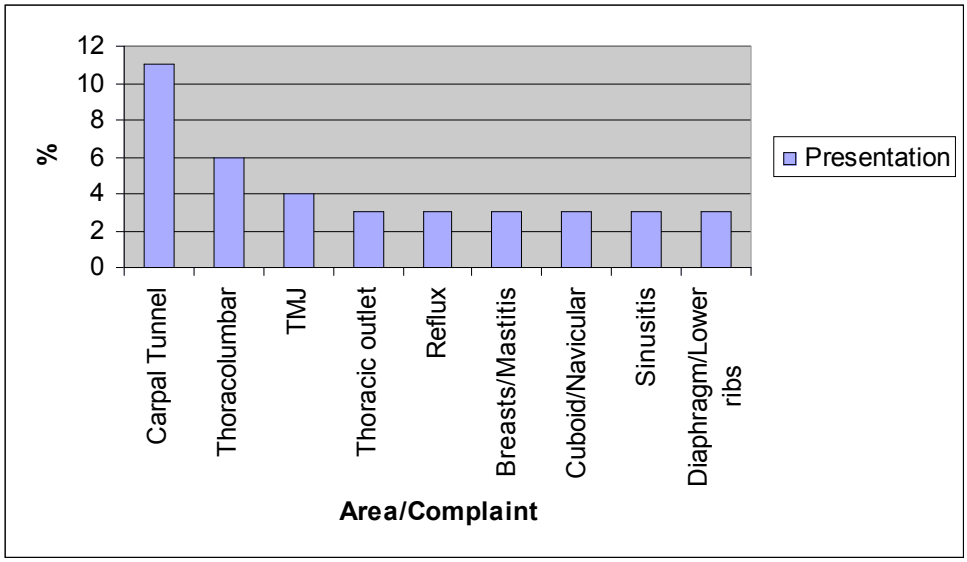
Figure 2: Other areas and complaints in the pregnant patient that present to the Osteopath



Techniques commonly used by osteopaths during the treatment of pregnant patients include articulation (75%), and muscle energy technique (MET) (72%) in the first trimester; articulation and HVLA manipulation (77%), and MET (69%) in the second trimester; and articulation (81%), and MET (72%) in the third trimester. This differs little to the techniques of choice in post-natal treatment which included articulation (78%), manipulation (77%) and MET (69%)(Figure 3). Respondents listed other techniques they used that weren't included in the survey as myofascial technique (13%), balanced ligamentous tension (BLT) technique (12%), and functional release (12%) (Figure 4).

Figure 3: Techniques used by the Osteopath to treat common complaints of pregnant patients

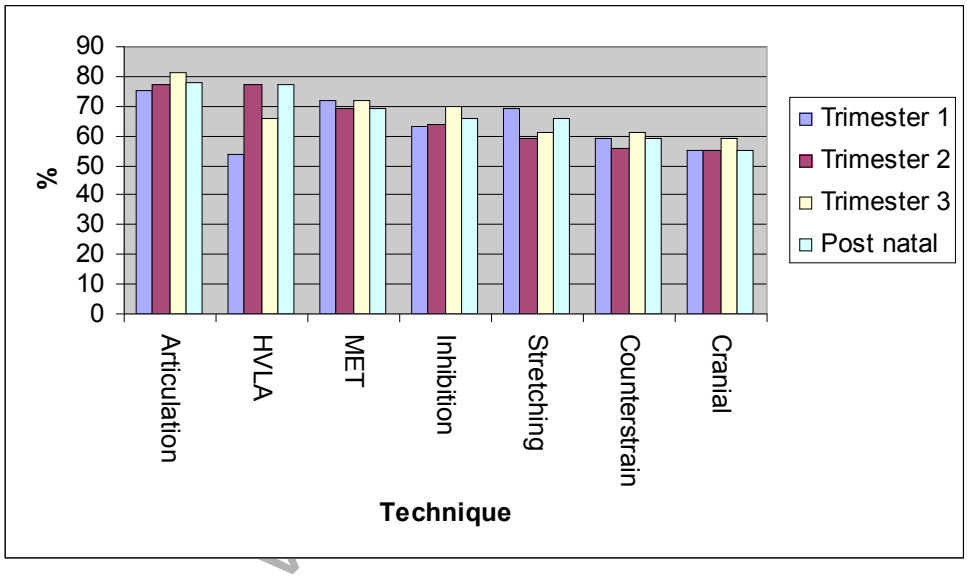
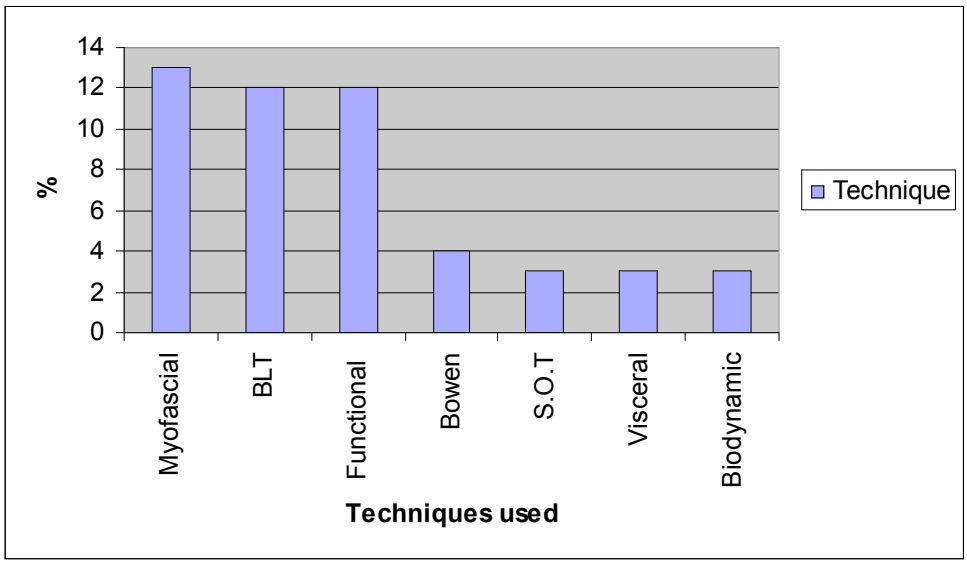


Figure 4: Other techniques used by the Osteopath for treatment of pregnant patients



Adjunctive (non-manual) therapies were used by 20% of the respondents. Adjunctive treatments included acupuncture and ultrasound (6%), and homeopathy (3%), which were all most commonly used in the post-natal period (20%).

62% of respondents used HVLA manipulation on the lumbar spine during pregnancy and 39% on the pelvis during treatment (Figure 5).

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Figure 5: HVLA technique used during pregnancy by the Osteopath

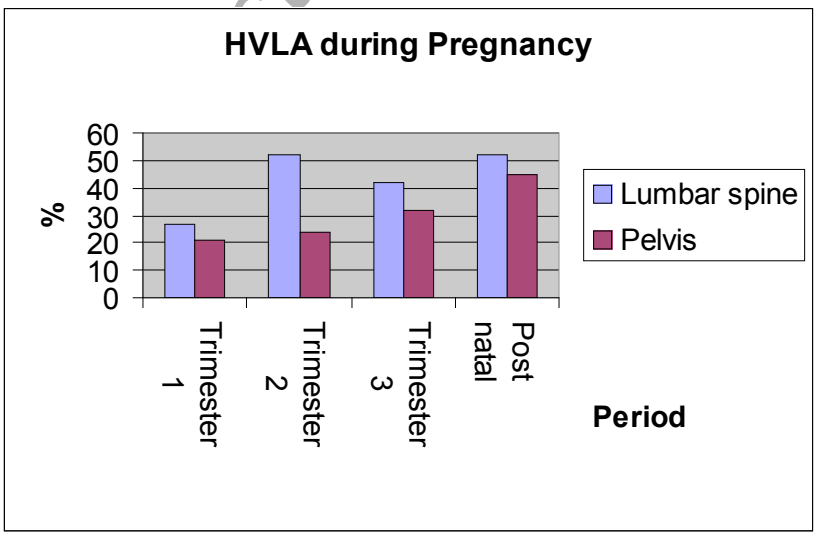
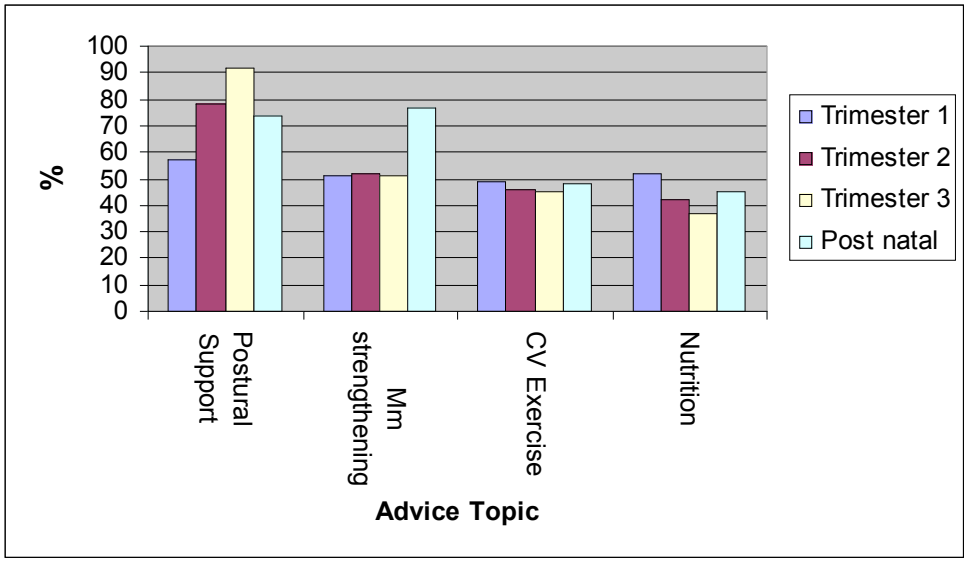


Figure 6: Advice offered to the patient during pregnancy by the Osteopath



92% of the respondents provide advice and support as part of their treatment (Figure 6), and 83% prescribe strengthening exercises at some stage in the pregnancy. Core stabilization is mainly advised in the post natal period (63%), shoulder retractors and elevators (39%) and hip extensors/stabilizers (34%) also advised predominantly post natal (Figure 7). Advice on pelvic floor exercises was stressed in the opinions section (15%).

75% of Osteopaths suggests programs for pregnant patients to attend. The most commonly recommended programs suggested were Yoga (78%) and Pilates (71%), followed by Fitball programs (63%). Just over half the respondents suggest Aqua aerobics (52%), and 15% recommend Preggie Bellies (Figure 8).

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Figure 7: Strengthening exercises recommended to the pregnant patient by the Osteopath

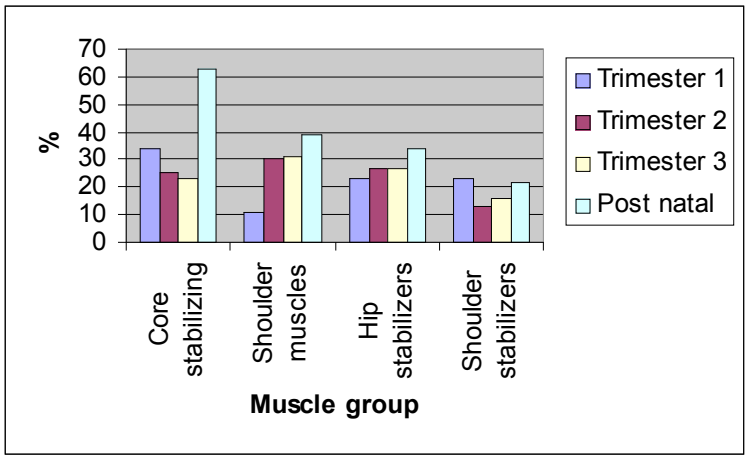

Figure 8: Programs suggested for the pregnant patient by the Osteopath

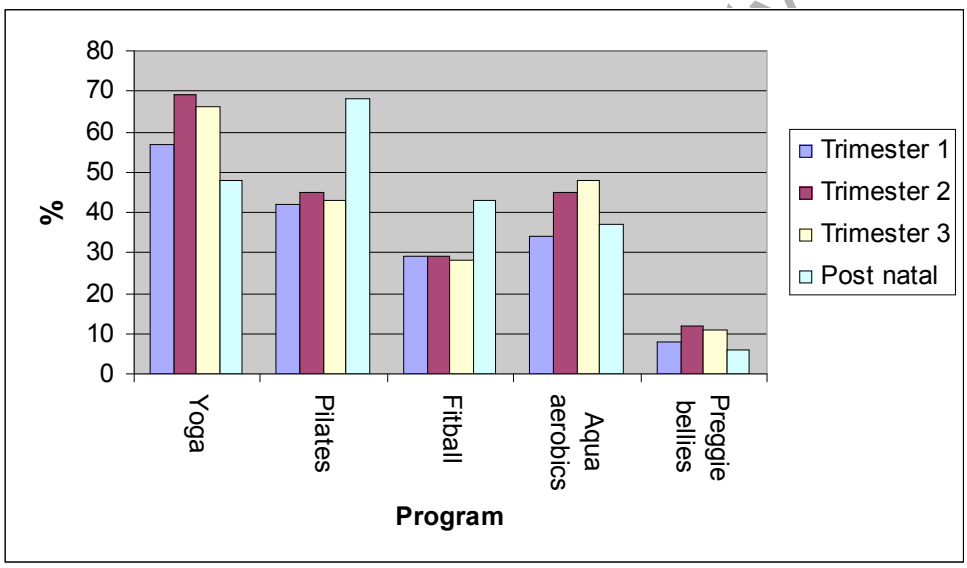

Table 2- The role of surveyed Osteopaths in the treatment of pregnant women

Options:	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Feel that we have a large enough role currently	0%	8%	20%	49%	23%
Feel we could play a larger role in the future	52%	40%	8%	0%	0%
Feel that other professions do not fully understand the role we could play with our current qualifications	65%	23%	11%	2%	0%
Feel that osteopathy shouldn't encompass prenatal care	2%	0%	3%	18%	77%

DISCUSSION

Most of the sample comprised graduates of Sydney College and RMIT, working in a private Osteopathic setting, having treated pregnant women before, through multiple pregnancies. The majority of surveyed Osteopaths treated throughout the whole pregnancy, with lumbar pain presenting most commonly. HVLA manipulation was the most commonly used treatment technique, followed by articulation and MET. Most of the respondents feel they could play a larger role in the future, and feel that other professions do not fully understand the role that Osteopaths could play in pre- and post- natal care with their current qualifications.

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Hormones and postural changes have been suggested as possible causes to the varied clinical presentations reported in the literature as occurring in the pregnant patient.[31,32] Presentations reported in the literature include low back and pelvic pain, sciatica, carpal tunnel syndrome, thoracic outlet syndrome, sacroiliac pain, hip pain, pubic symphysis dysfunction, compression of the popliteal nerve, and leg cramps.[31,33] Common presentations during pregnancy that were not included in the survey but were volunteered by respondents expanded this list, and included groin pain, thoracolumbar pain, ITB pain, navicular and cuboid restrictions, breast pain, TMJ dysfunctions, shoulder pain, elbow pain, and diaphragm and lower rib dysfunctions. Systemic presentations that were also mentioned by respondents as pregnancy related

included breathlessness, reflux, sinusitis, fatigue, depression, insomnia, dysparenia, blood pressure increases, and bowel function. Carpal tunnel was the most voluntarily reported, and comment was made by a number of the participants that this presentation is common in the 3rd trimester. Three respondents reported that they effectively treated symphysis pubis dysfunction (SPD) that predominantly presented in the patients in the 3rd trimester, as well as in the post-natal period. It has been suggested that manual therapy can play an integral role in the treatment and management of SPD,[34] however there is little evidence in current literature investigating the effectiveness of manual therapy on pregnant women with SPD, with no research based on the effect of OMT. It appears that there aren't just a few common conditions that pregnant women present with, but rather a wide variety of conditions they present with to the osteopath, even though these patients are a small amount of the respondent osteopaths' total workload.

Hitchcock et al.[35] states that in early pregnancy, women will experience no difficulty in being positioned for treatment of any kind; however with increase in foetal size, and therefore abdomen size, techniques requiring the prone position may be altered to a side lying or seated position. Many of the respondents listed techniques that were not included in the study, commenting that the size of the abdomen as the pregnancy progresses will often influence their choice of treatment technique. Myofascial technique was the most commonly reported technique other than those listed in the survey, with BLT and function release reported by 10% of the participants. Some of the practitioners stated that this was due to the techniques being less forceful and effective, and more convenient in the later part of the pregnancy when the growing foetus, and hence abdomen, can prevent certain positions.

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The use of osteopathic and manual therapy treatment techniques for PRPP and PRPP has been reported briefly in the literature. A case study by McIntyre et al.[36] (N=20) reported that LBP in pregnancy is significantly reduced with at least a 50% improvement in the patients' pain using mobilisation as a treatment technique, however the type of mobilisation wasn't specified. The survey showed that HVLA manipulation and articulation were the most commonly used techniques of choice from respondents throughout treatment of the pregnant patient, with MET, counterstrain, stretching, and craniosacral techniques following. A minority of

respondents pointed out that they didn't use craniosacral as taught by Upledger as was assumed in the survey, but do use Osteopathy in the Cranial Field as taught by Sutherland. The difference between the two cranial methods and an Osteopathic perspective on them could be an area of future study as the type of cranial technique wasn't specified in the survey.

There is little literature regarding the use and effects of HVLA for treatment during pregnancy. There has not been one reported case in the literature reviewed of miscarriage caused by the use of a HVLA manipulation during pregnancy, however times when spontaneous abortion is most common is in weeks twelve and sixteen, so it is proposed to withhold manipulative treatment in the form of HVLA techniques at this time.[33] Many respondents disagreed to the use of HVLA manipulation on the lumbar spine and pelvis in trimester 1 due to medico-legal aspects, however, no literature was found regarding medico-legal issues in the treatment of pregnant patients, and respondents gave no further reasoning. Despite this HVLA manipulation was the most commonly used technique out of all listed on the survey (86%), so many of the respondents were contradicting themselves. However, as most respondents avoid use of HVLA manipulation in trimester 1, and weeks 12 and 16 they avoid the times when the techniques may be unsafe based on recommended literature.[33]

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HVLA manipulation in the treatment of pregnant patients may present as a challenge latter in the pregnancy due to the change in posture and body physique. Only gentle adjustments using less force need to be applied to any area below T5 if desired due to ligament laxity in the 3rd trimester.[37] Many of the respondents used the technique throughout the pregnancy for lumbar and pelvic area, and more so later in trimester 2. A small amount of respondents (14%) disagreed to the use of HVLA on the lumbar spine and pelvis as they didn't feel the need to manipulate joints that may already be hypermobile, and felt that gentle articulatory techniques and positional release techniques are more appropriate. Other individuals in the sample felt that the technique was safe and secure if used appropriately on the areas, and obtained excellent results, hence there were varying results between the respondents. There is some evidence that HVLA during pregnancy for PLBP will reduce the occurrence of LBP during labour,[39] which supports statements from a few respondents, however this

is a retrospective study and not a randomised controlled trial, and hence may not be as valid, so this may be an area for future research. One osteopath stressed that working with the structure, using HVLA, and emotions at the same time is beneficial especially during pregnancy as the women prepares herself for a major life change. These comments relate directly to the philosophy and principles of osteopathy, with the structure-function relationship of total body integration, the use of manipulative therapy to restore the body's maximal functional capacity and the models of neurologic, circulatory, energy spending and self-regulatory systems as described by Greenman.[40] This corresponds with literature by Kutchera[41] who states that HVLA manipulation may normalise somatic dysfunctions that produce mechanical stresses and improve efficiency of mechanical and physiological components of the patient's compensatory and homeostatic process.

Acupuncture has been investigated as a treatment modality for use in PLBP and PRPP patients. It has been reported that acupuncture seems to alleviate LBP and pelvic pain during pregnancy,[1,42] as well as increase the capacity for some physical activity and decrease the need for drugs.[43] A decrease in medical inductions and caesarean sections has been reported in literature where pregnant patients were treated via acupuncture prior to their delivery date.[44] Acupuncture was used by only 6% of the current survey respondents in conjunction with Osteopathic treatment, which supports recent research that shows physical therapy with acupuncture provide the best results when compared with only physical therapy or only acupuncture.[1] Acupuncture has been reported in the literature to be safe and affective for treatment and the current survey results show a small amount of respondents use the modality, which relates to only a small amount of the surveyed osteopaths having completed an acupuncture degree (6%).

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Postural support via deep abdominal stabilization and pelvic floor muscle training during pregnancy for reduction in pain and urinary incontinence has been reported in the current literature. Authors have stated that pelvic floor muscle training can benefit the patient greatly, in helping deal with urinary incontinence postpartum and pelvic pain during the pregnancy.[22-24] The respondents who treated women throughout the pregnancy and post partum reported that postural support and muscles strengthening, especially of the core stabilizers, were shown to be important aspects

of the advice and support offered to the patient. Comments from survey respondents supported research in these areas, stressing the importance of the pelvic floor exercises throughout the pregnancy and after giving birth. As most of the respondents are training pelvic floor and core stability muscles they follow practice guidelines as suggested via the research, and this may indicate that core stability training is a large part of patient education for the pregnant women.

Cardiovascular exercise in pregnancy is widely discussed in the literature. Heckman[31] states that mild to moderate exercise isn't harmful to a normal, healthy pregnant patient, and Aldrich[37] advocates that pregnant women should exercise no more than fifteen minutes at a time, maintaining a pulse rate of less than 140 beats per minute and a temperature less than 38 degrees. These ideas are supported by more recent research into the safety and benefits of moderate exercise by Dempsy and Larsson.[26,28] Medical conditions that may prevent physical activity include hypertension, bleeding and multiple pregnancies, as exercise reduces the uterine flow especially in hypertension and less so in fit people.[28,29] Exercise was advised by 63% of participants, and was similar throughout the pregnancy and into the postnatal period. Individuals supported research stressing the importance of heart rate and temperature monitoring, and suggesting that walking and/or swimming (especially towards the end of pregnancy) were the best activities. One participant stated that the activity level of the patient should always be based on what they were doing prior to the pregnancy. Another individual partly supported this and felt that exercise prescription should be left to physiotherapists, that the time to benefit from exercise is long before the pregnancy, then should maintain levels of mobility as much as possible throughout the pregnancy, and if needed tone up after birth. Most of the osteopaths made comment regarding safety in conjunction with exercise supporting available literature and research.

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Prenatal aqua-aerobics classes have been reported as beneficial for treatment of LBP and pelvic pain in pregnant patients.[4,45] Over half (52%) of respondents recommend aqua-aerobics classes to their pregnant patients which relates to the research, some (6%) of respondents regarding it beneficial due to the non-weight-bearing aspect of the activity and therefore putting less stress on the body. Education

of the benefits of prenatal aqua-aerobics toward the community may be an area to look at in the future.

Pilates is based on the principle that a central core is developed and then movements are introduced to challenge this core stability. It is suggested that by maximising the mother's core stability before and during pregnancy, it should be possible to limit any potential harm;[46] however there is little literature in this area. A large majority of the sample advised patients to attend pilates classes, some commenting that it helps with core stabilization. However, one individual remarked that they see more injuries from pilates classes than good outcomes as many of the instructors are not trained correctly.

The role of the pelvic belt in the treatment of subjects with PRPP is controversial. Clinical experience has shown that positive effects can be obtained with different positions and tensions of a pelvic belt.[47,48] Ostgaard et al.[49] found that a reduction of posterior pelvic pain in pregnancy was experienced by 82% of pregnant women who presented with the symptom. The survey didn't directly ask about the use of pelvic belts, which may be a weakness as literature suggests it provides positive results for some pregnant women. However, 3 respondents stated that they recommend a pelvic belt to pregnant patients with pelvic pain so although these practitioners provide management supporting research it is only a minority of the sample, thus this may be an area of study to investigate in the future.

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Nutritional advice was provided by just over half of the participants with comments suggesting it is more important pre-conception and results showing that nutritional advice was offered more in the first trimester then any other time. Referral to a naturopath or dietician was suggested by 7% of the participants as they feel these professions would have a greater knowledge to provide advice. Other advise that participants offered to pregnant women for prior to and after the birth included the use of fitball for labour, and the use of hypnobreathing, however there is no current literature to support this advise.

Education throughout pregnancy has been widely discussed in background literature of studies into management of pregnancy related conditions.[15,19,27] Some

respondents of the survey stated that pregnant women are made to feel that they have to put up with the pain through the pregnancy and months after giving birth, and feel that the profession needs to educate the community of this. Most individuals felt that osteopaths could play a larger role in pre- and post- natal care, and suggest that the profession offers a huge assistance and service not only to the mother but also to the infant as well.

The osteopathic principles that the body structure and function are interrelated[40] are supported by comments that were volunteered by a moderate amount of the respondents. Comments regarded the use of osteopathy for assisting in infertility and pre-conception, with treatment aiming for a regular menstrual cycle pre-conception and a good blood supply and drainage for the pelvis and ureters by ensuring good pelvic balance and alignment of the rest of the body. The osteopaths base their opinions on their own experience and knowledge as there is no research into this theory, thus it is another area for further research.

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The inclusion rate of this study (17%) leaves the area open for further research, both in developing aspects of the survey to obtain more specific details, and to be more user friendly for a larger return rate. The return rate of the survey was only small and so many of the results may not be greatly valid and hence can only be used as a guide. Further research could be done focusing purely on treatment and management in the post partum period, as this area didn't get a thorough response from participants compared to during the trimesters. Other aspects that could be further researched are changes to the T/L area during pregnancy, and to look at the births with osteopathic preparation during pregnancy compared to those without.

Conclusion

This study highlights the fact that a majority of respondent Osteopaths treat pregnant women along a similar model, that there are many presenting complaints to the Osteopath by the pregnant patient, and that the osteopaths don't only treat the musculoskeletal system but also provide information and support throughout the pregnancy and post-partum. Most of the respondents feel their qualifications in the field may be underestimated, illustrating that the profession needs to educate not only

the public but also our fellow primary health care practitioners, so they are more aware of the role we could play in the treatment of pregnant women in the future.

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