Maternity exercises 75 years on: what has changed and what does experimental evidence tell us?

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ABSTRACT

Seventy-five years ago, in the first issue of the New Zealand Journal of Physiotherapy, Mrs DuFaur summarised Margaret Morris's 'Maternity Exercises' which included antenatal and postnatal exercises and relaxation. This paper looks briefly through a contemporary 'evidence-based' lens at the effectiveness of exercise and relaxation for childbearing women and considers priorities for present-day obstetric physiotherapy. Cochrane systematic review findings suggest the strongest evidence is for pelvic floor muscle training to prevent and treat urinary incontinence. There is limited, yet promising, evidence that pregnant women with low back or pelvic pain may benefit from individually tailored pregnancy-specific advice and that relaxation training (progressive muscle relaxation and breathing techniques) might offer benefits for labour and delivery. The context and delivery of New Zealand maternity care has changed substantively since the 'Maternity Exercises' were introduced. Organisational and professional influences on current maternity service delivery provide fewer opportunities for direct contact between childbearing women and obstetric physiotherapists. Working collaboratively with midwifery and other colleagues is necessary to maximise the potential benefits of physiotherapy interventions for the health of childbearing women; teaching and supporting intensive pelvic floor muscle training in pregnancy and postpartum is a priority for contemporary obstetric physiotherapy.

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INTRODUCTION

Seventy-five years ago, in the first issue of the New Zealand Journal of Physiotherapy, Mrs DuFaur summarised the Margaret Morris approach to 'Maternity Exercises' which were being taught at St Helen's Hospital in Wellington (DuFaur 1938). The 'Maternity Exercises' included antenatal and postnatal exercises and relaxation. Mrs DuFaur observed that "The result of this instruction has been very satisfactory" (p13). The purpose of the present paper is to view the 'Maternity Exercises' through a contemporary lens, summarising what is known about the effectiveness of such interventions, and suggest an appropriate emphasis for present-day obstetric physiotherapy.

MARGARET MORRIS MATERNITY EXERCISES

Margaret Morris was a dancer and a physiotherapist who graduated from St Thomas' Hospital, London, in 1930. She propounded the remedial benefits of her movements and exercises to doctors and midwives (Margaret Morris Movement) and within six years of her graduation Heinemann published her book 'Maternity and Postoperative Exercises', which included pelvic floor muscle exercises (Price et al 2010). Polden and Mantle (1990), in their account of obstetric physiotherapy history, noted that at St Thomas' Margaret was a student of the renowned Minnie Randell (considered the founder of obstetric physiotherapy). Minnie Randell, in her own book 'Fearless Childbirth' published in 1948, stated that pelvic floor muscle exercises could prevent and treat incontinence and prolapse (Polden and Mantle 1990).

Mrs DuFaur's paper suggested the use of pelvic floor muscle exercises in the antenatal period to maintain the "suppleness and tonicity of the perineum" (p13), although the primary focus was to increase the mother's awareness of how to relax her pelvic floor muscles during labour. Postnatal pelvic floor muscle exercises were also mentioned although in the context of improving general appearance and posture rather than preventing incontinence or prolapse! Beyond pelvic floor muscle exercises, the 'Maternity Exercises' also intended to assist circulation, reduce constipation, maintain or increase joint motion (especially those of the pelvis, antenatally), help relieve the discomforts and boredom of early labour, teach correct pelvic positioning and breathing for second stage labour, encourage bodily and psychological relaxation, improve oxygenation (to reduce postnatal fatigue), and tighten the lower abdominal wall postnatally (DuFaur 1938). To what extent is there evidence for such 'Maternity Exercises'?

COCHRANE DATABASE OF SYSTEMATIC REVIEWS

The Cochrane Database of Systematic Reviews is the first place I searched for systematic reviews (of randomised trials) about intervention effectiveness. Physiotherapy related Cochrane reviews are more likely to be methodologically sound compared with non-Cochrane reviews (Moseley et al 2009), and this is also true for obstetric fields such as sub-fertility (Windsor et al 2012). In addition to the robustness of the reviews, the Ministry of Health funds free access to the Cochrane Library for all New Zealanders which meant I could download full Cochrane reviews at no cost.

In a Cochrane Library title, abstract, keyword search I combined obstetric terms ('antenatal', 'pregnancy', 'postpartum', 'postnatal', 'childbirth', 'delivery', 'labour', 'constipation') with 'exercise', 'relaxation', 'breathing', and 'education'. I found six

Cochrane reviews closely related to the stated purpose of the 'Maternity Exercises', namely: circulation (Tooher et al 2010), pelvic joint mobility (Pennick and Young 2007), pelvic floor muscle exercise (Boyle et al 2012, Norton and Cody 2012), and relaxation (Khianman et al 2012, Smith et al 2011). I located seven more reviews in which exercise or relaxation is a potentially useful intervention, such as: obesity and diabetes prevention and management (Amorim Adegboye et al 2007, Ceysens et al 2006, Han et al 2012, Muktabhant et al 2012), prevention of unnecessary Caesarean section (Khunpradit et al 2011) and pre-eclampsia (Meher and Duley 2006), and effects of aerobic exercise (Kramer and McDonald 2006).

EXERCISE

Many women start or maintain aerobic exercise for physical fitness during pregnancy. Kramer and McDonald 2006 reviewed 14 trials (1014 healthy pregnant women) that measured fitness, pregnancy or labour outcomes. All the trials were small, none was at low risk of bias, and the findings were generally inconsistent. It seemed aerobic exercise during pregnancy did increase or maintain the mother's physical fitness, but the effects on the baby and labour were less clear.

Regular physical fitness activity reduces hypertensive risk in the general population, so Meher and Duley (2006) evaluated the effect of exercise to reduce pre-eclampsia (a hypertensive disorder of pregnancy). Neither of the two small, although robust, studies in the review found any effect for the outcomes of interest. The authors concluded there were insufficient data to be sure about the risks or harms of exercise to prevent pre-eclampsia.

Physical activity is also known to reduce insulin resistance. Thus, Han et al (2012) reviewed five trials (all at moderate risk of bias) of exercise to prevent gestational diabetes. There were no differences in insulin sensitivity or gestational diabetes incidence between exercise and non-exercise groups. Exercise also supports glycaemic control. Ceysens et al (2006) examined four small trials that recruited pregnant women with gestational diabetes in the third trimester. There were no differences in maternal or fetal outcomes between exercise and non-exercise groups.

A third risk of pregnancy and early postnatal period is unwanted blood clotting. Tooher et al (2010) reviewed the effects of pharmacologic and non-pharmacologic (including exercise and mobilisation) prevention. Thirteen trials evaluated the effect of drugs; one trial compared physiotherapy plus drug versus physiotherapy alone in 580 women undergoing Caesarean section but this comparison investigated the added benefit of drug therapy not the effect of physiotherapy.

Pennick and Young (2007) cautiously suggested tailored strengthening exercise, sitting pelvic tilt exercises, and hydrotherapy were beneficial in the management of low back or pelvic pain in pregnancy compared to usual antenatal care; the findings were tentative because all but one of the eight trials were at moderate to high risk of bias, and the effect sizes were small. None of the trials investigated exercise for prevention of pregnancy low back or pelvic pain.

A current concern in obstetrics is excess weight gain and obesity in pregnancy (because of the increased morbidity for women and infants, and the epigenetic consequences), and postpartum weight reduction. Muktabhant et al (2012) found 28 trials (3976 women) investigating interventions (including exercise) to prevent excess pregnancy weight gain. Most interventions combined diet and exercise, and the usual comparator was standard care. Despite a reasonable number of studies the authors concluded that methodological limitations and small effect sizes meant that no recommendations were possible. Postnatally, diet or diet plus exercise interventions resulted in statistically significant weight loss up to 12 months post-delivery in overweight or obese women or women who gained excess weight in pregnancy (Amorim Adegboye et al 2007). While it seemed diet was as effective as diet plus exercise the review authors suggested that the added benefits of exercise, with regard to cardiovascular fitness, were clinically important.

PELVIC FLOOR MUSCLE EXERCISE

Norton and Cody (2012) found four of 21 trials of faecal incontinence treatment specifically recruited women with obstetric injuries. Pelvic floor muscle exercises were combined with biofeedback and/or electrical stimulation so it was not possible to draw any conclusions about the effect of exercises alone.

Twenty-two trials (8485 women) that investigated pelvic floor muscle training (PFMT) (versus no training, or usual antenatal or postnatal care) to prevent or treat incontinence in pregnant or postnatal women were reviewed by Boyle et al (2012). Pregnant women without prior symptoms having their first baby randomised to PFMT were about 30% less likely to have urinary incontinence up to six months after delivery. For persistent urinary incontinence symptoms three months after delivery, women receiving PFMT were about 40% less likely to have urinary incontinence at 12 months. The outcome of teaching PFMT to 'populations' of antenatal women, regardless of whether the woman has urinary incontinence symptoms or not, was less clear. Unfortunately there were too few data about faecal incontinence to say anything about the effect of PFMT for prevention or treatment.

RELAXATION

Based on a few small trials at unclear risk of bias, it seemed relaxation instruction (including progressive muscle relaxation and breathing techniques) reduced pain in labour, increased satisfaction with pain relief, and potentially decreased the need for assisted vaginal delivery (Smith et al 2012). Khunpradit et al (2011) looked specifically at reducing Caesarean rates using non-clinical interventions including relaxation. One (of 11) trials in their review recruited 104 Iranian primigravid women in which women randomised to a seven week nurse-led relaxation programme (progressive muscle relaxation and breathing techniques) were less likely to have a Caesarean section. The same trial and finding was included in the review by Khianman et al (2012), who summarised the effectiveness of relaxation to prevent or treat pre-term labour by reducing maternal stress. Khianman et al (2012) had difficulty combining the findings from 11 small and heterogeneous trials and concluded that while there was some evidence that relaxation in pregnancy reduced maternal stress it was not clear if this influenced pre-term labour or birth.

WHAT HAS CHANGED AND WHAT DOES CURRENT EVIDENCE SUGGEST REGARDING PRACTICE?

The context of maternity care in New Zealand has changed substantively since 1938. Fully state funded maternity services,

Figure: A post-natal class in Dunedin (Acknowledgments: the Frank Weedon collection)

including 'free' general practitioner or obstetrician led care, began in 1938. The Ministry of Health still funds maternity care although most lead maternity carers are now midwives; from 1990 midwives were able to practise without medical supervision. Concurrently, care changed to reflect the knowledge and belief that childbearing is generally a 'normal' event in the lives of most healthy women, and unnecessary 'medicalisation' of care decreased. Further, midwifery training is now a tertiary qualification, no longer necessarily preceded by general nursing training, and it is possible an increasing proportion of present day midwives had no or minimal contact with a physiotherapist during their training or subsequently. Since I began practice in 1984, physiotherapist involvement in antenatal education has diminished in many centres, and opportunity for contact between physiotherapists and postnatal women has decreased as very short postnatal hospital stays are now the norm. Thus limited midwifery knowledge of what obstetric physiotherapy might offer and fewer opportunities for direct contact between physiotherapists and childbearing women, has changed the involvement of physiotherapists in obstetrics.

With these contextual changes in mind, alongside the systematic review findings I described briefly above, I offer some opinions about contemporary maternity exercises. First, the evidence for PFMT is the most robust. As a profession we need to make concerted efforts to reach first time mothers during their pregnancy, teach, and support intensive PFMT in this group; this is not easy if colleagues believe intensive PFMT will delay labour and increase Caesarean rates (a view not supported by evidence to date (Boyle et al 2012)). We also need to work with our midwifery, general practitioner and obstetrician colleagues to encourage referral of postnatal women with persistent urinary incontinence symptoms.

Second, although based on much less substantive evidence, we can encourage referral of pregnant women with low back or pelvic pain because these women may benefit from physiotherapist-led individually tailored pregnancy-specific advice. Third, where physiotherapists are involved in antenatal education, there is some limited evidence to suggest the inclusion of relaxation training (progressive muscle relaxation and breathing techniques) might offer benefits for labour and delivery. Both these areas are promising fields for further research.

Fourth, aerobic exercise and physical fitness are clearly important society-wide for health. While there is insufficient evidence to be sure about all the outcomes (especially fetal and delivery outcomes), current practice is guided

by recommendations from bodies such as the Colleges of Obstetricians and Gynaecologists (e.g. American College of Obstetrics and Gynecology 2002, Royal College of Obstetrics and Gynaecology 2006). Physiotherapists can work with midwifery colleagues and the fitness industry to promote safe exercise for pregnant women.

Finally, circulatory exercises are probably no longer needed in most instances because women are mobile soon after birth, including those who had Caesarean delivery. A gap in the review level evidence was the absence of a Cochrane review related to abdominal muscle exercise in pregnancy or postnatally (including those with rectal diastasis).

CONCLUSION

In many ways the Margaret Morris 'Maternity Exercises' described by Mrs DuFaur in 1938 translate remarkably well to the present day. We now have more evidence than unsystematic observation to support their use in some instances. Of the 'exercises', the strongest randomised trial evidence is for the use of pelvic floor muscle training for the prevention and treatment of urinary incontinence in childbearing women. The teaching and support of intensive PFMT in pregnancy and postpartum is a priority for contemporary obstetric physiotherapy.

KEY POINTS

- In many ways the Margaret Morris 'Maternity Exercises' described by Mrs DuFaur in 1938 translate remarkably well to the present day.
- Cochrane systematic review findings support pelvic floor muscle training to prevent and treatment urinary incontinence, with limited, yet promising, evidence for individually tailored pregnancy-specific advice for pregnant women with low back or pelvic pain and relaxation training (progressive muscle relaxation and breathing techniques) as preparation for labour and delivery.
- Working collaboratively with midwifery and other colleagues is necessary in the current New Zealand maternity services delivery context in order to maximise the potential benefits of physiotherapy interventions for the health of childbearing women
- The teaching and support of intensive PFMT in pregnancy and postpartum is a priority for contemporary obstetric physiotherapy.

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