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Outcomes of physiological and active third stage labour care amongst women in New Zealand

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ABSTRACT

Background: during the third stage of labour there are two approaches for care provision – active management or physiological (expectant) care. The aim of this research was to describe, analyse and compare the midwifery care pathway and outcomes provided to a selected cohort of New Zealand women during the third stage of labour between the years 2004 and 2008. These women received continuity of care from a midwife Lead Maternity Carer and gave birth in a variety of birth settings (home, primary, secondary and tertiary maternity units).

Methods: retrospective aggregated clinical information was extracted from the New Zealand College of Midwives research database. Factors such as type of third stage labour care provided; estimated blood loss; rate of treatment (separate to prophylaxis) with a uterotonic; and placental condition were compared amongst women who had a spontaneous onset of labour and no further assistance during the labour and birth. The results were adjusted for age, ethnicity, parity, place of birth, length of labour and weight of the baby.

Findings: the rates of physiological third stage care (expectant) and active management within the cohort were similar (48.1% vs. 51.9%). Women who had active management had a higher risk of a blood loss of more than 500 mL, the risk was 2.761 when a woman was actively managed (95% CI: 2.441–3.122) when compared to physiological management. Women giving birth at home and in a primary unit were more likely to have physiological management. A longer labour and higher parity increased the odds of having active management. Manual removal of the placenta was more likely with active management (0.7% active management – 0.2% physiological $p < 0.0001$). For women who were given a uterotonic drug as a treatment rather than prophylaxis a postpartum haemorrhage of more than 500 mL was twice as likely in the actively managed group compared to the physiological managed group (6.9% vs. 3.7%, RR 0.54, CI: 0.5, 0.6).

Conclusions: the use of physiological care during the third stage of labour should be considered and supported for women who are healthy and have had a spontaneous labour and birth regardless of birth place setting. Further research should determine whether the use of a uterotonic as a treatment in the first instance may be more effective than as a treatment following initial exposure prophylactically.

Background

The third stage of labour is defined as 'the period from the birth of the baby until the complete birth of the placenta and membranes' (New Zealand College of Midwives, 2006). The priority of midwifery care during the third stage of labour is to

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enhance the existing maternal physiology, ensure the complete separation and expulsion of the placenta and avoid serious and heavy blood loss, which may lead to maternal morbidity and mortality. A major complication of the third stage is of uterine atony and extreme blood loss with major obstetric haemorrhage responsible for maternal morbidity and mortality. Primary postpartum haemorrhage is often defined as a blood loss of more than 500 mL within the first 24 hrs of birth (World Health Organisation, 2009). However, healthy women in high resource countries often tolerate blood losses of 500 mL or more without hemodynamic compromise. Researchers are therefore using other measurements such as the requirement for a blood transfusion or a blood loss of more than 1,000 mL as a way of measuring the morbidity related to postpartum haemorrhage (Bais et al., 2004). Different countries report variations in postpartum haemorrhage rates, however there appears to be an increasing trend in the postpartum haemorrhage rate (Lu et al., 2005; Cameron et al., 2006; Joseph et al., 2007).

When providing care during the third stage of labour there are two widely accepted options or care pathways provided for women although these processes are managed in different ways around the world (Bais et al., 2004; NZCOM, 2006; NICE, 2007; Winter et al., 2007; Fahy, 2009). The first is a *physiological* pathway for the third stage (also called expectant management); the second is an *actively* managed third stage. New Zealand midwives are required to be competent in both and are guided by a consensus statement, a description of these two pathways is provided in Fig. 1 (New Zealand College of Midwives, 2006).

A recent Cochrane systematic review of third stage management found that active management of the third stage resulted in a reduced risk of haemorrhage greater than 1,000 mL but adverse effects were identified (Begley et al., 2010). Significant increases were found in maternal diastolic blood pressure, afterpains, the use of analgesia and more women returning to hospital with postnatal bleeding following active management of the third stage. A reduction in the baby's birth weight was also found suggestive of a lower blood volume due to early cord clamping practices. The authors concluded that women should be provided with information of benefits and harms to support their decision making. The data included in this review was based on hospital birth settings and compared physiological, active and mixed management of the third stage.

To date, outcomes of the third stage have not been systematically examined for women who labour and give birth outside of the hospital. The aim of this study was to describe, analyse and compare the midwifery care pathway and outcomes provided to a selected cohort of New Zealand women during the third stage of labour between the years 2004 and 2008. Blood loss in the third

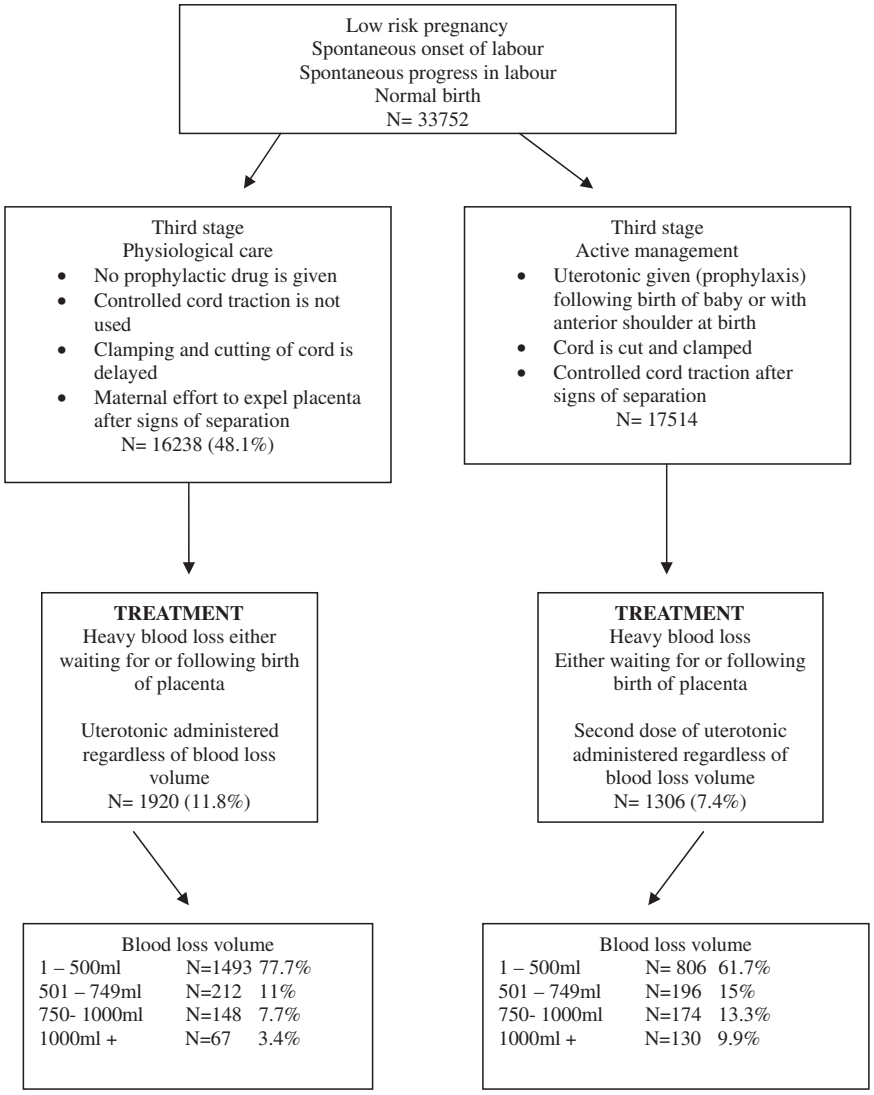

Fig. 1. Flow chart demonstrating third stage care pathway and treatment provision for NZCOM cohort (2004–2008).

stage of labour is difficult to measure because it soaks into clothing, sheets and pads at the birth and mixes with amniotic fluid. Therefore, in clinical practice, most midwives record a visual estimate of the blood loss volume. This study reports the blood loss volumes as identified by midwives at the time of birth, the measurement itself is acknowledged as having some degree of inaccuracy, however, there is consistency in that this is the same measure used across all birth settings and with both pathways of third stage care.

The New Zealand context

In New Zealand midwives provide continuity of care from the beginning of pregnancy (at registration), throughout the labour and birth and for up to 6 weeks after the baby is born. This care is funded by the government and free to women. Women may give birth at home, in a primary unit (midwife-led) or at a secondary or tertiary hospital. Pregnant women choose a midwife or medical Lead Maternity Carer (LMC) who co-ordinates and provides the maternity care over the whole maternity episode. The majority of women choose a midwife to be their Lead Maternity Carer (MOH, 2007) and approximately 80% of Lead Maternity Carer midwives in New Zealand are members of the Midwifery and Maternity Provider Organisation (MMPO). The MMPO is a subsidiary of the New Zealand College of Midwives and provides a practice management system for midwives, women-held maternity notes and maintains a midwifery database to which all members contribute their client's clinical data.

Informed decision making

Inherent within the health-care system in New Zealand is the right to make an informed choice and the need to give informed consent for services or treatment (The Health and Disability Commissioner, The Health and Disability Act, 1994). Midwives working within the maternity services are expected to provide appropriate information and education to encourage each woman and her family to fully participate in her healthcare so that she can achieve informed decision making (Ministry of Health, 2007; New Zealand College of Midwives, 2007; Midwifery Council of New Zealand, 2008; NZCOM, 2008). The midwife's role is to ensure information is accurate and accessible, whilst also promoting the physiological processes of pregnancy and childbirth. When women have had a physiologically normal labour and birth then a physiological third stage can be supported (New Zealand College of Midwives, 2006) and women who request physiological care without intervention are supported in their choice (NICE, 2007).

New Zealand midwives who belong to the New Zealand College of Midwives (NZCOM) have access to the anonymised data on the outcomes of their care provided to them annually through a maternity report published by NZCOM and the Midwifery and Maternity Provider Organisation (MMPO). In the first published report it became apparent that midwives were providing physiological care during the third stage for nearly 41% of the non-operative births and that this method of management for the third stage showed a lower blood loss volume when compared to those women who received active management (The New Zealand College of Midwives, 2009). The current project was set up to explore this phenomenon in more depth using data from the MMPO/NZCOM research database.

This paper discusses the outcomes of active and physiological third stage care with regard to blood loss (whether volume is estimated or measured), placental condition and the need for treatment during the third stage. Linear regression was used to determine the odds ratios of outcomes dependent on age, ethnicity, parity, place of birth, length of labour, weight of baby and condition of the placenta. A previously published paper has discussed the outcomes regarding time parameters for the third stage and influence of analgesia use (Dixon et al., 2009). We were unable to explore outcomes in relation to maternal haemoglobin levels, admission to intensive care unit for the mother or blood transfusion requirements.

Methods

The New Zealand Maternity and Midwifery Provider Organisation (MMPO) gathers administrative and clinical data in a midwifery practice management system for Lead Maternity Carer (LMC) midwife members of the New Zealand College of Midwives. These midwives provide care for women at home, primary, secondary and tertiary settings with the place of birth chosen by the woman dependent on her obstetric and medical history. Therefore the midwives provide care in a variety of settings. The clinical data is documented by the midwife contemporaneously and progressively as the woman's maternity episode proceeds. The MMPO system provides the clinical record for both the woman and the midwife and the information on the midwifery care provided generates a payment claim for the midwife. Selected data from the practice management system includes outcome data in relation to the health of mothers and babies including pregnancy and birth conditions, procedures and outcomes and neonatal morbidity relating to every episode of care undertaken by the members as it occurs. The MMPO anonymises and aggregates the clinical data and it is transferred to the New Zealand College of Midwives research database. A cohort of low risk women was selected using inclusion and exclusion criteria from this database and used for this study.

Inclusion and exclusion criteria

Data was included for all women who had received midwifery care and had a normal vaginal birth between the years 1 January 2004 to 31 December 2008. There were no policy or practice changes for third stage care known to occur during this time frame. A normal birth was defined as an unassisted vaginal birth following the spontaneous onset of labour after 37 completed weeks of pregnancy, with a cephalic presentation of a singleton live baby between the 10th and 90th percentile of birth weight. Women were excluded if they had a multiple pregnancy; a history of previous postpartum haemorrhage; previous vaginal birth after caesarean; non-cephalic presentation; episiotomy; induction or augmentation; instrumental (vacuum or forceps) birth; caesarean section; or had an intrauterine death.

Parity was analysed separately to determine if there were any changes in midwifery practice or increased blood loss in relation to increasing parity. During the study period (5 years) there were 88,781 case records of women collected in the MMPO/NZCOM research database. After applying the exclusion criteria noted above, 32,752 cases remained.

Data analysis

The primary outcome of the study was the type of third stage management—active or physiological. Secondary outcomes were blood loss volume, requirement for further uterotonic treatment, place of birth, weight of baby, length of labour, parity, age, ethnicity and condition of the placenta. Analysis has included a binary logistic regression and all data has been analysed using SPSS v16 (SPSS Data Collection, 2008).

Data integrity

Prior to transfer to the NZCOM research database the data is cross-checked and audited using a number of processes, namely:

(1) Midwives are not paid until a complete set of data is submitted.
(2) Lead Maternity Carer midwives compile their individual statistics to use during their bi-annual Midwifery Standards Review process (a requirement for recertification in New Zealand). Midwives are able to check their individual reports for any gaps in data, which can then be followed up and corrected by MMPO data entry staff.
(3) The database manager audits the data entry quality by generating random reports and then checking for data accuracy.

Ethical approval was obtained from the National Ethics Advisory Committee in New Zealand in 2009 (ref MEC/09/16/EXP).

Results

Of the 33,752 women in the study cohort, midwives reported that 16,238 (48.1%) received physiological management of the third stage and 17,514 (51.9%) received active management (Table 1). The 16,238 women who had a physiologically managed third stage included 979 women who declined an uterotonic when recommended by the midwife. First time mothers made up 33.9% of the sample, with the remaining 66.1% having a second or subsequent baby.

Table 1
Selected maternal and demographic factors amongst the cohort of women in the third stage management cohort, New Zealand, 2004–2008.

	Physiological		**Active**	
	No. **16,238**	(%) **(48.1)**	No. **17,514**	(%) **(51.9)**
Maternal age (years)*				
<20	1,225	7.5	1,481	8.5
20–34	12,069	74.3	13,079	74.7
≥35	2,944	18.1	2,954	16.9
Not stated				
Parity*				
Primiparous	5,030	(31.0)	6,412	(36.6)
Para 1–3	10,435	(64.3)	10,022	(57.2)
Para >4	772	(4.8)	1,080	(6.2)
Not stated	1		0	
Ethnicity*				
NZ/European	11,789	(72.6)	11,805	(67.4)
Maori	3,029	(18.7)	3,544	(20.2)
Pacific Island	488	(3.0)	906	(5.2)
Asian	513	(3.2)	771	(4.4)
Other	342	(2.1)	416	(2.4)
Not stated	77	(0.5)	72	(2.4)
Condition of placenta at birth*				
Complete	15,138	(93.2)	16,157	(91.3)
Ragged membranes	913	(5.6)	976	(5.6)
Incomplete/doubtful	152	(0.9)	236	(1.3)
EUA/manual removal	30	(0.2)	130	(0.7)
Not stated	5	(0.03)	15	(0.09)
Place of birth*				
Primary level birth facility	4,249	(26.2)	2,805	(16.0)
Secondary level	5,523	(34.1)	9,145	(52.3)
Tertiary level	2,633	(16.2)	4,764	(27.2)
Homebirth	3,814	(23.5)	784	(4.5)
Not stated	19	(0.1)	16	(0.1)

* Distribution of these factors significantly ($p < 0.0001$) different between physiological management and active management using χ^2 tests.

Women having a first baby were more likely to have active management of the third stage of labour (Table 1). We analysed parity and blood loss volumes separately (Table 2). Women having a first baby who had active management of labour had the highest median blood loss volume, 300 mL compared to 200 mL for all other women receiving active management. For those who received physiological management the median blood loss was 250 mL for primigravida women compared to 200 mL for all other parities. In this study increasing parity did not result in increased blood loss volumes regardless of the type of third stage care provided.

The largest group in the study gave birth in a secondary facility (42.5%). Similar percentages of women gave birth in primary and tertiary facilities (approx. 22%) whilst 13.1% gave birth at home (Table 3). Women who gave birth in tertiary facilities experienced the greatest level of blood loss over 500 mL, whilst those who gave birth at home had the lowest level of blood loss (data not shown).

Blood loss

In the maternity notes the midwives record the actual volume they have estimated or measured and volumes are entered into the database then put into one of four categories. These are 500 mL or less, between 501 and 749 mL, between 750 and 1,000 mL and lastly more than 1,000 mL (Table 4). The 1,209 (3.5%) women who had a blood loss of zero or a missing value were excluded.

The database records *estimated blood loss* for 97% of cases. Midwives are not compelled to measure (rather than estimate) blood loss; however if they do measure the blood loss they can enter this measure. Three per cent (954) of the cohort had an

Table 2
The rate of blood loss (mL) in association with *parity* and third stage management of labour.

Parity	**Percentile blood loss (mL)**					
	Active management, **N=16,950**			Physiological management, **N=15,594**		
	10th	Median 50th	90th	10th	Median 50th	90th
0	150	300	500	100	250	450
1	100	200	450	100	200	400
2	100	200	400	100	200	400
3	100	200	450	100	200	350
4	100	200	400	100	200	350
>5	100	200	400	100	200	400

Table 3
The management of third stage of labour in association with *place of birth*.

Birth place, N=32,729%	Type of third stage management, N=32,729			
	Active (%)	Active and treatment (%)	Physiological (%)	Physiological and treatment (%)
Primary facility (22.2)	37.8	4.4	50.1	7.9
Secondary facility (42.5)	59.7	4.0	30.6	5.6
Tertiary facility (22.1)	60.6	5.4	29.0	5.0
Home birth (13.1)	16.0	2.3	74.9	6.8

Table 4
Rate of blood loss both *measured* and *estimated* for women following third stage management.

	Physiological*				Active			
	Physiological		Physiological + treatment		Active		Active + treatment	
	N	%	N	%	N	%	N	%
Estimated, *N* = 31,566								
≤ 500 mL	12,557	(98.9)	1,493	(77.8)	14,981	(95.8)	806	(61.7)
501–749	82	(0.6)	212	(11.0)	301	(1.9)	196	(15.0)
750–1,000	35	(0.3)	148	(7.7)	232	(1.5)	174	(13.3)
> 1,000	22	(0.2)	67	(3.5)	130	(0.8)	130	(10.0)
Measured, *N* = 945								
≤ 500 mL	272	(95.8)	80	(71.4)	418	(92.3)	44	(45.8)
501–749	2	(0.7)	11	(9.8)	12	(2.6)	15	(15.6)
750–1,000	4	(1.4)	12	(10.7)	9	(2.0)	14	(14.6)
> 1,000	6	(2.1)	9	(8.0)	14	(3.1)	23	(24.0)

* Excludes 979 women who declined a uterotonic.

Table 5
Level of blood loss both estimated and measured associated with third stage management.

Third stage management group	N	10th	50th (Median)	90th	95th
***Estimated loss**					
Physiological	15,595	100	200	400	500
Active	16,950	100	250	450	650
†Measured loss					
Physiological	405	100	200	600	1,000
Active	549	100	250	800	1,300

* Mann–Whitney $U = 117{,}635{,}612$, $p < 0.00001$.
† Mann–Whitney $U = 102{,}347$, $p = 0.034$.

Table 6
Percentiles for *estimated* blood loss by management group.

Management type	N	Blood loss (mL)					
		Percentiles					
		10th	25th	50th (Median)	75th	90th	95th
Active	15,644	100	200	200	300	400	500
Active and treatment	1,306	200	300	450	700	1,015	1,500
Physiological	12,696	100	150	200	300	350	400
Physiological and treatment	1,920	200	300	400	500	800	1,000
Declined*	**979**	**100**	**150**	**200**	**300**	**400**	**400**

Kruskal–Wallis reveals a statistically significant difference in the amount of blood loss within each management type overall $\chi^2 = 3{,}848.4$, df = 3, $p < 0.0001$.

* Excluded from statistical analysis.

Table 7
Comparison of percentage of PPH and requirement for further treatment following active or physiological management of the third stage of labour.

	Active per cent	Physiological per cent	Risk ratio (95% confidence interval)
PPH (> 500 mL)	6.9	3.7	0.54 (0.5, 0.6)
Further treatment	7.8	13.2	1.7 (1.6, 1.8)

actual measurement entered. We hypothesised that an actual measurement may have been provided for those women who had or were considered to have a high blood loss volume as a means of determining the severity of the blood loss, although measuring blood loss may also be a routine part of practice for some midwives. The blood loss data for the 954 women who had a measured blood loss is provided in Tables 5 and 6. The discrepancies between estimated and actual blood loss volumes are more apparent at the upper extremes of the distribution. For women who had an actual measurement of blood loss, those in the active management group were reported as experiencing significantly higher blood loss than those in the physiologically managed group (median: physiological = 200 mL vs. active = 250 mL).

Regardless of whether the blood loss was estimated or measured, the Mann–Whitney *U*-test revealed that women in the active management group had a significantly higher blood loss (in terms of mean ranks) than those in the physiological management group ($U = 102{,}347$, $p = 0.034$).

Treatment

There may be circumstances when the woman is losing sufficient blood during the third stage to require treatment through the administration of an uterotonic drug. The timing of administration of the drug determines whether or not it is regarded as a treatment or prophylaxis (as in active management) (Fig. 1). The potential for administering a uterotonic as a treatment may arise regardless of whether the drug was first administered as a prophylactic. During an actively managed third stage it may be necessary to give a second dose of whichever uterotonic was used; alternatively following physiological management, the woman may require a first dose of an uterotonic if bleeding is a cause of concern.

After excluding the 979 (2.9%) women who declined an uterotonic, 7.8% of women from the active group, went on to have further treatment; whilst 13.2% of women in the physiological group went on to have a first dose of an uterotonic as treatment (Table 7). The relative risk of having treatment if a woman was in the physiological group was 70% higher than if she was in the active group (Relative risk = 1.7, 95% CI: 1.6–1.8). Table 7 shows that women in the physiological management group were less at risk of blood loss of more than 500 mL (RR: 0.54, 95% CI: 0.5–0.6) Amongst women in the physiological group 3.7% had a blood loss of more than 500 mL compared to 6.9% in the active group (Table 7).

Placental condition

The placental condition is an important outcome for the third stage. A retained placenta increases the risk of heavy bleeding and requires transfer to secondary/tertiary care for anaesthesia and manual removal of the placenta. Of the 33,752, 20 women had a missing value for the condition of the placenta at birth (Table 1). Of those women who received physiological care 93.2% had a 'complete' placenta compared to 91.3% of the active management group. The percentage of 'ragged membranes' was identical in both groups at 5.6%. Midwives describe a placenta as being incomplete when they have doubts as to whether the entire placenta has been expelled. For this category there were 0.9% in the physiological groups and 1.3% in the actively managed group. In the clinically important category relating to how many women required manual removal or examination under anaesthetic a statistically significant difference was found. More than three times the proportion of women in the active management group had an evacuation under anaesthetic (EUA) or a manual removal than in the physiological management group (0.7% vs. 0.2%, $p < 0.0001$, respectively) (Table 1).

A univariate analysis indicated that place of birth, ethnicity and parity appeared to be associated with the type of third stage management a woman received. In order to determine if these factors had an independent effect on third stage management binary logistic regression was conducted using third stage management as the outcome variable. The variables tested were: blood loss estimate – dichotomised into either ≤ 500 mL or > 500 mL; further treatment – dichotomised into those who received and those who did not receive further treatment; place of birth – categorised into Primary, Secondary, Tertiary and Home; weight of baby – a continuous measure; length of labour (first and second stage) – a continuous measure; parity – a continuous measure; age of mother at birth – a continuous measure; condition of placenta – dichotomised into complete or not complete; ethnicity – categorised into NZ European, Maori, Other.

All predictor variables were entered into the model and following the analysis the only two variables that did not appear to be independently associated with the outcome in the final model were weight of the baby and age of the mother at birth (Table 8).

We found that a woman in a secondary facility had two and a half times the likelihood of (2.489 times) of being actively managed compared to a woman in a primary facility; a woman in a tertiary facility had nearly three times the likelihood (2.89 times) of being actively managed compared to a woman in a primary facility; and a woman giving birth at home had only a 30% chance of being actively managed (0.312 times) compared to a woman in a primary facility. When considering ethnicity we found that compared to a NZ European woman, a Maori woman (the indigenous people of New Zealand) was a little more likely to be actively managed (1.061 times); whereas women identifying with an ethnic group other than NZ European or Maori were more likely to be actively managed (1.317 times). Women having a first baby were more likely to have active management of the third stage of labour. For each additional birth the odds of having active management increased by 1.075 (95% CI: 1.054–1.097) and for each additional hour of labour the odds of a woman having active management increased by 1.025. A woman was 2.761 times more likely to have a blood loss of more than 500 mL if she was actively managed (95% CI: 2.441–3.122) but 0.353 (65% less likely) to have further treatment if actively managed. A woman was 1.1 times (10%) more likely to have a placenta that was not complete if she was actively managed. Each of the predictors therefore had an independent, significant effect on the outcome of third stage management.

Discussion

This population based retrospective cohort study has provided the outcomes of third stage care provision by New Zealand midwives for a selected group of low risk women who had a spontaneous onset of labour and spontaneous birth between the years 2004 and 2008. Similar rates of physiological third stage care and actively managed care were reported. Although the midwives providing the care to this cohort of women provide care in any setting – across the continuum of home to hospital – women who gave birth in primary maternity and home birth settings were more likely to receive physiological third stage care, whilst active third stage care was more prevalent in secondary and tertiary settings.

Evidence to date has supported the use of active management in hospital but third stage care in other settings has not been examined (Prendiville et al., 2000). It is well known that hospital policies often dictate the course of care more strongly than the woman's own choice of care; however this is less likely to occur in the home or primary birth facility. This research therefore provides observational data on outcomes of third stage for women who have given birth outside of secondary and tertiary settings (as well as those within these settings) by midwives practising across all birth settings. Other studies have indicated that when there is continuity of carer there is increased use of physiological third stage care and low PPH rates (Benjamin et al., 2001; Fahy et al., 2010).

Table 8
Binary logistic regression.

	B	S.E.	Wald	df	Sig.	Exp(*B*)	95.0% C.I. for EXP(*B*)	
							Lower	Upper
Blood loss	1.015	0.063	261.975	1	0.000	2.761	2.441	3.122
Further treatment	−0.952	0.045	453.712	1	0.000	0.386	0.353	0.421
Placenta	0.199	0.048	17.209	1	0.000	1.220	1.111	1.340
Primary			2,925.757	3	0.000			
Secondary	0.912	0.032	837.458	1	0.000	2.489	2.340	2.647
Tertiary	1.061	0.037	819.982	1	0.000	2.890	2.687	3.107
Home	−1.165	0.049	575.199	1	0.000	0.312	0.284	0.343
Length of labour	0.024	0.004	47.069	1	0.000	1.025	1.018	1.032
Parity	0.073	0.010	49.517	1	0.000	1.075	1.054	1.097
NZ European			43.862	2	0.000			
Maori	0.060	0.030	3.889	1	0.049	1.061	1.000	1.126
Other	0.275	0.042	43.249	1	0.000	1.317	1.213	1.429
Constant	−0.579	0.037	242.345	1	0.000	0.560		

All women in this study received continuity of care, however, those who gave birth in a tertiary or secondary settings were more likely to be actively managed during the third stage regardless of their low risk status. This may be related to individual hospital policy and protocols although The New Zealand College of Midwives consensus guidelines for midwives state, *that women can expect a physiological third stage of labour when it has been preceded by a physiological labour and birth* (New Zealand College of Midwives, 2006). Thus supporting midwives to provide physiological third stage care in all settings in New Zealand. Our results suggest that when women have had a physiologically normal birth they may choose a physiological third stage, however there appears to be a further influencing factor related to giving birth in a large hospital. We have not explored individual midwifery practice or individual midwifery preferences related to third stage management provision.

The blood loss volumes that the midwives identified in this study indicate that women who had a physiological third stage of labour had lower blood loss volume and less postpartum haemorrhage than those who received active management of labour. This is in contrast to the Cochrane systematic review (Begley et al., 2010). Four out of the five RCT's included in the Cochrane systematic review included participants who received intervention during the labour and birth, such as induction of labour, augmentation or assisted birth (Prendiville and Elbourne, 1989; Begley, 1990; Khan et al., 1997; Rogers et al., 1998). The only RCT that included spontaneous labour onset and normal birth found little difference in blood loss volumes when active and physiological (expectant) care was compared (Thilaganathan et al., 1993). Although induction, augmentation and assisted delivery have become commonplace in many large maternity hospital worldwide, it is possible that these interventions themselves may increase the risk of postpartum haemorrhage. We therefore chose to examine women who considered a physiological third stage, which was preceded by a spontaneous onset of labour and a normal birth.

This study has identified that whichever management option is implemented for the third stage there may be circumstances when the midwife considers that the woman is losing sufficient blood to require treatment. This situation can occur during a physiological third stage and requires treatment in the form of an uterotonic drug. During an actively managed third stage this may necessitate the giving of a second dose of the uterotonic drug. This is a previously unexplored aspect of midwifery care but one which provides an important clarification because it describes the number of women in both management groups who require treatment for continuing blood loss in the third stage of labour. The study demonstrates that regardless of the third stage management originally chosen midwives respond to the individual clinical needs of women and provide treatment as necessary. Our results show that women who had physiological care during the third stage were nearly twice as likely to receive treatment as those provided with active management. However, the women who had active management and treatment were almost twice as likely to have a blood loss of more than 500 mL than women in the physiological and treatment group. We hypothesise here that the uterotonic may be more effective in lessening the blood loss if it has been reserved for treatment where there has been no previous routine exposure (as prophylaxis for active third stage) to the drug.

This result was also seen in two concurrent double-blind randomised non-inferiority trials, undertaken in five developing countries, to establish whether misoprostol was as effective a treatment for postpartum haemorrhage as oxytocin (Blum et al., 2010; Winikoff et al., 2010). A cross study comparison of the results found that when there has been no exposure to synthetic oxytocin during labour, birth or the third stage there was a quicker and more effective response from both treatment options (whether misoprostal or oxytocin) when compared to women who had previously been exposed to synthetic oxytocin as a prophylaxis.

More recently a matched control study examined the use of oxytocin augmentation and the incidence of severe postpartum haemorrhage (Grotegut et al., 2011). The results indicate that women with severe PPH due to uterine atony had been exposed to significantly more oxytocin during labour compared to the matched controls. A possible physiological explanation is that the uterine oxytocin receptors in the myometrium become desensitised and therefore less responsive during prolonged receptor activation (Phaneuf et al., 1997) . This appears to be the case when there has been administration of an exogenous oxytocin, to induce or augment labour (Phaneuf et al., 2000). Whatever the underlying physiology, there appears to be a need for further exploration of the question whether the administration of an uterotonic for treatment of continued bleeding following active management of the third stage (when a uterotonic has already been administered as prophylaxis) is less effective at preventing postpartum haemorrhage than when used for the first time as a treatment following a physiologically managed third stage.

Our study found that when a physiological third stage pathway is followed there is a reduced requirement for examination or manual removal of the placenta under anaesthetic. This is a clinically important finding especially when birth is occurring outside of hospital and the woman and baby are required to transfer to hospital for this procedure. Previous studies have suggested that the use of an uterotonic increases the incidence of retained placenta, however, this was balanced by higher levels of postpartum haemorrhage with physiological third stage care (Prendiville et al., 2000). In contrast to this, our results suggest that the real risk may be of an increased incidence of retained placenta and that this should be considered a risk factor when providing active management during the third stage, especially in settings that do not have immediate access to an operating theatre and staff.

The strength of this study is the large sample size and contemporaneous data collection as part of the midwives' health records and the fact that the same midwives work across a variety of birth environments providing intrapartum care in the home, primary facility or secondary/tertiary facility. The same midwives provided both active and physiological care dependent on both woman's informed decision making and the midwife's professional judgement in the context of the policies surrounding place of birth. The type of uterotonic was not explored in this study because the aim was to describe and compare the third stage care that midwives were providing in relation to outcomes.

Limitations of the study include the inability to verify the accuracy of the blood loss estimations, which were based on the midwives' subjective assessments. Visual estimation of blood loss is well known to be inaccurate with either an under or overestimation of volumes (Razvi et al., 1996; Glover, 2003; Kavle et al., 2006). In practice though it remains the most frequently used way of determining blood loss during childbirth in most countries (Schorn, 2010).This is counteracted somewhat in that the same midwives provide both methods of care and work in all settings and none were actively participating in a research process so the Hawthorne effect is eliminated. In this study visual estimation of blood loss was used in both care pathways with blood loss physically measured for a small number of women. The results reveal that regardless of the method of blood loss assessment, women with physiological third stage care provision had a lower volume of blood loss than those who had an actively managed third stage.

Another limitation of this research is the inability to examine all confounding influences; the active and physiological groups differed in some characteristics such as age, parity and ethnicity. Logistic regression found that parity and Maori ethnicity increased the use of active management of labour whilst age and the weight of the baby had no significant effect. We also found that for each additional hour of labour the odds of a woman having active management increased by 1.025 (95% CI: 1.025–1.018) indicating that these characteristics have influenced third stage management style and may also have had an influence on blood loss volume. Other characteristics that have not been described but which may have contributed to blood loss volumes were previous medical history and presence or absence of medical risk factors such as coagulopathies. Women choosing to give birth at home or in a primary unit could be considered at low risk but those giving birth at a secondary/tertiary unit may have risk factors that have not been identified within the inclusion/exclusion criteria. Additionally, women who choose to give birth at home or in a primary unit may differ in other ways regarding health, lifestyle and philosophy.

Conclusion

This study has described the outcomes of care during the third stage of labour when midwives work in a Lead Maternity Carer role providing non-fragmented care across the whole continuum from antenatal, labour and birth to postnatal care. The use of physiological third stage care resulted in lower levels of blood loss, and less need for manual removal of the placenta when preceded by a spontaneous labour and normal birth. The results suggest that physiological third stage care should be considered and supported for women who are healthy and have had a spontaneous labour and birth regardless of birth place setting. Further research should determine whether the use of a uterotonic as a treatment in the first instance may be more effective than as a treatment following initial exposure prophylactically.

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