Managing the pain of labour: factors associated with the use of labour pain management for pregnant Australian women

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Abstract

Background Despite high rates of women's use of intrapartum pain management techniques, little is known about the factors that influence such use.

Objective Examine the determinants associated with women's use of labour pain management.

Design Cross-sectional survey of a substudy of women from the 'young' cohort of the Australian Longitudinal Study of Women's Health (ALSWH).

Setting and participants Women aged 31–35 years who identified as being pregnant or recently given birth in the 2009 ALSWH survey ($n = 2445$) were recruited for the substudy. The substudy survey was completed by 1835 women (RR = 79.2%).

Main variables studied Determinants examined included pregnancy health and maternity care [including complementary and alternative medicine (CAM)] for their most recent pregnancy and any previous pregnancies. Participants' attitudes and beliefs related to both CAM and maternity care were also included in the analysis.

Main outcome measures The outcome measures examined were the use of both pharmacological and non-pharmacological pain management techniques (NPMT).

Results Differences were seen in the effects of demographics, health service utilization, health status, use of CAM, and attitudes and beliefs upon use of intrapartum pain management techniques across all categories. The only variable that was identified as a determinant for use of all types of pain management techniques was a previous caesarean section (CS).

Discussion and conclusions The effect of key determinants on women's use of pain management techniques differs significantly,

and, other than CS, no one determinant is clearly influential in the use of all pain management options.

Introduction

The pain and discomfort of labour is a dominant concern for many pregnant women,¹ and decisions regarding pain management techniques during labour and birth are prominent in much public² and clinical³ discussion, antenatal education⁴ and within some women's birth plans.⁵ Most women expect to experience some degree of pain during labour.⁶ However, the majority feel that pain should be relieved, although many also hold concerns about the harmful effects of pain management techniques.⁶ These concerns may be informed by reported links to adverse birth outcomes associated with indiscriminate use of pharmacological pain management options such as epidural^{7,8} and pethidine.⁹ As such, the factors that drive the use of labour pain management techniques have received the attention of researchers^{10–17} although most of this attention has focused on pharmacological rather than non-pharmacological pain management techniques, with a primary consideration of epidural analgesia.

The profile of women using epidural analgesia

Women who use epidural are most commonly either primiparas^{10–13} or women who have used epidural in previous births.^{10,14} Use of epidural for labour pain management is also more likely in women with higher education^{11,13–15} and higher income.^{11,13} Attitudes of women towards birth may likewise influence their decisions regarding pain management, with an increased likelihood of using epidural for women who desire a pain-free birth^{10,13} and by women who fear the side-effects of pharmacological pain management.¹³ The birth setting and maternity care provision may also contribute to women's decision making about pharmacological labour pain management such as epidural. In particular, women who birth in

smaller, non-profit hospitals or in rural services, without an anaesthesiologist on site, are more likely to birth without the use of epidural.^{12,15} Women who consult with a midwife, family physician or nurse for prenatal and intrapartum care are also less likely to use epidural analgesia,¹⁵ which is possibly reflective of the preferences towards pain management held by the care providers.^{16,17} The attitudes portrayed by women's informal social network, such as positive experiences with epidural from friends and family¹³ and preference for epidural analgesia from their partner,¹⁴ have been linked with women's decisions to use epidural. Beyond the investigation of epidural analgesia, there have been some attempts to examine the factors influencing women's preference to avoid drug use during pregnancy^{18,19} although such attempts have not been successful in identifying any clear determinants.

Beyond epidural: exploring the profile of women using other labour pain management techniques

Despite efforts to understand the factors that influence women's use of labour pain management, the research focus upon epidural analgesia has overlooked other important pain management options. Pethidine and other opioids are accessed less commonly than epidural, because of the concerns of women and maternity care providers over the safety of the drug for the neonate.^{17,19} Given these concerns, the factors influencing decision making for those women who use pethidine for labour pain management require close scrutiny. Likewise, the use of low risk (nitrous oxide) or non-pharmacological options (including CAM) for labour pain management, or the decision to use no pain management techniques at all, have received little attention and deserve examination. A better understanding of the factors influencing women's use of a wide range of

labour pain management techniques may assist maternity care providers and policy makers to support women through informed decision making for their intrapartum care. In response, this study presents the first nationally representative data on determinants associated with women's use of labour pain management, including not only epidural analgesia but pethidine, nitrous oxide and non-pharmacological pain management techniques.

Methods

Sample

The sample is a substudy drawn from the Australian Longitudinal Study on Women's Health (ALSWH). ALSWH is a longitudinal population-based survey examining the health of over 40 000 Australian women who were randomly selected from the national Medicare database. The ALSWH is stratified by age into three cohorts: 'older' (1921–6), 'mid-age' (1946–51) and 'young' (1973–8). This substudy sample is drawn from the young cohort ($n = 8012$). For the most recent general ALSWH survey (Survey 5) conducted in 2009, all women in the young cohort who identified as being pregnant or having recently given birth ($n = 2445$) were recruited for the substudy. This group was invited to complete the substudy survey in 2010, which examined a range of aspects associated with their health care during the pregnancy and birth of their youngest child. The cross-sectional data from the 2010 substudy were used for the analysis presented here. Ethics approval for the substudy reported here was gained from the relevant ethics committees at the University of Newcastle (#H-2010_0031), University of Queensland (#2010000411) and the University of Technology Sydney (#2011-174N).

Demographics

The survey examined a range of demographics, including marital status, educational qualifications, income security, level of health insurance and employment status at the time of birth.

Pregnancy health and maternity care

Features of participants' maternal health were also examined including parity, previous pregnancy complications (e.g. caesarean delivery, low birth weight baby, instrumental delivery), the occurrence of pregnancy-related health conditions (e.g. varicose veins, fluid retention, pre-eclampsia) and the location of the birth of their youngest child (e.g. public hospital, private hospital, community/birth centre). They also provided details of the incidence and frequency of their consultations with a range of health-care practitioners including conventional maternity care providers (e.g. obstetricians and midwives) and CAM practitioners (e.g. osteopaths and massage therapists), and their use of CAM treatments for pregnancy-related health conditions such as herbal teas and vitamins/mineral supplements.

Attitudes and beliefs

Participants were asked to respond along a five-point Likert scale to a number of statements reflecting their attitudes or beliefs relating to both CAM and maternity care.

Use of labour pain management techniques

Data were collected regarding women's use of pain management techniques for labour and birth. This comprised of a range of broader non-pharmacological options including breathing techniques, transcutaneous electronic nerve stimulation (TENS) or shower/bath use alongside non-pharmacological techniques commonly associated with CAM (acupuncture, acupressure, hypnotherapy and massage). In addition, the use of pharmacological options (nitrous oxide, pethidine and epidural) was also examined.

Statistical analysis

Women were categorized according to the pain management options accessed for their labour and birth. The women were asked in the survey

to select these five categories included 'no pain management', 'non-pharmacological pain management', 'nitrous oxide', 'pethidine' and 'epidural'. Women reporting use of multiple pain management techniques were allocated to more than one category based upon their response choices. General anaesthetic was not included in the pharmacological options analysed, as it was determined to be a technique applied in circumstances of significant birth risk to facilitate emergency operative delivery and was not generally used to manage labour pain outside of these situations. Significant demographic, health and attitudinal factors were determined in relation to use of pain management techniques through chi-square analysis. All associations that were found to have a *P*-value of 0.25 or less were included as variables within the baseline regression model. As such, unique baseline regression models were developed for each pain management technique. To identify the features influencing women's likelihood of using (or not using) labour pain management techniques, a separate backwards stepwise regression was generated for the five categories. All the demographic, attitudes and beliefs, and pregnancy and maternity care variables were considered in this stage of the analysis and removed if appropriate as determined by a likelihood ratio test. All analyses were conducted using statistical program STATA 11.1.

Results

The survey response was 79.2% ($n = 1835$) and primarily constituted married/defacto women (96.3%) living in urban (62.4%) or rural (34.6%) areas. The majority of participants had completed some form of education beyond secondary school, although this varied between vocational training (apprenticeship/diploma) (23.9%) and university qualifications (60.1%). Most women birthed in a hospital [either public (41.5%) or private (54.1%)] and consulted with a general practitioner (90.1%) or an obstetrician (85.2%) for their maternity care.

Across all participants, a high frequency of consultations (5+) with an obstetrician was

quite common (64.2%). Consultation patterns with midwives were more diverse, with similar numbers of women reporting frequent (5+) consultations with a midwife (32.0%) as those who did not consult with a midwife at all (35.3%). The prevalence of pregnancy-related health conditions varied between participants, with higher rates regarding preparation for labour (21.9%) and constipation (16.7%) and lower rates of varicose veins (9.4%), fluid retention (8.7%), urinary tract infections (4.9%) and pre-eclampsia (3.2%). A substantial number of women had reported caesarean section (35.7%), instrumental delivery (28.7%) or episiotomy (26.4%) associated with a previous birth (prior to the one investigated in this sub-study). In comparison, rates of post-partum haemorrhage (10.7%) and low birth weight babies (7.0%) from these previous births were less substantial. The women used a range of CAM, such as vitamin/mineral supplements (88.8%), massage therapy (34.1%), herbal tea (29.5%), yoga/meditation classes (13.6%) and osteopathy (6.1%) to manage their pregnancy-related health conditions. As seen in Table 1, the frequency of utilization of labour pain management techniques varied amongst women as did antenatal consultations with CAM practitioners. The majority of women (68.4%) used two or more pain management techniques, with some women using five or more (10.7%). Almost all (95.7%) of women consulted with professionals from more than one group, and a substantial number (13.2%) consulted with professionals from five or more practitioner groups.

Tables S1, S2 and S3 present the bivariate analysis used to identify variables to be included in each independent regression model. As seen in Table 2, women who were married/defacto (OR = 6.90) or reported higher consultation rates with midwives (OR = 2.31) were more likely to use non-pharmacological pain management techniques. This use of non-pharmacological pain management methods was less likely for multiparous women (OR = 0.52) or those who have higher obstetric consultation rates (OR = 0.29–0.50). Women who did

Table 1 Frequency distribution of CAM practitioners consulted by women during pregnancy and pain management techniques used by women during labour

Frequency	Pain management techniques		Maternity health professionals*	
	<i>n</i>	%	<i>n</i>	%
0	68	4.95	2	0.1
1	367	26.7	69	4.2
2	299	21.8	363	22.3
3	278	20.2	662	40.6
4	216	15.7	317	19.5
5+	147	10.7	216	13.2

*This includes midwives, obstetricians, general practitioners, acupuncturists, aromatherapists, chiropractors, herbalist/naturopaths, doula, massage therapists, yoga/meditation instructors and osteopaths.

consult frequently with an obstetrician (OR = 2.2) or were primiparas (OR = 2.04) were more likely to use nitrous oxide. The use of nitrous oxide was less likely for women birthing in private hospitals (OR = 0.83). Women birthing in community/birth centre settings were less likely to use nitrous oxide (OR = 0.19), epidural (OR = 0.16) or pethidine (OR = 0.10). Women with a university qualification were less likely to use pethidine, compared with women with a high school certificate or less (OR = 0.54). Primiparous women were more likely to use epidural for pain management (OR = 2.1), whilst those women who were not in permanent employment were less likely to use epidural (OR = 0.67).

Table 3 presents the logistic regression model outputs showing the relationship between various CAM utilization and pregnancy health characteristics and participants' chosen pain management options. Women who reported fluid retention were more likely to use nitrous oxide for pain management (OR = 1.73), whilst women with constipation were more likely to use pethidine (OR = 1.59), and those with pre-eclampsia were more likely to receive an epidural (OR = 3.40). The women more likely to use non-pharmacological pain management options were those who reported 'preparing for labour' (OR = 1.84). Women reporting urinary tract infections during pregnancy were more likely

to birth without any pain relief (OR = 3.18). Women who did not use pain relief were also more likely to have had a caesarean section in previous pregnancies (OR = 4.20). A history of caesarean section was also linked to an increased likelihood of using epidural (OR = 13.3), but not non-pharmacological options (OR = 0.08), nitrous oxide (OR = 0.23) or pethidine (OR = 0.56) for pain management. Participants who had a previous episiotomy were more likely to access nitrous oxide (OR = 1.55), and those who had a history of instrumental delivery were more likely to utilize epidural (OR = 2.21). A history of delivering a low birth weight baby was associated with a reduced likelihood of using non-pharmacological techniques (OR = 0.50) or nitrous oxide (OR = 0.59), whilst a previous post-partum haemorrhage was linked with a lower likelihood of using pethidine (OR = 0.50). In terms of CAM use, the use of herbal teas was associated with an increased likelihood of using non-pharmacological techniques (OR = 1.96) or nitrous oxide (OR = 1.32), but a reduced likelihood of receiving epidural (OR = 0.63) for pain management. Accessing massage therapy during pregnancy also increased the use of certain pain management in labour, namely non-pharmacological techniques (OR = 1.58) and pethidine (OR = 1.49). Women using non-pharmacological techniques were also more likely to have attended a yoga/meditation class during pregnancy (OR = 2.87). Those women who birthed without pain management were more likely to have consulted with an osteopath (OR = 3.01), but were less likely to have taken vitamin or mineral supplements (OR = 0.40).

The findings in Table 4 outline the relationship between participants' attitudes and beliefs towards maternity care and CAM with regard to women's labour pain management use, as determined by the logistic regression models. Women who birthed without pain management techniques were less likely to agree that their preferred birth choices were respected by their primary maternity care provider (OR = 0.32), as were those women who accessed pethidine

Table 2 Demographic and health service utilization characteristics of women accessing pain management techniques for labour and birth (*n* = 1835)*

Characteristics	Without pain management (<i>n</i> = 71)	Non-pharmacological pain management (<i>n</i> = 1218)	Nitrous oxide (<i>n</i> = 775)	Pethidine (<i>n</i> = 285)	Epidural (<i>n</i> = 825)
Marital status					
Never married		–			
Married/defacto		6.90			
Separated/widowed/divorced					
Employment status at time of birth					
Permanent employment					–
Casual/unemployed					0.67
Birthplace					
Public hospital			–	–	–
Private hospital			0.83		
Community or birth centre			0.19	0.10	0.16
Parity					
Nulliparity		–	–		–
Primiparity			2.04		2.1
Multiparity		0.52			
Consultations with obstetrician					
None	–	–	–		
1 or 2	0.09				
3 or 4		0.29	2.2		
5 or more		0.50			
Consultations with midwife					
None		–			
1 or 2					
3 or 4					
5 or more		2.31			
Highest education qualification					
High school certificate or less				–	
Vocational qualification					
University qualification				0.54	

*'n' reflects the number of women included in the category and 'N' describes the number of women included in the overall analysis for each model.

*Figures presented as an odds ratio determined through independent backwards stepwise regression models for each category. Independent variables included in each baseline regression model were those found to have a *P*-value of <0.25 through bivariate analysis.

for pain management (OR = 0.53). Women who used non-pharmacological pain management techniques were less likely to consider their personal experience of the effectiveness of CAM to be more important than clinical evidence (OR = 0.59), but more likely to agree that respect and support of their birth choices by their maternity care provider is important to them (OR = 2.33). A belief that CAM is more natural than conventional medicine is less likely to be held by women who use nitrous oxide for pain relief, whilst women who feel safer during birth knowing a specialist obstetri-

cian is supporting them are more likely to use an epidural for labour pain management (OR = 2.27).

Discussion

Our study provides the first data reporting the determinants for women's use of other labour pain management techniques, including non-pharmacological techniques such as CAM. It is also the first nationally representative data set examining the factors influencing women's use of epidural analgesia for labour pain

Table 3 Pregnancy health and CAM utilization characteristics of women accessing pain management options for labour and birth ($n = 1835$)*

Characteristics	Without pain management ($n = 71/N = 1794$)	Non-pharmacological pain management ($n = 1218/N = 1638$)	Nitrous oxide ($n = 775/N = 1549$)	Pethidine ($n = 285/N = 1446$)	Epidural ($n = 825/N = 1610$)
Pregnancy-related health conditions and health behaviours					
Preparing for labour		1.84			
Varicose veins			0.58		
Fluid retention			1.73		
Constipation				1.59	
Urinary tract infection	3.18				
Pre-eclampsia					3.40
Previous pregnancy complications					
Caesarean section	4.20	0.08	0.23	0.56	13.3
Episiotomy			1.55		
Instrumental delivery (forceps or ventouse suction)					2.21
Low birth weight (<2500 g) baby		0.50	0.59		
Post-partum haemorrhage				0.50	
Use of complementary and alternative medicine for pregnancy health					
Vitamins and minerals	0.40				
Herbal teas		1.96	1.32		0.63
Massage therapy		1.58		1.49	
Yoga/meditation class		2.87			
Osteopathy	3.01				

*'n' reflects the number of women included in the category and 'N' describes the number of women included in the overall analysis for each model.

*Figures presented as an odds ratio determined through independent backwards stepwise regression models for each category. Independent variables included in each baseline regression model were those found to have a P -value of <0.25 through bivariate analysis.

management. The findings of this study are limited by the nature of a survey using self-reported data and lacking a confirmatory diagnosis of health conditions by a qualified health professional, both of which may lead to recall bias. It is also limited by the cross-sectional survey design in that it only measures the sample at one point in time and as such it is difficult to determine causality.²⁰ The analysis of this data was also limited in that women's self-reported reasons for using different PMT were not collected through the survey, and as such all conclusions have been drawn through inferential statistical analysis. In addition, the study may be at risk of sampling bias due to the high level of respondents with a university degree (60%). Furthermore, as women were found to be using multiple pain management techniques, it was not statistically sound to provide inde-

pendent analysis of only women who used single pain management techniques. Despite these limitations, the ALSWH is a well-regarded source of epidemiological data, and the value of a nationally representative data set exploring this topic and the high response rate for the substudy survey may counter these limitations.

Our study reveals a number of important findings. Firstly, the role of both care providers and birth setting influences women's use of labour pain management in a variety of ways. Women birthing in a community or birth centre setting were less likely to use all three of the pharmacological pain management options. In part, this may be explained by the services available in birth centres, where epidural analgesia is not available to birthing women and systemic opioids such as pethidine are available less frequently than non-pharmacological pain

Table 4 Attitude and belief towards maternity care and CAM of women accessing pain management options for labour and birthing (*N* = 1835)*

	Without pain management (<i>n</i> = 71/ <i>N</i> = 1794)	Non-pharmacological pain management (<i>n</i> = 1218/ <i>N</i> = 1638)	Nitrous oxide (<i>n</i> = 775/ <i>N</i> = 1549)	Pethidine (<i>n</i> = 285/ <i>N</i> = 1446)	Epidural (<i>n</i> = 825/ <i>N</i> = 1610)
Attitudes and beliefs					
Alternative medicine is more natural than conventional medicine			0.75		
Knowledge about the evidence of alternative medicine is important to me as a patient				0.63	
My preferred birth choices were respected by my primary maternity care provider	0.32			0.53	
I feel safer during birthing knowing that I have a specialist obstetrician supporting me					2.27
My personal experience of the effectiveness of alternative medicine is more important than clinical evidence		0.59			
It is important to me that my preferred birth choices are respected and supported by my maternity carer		2.33			

*'n' reflects the number of women included in the category and 'N' describes the number of women included in the overall analysis for each model.

*Figures presented as an odds ratio determined through independent backwards stepwise regression models for each category. Independent variables included in each baseline regression model were those found to have a *P*-value of <0.25 through bivariate analysis.

management techniques.²¹ However, as pethidine is still available in some birth centres²¹ and nitrous oxide is available in all reported birth centres,²¹ the low use of pharmacological pain management techniques in these environments suggests that a birth centre's philosophy, of which minimal pharmacological pain management is often considered important,²¹ may also contribute to women's decisions regarding labour pain management. The links between community settings such as home birth and lower rates of pharmacological pain management may be similarly aligned with the philosophy and preferences of the birthing woman.²² Alongside the setting of the birth, the health professional involved in antenatal and intrapartum care was also identified as influencing the use of labour pain management. Women who consulted with an obstetrician were less likely to use non-pharmacological pain management techniques or to use no pain management. Previous research has identified that obstetricians are becoming increasingly supportive of routine

epidural for labour pain management.²³ Although a relationship between obstetric consultations and epidural use specifically was not identified through our analysis, our findings in the context of this previous research may indicate obstetricians are less likely to encourage women to attempt the use of non-pharmacological pain management options or labour without any pain management. However, it is interesting that in our study, there was no identified association between obstetric care and epidural use. As such, the views held by obstetricians with regard to pain management-free labour or the use of non-pharmacological pain management options, and the associated outcomes these views may have on their clinical practice and interactions with women in their care, deserves closer attention. In contrast with the trends associated with obstetric care, women's consultations with a midwife were linked with a higher likelihood of using non-pharmacological pain management techniques. Given that many of these pain management

options apply treatments commonly considered CAM,²⁴ this trend may be an extension of the sense of job satisfaction and professional independence midwives associate with the use of CAM.²⁵ Likewise, midwives describe an alignment between midwifery and CAM philosophy²⁵ and as such may be encouraging the use of these non-pharmacological pain management techniques in an attempt to minimize obstetric intervention and support a normal physiological birth for women in their care.²⁶

Secondly, a number of demographic characteristics appear to influence women's use of labour pain management. Women who were married had a significantly higher likelihood of utilizing non-pharmacological pain management techniques. This trend may be reflective of non-pharmacological methods providing a task and role for fathers during labour and birth. Practices such as hypnosis for birth encourage fathers, where appropriate, to be an active and engaged member of the woman's birth support team.^{27,28} Acupressure, as another non-pharmacological method, has also been positioned as a technique which can be applied by birth support partners such as fathers during labour.²⁹ This finding is partly supported by previous research indicating that the preference of women's partners regarding labour pain management may be an influencing factor,¹⁴ although this previous research explored the relationship between partner preference and epidural analgesia rather than non-pharmacological techniques. A relationship between marital status and epidural was not identified in our study. In contrast to the influence of marital status, it appears that women in permanent employment have a higher likelihood of labouring using epidural analgesia. This finding aligns with previous research in this area where women with higher levels of income have been found to be more likely to use an epidural.^{11,13} The driver behind this association is not clear, but it may be related to women in permanent employment electing caesarean section delivery, a procedure which commonly involves epidural analgesia, to facilitate childcare arrangements and expedite a

return to full-time employment.³⁰ There may also be a trend for women in permanent employment to more strongly desire a pain-free birth,^{10,13} when compared with women in casual employment or who are unemployed. Alongside those in permanent employment, primiparous women were significantly more likely to utilize epidural for labour pain management, and this trend may also be linked to fear of the pain of childbirth, a finding supported by previous research in this field.^{10–13} Women have been found to balance this fear of labour pain with the risks of using pharmacological pain management,¹⁹ and this may be a factor behind the reduced likelihood of using pethidine for labour pain management for women with university qualifications. As pethidine has a higher risk profile in terms of adverse effects for both mother and baby,^{9,17,31} women accessing and using information related to the risks of pethidine may be influenced to actively choose other pain management options. The education level of women avoiding pethidine use may encourage greater critical appraisal of all available options prior to making health-related decisions. This decision-making process is considered a key feature of health literacy,³² which has an established association with education level.³³ Whilst a relationship between higher epidural rates and women's level of education was not identified in this study, previous research has linked higher education with use of epidural analgesia^{11,13–15} and suggests that women's education level may not so much affect the perceived need for labour pain management as influence the tools accessed to control the pain of childbirth.⁶ The interface between employment, income status and social class appears to have varying effects on the use of different labour pain management techniques, and the interface between these demographic factors deserves closer scrutiny in future research.

Women's health status also appears to influence their use of labour pain management. Our study reports a high likelihood of epidural analgesia use by women with pre-eclampsia. As this condition is viewed as a significant health

risk to mother and baby, obstetric management commonly recommends either artificially induced labour or caesarean section delivery.³⁴ Not only is epidural analgesia linked with caesarean delivery, but artificially induced labour also increases the likelihood of both epidural analgesia specifically³⁵ and operative delivery overall,³⁶ possibly explaining the relationship identified in this study. In contrast to women with pre-eclampsia, women with urinary tract infections were highly likely to birth without the use of labour pain management. This relationship may imply a broader pattern of low engagement with health-care professionals for these women. Given that women birthing without pain management were also likely to only engage with an obstetrician once or twice, the higher incidence of urinary tract infections may be reflective of poor attention to their health during pregnancy or a reduced interest in engaging with medical professionals. However, low consultation rates with midwives or GPs were not identified for women birthing without pain management and as such these women may simply be managing their antenatal health by consulting practitioners from these other professional groups. Even so, the results from this study do not indicate women who avoid labour pain management are consulting any other health professionals at a greater rate than other women to account for low rates of visits with obstetricians. Ultimately, further research that examines the factors influencing women to labour without the use of pain management techniques is needed to better understand the relationships identified through this study, particularly given that these are the first data to explore the profile of this subgroup of women. In terms of women's previous birth experiences, this study reported a polarity in labour pain management utilized by women with a history of a previous caesarean delivery. The likelihood of women who had a previous caesarean using epidural analgesia was extremely high and suggests they may have had a repeat caesarean. This finding may be explained by the current recommendations for women with a previous caesarean section which deter '*trial*

of labour' – a planned attempt to birth vaginally for women who have had a previous caesarean delivery – without a high level of medical observation and possible intervention.³⁷ The influence of recommendations deterring trial of labour may also explain the increased likelihood of women birthing without pain management. This is because, should women wish to attempt a vaginal birth after caesarean (VBAC) and this wish is not supported by hospital policy, they may attempt to birth 'outside of the system'³⁸ and in doing so reject other common elements of intrapartum care such as pain management.

Finally, it is interesting to note the broader differences between women using different labour pain management techniques. Women using non-pharmacological pain management are consulting less frequently with medical practitioners; using more CAM; less likely to have previous pregnancy complications; placing value on evidence of CAM; and respect for their birth choices. In contrast, women who use pethidine are more likely to birth in a private hospital; less likely to have a university education; place less value on the evidence for CAM; and do not feel their birth choices are respected. Women who used epidural are more likely to have complex antenatal health issues such as pre-eclampsia; a higher incidence of birth interventions; and more confidence in obstetric care. Overall, these data suggest women's use of labour pain management may be affected by a broad range of factors and that attempts to understand or modify use of labour pain management techniques must take this under consideration.

Conclusion

Women access a number of different techniques and treatments to manage the pain of labour and birth. Women's use of labour pain management is influenced by a variety of factors including health characteristics, demographics and attitudes. The effect these determinants have on women's decisions to use pain management during childbirth differs depending upon

the pain management technique. The range of possible determinants affecting women's use of pain management is also broader than indicated from previous research and includes past birth experiences and antenatal use of CAM. These findings also move beyond the current body of evidence, which focuses on the profile of women who use epidural analgesia, and they offer an understanding of the factors influencing the use of an array of labour pain management options, including CAM techniques. A richer understanding of the factors determining all types of pain management use by women during labour and birth is important, and this paper offers key insights for all health professionals and policy makers who work within maternity care.

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Conflict of interest

We declare that no authors have real or potential conflict of interests related to this study.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Table S1. Bivariate relationship between women's demographics and use of labour pain management.

Table S2. Bivariate relationship between women's pregnancy-related health and use of labour pain management.

Table S3. Bivariate relationship between women's health-related attitudes and use of labour pain management.

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