NEW ZEALAND RESEARCH

ABC by LMC midwives: an innovative intervention to support women to become smoke-free in pregnancy.

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ABSTRACT

Background: Smoking in pregnancy is associated with significant adverse outcomes for women and their babies. Certain population groups contribute disproportionately to smoking prevalence in New Zealand such as younger women and Māori women. It is however a modifiable risk factor and midwives have a role to play in supporting women to achieve smoke-free pregnancies.

Objective: This was a demonstration project designed to assess whether frequency of midwives' smoking cessation advice within the home environment had an impact on smoking rates for the women and their wider household contacts over a 15 month period.

Method: A prospective observational study audited the results of smoking cessation intervention practices provided by six Lead Maternity Carer (LMC) midwives using the ABC framework. Demographic and smoking data were collected by the midwives, on each woman who smoked, during a 15 month period. This included women who were already being cared for at the time when data collection commenced as well as women who registered for care subsequently. Data were also collected on the smoking status of partners and other household members, and on the frequency with which the midwives had discussions with the women and others about smoking.

Findings: Young and Māori women within this project were more likely to become smoke-free than others. A significant number of the women lived in households with other smokers, which may have made it more difficult for them to become smoke-free. The midwives provided smoking cessation interventions using the ABC to the women with varying frequency; however, the frequency of these interventions did not appear to be related to the likelihood of the women becoming smoke-free. The midwives did not provide ABC at every single visit for every woman; however, for some women it was provided more often than for others.

Conclusion: Although midwifery care is provided within, and acknowledges the woman's context, the majority of women in this project faced considerable day-to-day challenges to becoming smoke-free, as they lived in households with others who also smoked. Broad strategies are needed to reduce smoking, that reach beyond the realm of midwifery practice and the health care sector, such as wider tobacco control policies, public health campaigns and smoke-free environments.

Key words: smoking in pregnancy, midwife, smoking cessation, Lead Maternity Carer, young women, continuity of care

INTRODUCTION

There is a strong government focus on reducing smoking as a major cause of preventable morbidity, with an aspirational goal of achieving a smoke-free Aoteoroa by 2025 (Ministry of Health, 2011). This focus has resulted in a range of policies, including health targets which require providers to routinely ask about smoking status, provide brief advice and offer support to quit to current smokers (Ministry of Health, 2015a). Pregnant women are considered a priority population for smoking cessation support because smoking in pregnancy is associated with higher rates of perinatal mortality (PMMRC, 2013). Smoking in pregnancy also contributes to a range of morbidities, such as an increased incidence of low birth weight, pre-term birth and placenta praevia (Cnattingius, 2004; Ko et al., 2014; Ward, Lewis, & Coleman, 2007). It may also have an impact on the lifespan of children born to smoking mothers and is associated with increased risks of behavioural disorders in childhood and ongoing respiratory complications (Hofhuis, de Jongste, & Merkus, 2003).

Although smoking rates in New Zealand are gradually trending down, they are highest in women in the childbearing age range (Statistics New Zealand, 2013). Estimates of the overall rate of smoking in pregnancy in New Zealand vary between 18.7% (Andrews et al., 2014) and 16.9% (PMMRC, 2013). Estimated rates of smoking in pregnancy vary with age and ethnicity, with women who identify as Māori having the highest rates of smoking (42.9%), followed by Pasifika women (15%) and those of New Zealand European ethnicity (13.4%). Pregnant women in the 16 to 19 years age group are estimated to have the highest rates of smoking (39.4%), followed by the under 16 years age group (35.7%) (Andrews et al., 2014). While some women will cease smoking when they discover that they are pregnant, those who continue to smoke are more likely to be heavily addicted to tobacco, have a partner who smokes and be socio-economically disadvantaged (Cui, Shooshtari, Forget, Clara, & Cheung, 2014; Moshin, Bauman, & Forero, 2011; Synovate, 2009).

Various researchers have explored the most effective interventions to reduce smoking rates amongst pregnant women. These include the integration of smoking cessation guidelines by midwives as a routine part of antenatal care (Fendall, Griffith, Iliff, Lee, & Radford, 2012). Cessation support methods include the use of

psychosocial interventions (such as multi-sessional counselling) and Nicotine Replacement Therapy (NRT). Although some studies have demonstrated an increase in cessation rates with the use of specific support services, others have shown little or no effect (Chamberlain et al., 2013). In particular, the use of NRT has been shown to have little effect on cessation rates in pregnant women (Cooper et al., 2014). Recent studies have focused on the use of material or financial incentives (e.g., vouchers exchangeable for retail items) (Higgins et al., 2012). These included a New Zealand feasibility study which found that such incentives, in addition to the usual smoking cessation support among Māori pregnant women, had the potential to increase cessation rates (Glover, Kira, Walker, & Bauld, 2014).

Young pregnant women (including teenagers) have high rates of smoking and are likely to have specific needs in relation to smoking cessation strategies (Bottorff et al., 2014; Greaves et al., 2011). These include acknowledgement of the influence of partners and friends on their smoking behaviour and other contextual factors in their living circumstances and lifestyles (Greaves et al., 2011). However, there is a dearth of research which demonstrates effective smoking cessation interventions for this population group (Bottorff et al., 2014; Greaves et al., 2011).

Within the New Zealand maternity service model, women choose a Lead Maternity Carer (LMC) who provides and co-ordinates the woman's maternity care. In New Zealand 88% of women register with an LMC and, of those, 92% choose a midwife (Ministry of Health, 2015b). Therefore the vast majority of New Zealand women receive continuity of care from a chosen midwife (or her backup) during pregnancy, labour and birth, and the postnatal period. The care provided by New Zealand midwives is located within a partnership model (Guilliland & Pairman, 2010), which recognises the woman as an expert of her own context, with shared responsibility for decision making with her midwife, in relation to her childbirth choices. Socio-economically disadvantaged women are more likely to choose a midwife as their LMC, than a general practitioner or obstetrician (Ministry of Health, 2015b). This is significant for midwives, as these women are more likely to smoke during pregnancy (Moshin et al., 2011; Statistics New Zealand, 2013; Thrift, Nancarrow, & Bauman, 2011).

Given the high level of engagement New Zealand women have with midwives during pregnancy, any assessments of the efficacy of smoking cessation interventions for pregnant women need to consider the role of the midwife. Although there is little published research in New Zealand about the midwife's role in promoting smoking cessation in pregnancy, one study did demonstrate that midwives can effectively provide education and support if they match the woman's readiness to make changes with the type of advice and support they provide (McLeod, Pullon, et al., 2003).

The framework for all health practitioners to address smoking with clients is set out in the New Zealand Guidelines to Help People Stop Smoking (the Guidelines), (Ministry of Health, 2014). It describes an ABC approach:

- A – Ask about smoking
- B – Brief advice – offer tailored, specific brief advice about the harms of smoking/benefits of being smoke-free
- C – Cessation – offer referral to specialist smoking cessation service for additional support and provision of NRT as an aid to cessation

New Zealand midwives have acknowledged their professional responsibility to address smoking in pregnancy (New Zealand College of Midwives, 2015) and the New Zealand College of Midwives (NZCOM) has formally endorsed the Ministry's guidelines. Although the Guidelines have a pregnancy section, they are laid out in a generic document and the partnership relationship between a woman and her midwife, and the New Zealand continuity of care model, are not specifically recognised within them.

AIM

To gain a better understanding of the role of midwives in supporting young women to become smoke-free, the Ministry of Health funded NZCOM to develop and implement a smoking in pregnancy "demonstration project" during the years 2011 to 2013. A demonstration project is a broad term, which has been described as "a relatively self-contained, small-scale capital investment, or technical assistance project, the purpose of which is to 'demonstrate' a particular approach" (UN-Habitat, 2003, p.77).

This project aimed to observe the frequency with which a practice of six LMC midwives provided ABC to women in their care and to their household contacts/whānau. The interventions were to be undertaken in the woman's home environment, following which the midwives would record any impact on smoking cessation over a 15 month period. The project also examined qualitative aspects of the midwives' group practice and communication with young women, however the findings from that arm of the project are not presented in this paper.

METHODOLOGY

The project took the form of a prospective, observational study. A practice of six LMC midwives who cared for approximately 200 women per annum, (around 50% of whom smoke) was selected. These midwives routinely provide care to a young client group, with 60% of the women being under the age of 25 and 50% identifying as Māori. The practice is based in a large urban centre in New Zealand and the midwives routinely provide the majority of their care in the women's homes. It was anticipated that the midwives would care for up to 100 smoking women and their families/support networks over the 15 month period of the demonstration project.

The midwives in the practice provided significant input into the design of the project through a series of meetings with Ministry of Health and NZCOM staff prior to the project's commencement.

Although undertaking ABC is a part of usual midwifery practice, for the purposes of the project the midwives made discussions about smoking a specific focus of their care, providing ABC not only to all pregnant and postnatal women in their care who smoked, but also, opportunistically, to household members, partners and whānau. To maximise these opportunities the midwives provided exclusively home-based care.

Data collection and analysis

The midwives routinely collected demographic and living circumstances information about the women, as well as their smoking behaviour and that of their partners and household contacts. Additional information was collected about whether or not their homes and cars were smoke-free. For the purposes of this study the number of ABC conversations the midwives held with both the women and others in the home was also recorded. Providing the ABC to women and their whānau is part of usual midwifery care; however, collecting data around frequency at which LMC midwives provide these interventions is not routinely collected or reported.

Data were collected prospectively at the point of care, on a specific, anonymised, data collection form. The form was designed to look similar to the Midwifery and Maternity Provider Organisation

(MMPO) maternity notes, used by the midwives and held by the women, as a means to prompt the midwives to collect the data. The midwives use the MMPO notes routinely, so this supported them to collect smoking data as a part of usual care. The data collection form also contained health information about smoking in pregnancy for women and midwives to refer to.

Data collection commenced in May 2012 for all women registered in the midwives' practice who smoked. This was regardless of their gestation or stage of maternity care. All the women, who reported smoking who registered for care, subsequently had their data collected from the date of registration with their midwife. The forms on which these data were collected over the 15 month period did not identify either the midwife or the woman.

Forms were submitted to the project co-ordinator/researcher at the completion of maternity care. Therefore data were collected and analysed continuously for the entire pregnancy and postnatal period for a number of women; for others, data were captured for only a part of their maternity care, depending on their gestation or postnatal stage reached when data collection commenced or ceased.

The total number of women cared for by the midwifery practice during the 15 month period of the demonstration project (including those who did not smoke) was used as the denominator to determine overall smoking rates for the entire caseload of the practice. No other information was collected about the women who did not smoke.

This study was granted ethical approval by the relevant Ethics Committee in May 2011. All data will be securely stored for ten years following completion of the study as required by the approving Ethics Committee (Reference: URA/12/EXP/015).

FINDINGS

The midwives provided maternity care for 202 women experiencing 203 pregnancies during the data collection phase. 101 women reported smoking and were included in the practice audit giving a smoking prevalence rate of 50%. Smoking was defined as smoking at least one cigarette every day and, whilst the number of women included in the project was too small to provide statistically significant results, a number of interesting findings emerged from the data.

Demographic and initial smoking status data were collated for all 101 women. End point data (end of the maternity care episode or end of the study period in a small number of cases) were collated for 87 women, giving a follow-up rate of 86% through the fifteen months of the study period. The lead researcher met with the midwives regularly throughout the project to discuss and identify issues as they arose and encourage full data collection to be completed by the midwives for each woman.

The data collection forms functioned well with most data fields completed in full and there were very few missing data (between 95% and 98% of data fields completed depending on the parameter). The parameter with the highest rate of missing data was the initial number of cigarettes per day smoked by women; however, there was still a good completion rate of 95%.

Table 1 presents demographic and parity characteristics of the 101 women who smoked at the commencement of the project and who subsequently registered for midwifery care with the practice. There was a high proportion of women who identified as Māori — 46 women (45.6%) compared to the general New Zealand childbearing population (Ministry of Health, 2015b). 50 women (49.5%) identified as New Zealand European, four as Pasifika (3.9%) and one as Asian (0.9%). The age of the women ranged from 15 to 42 years, with a mean age of 23 years, which is younger than that of the general childbearing population in New Zealand (Ministry of Health, 2015b). The majority (70%) were under the age of 25; close to a third (29.7%) were under the age of 20. 49 women (48.5%) were expecting their first baby, 34 women (33.6%) were expecting their second child, with the remaining 18 (17.8%) women expecting their third, fourth or fifth child.

Table 1: Demographic characteristics of women who reporting smoking during the project period.

Ethnicity	**Smoking status by ethnic group**	
	N	**%**
NZ European	50	49.5
Māori	46	46.5
Pasifika	4	3.9
Asian	1	1
Total	**101**	**100**
Age	**Smoking status by age group**	
	N	**%**
<20	30	29.7
20-24	41	40.6
25-29	18	17.8
>30	12	11.9
Total	**101**	**100**
Parity	**Smoking status by parity**	
	N	**%**
Nulliparous	49	48.5
Para One	34	33.6
Para Two +	18	17.8
Total	**101**	**100**

Personal circumstances

Most of the women, 83 out of 101 (82.2%), described themselves as being in a stable committed relationship with 66 (65.3%) living with the father of their child, in a de-facto or married relationship. Seventeen women who described themselves as being in a stable committed relationship were not living in the same house as the person with whom they were in a relationship. Only 18 (17.8%) women described themselves as single.

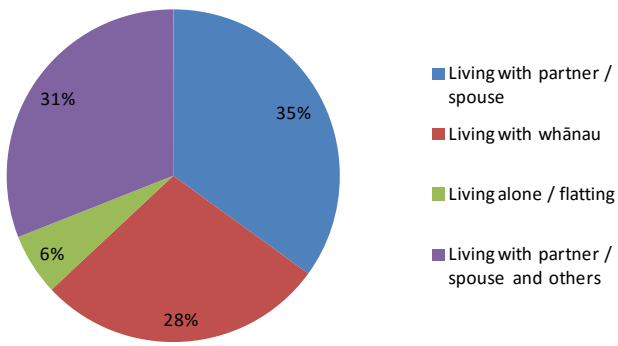

Figure 1: Living circumstances

The majority (97) of the women lived with other adults; 35 with their partner only (35%); and 31 (31%) lived in an extended household comprising their partners and either their whānau or

friends (Figure 1). Twenty-eight women stated that they lived with their whānau but not their partner (28%). The remaining six women (6%) either lived alone (3) or were flatting with other adults (3). Data were missing for one woman.

Cigarettes smoked by women at the commencement of the project

The number of cigarettes smoked by women varied from one to 40 per day. Approximately half of the women admitted to smoking between five and ten cigarettes daily, with 25 (24.6%) reporting smoking less than five cigarettes per day. Few women smoked more, with nine (8.9%) reporting smoking more than sixteen cigarettes per day, and two (1.9%) more than twenty cigarettes per day (Figure 2). The mean number of cigarettes smoked per day was nine.

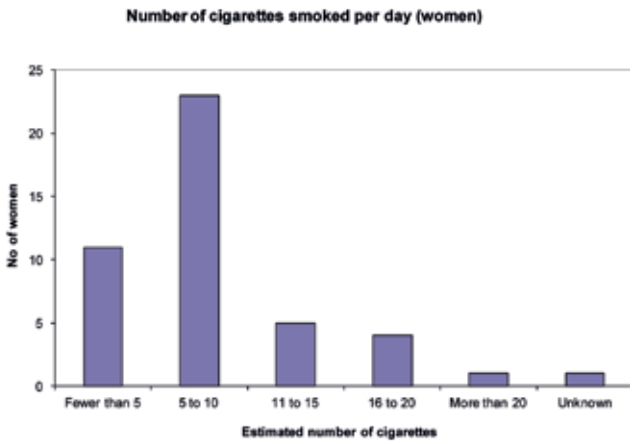

Figure 2: Number of cigarettes smoked by women at commencement of data collection

Partners / household members who smoked

Out of the 100 women for whom living circumstances data were recorded, 79 (79%) were living in a household with at least one other adult who smoked. This was either their partner, other adults, or a combination of their partner and other adults. The total number of other adults (who smoked with whom these 79 women lived) was 195 (50 partners and 145 other adults, either whānau or flatmates).

Out of the 65 women who lived with their partner, 50 of these partners also smoked and of the 18 women who described themselves as being in a stable committed relationship but not living with their partner, 15 of the partners smoked.

Only 21 (21%) of the women for whom living circumstances data were collected, lived in a household where there were no other smoking adults residing in the house, with three of these women living alone. The majority of the women either lived in a house where at least one other smoker also lived, or had a partner who smoked. Thus the women were living in an environment where smoking was normal amongst the adults who surrounded them. In general, partners and household members smoked a greater number of cigarettes per day than the women did. The average numbers of cigarettes smoked per day by the partners were 11 and by other adults in the household, 15.

Smoke-free environments

Eighty-seven (85.3%) homes were described as smoke-free at the beginning of the project, meaning all adults in the household who smoked did so outside of the home. Only 10 households reported household members smoking inside the house. However, the smoking incidence in cars, used by the women, was higher. Eighty-eight women (87.1%) had a car or regular access to a car. In contrast to the high percentage of smoke-free homes, at the beginning of the data collection only 44 (50%) cars were smoke-free, 38 (43.2%) were not, with 7% of data about the smoke-free status of cars being incomplete.

Table 2: Characteristics of women who became smoke-free

Demographics			
Ethnicity	**Ethnicity of women who became smoke-free**		
	Total N of women	**N who became smoke-free**	**% of total who became smoke-free**
NZ European	50	13	26
Māori	46	15	30
Pasifika	4	3	75
Asian	1	1	100
Total	**101**	**32**	
Age	**Age of women who became smoke-free**		
<20	30	13	43
20-24	41	8	19.5
25-29	18	6	33
>30	12	5	41
Total	**101**	**32**	
Parity	**Parity of women who became smoke-free**		
Nulliparous	49	20	41
Para One	34	9	26
Para Two +	18	3	17
Total	**101**	**32**	

ABC by midwives

Data on the frequency of the ABC interventions were collected for 85 (85%) women, with data missing for 16 women. The data were collected for varying lengths of time, depending on when the data collection commenced or ceased as a result of the project timeframes. Some women had ABC data collected throughout their entire pregnancy and postnatal care period, while others had data collected for only a portion of the time they were in the care of their midwives. Therefore, it is not possible to draw any conclusions linking frequency to the efficacy of ABC interventions for each woman.

Over the course of the project, the six midwives delivered a total of 1086 ABC interventions to the 101 women. This total is comprised of 438 reported incidences of asking about smoking behaviour, 358 incidences of offering brief advice and 290 incidences of offering referral to specialist cessation support to women. There was a considerable range in the number of times that the ABC was provided by the midwives to individual women, with some women having discussions about smoking with their midwife 15 times, and others once only. However, the number of times women were asked about smoking and offered brief advice or referral for cessation support is likely to reflect when data collection commenced and concluded in line with the project timeframe.

Sixteen women accepted referral to the dedicated pregnancy smoking cessation service—all of whom had a least one reported

contact with the provider. Partners and other adults in the household received fewer ABC interventions than did the women, as they were not present every time the midwife visited.

Thirty-two women became smoke-free during the course of the project following the midwives' intervention. Becoming smoke-free was defined as a deliberate decision not to smoke and, when asked, it was more than 48 hours since the last cigarette. This definition was agreed for the purposes of the study at the commencement of data collection. If, following a period of becoming smoke-free, a woman recommenced smoking, this was recorded as a relapse. The women who were successful in becoming smoke-free were more likely to be under the age of 20 or over the age of 30, and nulliparous. Women who identified as Pasifika or Asian were also more likely to become smoke-free, although the numbers were very small in these groups. Eighteen (66%) of the women who became smoke-free lived in extended households (i.e., with adults other than their defacto partner/spouse).

Women who became smoke-free required varying levels of support and ABC intervention. This did not appear to be directly related to initial numbers of cigarettes smoked. The number of ABC interventions provided by the midwives prior to women becoming smoke-free ranged from one to 10. The frequency of activation of the ABC intervention was similar for all women for whom data were collected, regardless of whether they became smoke-free or not. Unfortunately 16 (50%) of the 32 women who became smoke-free recommenced smoking, nine during pregnancy, and seven posnatally.

Ten partners (15%) became smoke-free following the LMC midwives' intervention; in five of these cases the woman also became smoke-free. Three other adults (2.7%) also became smoke-free and in two of these cases the woman herself also became smoke-free.

Smoke-free homes and smoke-free cars

The LMC midwives' intervention had a positive impact on the number of smoke-free homes and smoke-free cars, with an increase in both reported at the end of the project period. The number of smoke-free homes increased from 85% to 90% with the percentage of smoke-free cars increasing from 50% to 58%.

DISCUSSION

The overall rate of smoking for the women in this project was 50%, which reflects their demographic characteristics, with a predominance of young and Māori women within the LMC midwives' caseloads. It was encouraging to note that the women in this project with the highest rates of smoking (under 20-year-olds and nulliparous women) were more likely to become smoke-free. Interestingly, women over 30 were also more likely to become smoke-free; however, the number of women in this category was small.

A recently published New Zealand study analysed the smoking status of 81,821 women, who were pregnant during 2008 to 2010, on registration and at discharge with an LMC midwife, by ethnicity, age, and parity. (Andrews et al., 2014). This study found that groups with the highest prevalence of smoking (under 25 years of age and those who identified as Māori or Pasifika) also had the greatest reduction in smoking at completion of their midwifery care.

An important finding from this current project was that most of the women who smoked were living in extended households where the majority of other adults also smoked and this included the women's partners. Very few of these individuals living in close proximity to the pregnant women became smoke-free during the course of this project. This was so, even though they were exposed to the midwives' brief advice and offers of cessation support, either if present during the midwife's visit, or through information passed on from the woman or others living in the same home. This may indicate that the midwives' intervention, whilst well received, had little impact on the non-pregnant people who smoked.

These studies and the findings from this project highlight the importance of midwives' understanding a woman's wider social context and how this impacts on her ability to achieve a smoke-free pregnancy.

In addition, the presence of others who smoked may have created an unsupportive environment for the pregnant woman if she decided to become smoke-free. The influence of family, friends and household members on the ability of a pregnant smoker to become smoke-free has been noted in other studies. A New Zealand study, using semi-structured, face-to-face interviews, of 60 pregnant smokers who identified as Māori, found that all of the women lived with at least one other smoker and over half socialised with people who smoked. These factors contributed to the low motivation amongst the pregnant smokers to become smoke-free (Glover & Kira, 2011). Similarly, a systematic review of seven qualitative studies noted that, although women were aware of the risks of continuing to smoke in pregnancy, the proximity of family and friends who continued to smoke was a barrier to pregnant smokers achieving smoke-free pregnancies (Ingall & Cropley, 2010). It concluded that there was at that time a shortage of qualitative studies that concentrate on the specific difficulties that pregnant women face when trying to quit smoking. A more recent systematic review identified that the woman's relationship with her partner was more likely to be a barrier to smoking cessation in pregnancy than a facilitator, as partners were also likely to smoke (Flemming, Graham, Heirs, Fox, & Sowden, 2013). These studies and the findings from this project highlight the importance of midwives' understanding of a woman's wider social context and how this impacts on her ability to achieve a smoke-free pregnancy.

Interventions to support pregnant smokers to become smoke-free have been assessed in numerous studies. These interventions include the use of NRT, smoking cessation counselling, online resources, financial or material incentives and a range of actions by health professionals working directly with pregnant women, such as integrating smoking cessation guidelines into practice (Bowden, Oag, Smith, & Miller, 2010; Chamberlain et al., 2013; Fendall et al., 2012; Greaves et al., 2011; Hill, Young, Carter, & Lang, 2013; McLeod, Benn, et al., 2003).

It is clear from these studies that cessation rates during pregnancy are often modest and no single approach has proven to be more effective than any other, though it has been estimated that 20–30% of pregnant women will become smoke-free for at least some of their pregnancy (Ebert & Fahy, 2007). Contextual factors, such as socio-economic status, age and environment as well as nicotine dependence, have been noted as influential on pregnant women's ability to become smoke-free (Greaves et al., 2011).

A particular challenge for pregnant smokers is that the motivation to become smoke-free is strongly linked to the experience of being pregnant and a desire to protect the unborn baby (Synovate, 2009). Once the baby is born, the motivation to remain smoke-

free can be lost and postnatal relapse is a common feature (Greaves et al., 2011; Synovate, 2009). The data from this project were consistent with these findings, with 16 (50%) of the 32 women who became smoke-free relapsing; nine during pregnancy and seven postnatally. Postnatal relapse rates have been estimated as being at least 50% of former smokers at six months resuming the habit and that this rises to 70% at 12 months postpartum (Ebert & Fahy, 2007).

It could be assumed that midwives effectively provide support for women to change smoking behaviour in pregnancy in the New Zealand maternity context, if the advice and support offered match the woman's readiness to change (McLeod, Pullon, et al., 2003). The ABC smoking cessation intervention in this project was offered by the midwives to pregnant women in their homes. It was also offered to their partners, household contacts and whānau as the opportunity arose. Despite offering ABC frequently, the midwives did not offer it at every single visit, but rather used their discretion to judge the most appropriate time to raise the topic of smoking, believing that this enabled more effective communication. Interestingly, only 16 women took up the offer of referral to the dedicated pregnancy smoking cessation service available in the region.

This particular midwifery practice had high numbers of word of mouth referrals for midwifery care which is likely to have influenced both the age and ethnicity of the women included in the project. The midwives' expertise with teenage women in particular, was well known and the fact that young women recommended them to their friends is a measure of the success of their approach and ability to build successful partnerships with these young women. This may be related to well-developed communication skills with the midwives able to engage in discussions about smoking targeted to the women's individual situations.

Providing predominately home-based care meant that the midwives were able to effectively communicate with the women and, opportunistically, with partners and household members. The value of home visits was found in a recent United Kingdom (UK) study which found cessation support offered in the home to a group of 79 pregnant women under 25 years of age, was acceptable to both the midwives and the women. It supported flexible, non-judgemental care and attention to the women's wider circumstances, including the influence of family and friends (Bryce, Butler, Gnich, Sheey, & Tappin, 2009). Given the focused nature of the midwives' practice and the strong relationships that they developed with the young and Māori women they cared for, it is surprising to note the moderate impact that they had on smoking cessation rates. This appears to illustrate the challenges for midwives when working with women within social contexts and home environments that do not support them to become smoke-free. Further, although the majority of the women in this project reported smoke-free homes, and over half had smoke-free cars, the midwives' intervention appeared to effect only a small increase in the number of smoke-free environments.

STRENGTHS AND LIMITATIONS

Although the population characteristics of the women in this project reflected the characteristics of pregnant smokers in New Zealand overall, the small number of women studied means that the results are not generalisable to the wider New Zealand population. Women who became smoke-free were more likely to be young and nulliparous and this finding is consistent with other New Zealand studies with larger samples. It is therefore likely that these women are more amenable to advice and support than pregnant smokers who may be older and who have smoked through previous pregnancies. Although the frequency of ABC provided by the midwives did not seem to be related to whether women became smoke-free or not, it is not possible to know from this small sample whether this was significant. A further limitation was the timeframe of the project which meant that, for some of the women, data were collected about their smoking and the care provided by the midwives for a limited time, rather than for the full period of maternity care. A prospective study which follows each woman throughout her childbirth experience, rather than a time-limited study, may provide more insights into the usefulness of the ABC framework.

This is one of the very few New Zealand studies to consider the efficacy of the ABC intervention in the context of the LMC continuity of care model. New Zealand's maternity model is unique. International literature about midwifery practice with regard to smoking cessation interventions during pregnancy is often difficult to interpret in the local context as our continuity model of care and autonomous nature of midwifery practice do not have an equivalent in other countries. The women in this project reflected the demographic characteristics of pregnant smokers in New Zealand and thus, the challenges that the study midwives faced in supporting the women to achieve smoke-free pregnancies will be experienced by many other New Zealand midwives. Given the importance of social context on the influence to smoke for young women, and the apparent modest success of all cessation support methods for pregnant women (including NRT), further research on how to best support young pregnant women to become smoke-free is warranted. Moreover, given the small number of women (16) who accepted referral to a cessation provider, further research about the barriers to uptake of cessation support, and how midwives can overcome these, is also recommended. Given the relatively high number of women who became smoke-free and then relapsed, further research into the reasons behind relapsing leading to possible strategies to reduce relapse, particularly in the postnatal period, is worth considering.

CONCLUSION

The vast majority of women in New Zealand will receive most of their primary maternity care from a midwife, and midwives therefore have a significant role to play in supporting women to achieve smoke-free pregnancies. This project sought to better understand how midwives utilise the ABC smoking cessation framework within the context of their practice and the New Zealand model of maternity care. It is clear that midwives can have an impact, but it also appears that the woman's social context and home environment can be a significant barrier to success.

Midwives who work in the partnership model understand the importance of women's contexts. This project is a good illustration of the impact of the woman's environment and social context on her health and wellbeing. Although pregnancy can be both a catalyst for change and a time of high motivation for many women to make positive lifestyle choices, a number will face significant challenges in achieving smoke-free pregnancies.

Ultimately it is up to women themselves to choose to become smoke-free, and midwives have the opportunity to offer brief intervention and support to those who do make that choice. The current government has placed expectations on the health care sector to reduce smoking (Ministry of Health, 2015a); however, the evidence from this project and other research clearly demonstrates that smoking needs to be viewed in a broader context beyond the child-bearing woman/health care interface. A multi-layered approach is needed to reduce smoking if we are to achieve a Smoke-free Aotearoa by 2025. Broader strategies are needed to

address social influences, the impact of intergenerational tobacco use on whānau, and to ensure the effectiveness of current tobacco control policies specifically for pregnant women who smoke.

ACKNOWLEDGEMENTS AND CONFLICT OF INTEREST STATEMENT

This project was funded by the Ministry of Health. We would like to thank the midwives and women who participated.

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Accepted for publication August 2015

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