

NEW ZEALAND RESEARCH

Using a breath CO analyser to improve rate of referrals for smoking cessation during pregnancy: An exploratory single-case evaluation

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ABSTRACT:

Background: Smoking in pregnancy negatively impacts pregnancy outcomes and wellbeing in infancy and childhood. While midwives are increasingly offering brief advice, cessation support and referral for smoking cessation, the data collected from a significant number of midwifery practices allows an estimate of 79% of women decline referral.

Aim: The aim of this single-case evaluation was to assess if voluntary use of an exhaled carbon monoxide (CO) test would increase referral rates to smoking cessation services. Because of the high rates of smoking during pregnancy by women who identify as Māori (43%), the focus was the practice of a midwife who works with pregnant Māori women.

Method: This was an exploratory single-case evaluation including all women who reported that they smoked when they registered with the midwife. The midwife introduced the breath CO analyser (CO test machine) as a way of measuring mother's and baby's levels of CO and use was voluntary. Data gathered included: use of the breath CO analyser and number of referrals to cessation services. Additionally, an interview was conducted with the midwife on how the breath CO analyser was used. Simple descriptive statistics were produced and proportions reported. The interview was analysed deductively.

Findings: Thirteen pregnant women participated in this study. Seven consented to use the analyser and six declined. Of the 13 women who were offered the analyser, 9 (69%) accepted and 4 (31%) declined referral to a smoking cessation service. The midwife perceived that the analyser made it easier for her to discuss smoking with her clients.

Conclusion: The breath CO analyser may be a useful tool for supporting midwives, who care for a high number of women who smoke, to initiate discussions about smoking cessation while pregnant, and to increase acceptance of referral to cessation services. Further research is needed to determine the effectiveness of a breath CO analyser as a tool for midwives nationwide, as well as to determine extra time and resources that may be required.

Keywords: smoking, pregnancy, indigenous women, carbon monoxide testing, referral

INTRODUCTION

Smoking in pregnancy negatively impacts pregnancy outcomes and wellbeing in infancy and childhood (Glover et al., 2010). In 2007, smoking prevalence for pregnant Māori women (the indigenous people of New Zealand) was 43.5% at first registration with a midwife and, for postpartum Māori women at discharge, 34% still smoked (Dixon, Aimer, Fletcher, Guilliland, & Hendry, 2009). This had only reduced marginally by 2010 to 42.9% smoking at first registration (Andrews et al., 2014). In Northland, a region in northern New Zealand (NZ), approximately half of all births are to Māori women and 43% of Māori women are smoking at booking. This accounts for the high overall smoking rate of 31% by pregnant women at booking in 2013 (Midwifery and Maternity Providers Organisation, 2013). An audit in 2012 at Northland District Health Board (DHB) showed that admissions to the Special Care Baby Unit (SCBU) for babies of mothers who smoked was 21%, compared with the percentage of all babies born in this region admitted to SCBU, which was 11% (Mentor, 2012). While midwives are increasingly offering brief advice, cessation

support, and referral to a cessation service (as is accepted good public health practice), data collected from a significant number of midwifery practices in Northland allow an estimate of 79% of women decline referral (Midwifery and Maternity Providers Organisation, 2013). Strategies are needed to increase the rate of acceptance of referral.

One of the Ministry of Health's strategies for reducing smoking prevalence, is to trigger more supported quit attempts more often (Jenkins, 2009). It is well established that dedicated behavioural cessation support is likely to increase cessation rates in general populations (Bains, Pickett, Laundry, & Mecredy, 2000; Cahill & Perera, 2011; Croghan et al., 2001; Hughes, Stead, & Lancaster, 2007; Stead, Perera, Bullen, Mant, & Lancaster, 2008), and cessation support for reducing smoking during pregnancy can be effective (Meernik & Goldstein, 2015; Myung et al., 2012). Although midwives can provide brief advice, dedicated cessation services have more time and expertise in providing a combination of pharmacological and behavioural support.

Previous research has identified that there is a need to increase referral to dedicated cessation services for women who smoke while pregnant (McGowan et al., 2010). Although many women receive advice about quitting smoking, not all feel influenced by it (Glover & Kira, 2011). Glover, Kira, Walker and Bauld (2014) found that pregnant women who smoke will accept a referral but a large number do not respond to contact attempts or decline support by the cessation provider. Therefore, methods are needed that engage pregnant women who smoke in the discussions about cessation and thereby increase use of supported quit attempts.

The United Kingdom (UK) smoking cessation guidelines for midwives advise that midwives should use demonstration of the level of exhaled carbon monoxide (CO) as a screening tool to identify and refer pregnant women who smoke to dedicated smoking cessation services (McEwen & Potts, 2013). The breath CO analyser is an instrument which calculates the amount of carbon monoxide in a single exhaled breath, automatically calculates the percentage of carboxyhaemoglobin in the blood of the mother and estimates the carboxyhaemoglobin in the baby's blood. The result is displayed in exact parts per million (ppm) for CO, and as a percentage for carboxyhaemoglobin.

Use of the breath CO analyser is not currently included in NZ guidelines. Although testing all women, as is done in the UK, may lead to a higher referral rate, it may not lead to a higher uptake of dedicated cessation support (Bauld et al., 2012). Furthermore, compulsorily testing all women may interfere with the relationship between midwife and client. The way a midwife communicates with a pregnant woman who smokes, influences the willingness for the woman to consider smoking cessation (Baxter et al., 2010). Preaching or being authoritarian, for example, by imposing a compulsory CO test, can result in women being disinclined to enter into smoking cessation discussions (Anderson, 2002; Arborelius & Nyberg, 1997). In contrast, a friendly and sensitive approach can encourage engagement (Lowry, Hardy, Jordan, & Wayman, 2004).

The aim of our evaluation was to assess if voluntary use of a CO test, by women who stated that they smoke, would increase referral rates to dedicated smoking cessation services. Because indigenous people often have higher smoking prevalence during pregnancy than non-indigenous populations (Heaman & Chalmers, 2005; Kim, England, Dietz, Morrow, & Perham-Hester, 2010; Midwifery and Maternity Providers Organisation, 2013; Morton et al., 2010; Wright & Tam, 2010), this evaluation focused on the practice of a midwife who worked with pregnant Māori women.

METHOD

This was an exploratory single-case evaluation, carried out in Northland, NZ, over three months (April–June 2014). The evaluation was seeking to determine if the use of a breath CO analyser would increase the uptake of referrals and quit attempts amongst one Māori midwife's client group. A CO test was chosen for pragmatic reasons; it is the least invasive and cheapest biofeedback method for showing a pregnant woman an effect of smoking on her baby.

Participants were all Māori women who smoked and who registered with, or were in the care of, the midwife. Inclusion criteria were current smoker and seeking or having sought care with the midwife. Verbal informed consent was sought from the pregnant women by the midwife. All data collected were anonymous and confidential. Because this was a low risk evaluation, no formal ethical approval was sought from an external body.

At the first booking visit with the midwife, or at a subsequent visit, during a discussion about smoking, the midwife talked about CO and introduced the analyser as a way of measuring mother's and baby's levels. Use of the analyser was voluntary, in fitting with the New Zealand midwifery partnership model of practice (New Zealand College of Midwives, 2015). Referral was by agreement and was not compulsory.

The midwife recorded data on a tick box record sheet. The data gathered included:

1. The number of pregnant women who smoked who consented to use the breath CO analyser.
2. The number of pregnant women who smoked and declined to use the analyser.
3. The number of pregnant women who smoked who accepted referral to a dedicated smoking cessation service.
4. The number of women who smoked and declined referral to a dedicated smoking cessation service.

At the completion of the evaluation period, the midwife was interviewed by the lead author. The interview was structured and included the following questions:

1. What was the best time to introduce the analyser?
2. How did you use the analyser?
3. What difference did the analyser make to your practice?
4. Any suggested improvements?

Data were entered and analysed using Microsoft Excel Spreadsheet, and simple descriptive statistics were produced and simple proportions reported. Referral rates for the trial period were compared to the referral rates for the same midwife during the previous year of practice. The interview data were analysed deductively (Thomas, 2006), allowing themes to emerge following the interview schedule.

FINDINGS

Thirteen pregnant women who smoked were invited by the midwife to use the breath CO analyser. Of those, seven (54%) consented to use the analyser and six (46%) declined. Of the 13 women who were invited to use the breath CO analyser, 69% (n = 9) accepted a referral to a dedicated smoking cessation service. Of the seven women who used the breath CO analyser, six (88%) accepted referral compared to three (50%) of those who declined the analyser (Figure 1).

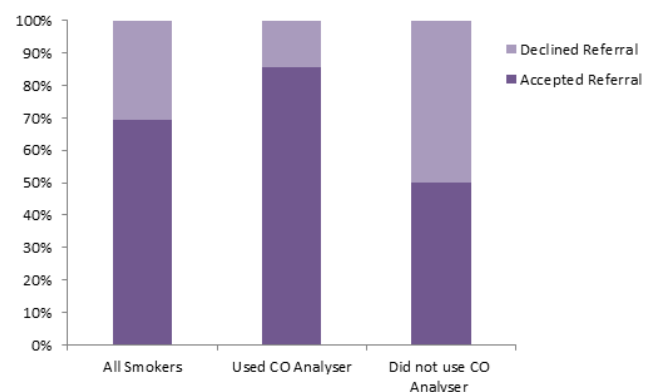


Figure 1: Percentage of clients who accepted or declined referral to dedicated smoking cessation services

Figure 2 shows referral rates for women who smoked achieved by the same midwife in the same location, in the previous year from 1 March 2013 – 1 March 2014. 22 pregnant women who smoked were seen, five of them (23%) accepted referral and 17 (77%) declined.

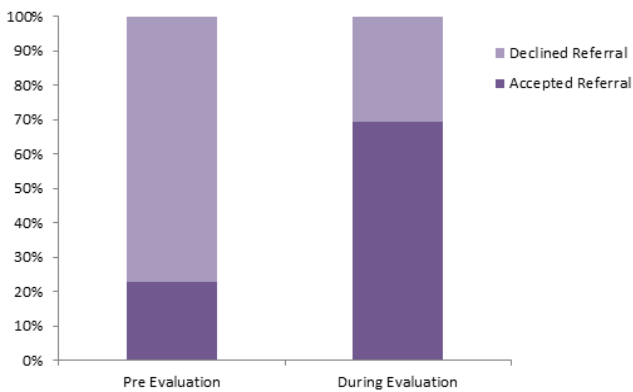


Figure 2: Percentage of women who declined or accepted referral to a dedicated cessation service in the year prior to the evaluation of the breath CO analyser compared to during the evaluation period.

The midwife's perceptions

The midwife stated that the analyser was a useful tool and that it made it easier for her to discuss smoking with her clients. The fetal CO haemoglobin levels showed the client how her smoking was affecting her unborn child, which the midwife thought may help break through the prevailing denial that smoking does not harm the unborn child.

The analyser has made it a lot easier to discuss smoking risks and advise referral.

I have a tool that shows what is happening now.

Two women teared up when they realised the adverse result. It broke through the denial. It was an opportunity to turn it into positive action to get off the smoke for baby.

Asking clients to use the analyser, even after they had declined a referral, appeared to make them more open to future referrals.

If she declines a referral I suggest just having a puff in the analyser anyhow. I record the result and then by doing it again at the next visit she is more likely to want a referral.

The midwife thought that the initial appointment was the most opportune time for using the analyser.

Booking is the best time to use the analyser because there is more time.

It was easier to discuss smoking at follow up appointments if the analyser had been introduced at the initial appointment.

During the follow up appointment it is easier to address if discussed earlier and it is harder if it has not already been discussed.

The only criticism of the analyser was that it was too large.

A more compact kit would be better. The analyser kit is quite bulky and does not fit conveniently in the midwifery kit.

DISCUSSION

In this exploratory single-case evaluation of a midwife's use of an analyser with clients who smoke, we found an increase in the referral rate to dedicated smoking cessation services. Previous research has found that women who smoke while pregnant feel influenced by the discussions about quitting smoking (Glover & Kira, 2011). This evaluation suggests that the analyser was a useful tool for the midwife to engage her clients in discussion about smoking.

Using an analyser may better enable midwives to approach the subject of quitting smoking because they can back up the discussion with practical information (the results) that can be shown to the woman. The analyser as a tool provided women with specific information of the CO levels if they smoked while pregnant. Providing analysers to midwives, who have high numbers of women who smoke in their caseload, may improve their engagement with women who smoke while pregnant, irrespective of experience, training in behaviour change, or any other variable. The analyser does take extra time at booking. However, time will likely be saved longer term by reduced number of high risk pregnancies in the caseload when women manage to quit.

In contrast to the recommendations in the UK (McEwen & Potts, 2013), the current study relied on a voluntary CO testing. In NZ, midwives' first standard of practice is to work in partnership with women. Trust, from both parties, is an important part of this relationship. Using compulsory CO testing may interfere with the client-midwife relationship, by implying a lack of trust in the clients' honest disclosure of their smoking status. Suggesting voluntary, as opposed to compulsory, CO testing may be a way of engaging women in the discussion about quitting smoking without compromising the relationship between midwife and client. Furthermore, the voluntary use may make the clients more open to accepting a referral after seeing the results of the CO test.

Both the time resource and the equipment will need to be fully and appropriately funded.

One potential problem is the resourcing for midwives. Both the time resource and the equipment will need to be fully and appropriately funded. At the time of the study, the average cost for Northland DHB to purchase an analyser was NZ\$600. However, the average estimated cost, of caring for one baby in SCBU in Northland in 2014, was NZ\$8568.03 (Stanners, 2014). If midwife use of analysers prompts more women to abstain from smoking while pregnant, this would decrease ill-health effects during pregnancy and for the baby. In addition, it would potentially decrease the midwifery workload associated with high risk pregnancies, decrease the time babies spend in SCBU, and result in both significant cost savings to health services, and financial and social costs to whānau. Thus there may be a positive cost benefit to the purchasing, and funding the use of, CO analysers.

STRENGTHS AND LIMITATIONS

A strength of this evaluation is the focus on a high-need indigenous population. However, this was a small single-case evaluation conducted at one midwife's practice, which cannot be generalised to other practices. It is also not possible to ascertain a causal effect.

Future work

This evaluation presents a strong case for conducting a larger trial with midwives using analysers in their interaction with indigenous women, who smoke while pregnant, in order to more fully establish their effectiveness. Future research should seek to determine the independent effect of the addition of an analyser test versus standard care.

CONCLUSION

Provision of breath CO analysers to midwives, caring for high numbers of women who smoke may enable midwives to increase referral rates to specialist services that have the time and skills to

provide dedicated cessation support. Such a tool has the potential to substantially improve health outcomes for both the mother and her unborn child.

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