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Supplementary File for paper:

Evaluation of 'Stop Smoking in its Tracks': an intensive smoking cessation program for pregnant Aboriginal women incorporating contingency-based financial rewards

STOP SMOKING IN ITS TRACKS – THE SMOKING CESSATION PROGRAM

Preliminary work to develop the program included:

1. A review of guidelines for antenatal smoking cessation – National guidelines recommend routine assessment of smoking status of all pregnant women, with intensive support for cessation using a 5A's approach (Ask, Advise, Assess, Assist and Arrange follow-up)(1, 2). Nicotine replacement therapy (NRT) is considered if the woman is otherwise unable to quit(1, 2).
2. A systematic review of the evidence for cessation programs for pregnant Indigenous women, which identified only two relevant trials, neither of which was effective(3).
3. A critical appraisal of the theoretical smoking cessation literature, including the literature on smoking cessation among Indigenous peoples and among pregnant women. Important principles identified included: tailoring to local culture and context; regular routine assessment and support repeatedly throughout the pregnancy; delivery by all members of the antenatal team (doctors, midwives and AHWs); involving household and social supports; addressing relapse both during pregnancy and in the post-partum period; addressing use of other substances including cannabis and alcohol; and testing the benefits of contingency-based financial rewards. The intervention applies these principles, and is consistent with the successful strategies in the most recent Cochrane review of smoking cessation in pregnancy(4) as well as recent research on smoking and cessation by Indigenous Australians(5-16).
4. Formative research with Indigenous women and antenatal providers, in collaboration with the CRG. A qualitative study with pregnant Indigenous women confirmed the complex challenges women face related to smoking cessation including the normalisation of smoking within Indigenous communities; high levels of stress and disadvantage; the role of tobacco and smoking in maintaining relationships; and the value of family and children in motivating women to make healthier choices(17). Surveys in NSW and the Northern Territory (NT) identified: poor knowledge of smoking cessation support strategies; misconceptions regarding smoking risks; and a low priority placed on addressing smoking, among providers(18). Women's surveys confirmed that many try to quit, some succeed, and most smokers cut down while pregnant;

many women have poor understanding of smoking risks and consider quitting too hard given other stressors(19). The women's survey also found high levels of use of alcohol and cannabis, particularly among smokers(20). Both service providers and women indicated the following strategies were likely to be helpful: family support; rewards contingent on confirmed cessation; advice and support from the midwife, doctor or AHW; community activities; free NRT; peer support groups; and brochures on the harms of smoking with advice on how to quit(21).

5. Assessment of the potential value of CBFR: At the time of developing this program, systematic reviews of interventions for smoking cessation during pregnancy found that rewards contingent on successful smoking abstinence had a significantly larger effect than other interventions(22). However, their acceptability and efficacy with Indigenous Australian women had not been tested. Our preliminary surveys found that CBFR were considered likely to be helpful by 63% of Indigenous women and 56% of antenatal providers caring for Indigenous women, suggesting reasonable levels of acceptability(21).

Principles for use of CBFR in our program were derived from previous research:

a. *Rewards should be provided as soon as possible after measurement of the behaviour* (23, 24) This reinforces the behaviour and takes advantage of many people's preference for smaller immediate benefits over larger, more distant benefits.

b. *Rewards should progressively increase* in value to reinforce abstinence(25, 26) and be reset for relapse(26)

c. *The value of rewards must be sufficiently high to be attractive* (24, 27, 28).

d. *Relapses are most frequent in the early phases* of quitting, and smoking status in the first two weeks of a quit attempt predicts outcomes including end-of-pregnancy smoking status (29). Thus there is a need for more intensive and frequent contact and reinforcement in the early phases of a quit attempt, with gradual tapering off.

e. *Post-partum relapse is common.* Post-partum relapse is more common among women with greater delay discounting(30). To reduce post-partum relapse, it is suggested that the frequency of monitoring and rewards should be increased in the post-partum period, and again gradually tapered down(31).

f. *Avoid creating perverse incentives* (24, 27) The design must not create a situation which discourages early spontaneous quitting.

The Stop Smoking in its Tracks Program

The smoking cessation program was designed by the research team, with frequent review of both the overall concepts and the detailed content, by the CRG and one of the AMIHS teams. Suggestions from the CRG and AMIHS team led to revisions to the design until all parties were satisfied. The program incorporates best evidence, as identified by the process above; is designed to be delivered collaboratively by the AMIHS midwife and AHW; and includes the following components:

1. Assessing all women for smoking status: Women were assessed at their first visit by the midwife who explored and documented women's smoking status, nicotine dependence and previous quit attempts.

2. Discussion of risk and benefit: Using a motivational approach, the providers (midwife and/or AHW) explored women's understanding of the risks of smoking and benefits of quitting, corrected any misconceptions and emphasised the benefits of quitting. Women were encouraged to identify personal reasons for wanting to quit by exploring their goals for themselves and their baby. A brochure on 'Reasons to Quit' was used as a prompt for discussions.

3. Advising smokers to quit: Women were advised to quit for the sake of both mother and baby. Women wanting to quit were advised to quit 'Cold Turkey', and do so on that day rather than delaying.

4. Exploring barriers to quitting: The providers assisted women wanting to quit to identify triggers for smoking, potential barriers, strategies to manage these and other sources of support, in order to tailor advice for smoking cessation to each woman's circumstances. Advice included an explanation of the roles of addiction and habit in smoking, specific strategies to support cessation and avoid relapse, goal setting and planning a quit attempt. The woman's use of other substances, particularly cannabis and alcohol, was also explored and additional advice provided as required. A brochure providing advice on tobacco cessation strategies ('How to Manage Quitting') was given to each woman attempting to quit, together with a fridge magnet showing the program logo and the 4Ds (delay, drink water, deep breaths, do something else). The providers emphasised their belief in the woman's ability to quit and the team's willingness to support the woman to do so, explaining the quitting program and support available. Women were then asked to make a commitment to making a quit attempt.

5. Agreeing to a contract to quit: Women wanting to quit were asked to complete a simple contract stating the reasons they wanted to quit and that they were willing to try. The contract was also signed by the provider, to commit to supporting the woman's quit attempt.

6. Assessing expired carbon monoxide (CO): Women wanting to quit were asked to blow in a smokerlyzer (piCO smokerlyzer (Bedfont Scientific Ltd, Kent UK)) to measure baseline expired CO and provide a visual reminder of the impact of smoking.

7. Household support: Household smoking patterns were explored and advice provided on ways the household members could support the woman to quit including making the car and home smokefree, not offering the woman cigarettes, commending her for her efforts and (if appropriate) making a quit attempt themselves. Women were given a 'Household support' brochure to share with household members.

8. Confirmation and follow-up: Providers reaffirmed women's decision to quit, congratulated them, then arranged follow-up in 2-4 days time.

9. Provision of educational material: All resources for the program were developed with the CRG who provided input on content and design. A series of four A5 brochures was developed, using a red, yellow and black colour scheme, containing graphic images and displaying the program logo. 1. 'Reasons to Quit' described the harms of smoking and the benefits of quitting, with a focus on short term/immediate gains and benefits to the woman, baby and family. 2. 'How to Manage Quitting' suggested strategies for avoiding triggers and managing cravings. 3. 'Household Support' advised household members on the best ways to support the pregnant woman in her quit attempt and the reasons this was important. 4. 'After the Birth' was designed to assist women to avoid postpartum relapse, and described the benefits of staying quit and strategies to do so. All brochures included the 4Ds on the back cover, contact details for the AMIHS team and the state Quitline number. Additionally, women were given fridge magnets with the 4Ds and program logo, a tiny nappy for an extremely premature baby, stickers with a no smoking sign, toothpaste, toothbrush and a water bottle, and several NSW Health resources: fridge magnets with the Quitline phone number and another with 'Smoke Free Zone', and a 'Car and Home Smoke Free Zone' brochure.

10. Subsequent visits:

    a. Frequency: Women were visited at home twice a week for three weeks, then weekly for four weeks, then fortnightly until the birth, by the midwife and/or AHW, to provide ongoing support and advice. If women were attending the antenatal clinic the smoking cessation visit was undertaken there.

    b. Content: At all visits, progress was assessed, positive feedback given and ongoing support and advice provided, tailored to each woman's circumstance. Women reporting successful

quitting were congratulated and asked to blow in the smokerlyzer to confirm this and provide visual reinforcement of the benefits of quitting. Those with abstinence confirmed by expired CO<6ppm were again congratulated and provided with a reward voucher (see below). Where women had not yet succeeded their experience was discussed and further tailored advice provided, including to continue trying, that the team had faith in her and that repeated attempts are often needed.

c. Household members: Other household members present during home visits were opportunistically targeted and provided with advice regarding the best ways to support the woman's quit attempt. Where appropriate, they were also encouraged to quit smoking themselves, and if interested were supported to do so through counselling, provision of free NRT as appropriate, and referral to other services.

d. Free NRT: Intermittent forms of NRT (inhalers, gum, lozenges, sublingual tablet) were offered free of charge to women who were unable to quit after two attempts without NRT. Women were instructed on using these products safely and effectively and provided with a brief information sheet.

11. Contingency Based Financial Rewards:

a. Immediate provision of CBFR: Women confirmed as abstinent (expired CO<6ppm) were immediately provided with a reward voucher which could be reimbursed for goods at participating businesses. Businesses included pharmacies and those selling home appliances, clothes and jewellery. Businesses selling alcohol or tobacco products were excluded.

b. CBFR value: Rewards started at $10 and increased by $2 for each consecutive visit in which abstinence was confirmed, to a maximum of $30. If women tested positive (ie smoking) the frequency of monitoring and value of the reward were reset to the beginning and women were not given a reward until they were again confirmed abstinent. If they then remained abstinent for three consecutive tests, the frequency and value of the reward was reinstated to the previous level. The amounts were determined by the CRG and the structure is consistent with the principles of setting the value at a level sufficiently high to be attractive(24, 27, 28), and of progressive increase to reinforce abstinence with resetting of rewards following relapse(26). The amount for a woman quitting at 12 weeks gestation, and continuing without smoking until 6 months post-partum would total $960.

12. Post-partum support: For women who quit and were not smoking at the end of their pregnancy, supportive counselling and follow-up was offered until 6 months post-partum. At each visit,

those confirmed abstinent were provided with a reward. As relapse is most common early in the post-partum period(30), visits were weekly for the first four weeks, then fortnightly until six months post-partum. Women were provided with the ‘After the Birth’ brochure either late in pregnancy or at the first post-partum visit.

13. Peer support groups: In addition to individual support, fortnightly peer support groups were offered to all women. A group manual gave detailed instructions and all required resources were provided. Women were offered transport to the group, which lasted about three hours, including lunch. Each session started with a relaxation exercise, followed by an educational session, then a group activity related to quitting smoking. After lunch, craft activities were offered. The program rotated through ten different topics: Harms of smoking; managing cravings; benefits of quitting; costs of smoking; managing stress; a tobacco quiz; dealing with boredom; passive smoking; positive self-talk and avoiding relapse; and staying quit postpartum; then returned to the beginning. Women were able to join the group at any point and could request different sessions if desired.

14. Women who had already quit: Women who quit smoking during their pregnancy but prior to enrolling in the study were immediately provided with their first reward (contingent on confirmation by expired CO monitoring) to support them in their non-smoking status and to avoid relapsing. This also helped avoid creating an incentive to delay quitting in order to be eligible for the scheme(24, 27). They then followed the same program.

15. Women not wanting to quit: Women not wanting to try to quit during their first visit continued to receive advice to quit at every standard antenatal visit. Those subsequently deciding to make a quit attempt were supported in the same manner as those deciding at their first visit.

16. Training for staff: Staff received a structured two day training program covering: the program design and the rationale behind this; harms of smoking and benefits of quitting; motivational interviewing; how to deliver the program and use of all program resources, including NRT, smokerlyzers, CBFR and the groups; and research components (recruitment, informed consent, record keeping).

Strengths-based approach

A strengths-based approach was used by engaging with the CRG and through building on existing service infrastructure, relationships in the community, and the communities own strengths. Examples within the community included the strong social networks, the value placed on relationships and the strong motivation women have to do the best for their children and family(10,

14, 17, 18). These were incorporated into the program through the household support and peer group support processes and the use of resources that emphasised the value of quitting for the sake of the family and the community. All attempts to quit smoking were acknowledged and affirmed.

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