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RESEARCH INSIGHT

Photo-ageing for smoking cessation in pregnancy: A pilot study

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SUMMARY

- Pregnancy is a key life event where provision of smoking cessation interventions may have increased success.
- The AprilAge Age Progression Software is a novel technological intervention proven to reduce nicotine dependence.
- Recruitment and retention of pregnant women was challenging despite numerous protocol modifications, due to a variety of barriers preventing women from engaging with the study.
- Perceived stigma associated with smoking during pregnancy may be the biggest factor preventing disclosure of smoking status, leading to fewer women being offered intervention.
- We do not recommend this intervention in the pregnant population.

Key Words
Pregnancy, smoking cessation, interventions, photo-ageing

INTRODUCTION

Smoking cessation during pregnancy may prevent poor outcomes. In Australia, one in 10 mothers (10 per cent) who gave birth in 2015 admitted to smoking at some stage of their pregnancy. Young pregnant women, particularly those under the age of 20 have a higher rate of smoking than this national average (32 per cent) indicating they may be taking up smoking in increasing numbers relative to other demographics.[1]

In theory, pregnancy may be an optimal time to promote a healthy lifestyle. For behaviour change to be successful three factors must coincide: 1) the individual must be highly motivated; 2) have the ability, resources, and support to facilitate change; and 3) be triggered to attempt the desired behaviour at the opportune time.[2]

Pregnancy is a key life event. During pregnancy the woman is more alert to the risks of her behaviours, more attuned to the benefits of behaviour change, and has a heightened emotional response associated with a perceived change in role from woman to mother.[3] The literature frames this as a "teachable moment". It may be the context in which motivation is maximised as per the Fogg Behaviour Model.[2,3] The Fogg behavioural framework and the concept of teachable moments are promising bases to deploy an effective trigger for smoking cessation in a highly motivated, empowered, and supported person who is nicotine dependent.

The AprilAge Age Progression Software is a novel technological intervention that demonstrates the effect of smoking on the ageing face of a smoker versus a non-smoker. It was successfully deployed in promoting cessation in smokers in a randomised controlled trial in Western Australia.[4] In a previous study reported in *The Journal of Health Design*, Tambakis et al[5] deployed AprilAge in an inpatient cohort of smokers to determine if they could be triggered to make quit attempts.[5]

In this study, the AprilAge intervention was employed in an antenatal setting to explore the scope for the intervention to be tested in a formal experimental design.

SUMMARY

Pregnant women identified as smokers during their antenatal clinic booking visit were the target group. Following informed consent recruits completed a baseline questionnaire focusing on demographic information, nicotine dependence, and stage of change.[6,7]

All individuals were provided with standard smoking cessation advice. In addition, the AprilAge Age Progression Software was used to provide age-progressed images of the participant as a smoker versus a non-smoker. Follow-up questionnaires were planned to be completed at four, eight, and 12 weeks to determine nicotine dependence and stage of change over that time.

Despite a previous study demonstrating the AprilAge intervention was acceptable and effective in female participants of reproductive age,[4] and a determined research team working with enthusiastic clinicians, we were unable to recruit participants. At the conclusion of the study period, only one woman was involved in the study.

LESSONS LEARNED

The difficulty recruiting was an unexpected finding. In consultation with clinical staff, the recruitment strategy was revised several times and multiple attempts were made. Three different strategies were eventually formally tried.

During the first two weeks of recruitment, midwives reported difficulty in remembering the number of times a recruitment attempt was made during their shift leading to uncertainty about the number of women offered the opportunity to participate. To remedy this, our first strategy was to implement a form on which patient identification labels were collected, to ensure all recruitment efforts were documented for data collection and followed up by the principal researcher.

Literature indicates the perception of the support provided by the research team may impact whether the clinical staff offer the study to their patients.[8] Our second strategy aimed to increase researcher time within the antenatal clinic while also optimising the ability to take direct referrals if eligible participants presented to the clinic.

Our final strategy aimed to improve the recruitment rate. Initially all midwives were educated on study protocol and encouraged to recruit, however, variable rostering and ward duties meant this was difficult logistically. Instead, five midwives with a strong research background and previous experience in recruitment were inducted to the study protocol. The targeted midwives allowed focused recruiting, which increased the number of women offered the intervention over the remaining recruitment period.

Informal feedback from potential participants suggested that pregnancy was not an opportune time to focus on smoking cessation:

- Some potential participants expressed the view that the demanding schedule of antenatal appointments made it difficult to factor in the commitment to a research study with follow-up appointments or phone calls.
- Others felt that the "basic" level of counselling provided at the initial consult was insufficient; they indicated they would have preferred ongoing counselling scheduled at each follow-up appointment.
- There were also several women who challenged the evidence for foetal smoking-related harm. Some stated that smoking was protective to maternal wellbeing at a time of financial, social, and personal stressors during pregnancy.

Similar challenges have emerged in previous studies conducted during the perinatal period. Practical barriers such as work, childcare commitments, and transport issues, as well as concerns regarding the intervention and patient attitudes to the research process have greatly influenced the uptake of research studies at this time in a woman's life.[8]

Anecdotally it was also apparent that some women were unwilling to disclose or admit to their smoking status due to the perceived stigma associated with smoking during pregnancy. We speculate that this unwillingness was possibly the

most important reason why the study failed to recruit, a surprising result given the high level of clinical staff support in this context.

Logistically, the recruiting midwives found it challenging to provide information and recruit to the study during an already busy antenatal visit. A previous study have a had similar experience with time management, institutional/ organisational issues, and difficulty engaging and educating the whole team being significant hurdles in effective trial recruitment.[8]

Our study faced similar recruitment and retention challenges as the previous study comprising a hospital-based cohort reported in *The Journal of Health Design*.[5]

We therefore do not recommend this intervention and anticipate that promoting smoking cessation during pregnancy does not lend itself to a simple trigger in this context, unlike the cohort of people presenting to a community pharmacy in a successful published study.[4] It is possible that there needs to be greater emphasis on facilitating the behaviour change and factoring in the stigma associated with addressing smoking during pregnancy. For some smoking cessation may not be possible, even during pregnancy, and for these women we must make them feel safe to attempt to quit even if they fail.

CLINICIAN INSIGHT

Interventions for smoking cessation are key in preventing several smoking-related health hazards, including lung cancer, hypertension, stroke, and myocardial infarction. The importance of these interventions increases many folds where the risk is immediate and certain. Smoking during pregnancy has profound and severe adverse effects on the unborn child, hence interventions for smoking cessation during pregnancy are critical.

As pregnancy is also associated with a heightened emotional response and women are more attuned to a positive behaviour change, it would appear that a behaviour modification-directed intervention would be a perfect smoking cessation intervention for pregnant women. However, the authors of this study report quite the opposite experience. This study had to be closed early since the authors could not even enroll patients for this intervention.

Although it is a negative study, it sends a very important message that even the most thought out and logical interventions may not work in certain settings owing to unforeseeable circumstances or reasons that seem logical in hindsight, but might not have been apparent upfront. Smoking cessation during pregnancy might be one of them due to the various factors discussed by the authors in this study. I am hopeful that the results of this study will encourage the authors to identify other more innovative methods for smoking cessation targeted towards pregnant women.

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PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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ETHICS COMMITTEE APPROVAL

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