



NOVA

University of Newcastle Research Online

nova.newcastle.edu.au

Bar-Zeev, Y., Bonevski, B. & Gruppeta, M. et al (2018) Clinician factors associated with prescribing nicotine replacement therapy in pregnancy: a cross-sectional survey of Australian obstetricians and general practitioners. Australian and New Zealand Journal of Obstetrics and Gynaecology, 58 (3) 366-370

Available from: <http://dx.doi.org/10.1111/ajo.12751>

This is the peer reviewed version of the above article, which has been published in final form at <http://dx.doi.org/10.1111/cea.13153>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions.

Accessed from: <http://hdl.handle.net/1959.13/1393529>

**Clinician Factors Associated with Prescribing Nicotine Replacement
Therapy in Pregnancy: A Cross-Sectional Survey of Australian
Obstetricians and General Practitioners**

Bar Zeev Yael, MD, MPH

Corresponding Author

School of Medicine and Public Health, The University of Newcastle, Callaghan, New South Wales, Australia

Postal address: PO Box 833, Newcastle, New South Wales, 2300

Telephone: 0240335729

E-mail: yael.barzeev@uon.edu.au

Bonevski Billie, PhD

School of Medicine and Public Health, The University of Newcastle, Callaghan, New South Wales, Australia

Gruppetta Maree, PhD

Wollotuka Institute, The University of Newcastle, Callaghan, New South Wales, Australia

Tywman Laura, PhD

School of Medicine and Public Health, The University of Newcastle, Callaghan, New South Wales, Australia

Atkins Lou, PhD

Centre for Behaviour Change, University College London, London, UK,

Watt Kerrienne, PhD

James Cook University, Townsville, Queensland, Australia

Palazzi Kerrin, MPH

Hunter Medical Research Institute, Newcastle, New South Wales, Australia

Oldmeadow Christopher, PhD

Hunter Medical Research Institute, Newcastle, New South Wales, Australia, and
School of Medicine and Public Health, The University of Newcastle, Callaghan, New South Wales, Australia

Gould Gillian S, PhD, MA, MBChB

School of Medicine and Public Health, The University of Newcastle, Callaghan, New South Wales, Australia

ABSTRACT

The use of nicotine replacement therapy in pregnancy has been debated but evidence suggests that it is safer than smoking.

A cross-sectional survey was conducted with: 1) General Practitioners and Obstetricians from a college database; 2) General Practitioners with a special interest in Indigenous health.

General Practitioners had higher odds of prescribing compared to Obstetricians. Reading guidelines, confidence, viewing nicotine replacement therapy as safe, effective, and with good adherence, also significantly increased the odds of prescription. Clear guidance regarding safety and efficacy, with practical clinical protocols, are required in order to reduce variation in prescribing rates across these clinicians.

INTRODUCTION

Smoking in pregnancy is an important risk factor for adverse pregnancy and foetal outcomes¹. The use of Nicotine Replacement Therapy (NRT) during pregnancy has been debated due to the potential harmful effects of nicotine on foetal development²⁻⁴. However, NRT provides a slower and lower absorption rate of nicotine, compared to smoking⁵. Due to the higher metabolism of nicotine in pregnancy⁶, pregnant women who smoke might need a higher NRT dose, than non-pregnant women^{1,2,6}.

In the 2015 Cochrane review, NRT use during pregnancy increased cessation by 40% (RR 1.41, 95% CI 1.03-1.93), and was not associated with any harmful effects¹. In UK stop smoking services⁷, combination NRT (oral NRT combined with a nicotine patch) was more effective than receiving just one form of NRT (OR = 1.06, 95% CI 0.60–1.86) during pregnancy.

The Royal Australian College of General Practitioners (RACGP)⁸ guidelines recommend that pregnant women who are motivated to quit, and have been unsuccessful without medication, should be offered NRT after discussing the relative risks and benefits. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) Statement⁹ does not routinely recommend using NRT in pregnancy, yet acknowledges that NRT might be used with pregnant women who are highly dependent, and unable to quit.

International studies have found that NRT prescribing rates during pregnancy were relatively low, ranging from 7-55%¹⁰⁻¹³. Safety concerns and lack of training were mentioned as common barriers¹¹⁻¹³.

Using NRT during pregnancy is recommended to be under the supervision of a health professional⁸. None the less, NRT can be bought over the counter, and therefore for the purpose of this study, NRT prescription refers to either a prescription and/or a recommendation for NRT use.

This study aimed to examine: 1) self-reported NRT prescription rates during pregnancy 2) the association between clinician-related factors including attitudes, confidence and guidelines awareness, and NRT prescription rate, in Australian General Practitioners (GPs) and Obstetricians,

MATERIAL AND METHODS

Design: A national self-administered cross-sectional survey (July to November 2015).

Sample: Eligible participants were Australian Obstetricians or GPs with or without obstetric training, who confirm pregnancy or consult with pregnant women.

Procedures: Two sampling methods were used: 1) a paper survey sent as an insert in The RANZCOG “O&G” magazine distributed to 5571 Obstetricians and GPs with obstetric training, and 2) an online survey emailed to a random sample of 500 members of the RACGP National Faculty of Aboriginal and Torres Strait Islander Health (members are either working or have a special interest in Aboriginal and Torres Strait Islander health, and/or identify as Aboriginal and Torres Strait Islander). The first sample did not receive a reminder. The second sample received one reminder after two weeks. An Information Statement was provided with survey completion assumed consent. An incentive of a draw of one of two mini-tablet devices was offered. The University of Newcastle Human Research Ethics Committee approved the study (#H-2015-0067, 18/03/2015).

Survey: Included questions about participant's characteristics, self-reported provision of smoking cessation care, including NRT prescription; factors associated with prescribing NRT in pregnancy; and a self-assessment of barriers and enablers to providing smoking cessation care. The full survey description can be found elsewhere¹⁴. Results presented here include self-reported prescription of NRT and factors related to prescribing NRT in pregnancy.

Participant characteristics: included gender, years since medical qualification, smoking status, population their medical practice mostly caters for (general or Aboriginal and Torres Strait Islander), and work location postcode (for rural, remote and urban classification)¹⁵.

Frequency of prescribing NRT: A 5-point Likert scale was used - Never (0%); Occasional (1-25%); Sometimes (26-50%); Often (51-75%); Always (76-100%). Another set of questions, with the same Likert Scale, asked specifically the prescription rates of a) oral forms, b) patches and c) combination NRT.

Clinician factors associated with prescribing NRT: Clinicians were asked to rate the following factors - perceived safety, effectiveness and women's adherence of NRT. Self-reported confidence (to prescribe) was measured using a 5-point Likert Scale (strongly disagree to strongly agree). An additional question assessed reading the RACGP guidelines Yes/No.

Analysis: was performed with SPSS v24. A descriptive analysis used counts and percentages. Univariate analysis was performed using Pearson's Chi-square test for categorical measures (with post-hoc comparisons using Bonferroni correction), and Kruskal-Wallis for ordinal measures, to examine the association between all clinician factors (physician group – RACGP GPs, RANZCOG GPs, Obstetricians; perceived NRT safety, effectiveness, and adherence; confidence; and reading the RACGP guidelines) and NRT prescription frequency.

Separate ordinal regressions were performed to examine the associations between each clinician factor listed above on NRT prescription frequency, adjusted for gender and years from medical qualification to account for possible confounding.

RESULTS

Sample characteristics: 378 clinicians completed the survey (42 RACGP GPs, 157 RANZCOG GPs and 178 Obstetricians, 1 missing the answer regarding specialty; response rate 6.2%), from all Australian states and territories. Most GPs (81.4% (n=162) had obstetric training, 97.5% (n=153) of RANZCOG GPs, and 21.4% (n=9) of RACGP GPs. A full description can be found elsewhere¹⁴.

Prescription of NRT and clinician factors associated with prescribing NRT

‘Never’ prescribing NRT was reported by 25.1% (n=93), more so by Obstetricians (38.9%, n= 68) compared to RACGP GPs (12.2%, n=5, $p<0.001$), and RANZCOG GPs (13%, n=20, $p<0.001$). Nearly half (49.9%, n=181) reported ‘never’ prescribing combination NRT, fewer RACGP GPs (30%, n=12), compared to Obstetricians (58.1%, n=100, $p<0.001$) and RANZCOG GPs (45.7%, n=69, $p=0.004$).

Clinician factors associated with NRT prescribing are presented in Table 1.

Associations between clinician factors and prescription of NRT:

Table 2 details the crude and adjusted Odds Ratio (OR) for prescribing NRT using ordinal regression analyses. RACGP GPs (adjusted OR 4.1, 95% CI 2.2-7.7, $p<0.001$) and RANZCOG GPs (adjusted OR 3.45, 95% CI 2.3-5.1, $p<0.001$) had higher odds of NRT prescription, compared to Obstetricians. Reading the RACGP guidelines, confidence to

prescribe NRT, viewing NRT as safe, effective, and with good adherence, were also significantly associated with higher odds of NRT prescription.

DISCUSSION

Main findings: 25% of participants reported ‘never’ prescribing NRT during pregnancy. Nearly half (49.9%) reported they ‘never’ prescribe combination NRT. Being an Obstetrician, low confidence, and uncertainty over NRT safety, effectiveness and adherence, were all independently associated with lower odds of prescribing NRT.

Comparison with the literature: These findings are consistent with previous international studies showing low levels of NRT prescription and low levels of confidence, associated particularly with safety concerns^{11,13,16-19}. The low frequency of NRT prescription could partly be explained by the lack of a strong evidence base on the effectiveness and safety of NRT in pregnancy.

Women may hold negative views regarding NRT use during pregnancy²⁰. Clinician’s low confidence might be partially attributable to their perceived ability to potentially address negative patient views.

Reading the RACGP guidelines was associated with higher odds of prescribing. As these guidelines are more “favourable” for NRT use in pregnancy, this highlights the need for clear practical up-to-date guidelines that can direct clinicians’ decisions.

Implication for policy and practice:

Further research is needed to strengthen the evidence base regarding NRT safety and effectiveness in pregnancy, specifically in regard to using higher doses and combination NRT¹. Specific training on the management of smoking during pregnancy is essential, in particular on ‘when’ and ‘how’ to use NRT, ‘how’ to consult on the risks versus benefit of

using NRT during pregnancy, and ‘how’ to proactively address patient concerns about using NRT. Guidelines need to be updated regularly, and be more practical. . Pregnant women receive information from multiple health professionals as part of their prenatal care, and a consistent message is crucial for changing smoking behaviour.

A practical approach would be for clinicians to aid women to weigh up their relative risk versus benefit from using NRT in pregnancy. NRT provides lower levels of nicotine compared to smoking, and experts and guidelines agree that NRT is comparatively safer. This may assist in all pregnant women who smoke being offered an informed option about NRT treatment in a timely manner.

Limitations and Strengths: Strengths of this study include national sampling, different geographical settings, and a subsample that are involved in Aboriginal and Torres Strait Islander Health. A limitation of the research was the low response rate, indicating that this sample may not represent all Australian GPs and Obstetricians, and may reflect those more interested in tobacco related topics, suggesting that if anything, the results may over-estimate practices, and NRT prescribing rates may be lower. Another limitation is that the RANZCOG statement was not included as an option in the reading guidelines question, so we could not assess whether familiarity with this guideline impacted practice. The data presented here was part of a larger survey and only a few NRT specific questions were included. Further research should include a larger more representative sample, and a more in depth understanding of clinician’s attitudes, and what they need in order to change their NRT prescription rates.

Conclusions: NRT prescription rates during pregnancy are low: more so among Obstetricians than GPs. Concerns over safety and low confidence are associated with lower odds of prescribing NRT. Training and practical detailed protocols may help change clinicians’ views on the ‘harm versus benefit’ of NRT.

References:

1. Coleman T, Chamberlain C, Davey MA, Cooper SE, Leonardi-Bee J. Pharmacological interventions for promoting smoking cessation during pregnancy. *Cochrane Database Syst Rev*. 2015(12):CD010078.
2. Benowitz N, Dempsey D. Pharmacotherapy for smoking cessation during pregnancy. *Nicotine Tob Res*. 2004;6 Suppl 2:S189-202.
3. Siu AL. Behavioral and Pharmacotherapy Interventions for Tobacco Smoking Cessation in Adults, Including Pregnant Women: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med*. 2015;163(8):622-634.
4. De Long NE, Barra NG, Hardy DB, Holloway AC. Is it safe to use smoking cessation therapeutics during pregnancy? *Expert Opin Drug Saf*. 2014;13(12):1721-1731.
5. Stead LF, Perera R, Bullen C, et al. Nicotine replacement therapy for smoking cessation. *Cochrane Database Syst Rev*. 2012;11:CD000146.
6. Dempsey D, Jacob P, 3rd, Benowitz NL. Accelerated metabolism of nicotine and cotinine in pregnant smokers. *J Pharmacol Exp Ther*. 2002;301(2):594-598.
7. Brose LS, McEwen A, West R. Association between nicotine replacement therapy use in pregnancy and smoking cessation. *Drug and alcohol dependence*. 2013;132(3):660-664.
8. Zwar N, Richmond R, Borland R, et al. *Supporting smoking cessation: a guide for health professionals* Melbourne 2011 [Updated July 2014].
9. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. *Women and Smoking*. 2014.
10. Okoli CT, Greaves L, Bottorff JL, Marcellus LM. Health care providers' engagement in smoking cessation with pregnant smokers. *J Obstet Gynecol Neonatal Nurs*. 2010;39(1):64-77.
11. Herbert R, Coleman T, Britton J. U.K. general practitioners' beliefs, attitudes, and reported prescribing of nicotine replacement therapy in pregnancy. *Nicotine Tob Res*. 2005;7(4):541-546.
12. Oncken CA, Pbert L, Ockene JK, Zapka J, Stoddard A. Nicotine replacement prescription practices of obstetric and pediatric clinicians. *Obstet Gynecol*. 2000;96(2):261-265.
13. Price JH, Jordan TR, Dake JA. Obstetricians and gynecologists' perceptions and use of nicotine replacement therapy. *J Community Health*. 2006;31(3):160-175.
14. Bar-Zeev Y, Bonevski B, Twyman L, et al. Opportunities Missed: A Cross-Sectional Survey of the Provision of Smoking Cessation Care to Pregnant Women by Australian General Practitioners and Obstetricians. *Nicotine & Tobacco Research*. 2017;19(5):636-641.
15. Australian Government Department of Health. Australian Standard Geographical Classification – Remoteness Areas (ASGC-RA 2006) 2006; <http://www.doctorconnect.gov.au/internet/otd/publishing.nsf/content/ra-intro>.
16. Jordan TR, Dake JR, Price JH. Best practices for smoking cessation in pregnancy: do obstetrician/gynecologists use them in practice? *J Womens Health (Larchmt)*. 2006;15(4):400-441.
17. Pullon S, Webster M, McLeod D, Benn C, Morgan S. Smoking cessation and nicotine replacement therapy in current primary maternity care. *Aust Fam Physician*. 2004;33(1-2):94-96.
18. Glover M, Paynter J, Bullen C, Kristensen K. Supporting pregnant women to quit smoking: postal survey of New Zealand general practitioners and midwives' smoking cessation knowledge and practices. *N Z Med J*. 2008;121(1270):53-65.
19. Mejia R, Martinez VG, Gregorich SE, Perez-Stable EJ. Physician counseling of pregnant women about active and secondhand smoking in Argentina. *Acta Obstet Gynecol Scand*. 2010;89(4):490-495.

20. Bowker K, Campbell KA, Coleman T, Lewis S, Naughton F, Cooper S. Understanding Pregnant Smokers' Adherence to Nicotine Replacement Therapy During a Quit Attempt: A Qualitative Study. *Nicotine Tob Res.* 2016;18(5):906-912.

Table 1: Clinician factors association with NRT prescription to pregnant smokers according to physician group, n (%)

Variable	Total sample (n=378)	Online sample GP's from RACGP NATIFH (n=42)	Paper survey GP's from RANZCOG (n=157)	Paper survey OBS from RANZCOG (n=178)	Chi-Square/ Kruskal-Wallis test
NRT Safety (n=370, missing n=8)					
<i>Very safe and Safer than smoking</i>	165 (44.6%)	14 (34.1%)	75 (48.1%)	76 (43.9%)	$\chi^2=2.6$, p=0.27
<i>Safer than smoking but some concerns and Not safe</i>	205 (55.4%)	27 (65.9%)	81 (51.9%)	97 (56.1%)	
NRT Effectiveness (n=372, missing n=6)					
<i>Very effective and Moderately effective</i>	247 (66.4%)	29 (70.7%)	113 (72.4%)	105 (60%)	$\chi^2=6.1$, p=0.047
<i>Low effectiveness and Not effective</i>	125 (33.6%)	12 (29.3%)	43 (27.6%)	70 (40%)	
NRT Adherence (n=346, missing n=36)					
<i>Most adhere to NRT well</i>	29 (8.4)	2 (6.9)	20 (13.1)	7 (4.3)	$\chi^2=12.8$, p=0.012
<i>Equal numbers adhere well and poorly</i>	179 (51.7)	12 (41.4)	84 (54.9)	83 (50.6)	
<i>Most adhere to NRT poorly</i>	138 (39.9)	15 (51.7)	49 (32)	74 (45.1)	
"I am confident that I can prescribe NRT for pregnant smokers" (n=370, missing n=8)					
<i>Strongly agree</i>	38 (10.3%)	5 (12.8%)	22 (14.2%)	11 (6.3%)	$\chi^2=29.4$, p<0.001
<i>Agree</i>	163 (44.1%)	22 (56.4%)	78 (50.3%)	63 (35.8%)	
<i>Neutral</i>	91 (24.6%)	10 (25.6%)	36 (23.2%)	45 (25.6%)	
<i>Disagree</i>	61 (16.5%)	2 (5.1%)	17 (11%)	42 (23.9%)	
<i>Strongly disagree</i>	17 (4.6%)	0 (0%)	2 (1.3%)	15 (8.5%)	
Reading the RACGP guideline (n=359, missing n=19)					
<i>Yes</i>	150 (41.8%)	27 (64.3%)	90 (59.6%)	33 (19.9%)	$\chi^2=61.1$, p<0.001
<i>No</i>	209 (58.2%)	15 (35.7%)	61 (40.4%)	133 (63.6%)	

Table 2: Crude and Adjusted* Odds Ratio for NRT prescription frequency from ordinal regression analyses

Variable	NRT Prescribing Frequency			
	Crude		Adjusted*	
	Odds Ratio (95% CI)	P-value	Odds Ratio (95% CI)	P-value
Physician Group (n=370)				
RANZCOG OBS	Ref.		Ref.	
RANZCOG GPs	3.16 (2.12, 4.72)	<0.001	3.45 (2.3, 5.18)	<0.001
RACGP GPs	4.1 (2.2, 7.61)	<0.001	4.16 (2.23, 7.76)	<0.001
NRT safety (n=365)				
Concerns over safety	Ref.		Ref.	
Safer than smoking	3.26 (2.22, 4.78)	<0.001	3.24 (2.21, 4.77)	<0.001
NRT effectiveness (n=367)				
Not effective	Ref.		Ref.	
Effective	2.55 (1.71, 3.78)	<0.001	2.73 (1.82, 4.1)	<0.001
NRT adherence (n=342)				
Most adhere poorly	Ref.		Ref.	
Equal adhere well and poorly	1.86 (1.25, 2.79)	0.002	1.81 (1.21, 2.71)	0.004
Most adhere well	2.19 (1.07, 4.48)	0.032	2.19 (1.06, 4.51)	0.034
"I am confident that I can prescribe NRT for pregnant smokers" (n=366)				
Strongly disagree to neutral	Ref.		Ref.	
Strongly agree & agree	8.2 (5.39, 12.5)	<0.001	8.6 (5.64, 13.19)	<0.001
Reading the RACGP guidelines (n=354)				
No	Ref.		Ref.	
Yes	2.43 (1.27, 3.56)	<0.001	2.4 (1.65, 3.6)	<0.001

*Adjusted for gender and years from medical qualification