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General practice registrars' experiences of antenatal care: A cross-sectional analysis

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Background: General practitioners play an important role in diagnosis and ongoing management of pregnancies. Some GP registrars entering GP training may have had no post-graduate experience in obstetrics and gynaecology. GP registrars' involvement in antenatal care is under-researched.

Aims: This study aimed to determine the prevalence and associations of Australian GP registrars' clinical consultations involving antenatal care.

Materials and Methods: A cross-sectional analysis from the Registrar Clinical Encounters in Training (ReCEnT) cohort study. GP registrars record details of 60 consecutive consultations during each of three six-month training terms. Associations of managing pregnancy-related problems (compared to all other problems) were analysed using univariate and multivariable logistic regression. Independent variables included registrar, practice, patient, consultation and educational factors.

Results: Antenatal care comprised 3277 (1.1%) of registrar problems/diagnoses. Consultations involving pregnancy-related problems were significantly associated with registrars being female, in term three, younger, and having post-graduate qualifications in obstetrics/gynaecology. Patients were significantly more likely to be from a non-English speaking background. Pregnancy-related problems/diagnoses were more likely to be seen in lower socioeconomic areas. Consultation factors significantly associated with a pregnancy-related problem/diagnosis included ordering imaging, ordering pathology, arranging referrals, and a longer duration of consultation. Registrars were less likely to prescribe medication or generate learning goals.

Conclusions: GP registrars see fewer antenatal problems compared to established GPs. Male registrars, especially, have significantly less exposure to antenatal care, suggesting potential limitation of opportunity to gain skills and experience in antenatal care.

KEYWORDS

cohort studies, general practice, inservice training, pregnancy, prenatal care

BACKGROUND

Antenatal care is medical care provided to pregnant women to optimise the health of both mother and baby in the course of a pregnancy.[1] Women with multiple health risk factors are at increased risk of adverse birth outcomes, and appropriate antenatal care aims to identify and manage these risks, thereby reducing mortality and morbidity for pregnant women and babies. Antenatal care visits also offer an opportunity to engage the patient in preventative care, screening for serious disease and health promotion.[1,2] Lifestyle interventions are more likely to succeed during pregnancy, particularly reducing smoking, alcohol and caffeine exposure, making the antenatal care period an ideal time to implement behaviour change.[3]

General practitioners (GPs) play an essential part in management of pregnancy, with close to 90% of Australian women visiting their GP to confirm their pregnancy.[4,5] However, the role of the GP extends beyond this first visit. Shared care, a model in which women visit both their GP and the hospital antenatal clinics for antenatal care, is utilised in 50% of pregnancies managed in the public healthcare system in Australia, and pregnancy-related encounters comprise 2.7% of GP-patient encounters.[6,7]

General practice registrars (trainees) also see women presenting for antenatal care and pregnancy-related problems. However, little research has addressed how often GP registrars see pregnant women, what happens clinically and educationally during these consultations, and what the associations are of these consultation demographics and content. In Australia, GP registrars operate in an apprenticeship-like model, working with considerable autonomy but under the general supervision of an experienced GP supervisor. Registrars on the pathway toward Fellowship with the Royal Australian College of General Practitioners (RACGP), which represents 90% of GPs in Australia, must complete terms in medicine, surgery and emergency medicine, and must fulfil a requirement for paediatric experience prior to commencing training.[8]

Obstetric experience is not a prerequisite for entry into general practice training in Australia, and as such registrars may enter training with no post–graduate experience in obstetrics and gynaecology.

In this study, we aim to establish the prevalence and associations of clinical consultations between GP registrars and patients with pregnancy-related presentations.

MATERIALS AND METHODS

This study was a cross-sectional analysis of the Registrar Clinical Encounters in Training (ReCEnT) study dataset. The ReCEnT methodology has been described in detail elsewhere.[9] Briefly, ReCEnT is an ongoing prospective multicentre cohort study of GP registrars training with one of five of Australia's 17 Regional Training Providers (RTPs) in five Australian states

(during 2010-2015), and (from 2016) with three of Australia's nine Regional Training Organisations (RTOs) in three states (in late-2015 there was a major restructure of Australian general practice training).The RTPs/RTOs encompass urban, rural, remote and very remote practices. GP registrars in Australia spend at least three six-month full-time-equivalent training terms in general practice as part of the 3–4 years vocational training program.

In ReCEnT, GP registrars document 60 consecutive clinical consultations during each of the three training terms in a paper-based form. This represents approximately one week of a registrar's office-based consultations. Only office-based consultations are recorded (not home or nursing home visits) and consultations in special-purpose 'clinics', for example, influenza or other vaccination clinics and Pap smear clinics, are excluded.

The in-consultation data encompass four broad areas: patient demographics, diagnoses/problems managed, investigations/management (including referral and follow-up), and educational training aspects (whether the registrar sought in-consultation advice or information from their supervisor or from other sources, or generated learning goals). Problems/diagnoses managed are coded according to the International Classification of Primary Care, second edition classification system (ICPC-2).[10]

Registrars also document, each term, the demographics of their current practice as well as personal demographics and educational background.

The ReCEnT data collection is part of registrar core training (for participating RTPs/RTOs) and summaries of individual registrar and normative group data are included in personalised feed-back reports which are designed to prompt reflection on practice and learning needs.[11] Registrars may also consent to this data being used for research purposes.

Outcome factor

The outcome factor in this analysis was a pregnancy-related diagnosis or problem seen by a registrar. 'Pregnancy-related diagnoses/problems' were defined by a set of ICPC-2 codes determined by consensus of GP clinician members of the research team (see Table S1 for included codes).

Independent variables

Registrar variables included age, gender, training term (1–3), full/part-time status, the RTP/RTO in which they were enrolled, country of primary medical degree (Australia or international), whether they had worked at the practice in previous terms, and previous obstetric or gynaecology qualifications (eg Diploma of Obstetrics). Practice variables included size of practice, billing status (whether the practice bulk-bills all patients with no direct cost to the patient), and urbanicity/rurality/remoteness and socioeconomic status of the practice location. The practice postcode was used to determine Australian Standard Geographical Classification

- Remoteness Area (ASGC-RA) classification and Socioeconomic Index for Area (SEIFA) Index of Disadvantage.[12,13]

Patient variables included age, gender, non-English-speaking background status (NESB), and Aboriginal or Torres Strait Islander status, and whether the patient was new to the registrar or practice.

Consultation variables included duration (in minutes), number of problems/diagnoses managed, if the problem/diagnosis was new, medications prescribed, investigations ordered, referrals made and follow-up plans organised.

Educational variables included sources of information or assistance accessed during the consult (from supervisors, specialists, electronic and paper resources) and whether the registrar generated learning goals (ie a gap in their skills or knowledge that they deemed not to need addressing within the consultation but which they determined they would pursue post-consultation).

Data analysis

This was a cross-sectional analysis of consultations from the longitudinal ReCEnT study. Included in the analysis were 14 rounds of data from 2010 to 2016.

We aimed to answer the questions:

(i) What is the frequency of registrars seeing patients for antenatal care?
(ii) What are the associations of a registrar seeing a patient for antenatal care?
(iii) How do these consultations differ from consultations not involving antenatal care?
(iv) How do outcomes from these consultations differ from consultations not involving antenatal care?

Analysis was at the level of the individual problem/diagnosis. The proportion of problems/diagnoses classified as pregnancy-related was calculated with 95% confidence intervals (CIs) adjusted for repeated measures within registrar.

To test associations of pregnancy-related problems/diagnoses with the documented explanatory variables, logistic regression was used within the generalised estimating equations (GEE) framework to account for repeated measures within registrars. An exchangeable working correlation structure was assumed.

Univariate analyses were conducted on each covariate against the outcome. Covariates with a P-value < 0.20 were considered for inclusion in the multiple regression model. Once the model with all significant covariates was fitted, model reduction was assessed. Covariates which were no longer significant (at $P < 0.20$) in the multivariable model were tested for removal from the model. If the covariate's removal did not substantively alter other coefficients in the model, the covariate was removed from the final model.

To examine our research questions, three models were built, each with 'pregnancy-related problem/diagnosis' as the dependent variable.

To examine the question of associations of a problem/diagnosis seen by the registrar being pregnancy-related, patient-, practice- and registrar-independent variables were entered into the regression model.

To examine the question of how consultations involving pregnancy-related problems/diagnoses differ from other consultations, the above variables were entered in a model along with the following additional variables: consultation duration, if the problem was new, the number of problems addressed during

TABLE 1 Demographics of participating registrars and their practices

Registrar characteristics (*N* = 1333)	*n* (%)*
Registrar gender	
Male	462 (34.7%)
Female	871 (65.3%)
Qualified as doctor in Australia	
Yes	1064 (80.5%)
No	258 (19.5%)
Post-graduate qualification (obstetrics/gynaecology)†	
Yes	82 (6.2%)
No	1251 (93.8%)
Registrar-round characteristics (*N* = 3202)	***n* (%)***
Registrar works full-time	
Yes	2418 (77.6%)
No	697 (22.4%)
Age (years)	
Mean ± SD	32.2 ± 6.3
Term	
Term 1	1233 (38.6%)
Term 2	1140 (35.7%)
Term 3	822 (25.7%)
Practice routinely bulk-bills	
Yes	561 (17.9%)
No	2,582 (82.1%)
No. GPs working at the practice	
1–4	1064 (34.2%)
5+	2045 (65.8%)
Rurality	
Major city	1833 (57.4%)
Inner regional	839 (26.3%)
Outer regional, remote or very remote	519 (16.3%)
SEIFA index	
Mean ± SD	5.6 ± 2.9

*Number may not add up to *N* because of missing data.
†Qualifications included: Diploma of Royal Australian and New Zealand College of Obstetrics and Gynaecology, Certificate of Women's Health, Masters of Reproductive Medicine, M.D Obstetrics and Gynaecology (qualification attained overseas).
GP, general practitioner; SEIFA, Socioeconomic Index for Area

TABLE 2 Characteristics associated with consultations involving antenatal care – univariate analysis

Variable	Class	Non-antenatal-related	Antenatal-related	P
Patient variables				
Patient age group	0–19	56 330 (20%)	203 (6%)	<0.001***
	20–29	38 887 (14%)	1534 (48%)	
	30–39	37 080 (13%)	1348 (42%)	
	40+	155 043 (54%)	126 (4%)	
ATSI	No	270 077 (98%)	3045 (98%)	0.054
	Yes	4292 (2%)	65 (2%)	
NESB	No	257 716 (93%)	2774 (89%)	<0.001***
	Yes	18 894 (7%)	348 (11%)	
Patient/practice status	Existing patient	123 797 (43%)	1867 (58%)	<0.001***
	New to registrar	141 778 (50%)	1107 (34%)	
	New to practice	19 264 (7%)	242 (8%)	
Registrar variables				
Registrar gender	Male	98 324 (34%)	719 (22%)	<0.001***
	Female	193 416 (66%)	2558 (78%)	
Registrar age	Mean (SD)	33 (6)	32 (6)	<0.001***
Registrar full- or part-time	Part-time	65 273 (23%)	804 (25%)	0.0481*
	Full-time	219 356 (77%)	2390 (75%)	
Term	Term 1	114 942 (39%)	1197 (37%)	0.005**
	Term 2	102 373 (35%)	1205 (37%)	
	Term 3	74 425 (26%)	875 (27%)	
Worked at practice previously	No	210 665 (73%)	2295 (71%)	0.022*
	Yes	77 016 (27%)	943 (29%)	
Qualified as doctor in Australia	No	54 238 (19%)	596 (18%)	0.87
	Yes	235 354 (81%)	2662 (82%)	
Post-grad qualifications (obstetrics/ gynaecology)	No	269 845 (93%)	2902 (89%)	<0.001***
	Yes	19 504 (7%)	341 (11%)	
Practice variables				
Practice size	Small	98 874 (35%)	1037 (33%)	0.10
	Large	185 147 (65%)	2139 (67%)	
Practice routinely bulk-bills	No	236 444 (82%)	2478 (77%)	<0.001***
	Yes	50 913 (18%)	747 (23%)	
Rurality	Major city	167 398 (57%)	1900 (58%)	0.30
	Inner regional	76 411 (26%)	834 (25%)	
	Outer regional, remote or very remote	47 646 (16%)	539 (16%)	
SEIFA index	Mean (SD)	6 (3)	5 (3)	<0.001***
Consultation factors				
Consultation duration	Mean (SD)	19 (10)	21 (10)	<0.001***
Number of problems	Mean (SD)	2.0 (1.0)	1.6 (0.7)	<0.001***
New problem seen	No	118 324 (44%)	1554 (51%)	<0.001***
	Yes	148 455 (56%)	1466 (49%)	
Sought help any source	No	245 993 (84%)	2618 (80%)	<0.001***
	Yes	45 747 (16%)	659 (20%)	
Imaging ordered	No	270 396 (93%)	2096 (64%)	<0.001***
	Yes	21 344 (7%)	1181 (36%)	

TABLE 2 (continued)

Variable	Class	Non-antenatal-related	Antenatal-related	P
Learning goals generated	No	231 448 (83%)	2493 (79%)	<0.001***
	Yes	47 253 (17%)	658 (21%)	
Follow-up ordered	No	163 682 (56%)	1164 (36%)	<0.001***
	Yes	128 058 (44%)	2113 (64%)	
Referral ordered	No	256 546 (88%)	2239 (68%)	<0.001***
	Yes	35 194 (12%)	1038 (32%)	
Pathology ordered	No	239 558 (82%)	1817 (55%)	<0.001***
	Yes	52 182 (18%)	1460 (45%)	
Medication prescribed	No	159 357 (55%)	2626 (80%)	<0.001***
	Yes	132 383 (45%)	651 (20%)	

*Significant values < 0.05.
**Significant values < 0.01.
***Significant values < 0.001.
ATSI, Aboriginal and Torres Strait Islander; NESB, non-English-speaking background; SEIFA, Socioeconomic Index for Area

the consultation and if any sources of information or advice were accessed.

To examine the question of how outcomes of consultations involving pregnancy-related problems/diagnoses differ from other consultations, all variables entered in the previous models were entered in a new model along with the following additional variables: if any imaging or pathology was ordered, if any medications were prescribed, if any referrals were made or follow-up organised for the diagnosis/problem, and whether the registrar generated any learning goals from the consultation.

The rationale for building three models was that a patient presenting with a pregnancy-related problem/diagnosis will plausibly be influenced by patient, registrar and practice factors, but evaluation of these influences may be compromised by inclusion in the multivariable model of factors operating once the consultation is progressing. Similarly, evaluation of the content of the consultation may be compromised by the inclusion in this model of outcomes arising from the consultation.

Analyses were performed using Stata 13.1 (StataCorp, College Station, TX, USA) and SAS V9.4. (SAS Institute Inc., Cary, NC, USA)

Ethics

The ReCEnT project has approval from the University of Newcastle Human Research Ethics Committee (reference: H-2009-0323).

RESULTS

A total of 1333 individual registrars contributed 3195 registrar-rounds of data, with a response rate of 95.8%. Of these registrars, 65.3% were female, their mean age was 32 years (SD 6.3), and 80.5% obtained their primary medical degree in Australia. See Table 1 for registrar and practice demographics. A total of 295 017 problems/diagnoses were recorded from 204 104 consultations.

Antenatal care comprised 3277 (1.1%; 95% CI 1.07–1.15) of problems/diagnoses. The characteristics associated with consultations involving pregnancy-related problems/diagnoses are presented in Table 2. The multivariable models with outcome 'pregnancy-related problem/diagnosis' are presented in Table 3.

On multivariable analysis, consultations involving pregnancy-related problems were statistically significantly associated with registrars being female, younger, in term three rather than term one, and having post-graduate qualifications relating to obstetrics/gynaecology. Patients attending for antenatal care were significantly more likely to be from a NESB, known to the practice, and known to the registrar. Pregnancy-related problems/diagnoses were more likely to be seen in a lower SEIFA region. Consultation factors significantly associated with a pregnancy-related problem/diagnosis included ordering imaging, ordering pathology, arranging referrals, organising follow-up, and a longer duration of consultation. Registrars were less likely to prescribe medication or generate learning goals, and consultations involved fewer other problems.

DISCUSSION

This is the first study to examine GP registrar exposure to antenatal care. Antenatal care comprised 1.1% of problems seen by registrars. By contrast, in a study of established GPs, antenatal care represented 2.7% of the workload for GPs.[7] Thus, GP registrars appear to see less than half as many

TABLE 3 Factors associated with pregnancy-related problem/diagnosis – multivariable analysis

Variable	Class	Univariate		Adjusted	
		OR (95% CI)	P	OR (95% CI)	P
Patient, registrar and practice variables					
Patient age group. Referent: 0–19	20–29	10.7 (9.01, 12.8)	<0.001***	10.0 (8.31, 12.1)	<0.001***
	30–39	9.91 (8.28, 11.9)	<0.001***	9.02 (7.43, 10.9)	<0.001***
	40+	0.23 (0.18, 0.29)	<0.001***	0.19 (0.15, 0.25)	<0.001***
NESB	Yes	1.70 (1.49, 1.95)	<0.001***	1.49 (1.28, 1.72)	<0.001***
Patient/practice status. Referent: Existing patient	New to practice	0.82 (0.71, 0.94)	0.006**	0.56 (0.48, 0.65)	<0.001***
	New to registrar	0.52 (0.48, 0.57)	<0.001***	0.50 (0.46, 0.54)	<0.001***
Registrar gender	Female	1.83 (1.59, 2.11)	<0.001***	1.59 (1.35, 1.87)	<0.001***
Registrar age		0.98 (0.98, 0.99)	<0.001***	0.99 (0.98, 1.00)	0.045*
Term. Referent: Term 1	Term 2	1.14 (1.04, 1.25)	0.004**	1.11 (0.99, 1.25)	0.069
	Term 3	1.16 (1.04, 1.28)	0.006**	1.14 (1.01, 1.29)	0.032*
Registrar full- or part-time	Part-time	1.12 (1.00, 1.24)	0.048*	0.94 (0.85, 1.05)	0.26
Worked at practice previously	Yes	1.12 (1.02, 1.23)	0.022*	0.99 (0.88, 1.12)	0.89
Post-grad qualification (obstetrics/gynaecology)	Yes	1.68 (1.30, 2.16)	<0.001***	1.49 (1.12, 1.99)	0.007**
Practice size	Small	0.91 (0.82, 1.02)	0.10	0.93 (0.83, 1.04)	0.22
Practice routinely bulk-bills	Yes	1.43 (1.28, 1.60)	<0.001***	1.11 (0.97, 1.26)	0.12
SEIFA index		0.96 (0.95, 0.98)	<0.001***	0.96 (0.95, 0.98)	<0.001***
In-consultation variables					
Consultation duration		1.02 (1.02, 1.02)	<0.001***	1.03 (1.03, 1.04)	<0.001***
Number of problems		0.54 (0.51, 0.57)	<0.001***	0.47 (0.44, 0.50)	<0.001***
New problem seen	Yes	0.75 (0.69, 0.81)	<0.001***	0.55 (0.50, 0.60)	<0.001***
Sought help any source	Yes	1.37 (1.24, 1.51)	<0.001***	0.91 (0.79, 1.03)	0.15
Consultation outcome variables					
Imaging ordered	Yes	7.12 (6.56, 7.73)	<0.001***	5.35 (4.81, 5.95)	<0.001***
Learning goals generated	Yes	1.31 (1.19, 1.45)	<0.001***	0.69 (0.60, 0.78)	<0.001***
Follow-up ordered	Yes	2.37 (2.18, 2.58)	<0.001***	1.28 (1.15, 1.42)	<0.001***
Referral ordered	Yes	3.36 (3.09, 3.65)	<0.001***	2.48 (2.22, 2.77)	<0.001***
Pathology ordered	Yes	3.63 (3.37, 3.92)	<0.001***	3.15 (2.85, 3.47)	<0.001***
Medication prescribed	Yes	0.30 (0.27, 0.33)	<0.001***	0.40 (0.35, 0.45)	<0.001***

*Significant values < 0.05.
**Significant values < 0.01.
***Significant values < 0.001.
NESB, non-English-speaking background; SEIFA, Socioeconomic Index for Area

pregnancy-related problems/diagnoses as do GPs who have completed training. However, the ICPC-2 codes chosen for inclusion in our analysis (see Table S1) were more extensive than those in the study of established GPs, so the difference in frequency of seeing pregnancy-related problems/diagnoses is likely to be even more marked.[7] This is significant given that exposure and experience gained during training will shape future practice patterns.[14]

Post-graduate qualifications in obstetrics and gynaecology were associated with registrars seeing more antenatal care. Completion of extra training indicates the registrar has a special interest in the field, and the association suggests that consultation scheduling processes facilitate patient allocation to accommodate this expertise or interest.

Female registrars are significantly more likely to see patients presenting with pregnancy-related problems/diagnoses. This suggests male registrars may have less opportunity to gain skills and experience in antenatal care. It has been established that female patients have a preference to see female GPs for intimate physical examination.[15] This preference may extend to more broadly encompass women's health and antenatal care. Previous research within the ReCEnT database has described a high prevalence of doctor-patient gender concordance in registrar consultations.[16] Thus male registrars' relatively limited opportunities for

experience in antenatal care may represent just one aspect of limited exposure to female health care generally.

In-consultation factors associated with antenatal care include registrars ordering more pathology, imaging, referrals and follow-up. This is consistent with national antenatal guidelines, which advise a schedule of tests and appointments throughout the course of the pregnancy.[17]

Rurality of practice was not a significant association for antenatal care on multivariable analysis. There was an association of antenatal care with lower SEIFA index as well as with universally bulk-billing practices. This may reflect higher rates of shared care with public hospital antenatal clinics in areas with lower access to private obstetric care. Consequently, registrars working in areas of higher socioeconomic status and in mixed/privately billing practices are less likely to see patients for antenatal care and this may possibly contribute to compromised training experience in antenatal care.

STRENGTHS/LIMITATIONS

The number of registrars and recorded consultations, and the high response rate (95.8%) are a strength of this study, along with a sample representative of Australian GP registrars. The study registrar population included participants from urban, regional and rural training locations, and the findings can likely be generalised to registrars across the country. However, the findings may not be as confidently generalisable to other countries and healthcare systems where different processes are in place for both GP registrar training and antenatal care. Another limitation of this study is that, as a cross-sectional analysis, it can establish associations but not causality in relationships of other variables and antenatal care. Our patient data were confined to the index consultation and did not include information about gestation and past obstetric and medical history (ReCEnT is a cohort study of registrar participants, not of patients). This limits our ability to fully assess appropriateness of prescribing, referring and investigation in the setting of pregnancy.

IMPLICATIONS FOR PRACTICE AND FUTURE RESEARCH

This study establishes a relatively low frequency of antenatal care by GP registrars. It has also identified multiple factors associated with exposure to antenatal care for GP registrars. Importantly, male GP registrars are seeing fewer antenatal patients than their female colleagues. This research may serve as a guide in identifying registrars at risk of decreased exposure to antenatal care and may inform development of educational interventions.

The research suggests a more proactive approach facilitating access to management of antenatal care of all levels of complexity for registrars, especially male registrars, is needed. Registrars are not required to have any experience in obstetrics or gynaecology prior to entering GP training, and no formal qualification is needed.[18] Given the importance of accessible antenatal care in the community, it is justifiable that some prior exposure or formal training in obstetrics is added to the training prerequisites. This could be framed as appropriate hospital experience in obstetrics or, given limited hospital rotations in obstetrics, alternative education via, for example, programs providing experience as supernumeraries in obstetrics clinics, or completion of antenatal shared care courses.

Further areas for research include better understanding registrars' antenatal care experiences, the impact of registrar gender on the antenatal consultation, and the influence of supervisors in education and training surrounding antenatal care.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table S1. List of ICPC2 codes included.