Acne in primary care

A cross-sectional analysis

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Background and objective

Acne is a common chronic condition. The aim of this study was to establish the frequency and associations of consultations for acne by early-career general practitioners (general practice registrars).

Methods

The study was a cross-sectional analysis of data from the Registrar Clinical Encounters in Training study.

Results

During 2010–18, 2234 registrars contributed data for 289,594 consultations and 453,344 problems/diagnoses. Acne comprised 0.38% (95% confidence interval [CI]: 0.36, 0.40) of all problems/diagnoses. Nine per cent of patients were new to the practice (odds ratio [OR] 1.82; 95% CI: 1.62, 2.05) and 61% were existing patients of the practice but new to the registrar (OR 1.78; 95% CI: 1.46, 2.18). There was a lower frequency of acne presentations by Aboriginal and Torres Strait Islander patients (OR 0.29; 95% CI: 0.14, 0.58) and by patients in regional/remote/very remote areas (OR 0.75; 95% CI: 0.58, 0.95).

Discussion

The majority of the patients had an existing diagnosis of acne. That Aboriginal and Torres Strait Islander patients and patients in rural/remote areas present less frequently with acne requires further study.

ACNE IS A COMMON CONDITION that is associated with significant physical and psychological morbidity. It is so common it can be considered almost universal in teenagers, with a prevalence of 93.3% in people aged 16–18 years in Australia.[1] Other international studies have shown a prevalence of 85% in people aged 12–24 years, and of 64% and 43% in those aged 20–29 years and 30–39 years, respectively.[2] Acne can be considered a chronic disease.[3,4]

Acne can entail significant psychological morbidity[5] and can affect quality of life,[6] with multiple studies showing that patients with more severe acne and acne of a longer duration are more likely to have low self-esteem, lower quality of life and mental health issues.[7,8]

Acne carries a high cost to both the patient and the community. This includes cost of prolonged treatment courses, lower rates of employment in patients with acne, poor school and work performance, and time in consultations.[2,9,10]

General practitioners (GPs) play a central part in the management of acne. In Australia, acne is seen by GPs at a frequency of 0.4 of every 100 consultations.[11] However, patients with acne will often seek treatment and advice for their acne from non-medical sources including family, friends and magazines.[12] Even when seen by a doctor for treatment, they may not adhere to their medication or attend follow-up appointments.[13,14]

In Australia, general practice registrars comprise approximately 12% of the general practice workforce by headcount[15,16] and see a younger patient population than longer-established

GPs.[17,18] These early-career GPs therefore contribute significantly to the medical management of acne within the community. Examining consultations between registrars and patients with acne will provide insight into how Australian patients with acne present and are managed, and have implications for education and training of GPs.

This study aimed to establish the frequency and associations of consultations for acne by registrars in Australian general practice.

Methods

This was an exploratory cross-sectional analysis of data from the Registrar Clinical Encounters in Training (ReCEnT) study. ReCEnT is an ongoing, multicentre prospective cohort study of registrars in general practice. From 2010–15, five of the then 17 regional training providers (RTP) in Australia participated. In 2016, nine regional training organisations (RTO) replaced the 17 RTPs. From 2016–18, three of these nine RTOs participated.

The ReCEnT study protocol is described in detail elsewhere.[19] Briefly, registrars complete paper-based case report forms recording details of 60 consecutive consultations in each of their six-month training terms (or per 12-month term for part-time registrars). Data collection is performed approximately mid-way through the training term. 'Specialist' clinic (eg immunisation, Pap smear) data are not included. Only office-based consultations (not home visits

or nursing home visits) are recorded. The ReCEnT project is an integral component of registrar training[20,21] with each participating registrar receiving an individualised feedback report for reflection on their clinical exposure and practice.[22] Registrars may also consent to have their data used for research purposes.

Outcome factor

The outcome factor in this study was a problem/diagnosis of acne. Problems/diagnoses are coded according to the International Primary Care Classification (ICPC-2), and acne was defined using the ICPC-2+ code S96. Inclusions in code S96 are summarised in Appendix 1.

Independent variables

Independent variables included in our analysis were classed as registrar, patient, practice, consultation and educational variables.

Statistical analysis

Analysis was performed on 17 rounds of data collected from 2010–18. Analysis was at the level of individual problem/diagnosis (rather than consultation). The percentage of registrars' problems/diagnoses that were acne and the percentage of consultations involving an acne problem were both calculated, with 95% confidence intervals, adjusted for repeated measures within registrars. To test associations of a problem/diagnosis being acne, simple and multiple logistic regression were used within the generalised estimating equations (GEE) framework to account for clustering of patients within registrars. Variables with a P value <0.20 in the univariate analysis were considered for inclusion in the multiple regression model. Covariates with P >0.20 in the resulting multivariable model were tested for removal. If the covariate's

removal did not substantively change the model, the covariate was removed from the final model. Statistical analyses were programmed using STATA 14.0 and SAS v9.4. P values <0.05 were considered statistically significant.

The ReCEnT study had ethics approval from the University of Newcastle Human Research Ethics Committee Reference H-2009-0323.

Results

A total of 2234 registrars (response rate 96.1%) contributed 4875 individual registrar-rounds of data including 289,594 consultations and 453,344 problems/diagnoses. Registrar and practice demographics are presented in Table 1. Of all problems/diagnoses, 1716 (0.38%; 95% CI: 0.36, 0.40) were acne. Of all consultations, 1715 (0.58%; 95% CI: 0.55, 0.61) included an acne problem/diagnosis.

Characteristics associated with a problem/diagnosis being acne are presented in Table 2.

Univariate and multivariable associations of seeing a patient with a diagnosis of acne are presented in Table 3.

Patients aged 15–34 years were the most common to present, and females presented more than males (odds ratio [OR] 1.27; 95% CI: 1.11, 1.44).

Acne as a problem/diagnosis was associated with the patient being new to the registrar (OR 1.82; 95% CI: 1.62, 2.05) and new to the practice (OR 1.78; 95% CI: 1.46, 2.18). However, acne was also associated with being an existing problem/diagnosis for the patient (ie not an initial diagnosis of acne, OR 0.29; 95% CI: 0.26, 0.32).

Acne problems/diagnoses were strongly associated with the patient not being an Aboriginal or Torres Strait Islander person (OR 0.29; 95% CI: 0.14, 0.58) and with being seen in a major city in comparison to an outer regional/remote/very remote practice (OR 0.75; 95% CI: 0.58, 0.95).

No registrar factors were significantly associated with the problem/diagnosis being acne.

Table 1. Registrar and practice characteristics

Variable	Class	n (%)
Registrar characteristics (n = 2234)		
Registrar gender	Female	1395 (62.4)
Qualified as doctor in Australia	Yes	1813 (81.6)
Registrar-round characteristics (n = 4875)		
Registrar works full time	Yes	3665 (77.6)
Age (years)*		32.4 ± 6.2
Term	Term 1	2108 (43.2)
	Term 2	1545 (31.7)
	Term 3	1222 (25.1)
Registrar worked at practice previously	Yes	1072 (22.3)
Practice routinely bulk bills	Yes	1214 (25.2)
Number of GPs working at the practice	1–4	1762 (37.4)
	5–10+	2950 (62.2)
Rurality	Major city	2958 (60.8)
	Inner regional	1232 (25.3)
	Outer regional remote	679 (14.0)
SEIFA decile of practice*		5.5 ± 2.8

Values presented as mean ± standard deviation
GP, general practitioner; SEIFA, Socio-Economic Indexes for Areas

There was a significant association with registrars seeking in-consultation information or advice (OR 2.04; 95% CI: 1.79, 2.32). There was also a significant association with the consultation duration being shorter than other consultations by approximately one minute (Table 2), with adjusted OR 0.99 (95% CI: 0.98, 0.99; Table 3). The registrar was also more likely to generate a learning goal (OR 1.44; 95% CI: 1.23, 1.68). There was a significant association with arranging follow-up (OR 1.16; 95% CI: 1.02, 1.31). Follow-up was organised in 46% of acne problem/diagnoses and was with the registrars themselves in 94.5% of instances.

Discussion

Frequency of acne in registrars' clinical experience

The diagnosis of acne comprised 0.38% of all problems/diagnoses seen by registrars, which is very similar to the 0.4% of all problems/diagnoses seen by GPs in the Bettering the Evaluation and Care of Health (BEACH) study.[11]

Acne as a chronic disease: Continuity of care

Nine per cent of the patients with acne were new to the practice and a further 61% were existing patients of the practice but new to the registrar (Table 2). The context is that 35% of patients had a new diagnosis of acne, with the majority having an existing

Table 2. Characteristics associated with a problem/diagnosis being acne

Factor group	Variable	Class	Diagnosis of acne		
			No	**Yes**	**P value**
Patient factors	Patient age group (years)	0–14	61,849 (14%)	200 (12%)	<0.001
		15–24	53,761 (12%)	986 (58%)	
		25–39	92,239 (21%)	397 (23%)	
		≥40	236,769 (53%)	111 (7%)	
	Patient gender	Male	167,666 (38%)	470 (28%)	<0.001
		Female	273,265 (62%)	1,199 (72%)	
	Aboriginal and/or Torres Strait Islander	No	415,202 (98%)	1,595 (99.3%)	0.002
		Yes	7,265 (2%)	11 (0.7%)	
	NESB	No	389,810 (92%)	1,466 (90%)	0.15
		Yes	35,690 (8%)	154 (10%)	
	Patient/practice status	Existing patient	186,248 (42%)	502 (30%)	<0.001
		New to registrar	222,974 (51%)	1,028 (61%)	
		New to practice	32,195 (7%)	153 (9%)	
Registrar factors	Registrar gender	Male	160,918 (36%)	544 (32%)	0.002
		Female	290,710 (64%)	1,172 (68%)	
	Registrar full time or part time	Part time	100,311 (23%)	421 (25%)	0.049
		Full time	337,857 (77%)	1,250 (75%)	
	Term	Term 1	198,570 (44%)	769 (45%)	0.77
		Term 2	141,113 (31%)	525 (31%)	
		Term 3	111,945 (25%)	422 (25%)	
	Worked at practice previously	No	344,914 (77%)	1,346 (80%)	0.065
		Yes	100,869 (23%)	347 (20%)	
	Qualified as doctor in Australia	No	76,584 (17%)	259 (15%)	0.057
		Yes	372,671 (83%)	1,450 (85%)	
	Registrar age (years)	Mean (SD)	32 (6)	32 (6)	0.31

Table 2. Characteristics associated with a problem/diagnosis being acne (cont'd)

Factor group	Variable	Class	Diagnosis of acne		
			No	Yes	*P* value
Practice factors	Practice size	Small	165,843 (38%)	564 (34%)	0.002
		Large	271,201 (62%)	1,099 (66%)	
	Practice routinely bulk bills	No	334,657 (75%)	1,226 (72%)	0.019
		Yes	112,100 (25%)	471 (28%)	
	Rurality	Major city	272,332 (60%)	1,157 (68%)	<0.001
		Inner regional	114,530 (25%)	404 (24%)	
		Outer regional/ remote/very remote	64,319 (14%)	152 (9%)	
	Regional training provider (RTP)	RTP 1	112,552 (25%)	388 (23%)	<0.001
		RTP 2	36,063 (8%)	110 (6%)	
		RTP 3	54,971 (12%)	175 (10%)	
		RTP 4	168,062 (37%)	733 (43%)	
		RTP 5	10,379 (2%)	33 (2%)	
		RTP 6	55,232 (12%)	222 (13%)	
		RTP 7	14,369 (3%)	55 (3%)	
	SEIFA decile	Mean (SD)	5 (3)	6 (3)	<0.001
Consultation factors	New problem seen	No	182,888 (44%)	991 (65%)	<0.001
		Yes	230,594 (56%)	539 (35%)	
	Sought help from any source	No	374,602 (83%)	1,218 (71%)	<0.001
		Yes	77,026 (17%)	498 (29%)	
	Consultation duration	Mean (SD)	19 (10)	18 (9)	<0.001
	Number of problems	Mean (SD)	2 (1)	2 (1)	0.88
	Learning goals generated	No	351,893 (82%)	1,187 (73%)	<0.001
		Yes	75,168 (18%)	450 (27%)	
	Follow-up ordered	No	253,783 (56%)	934 (54%)	0.14
		Yes	197,845 (44%)	782 (46%)	
	Referral ordered	No	395,775 (88%)	1,520 (89%)	0.27
		Yes	55,853 (12%)	196 (11%)	
	Pathology ordered	No	374,369 (83%)	1,663 (97%)	<0.001
		Yes	77,259 (17%)	53 (3%)	
	Medication prescribed	No	255,437 (57%)	360 (21%)	<0.001
		Yes	196,191 (43%)	1,356 (79%)	

NESB, non–English speaking background; SD, standard deviation; SEIFA, Socio-Economic Indexes for Areas

diagnosis (OR 0.29 when compared with other problems/diagnoses). This suggests patients with acne were more likely to have had their acne previously diagnosed and managed by another doctor, possibly at a different practice. Registrars in our study recorded organising follow-up for an acne problem/diagnosis in 46% of instances (more often than for other problems (OR 1.16; 95% CI: 1.02, 1.31) and almost always with themselves (Table 4). This suggests efforts by registrars to establish continuity of care.[23] This is important as a weak physician–patient relationship was identified as a hurdle to adherence to acne medication in a large literature review.[13]

Associations with Aboriginal and Torres Strait Islander status and location of practice

Another notable finding is the association of acne with non–Aboriginal and Torres Strait Islander status in our study. The prevalence of acne in this community is unknown, with very little previous research examining rates of dermatological

Table 3. Models: Associations with a diagnosis of acne – combined tables

Model	Factor group	Variable	Class	Univariate OR (95% CI)	Univariate P value	Adjusted OR (95% CI)	Adjusted P value
1	Patient factors	Patient age group (years) Referent: 15–34	0–14	0.18 (0.15, 0.21)	<0.0001	0.22 (0.19, 0.27)	<0.001
			35–64	0.23 (0.21, 0.27)	<0.0001	0.23 (0.20, 0.26)	<0.001
			≥65	0.03 (0.02, 0.03)	<0.0001	0.02 (0.02, 0.03)	<0.001
		Patient gender	Female	1.56 (1.40, 1.74)	<0.0001	1.27 (1.11, 1.44)	<0.001
		Aboriginal and Torres Strait Islander	Yes	0.41 (0.23, 0.72)	0.0021	0.29 (0.14, 0.58)	<0.001
		NESB	Yes	1.13 (0.95, 1.35)	0.1535	1.16 (0.95, 1.41)	0.15
		Patient/practice status	New to registrar	1.70 (1.52, 1.89)	<0.0001	1.82 (1.62, 2.05)	<0.001
		Referent: Existing patient	New to practice	1.75 (1.46, 2.10)	<0.0001	1.78 (1.46, 2.18)	<0.001
	Practice factors	Rurality Referent: Major city	Inner regional	0.83 (0.73, 0.93)	0.0022	0.96 (0.82, 1.12)	0.60
			Outer regional/ remote/very remote	0.56 (0.47, 0.67)	<0.0001	0.75 (0.58, 0.95)	0.018
		Regional training provider (RTP) Referent: RTP 1	RTP 2	0.88 (0.70, 1.10)	0.2573	0.91 (0.71, 1.17)	0.47
			RTP 3	0.92 (0.76, 1.12)	0.3946	0.85 (0.68, 1.06)	0.14
			RTP 4	1.26 (1.10, 1.44)	0.0007	1.03 (0.88, 1.20)	0.73
			RTP 5	0.93 (0.64, 1.35)	0.6989	0.94 (0.60, 1.47)	0.80
			RTP 6	1.17 (0.98, 1.38)	0.0822	0.95 (0.78, 1.16)	0.61
			RTP 7	1.11 (0.82, 1.50)	0.5071	0.91 (0.65, 1.26)	0.56
	Consultation factors	New problem seen	Yes	0.43 (0.39, 0.48)	<0.0001	0.29 (0.26, 0.32)	<0.001
2	Consultation factors	Sought help any source	Yes	2.00 (1.80, 2.23)	<0.0001	2.04 (1.79, 2.32)	<0.001
		Consultation duration		0.99 (0.99, 1.00)	0.0001	0.99 (0.98, 0.99)	<0.001
3	Consultation outcomes	Learning goals generated	Yes	1.79 (1.60, 2.00)	<0.0001	1.44 (1.23, 1.68)	<0.001
		Follow-up ordered	Yes	1.08 (0.98, 1.19)	0.1426	1.16 (1.02, 1.31)	0.02
		Pathology ordered	Yes	0.15 (0.12, 0.20)	<0.0001	0.18 (0.13, 0.25)	<0.001
		Medication prescribed	Yes	4.93 (4.35, 5.59)	<0.0001	4.30 (3.72, 4.97)	<0.001

CI, confidence interval; NESB, non–English speaking background; OR, odds ratio; SEIFA, Socio-Economic Indexes for Areas

conditions in Aboriginal and Torres Strait Islander populations.[24,25] Other studies comparing the rates of acne in different ethnic groups have been inconclusive with some showing higher prevalence in Caucasians and others showing higher prevalence in African-Americans, Hispanics and other ethnic groups. Regardless, acne is a common dermatological diagnosis in all ethnic groups and there is no difference in the approach to management in different ethnic groups.[2] The reason for the association in our study of an acne problem/diagnosis and the patient not being an Aboriginal or Torres Strait Islander patient is unclear. Possible explanations could be lower incidence of acne in Aboriginal and Torres Strait Islander communities or lower rates of these patients seeking medical care for acne.

There was also lower frequency of presentation for acne among patients from regional and remote communities. Again, the reason for this association is unknown. Possible explanations could be lower incidence of acne, or lower rates of seeking medical care for acne.

Strengths and limitations
To our knowledge, ReCEnT is the largest study of general practice trainees worldwide. The study includes registrars from a large portion of Australia and includes city, regional, remote and very remote communities. The generalisability to GP vocational training across Australia is strong, and the findings will have relevance to GP training in other countries with apprenticeship-like structures.

Ours is a cross-sectional analysis of patient consultations. Our methodology cannot establish causality in the associations we have found and cannot provide longitudinal information on, for example, continuity of care. We have inferred aspects of continuity of care with cross-sectional reporting of past patient behaviour and registrars' organisation (rather than occurrence) of follow-up. Our data are also limited by not including severity or pattern of acne and our outcome factor 'acne' being dependent on registrars' diagnoses.

As an exploratory study, there is a need for further studies confirming and expanding on our findings. Given, however, the lack of current evidence in this area, it would be reasonable to consider our findings when formulating educational approaches for GP vocational training and approaches to the interface of GP and specialist care of patients with acne.

Implications for practice and future research
The exposure of registrars to patients with acne is similar to the exposure of established GPs to acne. However, the high level of in-consultation information/assistance-seeking suggests that acne could receive more emphasis in registrar training.

The high proportion of patients with an existing diagnosis of acne who are seeing the registrar for the first time raises the issue of relationship continuity of care. However, we have evidence that registrars are attempting, to some extent, to promote continuity of care by their organisation of follow-up. Changes to structural responses in general practice – such as appointment scheduling, and patient education regarding the chronic nature of acne and the need for ongoing care – may also facilitate appropriate follow-up. Dermatologists also have a role in encouraging collaborative care of the patient between themselves and a single GP. The dermatologist may encourage the GP to address comorbidities, including the psychological aspects of care, any hormonal or contraception issues, and to monitor for the side effects and risks of therapies such as isotretinoin as well as the ongoing care of the acne itself. Further research is needed to assess continuity of care in acne longitudinally and also to explore patients' motivations for continuity of medical care, especially that delivered by GPs.

Our study also shows the low prevalence of Aboriginal and Torres Strait Islander patients and patients in regional and remote areas seeking help for acne. More research is needed to determine if this is due to a low incidence in acne in these communities or if there are barriers to seeking care for acne in these communities.

Conclusion
Acne is a very common condition that is seen by registrars at a rate similar to their established GP colleagues. It is a chronic disease but our study suggests what we would judge to be modest continuity of care in its management.

Little is known about the prevalence and management of acne in Aboriginal and Torres Strait Islander communities and in regional and remote areas of Australia. Our findings suggest that acne is managed by GPs less frequently in these populations when compared with other populations, and this is a topic requiring further investigation.

Implications for general practice
This study adds to the epidemiological data for acne in Australian general practice. It reveals the numbers of acne presentations to general practice registrars and the associations with these consultations.

This study also gives some provisional insight into continuity of care for acne; however, more research is needed to assess the true rates of follow up and management adherence for acne.

Table 4. Follow-up for acne (n = 794)

Follow-up	Frequency	%
1. General practitioner appointment with diagnosing registrar	751	94.6
2. General practitioner appointment with another doctor in the practice	39	4.91
3. Telephone	3	0.38
4. Practice nurse appointment	1	0.13

This study also highlights the need for further research in acne in Aboriginal and Torres Strait Islander communities as well as regional/remote/very remote communities.

Appendix 1: S96 acne inclusions

Description of acne type	ICPC-2 code	Term code
Acne	S96	7
Acne;conglobate (cystic)	S96	3
Acne;vulgaris	S96	2
Blackheads	S96	1
Comedo	S96	4
Pimples	S96	5
Whiteheads	S96	6

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