General practitioner referral patterns for women with gynaecological symptoms: a randomised incomplete block study design

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Abstract

Objective: To describe why, when and to whom general practitioners refer women with symptoms possibly attributable to cervical, endometrial or ovarian cancers, and to identify patient and GP factors that predict referral to either a gynaecologist or a gynaecological oncologist.

Design and setting: A national survey of GPs between 1 April and 31 August 2009 using a randomised incomplete block design based on case vignettes, and using a self-completed postal or online questionnaire.

Participants: A sample of GPs, stratified by location and randomly selected from a database of GPs maintained by the Australasian Medical Publishing Company.

Main outcome measures: Proportion of vignettes that were deemed to reflect a high probability of cancer being referred; and the patient and clinician factors that were the strongest predictors of referral.

Results: Of the 3082 GPs who were selected for participation, 1402 responded, giving a response rate of 45.5%. Overall, for vignettes identified as describing women with a high probability of cancer, 75% were referred by metropolitan GPs and 73% by rural practitioners. Metropolitan GPs were significantly more likely to refer women in scenarios indicative of endometrial cancer than rural GPs. For all three cancers, GPs were significantly more likely to refer a patient to a gynaecologist (between 70.8% and 95.4%) than a gynaecological oncologist. Metropolitan GPs had significantly greater access to both private and public gynaecological oncologists than their rural counterparts. Referral rates were higher for ovarian and cervical cancer (83% and 80%, respectively) and lower for endometrial cancer (68%). For all three cancers, patient factors were stronger predictors of referral than the demographic factors of participating GPs.

Conclusion: There appears to be significant variation in referral practices among GPs and this variation is greater for endometrial cancer, for which there are currently no evidence-based clinical practice guidelines in Australia. There is a need for further research into understanding the basis of these differences, including a review of the existing guidelines for ovarian and cervical cancer and the development of guidelines for endometrial cancer.

In Australia, more than 4000 women are diagnosed each year with a gynaecological cancer; one in 33 Australian women will be diagnosed with a gynaecological cancer before the age of 75 years.[1] Delays in the diagnosis of such cancers are a major cause of poor outcomes. For example, ovarian cancer has a poor prognosis, because many cases are diagnosed at an advanced stage.[2,3] Differences in access to health care and quality diagnostic care are primary contributors to differences in diagnosis, survival rates, and mortality outcomes for women with cervical cancer.[4]

In Australia, general practitioners provide the bulk of primary health care, and are often the first health care professionals visited by women experiencing gynaecological symptoms. GPs refer patients to specialists for diagnosis, investigation, treatment and reassurance, as a result of patient pressure, to obtain a second opinion, and for medicolegal reasons.[5] Patients gain access to specialists like gynaecologists through referral from GPs, who refer to specialists at an overall rate of 7.7%, with referrals to gynaecologists ranking 6th most common and comprising 4.6% of all medical referrals.[6]

Our aim in this survey was to collect national baseline data to establish referral practices for women with symptoms indicative of gynaecological cancers. Such data would assist in evaluating the effectiveness of the strategies implemented by Cancer Australia and the National Centre for Gynaecological Cancers (NCGC) to reduce variability in the diagnosis and management of these gynaecological cancers.

The survey was designed to:

- identify and distinguish why, when and to whom GPs refer women with symptoms indicative of gynaecological cancer;
- identify patient and GP factors that predict referral; and
- inform recommendations to improve clinical practice.

Methods

Design and setting

The design of the study was developed as part of a separate pilot conducted by researchers from Monash University (a 2008 unpublished report on patterns of care in gynaecological cancers commissioned by the NCGC). Another study was used as the basis for developing the study methods.[7] The Monash team undertook an extensive review of evidence-based clinical practice guidelines relevant to referral behaviour for ovarian, cervical and endometrial cancers, which informed the development of the set of vignettes for this study. Their extensive search revealed a paucity of evidence to guide clinical practice, including referral.[7-9] Six clinical practice guidelines were relevant (two to ovarian cancer, three to cervical cancer and one to all gynaecological cancers) and were reviewed. In most instances, the recommendations were based on low-level evidence or on expert opinion. The information derived from the clinical practice guidelines was used to inform the content of the study vignettes and was supplemented with expert opinion.

Thirty-one clinicians (12 GPs, 12 gynaecologists and seven gynaecological oncologists) participated in telephone interviews to elicit their views about clinical factors influencing referral of women with suspected

gynaecological cancers, and to discuss issues associated with variations in their care. The resulting clinical variables were added to the clinical practice guideline recommendations and prioritised to form a pool of fixed (contextual) factors and clinical variables relevant to each cancer type.

Vignettes

We used a series of vignettes, each containing a hypothetical scenario about a patient with gynaecological symptoms. Vignettes have the advantage of reflecting real-life situations in a concise manner, while controlling for external, potentially confounding variables and contextual variations between patients. They are recognised as valid, simple and cost-effective tools to assess differences in doctors' behaviour and practice.[10-12]

A pool of 128 vignettes that made clinical sense were constructed: 96 for ovarian, eight for endometrial, and 24 for cervical cancer (these proportions were used because each cancer had a different number of patient factors [clinical variables] and the vignettes reflected this number). The vignettes depicted a combination of clinical details including: physical presentations such as lumps, masses, lesions, ulcers, irregular bleeding or postcoital bleeding; results of investigations such as the cancer antigen 125 (CA125) blood test for ovarian cancer, biopsies and ultrasound; duration of symptoms and the age of the patient. Each GP received a random allocation of 12 vignettes. At the end of each vignette, GPs were asked whether they would refer the patient, and if so, to whom. They were also asked to estimate the probability that the patient in each scenario had cancer.

The survey also collected the following data on the GPs: (i) demographic data such as age, sex, country of basic medical training, teaching experience and years of experience; (ii) practice location (urban versus rural) and practice type (solo versus group); (iii) information relating to access to gynaecologists, gynaecological oncologists and cancer multidisciplinary teams (MDTs); and (iv) the number of patients seen in the previous 5 years with potential gynaecological cancer.

We used a randomised incomplete block design (RIBD) for the study, which allows a limited number of vignettes to be presented to each participant,[13,14] thus lightening the burden on respondents. The main disadvantage of the RIBD is that data analysis is more complex and regression results need to be interpreted with caution.[14] The RIBD also results in some loss of precision when estimating associations between patient factors and referral.[14] Some interactions may also be confounded with between-subjects factors.[7] This limitation was accounted for during analysis.

Data collection

From a population of over 20 000 GPs (listed as currently practising, but limited to only one GP per practice), the Australasian Medical Publishing Company provided a random list of 5000 GPs, stratified by location with 2500 each from metropolitan and rural or remote areas. We sent participation packages to the first 3180 of these 5000 GPs (1615 metropolitan and 1565 rural GPs).

Data were collected between 1 April and 31 August 2009 using a mixed method, whereby participants could respond either by post (paper questionnaire) or on the internet (online questionnaire). The online and paper questionnaires were pilot-tested with members of the project reference group (invited clinicians, academics and consumer representatives) and staff of Cancer Australia. Modifications were made to both versions before the start of data collection. An upfront $20 gift card was offered to a subset of GPs as an incentive to participate, and techniques such as getting a well respected peer to sign the cover letter, highlighting the uniqueness of each survey and sending up to three reminder letters to encourage participation were used.[15,16]

Statistical analysis

Data were loaded into a statistical software package (SPSS, version 13, SPSS Inc, Chicago, Ill, USA). χ^2 tests were used to identify significant differences in referral practices between metropolitan and rural GPs (significant at $P < 0.05$). Logistic regression was used to determine the factors that were the strongest predictors of referral. To improve the precision of the regression models, the sample was adjusted for clustering (should referral patterns of individual clinicians be more similar than those across clinicians); stratification (should referral patterns within a stratum be more similar than across strata) and the finite population correction.

Ethics and other approvals

The study was approved by the University of Adelaide Human Research Ethics Committee, and the Australian Bureau of Statistics Statistical Clearing House.

Results

Of the 3180 GPs recruited to the study, 98 were ineligible or not contactable. Of the remaining 3082, 1402 responded (689 metropolitan and 713 rural or remote,) giving an overall response rate of 45.5%. Eighty-two GPs whose location was identified in our original sample as rural classified themselves as practising in a metropolitan location; these were reclassified as metropolitan for the analysis, giving final numbers of 771 metropolitan and 631 rural GPs.

Compared with labour force statistics in 2008,[17] the study sample was generally representative in terms of sex and age distribution, with a small underrepresentation of GPs aged under 35 years and from 45–54 years, and a slight overrepresentation of GPs aged over 55 years. Stratification by location ensured appropriate numbers for the intended comparisons between metropolitan and rural GPs; 56.0% practised in metropolitan regions and the remaining 45.0% in rural locations.

Overall

For vignettes identified as describing a woman with a high probability of cancer, 75.0% were referred by metropolitan GPs compared with 72.9% by their rural counterparts. GPs' referral decisions were closely aligned to their own estimation of cancer risk based on the patient factors present in each scenario. However, the mean estimations of cancer risk made by participating GPs did not always mirror the referral deci-

1 Predictors of a patient being referred for endometrial cancer by metropolitan and rural general practitioners

Predictor	B*	P†	Adjusted odds ratio (95% CI)
Age of patient 63 years (reference group, 30 years)			
Metropolitan	3.445	< 0.001	31.4 (16.6–59.2)
Rural	3.832	< 0.001	46.2 (23.9–89.3)
Thickened endometrium on pelvic ultrasound (reference group, normal endometrium)			
Metropolitan	2.052	< 0.001	7.8 (4.5–13.6)
Rural	1.473	< 0.001	4.4 (2.5–7.5)
Duration of symptoms 8 weeks (reference group, 2 weeks)			
Metropolitan	0.549	0.046	1.7 (1.0–3.0)
Rural	0.515	0.046	1.7 (1.0–2.8)

* Unstandardised regression coefficient. † Relates to the predictor (age, condition of endometrium, duration of symptoms).
Model evaluation for metropolitan GPs — Likelihood ratio test, $\chi^2_{(df=3)} = 215.461$ ($P < 0.001$); Hosmer–Lemeshow goodness of fit test, $\chi^2_{(df=6)} = 0.946$ ($P = 0.946$); overall percentage correctly classified: 83.3%.
Model evaluation for rural GPs — Likelihood ratio test, $\chi^2_{(df=3)} = 248.176$ ($P < 0.001$); Hosmer–Lemeshow goodness of fit test, $\chi^2_{(df=6)} = 2.664$ ($P = 0.850$); overall percentage correctly classified: 82.5%. ◆

sion provided in the unpublished Monash University report (based on the clinical practice guidelines and expert opinion available at the time of the pilot study[6]). Overall, GPs were significantly more likely to refer to a gynaecologist than to a gynaecological oncologist.

Endometrial cancer

For vignettes describing women identified as having a high probability of endometrial cancer, 67.7% resulted in a referral, of which 95.4% were to a gynaecologist. Metropolitan GPs were significantly more likely to indicate a decision to refer than rural GPs (68.4% versus 61.1%). The best predictors of referral for endometrial cancer were the age of the patient, results of pelvic ultrasound and duration of symptoms (Box 1).

Ovarian cancer

For vignettes describing women identified as having a high probability of ovarian cancer, 83.3% resulted in a referral, of which 70.8% were to a gynaecologist. The best predictors of referral for ovarian cancer were findings on physical examination, CA125 test results, ultrasound findings, duration of symptoms, age of the patient and years of experience of the GP (Box 2). Practitioners with more than 15 years of experience were more likely to refer a patient than those with less experience.

2 Predictors of a patient being referred for ovarian cancer by a general practitioner

Predictor	B*	P	Adjusted odds ratio (95% CI)
Palpable mass on physical examination (reference group, no abnormalities)	3.484	< 0.001	32.6 (25.5–41.8)
Markedly elevated CA125 level (reference group, normal level)	2.888	< 0.001	18.0 (14.5–22.2)
Complex cyst on ultrasound (reference group, no abnormalities)	1.892	< 0.001	6.6 (5.6–7.9)
Duration of symptoms 8 weeks (reference group, 2 weeks)	0.767	< 0.001	2.2 (1.9–2.5)
Age of patient 58 years (reference group, 35 years)	0.495	< 0.001	1.6 (1.4–1.9)
Year of experience (reference group, 1–15 years)			
16–30 years	0.388	0.001	1.1 (0.9–1.4†)
⩾ 31 years	0.484	< 0.001	1.6 (1.3–2.1)

CA125 = cancer antigen 125. * Unstandardised regression coefficient. † Not significant.
Model evaluation — Likelihood ratio test, $\chi^2_{(df=7)} = 3730.431$ ($P < 0.001$); Hosmer–Lemeshow goodness of fit test, $\chi^2_{(df=8)} = 61.989$ ($P < 0.001$); overall percentage correctly classified: 89.7%. ◆

Cervical cancer

Almost 80% of vignettes describing women with a high probability of cervical cancer resulted in a decision to refer. Of these decisions, 90% were to refer to a gynaecologist. The best six predictors of referral for cervical cancer were the presence of a lesion, the age of the patient, irregular bleeding, duration of symptoms and post-coital bleeding (Box 3).

GPs' access to services

Overall, metropolitan GPs had significantly greater access to both private and public gynaecological oncologist services than rural GPs. This difference also extends to their access (and, by default, their patients' access) to gynaecological oncologist services associated with a multidisciplinary team (MDT). That is:

- 80% of metropolitan GPs and 50% of rural GPs reported access to private gynaecological oncologist services;
- 40% of metropolitan GPs and 25% of rural GPs reported that these private services were associated with an MDT;
- 80% of metropolitan GPs and 58% of rural GPs reported access to public gynaecological oncologist services; and
- 63% of metropolitan GPs and 40% of rural GPs reported that these public services were associated with an MDT.

Discussion

A significantly higher proportion of metropolitan GPs (compared with rural GPs) reported intentions to refer patients who had presentations indicative of endometrial cancer. In all other respects, referral patterns for urban and rural GPs were similar, although rural GPs had less access to gynaecological oncologists and MDTs than urban GPs. Metropolitan GPs were also significantly more likely than rural GPs to report private and public specialist services as being associated with an MDT. Overall, public services were more likely than private services to be associated with an MDT. Given that access to an MDT

is recognised as best practice in the treatment of cancer,[16,17] it is of concern that about 60% of metropolitan GPs reported not having access to a private gynaecological oncologist service associated with an MDT, and 37% in the public sector did not have such access. Higher proportions of rural GPs did not have access to private (75%) and public (60%) gynaecological oncologist services associated with an MDT. Consistent with the findings of other studies,[18] we found that rural GPs and their patients have fewer options for oncology services than their urban counterparts. Better access to specialist services for referral could, in part, explain why metropolitan GPs were significantly more likely to refer patients with particular gynaecological conditions.

Our study shows that patient factors such as symptoms and clinical findings are better predictors of referral behaviour than the demographic characteristics of GPs. Across the three cancers, the age of the patient and the duration of symptoms were important determinants of referral, with specific factors such as ultrasound results, CA125 test results, bleeding, and ulcers or lesions being factors for individual cancers. Overall, the only clinician factor that was predictive of referral was years in practice, with more years in practice being associated with a higher likelihood of referral for ovarian cancer. Reasons for this difference are not clear. It appears that GPs' referral decisions are also closely aligned to their estimation of cancer risk based on the patient factors present in each vignette. This variance in the assessment of cancer risk could, in part, explain the variance in referral practice.

For endometrial cancer, for which there are no current Australian guidelines, there was greater variation in referral practices: 68% of vignettes deemed to have a high probability of cancer were referred compared with 83% for ovarian cancer and 80% for cervical cancer, for which Australian guidelines are available.

This study had a number of limitations. First, measuring referral based on hypothetical scenarios, regardless of the validity of the included variables, can only provide evidence of practitioner intention, not actual practice. Second, the respondents' capacity to make referral decisions was restricted by the factors in the vignettes, so the reported referral rates could underestimate actual referral rates had clinicians been able to consider other forms of investigation before making a referral decision. Third, vignette scenarios rarely include minor symptoms that might provide additional information to help with decision making.[8,9] However, when using a comparison with standardised patients (the gold standard for measuring quality of clinical practice), vignettes have been found to be a more accurate method than medical record abstraction.[8] Finally, a response rate of less than 60% may limit the generalisability of our results.

Overall, our findings highlight the variability in Australian GPs' referral practices in relation to women with a range of gynaecological symptoms attributable to endometrial, ovarian or cervical cancer. Greater awareness, understanding, and adherence to available national and international guidelines could help standardise referral behaviour. However, evidence-based clinical practice guidelines for endometrial cancer still need to be developed and, in light of our results, current guidelines for ovarian and cervical cancer should be reviewed.[7] Unfortunately, the existence of evidence-based clinical practice guidelines does not guarantee that they will be used in daily practice. Changing the behaviour of physicians is complex and difficult, and interventions developed to change their behaviour have shown limited effects.[19] Identifying efficient implementation strategies to increase the uptake of guideline recommendations will be a major challenge for the future. Our findings also have implications for current training curricula and continuing professional development.

3 Predictors of a patient being referred for cervical cancer by a general practitioner

Predictor	B*	*P*	Adjusted odds ratio (95% CI)
Lesion on cervix (reference group, no lesion)	1.791	< 0.001	6.0 (4.7–7.6)
Age of patient 71 years (reference group, 32 years)	1.783	< 0.001	6.0 (4.8–7.4)
Irregular bleeding (reference group, no irregular bleeding)	0.667	< 0.001	1.9 (1.5–2.5)
Duration of symptoms 8 weeks (reference group, 2 weeks)	0.654	< 0.001	1.9 (1.6–2.3)
Postcoital bleeding (reference group, no bleeding)	0.460	0.008	1.6 (1.2–2.1)

* Unstandardised regression coefficient.
Model evaluation — Likelihood ratio test, $\chi^2_{(df=5)} = 637.460$ ($P < 0.001$); Hosmer–Lemeshow goodness of fit test, $\chi^2_{(df=8)} = 46.278$ ($P < 0.001$); overall percentage correctly classified: 80.4%.

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