Original
article

Sexually transmissible diseases—knowledge and practices of general practitioners in Victoria, Australia

Graeme Mulvey, Meredith J Temple-Smith, Louise A Keogh

Objective: To examine knowledge and practices in relation to sexually transmissible diseases (STDs) of general practitioners (GPs) in Victoria, Australia.

Method: A questionnaire was distributed to 520 Victorian GPs randomly selected from the Australian Medical Publishing Company (AMPCo) database of Australian medical practitioners.

Results: A response rate of 85% was obtained. While sexual health consultations were common for Victorian GPs, STD caseloads were generally low. Knowledge of clinical features of symptomatic STDs and of important STD epidemiology was generally good although there was a lower awareness of the asymptomatic nature of the most prevalent STDs in Victoria. Diagnostic tests were generally selected appropriately although many GPs did not perform the gold standard combination of tests required for adequate differential diagnosis. Level of STD knowledge was related to frequency of advising about safe sex, diagnosing STDs, and younger practitioner age. Attendance at any of a number of postgraduate courses of relevance to the management of STDs was not related to better STD knowledge overall.

Conclusions: Prevention and detection of STDs in general practice involve risk assessment and screening of asymptomatic patients as well as effective treatment of symptomatic patients and their contacts. Results presented here suggest that GPs have good knowledge and use appropriate investigations for patients presenting with symptoms of an STD. The low levels of awareness of the asymptomatic nature of many STDs and other particular aspects of STD knowledge and practice should be addressed in undergraduate and postgraduate medical education programmes.

(*Genitourin Med* 1997;73:533-537)

Keywords: general practitioners; sexually transmitted diseases; health services

Background

Sexually transmissible diseases (STDs), one of the major preventable health problems affecting the Australian population,¹ are often asymptomatic and, if undetected, can cause subfertility, infertility, and chronic morbidity.² While there are a range of health service providers involved in STD management, the proportions of STD cases managed in different clinical settings in Victoria (the second most populous Australian state) are unknown. Service providers can be broadly classified as practising in low STD case load settings (such as private general practitioners (GPs) including those working in extended hours clinics), medium STD caseload settings (family planning clinics and public hospital emergency departments), and higher STD caseload settings (such as government funded specialist sexual health clinics and a small number of private general practice clinics with special interest in STDs). Consultations are free of cost to the patient in some of the low and medium caseload settings and in all of the government funded clinics.

Australia's approximately 17 500 GPs play an important role in STD prevention, management, and surveillance.³ There is some evidence that their case loads of patients with sexual health problems^{4,5} and the proportion of notifications originating in general practice¹ are increasing. Given that 80% of Australian

patients attend their GP each year,⁶ GPs are well placed to have a significant impact on STD transmission by diagnosing asymptomatic disease and identifying those at risk of acquiring an STD.

While a number of surveys of STD related knowledge, attitudes, behaviour, and practices (KABP) of GPs have been conducted overseas,⁷⁻¹⁰ Australian research has focused more narrowly on HIV and genital chlamydia. Victorian¹¹ and national¹² studies of GP KABP in relation to HIV positive patients have identified important research and practice issues. The latter study found that one fifth of Australian GPs had managed a symptomatic or asymptomatic HIV positive patient while a more recent Victorian study found that almost a third had done so.¹³

In relation to genital chlamydia, Westgarth *et al*'s survey of GPs in Melbourne (the capital city of Victoria) found that, although more than half had tested for chlamydia in the preceding month, underdiagnosis of chlamydia was likely, both because of low levels of suspicion of the disease and because of inappropriate specimen collection techniques.¹⁴ This study, in particular, suggested that GPs may have limited knowledge of other STDs and that further research in this area was needed.

Consequently, given the public health priority of improved STD control and the important role of GPs in STD prevention and

Centre for the Study of Sexually Transmissible Diseases, LaTrobe University, Australia
G Mulvey
M J Temple-Smith
L A Keogh

Correspondence to:
Meredith Temple-Smith,
Centre for the Study of Sexually Transmissible Diseases, LaTrobe University, 11-13 Lincoln Square South, Carlton, Vic 3053, Australia.

Accepted for publication
28 May 1997

detection, this study aimed to examine STD KABP of GPs with a view to providing baseline information in this under-researched area and to inform undergraduate and postgraduate medical education.

Methods

POPULATION AND SAMPLE

A random sample was drawn from the Australian Medical Publishing Company (AMPCo) national database of medical practitioners. This is the largest and most frequently updated of the six databases of Australian medical practitioners that are available.³ At the time of sample selection (June 1995), there were 4748 GPs in Victoria listed on this database. Of these, 70% were male and 30% female. To maximise the chances of including GPs in the study who did actually see patients with STDs, GPs over the retirement age of 65 years, and those with fewer than 1500 consultations per year (2–3 sessions of general practice each week) were excluded. Although a common convention in this type of research, this may bias the sample by excluding a greater proportion of female practitioners, who are more likely to be in part time practice.¹⁵

The random sample consisted of 600 GPs and the survey was piloted with 40 of these. An additional 40 GPs were excluded as the doctor was unable to be contacted because of death, extended leave, or absence from the address provided, leaving a final sample of 520 GPs. This sample size allowed generalisation to the rest of the population and enabled comparisons to be made between subgroups.

The response rate to the survey was 85% (444/520). There were no significant differences in sex or age distribution between respondents and the source population.

PROCEDURE

In consultation with other GPs, venereologists, and epidemiologists, a 13 page (55 item) questionnaire was developed. This is available on request from the authors. Subject areas related to the STDs most commonly found in Victoria and included clinical features, investigations, treatment, public health issues, and epidemiology and demographic/practice characteristics. The questionnaire was pretested with eight practitioners from diverse settings, including academic and private general practice.

GPs were asked about the frequency with which they performed four different sexual health practices: providing contraceptive advice, performing PAP smears, advising on safe sex practices, and diagnosing patients with STDs. They were also asked to estimate the number of STD cases they had diagnosed in the past 4 weeks.

Two knowledge scores, Asymptomatic Disease and Diagnostic Tests, were developed to summarise responses to questions that were sufficiently interrelated (alpha greater than 0.6). These knowledge scores were constructed by dividing the number of correct answers by a possible score of 10 and 5 respec-

tively. Results were converted to percentages, and the mean knowledge scores for subgroups of GPs were then compared. To assess knowledge of the asymptomatic nature of STDs, GPs were asked to select from a list of five STDs commonly seen in Victoria, the STDs that may be present without causing symptoms in male and female patients (see table 4).

To ascertain their knowledge of diagnostic tests, respondents were asked to indicate which tests they would request in a range of clinical situations: female vaginal discharge, female genital ulcer or lump, female suspected PID, male urethral discharge, and male genital ulcer or lump. Responses were compared with "gold standard" answers, based on the consensus of a panel of venereologists and GPs (see table 5).

The questionnaire also contained questions on symptomatic presentations and epidemiology. Knowledge of common symptomatic presentations was assessed by asking: "In symptomatic patients, which are the most common modes of presentation for the following STDs?" for four STDs, for both male and female patients. The participant was required to select from four possible answers (see table 6). There were six questions on epidemiology, such as, "What in your opinion are the main age groups in which genital chlamydia is seen?" and "HIV infection in Australia occurs mostly in people who belong to (which of) the following groups?"

Previous consultations with GPs had suggested wide variations in GP caseloads of STDs. It was essential therefore to encourage participation in the survey by all GPs selected, regardless of their own perceptions of STD knowledge and caseloads. Thus, attempts were made to contact each potential participant by telephone and this was successful in 76% of cases. Participants were also offered continuing medical education points and entry into a prize draw for a weekend at a hotel. Follow up telephone calls and mailouts to non-responders were made at 2 and 5 weeks.

STATISTICS

SPSS was used to generate descriptive statistics. The χ^2 statistic, two tailed *t* test, and one way analysis of variance were used as measures of association between dependent and independent variables. A *p* value of less than 0.05 was considered significant.

Results

SEXUAL HEALTH CASELOADS

Two per cent of GPs estimated that they diagnosed STDs daily, 17% did so weekly, 36% monthly, 45% infrequently, and 1% never. These results and the frequency of other sexual health related practices are shown in table 1.

GPs were also asked to estimate the number of STDs they had diagnosed in the past 4 weeks. Fifty eight per cent (214) had diagnosed 887 cases of STDs in the preceding 4 weeks, an estimate which correlates well with the response to the question on the frequency

Table 1 Sexual health workload of GPs (number (%))

Sexual health practice	Daily	Weekly	Monthly	Infrequent	Never
Provide contraceptive advice	254 (57)	144 (32)	29 (6)	14 (3)	3 (1)
Perform PAP smears	265 (60)	127 (29)	21 (5)	22 (5)	9 (2)
Advise on safe sex practices*	116 (26)	170 (38)	94 (21)	58 (13)	5 (1)
Diagnose patient with an STD	7 (2)	74 (17)	159 (36)	198 (45)	6 (1)

*One missing value.

Table 2 Summary of two knowledge scores

Subgroups	n	Knowledge score (96) (mean (SD))	
		Asymptomatic disease	Diagnostic tests
Whole sample	442*	63.3 (22.9)	60.4 (28.8)
Sex			
Male	321	62.7 (22.8)	59.0 (29.6)
Female	121	64.8 (23.3)	64.0 (26.5)
		t = 0.86 (0.393)	t = 1.7 (0.091)
Age			
25–34	77	66.1 (21.7)	62.1 (24.2)
35–44	182	65.9 (22.6)	63.2 (28.4)
45–54	115	62.1 (23.9)	55.7 (29.7)
55+	68	55.4 (22.0)	59.1 (32.5)
		f = 4.00 (0.008)	f = 1.75 (0.156)
Practice			
Solo	103	61.0 (23.5)	57.3 (32.8)
Group	302	64.2 (22.4)	60.9 (26.9)
Other	36	63.6 (25.7)	63.9 (32.0)
		f = 0.77 (0.466)	f = 0.918 (0.400)
Location			
Rural	98	62.7 (22.1)	54.7 (29.4)
Urban	34	63.5 (23.2)	62.0 (28.5)
		t = 0.35 (0.727)	t = 2.2 (0.029)

*There are two missing values.

Table 3 Differences in knowledge between subgroups of doctors

Subgroups	n	Mean knowledge score (%)	
		Asymptomatic disease	Diagnostic tests
		(mean (SD))	
Advise on safe sex:			
daily/weekly	286	65.8 (23.1)	63.6 (27.6)
monthly/never	157	58.7 (22.0)	54.8 (29.8)
		t = 3.22 p = 0.001	t = 3.07 p = 0.002
Diagnose STDs			
daily/monthly	240	66.3 (22.6)	64.2 (27.8)
infrequently/never	204	59.8 (22.9)	55.8 (29.4)
		t = 2.99 p = 0.003	t = 3.11 p = 0.002

Table 4 GP knowledge of the common modes of presentations for four STDs in symptomatic patients

STD	Presentations	GPs	(n%)*
Female:			
chlamydia	vaginal discharge and abdominal or pelvic pain	280	63.2
gonorrhoea	vaginal discharge and abdominal or pelvic pain	250	56.4
genital herpes	genital ulcer and dyspareunia	239	54.0
genital warts	genital lesion(s)	435	98.2
Male:			
chlamydia	urethral discharge	436	98.4
gonorrhoea	urethral discharge	441	99.5
genital herpes	genital ulcer or lump	438	98.8
genital warts	genital ulcer or lump	431	97.3

*One missing value.

Table 5 Gold standard diagnostic tests for five patient presentations and the percentage of GPs indicating they would use the complete set

Presentation	Gold standard diagnostic tests	GPs	(n%)*
Female vaginal discharge	Vaginal swab in suitable transport medium for smear and culture Cervical swab for gonorrhoea Cervical swab for chlamydia	226	51.0%
Male urethral discharge	Urethral swab for smear and culture for gonorrhoea Urethral swab for chlamydia	400	90.3%
Female genital ulcer or lump	Swab of ulcer in viral transport medium Blood test for syphilis	182	41.1%
Male genital ulcer or lump	Swab of ulcer in viral transport medium Blood test for syphilis	196	44.2%
Female suspected PID	Cervical swab for gonorrhoea Cervical swab for chlamydia	333	75.2%

*One missing value.

of STD diagnoses, which indicated that 54% diagnosed STDs at least monthly. Of the cases diagnosed in the past 4 weeks, GPs estimated that 14% (122) were of genital chlamydia, 30% (263) were of genital herpes, 44% (393) were of human papilloma virus (HPV), and 12% (109) were of non-specific urethritis (NSU).

GP KNOWLEDGE

The means for the two knowledge scores, Asymptomatic Disease and Diagnostic Tests, are shown in table 2, along with the knowledge scores broken down by four demographic variables. Age was significantly associated with knowledge of the asymptomatic nature of STDs, with younger doctors having a higher score. Location of practice was significantly associated with diagnostic test knowledge, with urban doctors obtaining higher scores. No relation between practitioner sex or type of practice and the two knowledge scores was found. Level of knowledge in both areas was found to be significantly associated with the frequency of advising on safe sex practices and diagnosing STDs (table 3). After controlling for practitioner age, these associations were still significant. Frequently providing contraceptive advice and performing PAP smears were not associated with higher levels of knowledge.

Table 4 shows the proportion of doctors correctly identifying the most common mode of presentation in each of five STDs. High levels of knowledge of different modes of STD presentations among symptomatic male patients were found, with over 97% (431) of GPs choosing the correct symptoms for chlamydia, gonorrhoea, genital herpes, and genital warts. The level of knowledge of the symptoms of the same diseases for females was lower in all cases, with, for example, only 56% (250) of GPs knowing that gonorrhoea may present with abdominal or pelvic pain or vaginal discharge. There were no significant associations between knowledge of clinical features and demographic or practice characteristics.

The proportion of GPs who would perform all of the tests recommended in the gold standard combination are shown in table 5. For each presentation, more than 90% (399) of GPs selected the single most important test out of the gold standard combination.

In relation to the investigation and treatment of specific STDs, 88% (386) of GPs mostly or always sought specialist advice regarding abnormal syphilis serology. In the case of an abnormal PAP smear result, 74% (327) of GPs would repeat the smear at 6 months and 52% (228) would advise on the need for safe sex. For patients who were found on testing to be neither immune to, nor carriers of, hepatitis B, 62% (271) of respondents always or mostly advised immunisation against hepatitis B.

Only 28% (125) of GPs correctly identified the main age group for genital chlamydia as being 15–24 years, while 42% (184) correctly identified the main population groups in whom gonorrhoea occurs (men who have sex

Table 6 GP knowledge of the asymptomatic nature of STDs

STD	Proportion of GPs believing the STD to be asymptomatic (n = 444) *	
	Male patient	Female patient
NSU	189 43%	259 58%
Chlamydia	349 79%	421 95%
Gonorrhoea	120 27%	244 55%
Genital herpes	196 44%	233 53%
Genital warts	370 84%	424 96%

*One missing value for all questions.

with men and men who have acquired the infection overseas). Eighty three per cent (363) of respondents correctly identified the two main sources of HIV in heterosexual women as injecting drug use and bisexual men. In contrast, only 30% (127) of GPs knew the main population groups in whom HIV infection occurs is homosexual (80% infections) and bisexual men (10%).¹⁶ Most respondents (62%) incorrectly stated the two main groups of people in whom HIV infection occurs to be homosexual men and intravenous drug users. Knowledge of diseases related to STDs was much better, with 96% (416) knowing that HPV is the STD most commonly associated with cancer of the cervix, and 92% (401) that chlamydia is the STD most commonly associated with female tubal infertility.

Respondents were also asked to identify which of six STDs are notifiable in Victoria. Of the 444 respondents, the majority correctly identified gonorrhoea (94%), AIDS (93%), and chlamydia (62%) as notifiable. Many (89%) incorrectly identified HIV and a few incorrectly believed herpes (16%) and human papilloma virus (3%) to be notifiable.

POSTGRADUATE EDUCATION

Respondents were asked about particular postgraduate qualifications of relevance to the management of STDs. Twenty seven per cent (121) had obtained the Fellowship of the Royal Australian College of General Practitioners (RACGP), 32% (144) had completed the Diploma of the Royal College of Obstetricians and Gynaecologists (DRCOG), 11% (50) the Certificate of the Family Planning Association of Victoria, and 1% (four) the Diploma of Venereology. Other options for brief postgraduate training for GPs in STD management exist in Victoria. Seventeen per cent of respondents (77) had completed the annual Venereology Society of Victoria (VSOV)/RACGP STD update course, 9.3% (42) had attended the Fairfield Hospital 2 day HIV management course, and 40% (178) had completed the written RACGP Check programme on STDs.

The knowledge scores of doctors who had completed one or more of these educational courses were compared with those who had not done so. No consistent improvement in knowledge relating to a particular course was evident, although doctors who were FRACGP scored significantly higher on knowledge of the asymptomatic nature of STDs. Attendance at an HIV course was not related

to better knowledge of HIV epidemiology.

Discussion

Results from this study show that sexual health consultations are a common component of the everyday general practice workload in Victoria, offering GPs a good opportunity for sexual health promotion and screening of patients with high risk practices. This is obviously of great importance when dealing with young adults who are sexually active, yet this study found that less than one third of GPs knew that young people of 15–24 years are the main risk group for chlamydia, a finding, interestingly, also reported in Canadian GPs.¹⁰

Chlamydia was made a notifiable disease in Victoria in 1990. Our study found 62% of GPs knew this to be the case. Although this is an improvement in comparison with the 41% of GPs who did so in 1994,¹³ the fact that genital chlamydia is the most prevalent of the treatable bacterial STDs in Victoria renders this finding of some concern.

Over half of the GPs in this survey had diagnosed at least one STD in the preceding four weeks. GPs diagnosing an STD weekly or monthly had better knowledge of the asymptomatic nature, diagnosis, and epidemiology of STDs than those diagnosing STDs infrequently or never.

GP knowledge of the symptoms of STDs was excellent for male patients and good overall (table 6). In contrast, awareness of the asymptomatic nature of STDs was variable, and while the possibility of silent infection with chlamydia or HPV in female patients was recognised by most GPs, knowledge of asymptomatic presentations of other STDs for both male and female patients was poor, suggesting that they may be advising patients inappropriately and missing opportunities for sexual health promotion.

Diagnostic tests were generally selected appropriately although many GPs did not appear to perform the gold standard combination of tests required for adequate differential diagnosis. For a range of clinical presentations, the most important test of the gold standard combination was selected by nearly all GPs but for three of the five presentations investigated, the full complement of tests was chosen by only half of the respondents.

In relation to investigation and treatment of STDs with which they were likely to be unfamiliar (for example, regarding abnormal syphilis serology), respondents generally sought consultant advice. GPs appeared to opt for conservative approaches to management issues for which there are no clear consensual guidelines. This was evidenced by the nearly three quarters of respondents who, in the case of a PAP smear result reporting the presence of HPV infection, would repeat the smear at 6 months and the fact that more than half would advise on the need for safe sex in this situation, although epidemiological data suggest that condoms do not prevent transmission of HPV infection.¹⁷

The results presented here indicate that

some areas of STD detection are thoroughly understood by GPs, but that there are also areas where a lack of understanding or knowledge could be resulting in misdiagnosis or underdiagnosis of particular STDs. Those diagnosing STDs regularly had higher levels of knowledge than those diagnosing STDs infrequently and younger practitioners had consistently better STD knowledge than older GPs in the sample, suggesting that undergraduate medical training in STDs may have undergone improvement in recent years.

Although information on the length of time since attendance was not collected, the finding that completion of an STD related continuing education course was not related to better STD knowledge is of concern and raises questions about the targeting of such education. Should STD related continuing education be aimed at those GPs who are already diagnosing STDs or should the aim be to train all doctors to be proactive in STD detection?

There are three avenues of STD diagnosis open to GPs—the diagnosis of symptomatic patients, contact tracing of infected sexual partners, and the screening of asymptomatic patients. Information relevant to the diagnosis of symptomatic patients is covered both in this paper and a companion paper which describes GP STD caseloads in greater detail.¹⁸ This, along with the results of our projects on STD screening of asymptomatic patients¹⁹ and contact tracing, will provide much needed information about the most appropriate type of STD education for medical undergraduates and GPs, and the specific GP audience to which it should be targeted.

This project was funded by the Victorian Health Promotion Foundation. Wendy Doyle provided research assistance.

- 1 AIDS/STD Unit. *Surveillance of sexually transmissible diseases in Victoria, 1992*. Melbourne: Department of Health and Community Services, 1993.
- 2 White G. STDs: social aspects and public health. *Venerology* 1988;1:11–3.
- 3 General Practice Branch, Commonwealth Department of Health and Family Services. *General practice in Australia: 1996*. Commonwealth of Australia, 1996.
- 4 Condon R, Roberts M, Rouse I, Sesnan K. A comparison of doctor and laboratory notification of gonorrhoea in Western Australia during 1989. *Venerology* 1992;5:84–6.
- 5 Dunne MP, George M, Byrne D, Patten J. The sexual health caseloads of general practitioners in Queensland. *Venerology* 1995;8:71–5.
- 6 Deeble J. *Medical services through Medicare. February 1991. Background Paper No 2 National Health Strategy*. Canberra: AGPS, 1992.
- 7 Driscoll C, Coble R, Caplan R. The sexual practices, attitudes, and knowledge of family physicians. *Family Pract Res J* 1982;1:200–10.
- 8 Boekeloo B, Marx E, Kral A, Coughlin S, Bowman M, Rabin D. Frequency and thoroughness of STD/HIV risk assessment by physicians in a highrisk metropolitan area. *Am J Public Health* 1991;81:1645–8.
- 9 Lewis C, Montgomery K. The AIDS-related experiences and practices of primary care physicians in Los Angeles: 1984–1989. *Am J Public Health* 1990;80:1511–3.
- 10 McDougall L, Matthias RG, O'Connor BA, Bowie W. Management of chlamydia trachomatis genital infections: reported practices of primary care physicians. *Can Med Ass J* 1992;146:715–28.
- 11 Paine SL, Briggs D. Knowledge and attitudes of Victorian medical practitioners in relation to the acquired immunodeficiency syndrome. *Med J Aust* 1988;148:221–5.
- 12 Commonwealth AIDS Research Grant Committee Working Party. Attitudes, knowledge and behaviour of general practitioners in relation to HIV infection and AIDS. *Med J Aust* 1990;153:5–12.
- 13 Mulvey G, Temple-Smith M. The involvement of Victorian general practitioners in the management of patients with HIV/AIDS. *Aust Fam Phys*, REASON, 1997;26(Suppl 2): S66–70.
- 14 Westgarth F, Crofts N, Gertig D. Genital chlamydial infection: diagnostic practices of General Practitioners in Melbourne, Australia. *Sex Transm Dis* 1994;21:118–23.
- 15 Australian Institute of Health and Welfare. National Health Labour Force Bulletin No 3. Medical Labour Force 1992–3. Australian Institute of Health and Welfare, 1996.
- 16 AIDS/STD Unit. *Surveillance of sexually transmissible diseases in Victoria, 1994*. Melbourne: Department of Health and Community Services, 1995.
- 17 Stratton P, Alexander NJ. Prevention of sexually transmitted infections. *Infect Dis Clin N Am* 1993;7:841–59.
- 18 Temple-Smith M, Keogh L, Mulvey G. Testing for chlamydia and other sexually transmissible diseases in general practice in Victoria. *Venerology* 1997;10:14–8.
- 19 Temple-Smith M, Hammond J, Pyett P, Presswell N. Barriers to sexual history taking in general practice. *Aust Fam Phys*, REASON 1996;25(Suppl 2):S1–4.