Health Service Research

Is identification of smoking, risky alcohol consumption and overweight and obesity by General Practitioners improving? A comparison over time

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Abstract

Background. Detection of lifestyle risk factors by GPs is the first step required for intervention. Despite significant investment in preventive health care in general practice, little is known about whether GP detection of lifestyle risk factors have improved over time.

Objectives. To examine whether sensitivity and specificity of GP detection of smoking, risky alcohol consumption and overweight and obesity has increased in patients presenting to see their GP, by comparing results from four Australian studies conducted between 1982 and 2011.

Methods. Demographic characteristics of patient and GP samples and the prevalence, sensitivity and specificity of detection of each risk factor were extracted from published studies. Differences between GP and patient sample characteristics were examined. To identify trends over time in prevalence of risk factors, sensitivity and specificity of detection across studies and the Cochran–Armitage test for trend were calculated for each risk factor for the overall sample and by male and female subgroups.

Results. There were no statistically significant changes in the sensitivity of GP detection of smoking or overweight or obesity over time. Specificity of detection of smoking increased from 64.7% to 98% (P < 0.0001) and decreased for overweight or obesity from 92% to 89% (P = 0.01). There was a small decrease in the sensitivity of detection of alcohol consumption (P = 0.02) and an increase in specificity (P = 0.01).

Conclusions. Despite significant investment to increase GP detection and intervention for lifestyle risk factors, accurate detection of smoking, risky alcohol consumption and overweight and obesity occurs for less than two-thirds of all patients.

Key words. Alcohol drinking, general practice, obesity, smoking.

Introduction

Modifiable health risk factors including smoking, excessive alcohol consumption and overweight and obesity are responsible for >20% of global mortality (1). In Australia, one in eight people drink alcohol at levels which puts them at risk of long-term harm (2), 15.1% are daily or occasional smokers and nearly two-thirds are overweight...
or obese (3). These prevalence rates are mirrored in other developed countries (4,5). Early detection and intervention for these lifestyle risk factors can limit the health impact of disease and reduce health care costs (6).

Advice and intervention from GPs can successfully reduce smoking and alcohol consumption (7–10) and assist in healthy weight management (11–13). Approximately 81% of Australians (14), 80% of Americans (15) and 78.5% of Canadians (16) visit a GP annually, meaning GPs are well placed to provide preventive health care to a significant proportion of the population. Importantly, patients consider GPs an authoritative source of health information and advice (17) and find it acceptable for their GP to provide preventive health care (18–20). As such, clinical practice guidelines across a number of countries recommend the provision of preventive care as part of routine practice (21–23).

Detection of lifestyle risk factors by GPs has consistently found to be inadequate. In one German study, GPs failed to recognize current smoking and/or nicotine dependence in 25% of their patients (24), while an Australia study reported that smokers were identified in only 32% of consultations (25). A recent meta-analysis found alcohol problems were correctly identified by GPs in only 27% of cases (26). Further, detection of overweight was identified in only 20–30% of patients, while obesity was correctly detected in 50–65% of cases (27). As detection is the necessary first step in providing appropriate treatment, it is critical that GPs identify all patients with risk factors to ensure appropriate intervention occurs.

Over the last three decades, there has been considerable focus on increasing the provision of preventive health care in primary care (21,23). In Australia, this has been reflected in the development of government policies and health reforms (28–30), investment in the development of clinical practice guidelines (22,31), educating physicians about detection of smoking and alcohol use in undergraduate medical curricula (32), increases in remuneration for the provision of preventive health care (33) and growth in the employment of practice nurses able to provide preventive care on behalf of GPs (34,35). Despite this substantial investment, it is unknown whether these strategies have resulted in increased detection of lifestyle risk factors by GPs.

**Objectives**

To examine whether sensitivity and specificity of GP detection of smoking, alcohol consumption above recommended levels and overweight and obesity has increased in Australian general practice consultations between 1982 and 2011.

**Methods**

Data from four studies (published in six manuscripts) examining GP detection of risk factors conducted in Australia between 1982 and 2011 were compared (36–41). Only studies that included multipractice, multi-GP, Australian-based studies that reported primary quantitative data on GP detection of modifiable risk factors between 1980 and 2013 were included. These studies were selected for comparison given the similar methodologies used to determine detection (i.e. direct comparison between GP report and patient report). Studies that included data from a single site were excluded given the potential for limited generalizability of results. The decision to restrict studies to those conducted in Australia was made because it provided a single health care context to consider when interpreting the results. Detailed methodology is provided in each of the original publications. Table 1 provides a summary of data collection methods and definitions of behavioural risk used for each study. A summary of each study is discussed in the following sections.

**Reid et al. (40): Detection of patients with high alcohol intake by general practitioners**

**Aim**

To assess the degree to which GPs correctly detect patients who consume alcohol at excessive levels.

**Design**

Cross-sectional survey.

**Sample and eligibility**

Fifty-six GPs (52%) agreed to participate in a study investigating quality of care. Eligible patients were invited to participate if they were attending a consultation with a participating GP, were aged >18 years, could read and write English, consented to video recording of their consultations and were not too ill or in too much pain. A total of 2437 patients (83%) consented to participate and completed a pen-and-paper questionnaire prior to their consultation, which included a quantity frequency measure of alcohol consumption. After each consultation, GPs completed a short questionnaire that included an item about whether the patient’s alcohol consumption was light, moderate, heavy or if they were unaware of the level of consumption. At the completion of the research, all GPs indicated how they defined light, moderate and heavy drinking in standard drinks per day.

**Analysis**

Questionnaires were completed by 2081 of the 2437 consenting participants (70.9% of the eligible sample). Data from four patients were excluded from analysis leaving an effective sample of 2077 patients. Sensitivity and specificity were calculated based on patient self-report from the quantity frequency questionnaire and GP self-report, using criteria set by the Australian Medical Association.

**Dickinson et al. (37): General practitioners detection of patients’ smoking status**

**Aim**

To assess (i) GP opinions about what smoking detection rates should be in their practice; (ii) how well GPs detect smoking status of patients in their practice; (iii) patient predictors of detection by GPs and (iv) GP attitudes about the value of treatments for smoking.

**Design**

Cross-sectional survey.

**Sample and eligibility**

All full-time GPs within one area of New South Wales, Australia, were approached and randomly sampled. Eligible patients were invited to participate if they were attending a consultation with a participating GP, aged >18 years and able to complete the survey without impediments. Fifty-six GPs (52%) and 2234 patients (83%) consented to participate. Patients completed a pen-and-paper questionnaire prior to their consultation, which included questions about smoking. GPs completed 24 questions, either during the consultation or immediately after, where they were asked to indicate if the patient smoked.
<table>
<thead>
<tr>
<th>Study</th>
<th>Data collection method</th>
<th>Definition of risk</th>
</tr>
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<tbody>
<tr>
<td><strong>Smoking</strong></td>
<td></td>
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<tr>
<td>Reid et al. (40)</td>
<td>Patient self-report of smoking status and cotinine measures for 23% of patients</td>
<td>At risk if response: ‘I am a regular smoker’ or ‘Yes, I smoke occasionally’</td>
</tr>
<tr>
<td>Dickinson et al. (37)</td>
<td>Patient self-report of number of cigarettes</td>
<td>At risk if either: ‘Regular smoking’ ≥ 1 cig/day or ‘Occasional smoking’ 1–6 cigs/week</td>
</tr>
<tr>
<td>Heywood et al. (38)</td>
<td>Patient self-report of number of cigarettes</td>
<td>At risk if response ‘I smoke daily’ or ‘I smoke occasionally’</td>
</tr>
<tr>
<td>Yoong et al. (41); Paul et al. (39); Bryant et al. (36)</td>
<td>Single question from NSW Health Survey — five response options</td>
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<tr>
<td><strong>Alcohol consumption</strong></td>
<td></td>
<td></td>
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<tr>
<td>Data collection method</td>
<td>Patient self-report, 7-day diary recall of number of standard drinks</td>
<td>Modified AUDIT-C questionnaire for alcohol screening</td>
</tr>
<tr>
<td>Definition of risk</td>
<td>Average ≥ 6 standard drinks/day (males) or average ≥ 4 standard drinks/day (females)</td>
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<tr>
<td><strong>Overweight/obesity</strong></td>
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<tr>
<td>Data collection method</td>
<td>BMI, calculated from self-reported height and weight multiplied by a factor determined from measurement of a subsample</td>
<td></td>
</tr>
<tr>
<td>Definition of risk</td>
<td>BMI ≥ 25 overweight</td>
<td></td>
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</table>

N/R, data related to risk factor not reported in paper.

*Criteria set by the Australian Medical Association.

†National Health and Medical Research Council Guideline.
Analysis
Six GPs were involved in pilot testing and thus were excluded from further analysis, leaving data for 50 GPs. Matched GP and patient data were missing for 190 patients, leaving an effective sample size of 2044 patients. Sensitivity and specificity were calculated using patient and GP self-report data. Patient self-report was confirmed using cotinine for 23% of patients.

Heywood et al. (38): Risk prevalence and screening for cancer by general practitioners

Aim
To assess (i) the prevalence of risk factors for cardiovascular disease in patients attending general practices; (ii) the extent to which GPs identified risk factors; (iii) the extent that screening was undertaken by GPs during consultations; (iv) the patterns of advice/counselling with respect to cardiovascular risk factors and (v) the type of consultations where preventative action was taken.

Design
Cross-sectional survey.

Sample and eligibility
A random sample of metropolitan GPs and all full-time GPs in one rural town was approached. A total of 230 full-time practicing GPs (72%) and 7160 adult patients (91%) consented to participate. Eligible patients were invited to participate if they were attending a consultation with a participating GP, aged 18–75 years, literate in English, and mentally and emotionally capable of completing the survey. Patients completed a self-administered questionnaire prior to their consultation providing information on smoking, alcohol intake and weight. GPs completed a questionnaire regarding content and reason for the consultation, and knowledge of smoking, alcohol and weight risk factors (yes, no or do not know).

Analysis
Sensitivity and specificity were calculated using patient and GP self-report data.

Yoong et al. (41): A cross-sectional study examining Australian general practitioners’ identification of overweight and obese patients; Paul et al. (39): Under the radar: a cross-sectional study of the challenge of identifying alcohol consumption above recommended levels in the primary care setting; Bryant et al. (36): Missed opportunities: general practitioner identification of their patients’ smoking status

Aim
To assess the extent to which GPs identify the presence of lifestyle risk factors and screening for cancer or cardiovascular risk factors in their patients.

Design
Cross-sectional survey.

Sample and eligibility
Fifty-three GPs (63%) and 4079 patients (86%) from 12 practices. Eligible patients were invited to participate if they were attending a consultation with a participating GP for care, aged 18 years or older, able to complete the survey in English and able to give informed consent. Patient self-reported data on risk factors (weight, height, smoking behaviour and alcohol consumption) were collected via touch screen computer. GPs completed a one-page paper-and-pen survey to report their perception of whether the patient was at risk for each category (yes, no, unsure or not applicable).

Analysis
Fifty-one GPs completed at least one survey and were included in the analysis. GPs completed a survey for a subsample of 1720 patients. For these patients, prevalence was calculated for each risk factor. Sensitivity and specificity were calculated by comparing patient and GP self-report for each risk factor. If patients did not provide a response for a risk factor, exited the survey prior to completion, or if GPs reported being unsure of the presence of a risk factor, data were excluded from analysis. The following numbers of patients were therefore included in calculations of sensitivity and specificity: smoking, 1626 patients; alcohol consumption, 1607 patients; overweight and obesity, 1523 patients. Patient demographic characteristics are reported for the entire sample of 1720 patients.

Statistical analysis
Data for all risk factors were not available for all studies; comparisons for smoking and overweight and obesity were made between three studies, while comparisons for risky alcohol consumption were made between two studies. The number of patients meeting behavioural risk criteria for overweight [body mass index (BMI) ≥ 25 and < 30] and obesity (BMI ≥ 30) was reported separately in Yoong’s 2011 study but are combined in this analysis to enable comparisons.

Patient and GP characteristics are presented for each study using counts and proportions, with differences examined using the P value resulting from Pearson’s chi-square and exact tests. The prevalence of each risk factor is presented for the overall sample and separately by gender dependent upon the data provided in the primary studies. Cochran–Armitage (chi-square) tests were used to assess for each risk factor whether the underlying prevalence and detection rates (sensitivity and specificity) reported in each study differed over time; this was also performed separately by gender when results were available. Sensitivity was defined as the proportion of individuals correctly identified by their GP as having a risk factor when the individual had self-reported presence of the risk factor. Specificity was defined as the proportion of individuals correctly identified by their GP as not having a risk factor when the individual had self-reported not having the risk factor.

Results
Characteristics of GP and patient samples

Tables 2 and 3 outline the characteristics of GP and patient samples across studies, respectively. In studies for which data were reported, the majority of GPs were male, aged between 35 and 54 years, and had been practicing for > 10 years. There were statistically significant differences in the gender (P < 0.0001) and age (P < 0.05) of GPs between studies. There were no significant differences between samples in the proportion of male patients; however, the proportion of older patients was higher in the Yoong et al. study compared to Heywood et al.

Changes in prevalence of risk factors over time

Table 4 shows changes in the prevalence of risk factors over time. Prevalence of smoking decreased significantly in overall samples between 1989 and 2011 (31–11%, P < 0.0001), and in both males (27–14%) and females (23–10%) between 1994 and 2011.
Risky alcohol consumption increased in overall samples between 1986 (1.9%) and 2011 (21%; P < 0.0001), and in both males (4–29%) and females (1–15%) between 1994 and 2011 (P < 0.0001). There was a significant increase in the prevalence of individuals who were overweight and obese from 1994 to 2011 for both males and females.
Changes in detection rates over time

Table 5 shows changes in GP detection of risk factors over time. There were no statistically significant changes in the sensitivity of GP detection of smoking (P = 0.09) or overweight or obesity (P = 0.27) over time. Specificity of detection of smoking increased significantly from 64.7% to 98% (P < 0.0001). There was a significant decrease in specificity of detection of overweight or obesity from data collected in 1994 (92%) to 2011 (89%); (P = 0.01). There is some evidence towards sensitivity for alcohol detection decreasing (P = 0.02) and specificity increasing (P = 0.01) over time.

Discussion

This paper examined whether sensitivity and specificity of GP detection of smoking, excessive alcohol consumption and overweight and obesity has changed in Australian general practice consultations using data from four studies conducted using a similar methodology between 1982 and 2011. Failure to identify all patients with a modifiable risk factor represents an important missed preventive health care opportunity.

The significant changes in risk factor prevalence over time reflect changes found in larger Australian data sets. For example, changes in smoking from 31% in 1982 to 11% in 2011 are consistent with national surveys conducted during similar time periods (3,42). Increases in overweight and obesity also reflect trends consistent with national data (43) and other developed countries with similar profiles to Australia. The large differences found in the prevalence of risky alcohol consumption over time may be a result of differences in methods of assessment used between studies, as well as changes in definitions of ‘risky’ alcohol consumption used in national guidelines (44).

Overall, the sensitivity of detection of smoking, risky alcohol consumption and overweight and obesity has remained the same over the time period examined. Given that in each study participating GPs knew their knowledge would be compared to patient self-report, it is likely that actual detection rates in routine clinical practice would be lower. The significant increase in specificity of detection of smoking is likely to be the result of the overall decrease in population smoking rates (3,42). There were no statistically significant changes in the sensitivity of GP detection of smoking or overweight or obesity over time. Further, the sensitivity for detection of alcohol problems was almost identical in the oldest and most recent studies (around 27%), increasing only in Heywood’s et al. 1994 study (40%). However, the large sample size in Heywood’s et al. study may have influenced the direction of the trend and subsequent P value. Hence, the significant results should be treated with caution. A small decrease in specificity for overweight and obesity was observed. This may be due to the normalization of excess weight given increasing rates of overweight and obesity in the general population, which could have led to an overweight patient being perceived as being normal weight. The changes in specificity for risky alcohol detection over time are more difficult to interpret, but as stated above, may reflect changes in clinical practice guidelines between 2001 and 2009 regarding definitions of ‘risky’ alcohol consumption. Overall, this analysis suggests that strategies implemented to increase provision of preventive health care may not have had any lasting effect on GP detection of these risk factors.

There are several possible reasons for the identified continued low rates of detection of lifestyle risk factors. Unlike other risk factors such as blood pressure or high cholesterol, detection of lifestyle risk factors in the primary care setting largely relies on patient self-reported behaviour. GPs may be less comfortable assessing these risks, particularly those perceived as sensitive such as alcohol use (45), compared to those for which there are easily assessed biomarkers. While environmental factors (e.g. social factors, poverty) can strongly influence lifestyle risk factors (43,44), these are perceived to be under patient control to a certain degree. Therefore, GPs may have concerns about patients’ reactions when questioned about lifestyle risk factors (46), and lack the skills and confidence to assess sensitive issues (47). Lifestyle risk factors are also complex to treat, requiring ongoing changes to behaviour, and often require multiple attempts before success is achieved. For example, around 40% of smokers have two unsuccessful quit attempts each year (46). Therefore concerns about lack of skill to address these complex behaviours (47) and lack of time available to spend addressing lifestyle risk factors may serve as a barrier to detection (48).

The continued low rates of detection of lifestyle risk factors suggest the need to develop and implement effective strategies to support the provision of preventive care in primary care. System-based approaches that address multiple barriers to preventive care may be a promising option. One review indicated mixed evidence for computerized decision support on improving preventive care in primary care (49), while another showed a modest impact on professional practice for computer generated patient education materials on preventive care and mixed effects on patient outcomes (50). Clinician reminder systems have also been shown to produce modest improvements in preventive care, particularly for smoking care (51). While promising, these strategies require further investigation to determine which combinations are likely to be the most effective, and the circumstances and behaviours for which they are most appropriate.

Table 5. Comparing the sensitivitya and specificityb of GP detection rates of smoking, risky alcohol consumption and overweight or obesity across four studies

<table>
<thead>
<tr>
<th></th>
<th>Reid et al. (40)</th>
<th>Dickinson et al. (37)</th>
<th>Heywood et al. (38)</th>
<th>Young et al. (41); Paul et al. (39); Bryant et al. (36)</th>
<th>P value for slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>Sensitivity</td>
<td>N/A</td>
<td>56.2%</td>
<td>66%</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td>Specificity</td>
<td>N/A</td>
<td>64.7%</td>
<td>87%</td>
<td>98%</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>Sensitivity</td>
<td>27.5%</td>
<td>N/A</td>
<td>40%</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>Specificity</td>
<td>95.8%</td>
<td>N/A</td>
<td>82%</td>
<td>96%</td>
</tr>
<tr>
<td>Overweight or obesity</td>
<td>Sensitivity</td>
<td>N/A</td>
<td>N/A</td>
<td>59%</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>Specificity</td>
<td>N/A</td>
<td>N/A</td>
<td>92%</td>
<td>89%</td>
</tr>
</tbody>
</table>

N/A, not applicable.
aCorrectly detect risk factor.
bCorrectly detect absent risk factor.
Investigation of the effectiveness of strategies to increase detection rates should be conducted with the principles of knowledge translation in mind. In order to increase the adoption of effective interventions into routine practice, it is critical that systems are developed that have clear advantage in effectiveness and/or cost-effectiveness; are simple to use; address barriers and can be easily modified or adapted to suit the needs of specific organizations.

Strengths and limitations
All included studies reported high patient consent rates indicating that patient samples were reasonably representative of patients attending participating practices. While consent rates for GPs were lower than that for patients, all studies were multisite and included >50 GPs, providing a snap shot of Australian general practice care at the time the survey was conducted. However, study findings need to be considered in light of several limitations. First, there were differences between the questions used to identify risk factors between studies, and in the criteria used to define risk. This may have resulted in differences in prevalence rates and calculations of sensitivity and specificity. Second, because different demographic data were reported in each study, or data were reported differently, the demographic characteristics that could be compared between patients and GPs were limited.

Conclusions
Despite significant investment in strategies to increase GP detection and intervention for lifestyle risk factors over the previous three decades, GP detection of smoking, risky alcohol consumption and overweight and obesity has remained low. Effective strategies to support the provision of preventive care in the primary care setting are needed.

Declaration
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References


