Occupational health in general practice in an industrial area of Singapore

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The aim of this study was to estimate the caseload with regard to the proportion of work-related medical cases in factory workers and to survey knowledge of and attitudes to occupational medicine among doctors in an industrial area in Singapore. To this end, a self-administered questionnaire was given to 74 general practitioners in the industrial district of Jurong in Singapore. Overall, there was an 89.2% response rate. Thirty-three of the 66 respondents were males. Mean age was 40.8 years (range 27–64 years). Twenty-four (36%) had some postgraduate training in occupational medicine (GP-OM) while the rest did not (GP). The caseload for all doctors was similar with regard to the number of adult patients and, more specifically, the number of factory workers seen per day. The majority of doctors (76.6%) felt that <10% of factory workers seen had work-related problems. Most (70%) felt confident in dealing with the occupational problems that arose. However, a large percentage (78% of GPs, 45.8% of GP-OMs) felt that training in occupational medicine was inadequate. This is reflected in the knowledge questions, where GPs did not score as well as GP-OMs. It was concluded that GPs working in this industrial area see a good proportion of factory workers, in a fair number of cases for work-related problems. However, only a third of the GPs are qualified in occupational medicine. These factors highlight the need for more emphasis on occupational medicine training among general practitioners, especially those working in industrial areas.

Key words: Industrial area; occupational medicine; primary health care.

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Introduction

Singapore is an island nation consisting of 3.9 million people, of which an estimated 1.98 million make up the labour force [1]. Currently, the main occupational health legislation in Singapore is the Factories Act [2], by which only factory workers (making up 37% of this labour force) are covered. The purpose of the legislation is to protect workers at highest risk and to concentrate the occupational health and safety resources so that they serve those at highest risk [3]. In 1996, there were a total of 16 605 factories registered in Singapore. Of these, 8808 were involved in manufacturing; 5580 in construction; 83 in shipbuilding and repairing; 263 in commerce; 683 in transport, storage and communications; and 1341, in community, social and personal services [4].

General practitioners (GPs), working in private practice or in government polyclinics, see the bulk of factory workers. Some have completed various forms of training in occupational medicine, either as a diploma or masters degree at the National University of Singapore [5]. Thus, among GPs, two main groups can be identified: those who have not had further training (GPs) and those who have (GP-OMs). This is similar to other developed countries [6,7].

GPs are expected to cover a spectrum of medical conditions in order to recognize and treat common ailments, as well as recognizing when appropriate referral is necessary. Therefore, some basic knowledge about occupational health is expected. Also, all registered
medical practitioners in Singapore are expected to be able to identify, and thus notify, suspected cases of occupational disease to the Ministry of Manpower on prescribed forms (Appendix 1). These would then be investigated by the Occupational Health Department to determine whether they were indeed related to occupation. Furthermore, GP-OMs are able to perform the medical examination and tests required for factory workers who are exposed to a list of hazards, including arsenic, asbestos, benzene, cadmium, raw cotton, lead, manganese, mercury, noise, organophosphates, perchloroethylene, silica, tar, pitch, bitumen and creosote, trichloroethylene, vinylchloride monomer or who work in compressed air.

**Objectives**

This study aims to estimate the caseload of GPs in an industrial area in Singapore, in particular with regard to the number of factory workers seen, as well as to estimate the proportion of work-related illness.

A brief assessment of GP knowledge on occupational medicine was also undertaken. Attitudes of GPs with regard to confidence in managing cases, their perception on adequacy of training and suggestions for improvement were also sought.

**Methodology**

The constituency of Jurong was chosen as the site for this study because it is one of the more industrialized regions of Singapore. GPs in private practice, as well as in government service, working in the Jurong Industrial Area were located from several sources, such as the College of Family Physicians Singapore, the Singapore Medical Council, the telephone directory and a personal survey of the area (by L.P.L.). There were a total of 74 GPs in this area.

A self-administered questionnaire was personally delivered to individual doctors. The questionnaire included, amongst other things, personal demographic details and estimate of overall caseload, as well as number of factory workers seen. GPs were also asked about their confidence in managing OM cases, as well as completing questions testing knowledge (Appendix 2) relating to notifiable occupational diseases in Singapore. Finally, suggestions for improvement of the referral system and knowledge of OM in the GP setting were solicited.

A pilot study was conducted in a small sample of GPs to check for ambiguities in the questionnaire. The survey proper was subsequently conducted from mid-1994 to early 1995. Data were entered and analysed using an application of the dBase IV program. \( \chi^2 \) tests were used to assess differences between groups, with significance at a \( P \) value of 0.05.

**Results**

A response rate of 89.2% was achieved. Demographic details of the respondents are shown in Table 1. There were three non-respondents and five refusals.

There were equal numbers of males and females among the 66 respondents. The mean age was 40.8 years (27–64 years). Forty-two doctors did not have any postgraduate training in OM (GP), while the other 24 had attended either a masters course in OM or a course for designated factory doctors (GP-OM). The GP group had a significantly greater proportion of younger doctors and females compared with the GP-OM group.

To obtain a description of the patient profile amongst different groups of GPs, the respondents were asked to estimate their overall caseload for all patients, as well as just factory workers. They were also asked to estimate the number of patients who they believed to have work-related illnesses. This varied greatly, ranging from 10–19 to >70 per day (Table 2). A large proportion of doctors (40.9%) see >60 patients daily, most being adult patients (Table 3).

The estimated number of factory workers seen daily is shown in Table 4. There were no significant differences between the GP and GP-OM groups in the proportions.
of doctors who saw the same number of factory workers daily. Over two-thirds of the doctors saw >10 factory workers per day.

Table 5 shows the proportion of factory workers seen by the doctors and who the doctors thought had work-related disorders. Overall, the majority (76.6%) believed that <10% of factory workers presented with work-related problems.

Most of the respondents (70%) felt confident in dealing with the occupational problems that presented. However, a large percentage (66.2%) felt that training in OM was inadequate.

The results of the questions relating to occupational health are given in Table 6, which illustrates the proportion of doctors in the particular group who answered correctly. The GP-OMs scored better than the GPs.

**Discussion**

Overall, an excellent response rate of 89.2% was achieved. This is much higher than previous studies among health care workers in Singapore, which had response rates of 30–40% [8,9]. The high response rate was probably because of repeated personal visits or phone calls by the investigator (L.L.P). However, one major limitation of this study is recall bias, because it depended on the recollection of the doctors. The study also focused on factory workers and thus may not be generalizable to all workers. Nevertheless, it does give an indication of caseloads seen by GPs in an industrial setting in Singapore.

**Patient profile**

From the results, it can be seen that both GPs and GP-OMs see similar numbers of patients daily, as well as similar proportions of adult patients. Also, all (except one who did not answer) admits to seeing some factory workers daily. There were no significant differences in patient profile when the two groups were compared. Altogether, 67.7% of doctors interviewed saw >10 factory workers daily (with 35.4% seeing >30 factory workers per day). Thus, it is evident that a good proportion of patients seen by GPs in this industrial setting are factory workers.

**Estimate of workers with work-related illnesses**

In both groups, the majority thought that the proportion of factory workers who they saw for work-related problems was <10%. However, this still indicates a fair proportion of cases seen by GPs. Unfortunately, other sources for comparison of the true estimates of work-related problems in a similar setting are limited. Merrill et al. [10] attempted to estimate the number of patients seen per week with work-related or work-affecting conditions in a town in the USA. Although family physicians were found to see 7.5 patients per week in this category, it
is not known what proportion this group accounts for in the overall workload of the doctors and, thus, the impact of OM on primary care.

Care must also be taken in the interpretation of these figures as a true estimate of work-related illness in the primary care setting, because it is dependent on the recall by GPs and also their pre-existing knowledge and awareness of occupational health. Thus, this should not be seen as an indication of the actual incidence of occupational disease, but as a reflection of the workload of the GPs.

Indeed, increased awareness may also lead to the reporting of an increased proportion of work-related illness seen in primary care. Studies conducted elsewhere, assessing possible occupational links to illness of patients admitted to medical wards, have found that a high proportion of relevant occupational exposures remain unrecognized because of inadequate knowledge in OM among physicians and even simply due to failure to elicit an occupational history [6,11].

Prospective studies with strict criteria of what constitutes a work-related illness would be a more reliable method to assess the true number of cases seen by GPs. However, it must also be kept in mind that other barriers exist to the reporting of work-related illnesses, because of involvement with a third party—the employer [12].

**Knowledge of occupational medicine amongst doctors**

The constituency of Jurong was chosen as the setting for this study because it is one of the more industrial regions in Singapore. Thus, within Singapore, it is expected that the GPs in this constituency should know more about occupational health than their counterparts elsewhere. The questions asked relate to occupational diseases covered in the Factories Act [2] that are notifiable by law and should be familiar to all practising GPs. Thus, they reflect the basic general knowledge required by GPs working in Singapore. Overall, the level of knowledge in occupational health could have been better (the best scores were in the dermatology question).

A discrepancy should be noted in the finding that 70% of the doctors felt confident in dealing with the occupational health problems that they see, yet the knowledge score of legislated work-related health problems is poor. Further investigation is needed into what these doctors deem as work-related health problems to clarify this.

**Perceptions of adequacy of training in occupational medicine**

It is interesting to note from the survey that a large proportion of doctors felt that training in OM was inadequate. Others in the field of OM as well as family medicine have also acknowledged this. This stems from undergraduate training [13,14] to the postgraduate level, especially for GPs [15,16].

At the undergraduate level, where there is already a bulk of information for students to study, OM could be incorporated with other disciplines to illustrate the relationships between work and illness where relevant, rather than just increasing teaching time specifically for OM [13]. Although at the postgraduate level Singapore has established programmes for OM itself, as well as training in OM for family medicine trainees [5], the number of doctors who take up the courses is still small in comparison to the number of doctors who are currently practising as GPs. Nevertheless, the favourable response to a course (Diploma in Occupational Medicine) that was introduced in 1998 indicates a move in the right direction. However, other methods of increasing knowledge of OM could be considered.

**Suggestions to improve knowledge in occupational medicine**

Suggestions made by the respondents to improve OM knowledge include: providing feedback to doctors referring cases to OM specialists (learning on a case-by-case basis); lunchtime presentations on work-related illnesses with case discussions; and encouraging more doctors to attend courses in OM, as well as updating knowledge for those who have had prior training.

For a busy doctor, the first suggestion could act as a first positive step. This would also help establish communication links between GPs and occupational health specialists, and thus also a sharing of information [17]. A survey by Parker [18] in the UK also found that GPs would like more communication between themselves and OM specialists.

**Conclusions and recommendations**

This survey has illustrated that GPs in an industrial area in Singapore see a large proportion of factory workers, including a proportion who present with work-related medical problems. There is, thus, likely to be a significant burden of work-related problems presenting to GPs.

However, it has been shown that few GPs are qualified in OM and they may also tend to overestimate or be overconfident of their own knowledge of work-related problems. These factors reflect the need for more OM education.

Fortunately, the majority of doctors felt that further training in OM would be useful. Methods to increase knowledge and awareness should start at the undergraduate level, with further postgraduate training, as well as improving communication between GPs and OM specialists. This should help with increasing detection of work-related illnesses.
Further research with regard to the patient profile and typical work-related illnesses seen in the GP setting is also needed to provide more information about the numbers and types of problems seen, as well as to identify true areas of weakness in knowledge and thus requirements in education.

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References
Appendix 2. Questions used to test the knowledge of GPs

1. a. In your opinion, what proportion of cases of dermatitis is in general work-related?
   (a) <10%
   (b) 10–24%
   (c) 25–49%
   (d) 50–74%
   (e) ≥75%

   b. Is irritant contact dermatitis more common than allergic contact dermatitis?

2. What occupational causes of anaemia do you know of? Please name three.

3. What occupational causes of bronchial-asthma do you know of? Please name three.

4. What work-place toxins can cause peripheral neuropathy? Please name three.