Comparison of work-related ill health reporting by occupational physicians and general practitioners

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Introduction

The provision of occupational health (OH) services to the UK workforce is widely understood to be very limited. One study estimated that just 12% of the working population had access to an occupational physician (OP) [1], whereas another study estimated the coverage of OH services at 34% [2]. The number of OPs working in the UK has been estimated as 5 per 100 000 employees [3]. These services are often concentrated in certain industries such as health & social care, while employees in sectors such as agriculture have poor access [1].

In comparison, all the UK population should have access to a general practitioner (GP), with GPs usually being the first port of call for all types of ill health including those with an occupational cause. Estimates suggest that >90% of patients consult their GP within a 5-year period [4].

A number of studies have compared the work of OPs and GPs, examining areas such as communication [5] and interaction [6] between doctors, and comparisons in case management [7]. However, a search of the published literature did not reveal any information on how differences in patient access and type of practice influenced the nature of the work-related ill health presented to these physicians.

The Health & Occupation Reporting (THOR) network [8] collects data on work-related ill health seen by a range of physicians including GPs, OPs and clinical specialists. THOR is therefore in a unique position to compare cases presented to, and subsequently reported by, physicians as cases of work-related ill health.
The objective of this study was to examine how reports of work-related ill health submitted by GPs to The Health & Occupation Reporting network in General Practice (THOR-GP) [9] compare with those submitted by OPs to the Occupational Physicians Reporting Activity (OPRA) scheme [10] and to assess how biases in the coverage of OH services in the UK affect diagnostic and demographic differences.

**Methods**

OPRA and THOR-GP are surveillance schemes that perform an observatory function by collecting data on work-related ill health. OPRA has collected data from OPs since 1996, while THOR-GP was established in 2005 to collect information from GPs trained to the level of Diploma of the Faculty of Occupational Medicine (DOccMed). Both schemes follow similar data collection methods that have been described previously [9,10], with OPs using both paper-based (report card) and electronic (Internet-based) reporting methods, and GPs exclusively using an Internet-based ‘webform’. Reporters comprise a mix of ‘core’ participants who submit cases every month and ‘sample’ participants who report for one randomly assigned month per year. Cases submitted by ‘sample’ reporters are multiplied by 12 and added to the ‘core’ reporting subtotals to give estimated annual totals. Both OPs and GPs are given similar clinical guidance for case submission and instructed that any report should be a new case of work-related ill health. OPs’ cases by the proportion of GPs’ cases.

Details reported include demographic information (age, gender and postcode area) diagnosis/symptoms, occupation, industry and suspected causal agent/task/event. GPs provide additional information on sickness absence related to the condition and on patient referrals to clinical specialists or other health services. Physicians are asked to return a blank report if they have seen no relevant cases in any reporting month.

Actual cases (not estimated totals) reported to THOR-GP and OPRA from 2006 to 2007 (the first two full calendar years of THOR-GP data collection) were analysed using SPSS (version 15). Differences in GPs’ and OPs’ reporting patterns by diagnosis and gender were examined using Mantel–Haenszel likelihood ratios (LRs), which were subsequently stratified and adjusted by industry. LRs were calculated using Stata (version 9) by dividing the proportion of OPs’ cases by the proportion of GPs’ cases.

**Results**

On average, 276 GPs reported to THOR-GP per year (2006–07), and 433 OPs reported to OPRA. The majority of GPs were ‘core’ reporters, while most in OPRA participated on a ‘sample’ basis. The ‘core’:‘sample’ ratio in THOR-GP was 9:1, while in OPRA this was 1:9, resulting in 266 GPs and 68 OPs reporting each month. GPs returned 2872 cases (2923 diagnoses) of work-related ill health (0.4 cases/reporter/month), whereas OPs returned 3360 cases (3381 diagnoses) (2.1 cases/reporter/month). The mean age of cases reported by GPs was significantly younger: GPs 40.3 years and OPs 43.7 years ($P < 0.001$). Differences were shown particularly in the proportions of younger patients; GPs reported 15% of cases aged 16–25 years, whereas OPs reported just 6% (Figure 1).

Reports to both schemes were predominantly cases of musculoskeletal and mental ill health, making up >80% of the diagnoses. However, the majority of GP cases were musculoskeletal, whereas OP reports were more frequently mental ill health (Table 1). The LR (1.78) showed that the likelihood of a case report involving a mental ill health diagnosis was 78% higher for OPs than GPs.

For musculoskeletal diagnoses, both OPs and GPs reported most cases as disorders of the hand/wrist/arm [GPs $n = 404$ (26%), OPs $n = 397$ (35%)] and lumbar spine/trunk [GPs $n = 465$ (30%), OPs $n = 294$ (26%)]. Both groups of physicians reported similar proportions of skin disease (GPs 9%, OPs 6%) and respiratory disease (GPs 3%, OPs 3%); the majority of cases within these categories being contact dermatitis and asthma or ‘other respiratory disease’, respectively. Most of the ‘other respiratory disease’ cases were rhinitis or symptoms such as wheeze and breathlessness not reported specifically as asthma. Noise-induced hearing loss made up most of the audiological reports. Cases not classified within the five major diagnostic categories, such as ocular diagnoses, injuries and infections, were included within the ‘other’ category.

OPs reported 52% of cases in females overall, whereas GPs reported 44% (chi squared $P < 0.001$). The LR for
reporting of female cases by OPs compared to GPs was 1.18 (i.e. 18% higher for OPs than GPs). A higher proportion (%) of case reports for males was noted in all diagnostic categories apart from mental ill health for both OPs’ and GPs’ reporting (Table 1).

Case reports were analysed by employment sector using the Standard Industrial Classification (SIC) [11] and compared with employment information for the UK workforce using Labour Force Survey (LFS) data from 2006 to 2007 [12] (Figure 2). Both GPs and OPs returned cases most frequently from health & social care, but in greatly differing proportions (GPs 14%, OPs 38%). GPs reported higher proportions in construction and retail, while the converse was found for public administration & defence and education. Cases reported from each industry were analysed by diagnostic category (Table 2), with both GPs and OPs reporting the highest proportions of mental ill health in industries such as health & social care, education and public administration & defence. Both groups of physicians also showed similarities in reporting patterns for musculoskeletal cases, with the highest proportions found in construction and retail sectors.

The LR (1.78 overall) for OPs’ reporting of mental ill health diagnoses was analysed further to investigate whether this could be explained by differences in OPs’ industrial coverage (Table 3). After stratification by industry, the combined LR was 1.40 (95% CI: 1.31–1.49), showing that OPs’ cases are 40% more likely to be mental ill health diagnoses, even after adjustment for sector of employment.

Similar analysis was also carried out to assess the effect of employment sector on case reporting by gender (Table 3). Although the likelihood of OPs reporting female cases is 18% higher (LR 1.18) than it is for GPs, after adjustment for employment sector the combined LR is 0.90

**Table 1. Diagnostic groups and gender reported by OPs (OPRA) and GPs (THOR-GP) 2006/07**

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>OPs</th>
<th>GPs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Males</td>
</tr>
<tr>
<td></td>
<td>( n ) (%)</td>
<td>( n ) (%)</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>1130 (33)</td>
<td>632 (56)</td>
</tr>
<tr>
<td>Mental ill health</td>
<td>1802 (53)</td>
<td>741 (41)</td>
</tr>
<tr>
<td>Skin</td>
<td>218 (7)</td>
<td>115 (53)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>109 (3)</td>
<td>59 (54)</td>
</tr>
<tr>
<td>Audiological</td>
<td>49 (2)</td>
<td>46 (94)</td>
</tr>
<tr>
<td>Other diagnoses</td>
<td>73 (2)</td>
<td>41 (56)</td>
</tr>
<tr>
<td>Total diagnoses</td>
<td>3381 (100)</td>
<td>1634 (48)</td>
</tr>
<tr>
<td>Total cases</td>
<td>3360</td>
<td>1619 (48)</td>
</tr>
</tbody>
</table>

**Figure 2.** Cases of work-related ill health by industry reported by OPs (OPRA) and GPs (THOR-GP) 2006–07, compared to LFS data.
showing that OPs are 10% less likely to report females than GPs.

**Discussion**

Most cases of work-related ill health reported by OPs and GPs were musculoskeletal and mental ill health diagnoses. However, these two diagnostic categories differed in their reported proportions; OPs more frequently reporting mental ill health diagnoses, whereas GPs' reports were most frequently musculoskeletal. More detailed analysis showed marked differences within these categories with respect to age, gender and employment. Over a third of OPs' reports were from health & social care, whereas industries reported by GPs showed (proportionally) greater similarities to the employment patterns identified by the LFS. The differences in OPs' and GPs' reporting patterns for diagnostic category and gender appear to be linked to the industries from which the cases were derived, resulting in reporting differences for mental ill health diagnoses and female cases.

Work-related ill health reporting patterns in OPRA reflect the variation in OH provision for patients. THOR-GP may therefore give a more accurate picture of the overall burden of work-related ill health in the UK. However, OPs might, by virtue of their level of specialist training, give more specific diagnoses and assessments. Therefore, the potential importance of data from both OPRA and THOR-GP makes a comparison of information highly relevant to OH practitioners, as it presents both occupational ill health cases identified by OPs and OH services and those that are not. Without an increase in the provision of OH services, work-related ill health that does not present to OPs becomes the responsibility of GPs, very few of whom have specialist occupational medical training.

Data collected within OPRA and THOR-GP originate from surveillance methods that are practical, uniform and rapid. They allow early identification of new workplace hazards (perhaps from emerging industrial sectors) for which interventions can be identified before large numbers of employees have sustained harm to health. Participants in both schemes are recruited from sources such as specialist registers and participation lists from a postgraduate distributed learning course [13], producing a wide distribution of reporters throughout the UK.

### Table 2. Diagnoses reported by OPs (OPRA) and GPs (THOR-GP) by industry 2006/07

<table>
<thead>
<tr>
<th>Diagnostic category</th>
<th>Health &amp; social care n (%)</th>
<th>Construction n (%)</th>
<th>Public administration &amp; defence n (%)</th>
<th>Retail n (%)</th>
<th>Education n (%)</th>
<th>Other industries n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPs Musculoskeletal</td>
<td>324 (26)</td>
<td>74 (78)</td>
<td>194 (34)</td>
<td>18 (53)</td>
<td>32 (12)</td>
<td>483 (43)</td>
</tr>
<tr>
<td>Mental ill health</td>
<td>802 (63)</td>
<td>7 (7)</td>
<td>345 (60)</td>
<td>15 (44)</td>
<td>215 (79)</td>
<td>421 (38)</td>
</tr>
<tr>
<td>Other</td>
<td>144 (11)</td>
<td>14 (15)</td>
<td>32 (6)</td>
<td>1 (3)</td>
<td>24 (9)</td>
<td>215 (19)</td>
</tr>
<tr>
<td>Total</td>
<td>1270 (100)</td>
<td>95 (100)</td>
<td>571 (100)</td>
<td>34 (100)</td>
<td>271 (100)</td>
<td>1119 (100)</td>
</tr>
<tr>
<td>GPs Musculoskeletal</td>
<td>166 (43)</td>
<td>240 (79)</td>
<td>112 (41)</td>
<td>168 (62)</td>
<td>39 (24)</td>
<td>825 (56)</td>
</tr>
<tr>
<td>Mental ill health</td>
<td>187 (48)</td>
<td>23 (8)</td>
<td>120 (44)</td>
<td>84 (31)</td>
<td>104 (65)</td>
<td>351 (24)</td>
</tr>
<tr>
<td>Other</td>
<td>34 (9)</td>
<td>42 (14)</td>
<td>40 (15)</td>
<td>21 (8)</td>
<td>17 (11)</td>
<td>299 (20)</td>
</tr>
<tr>
<td>Total</td>
<td>387 (100)</td>
<td>305 (100)</td>
<td>272 (100)</td>
<td>273 (100)</td>
<td>160 (100)</td>
<td>1475 (100)</td>
</tr>
</tbody>
</table>

### Table 3. The LR of OPs (OPRA) reporting cases of work-related mental ill health and cases in females compared to GPs (THOR-GP) by industry (with 95% confidence intervals) 2006/07

<table>
<thead>
<tr>
<th>Industry</th>
<th>% of mental ill health reported by OPs</th>
<th>% of mental ill health reported by GPs</th>
<th>LR (95% confidence intervals)</th>
<th>% of female cases reported by OPs</th>
<th>% of female cases reported by GPs</th>
<th>LR (95% confidence intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health &amp; social care</td>
<td>63</td>
<td>48</td>
<td>1.31 (1.17–1.46)</td>
<td>76</td>
<td>83</td>
<td>0.92 (0.87–0.97)</td>
</tr>
<tr>
<td>Construction</td>
<td>7</td>
<td>8</td>
<td>0.98 (0.43–2.21)</td>
<td>1</td>
<td>6</td>
<td>0.19 (0.03–1.40)</td>
</tr>
<tr>
<td>Public administration &amp; defence</td>
<td>60</td>
<td>44</td>
<td>1.37 (1.18–1.59)</td>
<td>41</td>
<td>40</td>
<td>1.03 (0.87–1.23)</td>
</tr>
<tr>
<td>Retail</td>
<td>44</td>
<td>31</td>
<td>1.43 (0.94–2.18)</td>
<td>65</td>
<td>54</td>
<td>1.20 (0.92–1.58)</td>
</tr>
<tr>
<td>Education</td>
<td>79</td>
<td>65</td>
<td>1.22 (1.07–1.39)</td>
<td>56</td>
<td>75</td>
<td>0.75 (0.65–0.86)</td>
</tr>
<tr>
<td>Other industries</td>
<td>38</td>
<td>24</td>
<td>1.58 (1.40–1.80)</td>
<td>32</td>
<td>37</td>
<td>0.89 (0.80–0.95)</td>
</tr>
<tr>
<td>Mantel–Haenszel combined</td>
<td></td>
<td></td>
<td>1.40 (1.31–1.49)</td>
<td></td>
<td></td>
<td>0.90 (0.86–0.95)</td>
</tr>
</tbody>
</table>
who provide data from a range of geographical areas. Work is in progress to characterize the denominators of both schemes and preliminary analysis of the industrial employment of the THOR-GP population has shown it to be proportionally very similar to that of the whole of the UK [9].

Unlike other data sources providing estimates of the burden of work-related ill health (such as the self-reported work-related illness data gathered by the LFS [14]), OPRA and THOR-GP reporting relies on medically qualified practitioners with training in occupational medicine. These reporters have skills and knowledge to provide objective evidence-based decisions, enabling them to consider work and its attribution in relation to ill health.

However, there are limitations to these surveillance methods, including case definition. Reports to OPRA and THOR-GP are based on physicians’ opinions about the work-relatedness of the condition [15], and although reporting guidelines [8] are available on the schemes’ websites, opinions are likely to differ. Studies within THOR have examined intra- and inter-group determinants of diagnostic labelling and attribution for work-related musculoskeletal conditions [15], asthma [16] and mental ill health [17]. Diagnostic labelling was not found to differ between OPs and clinical specialists for musculoskeletal disorders, occupational asthma and mental ill health diagnoses, while investigations of attribution found that rheumatologists and psychiatrists use similar criteria to OPs when assessing work-relatedness. The mental ill health study [17] has since been repeated for THOR-GP reporters and the study found that GPs also classified psychiatric diagnoses in a similar way to OPs and psychiatrists [18].

The mental ill health study [17] concluded that differences in reporting patterns resulted from the case mix presenting to OPs and psychiatrists, rather than different reporting preferences. Essentially, as a large part of an OP’s work involves assessment of fitness for work, and as mental ill health diagnoses are the largest contributor to work-related sickness absence (79% of mental ill health cases are certified unfit for work by their GPs compared to 42% of those with musculoskeletal diagnoses) [9], a greater proportion of employees with psychological problems associated with work are likely to require OH involvement than those with other diagnoses.

Additionally, as THOR-GP reporters are trained to DOccMed level, they may differ from other GPs not only in the cases that they see but also in their reporting preferences and patterns. THOR-GPs may also differ from other GPs in their working timetables (and therefore tasks) within their general practices. Ongoing work to understand the THOR-GP and OPRA denominators will enable a study of the demographics of patients registered with THOR-GP practices and the population served by OPs, which is essential to assess possible biases and make valid comparisons in incidence rates.

There are slight differences in the reporting methodology between OPRA and THOR-GP, including combined postal/card-based reporting and electronic reporting in OPRA and (solely) electronic reporting in THOR-GP, and in the ‘core’:’sample’ reporting ratios. This method for sampling physicians’ practice was established to try to minimize reporter fatigue [19] and encourage participation; its merits and disadvantages are currently being formally investigated in a randomized control trial examining ‘core’ and ‘sample’ reporting behaviour [20]. However, any variations in monthly case reporting are less likely to be a methodological problem for categories of commonly presenting work-related ill health, in comparison to rarer occupational diseases.

It is unsurprising that OPs reported more cases per reporter per month, as the relationship between work and health is at the heart of their day to day practice. Little information has been published about the proportion of clinical practice that is work-related, but one estimate from a general clinic in the USA reported that 39% of patients believed their ill health to be work-related [21]. Other studies based on GPs’ opinions have estimated a work-related cause in 7% [22] and 16% [23] of patients. A further study researching beliefs in assessing the work-relatedness of musculoskeletal diagnoses found that OPs estimated 44% of their clinical cases to be work-related, whereas rheumatologists thought only 7% were work related [15].

GPs’ reports for musculoskeletal disorders were proportionally highest within male-dominated professions (such as construction), while mental ill health cases were proportionally highest in industries such as health & social work where females make up ~75% of the workforce [12]. These sectors differ in the type of hazards to which workers are exposed, with high physical demands within the construction industry and exposure to psychological stressors [24] and increased awareness of mental ill health issues among healthcare workers. The bias in the distribution within UK industry of OH services is therefore likely to result in increased reports of mental ill health from OPs. As in this study, a predominance of work-related psychological ill health in females has been found in self-reports of work-related ill health [14], in studies of GP consultations [25] and in older OPRA data [10]. In comparison, work based on psychiatrists’ reporting indicated that males had higher rates of mental ill health than females [26].

Although some of the differences in reporting between OPRA and THOR-GP are likely to be an effect of industrial coverage, after adjusting for this, OPs are still shown to report higher levels of mental ill health than GPs. This suggests differences in case mixes or reporting thresholds. OPs are likely to raise the issue of work with patients with mental ill health problems...
more frequently than GPs (even those with DOccMed training) and take a more extensive work-related history, whereas GPs may focus on the presenting systems. One study assessed consultations with sick-listed patients with mental ill health problems treated by both an OP and a GP and found that OPs discussed working conditions in 43% of consultations compared to 28% for GPs’ consultations [7]. However, this difference may be lower in THOR-GP due to participants having some training in occupational medicine [27]. Another factor to take into account is an individual patient’s behaviour and description of symptoms; for example, a patient who felt that a work-related issue was causing psychological problems may consider which physician was in a better position to offer assistance. Differences in referral patterns between OPs and GPs may also have an influence on the results; for example, a GP may omit reporting a case as work-related if the patient is being referred for diagnostic or aetiological assessment, and such omissions may vary by diagnostic category. Results from THOR-GP show that respiratory and audiological cases are far more frequently referred than mental ill health and musculoskeletal diagnoses [28]. Further work on referral patterns is in progress.

Analysis of raw data showed that GPs reported more cases in males (and OPs reported slightly more in females); however, after adjustment for employment sector OPs were more likely to report males than GPs. This predominance of male case reports may be primarily due to the gender distribution of the UK workforce (54% males) [12], which is corroborated by a survey (in progress) of the workforce covered by OPs reporting to THOR. Of note, these results are contrary to other sources of data; the incidence of female self-reported work-related ill health is higher than for males [14], and morbidity statistics from general practice found that females had a much higher consultation rate than men [61% of total (all cause) consultations] [25].

THOR-GP highlights the value of work-related ill health data collected from general practice in estimating incidence, measuring trends and studying determinants of work-related ill health. Although OPs are best placed to report on the relationship between work and health and therefore provide valuable information about work hazards and the causes of ill health in the workplace, some sectors of the UK’s workforce have poor access to OH services, and reports from GPs help to inform about this ‘blind spot’. It is recognized that there is a lack of vocational occupational medical training in general medical education [29,30] that may lead to the work aspects of a patient’s ill health being unrecognized; however, as all participants in THOR-GP are trained to DOccMed level, a work-related case should be recognized as such.

Within each THOR-GP case report, reporters also include information on suspected agents/tasks/events, certified sickness absence and referrals to other health practitioners. The observatory function of THOR is further increased by this additional information, enabling ‘triangulation’ of the information provided by GPs, OPs and clinical specialists to build a better picture of work-related ill health in the UK. These data will assist in the identification of occupations and industries, diagnoses and exposures that result in sickness absence and also in the investigation of the burden of work-related ill health in primary and secondary care and in corroboration of self-reported work-related ill health.

Key points

• Occupational physicians and general practitioners showed similar reporting patterns for work-related ill health—the vast majority of cases being musculoskeletal and mental ill health diagnoses.
• Occupational physicians reported more mental ill health diagnoses and fewer female cases than general practitioners, which is probably a consequence of the industries from which their respective cases were derived. Over a third of occupational physicians’ reports came from health & social care, whereas general practitioners’ reporting was similar to the employment distribution of the UK workforce.
• Occupational physician and general practitioner data collected in parallel strengthen the observatory function of The Health & Occupation Reporting by ‘triangulation’.

Funding

THOR is partly funded by a grant from the Health & Safety Executive (HSE ref: 4307/R36.069, 4496/R60.002 to R.A. and co-investigators). This paper expresses the views of the authors and not necessarily of the funders.

Acknowledgements

We would like to thank all GPs who participate in THOR-GP and the OPs who participate in OPRA. Thanks are also to Susan Taylor for her administrative assistance.

Ethics committee

Multicentre Research Ethics Committee approval has been given for THOR (Reference number MREC 02/8/72).

Conflicts of interest

None declared.
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