Occupational Medical History Taking: How Are Today's Physicians Doing? A Cross-Sectional Investigation of the Frequency of Occupational History Taking by Physicians in a Major U.S. Teaching Center

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Occupational illness plays a prominent role in the health of society, yet physicians frequently neglect occupational history-taking both in clinical practice and in medical education. This study sought to examine the trends as well as related factors that influence the taking of occupationally related histories. A total of 2050 charts were reviewed for occupational information as well as several patient demographics. Physicians obtained gender and age histories in approximately 99% of their patients; however; they only completed an occupational history in 27.8%. Characteristics such as smoking, male gender, family cancer history, middle age, and medical (vs. surgical) admission were all correlated with obtaining an occupational history. Physicians continue to do a poor job of occupational history-taking and medical education must correct the situation. (J Occup Environ Med. *2004;46: 550–555*)

"*I have noticed bakers with swelled hands, and painful, too; in fact the hands of all such workers become much thickened by the constant pressure of kneading the dough.*" *Bernardino Ramazzini*

"*When a doctor arrives to attend some patient of the working class. . . let him condescend to sit down. . . if not on a gilded chair. . . on a three-legged stool. . . . He should question the patient carefully. . . . So says Hippocrates in his work 'Affections.' I may venture to add one more question: What occupation does he follow?*" *Bernardino Ramazzini*

Just as Hippocrates is often called the father of modern medicine, the doctor, Bernardino Ramazzini, is often called the father of occupational medicine. He was born in Italy in 1633. While a medical student, he became interested in the ailments and afflictions suffered by the worker. In 1682, after being appointed chair of theory of medicine at the University of Modena, he focused on worker diseases. He visited workplaces, observed worker activities, and discussed their illness with them. He soon came to realize that not all workers' diseases were attributable to their working environment; he found that many common workers' complaints and diseases were caused by prolonged, violent, awkward movement or posture. As the result of his many hours of questioning, observation, experiences, and

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study, he formulated and eventually authored the book called *De Morbis Artificum Diatriba* or, "The Diseases of Workers," which was put into print in 1700 and followed by a second edition in 1713.[1,2] Each chapter contains a description of a disease associated with a particular work activity followed by a review of the literature, workplace description, worker questionnaires and, lastly, a disease review with analysis, advice, and remedies. Ramazzini was said to have very regularly inquired about the details of his patients' jobs and their occupational exposures. He felt that all physicians should ask their patients "what is your job?" and then solicit details about the nature of that occupation.[2]

Clearly, occupational health continues to play a fairly important role in modern society. Occupational exposures contribute to the morbidity and mortality of many diseases. However, occupational diseases continue to be underrecognized even though they are responsible for an estimated 860,000 illnesses and 60,300 deaths each year (NIOSH). Studies have found that 75% of hospitalized and ambulatory primary care patients report hazardous exposures and 17% of those patients suspect that their illness is linked to their job. However, work-related illness is only diagnosed in approximately 10% of patients.[3–5]

Today, it is estimated the average American between the ages of 22 and 65 spends approximately 40% of his or her waking hours at work.[6,7] However, few studies have evaluated the burden and costs of occupational illness in the United States. A variety of organizations such as the Bureau of Labor, HICFA, National Institute of Occupational Safety and Health, and The National Center for Health Statistics conservatively estimate that there are approximately 6500 job-related deaths from injury, 13.2 million nonfatal injuries, and 862,200 illnesses in the U.S. civil workforce before 1996. The direct total cost is estimated at $65 billion, along with another indirect $106 billion, which brings the total cost to $171 billion. Injuries cost $145 billion and illnesses approximately $26 billion.[7–9]

Some authorities agree that many of these approximations and estimates are perhaps smaller than the actual reported numbers and that the true costs of occupational injuries and illnesses are in fact even more expensive. This is in sharp contrast to the limited public attention, medical resources, and societal concern devoted to occupational disease education, prevention, treatment, and amelioration.

A variety of factors are responsible for the present underrecognition of occupational illnesses.[10] Some of these factors include:

- The present managed care environment, which reduces the time available to take a complete occupational history;
- Primary care physicians often have a low index of suspicion that the source of a patient's problem could be a workplace exposure[11];
- Difficulties physicians can encounter in dealing with the workers' compensation system;
- Reluctance of patients to connect a health problem with their work (primarily because they fear they will lose their jobs); and
- Lack of formal training in occupational medicine.[12–14]

Past studies have revealed that the teaching of occupational medicine has not progressed. A survey of U.S. medical schools in the mid1990s revealed that only 68% taught occupational health in their curriculums; this figure has changed minimally compared with 66% in the 1983 academic year. The median required time was 6 hours in 1992, up slightly from 4 hours in previous studies of medical schools.[15,16]

Despite its importance, few studies seek to explore occupational history-gathering. Even fewer explore out-of-training, nonmedical student, practicing physicians' rates of occupational history-gathering and the factors that might influence this skill.

This study seeks to determine and further examine the frequency and trends as well as related factors that influence the taking of occupationally related histories by today's physician. It seeks to identify what factors could play a role as to whether a physician will explore a patient's occupational history and offers insight into why.

Methods and Materials

The project was reviewed and accepted by the University's Institutional Review Board (IRB). The study was conducted at 1 medical facility, a large major academic urban university teaching hospital that serves as a vast tertiary care facility, referral center, as well as level I trauma center, and is located in southwestern Pennsylvania.

The study was conducted by reviewing computerized medical records of adult hospital admissions. The first 1050 medical admission records and first 1000 surgical admission records, which spanned the months of January through March 2002, were selected and then analyzed. The patient's age, gender, history of smoking, family or self history of cancer, mention of the patient's occupation and any occupationally related information, as well as admitting diagnosis were abstracted. No patient identifiers were used.

Sex was coded as male, female, or unknown. Age was only recorded if the physician listed it in the history record; age was not extracted from the record by calculation (eg, using date of birth, and so on). It was listed as unknown if not recorded. The presence of a cigarette smoking history was also dichotomous, as either yes, indicating that a history was taken (not that the patient smoked) or no, indicating that no history was taken. Similarly, occupational history was also dichotomized as yes or no. It is patently important to note that any mention of occupation in the

hospital electronic record generated a yes or positive response. For example, recorded physician comments such as "unemployed" or "on disability" were scored as yes or positive answers. Although obviously not a complete occupational history was taken in these instances, the authors felt it was justified because it indicated that the interviewing physician had at least, at some basic level, inquired about employment. When available, the occupation as well as any details associated with the occupation was also extracted. If the physician recorded a family or self history of cancer, this was also noted. Unknown was used to signify that the physician was not able to gather the cancer information because of the clinical situation (eg, trauma, unconscious, altered mental status, intubation, and so on). The unknowns were collapsed into the yes response because it was felt by the investigators that this indicated that the physician decided that the information gathered was pertinent to management and had made the conscious decision to include the information but was not able to because the patient was limited in some manner because of the clinical situation.

The raw data was extracted from the computerized charts and entered directly into an Excel spreadsheet. Statistical data analysis was then performed using the statistical package Minitab.[32] The chi-squared test statistic was used to assess associations between categorical variables. Binary logistic regression was used to assess the likelihood that type of physician (surgical vs. medical) influences the obtaining of occupational history after adjusting for the other factors.

Results

A total of 2050 charts (observations) were reviewed; 1050 were from medical admissions and 1000 were from surgical admissions. It is roughly estimated that approximately 32% of the histories taken were by residents; the remaining were from attending physicians or were unknown. A very few were from other allied healthcare providers. Approximately 51% were male and 49% were female. The mean age was 59.3 with a standard deviation of 18.1 (range,18–98 years). Figure 1 displays the age distribution.

Table 2 summarizes the percent of times that occupational history was listed on the chart by patient characteristics and record type. Overall, 27.8% of the records contained some indication of occupational history. Medical charts showed occupational history more often than did surgical charts (32% vs. 23%, respectively; $P < 0.001$).

Age was divided into 3 different ranges reflecting young, middle age, and older. Recording of occupational history was significantly more prevalent in charts of middle-aged patients than in the younger or older. A significantly greater percent of male patients (35%) have occupational history recorded in their admission record as compared with females (21%).

Ascertainment of smoking history was found in 78% of the records. Of those charts with a smoking history, 38% of the patients admitted to either being a former or current smoker. If the physicians gathered a smoking history, they were significantly more likely to have also gathered an occupational history (33.8% vs. 8.8%; $P < 0.001$).

Cancer history was obtained in 42.9% of the charts. Physicians were not able to obtain a cancer history for an additional 14.1% because of the patient's clinical situation (eg, trauma, unconscious, and so on) and are classified as unknown in Table 2. Physicians who gathered a cancer history were significantly more likely to have also gathered an occupational history (37% vs. 26%; $P < 0.001$).

Several multiple logistic regression models were fit to the data. Ascertainment of occupational history was the outcome measure (eg, dependent variable). All of the models contained the factor of record type. The best-fit model contained

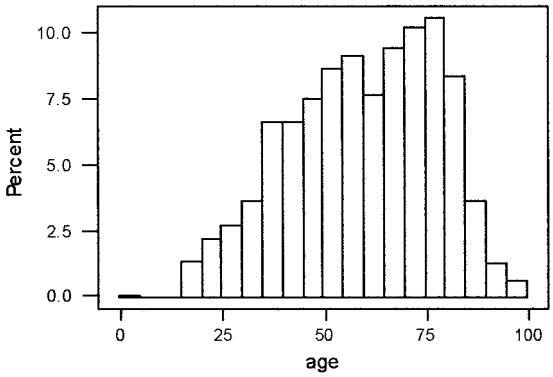

Fig. 1. Histogram of age distribution.

TABLE 1
Completeness of Information Gathered by Physician

Category	Percent of Records Containing Information	No. of Records Containing Information
Gender history	99.9	2047
Age history	99.1	2031
Smoking history	76.0	1560
Cancer history	42.9	879
Occupational history	27.8	569

All percentages are based on a total N = 2050 patient records, except for smoking which was based on 2047, because the investigator was unable to reliably classify 3 patients.

the terms of record type, gender, age group, and presence of smoking history (Table 3). After adjusting for the other covariates, record type was an independent predictor with medical records more likely (odds ratio, 1.53) to have an occupational history ascertained.

Discussion

Solid history-taking is a fundamental functional skill that has received less attention in many residency training programs in more recent years.[17] As discussed in the introduction, occupational history-gathering could, at many times, be vital to proper diagnosis as well as the compensation of the afflicted worker. This study sought to determine the frequency in which physicians gather occupational history and what patient factors could influence this behavior.

Gender and age were used as the primary control and their frequency of recording was very good (99.9% and 99.1%, respectively). Smoking history and cancer history ascertainment have substantially lower collection rates at 78.2% and 42.9% as seen in Table 1. Our study shows an overall frequency of occupational history-taking was attained in only 27% of the records and therefore missing in the majority of the admission records. The definition of what constitutes or defines an occupational history was systematically broad in this study. Thus, the value of 27% could be an overestimate because many affirmative statistics were credited for tenuous histories (eg, "patient is on disability," and so on). The investigators found notations such as "unemployed" or "university student" and considered this to be positive for ascertainment of occupational history.

The result from this study, showing a low ascertainment rate, is not that different from other studies addressing history-gathering of occupational data. One study of residents in an internal medicine program found a notation frequency of occupational data or employment in 24% of the charts,[18] and a study done in 1983, with family practice residents in Michigan, also produced similar findings, in that only 24% had any type of occupational or employee status history recorded at all. These rates did not appear to vary by the year in training.[19,20] Rates as low as 2% to 3% has been observed for total or complete occupational history-taking in which the details of exposures in the workplace were investigated as well.[19] Interestingly, however, the McCurdy[22] study showed an overall occupational history recording rate of 70% in third-year medical students in the state of California. However, those students rarely collected information (8%) about the patient's occupational concerns and/or exposure(s).

It appears that international physicians could do a somewhat better job. A report from Turkey[21] demonstrated that approximately 63% of physicians took some type of occupational history and 23% had taken the detailed or complete occupational history; they also noted that when a standardized printed occupational form (asking patients what their profession is) was used in a clinic, the rates jumped up to 82%

TABLE 2
Record Category vs. Presence of Occupational History

Category	Presence of Occupational History		Total	*P* Value
	Percent	No.		
All records	27.8%	569	2050	
Record type				
Surgical	23.1	231	1000	<0.001
Medical	32.2	338	1050	
Age (years)				
≤30	23.7	33	139	<0.001
31–50	36.4	187	514	
≥51	25.1	346	1378	
Gender				
Female	20.6	210	1020	<0.001
Male	34.9	358	1027	
Ascertainment of smoking history				
No	8.8	43	487	<0.001
Yes	33.6	525	1560	
Ascertainment of cancer history				
No	26.0	305	1171	<0.001
Yes	37.0	218	589	
Unknown	15.9	46	290	

* In a total of 14% of the records reviewed by the investigator, the cancer history was deemed not obtainable and thus unknown by the physician.

TABLE 3
Logistic Regression Assessing the Independent Predictors of a Patient Record Containing Occupational History

Term	Beta Coefficient	Odds Ratio	95% Confidence Interval	*P* Value
Constant	−3.00	—	—	<0.0001
Record type: medical	0.42	1.53	1.24–1.89	<0.0001
Gender: male	0.80	2.23	1.81–2.76	<0.0001
Age (years)				
31–50	0.47	1.60	1.01–2.52	<0.0001
≥51	−0.17	0.85	0.55–1.31	
Smoking: Yes	1.64	5.18	3.70–7.26	<0.0001

from 15%. Turkish doctors' attitudes concerning occupational history-taking was not correlated with their educational facility or the period of time within the working environment. The authors conclude that these doctors must get into the habit of occupational history-taking and that they often do not receive enough training in occupational health.

For some of the reviewed records in our study, the patient was admitted directly to the surgical unit by the trauma team, and the patient history was not able to be properly recorded because the individual was incapacitated at that time. Perhaps, occupational information was later recorded at a more appropriate time and this could be one reason why we saw such low rates for ascertainment of occupational history. Given that the surgical cases, apart from the obvious work injuries on the job, are usually not work-related, could be another explanation as to why surgical admission records tend to have lower ascertainment rates. Furthermore, the higher workload and longer working hours of surgical staff could also contribute to lower history collection rates. Our study is consistent with other(s) in finding that internal medicine rotation students perform a more adequate history than surgical students.[22]

Our study also shows that, generally speaking, younger and older patients were less likely to have their occupational history investigated by the doctor. This, again, has been found in other studies. One study looking at medical students in 1998 in California[22] found that patients who were younger than 40 years of age and female patients were less likely to have an occupational history gathered. Occupational conditions for which the work etiology is not obvious, like for many occupational diseases, could take decades to manifest and thus be less frequent among younger patients; therefore, physicians are not as likely to inquire about them. Stereotypically, women could be perceived to be less likely to be employed or, if employed, less likely to be employed in hazardous conditions, and thus, are less likely to be asked about their occupational history. As previously mentioned, the McCurdy study[22] found a lower frequency of occupational history-taking when the patient was either younger or female.

It appears that a history of cancer as well as smoking leads the physician to ask about occupation more often. Other studies have not examined these relationships in detail; however, it would intuitively follow that when a family history of cancer (or the like) is elicited, a more detailed series of questions would follow to more carefully delineate the cause of that cancer and rule out other etiology.

There are several limitations in this study worthy of discussion. Because our study only looks at those admitted to the hospital, it is possible that the occupational history could have been placed in the record at a later time, perhaps when deemed more important, and this would in turn have led to a higher frequency of occupational history-taking. However, there was no indication that this practice would be different between medical physicians and surgeons. It was noted that in some instances, patients were not capable of giving a history because of their incapacitation, ie, altered mental status, intubation, and so on. This was particularly common within the surgical records; however, this finding was not felt to be excessive. Also, in several cases, throughout the record, the following notations were observed: "see previous H&P by the resident for more detail" or "see prior social history for details." These notations were recorded as negative responses for data analysis.

In conclusion, occupational health investigations by physicians are not adequate and need to be improved. An occupational history is more likely to be recorded when the patient is middle-aged, male, has a history of cancer, and/or smokes cigarettes. Although other factors are associated with the likelihood of occupational history ascertainment, the logistic regression analysis shows that record type (eg, medical admission record) is an independent predictor. As seen in our study, medical doctors were 1.5 times more likely than surgical doctors to record occupation. These general observations have not markedly changed over the years, as evidenced by the 27% frequency in this study as well as similar numbers in other studies. This is not surprising because it appears that the teaching of occupational medicine in medical schools has not improved much[16] from the past. Better preparation of medical students to identify, record, and query occupationally related conditions has been recommended by many, including the Institute of Medicine.[23] Efforts to improve instruction about occupational medicine include integrating occupational health study into problem-based learning sessions in a medicine clerkship,[24] providing students the chance to get out into the work- or job site[25] and develop a more occupationally slanted curriculum to be integrated into required courses throughout medical school training.[26] However, reports still indicate an obviously significant need for more improvement of medical student skills in occupational and exposure history-taking.[22,27] It appears from several studies[28–30] that using tools such as teaching the generalized application of mnemonics, patient questionnaires, job-specific exposure forms, and focused intense training[31] could improve healthcare providers' occupational history-taking skills. It is clear that medical schools must implement into their teaching curriculum a much stronger component and motivation for occupational history-taking.

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